



To: Members of the Board of Adjustment, Applicants & Neighboring Property Owners
From: Jonathan B. Kanipe, Town Manager
Date: November 4, 2020
Re: **Board of Adjustment Meeting – November 16, 2020**

Applicants:

You or a representative **MUST** attend the Zoom meeting in order to have the matter considered.

Members of the Board of Adjustment & staff may visit each property prior to the meeting. If this occurs, the property owner will be notified beforehand and asked if they approve the visit. If so, the visit will be conducted in a socially distant manner consistent with North Carolina state orders related to preventing the spread of Covid-19.

Neighbors:

You are receiving this notice because your property is adjacent to an applicant on this month's agenda.

You may review applications & plans for the projects on this agenda at <http://www.biltmoreforest.org/board-of-adjustments>.

You are invited to attend the scheduled meeting via Zoom and make comment when called upon. Any additional information regarding the Zoom meeting will be provided on the Town's website no later than November 11, 2020.

The following items of business are scheduled to be addressed by the Biltmore Forest Board of Adjustment on Monday, November 16, 2020 at 4:00 pm in the Town Hall Board Room via Zoom. The format for the meeting and instructions for attending the meeting via Zoom can be found on the second page of this agenda. The link for the Zoom meeting can be found at the bottom of the second page.

1. The meeting will be called to order and roll call taken.
2. The minutes of the October 19, 2020 regular meeting will be considered.
3. Hearing of Cases (Evidentiary Hearings, Deliberations & Determinations).

Case 1: **63 Forest Road** – A special use permit is requested for the installation of roof mounted solar collectors.

Case 2: **324 Vanderbilt Road** – A special use permit is requested for the installation of a fence, and a variance is requested for installation in the side yard setbacks.

Case 3: **394 Vanderbilt Road** – A special use permit is requested for the construction of a detached accessory building, and a variance is requested for the allowance of two (2) detached accessory buildings on the property.

4. Adjourn

Process and Procedure for November 16, 2020 Board of Adjustment Meeting held on Zoom

- All participants attending will be held in the “waiting room” prior to admittance by Town staff. Once admitted into the meeting, please mute audio until called upon by the Board chair.
- The meeting will be called to order at 4:00 p.m. by the Chair. All interested parties and applicants will be virtually sworn-in at this time.
- Each matter will be called forward and Town staff will authorize video and audio for the applicants and any person with standing for that particular case. If an applicant would like to present visual evidence, they must provide this evidence to Town staff no later than Friday, November 13, 2020.
- The Board chair, or other Board of Adjustment member, will specifically ask questions to the applicant and ask for any evidence that they would like to present.
- The Board chair, or other Board of Adjustment member, will then specifically ask for any person with standing for that specific matter to provide comment. Town staff will moderate this comment period but will ensure each person who wishes to speak or provide evidence is able to do so.
- When all evidence and testimony has been provided, the Board will deliberate and render a decision, then move on to the next matter where the process will be repeated.

How to Access the November 16, 2020 Board of Adjustment Meeting via Zoom

In order to access the Board of Adjustment meeting, please visit <http://zoom.us> to sign up, for free, for a Zoom account. This will enable you to participate with your desktop or laptop computer as you see fit. The Zoom link and log-in credentials are at the bottom of this page.

You may also download the free Zoom app from the Apple Store or Google Play on your mobile iOS or Android device. This app will walk you through setting up a free account.

If you are unable to access the meeting through a web or app based format, but would still like to listen and participate in the meeting, you may do so by calling one of the phone numbers listed below and entering the meeting ID and password.

Dial by your location

+1 312 626 6799 US (Chicago)

+1 646 876 9923 US (New York)

+1 301 715 8592 US (Germantown)

Meeting ID: 889 0690 3841

Passcode: 585221

<https://us02web.zoom.us/j/88906903841?pwd=em81TktxRy9iZVBzZ1I3MGZtbTgzQT09>

Meeting ID: 889 0690 3841

Passcode: 585221

Find your local number: <https://us02web.zoom.us/u/kbPoJDWoHE>

355 Vanderbilt Rd | Biltmore Forest, NC
Po Box 5352 | Biltmore Forest, NC 28803
P (828) 274-0824 | F (828) 274-8131
www.biltmoreforest.org



George F. Goosmann, III, Mayor
Fran G. Cogburn, Mayor-Pro Tem
E. Glenn Kelly, Commissioner
Doris P. Loomis, Commissioner

Jonathan B. Kanipe,
Town Manager

MEMORANDUM

To: Board of Adjustment Members
From: Jonathan Kanipe, Town Manager
Re: Board of Adjustment Case Number 1 (63 Forest Road)
Date: November 11, 2020

Special Use Permit Request for the Installation of a Roof Mounted Solar Panel System

A special use permit is requested for the installation of a roof mounted solar panel system. The Town's Zoning Ordinance considers solar collectors an accessory structure and states they "shall be regulated in accordance with N.C.G.S. 160A-201". A copy of this statute is attached to this memorandum. As a result, a special use permit must be obtained by the applicant before installation on an existing roof. Solar panels are allowed by right as a part of a new construction design under the Town's Zoning Ordinance.

In addition to the zoning applications and special use permit applications, the applicant has included a schematic showing the placement of the panels and a site plan showing the panels on the home.

§ 160A-201. (Repealed effective January 1, 2021) Limitations on regulating solar collectors.

(a) Except as provided in subsection (c) of this section, no city ordinance shall prohibit, or have the effect of prohibiting, the installation of a solar collector that gathers solar radiation as a substitute for traditional energy for water heating, active space heating and cooling, passive heating, or generating electricity for a residential property, and no person shall be denied permission by a city to install a solar collector that gathers solar radiation as a substitute for traditional energy for water heating, active space heating and cooling, passive heating, or generating electricity for a residential property. As used in this section, the term "residential property" means property where the predominant use is for residential purposes.

(b) This section does not prohibit an ordinance regulating the location or screening of solar collectors as described in subsection (a) of this section, provided the ordinance does not have the effect of preventing the reasonable use of a solar collector for a residential property.

(c) This section does not prohibit an ordinance that would prohibit the location of solar collectors as described in subsection (a) of this section that are visible by a person on the ground:

- (1) On the facade of a structure that faces areas open to common or public access;
- (2) On a roof surface that slopes downward toward the same areas open to common or public access that the facade of the structure faces; or
- (3) Within the area set off by a line running across the facade of the structure extending to the property boundaries on either side of the facade, and those areas of common or public access faced by the structure.

(d) In any civil action arising under this section, the court may award costs and reasonable attorneys' fees to the prevailing party. (2007-279, s. 1; 2009-553, s. 1; 2019-111, s. 2.6(g).)

Zoning Compliance Application

Town of Biltmore Forest

Name

Rebecca Morgan

Property Address

63 Forest Road

Phone

(843) 647-7333

Email

permits@empwrsolar.com

Parcel ID/PIN Number

964658673700000

ZONING INFORMATION

Current Zoning

R-1

Lot Size

2 acres?

Maximum Roof Coverage

6,100 square feet (Up to 2 acres)

Proposed Roof Coverage Total

6000

Maximum Impervious Surface Coverage

1-3 acres (25 percent of lot area)

Proposed Impervious Surface Coverage

6000

Front Yard Setback

60 feet (R-1 District)

Side Yard Setback

20 feet (R-1 District)

Rear Yard Setback

25 feet (R-1 District)

Building Height

13

Description of the Proposed Project

installation of electric solar panels - roof mount

Estimated Start Date

11/23/2020

Estimated Completion Date

11/25/2020

Estimated Cost of Project

\$29,454.00

Supporting Documentation (Site Plan, Drawings, Other Information)

Stamped Plans-Morgan.pdf

2020.09.18 - Morgan, Rebecca Structural Letter.pdf

Applicant Signature

Date
10/22/2020

A handwritten signature in black ink, appearing to be "M. K. A.", written over a horizontal line.

Special Use Permit Application

Town of Biltmore Forest

Name

Rebecca Morgan

Address

63 Forest Rd Biltmore Forest , NC 28803

Phone

(828) 777-9813

Email

rebeccaismorgan@gmail.com

Please select the type of special use you are applying for:

Accessory Buildings

The applicant must show that the proposed use will not materially endanger public health or safety or injure value of adjoining or abutting property. In addition, the proposed use must be in general conformity with the plan of development of the town and be in harmony with scale, bulk, height, coverage, density, and character of the neighborhood.

Please provide a description of the proposed project:

Installation of electric solar panels - roof mounted.

Explain why the project would not adversely affect the public interest of those living in the neighborhood:

The solar panels will be installed on the roof of the home, not affecting any neighbors or their property

I hereby certify that all of the information set forth above is true and accurate to the best of my knowledge.

Signature

A handwritten signature in black ink, appearing to read 'Rebecca Morgan', written over a horizontal line.

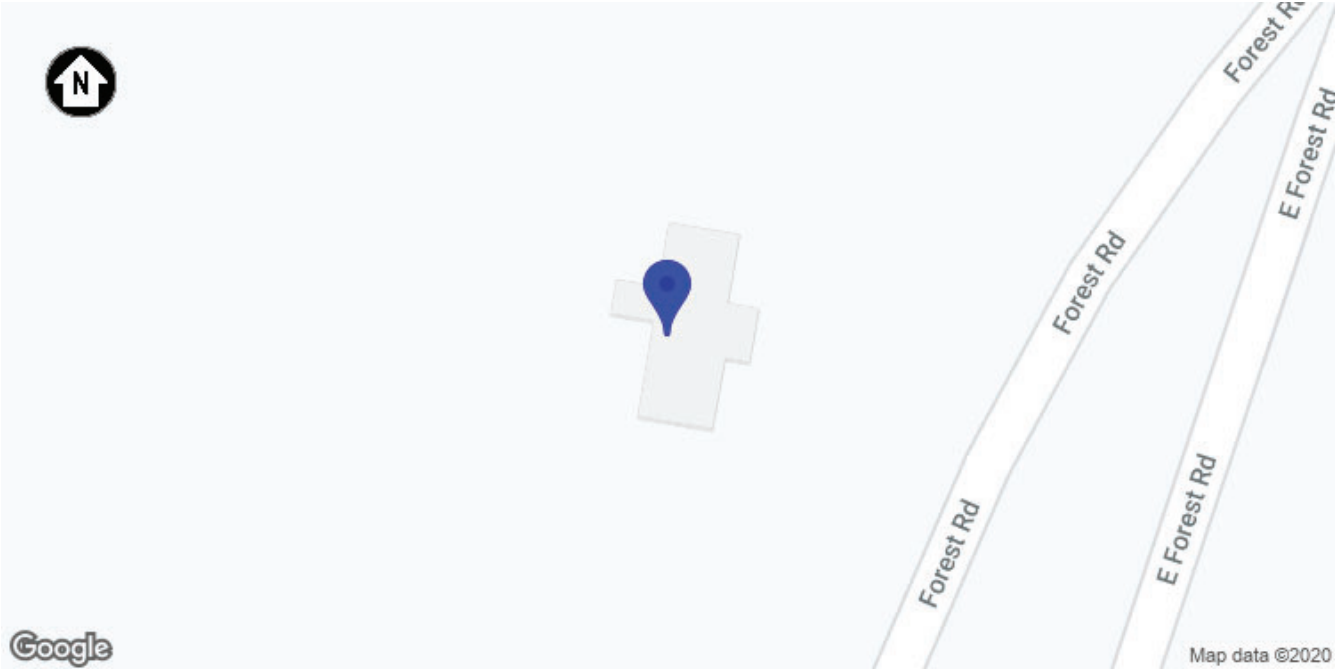
Date

10/27/2020

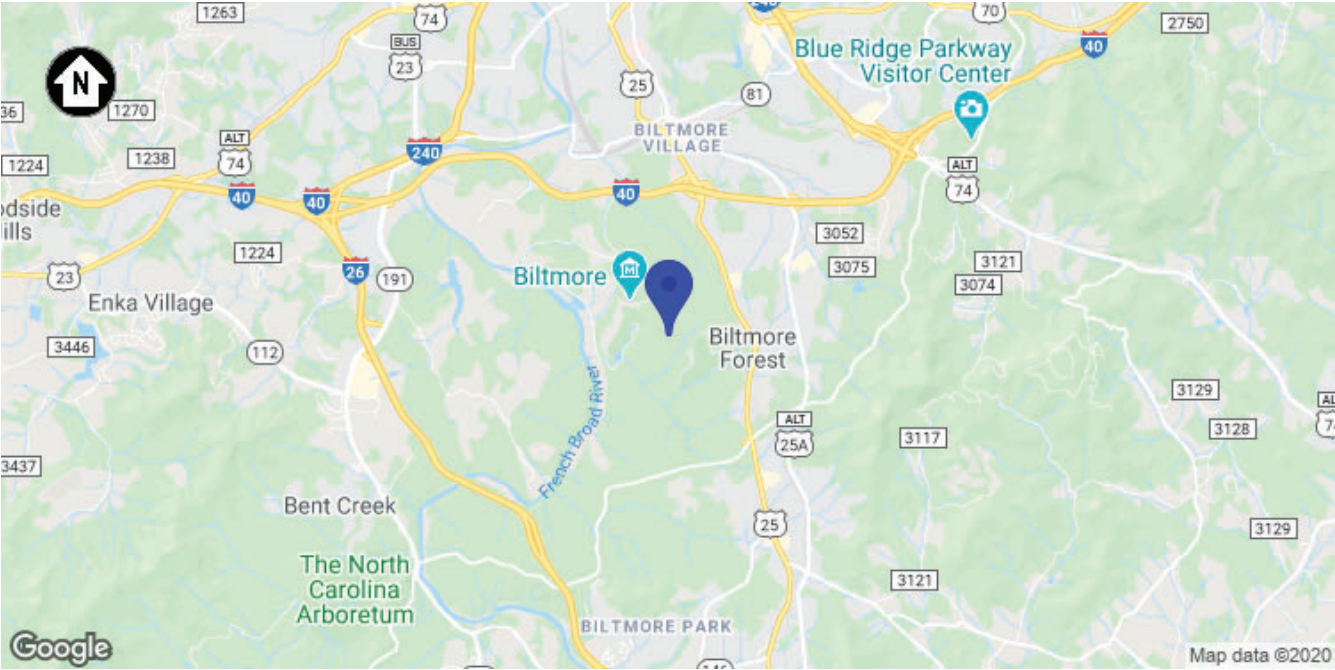
DIRECTORY OF PAGES	
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PV-5.2	ATTACHMENT PLAN 5.2
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PV-5.4	ATTACHMENT PLAN 5.4
PV-5.5	ATTACHMENT PLAN 5.5
PV-6	ATTACHMENT DETAILS
PV-7	FIRE SAFETY PLAN
APPENDIX	ELECTRICAL CALCULATIONS
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	OPTIMIZER DATASHEET
	ARRAY WIRING BOX DATASHEET
	DISCONNECT DATASHEET
	INVERTER DATASHEET
	MOUNTING SYSTEM DATASHEET
	MOUNTING SYSTEM ENGINEERING LETTER
UL 2703 GROUND AND BONDING CERTIFICATION	
ANCHOR DATASHEET	

PROJECT DETAILS	
PROPERTY OWNER	REBECCA MORGAN
PROPERTY ADDRESS	63 FOREST RD, BILTMORE FOREST, NC 28803 US
ZONING	RESIDENTIAL
USE AND OCCUPANCY CLASSIFICATION	ONE- OR TWO-FAMILY DWELLING GROUP (GROUP R3)
AHJ	TOWN OF BILTMORE FOREST
UTILITY COMPANY	DUKE ENERGY CAROLINAS, LLC
ELECTRICAL CODE	2017 NEC (NFPA 70)
FIRE CODE	2018 IFC
OTHER BUILDING CODES	2018 NC BUILDING CODE 2018 NC RESIDENTIAL CODE 2018 NC PLUMBING CODE 2018 NC MECHANICAL CODE

CONTRACTOR INFORMATION	
COMPANY	EMPWR SOLAR/SOURCE ENERGY SOLUTIONS
LICENSE NUMBER	114046 (EL2)
ADDRESS	3445 PELHAM RD, GREENVILLE, SC 29617
PHONE NUMBER	(866) 337-1104



1 PLOT
PV-1 SCALE: NTS



2 LOCALE
PV-1 SCALE: NTS



SCOPE OF WORK
THIS PROJECT INVOLVES THE INSTALLATION OF A PHOTOVOLTAIC POWER SYSTEM. SOLAR PANELS WILL BE RACKED USING A PREENGINEERED RACKING SYSTEM. THE RACKED MODULES WILL BE ELECTRICALLY CONNECTED WITH DC TO AC POWER INVERTERS AND INTERCONNECTED TO THE LOCAL UTILITY USING MEANS AND METHODS CONSISTENT WITH THE RULES ENFORCED BY THE LOCAL UTILITY AND PERMITTING JURISDICTION.

THIS DOCUMENT HAS BEEN PREPARED FOR THE PURPOSE OF DESCRIBING THE DESIGN OF A PROPOSED PV SYSTEM WITH ENOUGH DETAIL TO DEMONSTRATE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS. THE DOCUMENT SHALL NOT BE RELIED UPON AS A SUBSTITUTE FOR FOLLOWING MANUFACTURER INSTALLATION INSTRUCTIONS. THE SYSTEM SHALL COMPLY WITH ALL MANUFACTURERS LISTING AND INSTALLATION INSTRUCTIONS, AS WELL AS ALL APPLICABLE CODES. NOTHING IN THIS DOCUMENT SHALL BE INTERPRETED IN A WAY THAT OVERRIDES THEM. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF ALL CONDITIONS, DIMENSIONS, AND DETAILS IN THIS DOCUMENT.

SYSTEM DETAILS	
DESCRIPTION	NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE
DC RATING OF SYSTEM	12.92KW
AC RATING OF SYSTEM	11.40KW
AC OUTPUT CURRENT	47.5A
INVERTER(S)	1 X SOLAR EDGE SE11400H-US000BXX4
MODULE	Q-CELLS Q.PEAK DUO-G6 340
ARRAY WIRING	(1) STRING OF 12 (2) STRINGS OF 13

INTERCONNECTION DETAILS	
POINT OF CONNECTION	NEW SUPPLY SIDE AC CONNECTION PER NEC 705.12(A)
UTILITY SERVICE	120/240V 1Ø
LOCATION	UTILITY METER, PROTECTED BY FUSED EATON DG222NRB , 2-POLE, 60A, 240VAC

SITE DETAILS	
ASHRAE EXTREME LOW	-15°C (5°F)
ASHRAE 2% HIGH	31°C (88°F)
CLIMATE DATA SOURCE	ASHEVILLE REGIONAL AIRPORT (KAVL)
WIND SPEED	115 MPH
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	B
GROUND SNOW LOAD	15 PSF



GRID-TIED SOLAR POWER SYSTEM

MORGAN RESIDENCE
63 FOREST RD
BILTMORE FOREST, NC 28803

ENGINEERS SEAL FOR STRUCTURAL ITEMS ONLY



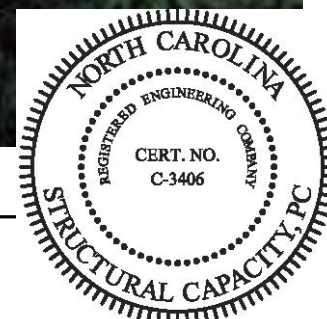
PROJECT SUMMARY
DOC ID: 145058-179284-1
DATE: 9/17/20
CREATOR: J.S.
REVIEWER:

REVISIONS

PV-1



1 SITE PLAN
PV-2 SCALE: 1" = 20'



GENERAL NOTES	
1	EQUIPMENT LIKELY TO BE WORKED UPON WHILE ENERGIZED SHALL BE INSTALLED IN LOCATIONS THAT SATISFY MINIMUM WORKING CLEARANCES PER NEC 110.26.
2	CONTRACTOR SHALL USE ONLY COMPONENTS LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY FOR THE INTENDED USE.
3	CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL EQUIPMENT, CABLES, ADDITIONAL CONDUITS, RACEWAYS, AND OTHER ACCESSORIES NECESSARY FOR A COMPLETE AND OPERATIONAL PV SYSTEM.
4	WHERE DC PV SOURCE OR DC PV OUTPUT CIRCUITS ARE RUN INSIDE THE BUILDING, THEY SHALL BE CONTAINED IN METAL RACEWAYS, TYPE MC METAL-CLAD CABLE, OR METAL ENCLOSURES FROM THE POINT OF PENETRATION INTO THE BUILDING TO THE FIRST READILY ACCESSIBLE DISCONNECTING MEANS, PER NEC 690.31(G).
5	ALL EMT CONDUIT FITTINGS SHALL BE LISTED AS WEATHERPROOF FITTINGS AND INSTALLED TO ENSURE A RAINTIGHT FIT, PER NEC 358.42.

