Teaching plan
SITE DETAILS:
1. SERVICE VOLTAGE: 240 VAC SINGLE PHASE
2. RACKING & ROOF ATTACHMENT: UNIRAC SOLARMOUNT RAILS, ECO-FASTEN L-FEET FLASHED WITH ECOFASTEN GREENFASTEN FLASHING.
3. MAX RAIL SPAN = 4' (PORTRAIT), 6' (LANDSCAPE)
4. RAFTERS (EAST, SOUTH):
   4.1 2x4 TRUSS (NOMINAL) 24" ON CENTER, 12.4" = MAX RAILER SPAN
   4.2 2x6 (NOMINAL) 18" ON CENTER, 7.5" = MAX RAILER SPAN
5. ROOF COMPOSITION: ASPHALT SHINGLES OVER PLYWOOD DECKING
6. GROUNDING: WEBB 6.7 GROUND LUGS AND WEBB 9.5 GROUND CLIPS
7. DISTANCE FROM ARRAY TO INTERCONNECTION POINT = 60'
8. ROOF HEIGHT = 12'
9. GROUND SNOW LOAD = 40 PSF
10. DESIGN WIND SPEED = 150 MPH
11. ARRAY CHARACTERISTICS (EAST, SOUTH):
   11.1 ARRAY WEIGHT (+5%) = 1,295 LB, 414 LB
   11.2 ARRAY SURFACE AREA = 432 SQ. FT., 126 SQ. FT.
   11.3 ARRAY DEAD LOAD = 3.00 PSF, 3.29 PSF
   11.4 NUMBER OF ATTACHMENT POINTS = 44, 20
   11.5 WEIGHT PER ATTACHMENT = 28.4 LB, 20.7 LB
   11.6 MINIMUM SETBACK FROM ROOF EDGE = 14", 5"

SITE OVERVIEW
RES PV 1.466

DRAWING NOTES:
1. PV ARRAY CONTAINS (31) CANADIAN SOLAR 300 WATT PV MODULES WITH (31) SOLAREDGE P320 POWER OPTIMIZERS.
2. PV ARRAY UTILIZES (1) SOLAREDGE SE10000A-US INVERTER.
3. INSTALLERS SHALL VERIFY LOCATION OF RAFTERS PRIOR TO INSTALLATION OF L-FEET AND RAILS.

MAIN DISTRIBUTION PANEL LOCATED IN BASEMENT
UTILITY METER AND EXTERNAL UTILITY DISCONNECT
SOUTH-FACING ARRAY (180°)
EAST-FACING ARRAY (0°)
EAST-FACING ARRAY

DRAWING NOTES:

1. PV ARRAY UTILIZES (44) ECO-FASTEN L-FEET AND 159’ OF UNIRAC RAIL.
2. L-FEET ARE LAGGED DIRECTLY INTO 2x4 TRUSSES USING MINIMUM 4” x 5/16” Ø LAG SCREWS.
3. L-FEET UTILIZE GREENFASTEN FLASHING FROM ECOFASTEN SOLAR.
4. L-FOOT LOCATION MAY BE SHIFTED N-S BY +/- 2” TO ENSURE PROPER INSTALLATION OF GREEN-FASTEN FLASHING.
5. VERIFY LOCATION OF RAFTERS PRIOR TO INSTALLATION OF L-FEET AND RAILS.
SOUTH-FACING ARRAY

2x6 RAFTERS (NOMINAL), 16" ON CENTER

RAIL MOUNTED PASS-THRU BOX

RAILS & L-FEET LAYOUT

PV - 1.2B SHOWN

CANADIAN SOLAR CS6K-300MS (30)

SOLAREDGE SE10000A-US (1)

240 VAC 42.0A

160°, 90°

11'-2" 11'-2"

3'-9" 2'

7'-2" 22'-2"

DRAWING NOTES:

1. PV ARRAY UTILIZES (20) ECO-FASTEN L-FEET AND 78' OF UNIRAC RAIL.
2. 2x6 RAFTERS (NOMINAL), 16" ON CENTER.
3. L-FOOT LOCATION MAY BE SHIFTED N-S BY +/- 2" TO ENSURE PROPER INSTALLATION OF GREEN-FASTEN FLASHING.
4. VERIFY LOCATION OF RAFTERS PRIOR TO INSTALLATION OF L-FEET AND RAILS.
SOUTH-FACING ARRAY

