

BARUN CORP

July 7, 2023

RE: CERTIFICATION LETTER

Project Address: TROY HARRIS
132 COOPER CREEK AVENUE
SPRING LAKE, NC 28390

Design Criteria:

- Applicable Codes = 2018 NCSBC, 2015 IEBC/IBC, 2015 IRC, ASCE 7-10 and 2015 NDS
- Risk Category = II
- Wind Speed = 130 mph, Exposure Category B, Partially/Fully Enclosed Method
- Ground Snow Load = 15 psf
- Roof 1&3: 2 x 4 @ 16" OC, Roof DL = 7 psf, Roof LL/SL = 17 psf (Non-PV), Roof LL/SL = 7.7 psf (PV)
- Roof 2: 2 x 4 @ 16" OC, Roof DL = 7 psf, Roof LL/SL = 19 psf (Non-PV), Roof LL/SL = 9.3 psf (PV)
- Roof 4 & 5: 2 x 4 @ 16" OC, Roof DL = 7 psf, Roof LL/SL = 19 psf (Non-PV), Roof LL/SL = 9.3 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 along with structural upgrades for the ROOF/ARRAY/MP(s) specified below, meets the prescriptive compliance requirements of the applicable existing building and/or new building provisions adopted/referenced above.

- Roof 4 & 5: Blocking Upgrade

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,



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MOUNTING PLANE STRUCTURAL EVALUATION			
MOUNTING PLANE	ROOF PITCH	RESULT	GOVERNING ANALYSIS
Roof 1&3	30°	OK	IEBC IMPACT CHECK
Roof 2	22°	OK	IEBC IMPACT CHECK
Roof 4 & 5	22°	OK	IEBC IMPACT CHECK

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.

BARUN CORP	LOAD CALCULATION	
	Roof 1&3	
TROY HARRIS, 132 COOPER CREEK AVENUE, SPRING LAKE, NC 28390		

PV PANELS DEAD LOAD (PV-DL)	
PV Panels Weight	= 2.50 psf
Hardware Assembly Weight	= 0.50 psf
Total PV Panels Weight	PV-DL = 3.00 psf

ROOF DEAD LOAD (R-DL)			
Existing Roofing Material Weight	Composite Shingle Roof	1 Layer(s)	= 2.50 psf
Underlayment Weight			= 0.50 psf
Plywood/OSB Sheathing Weight			= 1.50 psf
Framing Weight	2 x 4 @ 16 in. O.C.		= 1.09 psf
No Vaulted Ceiling			= 0.00 psf
Miscellaneous			= 1.50 psf
Total Roof Dead Load			R-DL = 7.10 psf

REDUCED ROOF LIVE LOAD (Lr)	
Roof Live Load	Lo = 20.00 psf
Member Tributary Area	At < 200 ft ²
Roof 1&3 Pitch	30° or 7/12
Tributary Area Reduction Factor	R1 = 1.00
Roof Slope Reduction Factor	R2 = 0.85
Reduced Roof Live Load, Lr = Lo (R1) (R2)	Lr = 17.00 psf

SNOW LOAD	
Ground Snow Load	pg = 15.00 psf
Effective Roof Slope	30°
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
Flat Roof Snow Load	pf = 11.60 psf

SLOPED ROOF SNOW LOAD ON ROOF (Non-Slippery Surfaces)	
Roof Slope Factor	Cs-roof = 1.00
Sloped Roof Snow Load on Roof	ps-roof = 11.60 psf

SLOPED ROOF SNOW LOAD ON PV PANELS (Unobstructed Slippery Surfaces)	
Roof Slope Factor	Cs-PV = 0.67
Sloped Roof Snow Load on PV Panels	ps-PV = 7.70 psf

BARUN CORP	IEBC IMPACT CHECK	
	Roof 1&3	
TROY HARRIS, 132 COOPER CREEK AVENUE, SPRING LAKE, NC 28390		

	EXISTING	WITH PV PANELS	
Roof Dead Load (DL) =	7.10	10.10	psf
Roof Live Load (Lr) =	17.00	0.00	psf
Roof Snow Load (SL) =	11.60	7.70	psf

	EXISTING	WITH PV PANELS	
(DL + Lr)/Cd =	19.28	11.22	psf
(DL + SL)/Cd =	16.26	15.48	psf
Maximum Gravity Load =	19.28	15.48	psf

Load Increase (%) = -19.72% **OK**

The requirements of section 807.4 of 2015 IEBC are met and the structure is permitted to remain unaltered.