- 1 (N) PROPOSED ROOF-MOUNTED PHOTOVOLTAIC ARRAY. 8:12 (34°) SLOPED ROOF, 4 PV MODULES (BLACK FRAME, WHITE BACKSHEET), 192° AZIMUTH
- 2 (N) PROPOSED ROOF-MOUNTED PHOTOVOLTAIC ARRAY. 8:12 (34°) SLOPED ROOF, 9 PV MODULES (BLACK FRAME, WHITE BACKSHEET), 101° AZIMUTH
- 3 (N) PROPOSED ROOF-MOUNTED PHOTOVOLTAIC ARRAY. 8:12 (34°) SLOPED ROOF, 7 PV MODULES (BLACK FRAME, WHITE BACKSHEET), 190° AZIMUTH
- 4 (N) PROPOSED ROOF-MOUNTED PHOTOVOLTAIC ARRAY. 8:12 (34°) SLOPED ROOF, 8 PV MODULES (BLACK FRAME, WHITE BACKSHEET), 281° AZIMUTH
- 5 (N) INVERTER (I1), OUTDOOR
- 6 (N) VISIBLE, LOCKABLE, LABELED AC DISCONNECT LOCATED WITHIN 10 FT OF UTILITY METER (SW1), OUTDOOR
- 7 (E) MAIN SERVICE PANEL (MSP), OUTDOOR
- 8 (N) PROPOSED ROOF-MOUNTED PHOTOVOLTAIC ARRAY. 8:12 (34°) SLOPED ROOF, 10 PV MODULES (BLACK FRAME, WHITE BACKSHEET), 101° AZIMUTH
- 9 (N) TRANSITION BOX (JB1), OUTDOOR , OUTPUT CIRCUIT CONDUCTORS SHALL BE RUN IN FLEXIBLE STEEL CONDUIT THROUGH THE INTERIOR OF THE BUILDING
- 10 (E) UTILITY METER, OUTDOOR
- 11 ALL ARRAY CIRCUITS SHALL BE ROUTED THROUGH THE INTERIOR OF THE BUILDING, AND WHERE POSSIBLE, ALONG THE BOTTOM OF LOAD BEARING MEMBERS. NO CONDUIT SHALL BE INSTALLED ABOVE THE ROOF.

2020-63



GRID-TIED SOLAR POWER SYSTEM

MORGAN RESIDENCE
63 FOREST RD
BILTMORE FOREST, NC 28803

ENGINEERS SEAL FOR
STRUCTURAL ITEMS ONLY

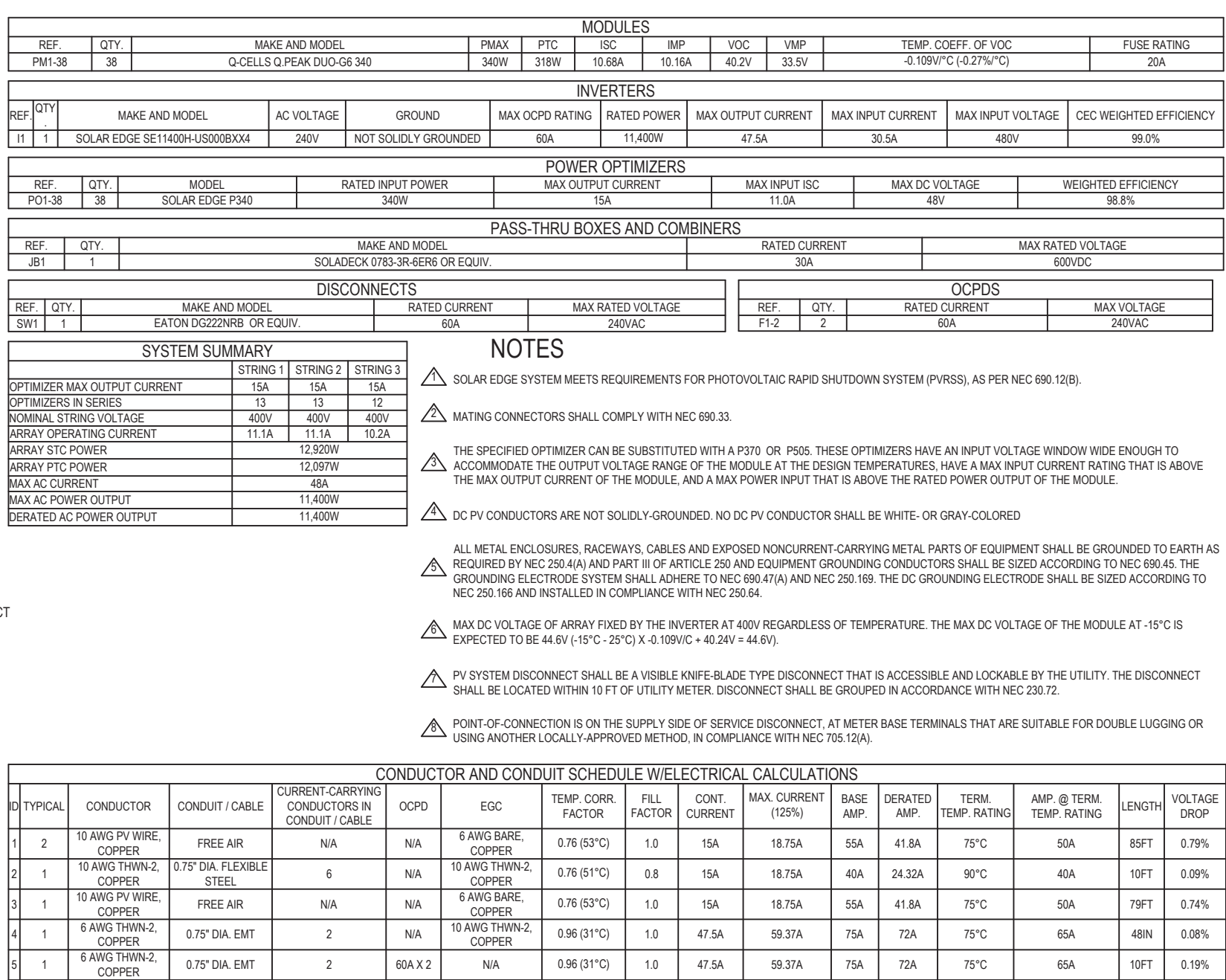


SITE PLAN

DOC ID: 145058-179284-1
DATE: 9/17/20
CREATOR: J.S.
REVIEWER:

REVISIONS

PV-2



1 SINGLE-LINE DIAGRAM
PV-3 SCALE: NTS

1	UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
2	MODULES CONFORM TO AND ARE LISTED UNDER UL 1703.
3	CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D).
4	CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).

1	ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690
2	PV MODULES SHALL BE GROUNDED TO MOUNTING RAILS USING MODULE LUGS OR RACKING INTEGRATED GROUNDING CLAMPS AS ALLOWED BY LOCAL JURISDICTION. ALL OTHER EXPOSED METAL PARTS SHALL BE GROUNDED USING UL-LISTED LAY-IN LUGS.
3	INSTALLER SHALL CONFIRM THAT MOUNTING SYSTEM HAS BEEN EVALUATED FOR COMPLIANCE WITH UL 2703 "GROUNDING AND BONDING" WHEN USED WITH PROPOSED PV MODULE.
4	ALL GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE
5	IF THE EXISTING MAIN SERVICE PANEL DOES NOT HAVE A VERIFIABLE GROUNDING ELECTRODE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE.
6	AC SYSTEM GROUNDING ELECTRODE CONDUCTOR (GEC) SHALL BE A MINIMUM SIZE #8AWG WHEN INSULATED, #6AWG IF BARE WIRE.
7	EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC ARTICLE 690.45, AND BE A MINIMUM OF #10AWG WHEN NOT EXPOSED TO DAMAGE, AND #6AWG SHALL BE USED WHEN EXPOSED TO DAMAGE
8	GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN, OR MARKED GREEN IF #4AWG OR LARGER



Source Energy
SOLUTIONS

GRID-TIED SOLAR POWER SYSTEM

MORGAN RESIDENCE
63 FOREST RD
ASHEVILLE NC 28803

REVISIONS

PV-3

DC RACEWAYS

3

JB1 - TRANSITION BOX
(SOLADECK 0783-3R-6ER6)

4

SW1 - DISCONNECT
(EATON DG222NRB)

146789

I1 - INVERTER
(SOLAR EDGE SE11400H-US000BXX4)

45

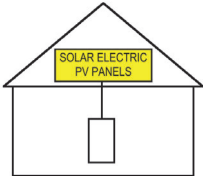
MSP - MAIN SERVICE PANEL
(CUTLER HAMMER)

9

1 SEE NOTE NO. 4 (SW1)

PHOTOVOLTAIC SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN
SWITCH TO THE 'OFF'
POSITION TO SHUT DOWN
PV SYSTEM AND REDUCE
SHOCK HAZARD IN THE
ARRAY.



NEC 690.56(C)(1) AND IFC 1204.5.1

3 SEE NOTE NO. 5 (DC RACEWAYS)

WARNING
PHOTOVOLTAIC POWER SOURCE

NEC 690.31(G)(3)

4 EACH DISCONNECTING MEANS FOR
PHOTOVOLTAIC EQUIPMENT (JB1, SW1, I1)

! WARNING !
ELECTRIC SHOCK HAZARD. TERMINALS ON BOTH
LINE AND LOAD SIDES MAY BE ENERGIZED IN
THE OPEN POSITION.

NEC 690.13(B)

7 AC SOLAR DISCONNECT (SW1)

PV SYSTEM DISCONNECT

NEC 690.13(B)

5 DC DISCONNECT (I1)

DIRECT-CURRENT PV POWER SOURCE
MAXIMUM VOLTAGE: 400V
MAX CIRCUIT-CURRENT: 56.2A
DC-TO-DC CONVERTER RATED CURRENT: 15.0A

NEC 690.53

8 SEE NOTE NO. 6 (SW1)

RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM

NEC 690.56(C)(3) AND IFC 1204.5.3

6 AC DISCONNECT (SW1)

MAXIMUM AC OPERATING CURRENT: 47.5A
MAXIMUM AC OPERATING VOLTAGE: 240V

NEC 690.54


9 ANY AC ELECTRICAL PANEL THAT IS FED BY
BOTH THE UTILITY AND THE PHOTOVOLTAIC
SYSTEM (SW1, MSP)

! WARNING !
DUAL POWER SOURCE. SECOND SOURCE IS
PHOTOVOLTAIC SYSTEM.

NEC 705.12(B)(3)

LABELING NOTES	
1	ALL PLAQUES AND SIGNAGE REQUIRED BY 2017 NEC AND 2018 IFC WILL BE INSTALLED AS REQUIRED.
2	LABELS, WARNING(S) AND MARKING SHALL COMPLY WITH ANSI Z535.4, WHICH REQUIRES THAT DANGER, WARNING, AND CAUTION SIGNS USED THE STANDARD HEADER COLORS, HEADER TEXT, AND SAFETY ALERT SYMBOL ON EACH LABEL. THE ANSI STANDARD REQUIRES A HEADING THAT IS AT LEAST 50% TALLER THAN THE BODY TEXT, IN ACCORDANCE WITH NEC 110.21(B).
3	A PERMANENT PLAQUE OR DIRECTORY SHALL BE INSTALLED PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION IN ACCORDANCE WITH NEC 690.56(B).
4	LABEL(S) WITH MARKING, "TURN RAPID SHUTDOWN SWITCH TO THE 'OFF' POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY," SHALL BE LOCATED WITHIN 3 FT OF SERVICE DISCONNECTING MEANS THE TITLE SHALL UTILIZE CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8" IN BLACK ON A YELLOW BACKGROUND, AND REMAINING TEXT SHALL BE CAPITALIZED WITH A MINIMUM HEIGHT OF 3/16" IN BLACK ON WHITE BACKGROUND
5	LABEL(S) WITH MARKING, "WARNING PHOTOVOLTAIC POWER SOURCE," SHALL BE LOCATED AT EVERY 10 FEET OF EACH DC RACEWAY AND WITHIN ONE FOOT OF EVERY TURN OR BEND AND WITHIN ONE FOOT ABOVE AND BELOW ALL PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS AND BARRIERS. THE LABEL SHALL HAVE 3/8" TALL LETTERS AND BE REFLECTIVE WITH WHITE TEXT ON A RED BACKGROUND
6	LABEL(S) WITH MARKING, "RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM," SHALL BE LOCATED WITHIN 3FT OF RAPID SHUTDOWN SWITCH THE LABEL SHALL HAVE 3/8" TALL LETTERS AND BE REFLECTIVE WITH WHITE TEXT ON A RED BACKGROUND

2020-63



GRID-TIED SOLAR POWER SYSTEM

MORGAN RESIDENCE
63 FOREST RD
BILTMORE FOREST, NC 28803

SAFETY LABELS

DOC ID: 145058-179284-1
DATE: 9/17/20
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REVISIONS

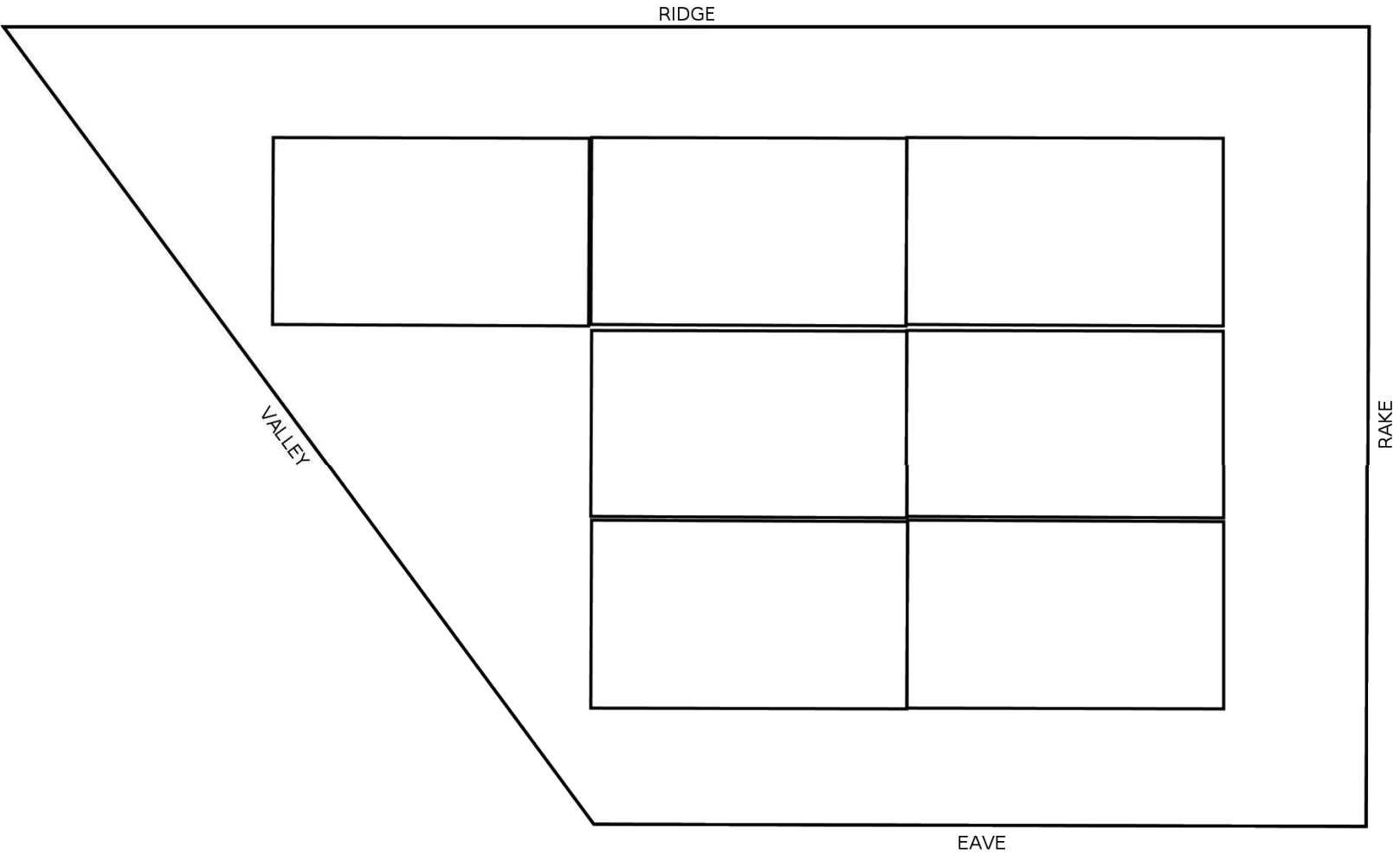
PV-4

ROOF PROPERTIES	
ROOF MATERIAL	COMPOSITION SHINGLE (1 LAYER)
SLOPE	8/12 (33.7°)
MEAN ROOF HEIGHT	24FT
DECK SHEATHING	15/32" OSB
CONSTRUCTION	RAFTERS (2X8'S), 18IN OC

MODULE MECHANICAL PROPERTIES	
MODEL	Q-CELLS Q.PEAK DUO-G6 340
DIMENSIONS (AREA)	68.5IN X 40.6IN X 1.3IN (19.3 SQ FT)
WEIGHT	43.9LB

MOUNTING SYSTEM PROPERTIES	
MAX. ALLOW. RAIL SPAN	102.0IN (ZONES 1, 2, AND 3)
MAX. MOUNT SPACING	36.0IN (ZONES 1, 2, AND 3)
MAX. ALLOW. CANTILEVER	40.8IN (ZONES 1, 2, AND 3)
GROUNDING AND BONDING	INTEGRAL GROUNDING CERTIFIED TO UL 2703 REQUIREMENTS

NOTES	
1	RAFTER LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS MAY DIFFER AND CONTRACTOR MAY NEED TO ADJUST MOUNT LOCATIONS. IN NO CASE SHALL THE MOUNT SPACING EXCEED "MAX. MOUNT SPACING"



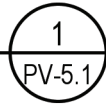
WIND ZONE I



WIND ZONE II



WIND ZONE III



ATTACHMENT PLAN (ORTHOGONAL PROJECTION)
SCALE: 1/4" = 1'

2020-63

GRID-TIED SOLAR POWER SYSTEM

MORGAN RESIDENCE
63 FOREST RD
BILTMORE FOREST, NC 28803

ENGINEERS SEAL FOR
STRUCTURAL ITEMS ONLY

ATTACHMENT
PLAN

DOC ID: 145058-179284-1

DATE: 9/17/20

CREATOR: J.S.

REVIEWER:

REVISIONS

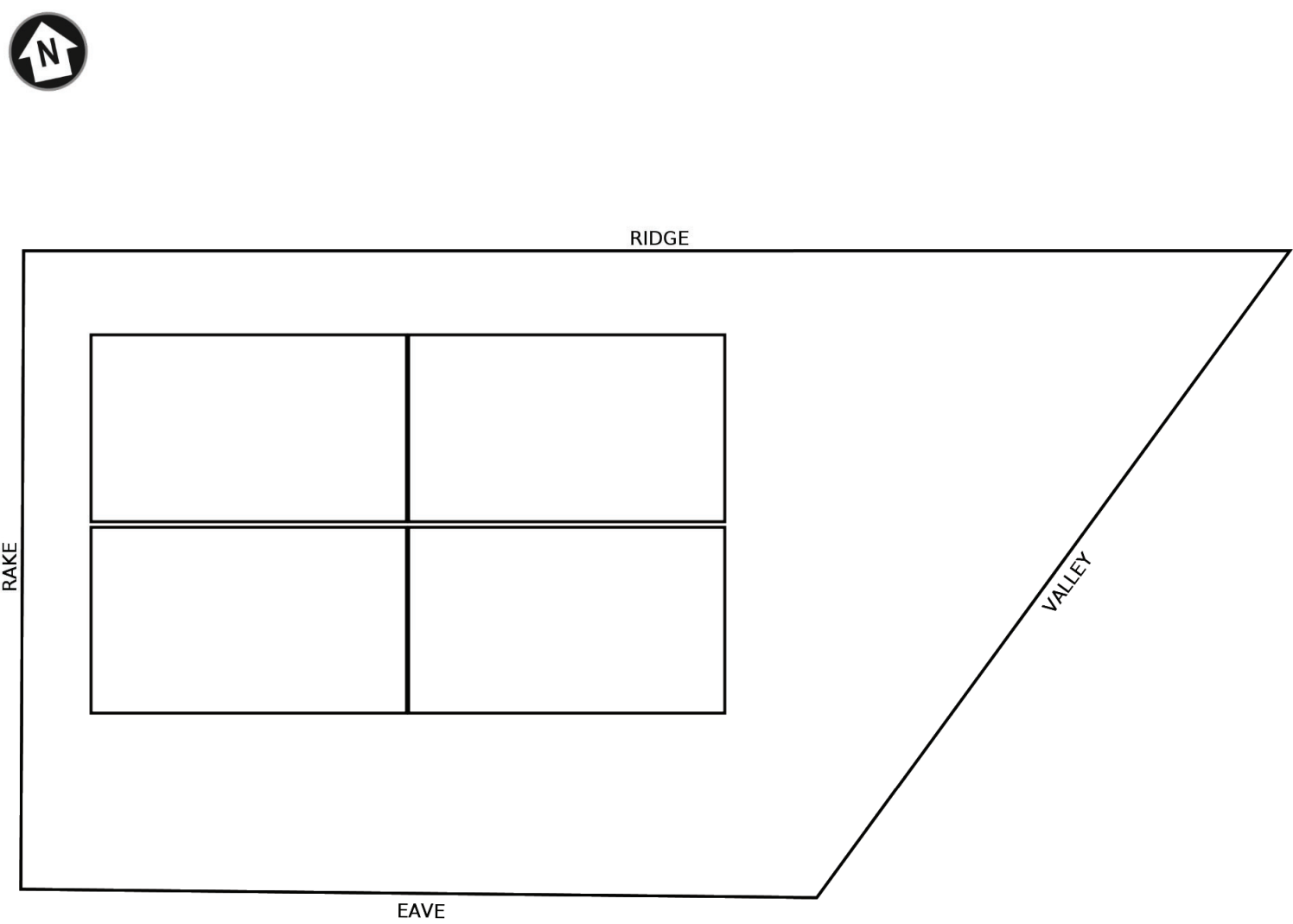
PV-5.1

ROOF PROPERTIES	
ROOF MATERIAL	COMPOSITION SHINGLE (1 LAYER)
SLOPE	8/12 (33.7°)
MEAN ROOF HEIGHT	23.3FT
DECK SHEATHING	15/32" OSB
CONSTRUCTION	RAFTERS (2X8'S), 18IN OC

