

# BARUN CORP

November 1, 2023

RE:

CERTIFICATION LETTER

Project Address:

SHAWN BAILEY  
233 SOUTH WEST HAVEN COURT  
HIGH SPRINGS, FL 32643

**Design Criteria:**

- Applicable Codes = 2020 FLBC/FLEBC 7th Edition, 2020 FLRC 7th Edition, 2018 IEBC/IBC, ASCE 7-16 and 2018 NDS
- Risk Category = II
- Wind Speed = 119 mph, Exposure Category C, Partially/Fully Enclosed Method
- Ground Snow Load = 0 psf
- Roof 1: 2 x 2 @ 24" OC, Roof DL = 5 psf, Roof LL/SL = 20 psf (Non-PV), Roof LL/SL = 0 psf (PV)

To Whom It May Concern,

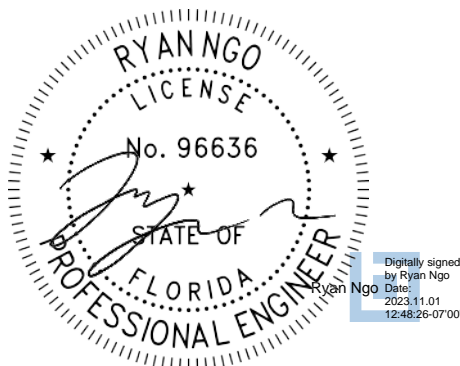
A structural evaluation of loading was conducted for the above address based on the design criteria listed above.

Existing roof structural framing has been reviewed for additional loading due to installation of Solar PV System on the roof. The structural review applies to the sections of roof that is directly supporting the Solar PV System.

Based on this evaluation, I certify that the alteration to the existing structure by installation of the Solar PV System meets the prescriptive compliance requirements of the applicable existing building and/or new building provisions adopted/referenced above.

Additionally, the Solar PV System assembly (including attachment hardware) has been reviewed to be in accordance with the manufacturer's specifications and to meet and/or exceed the requirements set forth by the referenced codes.

Sincerely,



This item has been digitally signed and sealed by Ryan Ngo, PE. on the date and/or time stamp shown using a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified by a 3rd Party Certificate Authority on any electronic copy.

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MOUNTING PLANE STRUCTURAL EVALUATION			
MOUNTING PLANE	ROOF PITCH	RESULT	GOVERNING ANALYSIS
Roof 1	10°	OK	IEBC IMPACT CHECK

STANDOFF HARDWARE EVALUATION FOR WIND UPLIFT	
MOUNTING PLANE	WIND UPLIFT DCR
Roof 1	96.7%

### Limits of Scope of Work and Liability:

The existing structure has been reviewed based on the assumption that it has been originally designed and constructed per appropriate codes. The structural analysis of the subject property is based on the provided site survey data. The calculations produced for this structure's assessment are only for the roof framing supporting the proposed PV installation referenced in the stamped planset and were made according to generally recognized structural analysis standards and procedures. All PV modules, racking and attachment components shall be designed and installed per manufacturer's approved guidelines and specifications. These plans are not stamped for water leakage or existing damage to the structural component that was not accessed during the site survey. Prior to commencement of work, the PV system installer should verify that the existing roof and connections are in suitable condition and inspect framing noted on the certification letter and inform the Engineer of Record of any discrepancies prior to installation. The installer should also check for any damages such as water damage, cracked framing, etc. and inform the Engineer of Record of existing deficiencies which are unknown and/or were not observable during the time of survey and have not been included in this scope of work. Any change in the scope of the work shall not be accepted unless such change, addition, or deletion is approved in advance and in writing by the Engineer of Record.