BARUN CORP	LOAD CALCULATION	
	Roof 2	
TROY HARRIS, 132 COOPER CREEK AVENUE, SPRING LAKE, NC 28390		

PV PANELS DEAD LOAD (PV-DL)	
PV Panels Weight	= 2.50 psf
Hardware Assembly Weight	= 0.50 psf
Total PV Panels Weight	PV-DL = 3.00 psf

ROOF DEAD LOAD (R-DL)			
Existing Roofing Material Weight	Composite Shingle Roof	1 Layer(s)	= 2.50 psf
Underlayment Weight			= 0.50 psf
Plywood/OSB Sheathing Weight			= 1.50 psf
Framing Weight	2 x 4 @ 16 in. O.C.		= 1.09 psf
No Vaulted Ceiling			= 0.00 psf
Miscellaneous			= 1.50 psf
Total Roof Dead Load			R-DL = 7.10 psf

REDUCED ROOF LIVE LOAD (Lr)	
Roof Live Load	Lo = 20.00 psf
Member Tributary Area	At < 200 ft ²
Roof 2 Pitch	22° or 5/12
Tributary Area Reduction Factor	R1 = 1.00
Roof Slope Reduction Factor	R2 = 0.95
Reduced Roof Live Load, Lr = Lo (R1) (R2)	Lr = 19.00 psf

SNOW LOAD	
Ground Snow Load	pg = 15.00 psf
Effective Roof Slope	22°
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
Flat Roof Snow Load	pf = 11.60 psf

SLOPED ROOF SNOW LOAD ON ROOF (Non-Slippery Surfaces)	
Roof Slope Factor	Cs-roof = 1.00
Sloped Roof Snow Load on Roof	ps-roof = 11.60 psf

SLOPED ROOF SNOW LOAD ON PV PANELS (Unobstructed Slippery Surfaces)	
Roof Slope Factor	Cs-PV = 0.80
Sloped Roof Snow Load on PV Panels	ps-PV = 9.30 psf

BARUN CORP	IEBC IMPACT CHECK	
	Roof 2	
TROY HARRIS, 132 COOPER CREEK AVENUE, SPRING LAKE, NC 28390		

	EXISTING	WITH PV PANELS	
Roof Dead Load (DL) =	7.10	10.10	psf
Roof Live Load (Lr) =	19.00	0.00	psf
Roof Snow Load (SL) =	11.60	9.30	psf

	EXISTING	WITH PV PANELS	
(DL + Lr)/Cd =	20.88	11.22	psf
(DL + SL)/Cd =	16.26	16.87	psf
Maximum Gravity Load =	20.88	16.87	psf

Load Increase (%) = -19.21% OK

The requirements of section 807.4 of 2015 IEBC are met and the structure is permitted to remain unaltered.

BARUN CORP	LOAD CALCULATION	
	Roof 4 & 5	
TROY HARRIS, 132 COOPER CREEK AVENUE, SPRING LAKE, NC 28390		

PV PANELS DEAD LOAD (PV-DL)	
PV Panels Weight	= 2.50 psf
Hardware Assembly Weight	= 0.50 psf
Total PV Panels Weight	PV-DL = 3.00 psf

ROOF DEAD LOAD (R-DL)			
Existing Roofing Material Weight	Composite Shingle Roof	1 Layer(s)	= 2.50 psf
Underlayment Weight			= 0.50 psf
Plywood/OSB Sheathing Weight			= 1.50 psf
Framing Weight	2 x 4 @ 16 in. O.C.		= 1.09 psf
No Vaulted Ceiling			= 0.00 psf
Miscellaneous			= 1.50 psf
Total Roof Dead Load			R-DL = 7.10 psf

REDUCED ROOF LIVE LOAD (Lr)	
Roof Live Load	Lo = 20.00 psf
Member Tributary Area	At < 200 ft ²
Roof 4 & 5 Pitch	22° or 5/12
Tributary Area Reduction Factor	R1 = 1.00
Roof Slope Reduction Factor	R2 = 0.95
Reduced Roof Live Load, Lr = Lo (R1) (R2)	Lr = 19.00 psf

SNOW LOAD	
Ground Snow Load	pg = 15.00 psf
Effective Roof Slope	22°
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
Flat Roof Snow Load	pf = 11.60 psf

SLOPED ROOF SNOW LOAD ON ROOF (Non-Slippery Surfaces)	
Roof Slope Factor	Cs-roof = 1.00
Sloped Roof Snow Load on Roof	ps-roof = 11.60 psf

SLOPED ROOF SNOW LOAD ON PV PANELS (Unobstructed Slippery Surfaces)	
Roof Slope Factor	Cs-PV = 0.80
Sloped Roof Snow Load on PV Panels	ps-PV = 9.30 psf

BARUN CORP	IEBC IMPACT CHECK	
	Roof 4 & 5	
TROY HARRIS, 132 COOPER CREEK AVENUE, SPRING LAKE, NC 28390		

	EXISTING	WITH PV PANELS	
Roof Dead Load (DL) =	7.10	10.10	psf
Roof Live Load (Lr) =	19.00	0.00	psf
Roof Snow Load (SL) =	11.60	9.30	psf