MODULE MECHANICAL PROPERTIES	
MODEL	Q-CELLS Q.PEAK DUO-G6 340
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MAX. ALLOW. CANTILEVER	40.8IN (ZONES 1, 2, AND 3)
GROUNDING AND BONDING	INTEGRAL GROUNDING CERTIFIED TO UL 2703 REQUIREMENTS

NOTES	
1	RAFTER LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS MAY DIFFER AND CONTRACTOR MAY NEED TO ADJUST MOUNT LOCATIONS. IN NO CASE SHALL THE MOUNT SPACING EXCEED "MAX. MOUNT SPACING"



WIND ZONE I

WIND ZONE II

WIND ZONE III

1 ATTACHMENT PLAN (ORTHOGONAL PROJECTION)
PV-5.2 SCALE: 3/8" = 1'

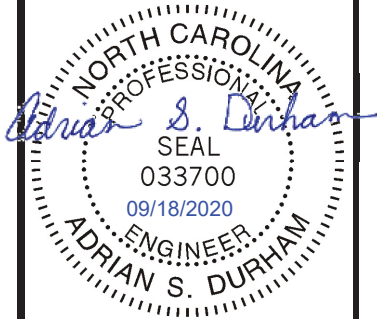


2020-63

GRID-TIED SOLAR POWER SYSTEM

MORGAN RESIDENCE
63 FOREST RD
BILTMORE FOREST, NC 28803

ENGINEERS SEAL FOR
STRUCTURAL ITEMS ONLY



ATTACHMENT
PLAN

DOC ID: 145058-179284-1
DATE: 9/17/20
CREATOR: J.S.
REVIEWER:

REVISIONS	

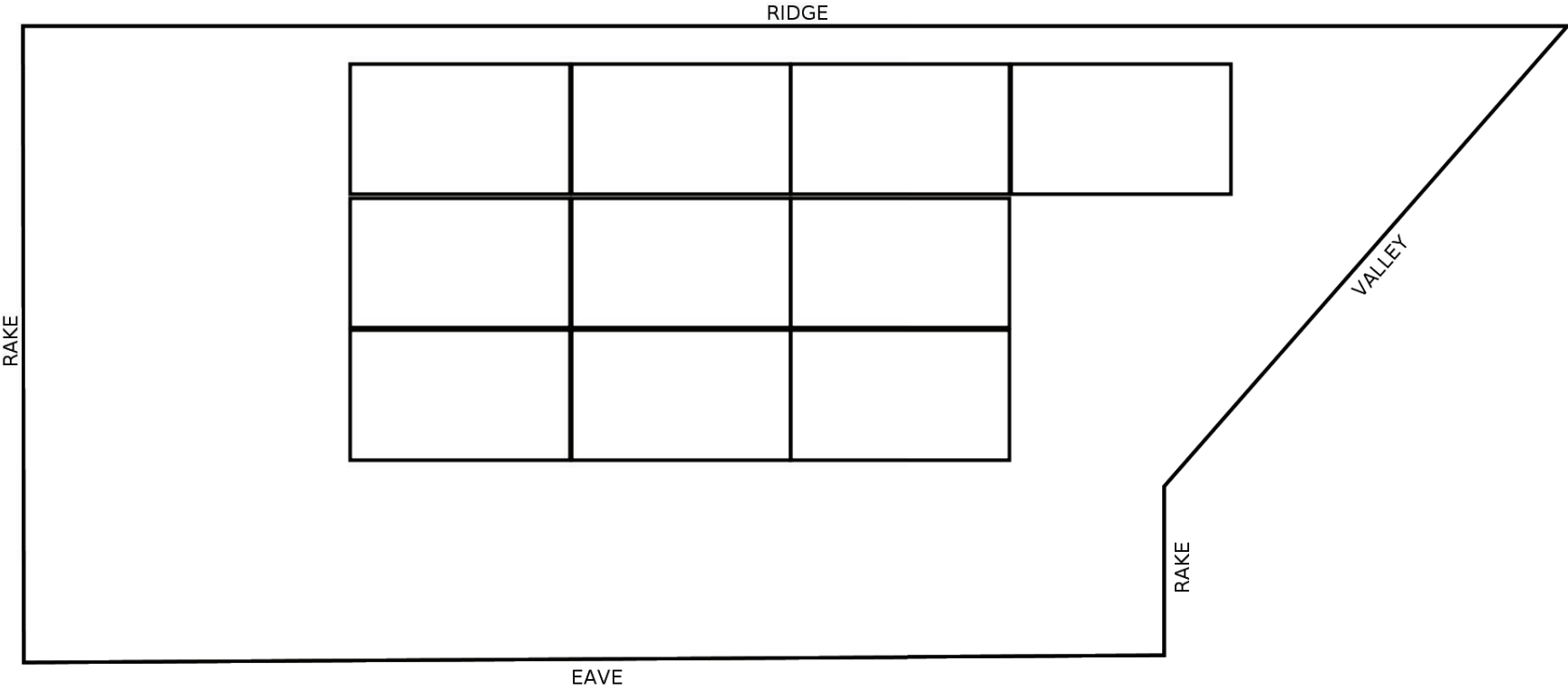
PV-5.2

ROOF PROPERTIES	
ROOF MATERIAL	COMPOSITION SHINGLE (1 LAYER)
SLOPE	8/12 (33.7°)
MEAN ROOF HEIGHT	24.7FT
DECK SHEATHING	15/32" OSB
CONSTRUCTION	RAFTERS (2X8'S), 18IN OC

MODULE MECHANICAL PROPERTIES	
MODEL	Q-CELLS Q.PEAK DUO-G6 340
DIMENSIONS (AREA)	68.5IN X 40.6IN X 1.3IN (19.3 SQ FT)
WEIGHT	43.9LB

MOUNTING SYSTEM PROPERTIES	
MAX. ALLOW. RAIL SPAN	102.0IN (ZONES 1, 2, AND 3)
MAX. MOUNT SPACING	36.0IN (ZONES 1, 2, AND 3)
MAX. ALLOW. CANTILEVER	40.8IN (ZONES 1, 2, AND 3)
GROUNDING AND BONDING	INTEGRAL GROUNDING CERTIFIED TO UL 2703 REQUIREMENTS

NOTES	
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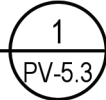
WIND ZONE I



WIND ZONE II



WIND ZONE III



ATTACHMENT PLAN (ORTHOGONAL PROJECTION)

SCALE: 3/16" = 1'



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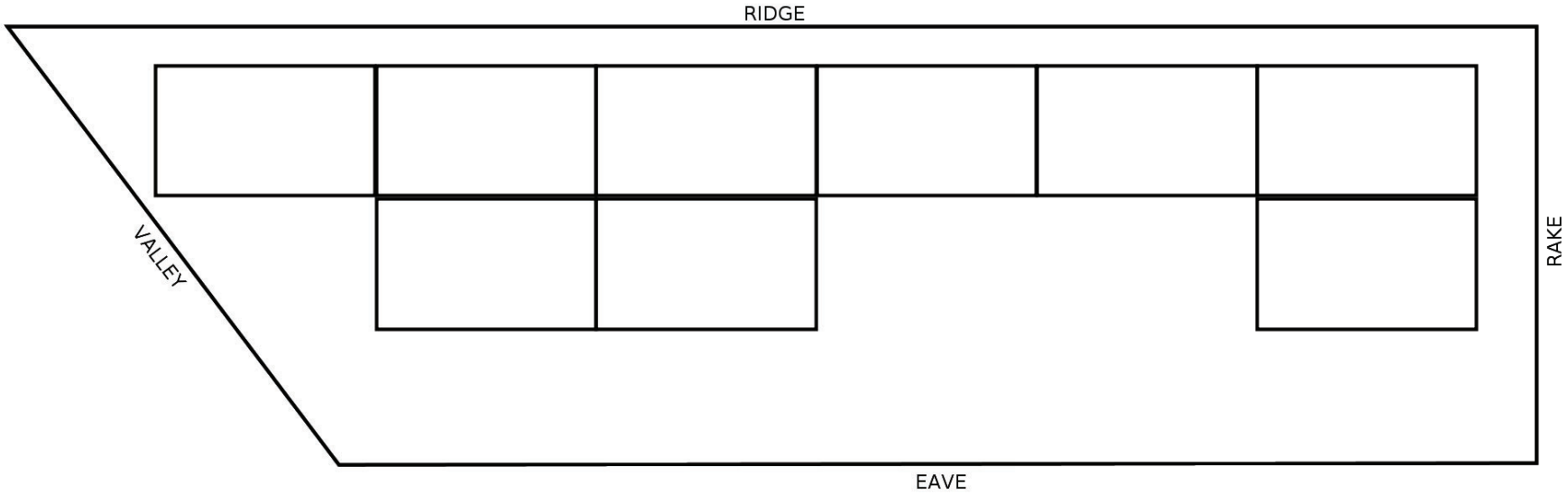
PV-5.3

ROOF PROPERTIES	
ROOF MATERIAL	COMPOSITION SHINGLE (1 LAYER)
SLOPE	8/12 (33.7°)
MEAN ROOF HEIGHT	23.2FT
DECK SHEATHING	15/32" OSB
CONSTRUCTION	RAFTERS (2X8'S), 18IN OC

MODULE MECHANICAL PROPERTIES	
MODEL	Q-CELLS Q.PEAK DUO-G6 340
DIMENSIONS (AREA)	68.5IN X 40.6IN X 1.3IN (19.3 SQ FT)
WEIGHT	43.9LB

MOUNTING SYSTEM PROPERTIES	
MAX. ALLOW. RAIL SPAN	102.0IN (ZONES 1, 2, AND 3)
MAX. MOUNT SPACING	36.0IN (ZONES 1, 2, AND 3)
MAX. ALLOW. CANTILEVER	40.8IN (ZONES 1, 2, AND 3)
GROUNDING AND BONDING	INTEGRAL GROUNDING CERTIFIED TO UL 2703 REQUIREMENTS

NOTES	
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WIND ZONE I



WIND ZONE II



WIND ZONE III

1 ATTACHMENT PLAN (ORTHOGONAL PROJECTION)
PV-5.4 SCALE: 3/16" = 1'

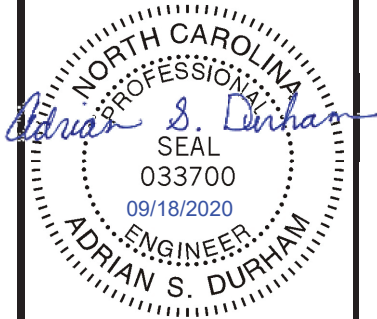


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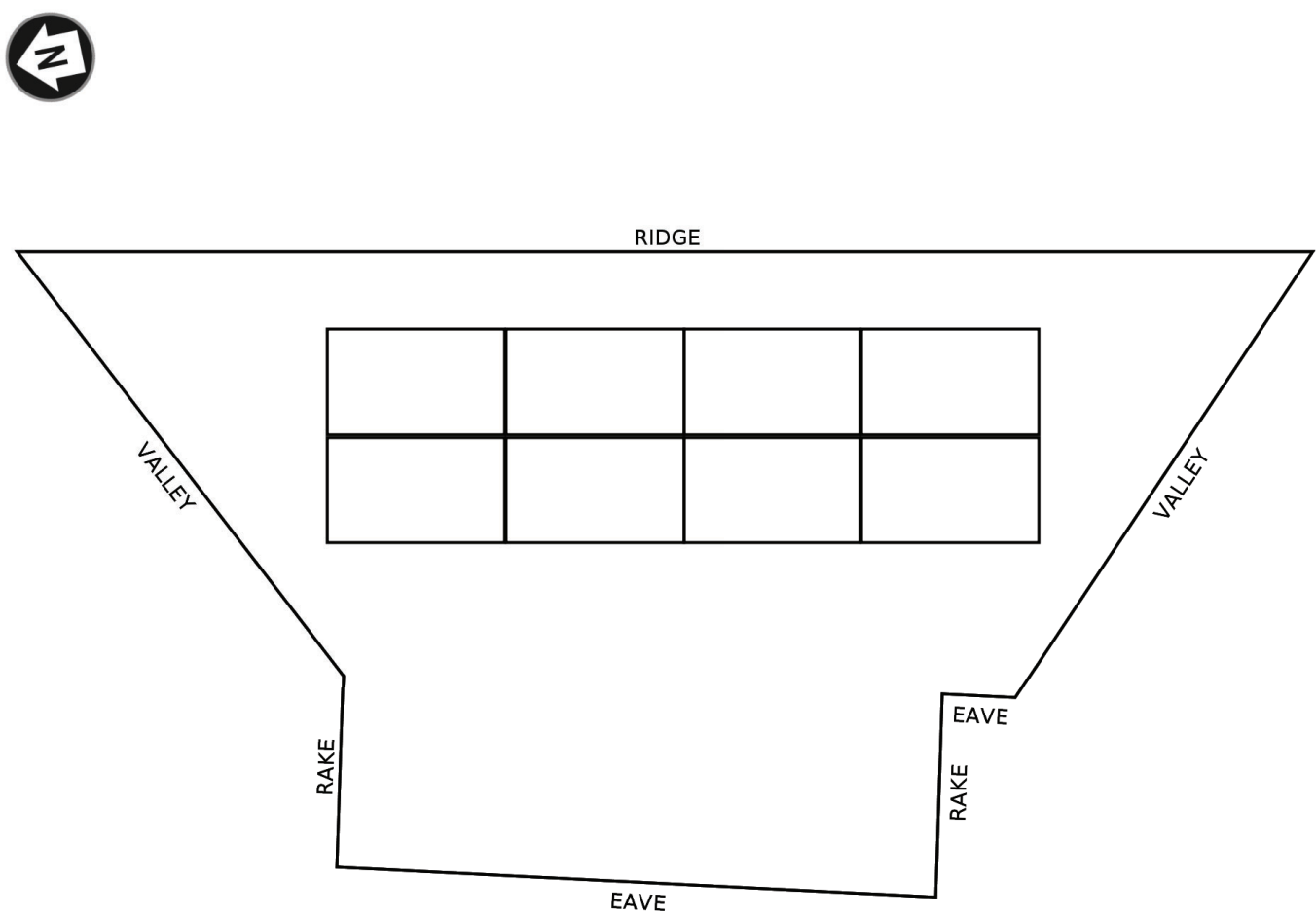
PV-5.4

ROOF PROPERTIES	
ROOF MATERIAL	COMPOSITION SHINGLE (1 LAYER)
SLOPE	8/12 (33.7°)
MEAN ROOF HEIGHT	25.7FT
DECK SHEATHING	15/32" OSB
CONSTRUCTION	RAFTERS (2X8'S), 18IN OC

MODULE MECHANICAL PROPERTIES	
MODEL	Q-CELLS Q.PEAK DUO-G6 340
DIMENSIONS (AREA)	68.5IN X 40.6IN X 1.3IN (19.3 SQ FT)
WEIGHT	43.9LB

MOUNTING SYSTEM PROPERTIES	
MAX. ALLOW. RAIL SPAN	102.0IN (ZONES 1, 2, AND 3)
MAX. MOUNT SPACING	36.0IN (ZONES 1, 2, AND 3)
MAX. ALLOW. CANTILEVER	40.8IN (ZONES 1, 2, AND 3)
GROUNDING AND BONDING	INTEGRAL GROUNDING CERTIFIED TO UL 2703 REQUIREMENTS

NOTES	
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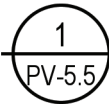
WIND ZONE I



WIND ZONE II



WIND ZONE III



ATTACHMENT PLAN (ORTHOGONAL PROJECTION)

SCALE: 3/16" = 1'

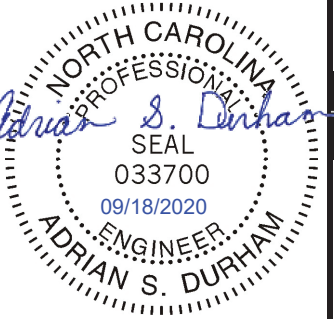


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ATTACHMENT PLAN

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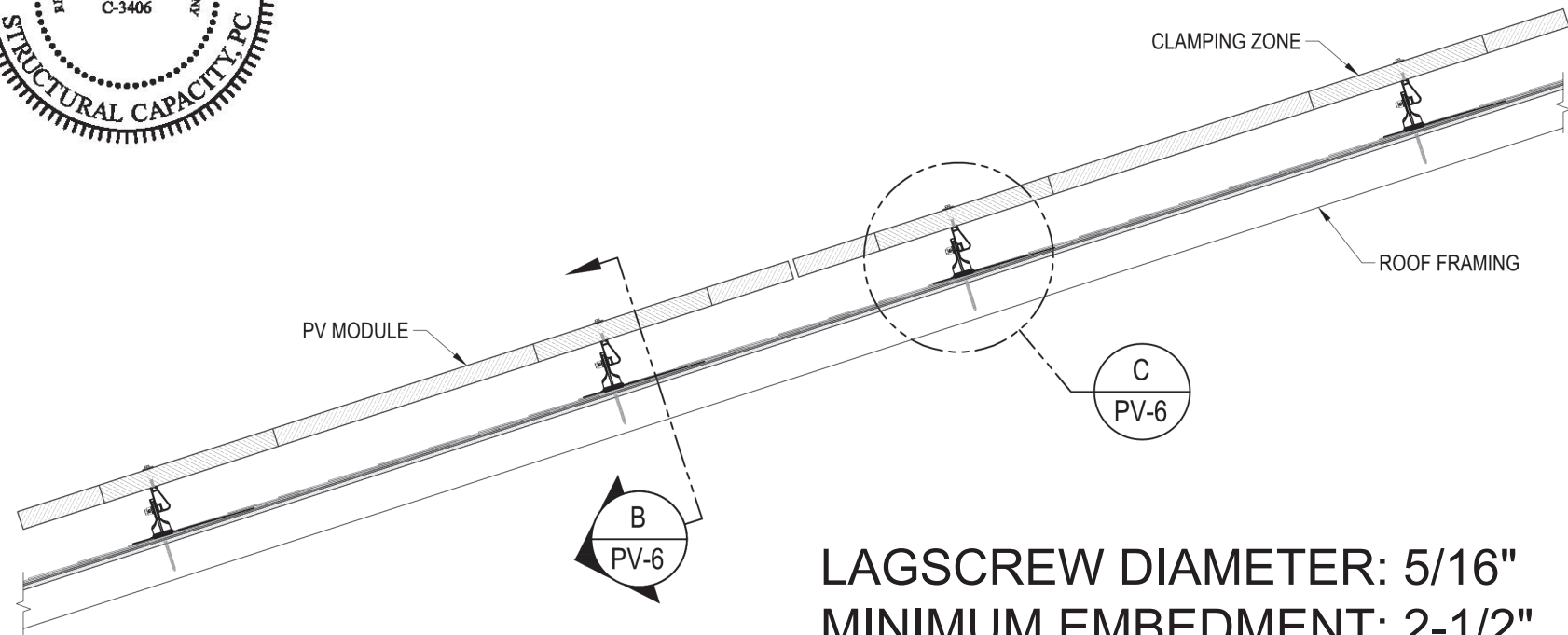
DATE: 9/17/20

CREATOR: J.S.