#### PV PANELS DEAD LOAD (PV-DL)

PV Panels Weight	= 2.50 psf
Hardware Assembly Weight	= 0.50 psf
<b>Total PV Panels</b>	<b>PV-DL = 3.00 psf</b>

#### ROOF DEAD LOAD (R-DL)

Existing Roofing Material Weight	Trapezoidal Metal Roof	1 Layer(s)	= 1.50 psf
Underlayment Weight			= 0.50 psf
Plywood/OSB Sheathing Weight			= 1.50 psf
Framing Weight	2 x 2 @ 24 in. O.C.		= 0.31 psf
No Vaulted Ceiling			= 0.00 psf
Miscellaneous			= 1.50 psf
<b>Total Roof Dead Load</b>			<b>R-DL = 5.30 psf</b>

#### REDUCED ROOF LIVE LOAD (Lr)

Roof Live Load	Lo = 20.00 psf
Member Tributary Area	At < 200 ft <sup>2</sup>
Roof 1 Pitch	10° or 2/12
Tributary Area Reduction Factor	R1 = 1.00
Roof Slope Reduction Factor	R2 = 1.00
<b>Reduced Roof Live Load, Lr = Lo (R1) (R2)</b>	<b>Lr = 20.00 psf</b>

#### SNOW LOAD

Ground Snow Load	pg = 0.00 psf
Effective Roof Slope	10°
Snow Importance Factor	Is = 1.00
Snow Exposure Factor	Ce = 1.00
Snow Thermal Factor	Ct = 1.10
Minimum Flat Roof Snow Load	pf-min = 0.00 psf
<b>Flat Roof Snow Load</b>	<b>pf = 0.00 psf</b>

#### SLOPED ROOF SNOW LOAD ON ROOF (Non-Slippery Surfaces)

Roof Slope Factor	Cs-roof = 1.00
<b>Sloped Roof Snow Load on Roof</b>	<b>ps-roof = 0.00 psf</b>

#### SLOPED ROOF SNOW LOAD ON PV PANELS (Unobstructed Slippery Surfaces)

Roof Slope Factor	Cs-PV = 1.00
<b>Sloped Roof Snow Load on PV Panels</b>	<b>ps-PV = 0.00 psf</b>

	EXISTING	WITH PV PANELS	
Roof Dead Load (DL) =	5.30	8.30	psf
Roof Live Load (Lr) =	20.00	0.00	psf
Roof Snow Load (SL) =	0.00	0.00	psf

	EXISTING	WITH PV PANELS	
(DL + Lr)/Cd =	20.24	9.22	psf
(DL + SL)/Cd =	4.61	7.22	psf
Maximum Gravity Load =	20.24	9.22	psf

 Load Increase (%) = -54.44% **OK**

The requirements of section 806.2 of 2018 IEBC are met and the structure is permitted to remain unaltered.

#### SITE INFORMATION

Ultimate Wind Speed =	119.00 mph	Roof Pitch =	10°
Risk Category =	II	Roof Type =	Gable
Exposure Category =	C	Velocity Pressure Exposure Coefficient, Kz =	0.85
Mean Roof Height =	10.00 ft	Topographic Factor, Kzt =	1.00
Solar Array Dead Load =	3.00 psf	Wind Directionality Factor, Kd =	0.85
a =	3.00 ft	Ground Elevation Factor, Ke =	1.00

#### DESIGN CALCULATIONS

DESIGN CALCULATIONS			
Wind Velocity Pressure, qh =		26.16 psf	(0.00256*Kz*Kzt*Kd*Ke*(V^2))
Solar Array Pressure Equalization Factor, ya =		0.60	
Hardware Type =		S-5 Proteabacket	
Allowable Load =		300.00 lbs	Metal Roof Attachment
Array Edge Factor, γE =		1.00	Non-Exposed Condition
Max. X - Spacing (Zone 1 & 2e) =		3.75 ft	Effective Wind Area 11.25 ft²
Max. Y - Spacing (Zone 1 & 2e) =		3.00 ft	
Max. X - Spacing (Zone 2n - 3e) =		3.75 ft	Effective Wind Area 11.25 ft²
Max. Y - Spacing (Zone 2n - 3e) =		3.00 ft	
Max. X - Spacing (Zone 3r) =		2.00 ft	Effective Wind Area 6.00 ft²
Max. Y - Spacing (Zone 3r) =		3.00 ft	
ROOF ZONE	GCp (-) UPLIFT	UPLIFT PRESSURE	
1 & 2e	-2.00	-17.06 psf	
2n - 3e	-2.93	-25.79 psf	
3r	-3.60	-32.13 psf	
		PULLOUT FORCE	
		191.95 lbs	
		290.15 lbs	
		192.78 lbs	

#### NOTE:

- Wind calculation is based on ASCE 7-16, 29.4 - C&C, LC #7: 0.6DL + 0.6WL is used.