Mina Makar

Engineer-PE

Pro Custom Solar LLC
3096B Hamilton Blvd
South Plainfield, NJ 07080

732-902-6224
February 23, 2023

Re: Proposed Photovoltaic Solar Panel Installation

       Laquasha Dixon

       797 SOUTHWEST TUSTENUGGEE AVENUE

       LAKE CITY, FL 32055

Dear Plan Reviewer:

Certification: I have reviewed the engineering testing reports for the racking and attachments to be used on this project and I certify that the products are capable of supporting the code required loads and are suitable for this installation when installed in strict compliance with the manufacturers printed instructions.

Regarding the solar panel array installation on the above referenced project please note that an inspection was performed by a representative of the Architect/Engineer of Record, and analysis of the existing structure was conducted. There is adequate structural capacity for the installation of the array with the following recommendations:

1. The array will be installed on the existing roof. The roof framing is constructed of 2"x4" wood trusses @24" o.c. spanning 13'9" with a top chord length of 14'7" with intermediate supports at 1/2 points, making the effective longest span equals 7'6" with 1/2" plywood sheathing. The new array (See Site map by contractor) will add 2.63 Lb. / Sf. overall to the roof. The existing structure is sufficient to support the new loads associated with the additional weight & wind resistance. No additional structural support is required for the roof structure.

2. The attachment system shall be secured to the roof and shall be in strict compliance with manufacturers printed instructions. The attachment system shall be UL 1703 approved tested. Provide 6 mil. vapor barrier between dissimilar metals. Provide water tight gasket and sealant at all penetrations. Attachments shall follow panel rows as specified by the system manufacturer's installation manual. The panel angle shall match the roof slope. Reference summary table below:

Roof Type:	Shingle	Fastener Max Spacing (in.)		
Attachment System:	"ROOFTECH"® "RT MINI II" & "EcoFasten" Click Fit® Attachment Systems	Wind Zone 1	Wind Zone 2	Wind Zone 3
Fastener Info:	min. 5/16" x 4" long stainless-steel lags with a min. embedment of 3" into the rafters	48	32	32

3. Solar Modules shall be UL-1703 rated. Refer to manufacturers specifications sheets.

4. Positive drainage of the system shall be so as not to void the existing roof warranty.

5. All aspects of the installation shall comply with the Florida Administrative Code, 2020 Florida Building Code - Residential Seventh Edition, ASCE-7-16, 2020 Florida Building Code – Energy Conservation, Seventh Edition, 2017 National Electric Code, All Local Governing County and Municipal Ordinances adopted by reference or enacted by law. All components used meet the criteria of the Florida Solar Energy Center.

6. Please refer to the attached structural calculations.

If you have any questions relating to this matter, please contact me at your earliest convenience. Thank you.

Mina Makar, P.E.
FL. Lic. No. PE86753

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Gravity Load Calculation Criteria

Structural Design Loads per ASCE 7-16

Dead Loads = 10 psf + 2.6 psf (new solar panels) = 12.6 psf

Roof Live Load = 20 psf

Ground Snow Load/Live Load = 0 psf

Wind Load Calculation Criteria

Wind Loads per ASCE 7-16, Equation 29.4-7

Using an effective wind area of 10 SF, external pressure coefficient from Figure 30.3-A-I

Zone 1 = -26.8 psf	Roof Slope = 15 degrees	Roof Mean Height = 15 ft
Zone 2 = -34.8 psf	Basic Wind Speed = 120 mph	
Zone 3 = -40.2 psf	Exposure = B	

Per section 2.4.1, ASD combo = D + 0.6W:

Zone 1 = 2.6 psf + 0.6(-26.8 psf) = -13.5 psf

Zone 2 = 2.6 psf + 0.6(-34.8 psf) = -18.3 psf

Zone 3 = 2.6 psf + 0.6(-40.2 psf) = -21.5 psf

Check Attachment to Wood Truss

Use 5/16 dia. Lag screw w/ 3" embedment into 2 in. wide roof rafter

Lag Screw Spacing:	Lag Screw Tributary Area:
Zone 1 = 48" o.c. max	Zone 1 = (48" o.c. max)^2 / 144 = 16 SF
Zone 2 = 32" o.c. max	Zone 2 = (32" o.c. max)^2 / 144 = 7.11 SF
Zone 3 = 32" o.c. max	Zone 3 = (32" o.c. max)^2 / 144 = 7.11 SF

Lag Screw Forces:

W = 266lb/in (Table 12.2A, 2015 NDS)

Zone 1 = 13.5 psf x 16 SF = 216 lb   < W', OK   Cd = 1.6 (Table 2.3.2, 2015 NDS)

Zone 2 = 18.3 psf x 7.11 SF = 130 lb   < W', OK   Ct = 1 (Table 2.3.3, 2015 NDS)

Zone 3 = 21.5 psf x 7.11 SF = 153 lb   < W', OK   W' = W x embed x Cd x Ct

W' = 266 lb/in x 3 in. x1.6 x 1 = 1276.8 lb