REVIEWER:

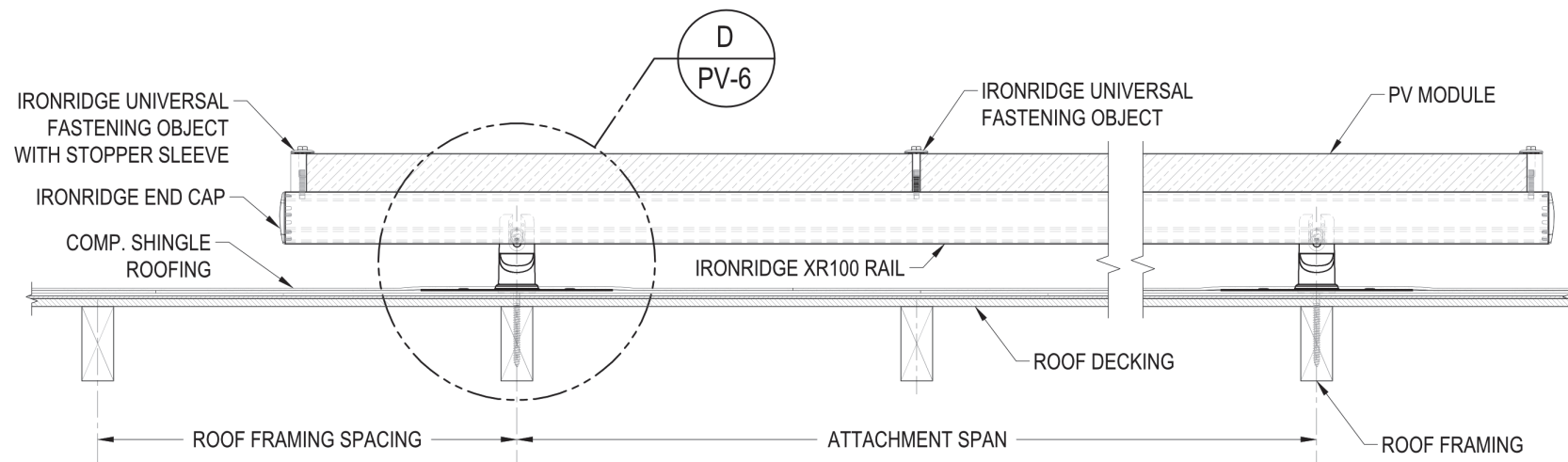
REVISIONS

PV-5.5



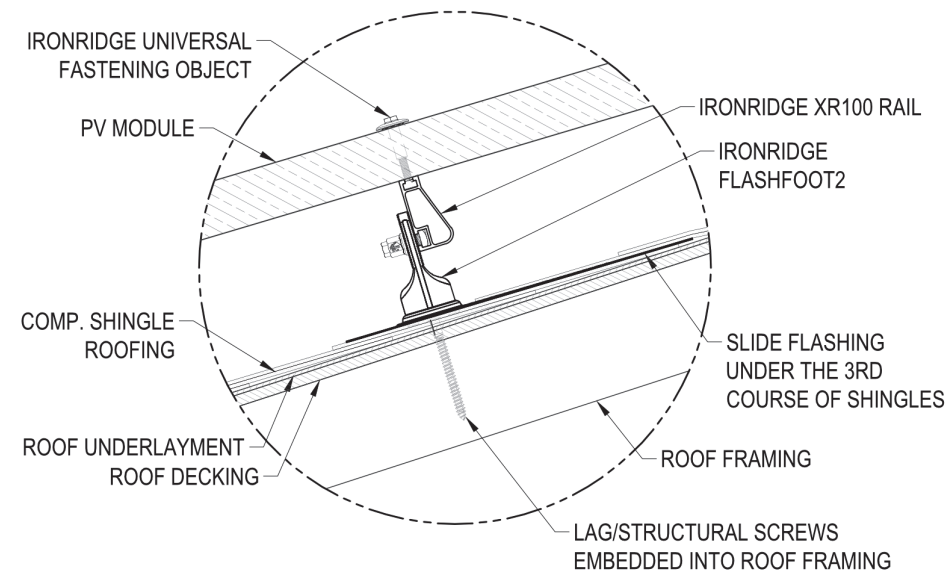
LAGSCREW DIAMETER: 5/16"
MINIMUM EMBEDMENT: 2-1/2"

A RACKING ELEVATION (TRANSVERSE VIEW)
PV-6 SCALE: NTS

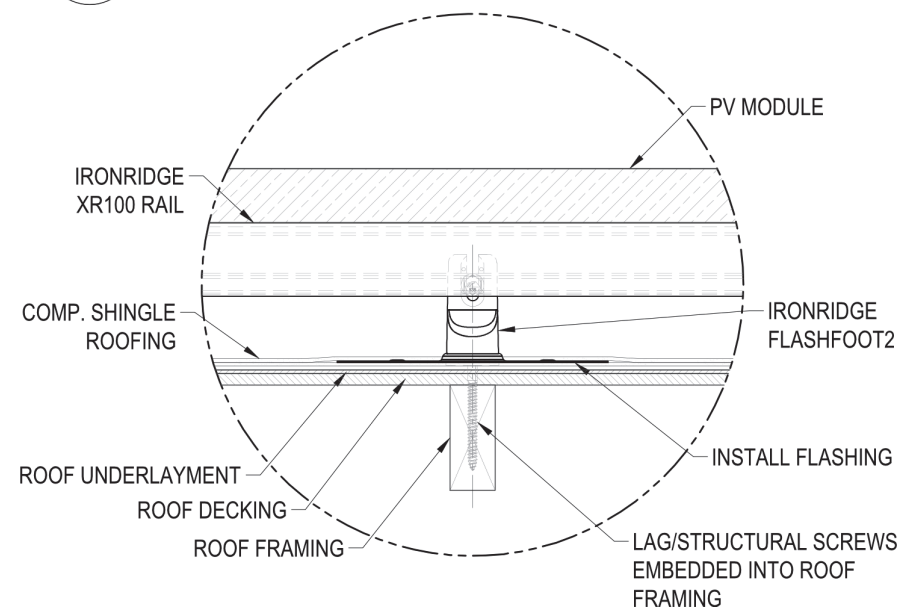


B RACKING ELEVATION (LONGITUDINAL VIEW)
PV-6 SCALE: NTS

MOUNTING SYSTEM NOTES	
1	FLASHING SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS.
2	IF THERE IS ANY CONFLICT BETWEEN WHAT IS DEPICTED HERE AND INSTRUCTIONS PROVIDED BY A MANUFACTURER, THE MANUFACTURER'S INSTRUCTIONS SHALL SUPERCEDE.



C ATTACHMENT DETAIL (TRANSVERSE VIEW)
PV-6 SCALE: NTS



D ATTACHMENT DETAIL (LONGITUDINAL VIEW)
PV-6 SCALE: NTS

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GRID-TIED SOLAR POWER SYSTEM

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ATTACHMENT
DETAILS

DOC ID: 145058-179284-1

DATE: 9/17/20

CREATOR: J.S.

REVIEWER:

REVISIONS

PV-6



1 FIRE SAFETY PLAN
PV-7 SCALE: 1" = 20'

GENERAL NOTES

1	AT LEAST TWO 36"-WIDE PATHWAYS ON SEPARATE ROOF PLANES, FROM LOWEST ROOF EDGE TO RIDGE, SHALL BE PROVIDED ON ALL BUILDINGS. THERE SHALL BE AT LEAST ONE PATHWAY ON THE STREET OR DRIVEWAY SIDE OF THE ROOF. FOR EACH ROOF PLANE WITH A PV ARRAY, AT LEAST ONE SUCH PATHWAY SHALL BE PROVIDED ON THE SAME ROOF PLANE, OR ON AN ADJACENT ROOF PLANE, OR STRADDLING THE SAME AND ADJACENT ROOF PLANES. (IFC 1204.2.1.1)
2	FOR PV ARRAYS OCCUPYING MORE THAN 1/3 OF THE PLAN VIEW TOTAL ROOF AREA, A MIN. 3'-WIDE SETBACK IS REQUIRED ON BOTH SIDES OF A HORIZONTAL RIDGE. (IFC 1204.2.1.2)
3	PV MODULES SHALL NOT BE INSTALLED ON THE PORTION OF A ROOF THAT IS BELOW AN EMERGENCY ESCAPE AND RESCUE OPENING. A 36"-WIDE PATHWAY SHALL BE PROVIDED TO THE EMERGENCY ESCAPE AND RESCUE OPENING. (IFC 1204.2.2)

- 1 ROOF ACCESS POINT
- 2 PV MODULES INSTALLED ON ROOF WITH IRONRIDGE ROOF MOUNTING SYSTEM. THE MOUNTING SYSTEM IS UL 1703 CLASS A FIRE RATED ON A 8/12 SLOPED ROOF WHEN INSTALLED WITH TYPE 1 OR 2 MODULES. THE Q-CELLS Q.peak DUO-G6 340 IS TYPE 2.
- 3 ALL ARRAY CIRCUITS SHALL BE ROUTED THROUGH THE INTERIOR OF THE BUILDING, AND WHERE POSSIBLE, ALONG THE BOTTOM OF LOAD BEARING MEMBERS. NO CONDUIT SHALL BE INSTALLED ABOVE THE ROOF.

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GRID-TIED SOLAR POWER SYSTEM

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FIRE SAFETY PLAN

DOC ID: 145058-179284-1

DATE: 9/17/20

CREATOR: J.S.

REVIEWER:

REVISIONS

PV-7

Conductor, Conduit, and OCPD Sizing Validation

1. Maximum System Voltage Test

1.1. Solar Edge inverter w/38 Q-Cells Q.PEAK DUO-G6 340 (340W)s

Array Properties

Array Type	Distributed MPPT System Inverter Array
System Description	Solar Edge inverter w/38 Q-Cells Q.PEAK DUO-G6 340 (340W)s
Module	Q.PEAK DUO-G6 340 (340W)
Highest number of modules in series in a PV Source Circuit	1
Design Low Temp.	-15°C
Module Voc	40.24V
Temp. Coefficient Voc	-0.109V/C

NEC Code Calculations

A. Maximum Voltage of PV Source Circuit <i>see 690.7(A)</i>	44.6V
--	-------

NEC 690.7(A) requires that if the PV module manufacturer provides a temperature coefficient of open-circuit voltage, it must be used to calculate the PV array's maximum system voltage. It includes an information note recommending the use of the ASHRAE 'Extreme Annual Mean Minimum Design Dry Bulb Temperature' as the design low temperature. Using these values, the module Voc (40.24V) will increase to 44.6V at the design low temperature (-15°C).

$(-15^{\circ}\text{C} - 25^{\circ}\text{C}) \times -0.109\text{V/C} + 40.24\text{V} = 44.6\text{V}$

The module Voc at the design low temperature is 44.6V.

$44.6\text{V} \times 1 = 44.6\text{V}$

B. Maximum Voltage of DC-DC Converter Source Circuit <i>see 690.7(B)(2)</i>	400V
--	------

All PV circuits have a voltage that does not exceed 600V. This system's DC-DC Converter Source Circuits are fed by Solar Edge P340 dc-to-dc converter optimization devices. Each device is connected to a single Q.PEAK DUO-G6 340 (340W) PV module. The voltage of this circuit is regulated by the inverter at a constant 400V.

NEC Code Validation Tests

1.	PV Source Circuit maximum Voc must not exceed 600V $44.6\text{V} < 600\text{V} = \text{true}$	PASS
2.	DC-DC Converter Source Circuit voltage must not exceed 600V $400\text{V} < 600\text{V} = \text{true}$	PASS

2. Wire, Conduit, and OCPD Code Compliance Validation

2.1. #1: DC Circuit Circuit: Series String Output to Transition Box

Circuit Section Properties

Conductor	10 AWG PV Wire, Copper
Equipment Ground Conductor (EGC)	6 AWG Bare, Copper
OCPD(s)	N/A
Raceway/Cable	Free Air
Lowest Terminal Temperature Rating	75°C
Maximum Wire Temperature	53°C
Power Source Description	String of 13 Solar Edge P340 power optimizers, each connected to a Q.PEAK DUO-G6 340 (340W) PV module
Current	15A
Voltage	400V
Module Series Fuse Rating	20A
Total Number of Series Strings	3

NEC Code Calculations

A. Continuous Current <i>see 690.8(A)(6)</i>	15A
---	-----

The continuous current of this series string of power optimizers is equal to the rated maximum output current of the optimizer.

Rated Max. Output Current of optimizer is 15A

B. Ampacity of Conductor <i>see Table 310.15(B)(17)</i>	55A
--	-----

Ampacity (30°C) for a copper conductor with 90°C insulation in free air is 55A.

C. Derated Ampacity of Conductor <i>see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100</i>	41.8A
--	-------

The temperature factor for 90°C insulation at 53°C is 0.76.

The fill factor for conductors in free air is 1.

The ampacity derated for Conditions of Use is the product of the conductor ampacity (55A) multiplied by the temperature factor (0.76) and by the fill factor (1).

$55\text{A} \times 0.76 \times 1 = 41.8\text{A}$

D. Max Current for Terminal Temp. Rating <i>see 110.14(C)</i>	35A
--	-----

The lowest temperature limit for this conductor at any termination is 75°C.

Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 35A.

E. Minimum Required EGC Size <i>see Table 250.122 and 690.45</i>	12 AWG
---	--------

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.

According to 690.45, it is not necessary to increase the size of the PV array's EGC when conductors are oversized for voltage drop considerations.

NEC Code Validation Tests

1.	System must meet requirements for not having series fuse (690.9(A))	PASS
2.	Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) $41.8\text{A} \geq 15\text{A} = \text{true}$	PASS
3.	Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) $55\text{A} > 15\text{A} \times 1.25 = \text{true}$	PASS
4.	Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) $35\text{A} \geq 15\text{A} \times 1.25 = \text{true}$	PASS
5.	EGC must meet code requirements for minimum size (Table 250.122) $6\text{ AWG} \geq 12\text{ AWG} = \text{true}$	PASS
6.	EGC must meet code requirements for physical protection (690.46) $6\text{ AWG} \geq 6\text{ AWG} = \text{true}$	PASS

2.2. #2: DC Source Circuit: Transition Box to Inverter

Circuit Section Properties

Conductor	10 AWG THWN-2, Copper
Equipment Ground Conductor (EGC)	10 AWG THWN-2, Copper
OCPD(s)	N/A
Raceway/Cable	0.75" dia. Flexible Steel
Lowest Terminal Temperature Rating	90°C
Maximum Wire Temperature	51°C
Power Source Description	String of 13 Solar Edge P340 power optimizers, each connected to a Q.PEAK DUO-G6 340 (340W) PV module
Current	15A
Voltage	400V
Module Series Fuse Rating	20A
Total Number of Series Strings	3

NEC Code Calculations

A. Continuous Current	15A
see 690.8(A)(6)	

The continuous current of this series string of power optimizers is equal to the rated maximum output current of the optimizer.

Rated Max. Output Current of optimizer is 15A

B. Ampacity of Conductor	40A
see Table 310.15(B)(16)	

Ampacity (30°C) for a copper conductor with 90°C insulation in conduit/cable is 40A.

C. Derated Ampacity of Conductor	24.32A
see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100	

The temperature factor for 90°C insulation at 53°C is 0.76.

The fill factor for a conduit/cable that has 6 wires is 0.8.

The ampacity derated for Conditions of Use is the product of the conductor ampacity (40A) multiplied by the temperature factor (0.76) and by the fill factor (0.8).

40A X 0.76 X 0.8 = 24.32A

D. Max Current for Terminal Temp. Rating	40A
see 110.14(C)	

The lowest temperature limit for this conductor at any termination is 90°C.

Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 90°C rating would be the amount referenced in the 90°C column in Table 310.15(B)(16), which is 40A.

E. Minimum Required EGC Size	12 AWG
see Table 250.122 and 690.45	

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.

According to 690.45, it is not necessary to increase the size of the PV array's EGC when conductors are oversized for voltage drop considerations.

F. Minimum Recommended Conduit Size	0.75" dia.
see 300.17	

The total area of all conductors is 0.1899in². With a maximum fill rate of 0.4, the recommended conduit diameter is 0.75.

Qty	Description	Size	Type	Area	Total Area
6	Conductor	10 AWG	THWN-2	0.0211in²	0.1266in²
3	Equipment Ground	10 AWG	THWN-2	0.0211in²	0.0633in²
9					0.1899in²

0.1899in² / 0.4 = 0.4748in² (Corresponding to a diameter of 0.75")

NEC Code Validation Tests

1.	System must meet requirements for not having series fuse (690.9(A))	PASS
2.	Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) 24.32A >= 15A = true	PASS
3.	Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) 40A > 15A x 1.25 = true	PASS
4.	Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) 40A >= 15A X 1.25 = true	PASS
5.	EGC must meet code requirements for minimum size (Table 250.122) 10 AWG >= 12 AWG = true	PASS
6.	Conduit must meet code recommendation for minimum size (300.17) 0.75in. >= 0.75in. = true	PASS

2.3. #3: DC Circuit Circuit: Series String Output to Transition Box

Circuit Section Properties

Conductor	10 AWG PV Wire, Copper
Equipment Ground Conductor (EGC)	6 AWG Bare, Copper
OCPD(s)	N/A
Raceway/Cable	Free Air
Lowest Terminal Temperature Rating	75°C
Maximum Wire Temperature	53°C
Power Source Description	String of 12 Solar Edge P340 power optimizers, each connected to a Q.PEAK DUO-G6 340 (340W) PV module
Current	15A
Voltage	400V
Module Series Fuse Rating	20A
Total Number of Series Strings	3

NEC Code Calculations

A. Continuous Current	15A
see 690.8(A)(6)	

The continuous current of this series string of power optimizers is equal to the rated maximum output current of the optimizer.

Rated Max. Output Current of optimizer is 15A

B. Ampacity of Conductor	55A
see Table 310.15(B)(17)	

Ampacity (30°C) for a copper conductor with 90°C insulation in free air is 55A.

C. Derated Ampacity of Conductor	41.8A
see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100	

The temperature factor for 90°C insulation at 53°C is 0.76.

The fill factor for conductors in free air is 1.

The ampacity derated for Conditions of Use is the product of the conductor ampacity (55A) multiplied by the temperature factor (0.76) and by the fill factor (1).

55A X 0.76 X 1 = 41.8A

D. Max Current for Terminal Temp. Rating	35A
see 110.14(C)	

The lowest temperature limit for this conductor at any termination is 75°C.

Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 35A.

E. Minimum Required EGC Size	12 AWG
see Table 250.122 and 690.45	

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.

According to 690.45, it is not necessary to increase the size of the PV array's EGC when conductors are oversized for voltage drop considerations.

NEC Code Validation Tests

1.	System must meet requirements for not having series fuse (690.9(A))	PASS
2.	Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) 41.8A >= 15A = true	PASS
3.	Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) 55A > 15A x 1.25 = true	PASS
4.	Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) 35A >= 15A X 1.25 = true	PASS
5.	EGC must meet code requirements for minimum size (Table 250.122) 6 AWG >= 12 AWG = true	PASS
6.	EGC must meet code requirements for physical protection (690.46) 6 AWG >= 6 AWG = true	PASS

2.4. #4: Inverter Output: Inverter to Utility Disconnect

Circuit Section Properties

Conductor	6 AWG THWN-2, Copper
Equipment Ground Conductor (EGC)	10 AWG THWN-2, Copper
OCPD(s)	N/A
Raceway/Cable	0.75" dia. EMT
Lowest Terminal Temperature Rating	75°C
Maximum Wire Temperature	31°C
Power Source Description	Solar Edge SE11400H-US000BXX4 11400W Inverter
Current	47.5A
Voltage	240V
Inverter Max OCPD rating	60A

NEC Code Calculations

A. Continuous Current	47.5A
see Article 100	

Equipment maximum rated output current is 1 X 45A = 47.5A

B. Ampacity of Conductor	75A
see Table 310.15(B)(16)	

Ampacity (30°C) for a copper conductor with 90°C insulation in conduit/cable is 75A.

C. Derated Ampacity of Conductor	72A
see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100	

The temperature factor for 90°C insulation at 31°C is 0.96.
The fill factor for a conduit/cable that has 2 wires is 1.
The ampacity derated for Conditions of Use is the product of the conductor ampacity (75A) multiplied by the temperature factor (0.96) and by the fill factor (1).
75A X 0.96 X 1 = 72A

D. Max Current for Terminal Temp. Rating	65A
see 110.14(C)	

The lowest temperature limit for this conductor at any termination is 75°C.
Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 65A.

E. Minimum Allowed OCPD Rating	59A
see 240.4	

NEC 690.9(B) requires that the OCPD be rated for no less than 1.25 times the Continuous Current of the circuit.
47.5A X 1.25 = 59.37A rounded down to 59A

F. Minimum Required EGC Size	10 AWG
see Table 250.122	

The smallest EGC size allowed is 10 AWG for OCPD rating 60A according to Table 250.122.

G. Minimum Recommended Conduit Size	0.75" dia.
see 300.17	

The total area of all conductors is 0.1591in². With a maximum fill rate of 0.4, the recommended conduit diameter is 0.75.

Qty	Description	Size	Type	Area	Total Area
2	Conductor	6 AWG	THWN-2	0.0507in²	0.1014in²
1	Neutral	8 AWG	THWN-2	0.0366in²	0.0366in²
1	Equipment Ground	10 AWG	THWN-2	0.0211in²	0.0211in²
4					0.1591in²

0.1591in² / 0.4 = 0.3978in² (Corresponding to a diameter of 0.75")

NEC Code Validation Tests

1.	OCPD rating must be at least 125% of Continuous Current (240.4) 60A >= 47.5A X 1.25 = true	PASS
2.	Derated ampacity must exceed OCPD rating, or rating of next smaller OCPD (240.4) 72A >= 60A (OC PD Rating) = true	PASS
3.	Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) 72A >= 47.5A = true	PASS
4.	Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) 75A > 47.5A x 1.25 = true	PASS
5.	Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) 65A >= 47.5A X 1.25 = true	PASS
6.	EGC must meet code requirements for minimum size (Table 250.122) 10 AWG >= 10 AWG = true	PASS
7.	Conduit must meet code recommendation for minimum size (300.17) 0.75in. >= 0.75in. = true	PASS

2.5. #5: Utility Disconnect Output: Utility Disconnect to utilityMeter

Circuit Section Properties

Conductor	6 AWG THWN-2, Copper
Equipment Ground Conductor (EGC)	N/A
OCPD(s)	60A X 2
Raceway/Cable	0.75" dia. EMT
Lowest Terminal Temperature Rating	75°C
Maximum Wire Temperature	31°C
Power Source Description	Solar Edge SE11400H-US000BXX4 11400W Inverter
Current	47.5A
Voltage	240V

NEC Code Calculations

A. Continuous Current	47.5A
see Article 100	

Equipment maximum rated output current is 1 X 45A = 47.5A

B. Ampacity of Conductor	75A
see Table 310.15(B)(16)	

Ampacity (30°C) for a copper conductor with 90°C insulation in conduit/cable is 75A.

