ECC

BLOCK 527 LOT 8 QUALIFICATION CODE _____ ADDRESS (SITE) _____ PERMIT NO. 16-1861

# CONSTRUCTION PERMIT APPLICATION

C-16-002403

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

**I. IDENTIFICATION**

1. Proposed Work Site at: 449 Jackson Ave, Brick, NJ 08723
2. Name: Kevin Connolly
   Tel: [redacted] e-mail _____
   Address Same as above (street / municipality / zip code)
3. Ownership in Fee: Public _____ Private X
4. Principal Contractor: Vivint Solar Developer, LLC Tel. (732) 831-7712
   Address 687 Prospect St Unit 470-480 e-mail jennifer.comiskey@vivintsolar.com
   Lakewood, NJ 08701
   License No. OR, if new home, Builder Reg. No. 13VH06589300 Exp. Date 03-13-17
   Home Improvement Contractor Registration No. or Exemption Reason (if applicable): _____
   Federal Emp. ID No. 80-0756438 FAX: (856) 439-6810
5. Architect or Engineer Scott E. Wyssling P.E. Contact Scott Wyssling
   Address 321 West Main Street, Boonton, N.J. 07005 e-mail swyssling@wysslingconsulting.com
   Tel. (973) 335-3500 FAX: (973) 335-3535
6. Responsible Person in Charge once Work has Begun Jennifer Comiskey
   Tel. (732) 503-9178 FAX: (732) 597-7497

**V. FEE SUMMARY (for office use only)**

| | | Update | Update |
|---|---|---|---|
| 1. Building | $ 150 / 340 | | |
| 2. Electrical | | | |
| 3. Plumbing | | | |
| 4. Fire Protection | | | |
| 5. Elevator Devices | | | |
| 6. Subtotal | | | |
| 7. Less 20% for State Plan Review | $ | | |
| 8. Subtotal | $ | | |
| 9. State Permit Surcharge Fee | 23 - | | |
| 10. Subtotal | $ | | |
| 11. Cert. of Occupancy | | | |
| 12. Other | | | |
| 13. TOTAL | $ | | |

**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 5,546 sq. ft.
10. Flood Hazard Zone _____
11. Base Flood Elevation _____
12. Wetlands yes ____ no ____

**IIa. PROPOSED WORK**

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

RECEIVED BUILDING MAY 19 2016

**IIb. SUBCODES** (Check all that apply)

**FOR OFFICE USE ONLY** (Optional)

| | Est. Cost | Plans Rec'd by | Date Rec'd | Rejection Date | Approval Date | Re-viewer | Resubmission Dates Approval | Resubmission Dates Rejection | Re-viewer |
|---|---|---|---|---|---|---|---|---|---|
| ☒ Building | $ 2,402 | LH | | | 6/4/16 | PW | | | |
| ☒ Electrical | $ 9,609 | | | | 6/1/16 | PS | | | |
| ☐ Plumbing | | | | | | | | | |
| ☐ Fire Protection | | | | | | | | | |
| ☐ Elevator | | Eng Exempt | | | 5/20/16 | ECC | | | |
| TOTAL COST | | | | | | | | | |

**VII. DESCRIPTION OF BUILDING USE**

A. RESIDENTIAL *(primary use)*
1. State Specific Use: Single Family Home
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 08/30/2016
Control Number C-16-002403
Permit Number 16-1861
Permit Issue Date 06/07/2016
Certificate Number 16-1861

# Certificate

Construction Code Division

(Certificate of Approval)

## Identification

Work Site Location: 449 JACKSON AVE. Brick Township, NJ Block: 527 Lot: 8 Qual:

Owner in Fee: CONNOLLY, KEVIN F & LISA K

Owner Address: 449 JACKSON AVE BRICK NJ 08723

Telephone: [redacted]

Contractor VIVINT SOLAR DEVELOPER, LLC

Address 687 PROSPECT ST UNIT 480 LAKEWOOD NJ 08701

Telephone: (848) 221-2777 Fax: (732) 597-7497

License Number or Builders Registration Number: 34EI01108500
34EB01809700
13VH06589300

Federal Emp. Number: 800756438

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 ...INSTALL 5.46 kw ROOF MOUNT PHOTOVOLTAIC SOLAR SYSTEM

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:**

David F. Newman Jr.
Construction Official

Fee: $0.00
Check Number:
Collected By:

*Date Printed: 08/30/2016*

U.C.C. F260 (rev. 08/05)

**CERTIFICATION IN LIEU OF OATH**

I. OWNER SECTION (to be completed if the applicant is the owner in fee)

I hereby certify that I am the owner in fee of the property listed on Page 1.

Mark the following applicable boxes:

A. ( ) I further certify that a new home (private residence) will be constructed on this property for my own use and occupancy. This dwelling is to be occupied by myself and is not to be used for any purpose other than single family residential use. I attest that all construction, plumbing, or electrical work will be done, in whole or in part, by me or by subcontractors under my supervision, in accordance with all applicable laws; and, I further acknowledge that said new home is not covered under the New Home Warranty and Builders Registration Act (N.J.S.A. 46:3B-1 et seq.) and that such fact shall be disclosed to any person purchasing this property within ten years of the date of issuance of a certificate of occupancy.

I UNDERSTAND THAT IN MARKING BOX A, I ACKNOWLEDGE THAT I AM ASSUMING RESPONSIBILITY FOR THE WORK DONE ON SAID PROPERTY, THE CONDITION OF THE PROPERTY PRIOR TO, DURING, AND AFTER ANY WORK PERFORMED, AND FOR THE PERFORMANCE OF THE SUBCONTRACTORS I HIRE, EMPLOY, OR OTHERWISE CONTRACT OR WITH WHOM I MAKE AGREEMENTS TO PERFORM WORK. I AM VOLUNTARILY AND KNOWINGLY ASSUMING THIS RESPONSIBILITY.

B. ( ) I further certify the following as required by the New Jersey Uniform Construction Code, N.J.A.C. 5:23-2.15(f)1.ix:

I personally prepared the plans submitted for: 1) the new home referred to in A.; or, 2) an addition, alteration, renovation, or repair to an existing single family residence owned and occupied by myself and located on the property listed on Page 1; or, 3) a new structure that will be physically separate from, but that will be deemed part of, an existing single family residence that is owned and occupied by myself and located on the property listed on Page 1.

C. ( ) I further certify that I will perform or supervise the following work:
C.1. ( ) Building C.2. ( ) Fire Protection

I further certify that I will perform the following work:
C.3. ( ) Electrical C.4. ( ) Plumbing

D. ( ) I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I understand that if any of the above statements are willfully false, I am subject to punishment.

Signature _____ Date _____

II. AGENT SECTION (to be completed if the applicant is not the owner in fee)

I hereby certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(d): the proposed work is authorized by the owner in fee; and I have been authorized by the owner in fee to make this application as his agent.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I understand that if any of the above statements are willfully false, I am subject to punishment.

(x) Check if contractor.

Agent Name Vivint Solar

Address 687 Prospect St Unit 470-480

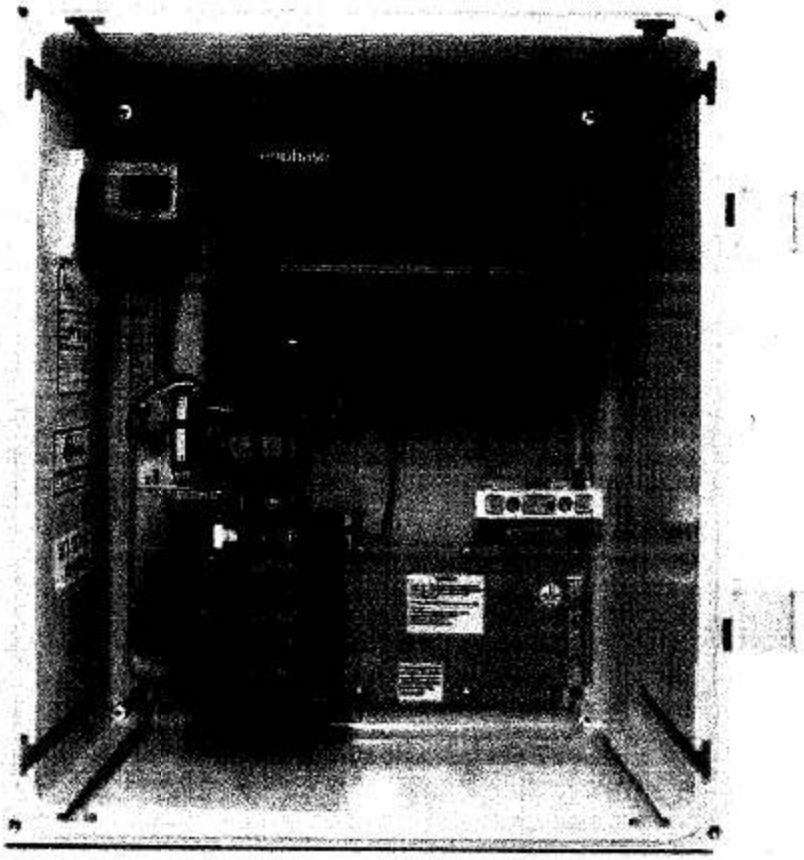
Lakewood, NJ 08701

Telephone (732) 831-7712

Signature _____

III. ( ) LEAD HAZARD ABATEMENT: Include Homeowner or Building Owner Affidavit as per N.J.A.C. 5:17.

# Enphase **AC Combiner Box**



The Enphase® **AC Combiner Box** with Envoy-S consolidates interconnection equipment into a single enclosure and streamlines PV installations by providing a consistent, pre-wired solution for residential applications.

### SMART

- Includes Envoy-S for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular

### SIMPLE

- Three pre-installed 20 A / 240 VAC circuit breakers
- Pre-configured revenue-grade metering available

### RELIABLE

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty

[e] enphase® ENERGY

UL® LISTED

# NEC 2014 — Enphase System Code Compliance

## Overview

This technical brief discusses new NEC 2014 requirements that apply to Enphase Microinverter Systems. It is useful for installers, electricians, and electrical inspectors or authorities having jurisdiction (AHJs) in understanding how code-compliance is handled where NEC 2014 is adopted. Main topics discussed in this document are:

- NEC 2014 Section 690.12 Rapid Shutdown of PV Systems on Buildings
- NEC 2014 Section 705.12 Point of Connection
- NEC 2014 Section 690.11 DC Arc-Fault Circuit Protection

## NEC 2014 Section 690.12 Rapid Shutdown of PV Systems on Buildings

Enphase Microinverter Systems fully meet the rapid shutdown requirement without the need to install additional electrical equipment. Properly labeling the PV system power source and rapid shutdown ability is required per NEC Section 690.56 (B) and (C).

Solar electric PV systems with Enphase Microinverters have one utility-interactive inverter directly underneath each solar module, converting low voltage DC to utility grid-compliant AC. When the utility grid is available and the sun is shining, each microinverter verifies that the utility grid is operating within the IEEE 1547 requirements. Only then does it export AC power into the electric service for use by loads onsite or export power to the utility grid for others to use. When the utility grid has a failure, or the PV system AC circuits are disconnected from the utility service via an AC breaker, AC disconnect, or removal of the solar or main utility service meter, the microinverters stop producing AC power in fewer than six AC cycles. Enphase Microinverters are not capable of operating as an AC voltage source. This means that without an AC utility source, Enphase Microinverters are not able to energize connected wiring and no AC voltage or current can be injected into the inverter output circuits or the grid.

When the AC utility source is removed from the inverter output circuits via any means, such as an AC breaker, AC disconnect or removal of the solar or main utility service meter, this equipment performs the rapid shutdown function per 690.12. With an Enphase Microinverter System this shutdown occurs well within the 690.12 required 10 seconds, and there are no other conductors energized more than 1.5 m (5 ft) in length inside a building or more than 3 m (10 ft) from a PV array.

***Code Reference***

> **690.12 Rapid Shutdown of PV Systems on Buildings.** PV system circuits installed on or in buildings shall include a rapid shutdown function that controls specific conductors in accordance with 690.12(1) through (5) as follows.
>
> (1) Requirements for controlled conductors shall apply only to PV system conductors of more than 1.5 m (5 ft) in length inside a building, or more than 3 m (10 ft) from a PV array.
> (2) Controlled conductors shall be limited to not more than 30 volts and 240 volt-amperes within 10 seconds of rapid shutdown initiation.
> (3) Voltage and power shall be measured between any two conductors and between any conductor and ground.
> (4) The rapid shutdown initiation methods shall be labeled in accordance with 690.56(B).
> (5) Equipment that performs the rapid shutdown shall be listed and identified.

[redacted]

**Enphase** AC Combiner Box // DATA

| | |
|---|---|
| **MODEL NUMBER** | |
| AC Combiner Box, Metered<br>XAM1-120 | AC combiner with Enphase® Envoy-S Metered for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%, **pending**) and optional consumption monitoring (+/- 2.5%). |
| **ACCESSORIES** (Order Separately) | |
| Enphase® Mobile Connect<br>CELLMODEM-01 | Plug and play industrial grade cellular modem with five-year data plan for systems up to 12 kW. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) |
| Consumption Monitoring CT<br>CT-200-SPLIT | Split core current transformers enable whole home consumption metering (+/- 2.5%). |
| **ELECTRICAL SPECIFICATIONS** | |
| Maximum system size | 11.5 kW at 240 VAC |
| Rating | Continuous duty |
| Maximum system voltage | 240 VAC |
| Rated output current | 48 A |
| Rated input current, each input | 16 A |
| Maximum fuse/circuit breaker rating (output) | 60 A |
| Solar branch circuit breakers | Three 2-pole 20A/240 VAC DIN rail-mounted breakers |
| Production Metering CT | 200A solid core pre-installed on solar busbar and wired to Envoy-S |
| **MECHANICAL DATA** | |
| Dimensions (WxHxD) | 38.0 x 38.7 x 20.3 cm (15.0" x 15.3" x 8.0") |
| Weight | 5.1 kg (11.2 lbs) |
| Ambient temperature range | -40° C to +46° C (-40° to 115° F) |
| Cooling | Vented, natural convection |
| Enclosure environmental rating | Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction |
| Wire size | 10 AWG for branch inputs<br>4 AWG for combined output (3 circuits)<br>6 AWG for combined output (2 circuits) |
| Altitude | To 2000 meters (6,560 feet) |
| **INTERNET CONNECTION OPTIONS** | |
| Integrated Wi-Fi | 802.11b/g/n |
| Ethernet | 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included) |
| Cellular | Optional, CELLMODEM-01 (not included) |
| **COMPLIANCE** | |
| Compliance, Combiner Box | UL 1741 |
| Compliance, Envoy-S | UL 916<br>CAN/CSA C22.2 No. 61010-1<br>47 CFR, Part 15, Class B, ICES 003<br>IEC/EN 61010-1:2010,<br>EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2<br>Metering: ANSI C12.20 accuracy class 0.5 (Pending) |

To learn more about Enphase Microinverter technology,
visit enphase.com

[e] enphase ENERGY

# NEC 2014 Section 705.12 Point of Connection (AC Arc-Fault Protection)

In this section we explain how to comply with NEC 2014 Section 705.12 Point of Connection when installing Enphase Energy Systems with:

- Supply Side Connection
- Load-Side Connection to Single-Phase 120/240 Volt Services
- Three-Phase 208/120 Volt Services

## Supply Side Connection

Solution: No AC AFCI (Arc-Fault Circuit Interrupter) protection is required.

***Code Reference***

> **705.12 Point of Connection** The output of an interconnected electric power source shall be connected as specified in 705.12(A), (B), (C) **or** (D).