STRING CONTINUES TO EAST-FACING ARRAY

RAIL MOUNTED PASS-THRU BOX

PV -1.3B

CANADIAN SOLAR
CS6K-300MS (31)

SOLAREDGE
SE10000A-US (1)

SOLAREDGE

240 VAC 42.0A

160°, 90°, 23°

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**SOUTH-FACING ARRAY**

1. **CONDUCTOR #1**
   - (2) #10 THHN-2 and (1) 36 BARE GROUND IN MINIMUM 3/4" EMT (5' OR LESS)
   - ALL GROUNDS TERMINATED AT PASS-THRU BOXES

2. **CONDUCTOR #5**
   - (1) #4 THHN-2 GEC IN MINIMUM 3/4" EMT (5' OR LESS)

3. **CONDUCTOR #4**
   - (3) #6 THHN-2 and (1) #6 THWN-2 GEC IN MINIMUM 3/4" EMT (5' OR LESS)

4. **CONDUCTOR #2**
   - (2) #10 THHN-2 and (1) #6 THHN-2 GEC IN MINIMUM 1/2" EMT (20' OR LESS)

**FROM EXISTING UTILITY SERVICE**

**INVERTER SPECIFICATIONS**
- MAX AC OUTPUT POWER: 10,950W
- MAX AC OUTPUT CURRENT: 42.0 A
- OPERATING VOLTAGE: 240 VAC, SINGLE PHASE

**MODULE SPECIFICATIONS**
- Pmp: 300 W
- Vmp: 32.5 Vdc
- Voc: 39.7 Vdc
- Imp: 9.24 A
- Isc: 9.83 A
- Isc x 1.25: 12.29 A
- Isc x 1.56: 15.33 A

**STRING 1 SPECIFICATIONS**
- Pmp: 3000 W
- Vmp: 350 Vdc
- Voc: 500 Vdc
- Imp: 9.24 A
- Isc: 9.83 A
- Isc x 1.25: 12.29 A
- Isc x 1.56: 15.33 A

**STRING 2 SPECIFICATIONS**
- Pmp: 3000 W
- Vmp: 350 Vdc
- Voc: 500 Vdc
- Imp: 9.24 A
- Isc: 9.83 A
- Isc x 1.25: 12.29 A
- Isc x 1.56: 15.33 A

**EQUIPMENT OUTSIDE EQUIPMENT IN BASEMENT**

- 1 - (31) CANADIAN SOLAR CS6K-300MS SOLAR ELECTRIC MODULES
- 1.1 - STRING OF (10) CANADIAN SOLAR PV MODULES WITH (10) SOLAREDGE P320 POWER OPTIMIZERS
- 1.2 - STRING OF (11) CANADIAN SOLAR PV MODULES WITH (10) SOLAREDGE P320 POWER OPTIMIZERS
- 2 - RAIL MOUNTED PASS-THRU BOX
- 3 - SOLAREDGE SE10000A-US GRID-TIED INVERTER, 240 VAC, SINGLE-PHASE
- 4 - 100 A REVENUE GRADE METER AND SOCKET
- 5 - EXTERNAL UTILITY DISCONNECT 60 A, 2P, 240 VAC, NEMA 3R, 60A FUSES, ADJACENT TO EXISTING UTILITY METER
- 6 - EXISTING 25A MAIN SERVICE PANEL (ITE) WITH 200A MAIN SERVICE DISCONNECT WITH 60 A BACKFEED BREAKER INSTALLED AT BOTTOM OF BUS BAR
- 7 - 12X12X6 JUNCTION BOX WITH INSULATED TRIPLE TERMINATION TAPS
- 8 - EXISTING UTILITY METER

**COLOR LEGEND**
- MODULES ARE DRAWN IN BLUE
- DC+ CONDUCTORS ARE DRAWN IN BLACK
- DC- CONDUCTORS ARE DRAWN IN GRAY
- GROUNDING CONDUCTORS ARE DRAWN IN GREEN
- L1 CONDUCTORS ARE DRAWN IN BLACK
- L2 CONDUCTORS ARE DRAWN IN RED
- NEUTRAL CONDUCTORS ARE DRAWN IN GRAY