C. Derated Ampacity of Conductor	72A
see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100	

The temperature factor for 90°C insulation at 31°C is 0.96.
The fill factor for a conduit/cable that has 2 wires is 1.
The ampacity derated for Conditions of Use is the product of the conductor ampacity (75A) multiplied by the temperature factor (0.96) and by the fill factor (1).
75A X 0.96 X 1 = 72A

D. Max Current for Terminal Temp. Rating	65A
see 110.14(C)	

The lowest temperature limit for this conductor at any termination is 75°C.
Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 65A.

E. Minimum Allowed OCPD Rating	59A
see 240.4	

NEC 690.9(B) requires that the OCPD be rated for no less than 1.25 times the Continuous Current of the circuit.
47.5A X 1.25 = 59.37A rounded down to 59A

F. Minimum Recommended Conduit Size	0.75" dia.
see 300.17	

The total area of all conductors is 0.138in². With a maximum fill rate of 0.4, the recommended conduit diameter is 0.75.

Qty	Description	Size	Type	Area	Total Area
2	Conductor	6 AWG	THWN-2	0.0507in²	0.1014in²
1	Neutral	8 AWG	THWN-2	0.0366in²	0.0366in²
3					0.138in²

0.138in² / 0.4 = 0.345in² (Corresponding to a diameter of 0.75")

NEC Code Validation Tests

1.	OCPD rating must be at least 125% of Continuous Current (240.4) 60A >= 47.5A X 1.25 = true	PASS
2.	Derated ampacity must exceed OCPD rating, or rating of next smaller OCPD (240.4) 72A >= 60A (OC PD Rating) = true	PASS
3.	Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) 72A >= 47.5A = true	PASS
4.	Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) 75A > 47.5A x 1.25 = true	PASS
5.	Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) 65A >= 47.5A X 1.25 = true	PASS
6.	Conduit must meet code recommendation for minimum size (300.17) 0.75in. >= 0.75in. = true	PASS



Q.PEAK DUO-G6 340-355

ENDURING HIGH
PERFORMANCE



- Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY**
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 20.1%.
- INNOVATIVE ALL-WEATHER TECHNOLOGY**
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.
- ENDURING HIGH PERFORMANCE**
Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.QTM.
- EXTREME WEATHER RATING**
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).
- A RELIABLE INVESTMENT**
Inclusive 12-year product warranty and 25-year linear performance warranty².
- STATE OF THE ART MODULE TECHNOLOGY**
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

¹ APT test conditions according to IEC/TS 62804-1:2015, method B (-1500 V, 168h)
² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

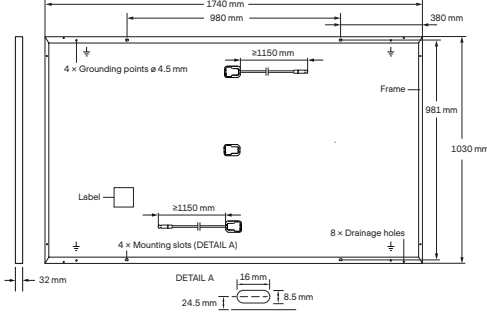
- Rooftop arrays on residential buildings
- Rooftop arrays on commercial/industrial buildings
- Ground-mounted solar power plants



Engineered in Germany

MECHANICAL SPECIFICATION

Format	1740 mm × 1030 mm × 32 mm (including frame)
Weight	19.9 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥1150 mm, (-) ≥1150 mm
Connector	Stäubli MC4, Hanwha Q CELLS HQC4, Amphenol UTX, Renhe 05-6, Tongling TL-Cable01S, JMTHY JM601; IP68 or Friends PV2e; IP67

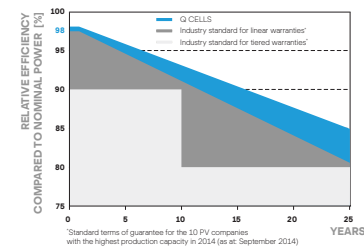


ELECTRICAL CHARACTERISTICS

POWER CLASS			340	345	350	355
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)						
Minimum	Power at MPP ¹	P _{MPP} [W]	340	345	350	355
	Short Circuit Current ¹	I _{SC} [A]	10.68	10.73	10.79	10.84
	Open Circuit Voltage ¹	V _{OC} [V]	40.24	40.49	40.73	40.98
	Current at MPP	I _{MPP} [A]	10.16	10.22	10.27	10.33
	Voltage at MPP	V _{MPP} [V]	33.45	33.76	34.07	34.38
	Efficiency ¹	η [%]	≥19.0	≥19.3	≥19.5	≥19.8
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²						
Minimum	Power at MPP	P _{MPP} [W]	254.5	258.2	261.9	265.7
	Short Circuit Current	I _{SC} [A]	8.60	8.65	8.69	8.74
	Open Circuit Voltage	V _{OC} [V]	37.94	38.17	38.41	38.65
	Current at MPP	I _{MPP} [A]	8.00	8.04	8.09	8.13
	Voltage at MPP	V _{MPP} [V]	31.81	32.10	32.40	32.69

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}, V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • 2800 W/m², NMOT, spectrum AM 1.5

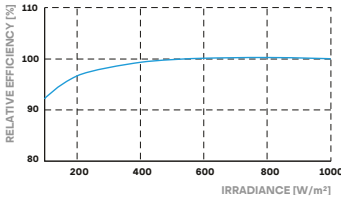
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I _{SC}	α [%/K]	+0.04	Temperature Coefficient of V _{OC}	β [%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ [%/K]	-0.36	Nominal Module Operating Temperature	NMOT [°C]	43 ± 3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V _{sys} [V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Reverse Current	I _R [A]	20	Fire Rating based on ANSI/UL 1703	C / TYPE 2
Max. Design Load, Push / Pull	[Pa]	3600 / 2667	Permitted Module Temperature on Continuous Duty	-40 °C - +85 °C
Max. Test Load, Push / Pull	[Pa]	5400 / 4000		

QUALIFICATIONS AND CERTIFICATES

VDE Quality Tested, IEC 61215:2016; IEC 61730:2016;
This data sheet complies with DIN EN 50380.



PACKAGING INFORMATION

Number of Modules per Pallet	32
Number of Pallets per Trailer (24t)	28
Number of Pallets per 40' HC-Container (26t)	26
Pallet Dimensions (L × W × H)	1791 × 1130 × 1200 mm
Pallet Weight	681 kg

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH
Sonnental 17-21, 06766 Bitterfeld-Wolfen, Germany | TEL +49 (0)3494 66 99-23444 | FAX +49 (0)3494 66 99-23000 | EMAIL sales@q-cells.com | WEB www.q-cells.com



Engineered in Germany

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505



POWER OPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	P505 (for higher current modules)	
INPUT							
Rated Input DC Power ⁽¹⁾	320	340	370	400	405	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125 ⁽²⁾	83 ⁽²⁾	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11			10.1		14	Adc
Maximum DC Input Current	13.75			12.63		17.5	Adc
Maximum Efficiency	99.5						%
Weighted Efficiency	98.8					98.6	%
Overvoltage Category	II						
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)							
Maximum Output Current	15						Adc
Maximum Output Voltage	60				85		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)							
Safety Output Voltage per Power Optimizer	1 ± 0.1						Vdc
STANDARD COMPLIANCE							
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3						
Safety	IEC62109-1 (class II safety), UL1741						
RoHS	Yes						
INSTALLATION SPECIFICATIONS							
Maximum Allowed System Voltage	1000						Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters						
Dimensions (W x L x H)	128 x 152 x 28 / 5 x 5.97 x 1.1			128 x 152 x 36 / 5 x 5.97 x 1.42	128 x 152 x 50 / 5 x 5.97 x 1.96	128 x 152 x 59 / 5 x 5.97 x 2.32	mm / in
Weight (including cables)	630 / 1.4			750 / 1.7	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4 ⁽³⁾						
Output Wire Type / Connector	Double Insulated; MC4						
Output Wire Length	0.95 / 3.0		1.2 / 3.9				m / ft
Input Wire Length	0.16 / 0.52						m / ft
Operating Temperature Range	-40 - +85 / -40 - +185						°C / °F
Protection Rating	IP68 / NEMA6P						
Relative Humidity	0 - 100						%

⁽¹⁾ Rated STC power of the module. Module of up to +5% power tolerance allowed

⁽²⁾ NEC 2017 requires max input voltage be not more than 80V

⁽³⁾ For other connector types please contact SolarEdge

PV System Design Using a SolarEdge Inverter ^{(4),(5)}		Single Phase HD-Wave	Single phase	Three Phase 208V	Three Phase 480V	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400	8		10	18	
	P405 / P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50 ⁽⁶⁾	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000 ⁽⁷⁾	12750 ⁽⁸⁾	W
Parallel Strings of Different Lengths or Orientations		Yes				

⁽⁴⁾ For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf

⁽⁵⁾ It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string

⁽⁶⁾ A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement

⁽⁷⁾ For SE14.4KUS/SE43.2KUS: It is allowed to install up to 6,500W per string when 3 strings are connected to the inverter (3 strings per unit for SE43.2KUS) and when the maximum power difference between the strings is up to 1,000W

⁽⁸⁾ For SE30KUS/SE33.3KUS/SE66.6KUS/SE100KUS: It is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE66.6KUS/SE100KUS) and when the maximum power difference between the strings is up to 2,000W



Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included



SolaDeck Model SD 0783



SolaDeck UL50 Type 3R Enclosures

Available Models:

Model SD 0783 - (3" fixed Din Rail)

Model SD 0786 - (6" slotted Din Rail)



SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

****Typical System Configuration**

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 1- Power Distribution Block 600VDC 175AMP
- 1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

****Typical System Configuration**

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 4- Din Rail Mounted Terminal Blocks
- Bus Bars with UL lug

****Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.**



Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.



Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.



Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.



Powering Business Worldwide

pe.eaton.com

Product compliance: No Data

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Eaton general duty cartridge fuse safety switch

DG222NRB

UPC:782113144221

Dimensions:

- **Height:** 14.38 IN
- **Length:** 14.8 IN
- **Width:** 9.7 IN

Weight:10 LB

Notes:Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

Warranties:

- Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

Specifications:

- **Type:** General duty, cartridge fused
- **Amperage Rating:** 60A
- **Enclosure:** NEMA 3R
- **Enclosure Material:** Painted galvanized steel
- **Fuse Class Provision:** Class H fuses
- **Fuse Configuration:** Fusible with neutral
- **Number Of Poles:** Two-pole
- **Number Of Wires:** Three-wire
- **Product Category:** General duty safety switch
- **Voltage Rating:** 240V

Supporting documents:

- [Eatons Volume 2-Commercial Distribution](#)
- [Eaton Specification Sheet - DG222NRB](#)

Certifications:

- UL Listed



Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US



INVERTERS

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

solaredge.com

solaredge

/ Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5 ⁽¹⁾							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V ⁽²⁾	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V ⁽²⁾	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600k Ω Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

⁽¹⁾ For other regional settings please contact SolarEdge support

⁽²⁾ A higher current source may be used; the inverter will limit its input current to the values stated

Single Phase Inverter

with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

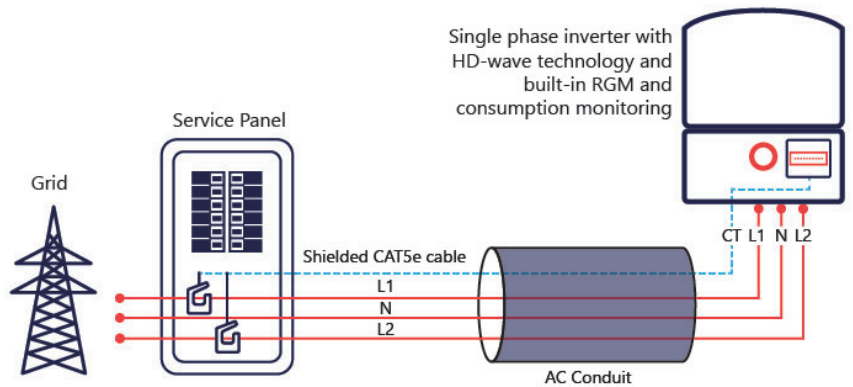
MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)						
Revenue Grade Metering, ANSI C12.20	Optional ⁽³⁾						
Consumption metering							
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection						
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07						
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)						
Emissions	FCC Part 15 Class B						
INSTALLATION SPECIFICATIONS							
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG				1" Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG				1" Maximum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174				21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9		38.8 / 17.6		lb / kg
Noise	< 25				<50		dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽⁴⁾						*F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)						

⁽³⁾ Inverter with Revenue Grade Meter P/N: SExxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxH-US000BNI4 . For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box

⁽⁴⁾ Full power up to at least 50°C / 122°F; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

How to Enable Consumption Monitoring

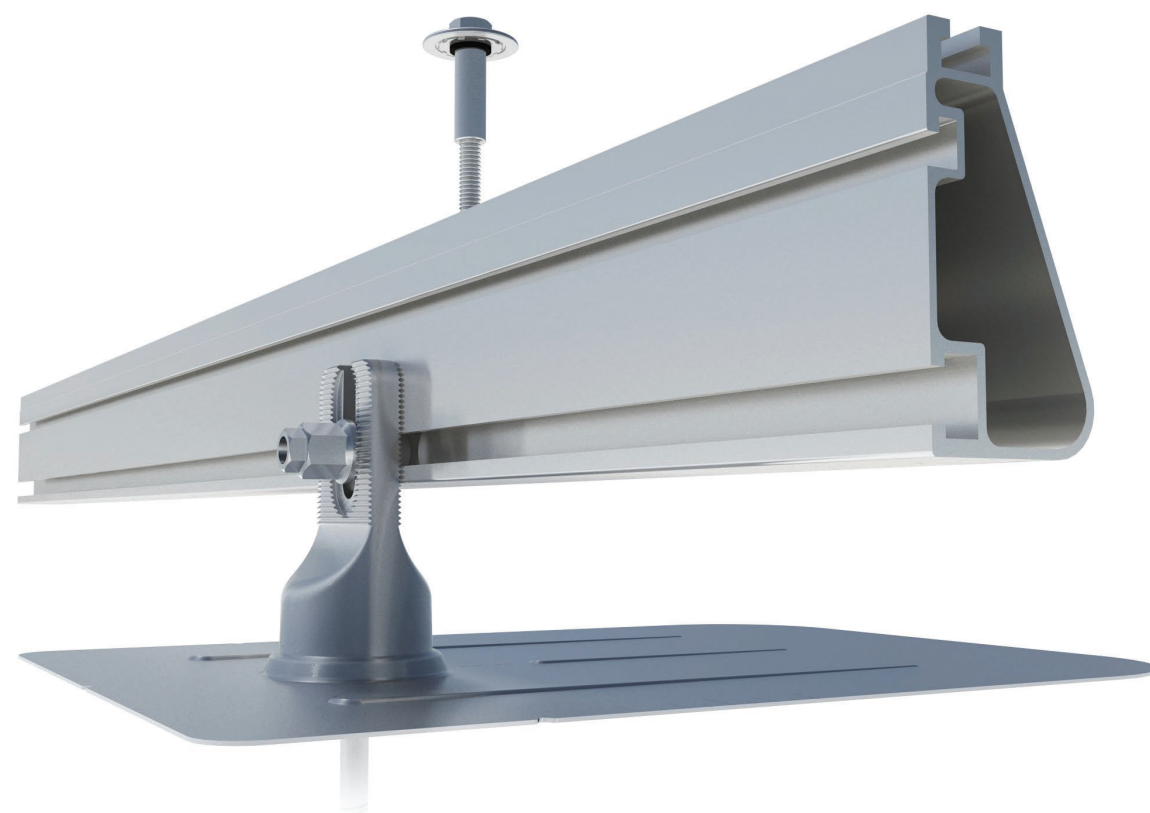
By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills





Datasheet

Flush Mount System



Built for solar's toughest roofs.

IronRidge builds the strongest mounting system for pitched roofs in solar. Every component has been tested to the limit and proven in extreme environments.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 25-year warranty.



Strength Tested

All components evaluated for superior structural performance.



Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.



UL 2703 Listed System

Entire system and components meet newest effective UL 2703 standard.



PE Certified

Pre-stamped engineering letters available in most states.



Design Assistant

Online software makes it simple to create, share, and price projects.



25-Year Warranty

Products guaranteed to be free of impairing defects.

Datasheet

XR Rails ☺

XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear and black finish

XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

Bonded Splices



All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

Clamps & Grounding ☺

UFOs



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

Stopper Sleeves



Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

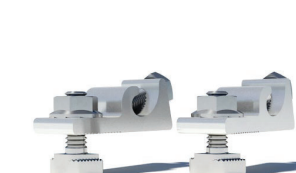
CAMO



Bond modules to rails while staying completely hidden.

- Universal end-cam clamp
- Tool-less installation
- Fully assembled

Grounding Lugs



Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

Attachments ☺

FlashFoot2



Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

Conduit Mount



Flash and mount conduit, strut, or junction boxes.

- Twist-on Cap eases install
- Wind-driven rain tested
- Secures 3/4" or 1" conduit

Slotted L-Feet



Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

Bonding Hardware



Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

[Go to IronRidge.com/design](https://www.ironridge.com/design)



NABCEP Certified Training

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1495 Zephyr Avenue
Hayward, CA 94544
1-800-227-9523
IronRidge.com

Attn: Corey Geiger, COO, IronRidge Inc.
Date: September 7th, 2018

Re: Structural Certification and Span Tables for IronRidge Flush Mount System

This letter addresses the structural performance and code compliance of IronRidge's Flush Mount System. The Flush Mount System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum XR Rails and secured to the rails with IronRidge mounting clamps. The XR Rails are side mounted to a selected roof attachment with 3/8" stainless steel bonding hardware and then attached directly to the roof structure or to a stanchion that is fastened to the underlying roof structure. Assembly details of a typical Flush Mount installation and its core components are shown in Exhibit EX-0015.

The IronRidge Flush Mount System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- 2015 International Building Code (IBC-2015)
- 2012 North Carolina State Building Code
- 2015 Aluminum Design Manual (ADM-2015)

The tables included in this letter provide the maximum allowable spans of XR Rails in the Flush Mount System for the respective loads and configurations listed, covering wind exposure categories B, C, & D, roof zones 1, 2 & 3, and roof slopes from 0° to 45°. The span tables are applicable provided that the following conditions are met:

1. *Span* is the distance between two adjacent roof attachment points (measured at the center of the attachment fastener)
2. The underlying roof pitch, measured between roof surface and horizontal plane, is 45° or less.
3. The *mean roof height*, defined as the average of the roof eave height and the roof ridge height measured from grade, does not exceed 30 feet.
4. Module length shall not exceed the listed maximum dimension provided for the respective span table and module width shall not exceed 48".
5. All Flush Mount components shall be installed in a professional workmanlike manner per IronRidge's *Flush Mount installation manual* and other applicable standards for general roof construction practice.



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The span tables provided in this letter are certified based on the structural performance of IronRidge XR Rails only with no consideration of the structural adequacy of the chosen roof attachments, PV modules, or the underlying roof supporting members. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the aforementioned system components in regards to the applied or resultant loads of any chosen array configuration.

Sincerely,

Gang Xuan, PE, LEED AP
Senior Structural Engineer

FRAMELESS MODULE KITS

Insert Frameless Kit T-bolt in top rail slot. Place star washer over T-bolt, allowing it to rest on top of rail. Secure module clamps with a hex nut and torque to **80 in-lbs**.

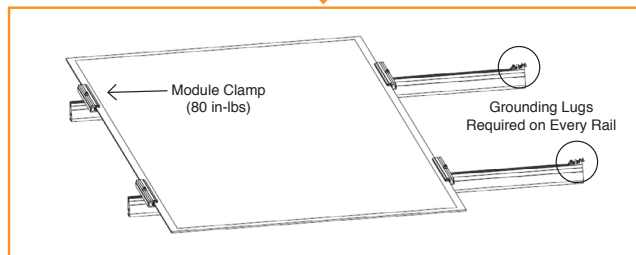
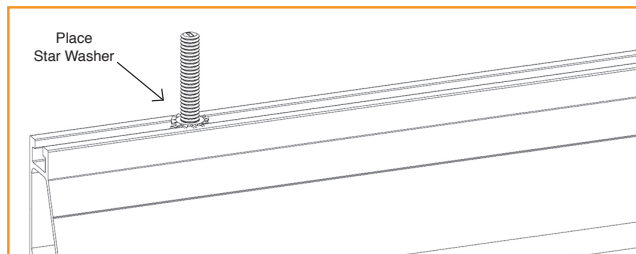
☞ **Tested or evaluated module clamps:**

- Sunferson silver or black SFS-UTMC-200(B) mid and SFS-UTEC-200(B) end clamps.
- Sunpreme silver or black mid and end clamps with part numbers 7500105X where "X" is 1, 5, 6 or 7.
- IronRidge silver or black mid and end clamps with part numbers FMLS-XC-001-Y where "X" is E or M and "Y" is B or blank.