Since the operator "OR" is used to define connection types, the code seems to intend that if one criteria is met, for example (A), the other criteria are not applicable.

***Code Reference***

> **705.12(A) Supply Side.** An electric power production source shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6). The sum of the ratings of all overcurrent devices connected to power production sources shall not exceed the rating of the service.
>
> **705.12(B) Integrated Electrical Systems.** ...
>
> **705.12(C) Greater Than 100 kW.** ...
>
> **705.12(D) Utility-Interactive Inverters.** ...

230.82(6) lists solar photovoltaic systems as eligible for equipment permitted to be connected to the supply side of the service disconnecting means. Since Enphase Energy Systems are solar photovoltaic systems, a supply side connection of an Enphase System may be accepted by AHJs to fully meet Code section 705.12. Since 705.12(A) requirements are met, it seems logical that the 705.12(D) requirements for connections to the load-side of the service disconnect means are not applicable.

## Load-Side Connection to Single-Phase 120/240 Volt Services

Solution: Refer to section 90.4 and the previous code edition, NEC 2011. No **listed** backfeed capable AC AFCI solutions or acceptable equipment to enclose the cable harness exist. Until such products are generally available from manufacturers, when making load side connections, complying with **NEC 2014** Section 705.12 (D) (6) is achieved by discretionary guidance per NEC 2014 Section 90.4. This means to refer to the previous code edition **NEC 2011** Section 705.12, where AC Arc-Fault Circuit Protection is not a requirement for utility-interactive inverters.

**NEC 2014 Code Reference**

> **705.12(D) Utility Interactive Inverters.** The output of a utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises. Where distribution equipment, including switchgear, switchboards, or panelboards, is fed simultaneously by a primary source(s) of electricity and one or more utility-interactive inverters, and where this distribution equipment is

capable of supplying multiple branch circuits or feeders, or both, the interconnecting provisions for the utility-interactive inverter(s) shall comply with 705.12(D)(1) through (D)(6).

**705.12 (D) (4) Suitable for Backfeed.** Circuit breakers, if backfed, shall be suitable for such operation.

**705.12(D)(6) Wire Harness and Exposed Cable Arc-Fault Protection.** A utility-interactive inverter(s) that has a wire harness or cable output circuit rated 240 V, 30 amperes, or less, that is not installed within an enclosed raceway, shall be provided with listed ac AFCI protection.

This NEC 2014 code section allows connection of an electric power source to the load side of service disconnect means and requires that the "interconnecting provisions for the utility-interactive inverter(s) shall comply with 705.12(D)(1) through (D)(6)". Since the Enphase system contains one or more microinverters, which are the utility-interactive inverter(s), this section applies when connecting a system to the load side of a service disconnecting means. 705.12(D)(6) specifically requires that exposed AC cable systems, such as the Enphase Engage Cable, which is not feasibly run in enclosed raceway, to be protected by **listed** AC Arc-Fault Circuit Interrupter (AC AFCI) functionality. Given that utility-interactive inverters cannot operate without a utility service source, the location of the AC AFCI protecting the cable must logically be applied at the utility source side of the circuit. AC AFCI circuit breakers are the commonly available devices for single-phase branch circuits.

**No suitable for backfeed AC AFCI circuit breakers exist.**

Since Enphase Microinverters are utility-interactive inverters that backfeed into the electrical service through the overcurrent protection device, any AC AFCI circuit breakers must be specifically backfeed capable, per 705.12(D)(4).

If terminals of circuit breaker AFCIs are marked "Line" and "Load," then the AFCI product is not backfeed capable.

**No UL standard for backfeed testing exists for AC AFCI circuit breakers.**

Furthermore, 705.12(D)(6) requires that ac AFCI protection must be **"listed."** For a product or product category to become "listed," a standard safety test procedure, such as a UL standard, must exist. The testing standard for AFCI circuit breakers is UL1699, which currently does not have provisions for testing this product category for backfeed applications. It is clear, that the code requirement is ahead of new product availability.

**Summary**

Until suitable for backfeed and listed AC AFCI circuit breakers become generally available, an AHJ is permitted to refer to 90.4, i.e., the previous code edition, NEC 2011.

***Code Reference***

**90.4 Enforcement.**

This Code may require new products, constructions, or materials that may not yet be available at the time the Code is adopted. In such event, the authority having jurisdiction may permit the use of the products, constructions, or materials that comply with the most recent previous edition of this Code adopted by the jurisdiction.

# BUILDING SUBCODE
## TECHNICAL SECTION

Date Received / Control # 6/7/16

Date Issued / Permit # 16-1861

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

Block 527 Lot 8 Qualification Code

Work Site Location 449 Jackson Ave
Brick, NJ, 08723

Owner in Fee: Kevin Connolly

Tel. [redacted] e-mail

Address Same as above
street municipality zip code

Contractor: Vivint Solar Developer, LLC Tel. 732-831-7712

Address 687 Prospect St Unit 470-480 e-mail jennifer.comiskey@vivintsolar.com
Lakewood, NJ 08701

Contractor License No. or Builder Registration No. 13VH06589300 Exp. Date 03-31-17

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

Federal Emp. ID No. 80-0756438 FAX:

**JOB SUMMARY (Office Use Only)**

PLAN REVIEW

| | Date | Initial |
|---|---|---|
| [ ] No Plans Required | | |
| [ ] All 6/14/16 | | |
| [ ] Footings/Foundations | | |
| [ ] Structural/Framework | | |
| [ ] Exterior | | |
| [ ] Interior | | |

Joint Plan Review Required:
[ ] Elec. [ ] Plumb. [ ] Fire [ ] Elevator

SUBCODE APPROVAL for PERMIT
Date: 06/05/16
Approved by: KEN

SUBCODE APPROVAL for CERTIFICATE
[ ] CO [ ] CCO [X] CA
Date: 08/29/16
Approved by: KEN

INSPECTIONS

| Type: | Failure | Failure | Approval | Initial |
|---|---|---|---|---|
| | Dates (Month/Day) | | | |
| Footing | | | | |
| Footing Bonding | | | | |
| Foundation | | | | |
| Slab | | | | |
| Frame | | | | |
| Truss Sys./Bracing | | | | |
| Barrier-Free | | | | |
| Insulation | | | | |
| Finishes -Base Layer | | | | |
| Finishes -Final | | | | |
| Energy | | | | |
| Mechanical | | | | |
| TCO | | | | |
| Other | | | | |
| Final | | | 8-24-16 | DB |
| Barrier-Free | | | | |

**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) $ 2,402

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

**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: [signature]

Print name here: Bruce Scott

**D. TECHNICAL SITE DATA**

DESCRIPTION OF WORK

-Support for a photovoltaic (PV) system (solar system)

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
- [X] Other PV Support
- [ ] Demolition

FEE (Office Use Only)

$ _____

Administrative Surcharge $ _____
Minimum Fee $ _____
State Permit Surcharge Fee $ _____
TOTAL FEE $ _____

NJ-4 JERSEY SHORE

Applicant: When submitting this form to your Local Construction Code Enforcement Office, please provide one original plus three photocopies.

## Three-Phase 208/120 Volt Services

Solution: The compliance solution for systems interconnected to three-phase systems is to defer to NEC 90.4. There are no three-phase AC AFCI detection devices in existence. Until backfeed capable three-phase AC AFCI circuit breakers become generally available, an AHJ is permitted to refer to 90.4, i.e., the previous code edition, NEC 2011. Additionally, the NEC 210.12 code intention for any AC AFCI protection is for single-phase applications in dwellings or dormitory units and not meant for three-phase applications, example:

***Code Reference***

> **210.12 Arc-Fault Circuit-Interrupter Protection. ...**
>
> **210.12(A) Dwelling Units.** All 120-volt, single-phase, 15- and 20-ampere branch circuits.....
>
> **210.12(B) Branch Circuit Extensions or Modifications — Dwelling Units. ...**
>
> **210.12(C) Dormitory Units.** All 120-volt, single-phase, 15- and 20-ampere branch circuits

Although Chapter 7 applies to "Special Conditions," the industry must be able to supply generally available equipment that is safe to use and meets the requirements for these special applications. For 705.12(D) (6) this is not the case for three-phase applications as there are no listed three-phase AC AFCI detection devices available.

# NEC 2014 Section 690.11 DC Arc-Fault Circuit Protection

This requirement is for direct current (DC) Arc-Fault Circuit protection and only applies to systems with DC voltages above 80 VDC. Enphase Microinverter systems are exempted from this requirement as they always operate well below 80 VDC. The requirement is basically unchanged from the NEC 2011, and it is unnecessary to add DC AFCI to an Enphase Microinverter System installation.

***Code Reference***

> **690.11 Arc-Fault Circuit Protection (Direct Current).** Photovoltaic systems with dc source circuits, dc output circuits, or both, operating at a PV system maximum system voltage of 80 volts or greater, shall be protected by a listed (dc) arc-fault circuit interrupter, PV type, or other system components listed to provide equivalent protection.

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

ROBERT LOUGY
*Acting Attorney General*

STEVE C. LEE
*Acting Director*

***Mailing Address:***
P.O. Box 45006
Newark, NJ 07101
(973) 504-6410

May 25, 2016

**TO WHOM IT MAY CONCERN**

Our records indicate that the holder of License and Business Permit No. **34EB01809700** has applied to the Board 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:

**MATTHEW K HOFHERR**
**Vivint Solar Developer LLC**
**3301 N Thanksgiving Way Suite 500**
**Lehi UT 84043**

This letter will be rendered invalid **180 days** after the date of its issuance.

Sincerely,

Philameana L. Tucker
Executive Director

PLT:gkb

BLOCK: 527
LOT: 8
PERMIT: 16-1861
449 JACKSON AVE
BRICK, NJ 08723

THIS [illegible] IS PRINTED ON WATERMARKED PAPER, WITH A MULTI-COLORED [illegible] TO VERIFY AUTHENTICITY

# 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**

Vivint Solar Developer LLC
MATTHEW K HOFHERR
25 E 7th Street
Clifton NJ 07011

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

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
Vivint Solar Developer LLC
Electrical Business Permit

05/23/2016 TO 03/31/2018
VALID

SIGNATURE

ACTING DIRECTOR

34EB01809700
License/Registration/Certification #

**PLEASE DETACH HERE**

**IF YOUR LICENSE/REGISTRATION/ CERTIFICATE ID CARD IS LOST PLEASE NOTIFY:**
Board of Exam. of Electrical Contr.
P.O. Box 45006
Newark, NJ 07101

05/23/2016 TO 03/31/2018
VALID

34EB01809700
LICENSE/REGISTRATION/CERTIFICATION #

Signature of Licensee/Registrant/Certificate Holder

ACTING DIRECTOR

**PLEASE DETACH HERE**

**Vivint Solar Developer LLC** EXPIRATION DATE **2018**

YOUR LICENSE/REGISTRATION/CERTIFICATE NUMBER IS **34EB 01809700** . PLEASE USE IT IN ALL CORRESPONDENCE TO THE DIVISION OF CONSUMER AFFAIRS USE THIS SECTION TO REPORT ADDRESS CHANGES YOU ARE REQUIRED TO REPORT ANY ADDRESS CHANGES IMMEDIATELY TO THE ADDRESS NOTED BELOW

**Board of Exam. of Electrical Contractors**
**P.O. Box 45006**
**Newark, NJ 07101**

PRINT YOUR NEW **ADDRESS OF RECORD** BELOW
YOUR ADDRESS OF RECORD IS THE ADDRESS THAT WILL PRINT ON YOUR LICENSE/REGISTRATION/CERTIFICATE AND IT MAY BE MADE AVAILABLE TO THE PUBLIC

HOME

BUSINESS

TELEPHONE
INCLUDE AREA CODE

PRINT YOUR NEW **MAILING ADDRESS** BELOW
YOUR MAILING ADDRESS IS THE ADDRESS THAT WILL BE USED BY THE DIVISION OF CONSUMER AFFAIRS TO SEND YOU ALL CORRESPONDENCE

HOME

BUSINESS

TELEPHONE
INCLUDE AREA CODE

# ELECTRICAL SUBCODE
## TECHNICAL SECTION

Date Received 6/7/16
Control #
Date Issued
Permit # 16-1861

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

Block 527 Lot 8 Qualification Code

Work Site Location 449 Jackson Ave Brick, NJ, 08723

Owner in Fee: Kevin Connolly

Tel. [redacted] e-mail

Address Same As Above
street municipality zip code

Contractor: Vivint Solar Developer LLC Tel. (732) 831-7712

Address 687 Prospect St Unit 470-480 e-mail jennifer.comiskey@vivintsolar.com
Lakewood, NJ 08701

Contractor License No. 34EB01108500 Exp. Date 3-31-18

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

Federal Emp. ID No. 80-0756438 FAX: (732) 597-7497

**B. ELECTRICAL CHARACTERISTICS**

Use Group Present Proposed

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

Building Occupied as Single Family Utility Co. JCP&L

Est. Cost of Elec. Work $ 9,609

**JOB SUMMARY (Office Use Only)**

PLAN REVIEW

[ ] No Plans Required

[ ] Partial -Underslab Utilities Approved
Date: Approved by:

[✓] Electric Plans Approved
Date: 6/1/16 Approved by: PJC

Joint Plan Review Required:
[ ] Bldg. [ ] Plumb. [ ] Fire. [ ] Elev.

SUBCODE APPROVAL for PERMIT
Date: 6/9/16
Approved by:

SUBCODE APPROVAL for CERTIFICATE
[ ] CO [ ] CCO [ ] CA
Date: 8/30/16
Approved by:

| INSPECTIONS Type: | Dates (Month/Day) Failure | Failure | Approval | Initial |
|---|---|---|---|---|
| Rough | | | | |
| Barrier-Free | | | | |
| Trench | | | | |
| Temp. Serv. | | | | |
| Constr. Serv. | | | | |
| TCO | | | | |
| Other | | | | |
| Service | | | | |
| Final | | | 8-29-16 | |
| Barrier-Free | | | | |

Temp. Cut-in-Card Date Issued
Final Cut-in-Card Date Issued
Annual Pool Inspection
Date of Grounding and Bonding Certification

**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: Bruce Scott

[ ] Licensed Elec. Contractor [ ] Certif'd Landscape Irrigation Cont'r. [ ] Exempt Applicant

**D. TECHNICAL SITE DATA**

DESCRIPTION OF WORK: Installation of a 5.46 KW PV System (per CAD drawing)

| QTY. | SIZE | ITEMS |
|---|---|---|
| | | Lighting Fixtures |
| | | Receptacles |
| | | Switches |
| | | Detectors |
| | | Light Poles |
| | | Motors—Fract. HP |
| | | Emergency & Exit Lights |
| | | Communications Points |
| | | Alarm Devices/F.A.C. Panel |
| | | Optimizers |
| | | TOTAL NUMBERS |
| | | Pool Permit/with UW Lights |
| | | Storable Pool/Spa/Hot Tub |
| | | KW Elec. Range/Receptacle |
| | | KW Oven/Surface Unit |
| | | KW Elec. Water Heater |
| | | KW Elec. Dryer/Receptacle |
| | | KW Dishwasher |
| | | HP Garbage Disposal |
| | | KW Central A/C Unit |
| | | HP/KW Space Heater/Air Handler |
| 17 | | KW Baseboard Heat |
| | MICRO | Invertor D/C |
| 1 | | A/C Disconnect |
| | | AMP Service |
| 1 | 60 | AMP Subpanels |
| | | AMP Motor Control Center |
| | | KW Elec. Sign/Outline Light |
| 1 | 5.46 | kW Array |

FEE (Office Use Only)

$

Administrative Surcharge $
Minimum Fee $
State Permit Surcharge Fee $
TOTAL FEE $

U.C.C. F120 (rev. 11/09)
Internet version

Applicant: When submitting this form to your Local Construction Code Enforcement Office, please provide one original plus three photocopies.