**EQUIPMENT**
- 1 - (31) CANADIAN SOLAR CS6K-300MS SOLAR ELECTRIC MODULES
- 1.1 - STRING OF (10) CANADIAN SOLAR PV MODULES WITH (10) SOLAREDGE P320 POWER OPTIMIZERS
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L1 CONDUCTORS ARE DRAWN IN RED
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MIDDLE SPECIFICATIONS

INVERTER SPECIFICATIONS

MAX AC OUTPUT POWER: 10,950W
OPERATING/VOLTAGE: 240VAC, SINGLE PHASE

STRING 1.1 SPECIFICATIONS

INVERTER SPECIFICATIONS

MAX AC OUTPUT POWER: 10,950W
OPERATING/VOLTAGE: 240VAC, SINGLE PHASE

STRING 1.2 SPECIFICATIONS

1 - (31) CANADIAN SOLAR CS6K-300MS SOLAR ELECTRIC MODULES
1.1 - STRING OF (10) CANADIAN SOLAR PV MODULES WITH (10) SOLAREDGE P320 POWER OPTIMIZERS
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INVERTER SPECIFICATIONS

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CANADIAN SOLAR INC.
2430 Camino Ramon, Suite 240 San Ramon, CA, USA 94583-4385 | www.canadiansolar.com/na | sales.us@canadiansolar.com

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. As a leading PV project developer and manufacturer of solar modules with over 15 GW deployed around the world since 2001, Canadian Solar Inc. (NASDAQ: CSIQ) is one of the most bankable solar companies worldwide.

SUPERPOWER
CS6K-290 | 295 | 300MS

Canadian Solar’s new SuperPower modules with Mono-PERC cells significantly improve efficiency and reliability. The innovative technology offers superior low irradiance performance in the morning, in the evening and on cloudy days, increasing the energy output of the module and the overall yield of the solar system.

KEY FEATURES

- 11% more power than conventional modules
- Excellent performance at low irradiance: 97.5%
- High PTC rating of up to 91.87%
- Improved energy production due to low temperature coefficients
- IP67 junction box for long-term weather endurance
- Heavy snow load up to 5400 Pa, wind load up to 2400 Pa

MANAGEMENT SYSTEM CERTIFICATES*
ISO 9001:2008 / Quality management system
ISO 14001:2004 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*
IEC 61215 / IEC 61730: VDE / CE / MCS / CEC AU
UL 1703 / IEC 61215 performance: CEC listed (US)
UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE / Take-e-way
UNI 9177 Reaction to Fire: Class 1

25 years
linear power output warranty

10 years
product warranty on materials and workmanship

* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world.
The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, Canadian Solar Inc. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

Caution: For professional use only. The installation and handling of PV modules requires professional skills and should only be performed by qualified professionals. Please read the safety and installation instructions before using the modules.
SolarEdge Single Phase Inverters
For North America

The best choice for SolarEdge enabled systems
- Specifically designed to work with power optimizers
- Superior efficiency (98%)
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight and easy to install outdoors or indoors on provided bracket
- Built-in module-level monitoring
- Internet connection through Ethernet or Wireless
- Fixed voltage inverter for longer strings
- Optional – revenue grade data, ANSI C12.1
## Single Phase Inverters for North America


### OUTPUT

<table>
<thead>
<tr>
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<th></th>
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<tbody>
<tr>
<td>Nominal AC Power Output</td>
<td>3000</td>
<td>3800</td>
<td>5000</td>
<td>6000</td>
<td>7600</td>
<td>9980 @ 208V</td>
</tr>
<tr>
<td>Max. AC Power Output</td>
<td>3300</td>
<td>4150</td>
<td>5400 @ 208V</td>
<td>5450 @ 240V</td>
<td>6000</td>
<td>8350</td>
</tr>
<tr>
<td>AC Output Voltage Min.-Nom.-Max.(1)</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
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<tr>
<td>AC Frequency Min.-Nom.-Max.(1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Max. Continuous Output Current</td>
<td>12.5</td>
<td>16</td>
<td>24 @ 208V</td>
<td>32 @ 240V</td>
<td>25</td>
<td>32</td>
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<tr>
<td>GFDI</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Additional Features:**
- Utility Monitoring, Islanding Protection, Country Configurable Thresholds
- SolarEdge API
- Rapid Shutdown - NEC 2014 and 2017 690.12
- Automatic Rapid Shutdown upon AC Grid Disconnect(5)
- RS485, RS232, Ethernet, ZigBee (optional)
- Optional
- Cooling: Natural Convection
- Fans (user replaceable)
- Noise: < 25 dBA
- Min.-Max. Operating Temperature Range: -13 to +140 / -25 to +60 (-40 to +60 version available(6))
- Protection Rating: NEMA 3R

