ON-SITE
Residential Engineering

Project #	21-129
Location	55 Farrah Shea Way, Angier
Client	Covenant Solar Tech
Contact	brandonr@covenantsolar.com

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Date	April 23, 2021

The purpose of this engineering project is to determine the structural adequacy of the existing roof system to support the addition of a solar panel energy system, and to provide a general visual review of the installed system to meet the intent of the NC Residential Code, 2018 Edition. The following structural specifications are based on the site visit by John F. Deal, PE on April 22, 2021. Directional indicators are referenced as if standing in front of, and facing the front of the residence. The engineer's seal applies only to structural items specifically addressed in this project.

(A) Solar Panel Energy System Addition

Observations

An array of solar panels has been added to the roof of the residence. The roof structure in this area is composed of 2x8 roof rafters spaced at 16" o.c., which span a horizontally projected distance of 17'-0". The roof covering is composed of asphalt shingles. The solar panel array is attached to the roof with a total of 88 footing plates per manufacturer. Plates appear to be located above rafters and attached with one 5/16" lag screw per manufacturer's instructions.

Per Covenant Solar Tech:

Total Solar Panel Array Area	773 sq ft
Total Solar Panel Array Weight	2,051 lb
Dead Load Added	**2.7 psf**

Per NC Residential Code, 2018 Edition:

Roof Live Load	20 psf	Table R301.5
Roof Dead Load	7 psf	Section R301.4
Wind Speed / Exposure	120 mph / Exposure B	Figure R301.2(4)
Wind Load (Uplift)	14.3 psf	Table R301.2(2)

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(A) Solar Panel Energy System Addition (continued)

Structural Specification

Upon analysis, it has been determined that the existing roof structure is adequate to support the design loads imposed by the NC Residential Code, 2018 Edition as well as the additional 2.7 psf dead load of the solar panel system.

The total uplift on the solar panel array is approximately 11,020 lb, which is resisted by a total of 88 footing plates. Footing plates withstand an uplift load of 125 lb per plate, which is within their allowable capacity.

The PV structural installation has been designed and inspected, and from a general visual review, no changes or reinforcements are necessary for the support and anchorage of the solar panel system to meet the intent of the NC Residential Code, 2018 Edition.

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