JERSEY SHORE

# CONSTRUCTION PERMIT

Date Issued 6/7/16
Control # C-16-002403
Permit # 16-1861

IDENTIFICATION Block: 527 Lot: 8 Qualifier
Work Site Location: 449 JACKSON AVE - Brick Township, NJ
Owner in Fee: CONNOLLY, KEVIN F & LISA K
449 JACKSON AVE BRICK NJ 08723
Telephone: (732) 492-8343

Contractor: VIVINT SOLAR DEVELOPER, LLC
Address: 687 PROSPECT ST UNIT 480 LAKEWOOD NJ 08701
Telephone: (848) 221-2777
Lic. No. or Bldrs. Reg. No. 34EI01108500 13VH06589300
Federal Employee. No. 800755438

**Is hereby granted permission to perform the following work:**

- [x] BUILDING
- [ ] PLUMBING
- [ ] LEAD HAZARD ABATEMENT
- [x] ELECTRICAL
- [ ] FIRE PROTECTION
- [ ] DEMOLITION
- [ ] ELEVATOR DEVICES
- [ ] ASBESTOS ABATEMENT (Subchapter 8 only)
- [ ] OTHER

DESCRIPTION OF WORK:
SOLAR PANELS ... INSTALL 5.46 kw ROOF MOUNT PHOTOVOLTAIC SOLAR SYSTEM

**Note: If constuction 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** $12,011

D. Newman Jr/mp 6/6/16
Construction Official Date

| PAYMENTS (Office Use Only) | |
|---|---|
| Building | $150 |
| Electrical | $615 |
| Plumbing | $0 |
| Fire Protection | $0 |
| Elevator Devices | $0 |
| Other | $0.00 |
| DCA Training Fee | $23 |
| CO Fee | |
| Other | $0 |
| Total | $788 |
| Check No. | 3666 |
| Cash | $0 |
| Credit | $0 |
| Collected By | Matt Fagan |

150
838

U.C.C. F170
equiv (rev 1/04)
1 WHITE - INSPECTOR 2 CANARY - OFFICE 3 PINK - TAX ASSESSOR 4 GOLD - APPLICANT

## 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.

- [x] 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:

- [x] 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".

- [x] A complete copy of released plans must be kept on the job site.

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

$50.00
$615.00
$23.00
$50.00
$838.00

RECEIVING CLERK LH
DATE REC'D 5/19/16

# ZONING PERMIT APPLICATION

PERMIT # 6/7/16
DATE ISSUED ZP-16-0082

BLOCK: 527 LOT: 8 QUALIFIER: _____ SITE ADDRESS: 449 Jackson Ave

IDENTIFICATION:

1. NAME OF OWNER IN FEE: Kevin Connolly
   COMPLETE ADDRESS: 449 Jackson Ave
   ~~Brick, NJ, 08723~~
   PHONE [redacted] EMAIL: _____

2. NAME OF APPLICANT: Vivint Solar Develper, LLC
   APPLICANT ADDRESS: 687 Prospect St, Unit 480
   Lakewood, NJ,08701
   PHONE # 732-503-9178 EMAIL: jennifer.comiskey@vivintsolar.com

3. RESPONSIBLE PERSON FOR WORK: Jennifer Comiskey
   PHONE# _____ FAX# 732-279-6193

4. SIGNATURE OF APPLICANT: J Comiskey

FOR OFFICE USE ONLY

FEE SUMMARY:

APPLICATION FEE: $ 50-
OTHER: $ _____
TOTAL: $ 50-

REQUIRED BY APPLICANT

RESIDENTIAL: YES
COMMERCIAL: N/A
EXISTING USE: SFD
PROPOSED USE: SFD

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 _____

DESCRIPTION: Installation of rooftop solar PV system

ZONING REVIEW:
DATE REVIEWED: 5/25/16 DATE DENIED: _____ DATE APPROVED: 5/25/16 INTLS _____

(SEE BACK PAGE)

# OFFICE USE ONLY

RECEIVED
MAY 26 2016
ZONING

ZONING REVIEW:

DATE REVIEWED: 5/26/16 DATE DENIED: — DATE APPROVED: 5/26/16 INTLS:

| DATE: | COMMENTS: | INITIALS: |
|---|---|---|
| 5/26/16 | SENT TO ECC | |
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Brick Township
401 Chambers Bridge Rd.

Brick, NJ 08723
(732) 262-1336

Date Issued: 6/7/16
Application Number: ZA-16-00849
Application Date: 05/24/2016
Project Number:
Permit Number: ZP-16-00826
Fee: $50.00

# Zoning Permit

Worksite **449 JACKSON AVE.**
Location: **Brick Township, NJ 08723**

Block: **527**
Lot: **8**
Qualifier:
Zone: **R-7.5**

Owner: **CONNOLLY, KEVIN F & LISA K**
Address: **449 JACKSON AVE**
**BRICK, NJ 08723**

Applicant: **Vivint Solar Developer, LLC**
Address: **687 Prospect St, UNIT 480**
**Lakewood, NJ 08701**

Application Approved Date: 05/25/2016

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 - 21- 260W Trina Solar, 5.460kW ENPHASE micro-inverters, mounted on the roof of the house.**

**Additional Zoning Permit is required for additional work.**

Upon review it was determined that the Zoning Permit:

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

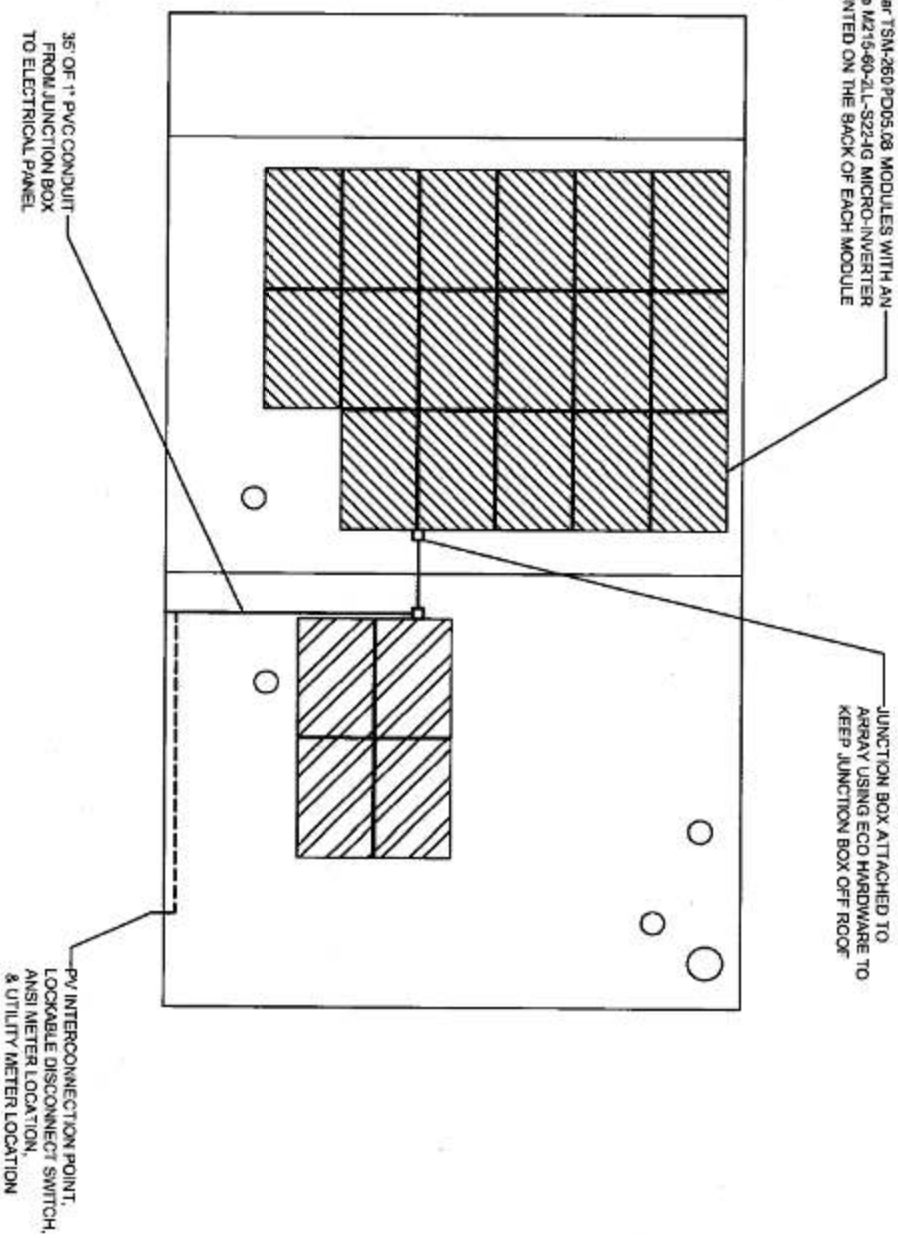
Christopher J. Romano, Assistant Zoning Officer — 05/25/2016 Date

**Sean Kinnevy, Zoning Officer** — 5/26/16 **Date**

# 449 Jackson Ave, Brick NJ 08723

PV SYSTEM SIZE:
5.460 kW DC

Zoning Review
Approval
By: [illegible]
Date: 5-25-16 Solar on 2nd

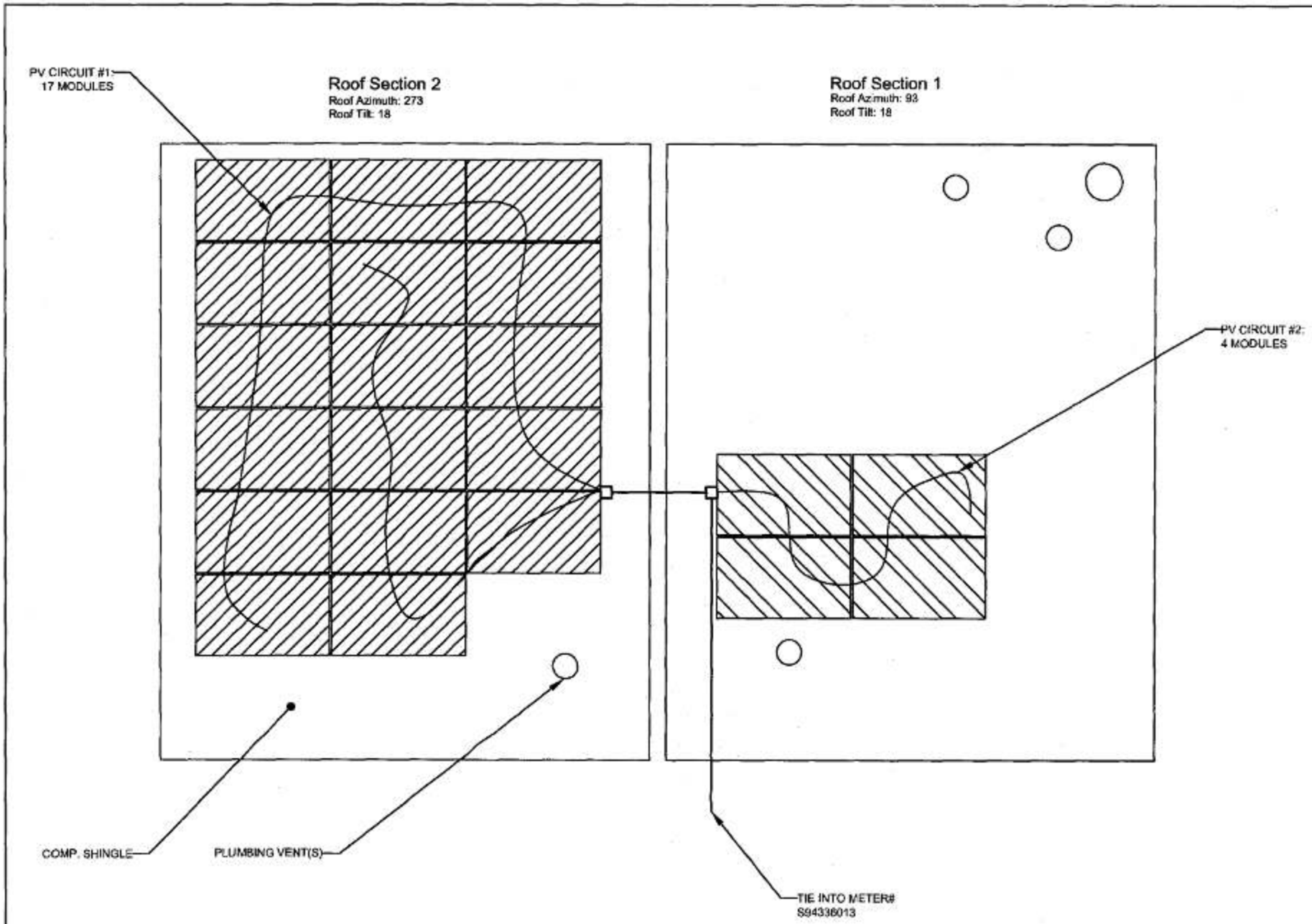



N

## PV SYSTEM SITE PLAN

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

| | | | | |
|---|---|---|---|---|
| SHEET NUMBER: PV 1.0 | SHEET NAME: SITE PLAN | INSTALLER: VIVINT SOLAR<br>INSTALLER NUMBER: 1.877.404.4129<br>NJ LICENSE: 13VH06569300<br>DRAWN BY: TW \| S- 4882961 | vivint. solar<br>Last Modified: 4/12/2016 | Connolly Residence<br>449 Jackson Ave<br>Brick, NJ 08723<br>UTILITY ACCOUNT NUMBER: 100 055 755 779 |




PV SYSTEM ROOF PLAN

SCALE: 3/16" = 1'-0"

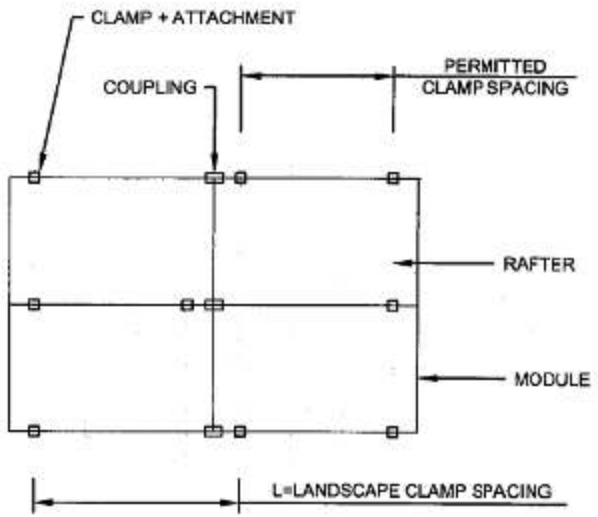
Connolly Residence
448 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

vivint. solar

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW
S- 4882981
Last Modified: 4/12/2016