☞ **Follow module manufacturer's installation instructions to install the module clamps.**

☞ **Frameless modules require using a Grounding Lug on every rail.**

☞ **For Sunpreme Modules Only: If required to use slide prevention hardware, see Module Slide Prevention Addendum (Version 1.10).**



MODULE COMPATIBILITY

The Flush Mount System may be used to ground and/or mount a PV module complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. Unless otherwise noted, “xxx” refers to the module power rating and both black and silver frames are included in the certification.

MAKE	MODELS
Amerisolar	Amerisolar modules with 35, 40 and 50 mm frames AS-bYxxxZ Where "b" can be 5 or 6; "Y" can be M, P, M27, P27, M30, or P30; "xxx" is the module power rating; and "Z" can be blank, W or WB
Astronergy Solar	Astronergy modules with 30, 35, 40 and 45 mm frames aaSMbbyyC/zz-xxx Where “aa” can be CH or A; "bb" can be 60, 66, or 72; “yy” can be blank, 10 or 12; "C" can M, P, M(BL), M-HC, M(BL)-HC, P-HC, (DG), or (DGT); “zz” can be blank, HV, F-B, or F-BH ; and “xxx” is the module power rating Astronergy frameless modules CHSM6610P(DG)-xxx Where “xxx” is the module power rating
Auxin	Auxin modules with 40 mm frames AXN6y6zAxxx Where "y" can be M or P; "z" can be 08, 09, 10, 11, or 12; "A" can be F or T; and "xxx" is the module power rating
Axitec	Axitec Modules with 35 and 40 mm frames AC-xxxY/aaZZb Where "xxx" is the module power rating; "Y" can be M, P or MH; "aa" can be blank, 125- or 156-; "ZZ" can be 54, 60, 72, 120, or 144; "b" can be S or SB
Boviet	Boviet modules with 40mm frames BVM66aaYY-xxx Where "aa" can be 9, 10 or 12; "YY" is M or P; and "xxx" is the module power rating
BYD	Where "xxx" is the module power rating; "Y" can be M, P or MH; "aa" can be blank, 125- or 156-; "ZZ" can be 54, 60, 72, 120, or 144; "b" can be S or SB
Canadian Solar	Canadian Solar modules with 30, 35 and 40 mm frames CSbY-xxxZ Where "b" can be 1, 3 or 6; "Y" can be H, K, P, U, V, W, or X; "xxx" refers to the module power rating; and "Z" can be M, P, MS, PX , M-SD, P-AG, P-SD, MB-AG, PB-AG, MS-AG, or MS-SD Canadian Solar frameless modules CSbY-xxx-Z Where "b" can be 3 or 6; "Y" is K, P, U, or X; "xxx" is the module power rating, and "Z" can be M-FG, MS-FG, P-FG, MB-FG, or PB-FG
CertainTeed	CertainTeed modules with 35 and 40 frames CTxxxYZZ-AA Where "xxx" is the module power rating; "Y" can be M, P or HC; "ZZ" can be 00,01, 10, or 11; and "AA" can be 01, 02, 03 or 04
CSUN	Csun modules with 35 and 40 mm frames YYxxx-zzAbb Where "YY" is CSUN or SST; xxx is the module power rating; "zz" is blank, 60, or 72; and "A" is blank, P or M; "bb" is blank, BB, BW, or ROOF
Ecosolargy	Ecosolargy modules with 35, 40 and 50 mm frames ECOxxxYzzA-bbD Where "xxx" is the module power rating; "Y" can be A, H, S, or T; "zz" can be 125 or 156; "A" can be M or P; "bb" can be 60 or 72; and "D" can be blank or B

MODULE COMPATIBILITY

ET Solar	ET Solar modules with 35, 40 and 50 mm frames ET-Y6ZZxxxAA Where “Y” can be P, L, or M; “ZZ” can be 60 or 72; “xxx” refers to the module power rating; and “AA” can be WB, WW, BB, WBG, WWG, WBAC, WBCO, WWCO, WWBCO or BBAC
Flex	Flex modules with 35, 40 and 50 mm frames and model identifier FXS-xxxYY-ZZ; where "xxx" is the module power rating; "YY" can be BB or BC; and "ZZ" can be MAA1B, MAA1W, MAB1W, SAA1B, SAA1W, SAC1B, SAC1W, SAD1W, SBA1B, SBA1W, SBC1B, or SBC1W
GCL	GCL modules with 35 mm and 40 mm frames GCL-a6/YY xxx Where "a" can be M or P; "YY" can be 60, 72, or 72H; and xxx is the module power rating
GigaWatt Solar	Gigawatt modules with 40 mm frames GWxxxYY Where “xxx” refers to the module power rating; and “YY” can be either PB or MB
Hansol	Hansol modules with 35 and 40 frames HSxxxYY-zz Where "xxx" is the module power rating; "YY" can be PB, PD, PE, TB, TD, UB, UD, or UE; and "zz" can be AN1, AN3, AN4, HV1, or JH2
Hanwha Solar	Hanwha Solar modules with 40, 45 and 50 mm frames HSLaaP6-YY-1-xxxZ Where "aa" can be either 60 or 72; "YY" can be PA or PB; "xxx" refers to the module power rating; and "Z" can be blank or B
Hanwha Q CELLS	Hanwha Q CELLS Modules with 32, 35, 40 and 42mm frames and model identifier aaYY-ZZ-xxx where "aa" can be Q. or B.; "YY" can be PLUS, PRO, PEAK, LINE PRO, LINE PLUS, or PEAK DUO; and "ZZ" can be G3, G3.1, G4, G4.1, L-G2, L-G2.3, L-G3, L-G3.1, L-G3y, L-G4, L-G4.2, L-G4y, LG4.2/TAA, BFR-G3, BLK-G3, BFR-G3.1, BLK-G3.1, BFR-G4, BFR-G4.1, BFR G4.3, BLK-G4.1, G4/SC, G4.1/SC, G4.1/TAA, G4.1/MAX, BFR G4.1/TAA, BFR G4.1/MAX, BLK G4.1/TAA, BLK G4.1/SC, EC-G4.4, G5, BLK-G5, L-G5, L-G5.1, L-G5.2, L-G5.2/H, L-G5.3, G6, G6+, BLK-G6, L-G6, L-G6.1, L-G6.2, L-G6.3, G7, BLK-G6+, BLK-G7, G7.2, G8, BLK-G8, G8+, BLK-G8+ L-G7, L-G7.1, L-G7.2, L-G7.3, L-G8, L-G8.1, L-G8.2, or L-G8.3; and "xxx" is the module power rating
Heliene	Heliene modules with 40 mm frames YYZZxxx Where "YY" can be 36, 60, 72, or 96; "ZZ" can be M, P, or MBLK; and "xxx" is the module power rating
HT-SAAE	HT-SAAE modules with 40 mm frames HT72-156Z-xxx Where "Z" can be M, P, M-C, P-C, M(S), M(VS), M(V), P(V), M(V)-C, P(V)-C; and "xxx" is the module power rating
Hyundai	Hyundai modules with 33, 35, 40 and 50 mm frames HiY-SxxxZZ Where "Y" can be A, M or S; "xxx" refers to the module power rating; and "ZZ" can be HG, HI, KI, MI, MF, MG, RI, RG(BF), RG(BK), SG, TI, or TG
Itek	Itek Modules with 40 and 50 mm frames IT-xxx-YY Where "xxx" is the module power rating; and "YY" can be blank, HE, or SE, or SE72
JA Solar	JA Solar modules with 35, 40 and 45 mm frames JAyyzz-bbww-xxx/aa Where “yy” can be M, P, M6 or P6; “zz” can be blank, (K), (L), (R), (V), (BK), (FA), (TG), (FA)(R), (L)(BK), (L)(TG), (R)(BK), (R)(TG), (V)(BK), (BK)(TG), or (L)(BK)(TG); “bb” can be 48, 60, or 72; “ww” can be S01, S02, S03, S09, or S10; “xxx” is the module power rating; and “aa” can be MP, SI, SC, PR, 3BB, 4BB, 4BB/RE, 5BB
Jinko	Jinko modules with 35 and 40 mm frames JKMYxxxZZ-aa Where "Y" can either be blank or S; "xxx" is the module power rating; "ZZ" can be P, PP, M; and "aa" can be blank, 60, 60B, 60H, 60L, 60BL, 60HL, 60HBL, 60-J4, 60B-J4, 60B-EP, 60(Plus), 60-V, 60-MX, 72, 72-V, 72H-V, 72L-V, 72HL-V or 72-MX Jinko frameless modules JKMxxxPP-DV Where "xxx" is the module power rating
Kyocera	Kyocera Modules with 46mm frames KYxxxZZ-AA Where "Y" can be D or U; "xxx" is the module power rating; "ZZ" can be blank, GX, or SX; and "AA" can be LPU, LPU, LPU, LPS, LPB, LFB, LFB2, LFB2, LPB2, 3AC, 3BC, 3FC, 4AC, 4BC, 4FC, 4UC, 5AC, 5BC, 5FC, 5UC, 6BC, 6FC, 8BC, 6MCA, or 6MPA
LG	LG modules with 35, 40 and 46 mm frames LGxxxYaZ-bb Where "xxx" is the module power rating; "Y" can be A, E, N, Q, S; "a" can be 1 or 2; "Z" can be C, K, T, or W; and "bb" can be A3, A5, B3, G3, G4, K4, or V5
Longi	Longi modules with 30, 35 and 40 mm frames LRA-YYZZ-xxxM Where "a" can be 4 or 6; "YY" can be blank, 60 or 72; "ZZ" can be blank, BK, BP, HV, PB, PE, PH, HBD, HPB, or HPH; "xxx" is the module power rating
Mission Solar	Mission Solar modules with 40 mm frames MSEbbxxxZZaa Where "bb" can be blank or 60A; "xxx" is the module power rating; "ZZ" can be blank, MM, SE, SO or SQ, and "aa" can be blank, 1J, 4J, 4S, 5K, 5T, 6J, 6S, 6W, 8K, 8T, or 9S
Mitsubishi	Mitsubishi modules with 46 mm frames PV-MYYxxxZZ Where "YY" can be LE or JE; xxx is the module power rating; and "ZZ" can be either HD, HD2, or FB

MODULE COMPATIBILITY

Motech	IM and XS series modules with 40, 45 and 50 mm frames
Neo Solar Power	Neo Solar Power modules with 35 mm frames D6YxxxZZaa Where "Y" can be M or P; xxx is the module power rating; "ZZ" can be B3A, B4A, E3A, E4A, H3A, H4A; and "aa" can be blank, (TF), ME or ME (TF)
Panasonic	Panasonic modules with 35 and 40 mm frames BHNxxxYYzzA Where "xxx" refers to the module power rating; "YY" can be either KA, SA or ZA; "zz" can be either 01, 02, 03, 04, 06, 06B, 11, 11B, 15, 15B, 16, 16B, 17, or 18; and "A" can be blank, E or G
Peimar	Peimar modules with 40 mm frames SGxxxYzz Where "xxx" is the module power rating; "Y" can be M or P; and "zz" can be blank, (BF), or (FB)
Phono Solar	Phono Solar modules with 35, 40 and 45 mm frames PSxxxY-ZZ/A Where xxx refers to the module power rating; "Y" can be M or P; "ZZ" can be 20 or 24; and "A" can be F, T or U
Prism Solar	Prism Solar frameless modules BiYY-xxxBSTC Where "YY" can be 48, 60, 60S, 72 or 72S; and "xxx" is the module power rating
REC Solar	REC modules with 30, 38 and 45 mm frames RECxxxYYZZ Where "xxx" is the module power rating; "YY" can be AA, M, NP, PE, PE72, TP, TP2, TP2M, TP2SM, or TP2S; and "ZZ" can be blank, Black, BLK, BLK2, SLV, or 72
Renesola	ReneSola modules with 35, 40 and 50 mm frames JCxxxY-ZZ Where "xxx" refers to the module power rating; "Y" can be F, M or S; and "ZZ" can be Ab, Ab-b, Abh, Abh-b, Abv, Abv-b, Bb, Bb-b, Bbh, Bbh-b, Bbv, Bbv-b, Db, or Db-b
Renogy	Renogy Modules with 40 and 50 mm frames RNG-xxxY Where "xxx" is the module power rating; and "Y" can be D or P
Risen	Risen Modules with 35 and 40 mm frames RSMyy-6-xxxZZ Where "yy" can be 60 or 72; "xxx" is the module power rating; and "ZZ" can be M or P Frameless modules RSMyy-6-xxxZZ Where "yy" can be 60 or 72; "xxx" is the module power rating; and "ZZ" can be MDG or PDG
S-Energy	S-Energy modules with 40 frames SNxxxY-ZZ Where "xxx" is the module power rating; "Y" can be M or P; and "ZZ" can be 10, or 15
Seraphim Energy Group	Seraphim modules with 35 and 40 mm frames SEG-6YY-xxxZZ Where "YY" can be MA, MB, PA, or PB; "xxx" is the module power rating; and "ZZ" can be BB, BW, WB or WW
Seraphim USA	Seraphim modules with 40 and 50 mm frames SRP-xxx-6YY Where "xxx" is the module power rating; and "YY" can be MA, MB, PA, PB, QA-XX-XX, and QB-XX-XX
Sharp	Sharp modules with 35 and 40 mm frames NUYYxxx Where "YY" can be SA or SC; and "xxx" is the module power rating
Silfab	Silfab Modules with 38 mm frames SYY-Z-xxx Where "YY" can be SA or LA; SG or LG; "Z" can be M, P, or X; and "xxx" is the module power rating
Solaria	Solaria modules with 40 mm frames PowerXT xxxY-ZZ Where "xxx" is the module power rating; "Y" can be R or C; and "ZZ" can be AC, BD, BX, BY, PD, PX, PZ, WX or WZ
Solarcity	Solarcity modules with 40 mm frames SCxxxYY Where "xxx" is the module power rating; and "YY" can be blank, B1 or B2
SolarTech	SolarTech modules with 42 mm frames STU-xxxYY Where "xxx" is the module power rating; and "YY" can be PERC or HJT
SolarWorld AG / Industries GmbH	SolarWorld Sunmodule Plus, Protect, Bisun, XL, Bisun XL, may be followed by mono, poly, duo, black, bk, or clear; modules with 31, 33 or 46 mm frames SW-xxx Where "xxx" is the module power rating
SolarWorld Americas Inc.	SolarWorld Sunmodule Plus, Protect, Bisun, XL, Bisun XL, may be followed by mono, poly, duo, black, bk, or clear; modules with 33 mm frames SWA-xxx Where "xxx" is the module power rating
Stion	Stion Thin film modules with 35 mm frames STO-xxx or STO-xxxA Thin film frameless modules STL-xxx or STL-xxxA Where "xxx" is the module power rating
SunEdison	SunEdison Modules with 35, 40 and 50 mm frames SE-YxxxZABCDE Where "Y" can be B, F, H, P, R, or Z; "xxx" refers to the module power rating; "Z" can be 0 or 4; "A" can be B,C,D,E,H,I,J,K,L,M, or N; "B" can be B or W; "C" can be A or C; "D" can be 3, 7, 8, or 9; and "E" can be 0, 1 or 2

MODULE COMPATIBILITY

Suniva	Suniva modules with 35, 38, 40, 46 and 50 mm frames OPTxxx-AA-B-YYY-Z MVXxxx-AA-B-YYY-Z Where "xxx" is the module power rating; "AA" is either 60 or 72; "B" is either 4 or 5; "YYY" is either 100,101,700,1B0, or 1B1; and "Z" is blank or B
Sunpower	Sunpower standard (G3 or G4) or InvisiMount (G5) 40 and 46 mm frames SPR-Zb-xxx-YY Where "Z" is either A, E, P or X; "b" can be blank, 17, 18, 19, 20, 21, or 22; "xxx" is the module power rating and "YY" can be blank, BLK, COM, C-AC, D-AC, E-AC, G-AC, BLK-C-AC, or BLK-D-AC
Sunpreme	Sunpreme frameless modules GXB-xxxYY Where "xxx" is the module power rating; and "YY" can be blank or SL
Sunspark	Sunspark modules with 40 mm frames SYY-xxZ Where "YY" can be MX or ST; "xxx" is the module power rating; and "Z" can be P or W
Suntech	Vd, Vem, Wdb, Wde, and Wd series modules with 35, 40 and 50 mm frames
Talesun	Talesun modules with 35 and 40 frames TP6yyZxxx-A Where "yy" can be 60, 72, H60 or H72; "Z" can be M, or P; "xxx" is the module power rating; and "A" can be blank, B, or T
Trina	Trina Modules with 30, 35, 40 and 46mm frames TSM-xxxYYZZ Where "xxx" is the module power rating; "YY" can be DD05, DD06, DE14, DE15, DEG15, PA05, PC05, PD05, PD06, PA14, PC14, PD14, PE14, or PE15; and "ZZ" can be blank, .05, .08, .10, .18, .08D, .18D, 0.82, .002, .00S, 05S, 08S, A, A.05, A.08, A.10, A.18, A(II), A.05(II), A.08(II), A.082(II), A.10(II), A.18(II), H, H(II), H.05(II), H.08(II), HC.20(II), HC.20(II), or M Frameless modules TSM-xxxYY Where "YY" can be either DEG5(II), DEG5.07(II), DEG5.40(II), DEG5.47(II), DEG14(II), DEG14C(II), DEG14C.07(II), DEG14.40(II), PEG5, PEG5.07, PEG5.40, PEG5.47, PEG14, or PEG14.40
Vikram	Vikram solar modules with 40 mm frames Syy.ZZ.AAA.bb Where "yy" can be M, P, MBB, MH, MS, MHBB, or PBB; "ZZ" can be 60 or 72; "AAA" is the module power rating; and "bb" can be 03.04 or 05
Winaico	Winaico modules with 35 and 40 mm frames Wsy-xxxz6 Where "y" can be either P or T; "xxx" is the module power rating; and "z" can be either M or P
Yingli	Panda, YGE and YGE-U series modules with 35, 40 and 50 mm frames



Tech Brief

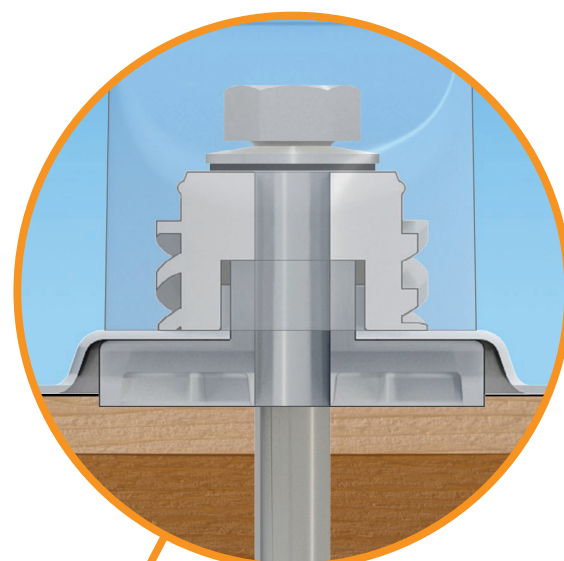
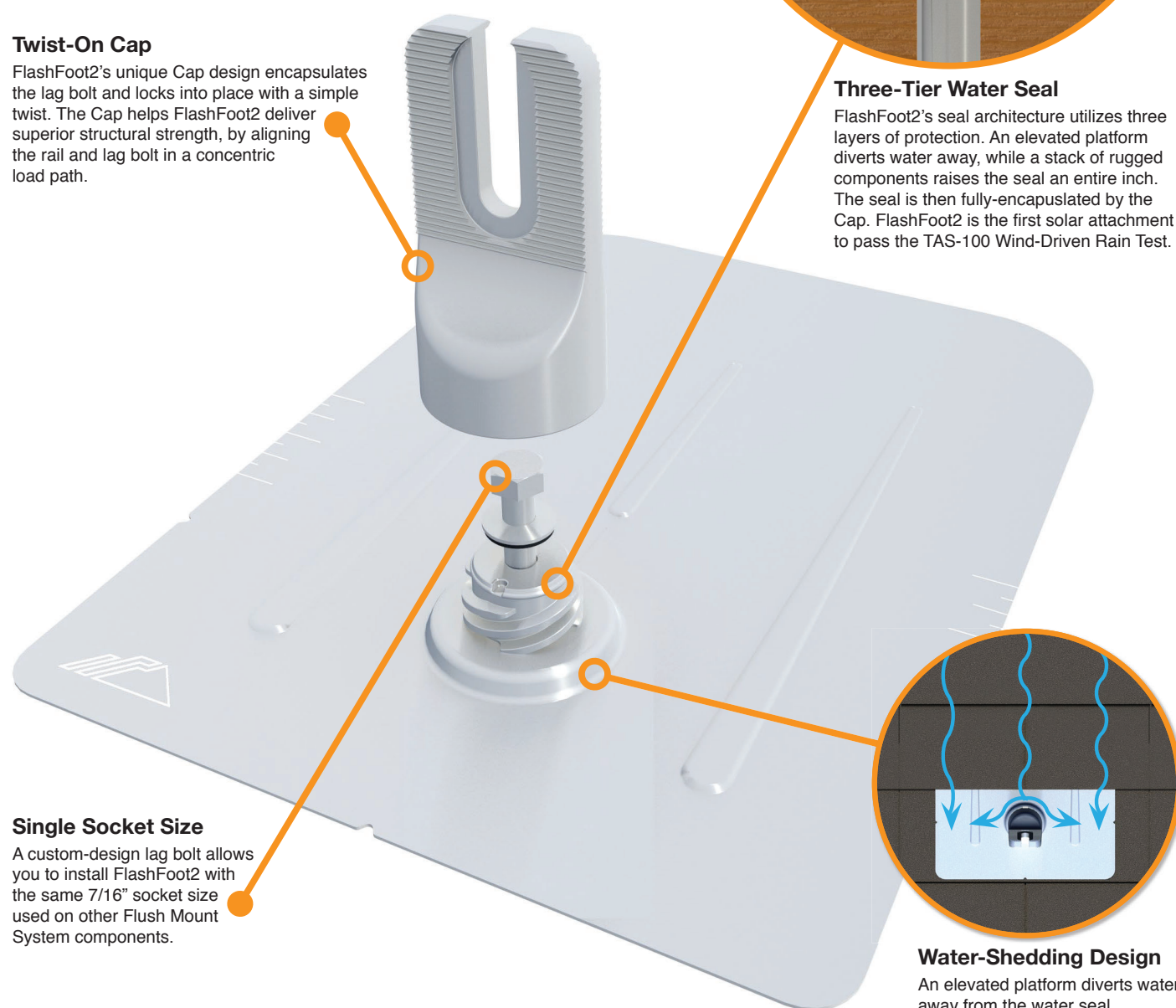
FlashFoot2

The Strongest Attachment in Solar

IronRidge FlashFoot2 raises the bar in solar roof protection. The unique water seal design is both elevated and encapsulated, delivering redundant layers of protection against water intrusion. In addition, the twist-on Cap perfectly aligns the rail attachment with the lag bolt to maximize mechanical strength.

