



VSE Project Number: U3340.0239.201

September 4, 2020

Moxie Solar
230 Sugar Creek Lane
North Liberty, IA 52317

**REFERENCE: Avery, Terry- Residence (13-2479-1): 943 Butler Drive, Erwin, NC 28339
Solar Array Installation**

To Whom It May Concern:

Per your request, Cameron Alworth, a representative of Vector Structural Engineering, LLC performed a site visit as the address above on August 26, 2020. The purpose of the visit was to observe the existing framing and determine the adequacy of the existing structure to support the proposed installation of solar panels on the roof.

Based upon our review, we conclude that the existing structure is adequate to support the proposed solar panel installation.

Design Parameters

Code: North Carolina Building Code, 2018 Edition (2015 IBC)
Risk Category: II
Design wind speed: 119 mph (3-sec gust) per ASCE 7-10
Wind exposure category: C
Ground snow load: 10 psf

Existing Roof Structure

Roof structure: 2x6 manufactured trusses @ 24" O.C.
Roofing material: composite shingles

Connection to Roof

Mounting connection: (1) 5/16" lag screw w/ min. 2.5" embedment into framing at max. 48" o.c. along rails
(2) rails per row of panels, evenly spaced; panel length perpendicular to the rails not to exceed 67 in

Conclusions

Based upon our review, we conclude that the existing structure is adequate to support the proposed solar panel installation. In the area of the solar array, other live loads will not be present or will be greatly reduced (2018 NCBC, Section 1607.12.5). The glass surface of the solar panels allows for a lower slope factor per ASCE 7, resulting in reduced design snow load on the panels. The gravity loads and; thus, the stresses of the structural elements, in the area of the solar array are either decreased or increased by no more than 5%. Therefore, the requirements of Section 807.4 of the 2018 NCEBC (2015 IEBC) are met and the structure is permitted to remain unaltered.



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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. Because the increase in lateral forces is less than 10%, this addition meets the requirements of the exception in Section 807.5 of the 2018 NCEBC (2015 IEBC). Thus the existing lateral force resisting system is permitted to remain unaltered.

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 must notify Vector Structural 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. Connections to existing roof framing must be staggered, except at array ends, so as not to overload any existing structural member. 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. The design of the solar panel racking (mounts, rails, etc.) and electrical engineering is the responsibility of others. Waterproofing around the roof penetrations is the responsibility of others. Vector Structural Engineering assumes no responsibility for improper installation of the solar array.

VECTOR STRUCTURAL ENGINEERING, LLC
NC Firm License: COA #P-0742



09/04/2020

Trevor Hawkes, P.E.
NC License: 44374 - Expires: 12/31/2020
Project Engineer

Enclosures

TPH/bac