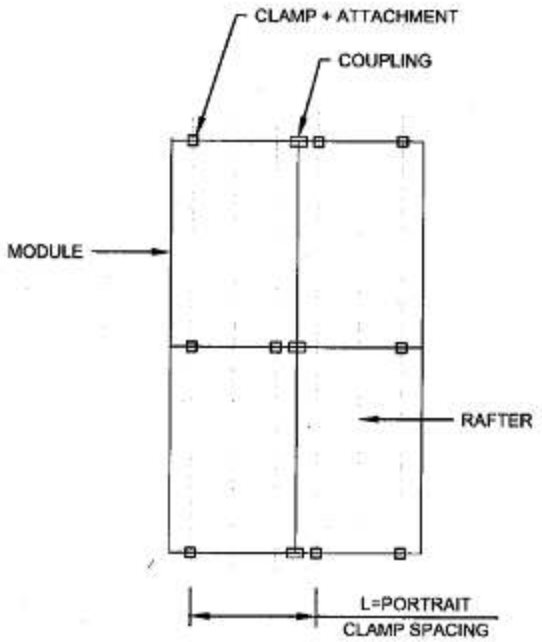
SHEET NAME: ROOF PLAN

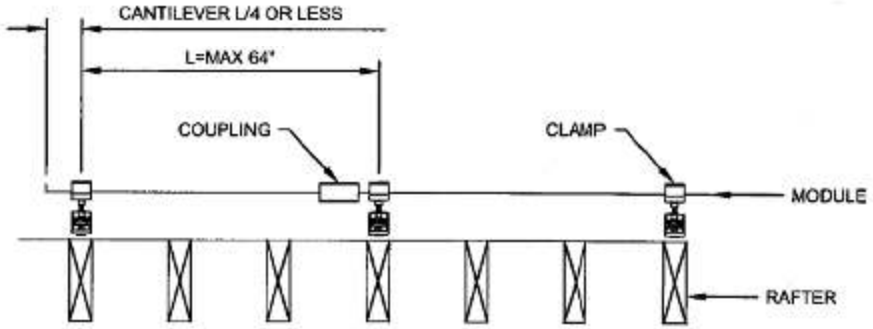
SHEET NUMBER: PV 2.0




1 / PV 3.0 — MODULES IN PORTRAIT/LANDSPACE

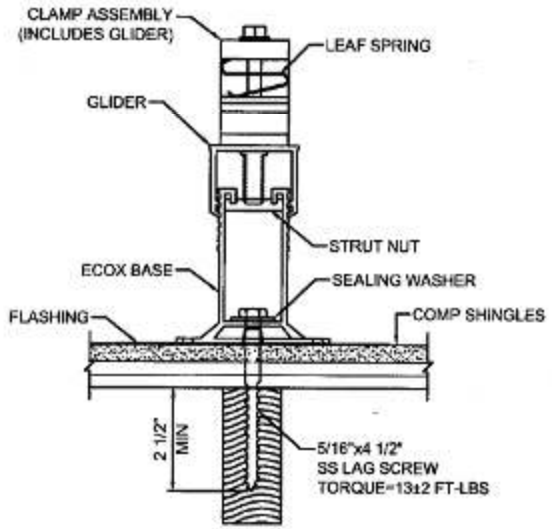
NOT TO SCALE




2 / PV 3.0 — PV SYSTEM MOUNTING DETAIL

NOT TO SCALE




3 / PV 3.0 — ECOX MOUNT DETAIL

NOT TO SCALE

Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

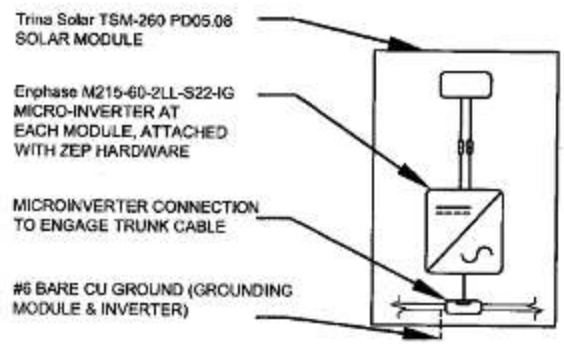
vivint.

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW | S- 4862981
Last Modified: 4/12/2016

SHEET NAME: MOUNT. DETAILS

SHEET NUMBER: PV 3.0

## MODULE DETAIL




| Inverter Ratings (Guide Section 4) | | |
|---|---|---|
| Inverter Make/Model | Enphase M215-60-2LL-S22-IG | |
| Max DC Volt Rating | 48 | Volts |
| Max Power @ 40°C | 215 | Watts |
| Nominal AC Voltage | 240 | Volts |
| Max AC Current | 0.9000 | Amps |
| Max OCPD Rating | 20 | Amps |
| Max Number of Panels/Circuit | 17 | |

**NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):**

1.) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENTS?
YES NO X NA

2.) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENTS?
YES NO X NA

3.) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.53 SIGN OR OCPD RATING AT DISCONNECT.

4.) SIZE INVERTER OUTPUT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING (See Guide Section 8).

5.) TOTAL OF 2 INVERTER OCPD(s). ONE FOR EACH PV CIRCUIT. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN NEC 690.64(B)(2)(a)? X YES NO

### Signs (See Guide Section 7)

Sign for inverter OCPD and AC Disconnect:

| Solar PV System AC Point of Connection | | |
|---|---|---|
| AC Output Current | 23.625000 | Amps |
| Nominal AC Voltage | 240 | Volts |
| THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR) | | |

| Conduit and Conductor Schedule | | | | | |
|---|---|---|---|---|---|
| Tag | Description | Wire Gauge | # of Conductors | Conduit Type | Conduit Size |
| 1 | Enphase engage cable - THWN-2 | 12 AWG | 4 (L1, L2, N, G) | N/A - Free Air | N/A - Free Air |
| 1 | Bare Copper Ground (EGC/GEC) | 6 AWG | 1 | N/A - Free Air | N/A - Free Air |
| 2 | THWN-2 | 10 AWG | 6 (2-L1, 2-L2, 2-N) | PVC | 1" |
| 2 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |
| 3 | THWN-2 | 10 AWG | 3 (1-L1, 1-L2, 1-N) | PVC | 1" |
| 3 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |
| 4 | THWN-2 | 6 AWG | 3 (1-L1, 1-L2, 1-N) | PVC | 1" |
| 4 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |

| PV Module Ratings @ STC (Guide Section 5) | | |
|---|---|---|
| Model Make/Model | Trina Solar TSM-260 PD05.08 | |
| Max Power-Point Current (Imp) | 8.50 | Amps |
| Max Power-Point Voltage (Vmp) | 30.6 | Volts |
| Open-Circuit Voltage (Voc) | 38.2 | Volts |
| Short-Circuit Current (Isc) | 9 | Amps |
| Max Series Fuse (OCPD) | 15 | Amps |
| Nominal Maximum Power at STC (Pmax) | 260 | Watts |
| Maximum System Voltage | 1000(IEC)/600(UL) | |
| Voc Temperature Coefficient | -0.32 | %/°C |

**NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 8 and 8 and Appendix D):**

1.) Lowest expected ambient temperature based on ASHRAE minimum mean extreme dry bulb temperature for ASHRAE location most similar to installation location: -24°C

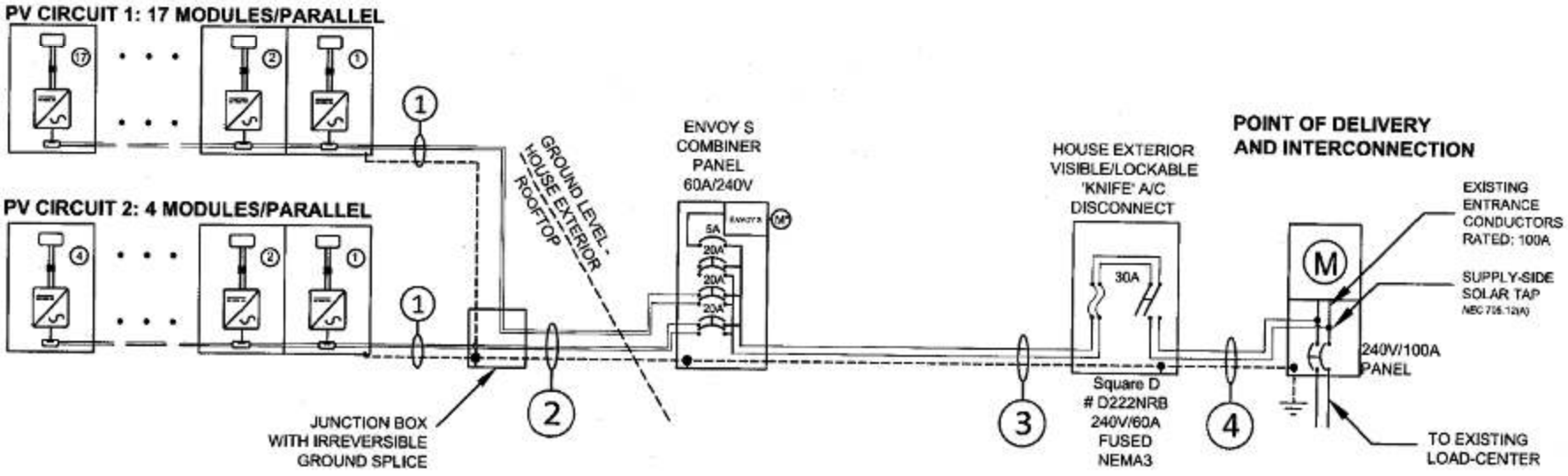
2.) Highest continuous ambient temperature based on ASHRAE highest month 2% dry bulb temperature for ASHRAE location most similar to installation location: 33°C

3.) 2005 ASHRAE fundamentals 2% design temperatures do not exceed 47°C in the United States. For less than 9 current-carrying conductors in roof-mounted sunlit conduit at least 0.5" above roof and using the outdoor design temperature of 47°C or less (all of United States).

a.) 12 AWG, 90°C conductors are generally acceptable for modules with Isc of 7.66 Amps or less when protected by a 12-Amp or smaller fuse.

b.) 10 AWG, 90°C conductors are generally acceptable for modules with Isc of 9.6 Amps or less when protected by a 15-Amp or smaller fuse.

NOTE: NEUTRAL CONDUCTOR(S) OMITTED FOR CLARITY
ALL INVERTER OUTPUT CIRCUITS WILL HAVE A NEUTRAL CONDUCTOR




*-with Integral Revenue Grade Meter
Compliant with ANSI C12.1-2008
**2014 NEC COMPLIANT**

Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

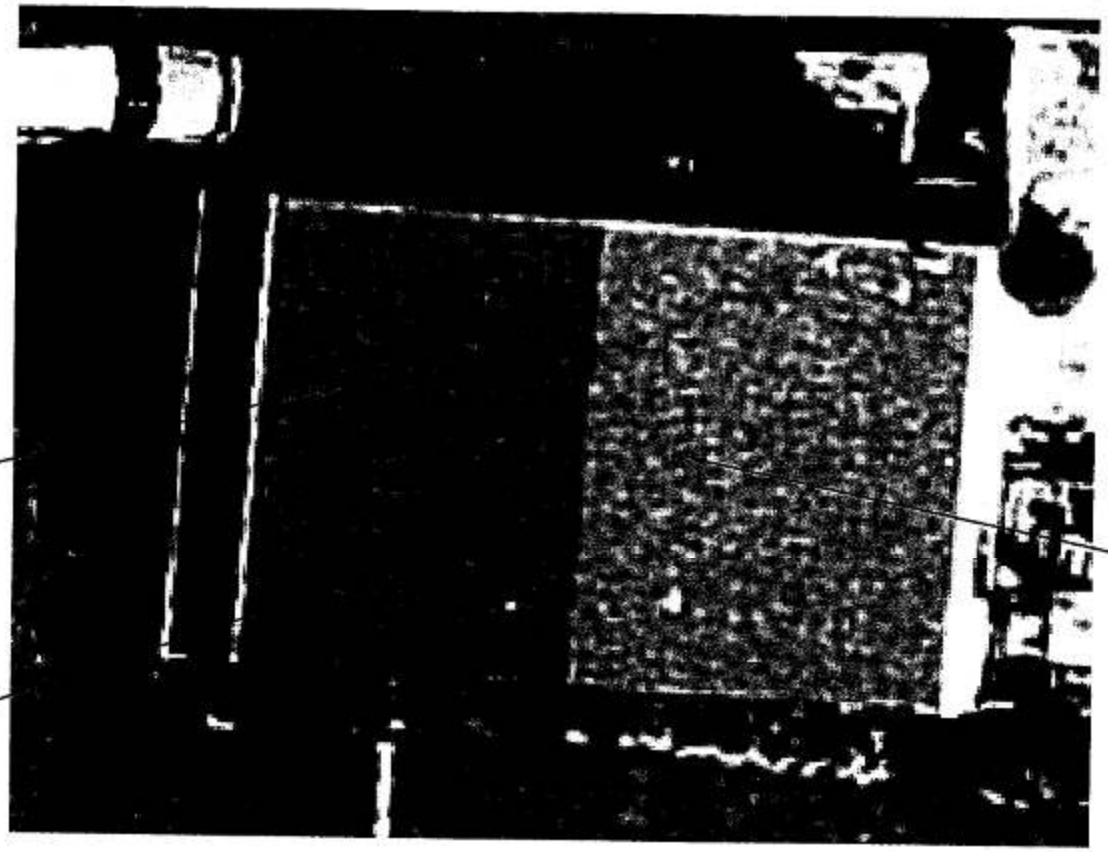
vivint.

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06569300
DRAWN BY: TW
S- 4882981
Last Modified: 4/12/2016

SHEET NAME: 1-LINE DIAGRAM

SHEET NUMBER: E 1.0

ALL OTHER ROOF
SECTIONS WERE
NOT USED
USAGE WAS
REACHED




USAGE CONSTRAINT

ESTIMATED UTILITY OFFSET:
100.0%

Connolly Residence
448 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 056 765 779

vivint.solar

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW
S- 4882981
Last Modified: 4/12/2016

SHEET NAME:
DESIGN LOGIC

SHEET NUMBER:
PV 5.0

vivint. solar
Structural Group

**Scott E. Wyssling, PE**
*Senior Manager of Engineering*

TOWNSHIP OF BRICK

| RELEASED FOR PERMIT | INITIAL | DATE |
|---|---|---|
| Building Subcode | | 6/9/16 |
| Plumbing Subcode | | |
| Fire Subcode | | |
| Electrical Subcode | PSC | 6/1/16 |
| Plan Reviewer | | |
| Plans Released | | |
| Construction Official | | |

3301 North Thanksgiving Way, Suite 500
Lehi, UT 84043
P: (801) 234-7050

*scott.wyssling@vivintsolar.com*

April 13, 2016

FILE COPY

Mr. Dan Rock, Project Manager
Vivint Solar
3301 North Thanksgiving Way, Suite 500
Lehi, UT 84043

Zoning Review
Approval
By: Solar on roof
Date: 5-25-16

Re: Structural Engineering Services
Connolly Residence
449 Jackson Ave, Brick NJ
S-4882981
5.46 kW

Dear Mr. Rock:

Pursuant to your request, we have reviewed the following information regarding solar panel installation on the roof of the above referenced home:

1. Site Visit/Verification Form prepared by a Vivint Solar representative identifying specific site information including size and spacing of members for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information was prepared by the Design Group and will be utilized for approval and construction of the proposed system.
3. Photovoltaic Rooftop Solar System Permit Submittal identifying design parameters for the solar system.
4. Photographs of the interior and exterior of the roof system identifying existing structural members and their conditions.

Based on the above information we have evaluated the structural capacity of the existing roof system to support the additional loads imposed by the solar panels and have the following comments related to our review and evaluation:

***Description of Residence:***

The existing residence is typical wood framing construction with the roof system consisting of the following:

- Roof Sections (1 and 2): Prefabricated truss with all chords constructed of 2x4 dimensional lumber at 24" on center. The attic space is unfinished and photos indicate that there was free access to visually inspect the size and condition of the roof members.

All wood material utilized for the roof system is assumed to be Hem-Fir #2 or better with standard construction components. The existing roofing material consists of composite shingle.