Twist-On Cap

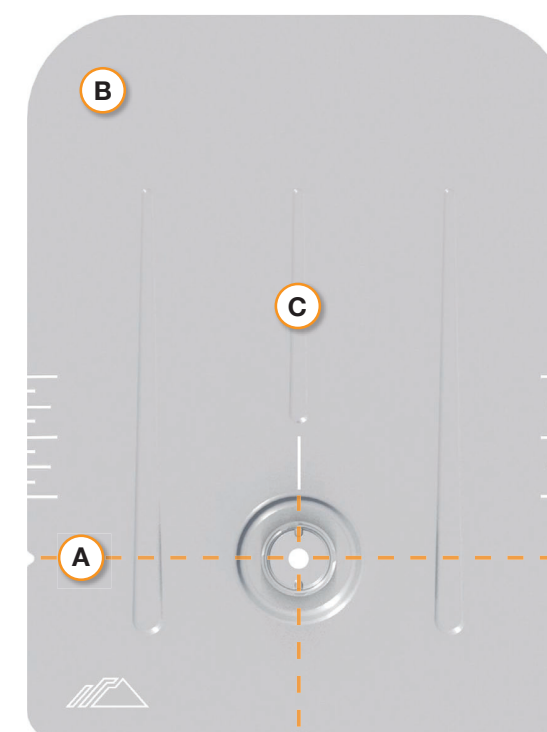
FlashFoot2's unique Cap design encapsulates the lag bolt and locks into place with a simple twist. The Cap helps FlashFoot2 deliver superior structural strength, by aligning the rail and lag bolt in a concentric load path.



Three-Tier Water Seal

FlashFoot2's seal architecture utilizes three layers of protection. An elevated platform diverts water away, while a stack of rugged components raises the seal an entire inch. The seal is then fully-encapsulated by the Cap. FlashFoot2 is the first solar attachment to pass the TAS-100 Wind-Driven Rain Test.

Installation Features



A Alignment Markers

Quickly align the flashing with chalk lines to find pilot holes.

B Rounded Corners

Makes it easier to handle and insert under the roof shingles.

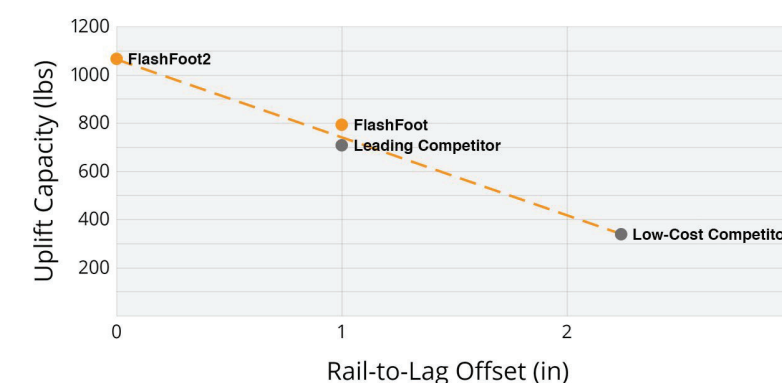
C Reinforcement Ribs

Help to stiffen the flashing and prevent any bending or crinkling during installation.

Benefits of Concentric Loading

Traditional solar attachments have a horizontal offset between the rail and lag bolt, which introduces leverage on the lag bolt and decreases uplift capacity.

FlashFoot2 is the only product to align the rail and lag bolt. This concentric loading design results in a stronger attachment for the system.



Testing & Certification

Structural Certification

Designed and Certified for Compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings

Water Sealing Tested to UL 441 Section 27 "Rain Test" and TAS 100-95 "Wind Driven Rain Test" by Intertek. Ratings applicable for composition shingle roofs having slopes between 2:12 and 12:12.

UL 2703

Conforms to UL 2703 Mechanical and Bonding Requirements. See Flush Mount Install Manual for full ratings.

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www.biltmoreforest.org



George F. Goosmann, III, Mayor
Fran G. Cogburn, Mayor-Pro Tem
E. Glenn Kelly, Commissioner
Doris P. Loomis, Commissioner

Jonathan B. Kanipe,
Town Manager

MEMORANDUM

To: Board of Adjustment Members
From: Jonathan Kanipe, Town Manager
Re: Board of Adjustment Case Number 2 (324 Vanderbilt Road)
Date: November 11, 2020

Special Use Permit Request for Installation of Fence in the Side Yard
Variance Request for Installation of the Fence along the Side Property Lines

A special use permit is requested for the installation of a fence in the side yards of the property. The applicant has also requested the fence be placed on the property line. Approval for this placement requires a variance from the Board of Adjustment.

The Town's recently amended fence regulations, found in § 153.049 FENCE, GATE AND WALL REGULATIONS, state that

(A) New fences, gates or walls may be approved by the Board of Adjustment as a special use, so long as the gate, fence or wall meets the following requirements.

(1) The fence, gate, or wall is constructed entirely within the rear yard, is not located in any side or rear yard setbacks, and is constructed of materials deemed acceptable in § 153.049(D).

(2) Mature vegetation or other buffering sufficient to screen the fence, gate, or wall from neighboring properties shall be required to the extent necessary.

The variance request is a result of the proposed fence being located along the side property lines. This residential property at 324 Vanderbilt Road is on a large lot (over 11 acres) that abuts and fronts incompatible land uses off of Hendersonville Road within the City of Asheville zoning jurisdiction. The Zoning Ordinance, in § 153.063 BUFFER STRIP AND SCREEN REQUIREMENTS, provides the Board of Adjustment "authority to require that a wall or fence be constructed next to property used for residential purposes when the Board determines that the buffer strip alone does not provide adequate buffering." In this case, the applicant is the residential property owner and NOT the commercial entities which reside within a different municipal jurisdiction. The requirements for the buffer strip, as noted below, allow for the fence to extend along the rear and/or side property line which abuts an incompatible land use. The property owner previously received approval for the construction of a fence on the eastern border of the property

abutting Hendersonville Road. This additional side yard fencing would result in the property being fenced on all sides that face Hendersonville Road.

§ 153.063 BUFFER STRIP AND SCREEN REQUIREMENTS.

(A) Certain land uses are defined in this chapter as being an incompatible land use when developed adjacent to other less intensive land uses. A buffer strip can serve to lessen adverse impacts when development occurs.

(B) The installation of the applicable buffer strip shall be the responsibility of the owner of the developing land use. Buffer strips shall be located on the property of the developing land use between the property line and any vehicular use areas, buildings, storage, service areas, or other area of activity. The buffer strip shall extend along the entire rear and/or side property line which abuts an incompatible land use, up to any required street tree planting strip.

(Note: Sections 1-5 not applicable to this specific situation)

(6) Additional buffering. The Board of Adjustment has the authority to require that a wall or fence be constructed next to property used for residential purposes when the Board determines that the buffer strip alone does not provide adequate buffering. The fence or wall shall be constructed in a durable fashion of wood, stone, masonry materials, or other materials if deemed appropriate and shall be built of material compatible with the principal building. When concrete block is utilized, it shall be finished with stucco on both sides. The materials and design shall be approved by the Board of Adjustment on a case-by-case basis. The finished side of the fence or wall shall face the abutting property. A chain link fence may not be used to satisfy the requirements of this section. Shrubs shall be planted on the applicant's side of the property at the rate of 25 per 100 linear feet; their placing and arrangement shall be the decision of the applicant.

As noted within the applicant's application, the Town's Police Department responded twice within the past several months to this property for a person trespassing on the property from Hendersonville Road. The applicants have noted this 6' fence would reduce noise from Hendersonville Road, block line of sight from cars in the office buildings, and stop pedestrians from accessing their property.

The applicant has noted the fence, if approved, would match Town requirements and be dark in color to blend into surroundings. The proposed fence is 300 feet in length on each side of the property line.

Zoning Compliance Application

Town of Biltmore Forest

Name

Sherry Taylor

Property Address

324 Vanderbilt Rd

Phone

(828) 450-6843

Email

stsanjema@gmail.com

Parcel ID/PIN Number

964783313500000

ZONING INFORMATION

Current Zoning

R-1

Lot Size

11.26 acres

Maximum Roof Coverage

9,647 square feet (Up to 6 acres)

Proposed Roof Coverage Total

n/a

Maximum Impervious Surface Coverage

3-6 acres (20 percent of lot area)

Proposed Impervious Surface Coverage

n/a

Front Yard Setback

60 feet (R-1 District)

Side Yard Setback

20 feet (R-1 District)

Rear Yard Setback

25 feet (R-1 District)

Building Height

not to exceed 6 feet

Description of the Proposed Project

Installation of 2 security fences that connect to an existing fence that runs along the northern boundary line of Lots 12, 13, p/o 14, and 15 along Hendersonville Road. Said proposed fences will run on both sides of the property starting on Hendersonville Road and running south along the lot lines of Lot 12 on the South side of the property and Lot 15 on the North side of the property for a distance of approximately 300 feet on each side.

Estimated Start Date

12/1/2020

Estimated Completion Date

3/1/2020

Estimated Cost of Project

\$5,000.00

Supporting Documentation (Site Plan, Drawings, Other Information)

Applicant Signature

Date
10/23/2020

Sherry Taylor

Special Use Permit Application

Town of Biltmore Forest

Name

Sherry Taylor

Address

324 Vanderbilt Rd

Phone

(828) 450-6843

Email

stsanjema@gmail.com

Please select the type of special use you are applying for:

Accessory Structures

The applicant must show that the proposed use will not materially endanger public health or safety or injure value of adjoining or abutting property. In addition, the proposed use must be in general conformity with the plan of development of the town and be in harmony with scale, bulk, height, coverage, density, and character of the neighborhood.

Please provide a description of the proposed project:

Installation of 2 security fences that connect to an existing fence that runs along the northern boundary of Lots 12, 13, p/o 14, and 15 as shown on Plat Book 2 at Page 39 of the Buncombe County Registry, along Hendersonville Road. Said proposed fences will run along the southern boundary line of Lot 12 and the northern boundary line of Lot 15 for distance of approximately 300 feet on each side.

Explain why the project would not adversely affect the public interest of those living in the neighborhood:

This project will have no negative impact on or adversely affect the public interest of those living in the neighborhood because it is being installed for safety reasons. My property abuts Hendersonville Road and the bus stop. It is also right across the road from the ABC store and a service station that homeless people are known to frequent. There is a lot of foot traffic in this area. In recent months I have had family walking on my property who on two different occasions encountered trespassers that the police had to be called to remove. Both of these men were known by the police and one of them was known to be mentally ill and violent. There are footpaths across my property that lead to adjoining properties which indicate that there are enough trespassers using these paths that it creates a real safety concern. It is my opinion that these fences would deter trespassers from entering the neighborhood from Hendersonville Road and the entire neighborhood would be safer.

The fences would be dark in color which would blend in with all of the vegetation. Further, the fences would be constructed according to the guidelines set forth by the Town.

I hereby certify that all of the information set forth above is true and accurate to the best of my knowledge.

Signature

Date
10/23/2020

Sherry Taylor

VARIANCE APPLICATION

Town of Biltmore Forest

Name

Sherry Taylor

Address

324 Vanderbilt Rd

Phone

(828) 450-6843

Email

stsanjema@gmail.com

Current Zoning/Use

R

Requested Use

R

APPLICATION REQUIREMENTS: An application to the Board of Adjustment for a variance must be submitted to the Town of Biltmore Forest Town Manager at least 21 days prior to the meeting at which the application will be considered. A pre-application meeting with Town staff is required prior to application submittal to the Board of Adjustment.

What would you like to do with your property?

I would like to construct 2 fences for security; specifically to help keep trespassers from camping out on my property and out of the neighborhood. One fence would run on the south side of my property and one on the north side of my property to connect to an existing fence that abuts Hendersonville Road. The 2 fences would run along the property lines for a distance of approximately 300 feet from Hendersonville Road on each side. Neither of these fences would be visible from Vanderbilt Road. They would be dark in color in order to blend into the vegetation and comply with all Town regulations. I would like to run them along the property line in order to connect them with the existing fence and to keep trespassers off of the property. Very little vegetation would be disturbed.

What does the ordinance require?

The ordinance requires in Section 153.049 (A)(1) that the fence be constructed in the rear yard and is not located in the side or rear yard setbacks. The fences I am requesting would be in the rear yard, but within the side setbacks.

The ordinance requires in Section 153.049 (D)(2) that non-wooden fences shall be black, dark green or brown and shall blend in with the surrounding trees or vegetation. The fences would be dark in color.

BOARD OF ADJUSTMENT: N.C.G.S. 160A-388(D) requires that the Board of Adjustment shall vary the provisions of the Zoning Ordinance only upon a showing of ALL the items below. The Board of Adjustment must follow strict procedure and all determinations must be decided by a concurring vote of four-fifths of the members of the Board. It is important to provide detailed supporting documentation for the Board of Adjustment to review. If necessary, additional sheets may be attached to this application.

REQUIRED FINDINGS: Please provide a thorough response to each.**Unnecessary hardship would result from the strict application of the ordinance.**

If the fences had to be constructed outside of the setback lines they would not connect to the existing fence along Hendersonville Road at the points that are necessary to keep trespassers out.

The hardship results from conditions that are peculiar to the property, such as location, size, or topography.

In order for the fences to be effective in preventing trespassers it is necessary that they connect with the

existing fence which means they must be constructed along the property lines.

The hardship did not result from actions taken by the applicant or the property owner.

The bus stop, service station, and ABC store are what draws the homeless and trespassers to my property. The fence is the only way to keep them off of my property. When we constructed the fence along Hendersonville Road its purpose was to keep trespassers from using the property for camping out, drinking, using drugs, and littering the property as well as for our personal safety. Through the years we have run many people off or had the police to come and remove them. Lately, the protesters and all of the unrest in downtown Asheville has caused the homeless people to relocate to areas away from downtown. It is quite often that I see someone on my property or walking on Vanderbilt Road that appears to be homeless.

The requested variance is consistent with the spirit, purpose, and intent of the ordinance, such that public safety is secured, and substantial justice is achieved.

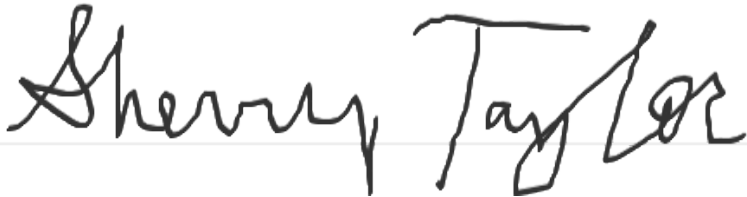
The fence is necessary for the personal safety of everyone on my property as well as to deter trespassers from walking through the neighbors' yards and hanging out in the neighborhood. It is the only practical way to prevent the trespassers. It is my concern that the more trespassers I have the more likely it is that there will be a serious incident.

I hereby certify that all of the information set forth above is true and accurate to the best of my knowledge.

Signature

Date

10/23/2020

A handwritten signature in black ink that reads "Sherry Taylor". The signature is written in a cursive, flowing style. The first name "Sherry" is written with a large, looped 'S' and the last name "Taylor" is written with a large, looped 'T'. The signature is positioned above a horizontal line.

Special Use Permit Application

Town of Biltmore Forest

Name

Sherry Taylor

Address

324 Vanderbilt Rd

Phone

(828) 450-6843

Email

stsanjema@gmail.com

Please select the type of special use you are applying for:

Accessory Structures

The applicant must show that the proposed use will not materially endanger public health or safety or injure value of adjoining or abutting property. In addition, the proposed use must be in general conformity with the plan of development of the town and be in harmony with scale, bulk, height, coverage, density, and character of the neighborhood.

Please provide a description of the proposed project:

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The fences would be dark in color which would blend in with all of the vegetation. Further, the fences would be constructed according to the guidelines set forth by the Town.

I hereby certify that all of the information set forth above is true and accurate to the best of my knowledge.

Signature

Date
10/23/2020

Sherry Taylor

VARIANCE APPLICATION

Town of Biltmore Forest

Name

Sherry Taylor

Address

324 Vanderbilt Rd

Phone

(828) 450-6843

Email

stsanjema@gmail.com

Current Zoning/Use

R

Requested Use

R

APPLICATION REQUIREMENTS: An application to the Board of Adjustment for a variance must be submitted to the Town of Biltmore Forest Town Manager at least 21 days prior to the meeting at which the application will be considered. A pre-application meeting with Town staff is required prior to application submittal to the Board of Adjustment.

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existing fence which means they must be constructed along the property lines.

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The requested variance is consistent with the spirit, purpose, and intent of the ordinance, such that public safety is secured, and substantial justice is achieved.

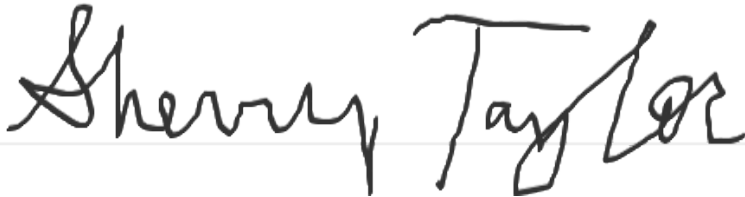
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I hereby certify that all of the information set forth above is true and accurate to the best of my knowledge.

Signature

Date

10/23/2020

A handwritten signature in black ink that reads "Sherry Taylor". The signature is written in a cursive style and is positioned above a horizontal line.

355 Vanderbilt Rd | Biltmore Forest, NC
Po Box 5352 | Biltmore Forest, NC 28803
P (828) 274-0824 | F (828) 274-8131
www.biltmoreforest.org



George F. Goosmann, III, Mayor
Fran G. Cogburn, Mayor-Pro Tem
E. Glenn Kelly, Commissioner
Doris P. Loomis, Commissioner

Jonathan B. Kanipe,
Town Manager

MEMORANDUM

To: Board of Adjustment Members
From: Jonathan Kanipe, Town Manager
Re: Board of Adjustment Case Number 3 (394 Vanderbilt Road)
Date: November 11, 2020

Special Use Permit Request for Detached Accessory Building Variance Request for Allowance of Two Detached Accessory Buildings

A special use permit is requested for the construction of a detached accessory building not to exceed 750 square feet. The accessory building will be located in compliance with the setbacks for the rear and side yards of the property. The applicant requests a variance to allow construction of this accessory building due to the existing, historic cabin on the property. The applicant has provided information regarding the history of this property as well as proposed improvements and other considerations being made in order to restore the property to its original state.

The Town's Zoning Ordinance defines an accessory building as,

BUILDING. ACCESSORY. A detached building subordinate to the main building on a lot and used for purposes customarily incidental to the main or principal building and located on the same lot.

The specific regulations for accessory buildings are as follows:

§ 153.029 ACCESSORY STRUCTURES AND BUILDINGS.

(A) Accessory structures and/or necessary buildings shall not detract from nor interfere with adjacent properties. No accessory structure or building shall be constructed, erected, or located within any front yard or within any side yard or rear yard setback.

