

5000 Gateway Dr. Ste 105
Medina, OH, 44256
330-419-2520
www.SynEngServices.com
ajsniiff@synengservices.com

October 13, 2019

Client: Modern Energy

Project Address: 424 S Columbia Ave, Columbus OH 43209

Subject: Structural Roof Evaluation

To Whom It May Concern:

We have reviewed the documents provided by Modern Energy relating to the installation of the solar array at the above- referenced site. Based upon our review, it is our conclusion that the installation of the solar array on this existing roof will not adversely affect this structure. It is our understanding that the structural components of the existing roof framing are in good condition and free of damage. The design of the solar panel racking (mounts, rails, etc.) and attachment is by the manufacturer or contractor. Please note a representative of Synergy Engineering has not physically observed the roof framing.

Design Parameters

Code: International Building Code,

Risk Category: II

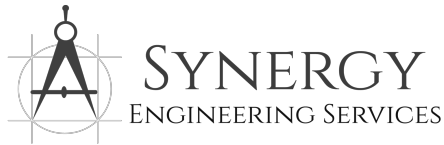
Design wind speed: 115 mph (3-sec gust) per ASCE 7-10 Wind exposure category: C

Ground snow load: 20 psf

Conclusions

Our conclusion regarding the adequacy of the existing roof is based on the fact that the additional weight of the solar array and attachment hardware is 4 psf or less. In the area of the solar array, other live loads will not be present or will be greatly reduced. Evaluation of expected loads and stress increase of the wood framing was made and shows sufficient reserve capacity in the roof framing members. Regarding snow loads, because the panels are slippery and unobstructed, effective snow loads will be reduced in the area of the solar array. The gravity loads in the area of the solar array are decreased; thus, the stresses of the structural elements are decreased. Based on these items, **the proposed solar array is structurally acceptable to install per the areas shown in the following layout drawing.**

Regarding lateral loads, 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 connections to the existing roof shall be spaced at 48" maximum. Because the increase in lateral forces is less than 10%, this addition meets the requirements of the exception in Section 3403.4 of the IBC. Thus the existing structure is permitted to remain unaltered.



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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 shall notify Synergy 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. Particular attention must be paid to the maximum allowable spacing of connections and the location of solar panels relative to roof edges. 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. Electrical engineering is the responsibility of others. Waterproofing around the roof penetrations is the responsibility of others. Synergy Engineering, LLC assumes no responsibility for improper installation of the solar array. Synergy Engineering, LLC assumes no responsibility for the effects of snow falling from roofs onto other roofs, property or persons due to the installation of the solar array.

Very truly yours,
Synergy Engineering Services

A handwritten signature in black ink that reads 'Adam J. Sniff'.

Adam J. Sniff, P.E.
Consulting Engineer



Figure 1. Proposed Solar Array