***Stability Evaluation:***

***A. Wind Uplift Loading***

1. Calculations for uplift are based on ASCE/SEI 7-10 Minimum Design Loads for Buildings and other Structures, a wind speed of 110 mph based on Exposure Category B and 18 degree roof slopes on the dwelling areas. Roof snow load is 30 PSF for Exposure B, Zone 1 per (ASCE/SEI 7-10).
2. Total area subject to wind uplift is calculated for the Interior, Edge and Corner Zones of the dwelling.

***B. Loading Criteria***

10 PSF = Dead Load (roofing/framing)
3 PSF = Dead Load (solar panels/mounting hardware)
*Total Dead Load = 13 PSF*

30 PSF = Live Load (Roof snow load)

The above values are within acceptable limits of recognized industry standards for similar structures. Analysis performed on the existing roof structure utilizing the above loading criteria indicates that the existing members will support the additional panel loading without damage, if installed correctly.

***C. Roof Structure Capacity***

1. The photographs provided of the attic space and roof rafters show that the framing is in good condition with no visible signs of damage caused by prior overstressing.

***D. Solar Panel Anchorage***

1. The solar panels shall be mounted in accordance with the most recent *"Ecolibrium Solar Installation Manual"*, which can be found on the Ecolibrium Solar website (ecolibriumsolar.com). If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The solar panels are 1 ½" thick and mounted 4 ½" off the roof for a total height off the existing roof of 6". At no time will the panels be mounted higher than 6" above the existing plane of the roof.
3. Maximum allowable pullout per lag screw is 235 lbs/inch of penetration as identified in the Nation Design Specifications (NDS) of timber construction specifications for Hem-Fir (North Lumber) *assumed*. Based on our evaluation, the pullout value, utilizing a penetration depth of 2 ½", is less than the maximum allowable per connection and therefore is adequate.
4. Roof Sections (1 and 2): Considering the roof slopes, the size, spacing, condition of the roof, the panel supports shall be placed at and attached no greater than every other roof member as panels are installed perpendicular across members and no greater than the panel length when installed parallel to the members *(portrait)*. No panel supports spacing shall be greater than two (2) spaces or 48" o/c, whichever is less.
5. Panel support connections shall be staggered to distribute load to adjacent members.

Based on the above evaluation, with appropriate panel anchors being utilized the roof system will adequately support the additional loading imposed by the solar panels. This evaluation is in conformance with the 2015 International Residential Code New Jersey Edition, current industry standards and practice, and the information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

Scott E. Wyssling, PE
NJ License No. 41996

vivint. solar
Structural Group

3301 North Thanksgiving Way, Suite 500
Lehi, UT 84043
P: (801) 234-7050

**Scott E. Wyssling, PE**
*Head of Structural Engineering*

scott.wyssling@vivintsolar.com

# Existing Rafter Analysis

Connolly Residence
449 Jackson Ave
Brick, NJ
Date: April 13, 2016

## Existing Rafter Properties

Lumber = Hem-Fir (North)
Grade = No. 2 E = 1700000 psi
Nominal size = 2x4 A = 5.25 in² S = 3.06 in³ I = 5.36 in⁴
Max Span = 0.00 ft
Rafter Spacing = 24 in o.c.
Tilt = 18 °

## Loading of Existing Rafter

| | | |
|---|---|---|
| DL = | 13 psf | Dead Load of Existing Structure and Panels |
| $w_{DL}$ = DL x spacing = | 26 plf | Dead Load of Existing Structure and Panels |
| LL = | 30 psf | Ground Snow Load (ASCE/SEI 7-10) |
| $w_{LL}$ = LL x spacing = | 60 plf | Live Load |

## Capacity of Wood Rafter

| Adjustment Factors | Shear | Moment | |
|---|---|---|---|
| $C_D$ = | 1.6 | 1.6 | Load Duration Factor, NDS Table 2.3.2 |
| $C_M$ = | 1 | 1 | Wet Service Factor, NDS Table 4A |
| $C_t$ = | 1 | 1 | Temperature Factor, NDS Table 10.3.4 |
| $C_L$ = | | 1 | Beam Stability Factor, NDS Section 3.3.3 |
| $C_F$ = | | 1.5 | Size Factor, NDS Table 4A |
| $C_{fu}$ = | | 1 | Flat Use Factor, NDS Table 4A |
| $C_i$ = | 1 | 1 | Incising Factor, NDS Section 4.3.8 |
| $C_r$ = | | 1.15 | Repetetive Member Factor, NDS Table 4A |

$F_b$ = 1200 psi Reference Design Allowable Bending Stress, NDS Table 4A
$F_v$ = 145 psi Reference Design Allowable Shear Stress, NDS Table 4A

$F'_b = F_b$ x Adjustment Factors = **3312 psi** (allowable bending stress)

**OK IN BENDING**

$f_b = M/S$ = **0 psi** (actual bending stress)

$F'_v = F_v$ x Adjustment Factors = **232 psi** (allowable shear stress)

**OK IN SHEAR**

$f_v = 3V/2bd$ = **0 psi** (actual shear stress)




vivint. solar

# Wind Uplift

## Simplified Procedure for Componenets and Cladding
**ASCE 7-10, Section 30.5**

| | | |
|---|---|---|
| V = | 110.00 ft | Basic Wind Speed |
| Exposure | C | ASCE 7-10, Section 26.7 |
| I = | 1.21 | Adjustment Factor for building height, ASCE 7-10, Figure 30.5-1 |
| $K_{zt}$ = | 1 | Topographic Factor, ASCE 7-10, Section 26.8.2 |
| Roof Zone | 2 | As shown in ASCE 7-10, Figure 30.5-1 |
| Roof Q = | 18.0 deg | deg |
| $A_{panel}$ = | 298.86 | $ft^2$ |
| $A_{trib}$ = | 12.99 | $ft^2$ Panel Area tributary to each roof anchor |
| $p_{net30}$ = | 38 psf | Net Wind Design Pressure, ASCE 7-10, Figure 30.5-1 |
| $p_{net} = IK_{zt}p_{net30}$ = | 46 psf | Design Wind Uplift Pressure, ASCE 7-10, Equation 30.5-1 |
| $p_{net}$ = | 16 psf | Minimum Design Wind Pressure, ASCE 7-10, Section 30.2.2 |
| | **Use 46 psf** | |

Connection to Existing Roof Framing

| | | |
|---|---|---|
| F.S. = | 1 | Additional Factor of Safety applied to withdrawl force, if desired |
| $A_{trib}$ = | 12.99 | $ft^2$ |
| $DL_{panel}$ = | 3.00 psf | |
| $W_{uplift}$ = | 46 psf | |

$P_{lag}$ = F.S. x $A_{trib}$ x (0.6D - 0.6W) = **-335.1 lbs Withdrawl force for each roof anchor**

Connection Capacity

| | | |
|---|---|---|
| $d_b$ = | 5/16 in | Lag Screw diameter |
| $D_{pen}$ = | 2.50 in | Lag Screw penetration into existing framing member |
| | | Hem-Fir (North) Species of wood framing |
| $C_D$ = | 1.6 | Load Duration Factor for Wind Loading, NDS Table 2.3.2 |
| $C_t$ = | 0.7 | Temperature Factor, NDS Table 10.3.4 |
| W = | 235 lb/in | Withdrawl Capacity, NDS Equation 11.2-1 |
| $W' = C_D \times C_t \times W$ = | 263 lb/in | Adjusted withdrawl value |
| **$P_{allow} = D_{pen} \times W'$ =** | **657 lbs** | |
| **DEMAND =** | **335 lbs** | |
| **CAPACITY =** | **657 lbs** | **= 0.510 OK** |

449 Jackson Ave, Brick NJ 08723

PV SYSTEM SIZE:
5.460 kW DC




PV SYSTEM SITE PLAN

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

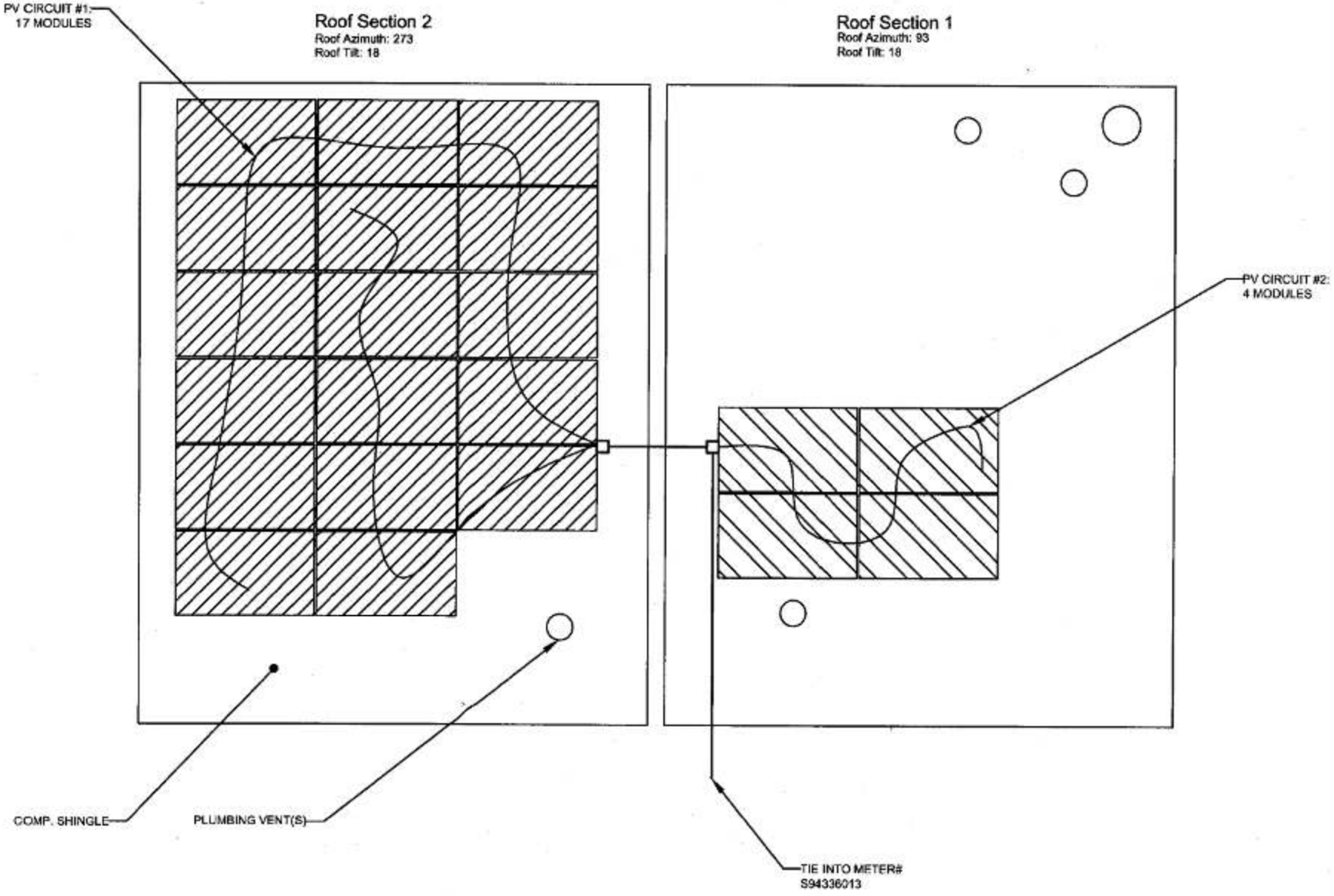
Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

vivint. solar

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06569300
DRAWN BY: TW
S- 4882961
Last Modified: 4/12/2016

SHEET NAME: SITE PLAN

SHEET NUMBER: PV 1.0




PV SYSTEM ROOF PLAN

SCALE: 3/16" = 1'-0"

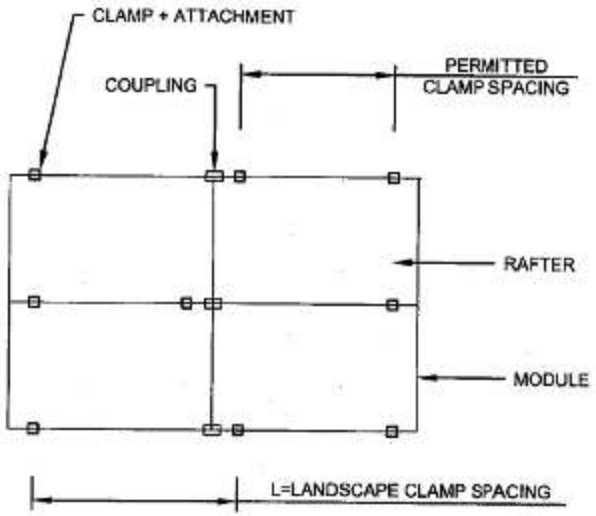
Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

vivint. solar

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW
S- 4882981
Last Modified: 4/12/2016

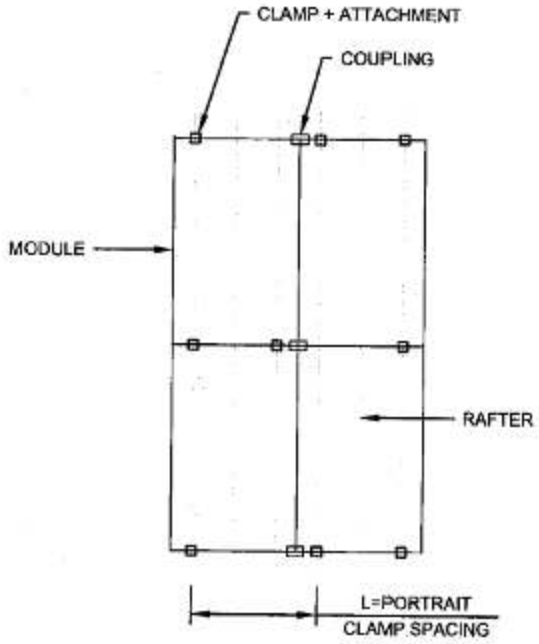
SHEET NAME: ROOF PLAN

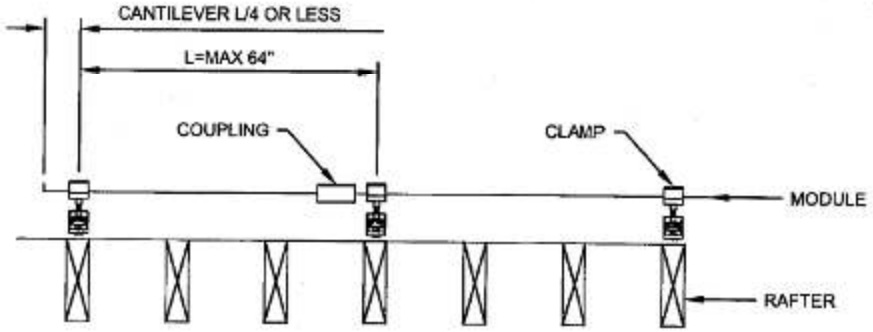
SHEET NUMBER: PV 2.0




1 / PV 3.0 — MODULES IN PORTRAIT/LANDSPACE

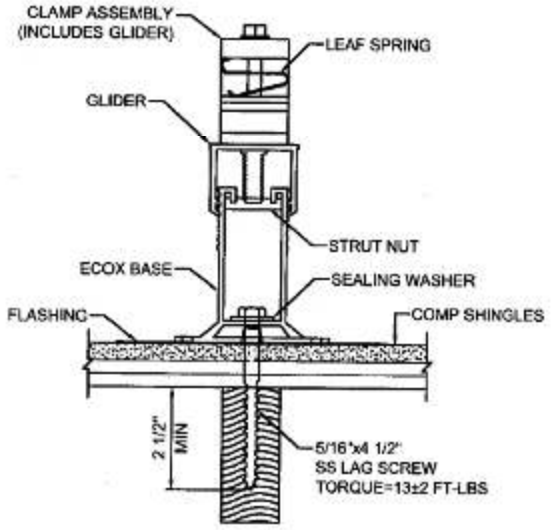
NOT TO SCALE




2 / PV 3.0 — PV SYSTEM MOUNTING DETAIL

NOT TO SCALE




3 / PV 3.0 — ECOX MOUNT DETAIL

NOT TO SCALE

Connolly Residence
448 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

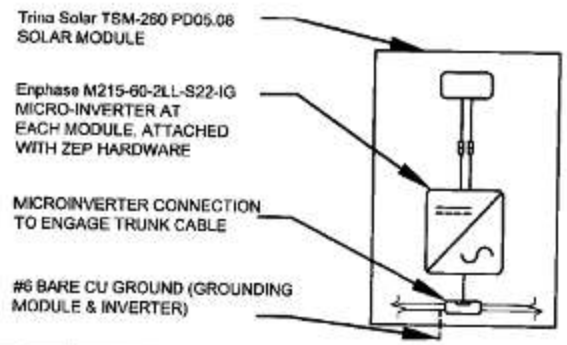
vivint.

