HEWITT SOLUTIONS, PLLC
DESIGN & ENGINEERING SERVICES

PROJECT: Donahoo Residence

ADDRESS: 76 Haywood Street, Spring Lake, NC 28390

SUBJECT: Roof Structural Review

DATE: December 16, 2020

To whom it may concern:

I, Ricky L Hewitt, Jr., PE, have reviewed the site information for the proposed PV system that is to be installed by Powerhome Solar. This review includes evaluation of the existing structures ability to handle the gravitational loads associated with the addition of PV system. In my professional opinion, I believe the additional gravitational loads imposed by the PV system to be acceptable for the project roof based on the following conditions and assumptions:

a. The structure conformed and was built to the building code requirements at time of construction.
b. Truss bracing required by original truss designer/manufacturer is installed as required, if required.
c. Loads imposed on bottom chord due to storage & equipment not evaluated.
d. The solar array displaces roof live loads that the roof was originally designed to carry because the area of panels is inaccessible (less than 24" between panel and roof).
e. The conditions of the overall roof structure are consistent with those represented in the initial site inspection photos and as provided by contractor in Site Survey package.
f. Snow loads remain unaffected by PV system.
g. Wind Speed and Ground Snow Load to be revised, if necessary, as directed by Building Official.
h. Current Ground Snow Load (GSL) is equal to or less than GSL at time of original construction.
i. The data and calculations provided in this letter.

SITE INFORMATION:

CATEGORY	CONDITION
WIND SPEED	*120 mph*
EXPOSURE CATEGORY	*B*
GROUND SNOW LOAD	*10 psf*
MEAN ROOF HEIGHT	*<30 ft*
ROOF PITCH	*27 degrees*
CONSTRUCTION TYPE	*Truss*
RAFTER SIZE, SPACING	*2x4 truss @ 24" O.C.*
ROOFING MATERIAL	*Plywood & shingles*

ANALYSIS:

Based on the above listed site data, the dead load capacity of the top chord of the truss is determined to be at least 10 psf per standard truss design. The top chord dead load tabulation below indicates the total roof system (including PV system) is less than the 10 psf dead load that it is understood to be rated for. The max unsupported span of the top chord members is also less than those listed in TABLE R802.4.1(1) of the 2015 North Carolina Residential Code for the conditions specific to this project and site. Attachment gravitational point loads are approximately 25 lbs each which is less than the industry recommended max of 45 lbs.

DEAD LOAD TABULATION:

TOP CHORD DEAD LOAD			
EXISTING	ROOF DECKING	*1.5*	PSF
	SHINGLES	*2.3*	PSF
	TRUSS	*2.0*	PSF
	MISC.	*1.0*	PSF
PROPOSED	PV SYSTEM	*3.0*	PSF
TOTAL		**9.8**	**PSF**

SUMMARY:

In my professional opinion, the existing roof has been evaluated and determined to be adequate for carrying the additional dead load associated with the proposed PV system, with the following conditions:

- All construction shall conform to all pertinent state and local building codes and ordinances.
- Recommend alternating roof attachments between rafters to best distribute the loads.
- Consult the engineer-of-record if conditions other than specified in this letter are encountered.
- Attachment shall be 5/16” lag screw with minimum 2.5” embedment installed per manufacturer’s specifications with a maximum spacing of 48” unless otherwise permitted by engineer.
- Attachments and racking shall be installed according to manufacturer’s specifications, including maximum allowable cantilever.

Regards,

Ricky L. Hewitt, Jr. PE
Owner & Engineer
Hewitt Solutions, *PLLC*
(252) 267-2525

NORTH CAROLINA PROFESSIONAL SEAL 042053 ENGINEER RICKY L. HEWITT, JR.

Ricky Hewitt Jr., PE

Digitally signed by Ricky Hewitt Jr., PE
Date: 2020.12.16 14:55:45 -05'00'