MODEL ENERGY, PLLC
MODELENERGY.COM
919-274-9905
300 FAYETTEVILLE ST., #1430
RALEIGH, NC 27602

Project: Anita Bolz

Subject: PV System Structural Compliance

Date: 1/17/2019

To whom it may concern:

Model Energy, PLLC has reviewed the installation details of the proposed PV system that is to be installed by Emerald Energy at 66 Sherman Pines Drive, Fuquay-Varina, NC 27526. The review was limited to the structural elements involved in the construction and not the electrical, mechanical, etc.

System/Structural Information

Wind Speed: 116 mph Exposure Category: B
Mean Roof Height: 25 ft. Roof Pitch: 6/12
Rafter Size, Spacing, and Span: 2" x 10" @ 16" O.C., 19'-8"
Roof Construction: Rafters, Sheathing, Asphalt Shingles
Wood Type and Grade: Southern Pine #1
Solar Module Make, Dimensions, and Weight: Solar World SW 295, 66" x 39.4", 40 lbs
Racking System Make and Weight: Everest 48X, 1.0 lbs. per foot
Roof Attachment Make: Everest L-feet (1) 5/16" x 4.5" lag per attachment
Roof Attachment Weight: 0.15 lb. per foot

PV System Dead Load: (Panel + Racking weight) / PV System Area

(16 panels x 40lbs./panel + 139 ft. of racking x 1.15 lb./ft) / (16 panels x 66" x 39.4") = 2.8 psf

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Additional Dead Load

The existing roof structure is comprised of 2"x10" wood rafters spanning 19'-8" from hip to ridge. On top of this is 5/8" thick OSB roof sheathing, with tar paper, and a single layer of asphalt shingles. The estimated dead load of the existing materials is 3.9 psi (1.6 psi for sheathing + 2.3 psi for shingles). The existing structure has been sized and spaced for supporting a dead load up to 10.0 psi. The additional dead load of the PV system and the existing roof elements gives a total dead load of 6.6 psi which can be adequately supported by the existing roof structure.

Wind Load and Roof Attachments

Based on the wind loading method outlined in ASCE 7-05 and the conditions/materials used in this installation, the following roof attachment layout is required for properly securing the PV system to the roof structure:

1. The attachments on the end of each rail shall be within 12" of the end of the rail.
2. Interior attachments within 36" of a roof edge and peak or two roof edges, "Zone 3", may be spaced apart no more than 32".
3. Interior attachments within 36" of a roof edge or peak, "Zone 2", may be spaced apart no more than 48".
4. Interior attachments that are NOT within 36" of a roof edge or peak, "Zone 1", may be spaced apart no more than 64".
5. Staggering the attachments of the top and bottom rails is preferable, but not required.
6. A single 5/16" x 4.5" (2.5" thread) lag screw shall secure each attachment foot to a roof member. Follow the manufacturers recommended pilot hole size to ensure proper fastening.

Thank you,
Andrew King, PE