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
N.J. LICENSE: 13VH06589300
DRAWN BY: TW
S- 4862981
Last Modified: 4/12/2016

SHEET NAME: MOUNT. DETAILS

SHEET NUMBER: PV 3.0

## MODULE DETAIL




| Inverter Ratings (Guide Section 4) | | |
|---|---|---|
| Inverter Make/Model | Enphase M215-60-2LL-S22-IG | |
| Max DC Volt Rating | 48 | Volts |
| Max Power @ 40°C | 215 | Watts |
| Nominal AC Voltage | 240 | Volts |
| Max AC Current | 0.5000 | Amps |
| Max OCPD Rating | 20 | Amps |
| Max Number of Panels/Circuit | 17 | |

**NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):**

1.) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENTS?
YES NO X NA

2.) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENTS?
YES NO X NA

3.) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.53 SIGN OR OCPD RATING AT DISCONNECT.

4.) SIZE INVERTER OUTPUT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING (See Guide Section 9).

5.) TOTAL OF 2 INVERTER OCPD(s). ONE FOR EACH PV CIRCUIT. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN NEC 690.64(B)(2)(a)? X YES NO

### Signs (See Guide Section 7)

Sign for inverter OCPD and AC Disconnect:

| Solar PV System AC Point of Connection | | |
|---|---|---|
| AC Output Current | 23.625000 | Amps |
| Nominal AC Voltage | 240 | Volts |
| THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR) | | |

| Conduit and Conductor Schedule | | | | | |
|---|---|---|---|---|---|
| Tag | Description | Wire Gauge | # of Conductors | Conduit Type | Conduit Size |
| 1 | Enphase engage cable - THWN-2 | 12 AWG | 4 (L1, L2, N, G) | N/A - Free Air | N/A - Free Air |
| 1 | Bare Copper Ground (EGC/GEC) | 6 AWG | 1 | N/A - Free Air | N/A - Free Air |
| 2 | THWN-2 | 10 AWG | 6 (2-L1, 2-L2, 2-N) | PVC | 1" |
| 2 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |
| 3 | THWN-2 | 10 AWG | 3 (1-L1, 1-L2, 1-N) | PVC | 1" |
| 3 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |
| 4 | THWN-2 | 6 AWG | 3 (1-L1, 1-L2, 1-N) | PVC | 1" |
| 4 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |

| PV Module Ratings @ STC (Guide Section 5) | | |
|---|---|---|
| Model Make/Model | Trina Solar TSM-260 PD05.08 | |
| Max Power-Point Current (Imp) | 8.50 | Amps |
| Max Power-Point Voltage (Vmp) | 30.6 | Volts |
| Open-Circuit Voltage (Voc) | 38.2 | Volts |
| Short-Circuit Current (Isc) | 9 | Amps |
| Max Series Fuse (OCPD) | 15 | Amps |
| Nominal Maximum Power at STC (Pmax) | 260 | Watts |
| Maximum System Voltage | 1000(IEC)/600(UL) | |
| Voc Temperature Coefficient | -0.32 | %/°C |

**NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 6 and 8 and Appendix D):**

1.) Lowest expected ambient temperature based on ASHRAE minimum mean extreme dry bulb temperature for ASHRAE location most similar to installation location: -24°C

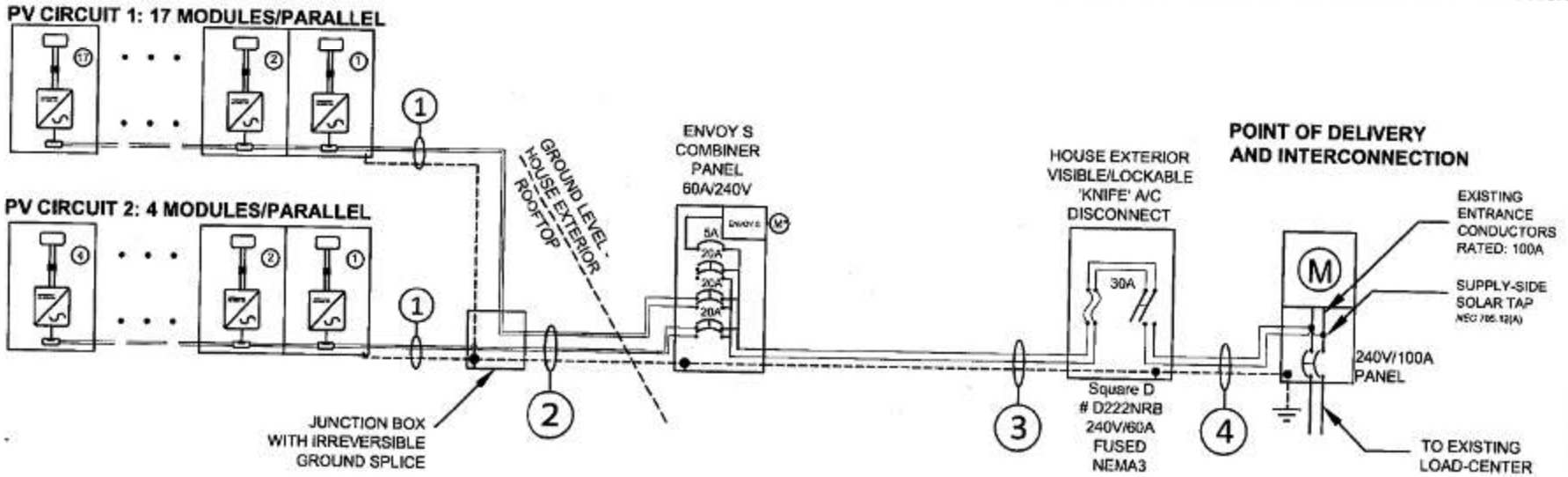
2.) Highest continuous ambient temperature based on ASHRAE highest month 2% dry bulb temperature for ASHRAE location most similar to installation location: 33°C

3.) 2005 ASHRAE fundamentals 2% design temperatures do not exceed 47°C in the United States. For less than 9 current-carrying conductors in roof-mounted sunlit conduit at least 0.5" above roof and using the outdoor design temperature of 47°C or less (all of United States).

a.) 12 AWG, 90°C conductors are generally acceptable for modules with Isc of 7.68 Amps or less when protected by a 12-Amp or smaller fuse.

b.) 10 AWG, 90°C conductors are generally acceptable for modules with Isc of 9.6 Amps or less when protected by a 15-Amp or smaller fuse.

NOTE: NEUTRAL CONDUCTOR(S) OMITTED FOR CLARITY
ALL INVERTER OUTPUT CIRCUITS WILL HAVE A NEUTRAL CONDUCTOR




*-with Integral Revenue Grade Meter
Compliant with ANSI C12.1-2008

**2014 NEC COMPLIANT**

Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

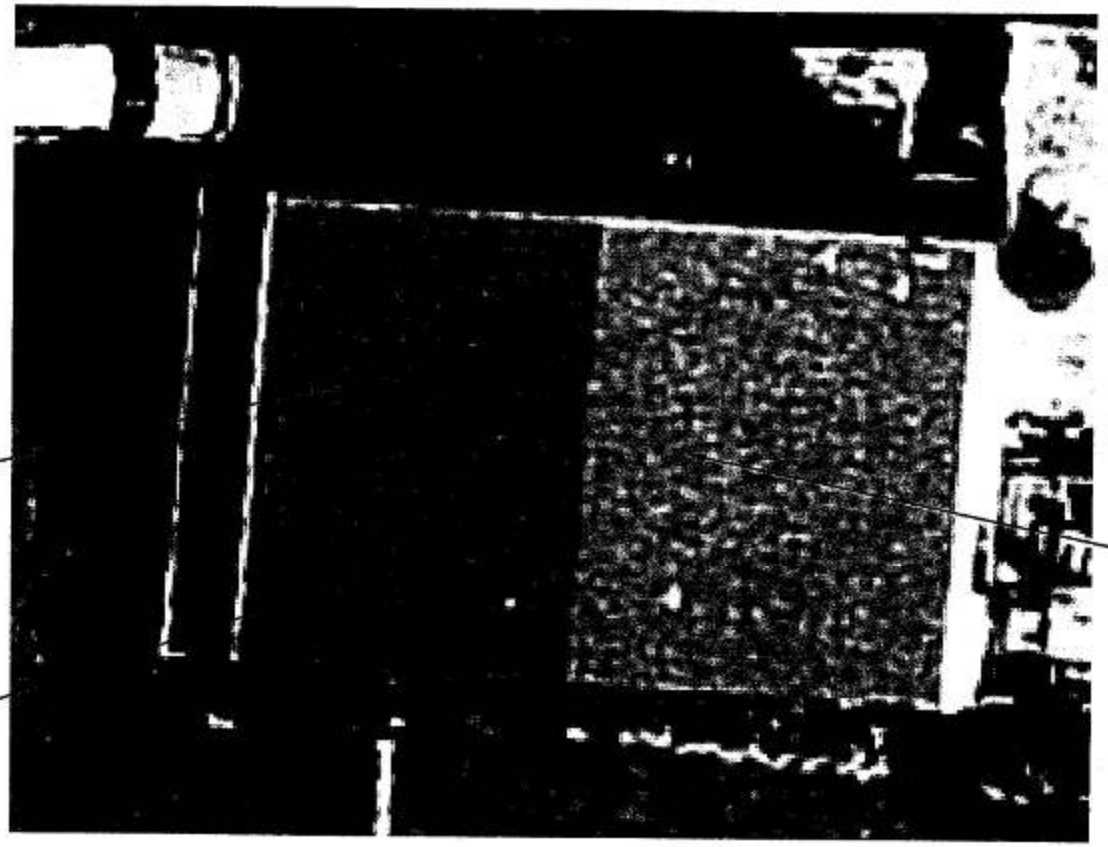
vivint.

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW
S- 48620981
Last Modified: 4/12/2016

SHEET NAME: 1-LINE DIAGRAM

SHEET NUMBER: E 1.0

ALL OTHER ROOF
SECTIONS WERE
NOT USED
USAGE WAS
REACHED




USAGE CONSTRAINT

ESTIMATED UTILITY OFFSET:
100.0%

Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 756 779

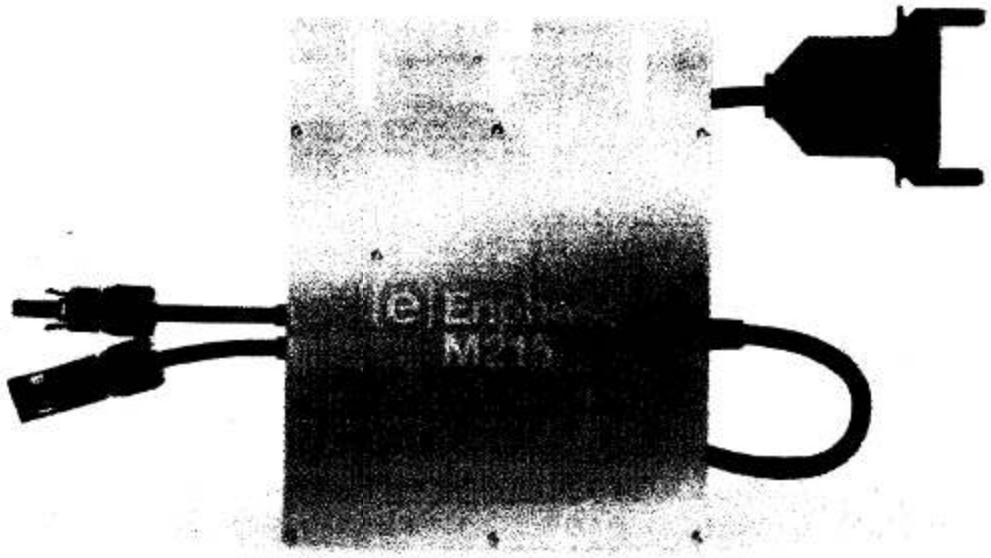
vivint.solar

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW | S- 4882681
Last Modified: 4/12/2016

SHEET NAME: DESIGN LOGIC

SHEET NUMBER: PV 5.0

# Enphase® **M215**



The Enphase® M215 Microinverter with integrated ground delivers increased energy harvest and reduces design and installation complexity with its all-AC approach. With the advanced M215, the DC circuit is isolated and insulated from ground, so **no Ground Electrode Conductor (GEC) is required for the microinverter.** This further simplifies installation, enhances safety, and saves on labor and materials costs.

The Enphase M215 integrates seamlessly with the Engage® Cable, the Envoy® Communications Gateway™, and Enlighten®, Enphase's monitoring and analysis software.

## PRODUCTIVE

- Maximizes energy production
- Minimizes impact of shading, dust, and debris
- No single point of system failure

## SIMPLE

- No GEC needed for microinverter
- No DC design or string calculation required
- Easy installation with Engage Cable

## RELIABLE

- More than 1 million hours of testing and millions of units shipped
- Industry-leading warranty, up to 25 years

enphase® ENERGY

C US

Bruce Scott

EXPIRATION DATE 2018

YOUR LICENSE/REGISTRATION/CERTIFICATE NUMBER IS 34EI 01108500 . PLEASE USE IT IN ALL CORRESPONDENCE TO THE DIVISION OF CONSUMER AFFAIRS USE THIS SECTION TO REPORT ADDRESS CHANGES YOU ARE REQUIRED TO REPORT ANY ADDRESS CHANGES IMMEDIATELY TO THE ADDRESS NOTED BELOW

Board of Exam. of Electrical Contractors
P.O. Box 45006
Newark, NJ 07101

PRINT YOUR NEW **ADDRESS OF RECORD** BELOW
YOUR ADDRESS OF RECORD IS THE ADDRESS THAT WILL PRINT ON YOUR LICENSE/REGISTRATION/CERTIFICATE AND IT MAY BE MADE AVAILABLE TO THE PUBLIC

HOME

BUSINESS

PRINT YOUR NEW **MAILING ADDRESS** BELOW
YOUR MAILING ADDRESS IS THE ADDRESS THAT WILL BE USED BY THE DIVISION OF CONSUMER AFFAIRS TO SEND YOU ALL CORRESPONDENCE

HOME ☐

BUSINESS ☐

TELEPHONE
INCLUDE AREA CODE

TELEPHONE
INCLUDE AREA CODE

**If the law governing your profession requires the current license/registration/certificate to be displayed, it should be within reasonable proximity of your original license/registration/certificate at your principal office or place of business.**

NEWUC (Rev 04/30/2014)

CA-20

THIS DOCUMENT IS PRINTED ON WATERMARKED PAPER WITH A VOILT COLORED BACKGROUND AND MULTIPLE SECURITY FEATURES. PLEASE VERIFY AUTHENTICITY

## 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

Bruce Scott
3301 N Thanksgiving Way
Suite 500
Lehi UT 84043

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

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
Bruce Scott
Electrical Contractor

03/26/2015 TO 03/31/2018
VALID

34E/01108500
LICENSE/REGISTRATION/CERTIFICATION #

Signature of Licensee/Registrant/Certificate Holder

ACTING DIRECTOR

PLEASE DETACH HERE
IF YOUR LICENSE/REGISTRATION/ CERTIFICATE ID CARD IS LOST PLEASE NOTIFY:
Board of Exam. of Electrical Contra
P.O. Box 45006
Newark, NJ 07101

PLEASE DETACH HERE

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

Vivint Solar Developer, LLC
Vivint Solar Inc.
3301 N Thanksgiving Way
Suite 500
Lehi UT 84043

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

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

02/08/2016 TO 03/31/2017
VALID

13VH06589300
LICENSE/REGISTRATION/CERTIFICATION #

Signature of Licensee/Registrant/Certificate Holder

ACTING DIRECTOR

PLEASE DETACH HERE

**Vivint Solar Developer, LLC** EXPIRATION DATE 2017

YOUR LICENSE/REGISTRATION/CERTIFICATE NUMBER IS **13VH 06589300** . PLEASE USE IT IN ALL CORRESPONDENCE TO THE DIVISION OF CONSUMER AFFAIRS. USE THIS SECTION TO REPORT ADDRESS CHANGES. YOU ARE REQUIRED TO REPORT ANY ADDRESS CHANGES IMMEDIATELY TO THE ADDRESS NOTED BELOW.