### ADDITIONAL FEATURES

- Supported Communication Interfaces: RS485, RS232, Ethernet, ZigBee (optional)
- Revenue Grade Data, ANSI C12.1
- Rapid Shutdown - NEC 2014 and 2017 690.12
- Automatic Rapid Shutdown upon AC Grid Disconnect(5)

### STANDARD COMPLIANCE

- Safety: UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCl according to T.I.I. M-07
- Grid Connection Standards: IEEE1547, Rule 21, Rule 14 (HI)
- Emissions: FCC part 15 class B

### INSTALLATION SPECIFICATIONS

- AC output conduit size / AWG range: 3/4" minimum / 1/2-6 AWG
- DC input conduit size / # of strings / AWG range: 3/4" minimum / 1-2 strings / 16-6 AWG
- Dimensions with Safety Switch: 30.5 x 12.5 x 7.2 / 288 x 270 x 184
- Weight with Safety Switch: 51.2 / 23.2
- Cooling: Natural Convection and internal fan (user replaceable)
- Noise: < 25 dBA
- Min.-Max. Operating Temperature Range: -13 to +140 / -25 to +60 (-40 to +60 version available(6))

---

(1) For other regional settings please contact SolarEdge support.
(2) A higher current source may be used; the inverter will limit its input current to the values stated.
(5) P/Ns SExxxxA-US0xxxx have Manual Rapid Shutdown for NEC 2014 compliance (NEC 2017 compliance with outdoor installation)
SYSTEM LEVEL FIRE CLASSIFICATION

The system fire class rating requires installation in the manner specified in the SOLARMOUNT Installation Guide. SOLARMOUNT has been classified to the system level fire portion of UL 1703. This UL 1703 classification has been incorporated into our UL 2703 product certification. SOLARMOUNT has achieved system level performance for steep sloped roofs. System level fire performance is inherent in the SOLARMOUNT design, and no additional mitigation measures are required. The fire classification rating is only valid on roof pitches greater than 2:12 (slopes ≥ 2 inches per foot, or 9.5 degrees). There is no required minimum or maximum height limitation above the roof deck to maintain the system fire rating for SOLARMOUNT. Module Types & System Level Fire Ratings are listed below:

<table>
<thead>
<tr>
<th>Rail Type</th>
<th>Module Type</th>
<th>System Level Fire Rating</th>
<th>Rail Direction</th>
<th>Module Orientation</th>
<th>Mitigation Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Rail</td>
<td>Type 1, Type 2, Type 3 &amp; Type 10</td>
<td>Class A, Class B &amp; Class C</td>
<td>East-West</td>
<td>Landscape OR Portrait</td>
<td>None Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>North-South</td>
<td>Landscape OR Portrait</td>
<td>None Required</td>
</tr>
<tr>
<td>Light Rail</td>
<td>Type 1 &amp; Type 2</td>
<td>Class A, Class B &amp; Class C</td>
<td>East-West</td>
<td>Landscape OR Portrait</td>
<td>None Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>North-South</td>
<td>Landscape OR Portrait</td>
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</table>

UL2703 CERTIFICATION MARKING LABEL

Unirac SOLARMOUNT is listed to UL 2703. Marking Labels are shipped with the Midclamps. After the racking system is fully assembled, a single Marking Label should be applied to the SOLARMOUNT rail at the edge of the array. Note: The sticker label should be placed such that it is visible, but not outward facing.
1. Locate the rafters and snap horizontal and vertical lines to mark the installation position for each GreenFasten flashing.

2. Drill a pilot hole (1/4” diameter) for the lag bolt. Backfill with sealant. EcoFasten Solar recommends an EPDM mastic.