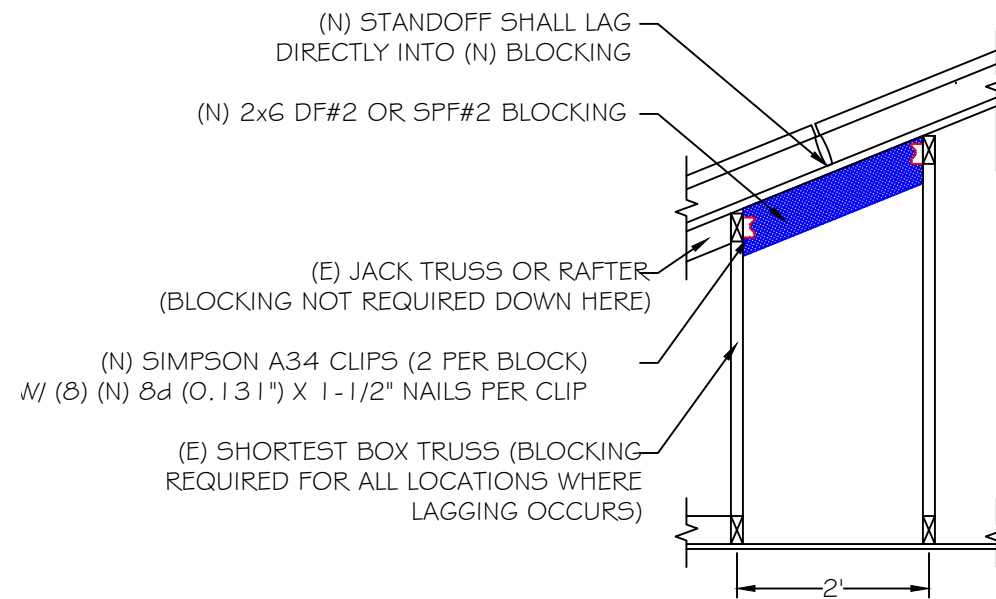
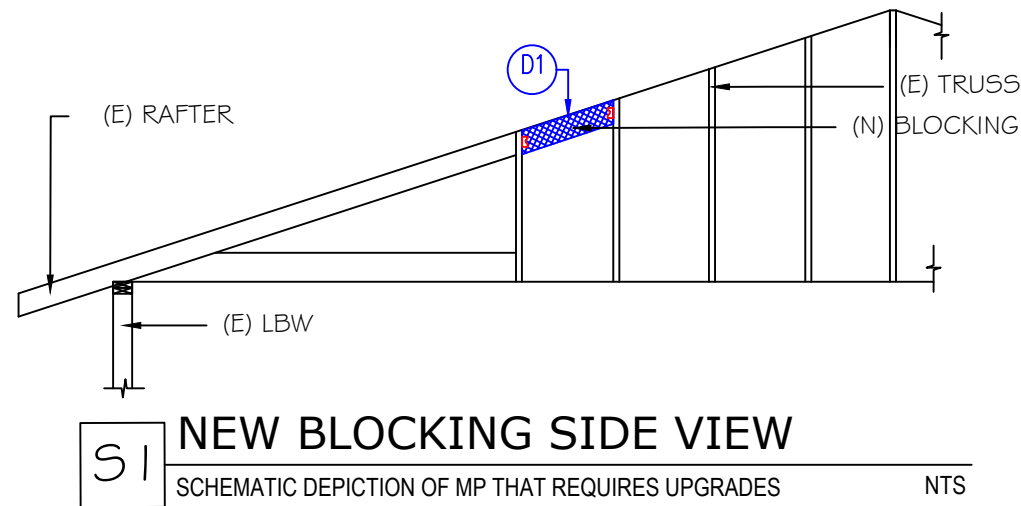
	EXISTING	WITH PV PANELS	
(DL + Lr)/Cd =	20.88	11.22	psf
(DL + SL)/Cd =	16.26	16.87	psf
Maximum Gravity Load =	20.88	16.87	psf

Load Increase (%) = -19.21% **OK**

The requirements of section 807.4 of 2015 IEBC are met and the structure is permitted to remain unaltered.

INSTALLATION NOTES:

1. CUT (N) BLOCKING TO FIT TIGHT BETWEEN (E) TRUSSES AND KEEP FLUSH TO ROOF SHEATHING. ENSURE THERE ARE NO GAPS BETWEEN MEMBERS.
 2. INSTALL (N) BLOCKING WITH TWO (N) A34 CLIPS, ONE AT EACH END OF (N) BLOCKING.
 3. NAIL (N) A34 CLIPS TO (E) TRUSSES WITH (8) (N) 8D (0.131") X 1.5" NAILS, FILLING ALL HOLES. ENSURE ALL NAILS ARE LOCATED AWAY FROM EDGE OF MEMBERS TO AVOID SPLITTING WOOD.
- INSTALL (N) BLOCKING ONLY BELOW STANDOFF LOCATIONS.



D1 NEW BLOCKING SIDE VIEW
Scale: 1/2" = 1'

PREMISE OWNER:

BARUN CORP

905 Chesterfield Dr.
Lower Gwynedd, PA 19002
Phone: (610) 202-4506
website: www.baruncorp.com

DESIGNED BY:	
CHECKED BY:	
APPROVED BY:	

JOB NUMBER:	
MOUNTING SYSTEM:	
MODULES:	
INVERTER:	

DESCRIPTION:
BLOCKING UPGRADE

PAGE NAME:
STRUCTURAL UPGRADES

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SHEET NUMBER:

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