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

PRINT YOUR NEW **ADDRESS OF RECORD** BELOW
YOUR ADDRESS OF RECORD IS THE ADDRESS THAT WILL PRINT ON YOUR LICENSE/REGISTRATION/CERTIFICATE AND IT MAY BE MADE AVAILABLE TO THE PUBLIC

HOME

BUSINESS

TELEPHONE
INCLUDE AREA CODE

PRINT YOUR NEW **MAILING ADDRESS** BELOW
YOUR MAILING ADDRESS IS THE ADDRESS THAT WILL BE USED BY THE DIVISION OF CONSUMER AFFAIRS TO SEND YOU ALL CORRESPONDENCE

HOME

BUSINESS

TELEPHONE
INCLUDE AREA CODE

# ENGINEERING PERMIT APPLICATION

RECEIVING CLERK: _____

PERMIT #: _____

BLOCK: 527 LOT: 8 ADDRESS: 449 Jackson Ave

**IDENTIFICATION:**

1. WORK SITE ADDRESS: 449 Jackson Ave
2. NAME OF OWNER IN FEE: Kevin Connolly
   ADDRESS: SAA PHONE [redacted]
   FAX #: ( )
3. PRINCIPAL CONTRACTOR: Vivint Solar Developer, LLC
   ADDRESS: 687 Prospect St, Unit 480 PHONE #: ( )
   Lakewood, NJ,08701 FAX #: ( )
4. ARCHITECT OR ENGINEER: Scott E. Wyssling P.E.
   ADDRESS: 321 W Main St Boonton, NJ PHONE: # ( )
5. RESPONSIBLE PERSON FOR WORK: Jennifer Comiskey
   ADDRESS: 687 Prospect St, Unit 480, Lakewood, NJ,08701
   PHONE #: (732) 503-9178 FAX #: (732) 597-7497 E-MAIL: _____

**PROJECT DESCRIPTION:**

☐ GRADING/CLEARING ☐ ROAD OPENING
☐ SOIL REMOVAL/FILL ☐ RETAINING WALL ☐ POOL
☐ BULKHEAD/DOCK ☐ DWELLING ☐ TREE REMOVAL
☒ OTHER Installation of rooftop solar PV system

LENGTH: _____ WIDTH: _____ HEIGHT: _____

**FEE SUMMARY:**

| | |
|---|---|
| APPLICATION FEE: | $ |
| REVIEW FEE: | $ |
| INSPECTION FEE: | $ |
| OTHER: | $ |
| BOND(S): | $ |
| 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: _____

**ENGINEERING REVIEW:**

DATE RECEIVED: _____ DATE REJECTED: _____ DATE APPROVED: _____ INITIALS: _____

# TOWNSHIP OF BRICK

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



Division of Engineering

Elissa C. Commins, PE, PP, CME, CPWM, CFM
Township Engineer & Floodplain Manger
Ecommins@twp.brick.nj.us

732-262-1040
Fax: 732-262-2941
www.twp.brick.nj.us

Date: _____

## ENGINEERING
## PLOT PLAN EXEMPT FORM
## (ONLY IF NOT IN A FLOOD ZONE)

Block: 527 Lot: 8

Property Address: 449 Jackson Ave

I, Jennifer Comiskey (name) of Vivint Solar (address)
request to be exempt from the plot plan requirement for an addition, fence, shed, deck, pool, retaining wall, etc. as outlined in the Township Code, Chapter 245, Section 245-29.

J Comiskey
Applicant's Signature

The following shall be submitted with this request:

1. Submit surveys locating existing dwelling and proposed addition. Dimensions of the addition should be included.

2. **Proof that the property is not located in a Flood Hazard Area.**

Note: Prior to approval a site inspection by the Engineering Department will be performed to verify that the proposed addition will not create a drainage problem.

---

FOR OFFICE USE ONLY

Approved on: _____ Signed: _____

Rejected on: _____ Signed: _____

Comments:

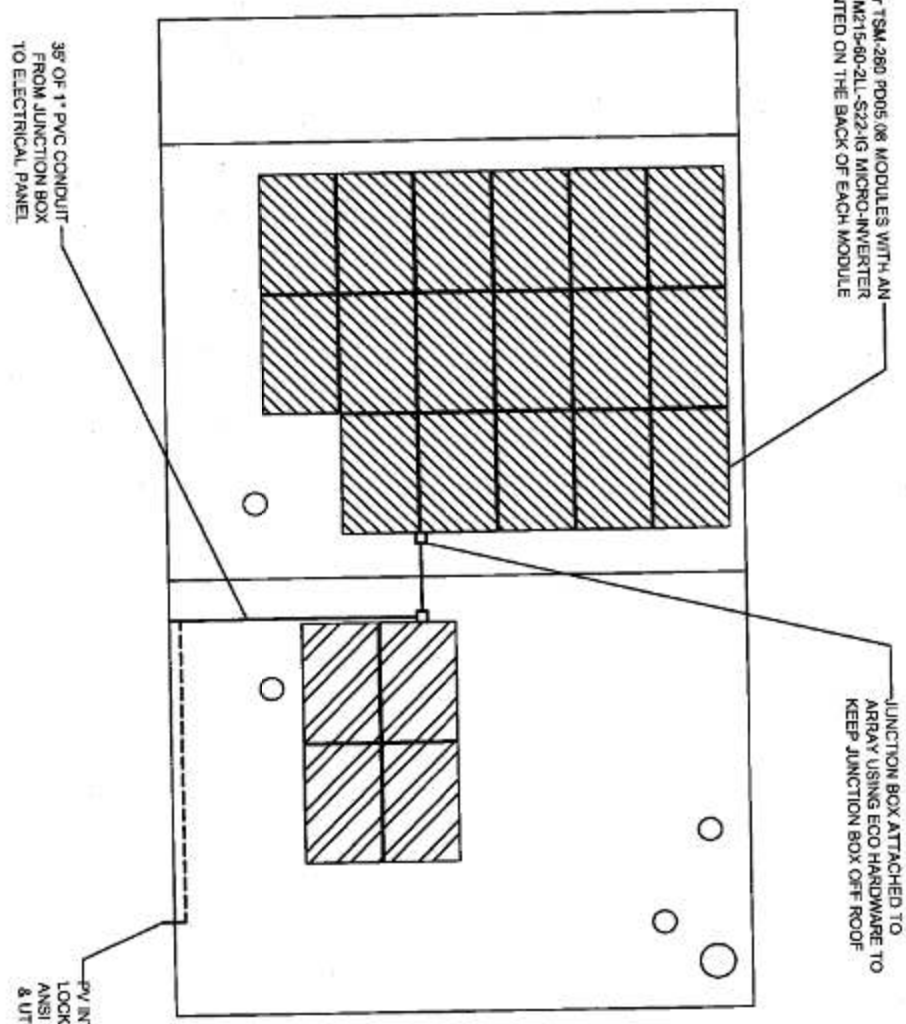
311 ACCESS BRICK TOWNSHIP

# 449 Jackson Ave, Brick NJ 08723

PV SYSTEM SIZE:
5.460 kW DC

N

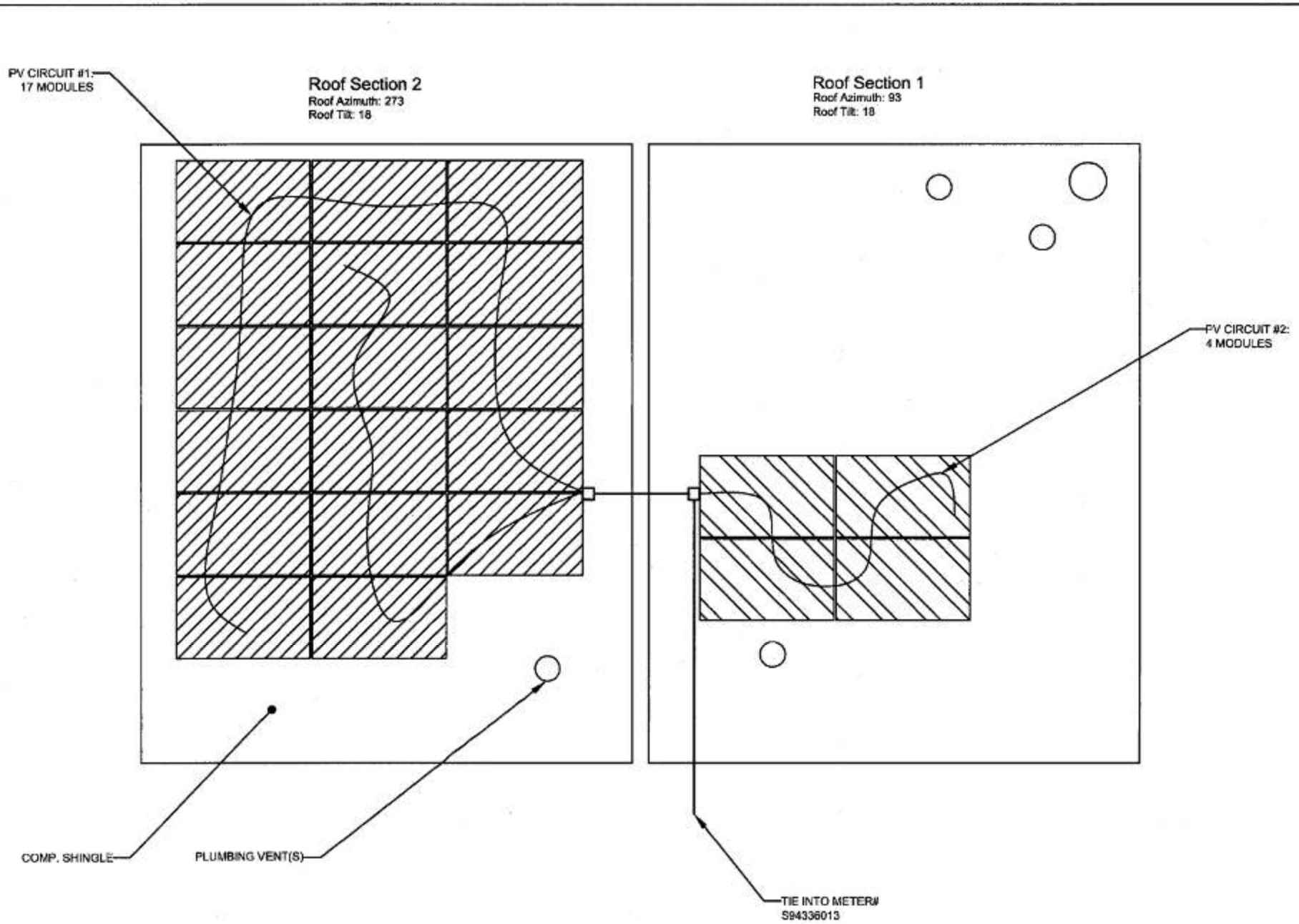
Zoning Review
Approval
By:
Date: 5-25-16 Solar on roof




## PV SYSTEM SITE PLAN

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

| SHEET NUMBER: | SHEET NAME: | | | |
|---|---|---|---|---|
| PV 1.0 | SITE PLAN | INSTALLER: VIVINT SOLAR | vivint. solar | Connolly Residence |
| | | INSTALLER NUMBER: 1.877.404.4129 | | 449 Jackson Ave |
| | | NJ LICENSE: 13VH08589300 | | Brick, NJ 08723 |
| | | DRAWN BY: TW S- 4882981 | Last Modified: 4/12/2016 | UTILITY ACCOUNT NUMBER: 100 055 755 779 |




## PV SYSTEM ROOF PLAN

SCALE: 3/16" = 1'-0"

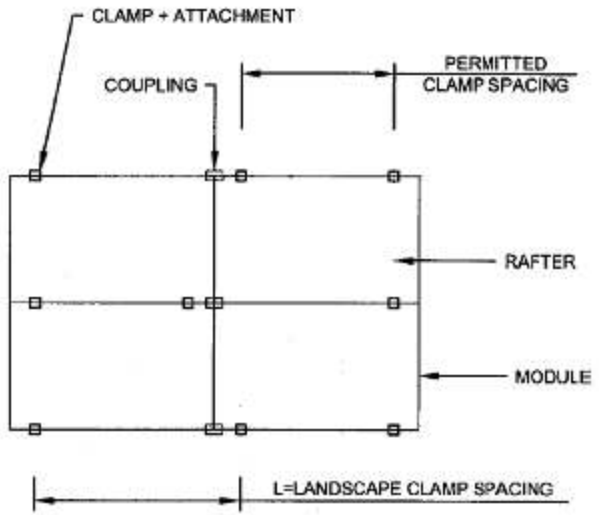
**Connolly Residence**
445 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

vivint. solar

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW | S- 4882981
Last Modified: 4/12/2016