3. Insert the flashing so the top part is under the next row of shingles and pushed far enough up slope to prevent water infiltration through vertical joint in shingles. The leading edge of flashing must butt against upper row of nails to prevent turning when torqued. See page 2.2 for vertical adjustment when leading edge of flashing hits nails in upper shingle courses.

4. Line up pilot hole with GreenFasten flashing hole.
   4a Insert the lag bolt through the EPDM washer, the top compression component bracket (L-102-3, Rock-It SlideComp*, SCL-101-3*, Z-101*, Conduit Mount Bracket*) and the gasketed hole in the flashing and into the rafter.
   4b Insert the lag bolt through the EPDM washer, the Comp Mount Slide compression bracket and the gasketed hole in the flashing and into the rafter.
   4c Insert the lag bolt through the SS washer, the third-party bracket, the EPDM bonded washer, the CP-SQ-Slotted compression bracket and the gasketed hole in the flashing and into the rafter.

5. Torque: The range is between 100-140 torque inch-pounds depending on the type of wood and time of year. The visual indicator for proper torque is when the EPDM on the underside of the bonded washer begins to push out the sides as the washer compresses. If using an impact wrench to install the fasteners be careful not to overtorque the fastener. You may need to stop and use a ratchet to finish the install.

*not pictured.

Consult an engineer or go to www.ecofastensolar.com for engineering data.
Certificate of Compliance

Certificate: 70131735 (266909)  
Master Contract: 266909

Project: 70161436  
Date Issued: 2017-12-06

Issued to: Unirac  
1411 Broadway NE  
Albuquerque, New Mexico 87102  
USA  
Attention: Klaus Nicolaedis

The products listed below are eligible to bear the CSA Mark shown

Issued by: Michael Hoffnagle
Michael Hoffnagle

PRODUCTS

CLASS - C531302 - POWER SUPPLIES- PHOTOVOLTAICS--PV Racking
CLASS - C531382 - POWER SUPPLIES- PHOTOVOLTAICS-PV Racking and clamping systems-Certified to US Standards

Models: SM SOLAR MOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.

The systems listed are designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with stainless steel mid clamps and Aluminum end clamps. The modules are bonded to the racking system with the stainless steel bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The system may employ optimizers/micro-inverters and used for grounding when installed per installation instructions.
Mechanical ratings:

<table>
<thead>
<tr>
<th>Load Type</th>
<th>Rating (lb/ft²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downward Design Load</td>
<td>113.4</td>
</tr>
<tr>
<td>Upward Design Load</td>
<td>50.4</td>
</tr>
<tr>
<td>Down-Slope Load</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Conditions of acceptability: Installation is subject to acceptance of the local inspection authorities having jurisdiction. The certification of these products relates only to the methods of installation, bonding, and grounding as outlined in the Installation Manual for each product.

**APPLICABLE REQUIREMENTS**

UL 2703 1st Edition - Mounting Systems, Mounding Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels

LTR-AE-001-2012 - List of Technical Requirements for Photovoltaic Module and Panel Racking Systems

**MARKINGS**

The manufacturer is required to apply the following markings:

- Products shall be marked with the markings specified by the particular product standard.
- Products certified for Canada shall have all Caution and Warning markings in both English and French.

The products listed are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (indicating that products have been manufactured to the requirements of both Canadian and U.S. Standards) or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Additional bilingual markings not covered by the product standard(s) may be required by the Authorities Having Jurisdiction. It is the responsibility of the manufacturer to provide and apply these additional markings, where applicable, in accordance with the requirements of those authorities.

The following markings appear on the rail by adhesive label:

1. Submitter’s name and/or CSA Master Contract number “266909”;
2. Model designation;
3. Manufacturing date;
4. System fire class rating/designation of information location in Installation Manual;
5. Design load rating/designation of information location in Installation Manual;

The following markings appear on the Mid clamp by stamping:

1. Submitter’s name and/or CSA Master Contract number “266909”;
2. Model designation;
3. CSA mark
4. Mil ID for factory location
November 28, 2017

INSTALLER
ATTENTION:

REFERENCE: Residence: Address in Massachusetts

Solar Array Installation

To Whom It May Concern:

We have reviewed the site plans and photographs provided by the Installer relating to the installation of the solar array at the above-referenced site. Based upon our review, it is our conclusion that the installation of the solar array on this existing roof will not adversely affect this structure. It is our understanding that the structural components of the existing roof framing are in good condition and free of damage. The design of the solar panel racking (mounts, rails, etc.) is by the manufacturer or contractor. Please note a representative of Engineering has not physically observed the roof framing. Our conclusions are based upon information regarding the existing roof framing provided by installer

Design Parameters

- Code: Massachusetts State Building Code, 8th Edition (2009 IBC) and ASCE 7-05
- Occupancy Category: II
- Design wind speed: 100 mph (3-sec gust) per ASCE 7-05
- Wind exposure category: C
- Ground snow load: 50 psf

Existing Roof Structure

- Roof structure: 2x4 manufactured trusses @ 24” O.C.
- Roofing material: composite shingles
- Roof slope: 23°

Connection to Roof

- Mounting connection: (1) 5/16” lag screw w/ min. 2.5” embedment into framing

Conclusions

Our conclusion regarding the adequacy of the existing roof is based on the fact that the additional weight of the solar array is 3 psf or less. In the area of the solar array, other live loads will not be present or will be greatly reduced. Regarding snow loads, because the panels are slippery and unobstructed, effective snow loads will be reduced in the area of the solar array. The gravity loads in the area of the solar array are decreased; thus, the stresses of the structural elements are decreased. Therefore, the requirements of Section 707.4 of the 2009 IEBC as referenced in 780 CMR Chapter 34, 8th Edition are met and the structure is permitted to remain unaltered.
The solar array will be flush-mounted (no more than 6" above the roof surface) and parallel to the roof surface. Thus, we conclude that any additional wind loading on the structure related to the addition of the proposed solar array is negligible. The attached calculations verify the capacity of the connections of the solar array to the existing roof against wind (uplift), the governing load case. The connections to the existing roof shall be spaced at 48" maximum.

**Limitations**

Installation of the solar panels must be performed in accordance with manufacturer recommendations. All work performed must be in accordance with accepted industry-wide methods and applicable safety standards. The contractor shall notify Engineering, LLC should any damage, deterioration or discrepancies between the as-built condition of the structure and the condition described in this letter be found. Particular attention must be paid to the maximum allowable spacing of connections and the location of solar panels relative to roof edges. Connections to existing roof framing must be staggered so as not to overload any existing structural member, except at array ends. The use of solar panel support span tables provided by others is allowed only where the building type, site conditions, site-specific design parameters, and solar panel configuration match the description of the span tables. Electrical engineering is the responsibility of others. Waterproofing around the roof penetrations is the responsibility of others. Engineering assumes no responsibility for improper installation of the solar array. Engineering assumes no responsibility for the effects of snow falling from roofs onto other roofs, property or persons due to the installation of the solar array.

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Professional Engineer P.E.
MA License: 12345 - Expires: 06/30/2018
Principal
Enclosures
RTA/wsp
<table>
<thead>
<tr>
<th>P&lt;sub&gt;e&lt;/sub&gt; = 20 psf</th>
<th>12&quot; RAFTER SPACING</th>
<th>16&quot; RAFTER SPACING</th>
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<td>18&quot; - 0'</td>
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<table>
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<td>7&quot; - 9&quot;</td>
<td>10&quot; - 13&quot;</td>
<td>12&quot; - 6&quot;</td>
</tr>
</tbody>
</table>

Notes and Assumptions for Use of Above Table:
1. Prior to use of this Table, comply with the Prescriptive Process Flowchart for Residential PV<10 kW.
2. This Table to be utilized by appropriately knowledgeable engineering or construction individuals.
3. Use of this table assumes construction is Code Compliant, i.e., collar ties exist at appropriate spacing, rafters are correctly located on opposing sides of ridge beam.
4. Actual spans exceeding the Table values may be reduced by installing rafter braces to appropriate bearing wall locations, employ a Registered Design Professional (RDP) for proper details.
5. Ground Snow Loads (P<sub>e</sub>) based on 780 CMR 58.00.
6. Allowable stress design based on NDS-2005, maximum total load deflection limited to L/180.
7. PV panels installed parallel to the roof plane and the distance between the roof covering and bottom of the PV panel is ≤12".