SHEET NAME: ROOF PLAN

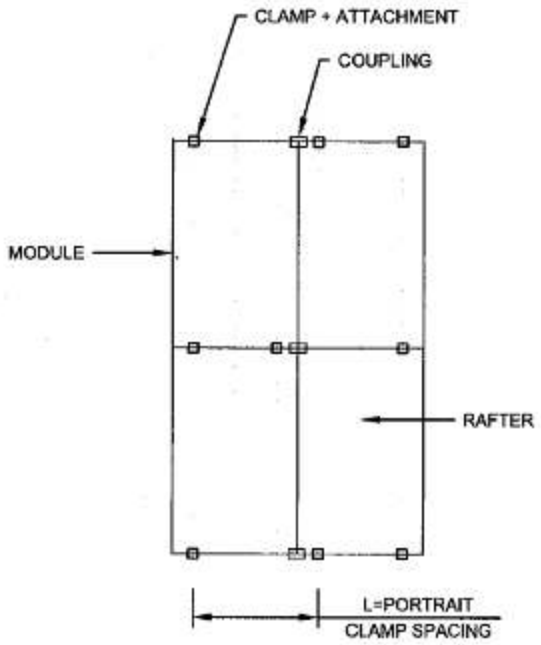
SHEET NUMBER: PV 2.0

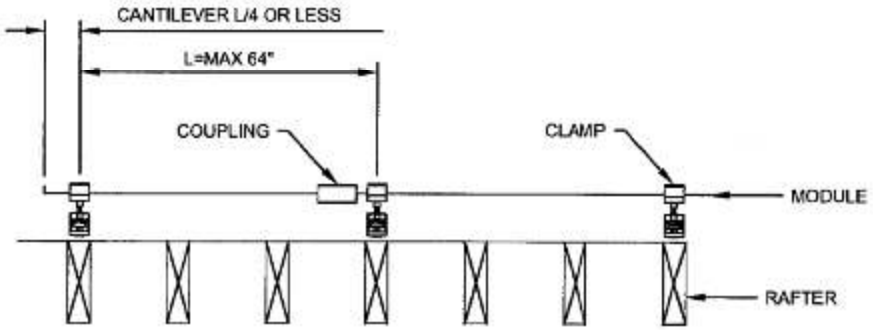



1 / PV 3.0

## MODULES IN PORTRAIT/LANDSPACE

NOT TO SCALE

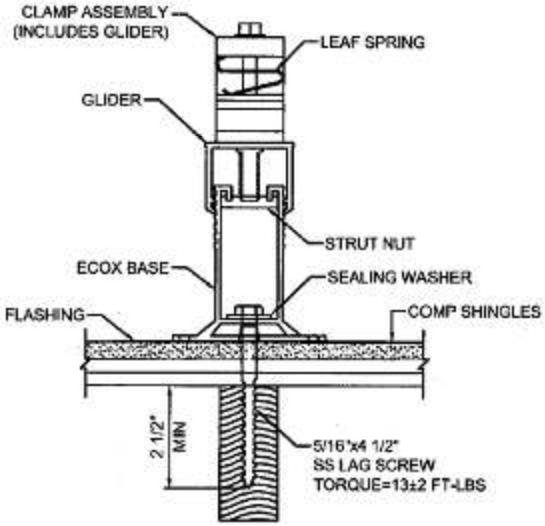



2 / PV 3.0

## PV SYSTEM MOUNTING DETAIL

NOT TO SCALE




3 / PV 3.0

## ECOX MOUNT DETAIL

NOT TO SCALE

Connolly Residence
448 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

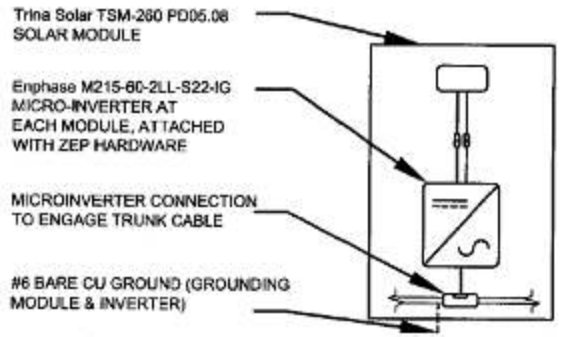
vivint.

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW | S-4882861
Last Modified: 4/12/2016

SHEET NAME: MOUNT. DETAILS

SHEET NUMBER: PV 3.0

## MODULE DETAIL




| Inverter Ratings (Guide Section 4) | | |
|---|---|---|
| Inverter Make/Model | Enphase M215-60-2LL-S22-IG | |
| Max DC Volt Rating | 48 | Volts |
| Max Power @ 40°C | 215 | Watts |
| Nominal AC Voltage | 240 | Volts |
| Max AC Current | 0.9000 | Amps |
| Max OCPD Rating | 20 | Amps |
| Max Number of Panels/Circuit | 17 | |

**NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):**

1.) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENTS?
YES NO X NA

2.) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENTS?
YES NO X NA

3.) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.53 SIGN OR OCPD RATING AT DISCONNECT.

4.) SIZE INVERTER OUTPUT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING (See Guide Section 9).

5.) TOTAL OF 2 INVERTER OCPD(s). ONE FOR EACH PV CIRCUIT. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN NEC 690.64(B)(2)(a)? X YES NO

### Signs (See Guide Section 7)

Sign for inverter OCPD and AC Disconnect:

| Solar PV System AC Point of Connection | | |
|---|---|---|
| AC Output Current | 23.625000 | Amps |
| Nominal AC Voltage | 240 | Volts |
| | | |
| THIS PANEL FED BY MULTIPLE SOURCES | | |
| (UTILITY AND SOLAR) | | |

| Conduit and Conductor Schedule | | | | | |
|---|---|---|---|---|---|
| Tag | Description | Wire Gauge | # of Conductors | Conduit Type | Conduit Size |
| 1 | Enphase engage cable - THWN-2 | 12 AWG | 4 (L1, L2, N, G) | N/A - Free Air | N/A - Free Air |
| 1 | Bare Copper Ground (EGC/GEC) | 6 AWG | 1 | N/A - Free Air | N/A - Free Air |
| 2 | THWN-2 | 10 AWG | 6 (2-L1, 2-L2, 2-N) | PVC | 1" |
| 2 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |
| 3 | THWN-2 | 10 AWG | 3 (1-L1, 1-L2, 1-N) | PVC | 1" |
| 3 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |
| 4 | THWN-2 | 8 AWG | 3 (1-L1, 1-L2, 1-N) | PVC | 1" |
| 4 | THWN-2 - Ground | 8 AWG | 1 | PVC | 1" |

| PV Module Ratings @ STC (Guide Section 5) | | |
|---|---|---|
| Model Make/Model | Trina Solar TSM-260 PD05.08 | |
| Max Power-Point Current (Imp) | 8.80 | Amps |
| Max Power-Point Voltage (Vmp) | 30.6 | Volts |
| Open-Circuit Voltage (Voc) | 38.2 | Volts |
| Short-Circuit Current (Isc) | 9 | Amps |
| Max Series Fuse (OCPD) | 15 | Amps |
| Nominal Maximum Power at STC (Pmax) | 260 | Watts |
| Maximum System Voltage | 1000(IEC)/600(UL) | |
| Voc Temperature Coefficient | -0.32 | %/°C |

**NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 6 and 8 and Appendix D):**

1.) Lowest expected ambient temperature based on ASHRAE minimum mean extreme dry bulb temperature for ASHRAE location most similar to installation location: -24°C

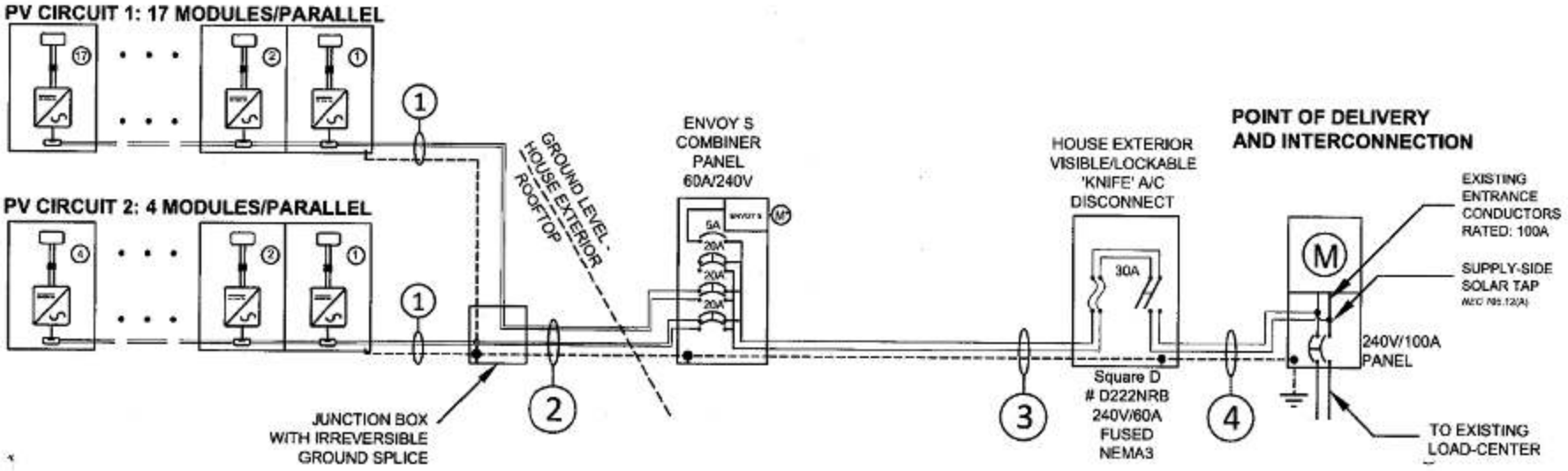
2.) Highest continuous ambient temperature based on ASHRAE highest month 2% dry bulb temperature for ASHRAE location most similar to installation location: 33°C

3.) 2005 ASHRAE fundamentals 2% design temperatures do not exceed 47°C in the United States. For less than 9 current-carrying conductors in roof-mounted sunlit conduit at least 0.5" above roof and using the outdoor design temperature of 47°C or less (all of United States).

a.) 12 AWG, 90°C conductors are generally acceptable for modules with Isc of 7.68 Amps or less when protected by a 12-Amp or smaller fuse.

b.) 10 AWG, 90°C conductors are generally acceptable for modules with Isc of 9.6 Amps or less when protected by a 15-Amp or smaller fuse.

NOTE: NEUTRAL CONDUCTOR(S) OMITTED FOR CLARITY
ALL INVERTER OUTPUT CIRCUITS WILL HAVE A NEUTRAL CONDUCTOR




*-with Integral Revenue Grade Meter Compliant with ANSI C12.1-2008

**2014 NEC COMPLIANT**

Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

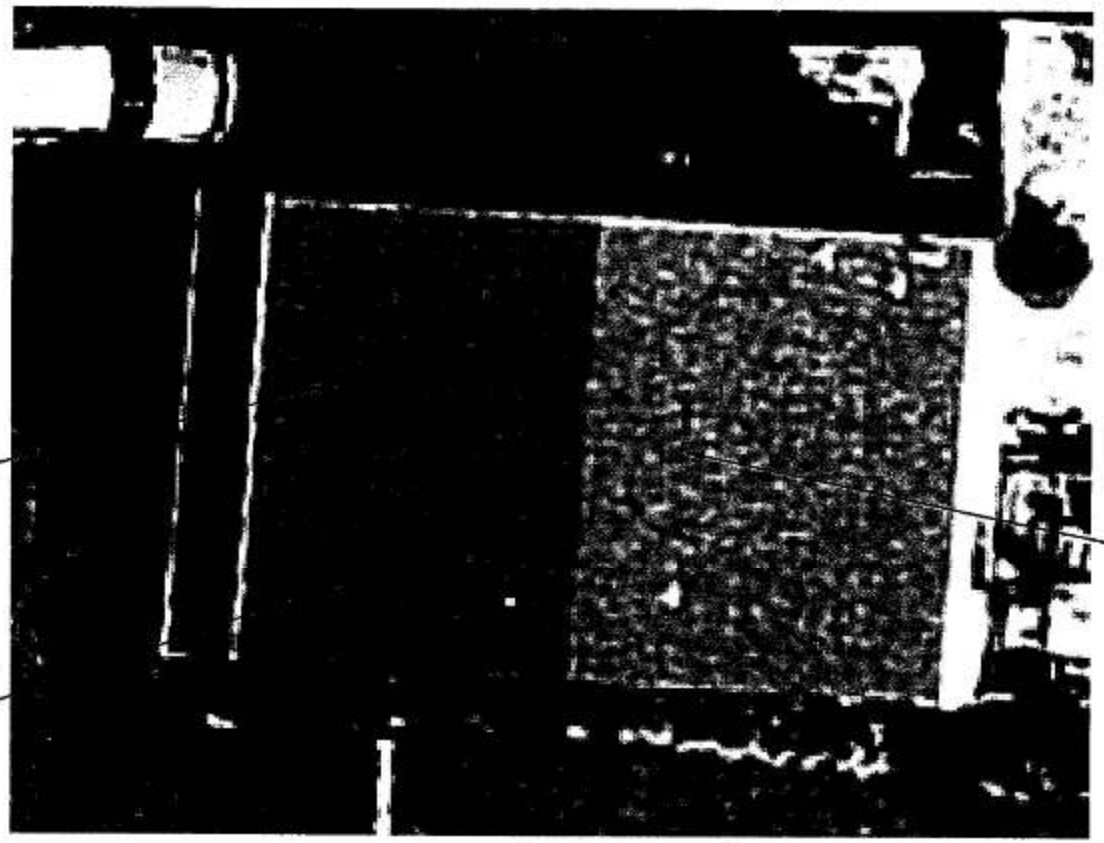
vivint.

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06589300
DRAWN BY: TW
S-4882961
Last Modified: 4/12/2016

SHEET NAME: 1-LINE DIAGRAM

SHEET NUMBER: E 1.0

ALL OTHER ROOF
SECTIONS WERE
NOT USED
USAGE WAS
REACHED




USAGE CONSTRAINT

ESTIMATED UTILITY OFFSET:
100.0%

Connolly Residence
449 Jackson Ave
Brick, NJ 08723
UTILITY ACCOUNT NUMBER: 100 055 755 779

vivint. solar

Last Modified: 4/12/2016

INSTALLER: VIVINT SOLAR
INSTALLER NUMBER: 1.877.404.4129
NJ LICENSE: 13VH06588300
DRAWN BY: TW | S- 4862981

SHEET NAME: DESIGN LOGIC

SHEET NUMBER: PV 5.0

OFFICE DATE RECEIVED: _____

| VIII. PRIOR APPROVALS CHECKLIST (office use only) | LOCAL APPROVAL | | COUNTY APPROVAL | | REGIONAL APPROVAL | | STATE APPROVAL | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| | Prelimin. Initial | Final Date | Prelimin. Initial | Final Date | Prelimin. Initial | Final Date | Prelimin. Initial | Final Date | |
| ☒ Zoning Officer | SC | 7/26/16 | | | | | | | ZA-16-00849 |
| ☐ Planning Board | | | | | | | | | |
| ☐ Zoning Board | | | | | | | | | |
| ☐ Sewer Authority | | | | | | | | | |
| ☐ Water Authority | | | | | | | | | |
| ☐ Police Department | | | | | | | | | |
| ☐ Health Department | | | | | | | | | |
| ☐ Soil Conservation | | | | | | | | | |
| ☐ N.J. Department of Community Affairs | | | | | | | | | |
| ☐ N.J. Department of Transportation | | | | | | | | | |
| ☐ N.J. Department of Environmental Protection | | | | | | | | | |
| ☐ Utility Dig No. | | | | | | | | | |
| ☐ | | | | | | | | | |
| ☐ | | | | | | | | | |

**IX. SUBCODES AND SPECIAL REGULATIONS APPLICABLE** (office use only—optional)

| Name of Code & Edition | | Name of Code & Edition | | |
|---|---|---|---|---|
| Building | | Energy | | Other |
| Electrical | | Barrier Free | | |
| Plumbing | | Flood Hazard | | |
| Fire Protection | | As Built Elevation Cert. | | |
| Mechanical | | Other | | |

**X. CERTIFICATES ISSUED** (office use only)

| | | DATE ISSUED | DATE EXPIRED | DATE REISSUED | DATE EXPIRED |
|---|---|---|---|---|---|
| ☐ Temporary Certificate of Occupancy | No. | | | | |
| ☐ Temporary Certificate of Compliance | No. | | | | |
| ☐ Continued Certificate of Occupancy | No. | | | | |
| ☐ Certificate of Compliance | No. | | | | |
| ☐ Certificate of Occupancy | No. | | | | |
| ☐ Certificate of Approval | No. | | | | |
| ☐ Lead Abatement Clearance Certificate | No. | | | | |