(B) (1) In addition, the following standards are established for accessory structures and accessory buildings:

- (a) The maximum number of accessory buildings permitted on a lot shall be one;
- (b) The maximum roof coverage area for accessory buildings shall be 750 square feet;
- (c) The maximum height for accessory buildings shall be 25 feet;

(d) The accessory building must be screened by vegetation or other buffer as set forth in § [153.008](#);

(e) The accessory building must be located behind a line parallel to the rear of the principal structure on the lot;

(f) The accessory building must be designed in the same architectural style as the principal structure;

(g) Any accessory structure and/or accessory building shall be included in the calculation of allowable roof coverage and allowable impervious surface coverage on the lot pursuant to §§ [153.043](#) and [153.048](#); and

Additionally, the applicants propose the removal of several non-conforming structures, including a wooden fence that encroaches into the rear building line and an existing structure that is non-compliant with the Town's side yard setback. The proposed wall attached to the rear home is in compliance with the rear setback abutting the Biltmore Forest Country Club. The proposed garage is attached to the main residence through heated and enclosed space and therefore is not considered a detached building. The proposed renovation and addition is in compliance with the Town's maximum roof coverage and impervious surface requirements as well.

Zoning Compliance Application

Town of Biltmore Forest

Name

Angela Newnam

Property Address

394 Vanderbilt Road

Phone

(704) 996-5035

Email

angelanewnam@gmail.com

Parcel ID/PIN Number

394 Vanderbilt Rd, record card 9646-78-0089, lots
15 (and 17)

ZONING INFORMATION

Current Zoning

R-1

Lot Size

lot 15 - 2.194 acres only

Maximum Roof Coverage

6,700 square feet (Up to 2.5 acres)

Proposed Roof Coverage Total

6,013

Maximum Impervious Surface Coverage

1-3 acres (25 percent of lot area)

Proposed Impervious Surface Coverage

16% including driveway, all structures and stone
patios(14,796requested/23,893 allowed)

Front Yard Setback

60 feet (R-1 District)

Side Yard Setback

20 feet (R-1 District)

Rear Yard Setback

25 feet (R-1 District)

Building Height

27

Description of the Proposed Project

The proposed project at Raoulwood, one of the earliest homes in Biltmore Forest, seeks to add functional space while maintaining the historical scale and character of Charles Parker's 5,500 square foot home. In addition, the project is designed to preserve and restore Chauncy Beadle's 3.5 acre property (2 lots combined). The historic landscape has majestic white oak and hemlock tree cover surrounding the property with original boxwoods, dogwoods, redbuds and rhododendron underneath. Already, vines and underbrush have been removed to highlight the 100 year old landscape.

The overall restoration and enhancement project has five principal components. The main house and garden restoration is underway and over 40 original windows have been reinstalled. Modern skylights will be removed in the coming weeks (prior approval received in August). General repairs and installation of a forced air system are underway to maintain the original plaster and timberwork in the interior.

The second component of the project is to enhance the existing garden space and exterior of the house facing the golf course.

The project plan envisions an impervious hardscape outdoor patio and timber beam arbor (526 square feet) to create more outdoor living space facing the golf course. The original house had a partial awning in this area that at some point had been removed. The existing garden and old wood fence area would be

replaced with a short stucco wall (2-3 feet tall and 1990 square feet) that has a shorter and smaller footprint than the current fenced garden which has a small section over the setback. The stucco wall would match the house in texture and color. The kitchen sliding glass door wall facade and side door (1970s renovation) is to be replaced with divided light, French doors that are in keeping with the four other sets of French doors in the home. A low roof over the side door will connect the access to the garden and the outdoor courtyard.

Third, the project presents an addition of a 2 car garage, upper floor gym, mudroom, laundry room, powder room and heated breezeway to replace the three sided open air garage shed that is not original to the property. The design of the understated 2 story structure is in keeping with the stucco, timber, and slate roof construction of the house and replicates the notable eyebrow detail on the house. The stable-like design maintains the drive behind the garage with the primary door access in the rear out of sight from the approach to the house and the golf course. The current garage is over the setback, but the new design shifts the structure closer to the main house to be in compliance with the setback. The garage structure will be attached with a narrow breezeway to preserve the largest white oak on the property. The breezeway will have a piered foundation to protect the roots and allow for root expansion. In addition to consulting arborists for placement and protection, all of the major white oaks have been pruned and lightning protection installed in a 200 foot radius around the house. The garage roof and scale are well below the roof peak of the house. The parking court of pea gravel is located on the current driveway space. The garage and breezeway have a total 1,593 ft square roof coverage with a maximum roof height of 27 feet.

Fourth, the requested project adds a second structure for a 750 square foot, one story personal office and pool table lounge approximately 100 feet from the house and golf course setback as well as over 80 feet from the side yard setback. The maximum roof height is 25 feet. Several scenarios were explored for this office as a heated addition to the home, but each of them required two or more of the surrounding signature white oaks to be removed and would change the scale of the National Registry home. Instead this project saves all of the largest trees but requires the removal of only one of the weaker, smaller white oaks. The location is tucked in a wooded area, discretely viewed from the golf course. Through research and discussions with the Bingham's, we learned that this location once housed a small log cabin. The materials are consistent with the main house - stucco, wood timbers and slate roof with divided light windows and French doors. A bank of diamond leaded glass windows in the pool lounge will also tie the structure with the diamond leaded glass windows on the main house.

Fifth, we are seeking a variance to have two outbuildings - the new construction office lounge detailed above as well as to keep the original 600 foot stable boy cottage located in the upper left quadrant of the property. The 1923 stable house has original windows, corner fireplace, heart pine floor, plaster, and a stucco and wood exterior. The layout of the cottage could not accommodate the office/lounge, so the new construction is presented in 4 above. The building needs material additional maintenance and would be repaired and maintained with no addition/ change to the exterior but for repainting and reroofing as needed to preserve the historic structure.

The homeowners and architect have reviewed many scenarios to add the garage, office, and gym functionality while preserving the trees and historic nature and scale of the house. In addition, with the help of Jonathon Kanipe, the project adheres to and corrects two areas that are currently out of compliance. While our strong preference is to keep the historic stable house outbuilding versus tearing it down, we understand this requires a variance.

Included are site plans, elevations, and photos of existing buildings and conditions. The roof coverage and impervious surface requirements are in compliance for lot 15 alone.

Please consider all of these aspects of our project. The approach presented has increased cost to build and loses the benefit of heated space resale value on both outbuildings, but we believe that it is truer to the original property design of this important home in the history of Biltmore Forest and thus we would like to

proceed with this plan versus other alternatives.

Estimated Start Date

1/11/2021

Estimated Completion Date

11/30/2021

Estimated Cost of Project

\$1,100,000.00

Supporting Documentation (Site Plan, Drawings, Other Information)

IMG_8445.jpg

IMG_8351.jpg

IMG_8267 (1).jpg

IMG_8270.jpg

IMG_8266.jpg

IMG_8267.jpg

IMG_8269.JPG

Newnam Elevations 10.21.2020-Email.pdf

Newnam Plans 10.21.2020.pdf

Newnam Site Plan 10.21.2020.pdf

10.26.2020 Todd's Office-Email.pdf

Applicant Signature

Date

10/25/2020

A handwritten signature in black ink, appearing to read "Todd's Office", written over a horizontal line.

Special Use Permit Application

Town of Biltmore Forest

Name

Angela Newnam

Address

394 Vanderbilt Road

Phone

(704) 996-5035

Email

angelanewnam@gmail.com

Please select the type of special use you are applying for:

Accessory Buildings

The applicant must show that the proposed use will not materially endanger public health or safety or injure value of adjoining or abutting property. In addition, the proposed use must be in general conformity with the plan of development of the town and be in harmony with scale, bulk, height, coverage, density, and character of the neighborhood.

Please provide a description of the proposed project:

The requested project adds a one story accessory building for a 750 square foot personal office and pool table lounge approximately 100 feet from the house and golf course setback as well as over 80 feet from the side yard setback. Several scenarios were explored for this office as a heated addition to the home, but each of them required two or more of the surrounding signature white oaks to be removed and would change the scale of the National Registry home. Instead this project saves all of the largest trees and only requires the removal of one of the smaller, weaker white oaks. Tucked back in the trees, the structure is discrete from the golf course. Through research and discussions with the Bingham's, we have learned that this location once housed a small log cabin. The materials are consistent with the main house - stucco, timbers and slate roof with divided light windows and French doors. A bank of diamond leaded glass windows in the pool lounge tie to the leaded glass windows on the main house. The piered based foundation is also less invasive to the existing tree roots and landscape.

Explain why the project would not adversely affect the public interest of those living in the neighborhood:

The proposed structure will be nestled under large white oak and hemlock trees in a small open area on the 3.5 acres total at Raoulwood in a location that had an original log cabin structure. Over 100 feet from the golf course, the design is in keeping with the house and is modeled after the historic stucco home structures adjacent to the Biltmore Town Hall, and is well within all of the required setbacks. In addition to the authentic design of the structure, we have planted 8 large mature deciduous and evergreen trees as well as 10 Japanese maples to soften the landscape and enhance the golf course perspective of the property.

I hereby certify that all of the information set forth above is true and accurate to the best of my knowledge.

Signature

Date

10/25/2020

A handwritten signature in black ink, appearing to read "Agustin Contreras", written over a horizontal line.

VARIANCE APPLICATION

Town of Biltmore Forest

Name

Angela Newnam

Address

394 Vanderbilt Road

Phone

(704) 996-5035

Email

angelanewnam@gmail.com

Current Zoning/Use

Residential

Requested Use

Residential

APPLICATION REQUIREMENTS: An application to the Board of Adjustment for a variance must be submitted to the Town of Biltmore Forest Town Manager at least 21 days prior to the meeting at which the application will be considered. A pre-application meeting with Town staff is required prior to application submittal to the Board of Adjustment.

What would you like to do with your property?

The project asks for a variance to have two outbuildings - the new construction 750 foot (25 foot one story) office lounge and the original 560 foot stable boy cottage (16 feet tall one story) located in the upper left quadrant of the property. The 1923 stable house has original windows, corner fireplace, heart pine floor, plaster, and a stucco and wood exterior. The layout of the cottage could not accommodate the office/lounge, so the new construction is presented in our special use application. The stable building needs material additional maintenance and would be repaired with no addition/ change to the exterior but painting.

What does the ordinance require?

The ordinance specifies only two structures per property. The ordinance requires a lot to have a minimum size building of over 2,000 feet and a second structure at maximum of 750 square feet.

BOARD OF ADJUSTMENT: N.C.G.S. 160A-388(D) requires that the Board of Adjustment shall vary the provisions of the Zoning Ordinance only upon a showing of ALL the items below. The Board of Adjustment must follow strict procedure and all determinations must be decided by a concurring vote of four-fifths of the members of the Board. It is important to provide detailed supporting documentation for the Board of Adjustment to review. If necessary, additional sheets may be attached to this application.

REQUIRED FINDINGS: Please provide a thorough response to each.**Unnecessary hardship would result from the strict application of the ordinance.**

The homeowner and architect have reviewed many scenarios to add the garage, office, and gym functionality while preserving the trees and historic nature and scale of the house. In addition, with the help of Jonathon Kanipe, the project adheres to and corrects two areas that are currently out of compliance- the fenced garden and the garage. While the strong preference is to keep the historic stable house outbuilding versus tearing it down, we understand this requires a variance.

The hardship results from conditions that are peculiar to the property, such as location, size, or topography.

The request for 2 accessory buildings is in keeping with the original property which had 4 structures and currently has three structures.. The property is large enough to put on a large addition to achieve the

functionality and stay within the ordinances as written. However, a large addition to the house would require two major 100+ year old white oaks to be removed and also changes the scale and feel of the historic home. The project presented has increased cost to build and loses the benefit of heated space resale value on both outbuildings, but we believe is truer to the original property design of this important home in the history of Biltmore Forest. In addition, the property is two lots - 15 and 17. All of the structures are located on lot 15. The ordinances would allow us to build on lot 17 but the structure would have to be a minimum of over 2,000 feet and be placed in the middle of Chauncy Beadle's original green allee toward Pisgah which is surrounded by original boxwoods and hemlocks. The variance request keeps the landscape and building design as it was intended in 1923.

The hardship did not result from actions taken by the applicant or the property owner.

We purchased the property in July with the intention of restoring both the home and gardens, while adding the modern day functionality of a garage, home office and gym.

The requested variance is consistent with the spirit, purpose, and intent of the ordinance, such that public safety is secured, and substantial justice is achieved.

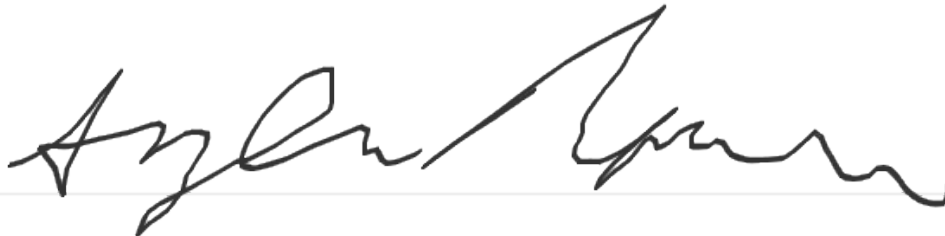
Our variance request is intended to preserve and improve historic Raoulwood. The stable boy's house is part of that and we would prefer not to sacrifice that historic part of the property. In addition, we believe that Biltmore Forest's ordinances are intended in the spirit of preservation and ongoing development of trees and landscapes as well as tasteful and charming structures. We believe that our requests achieve all of these objectives and are enhancing to the historic property and our community.

I hereby certify that all of the information set forth above is true and accurate to the best of my knowledge.

Signature

Date

10/25/2020

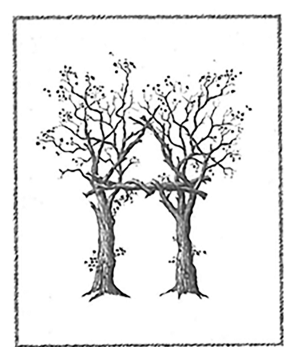
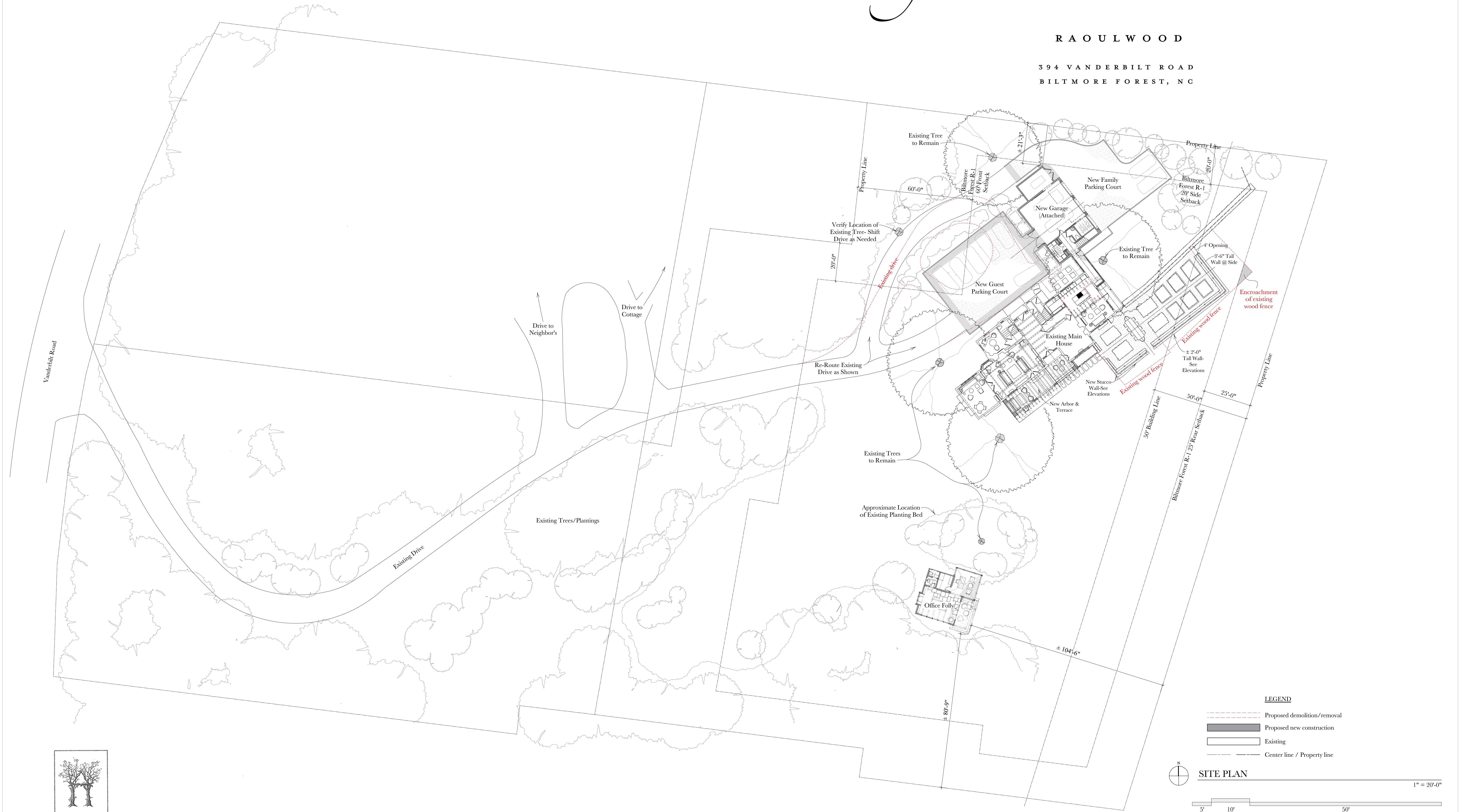
A handwritten signature in black ink, appearing to read "Tyler Egan", written over a horizontal line.

A RENOVATION

for
Angela & Todd Newnam

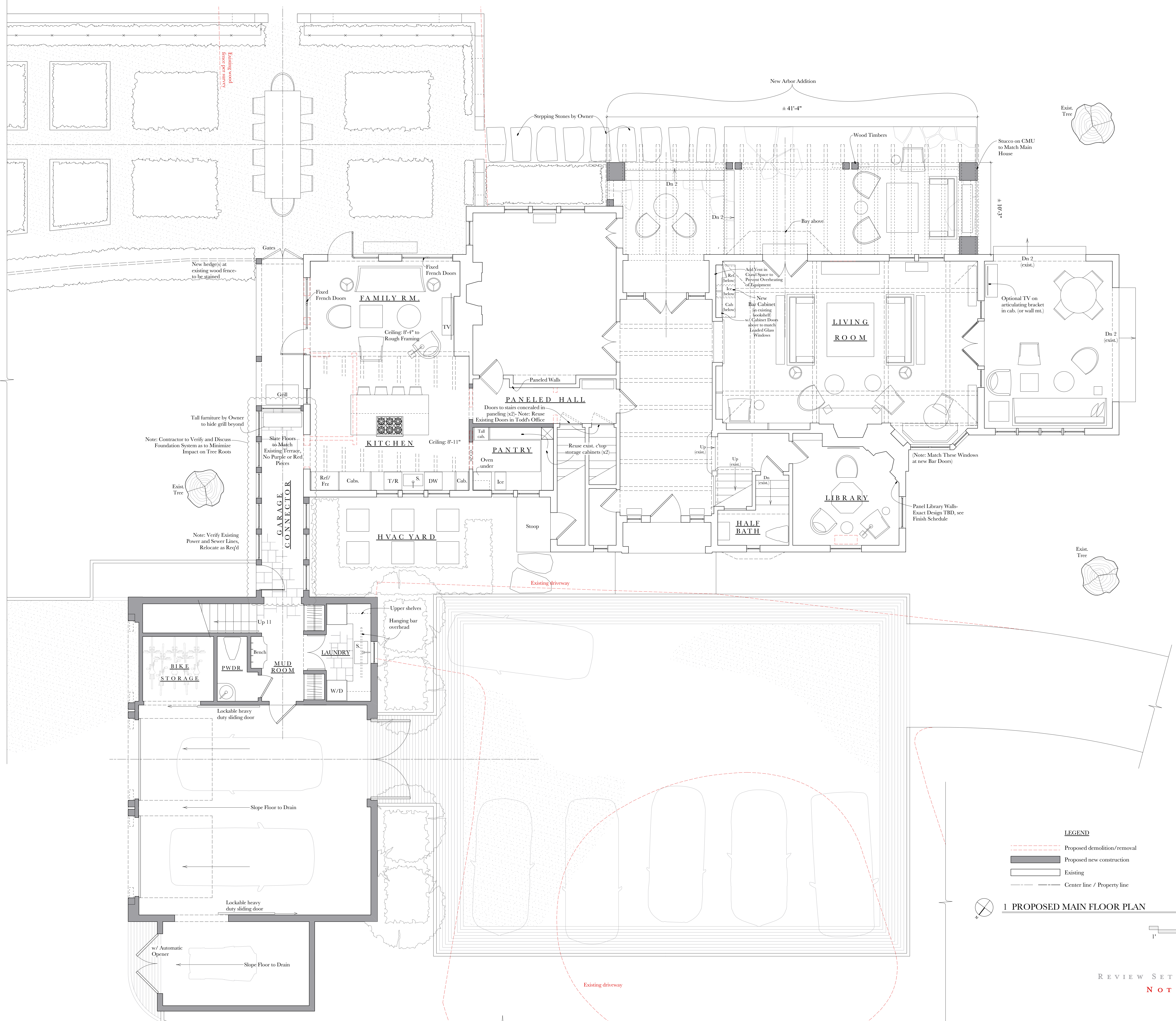
RAOULWOOD

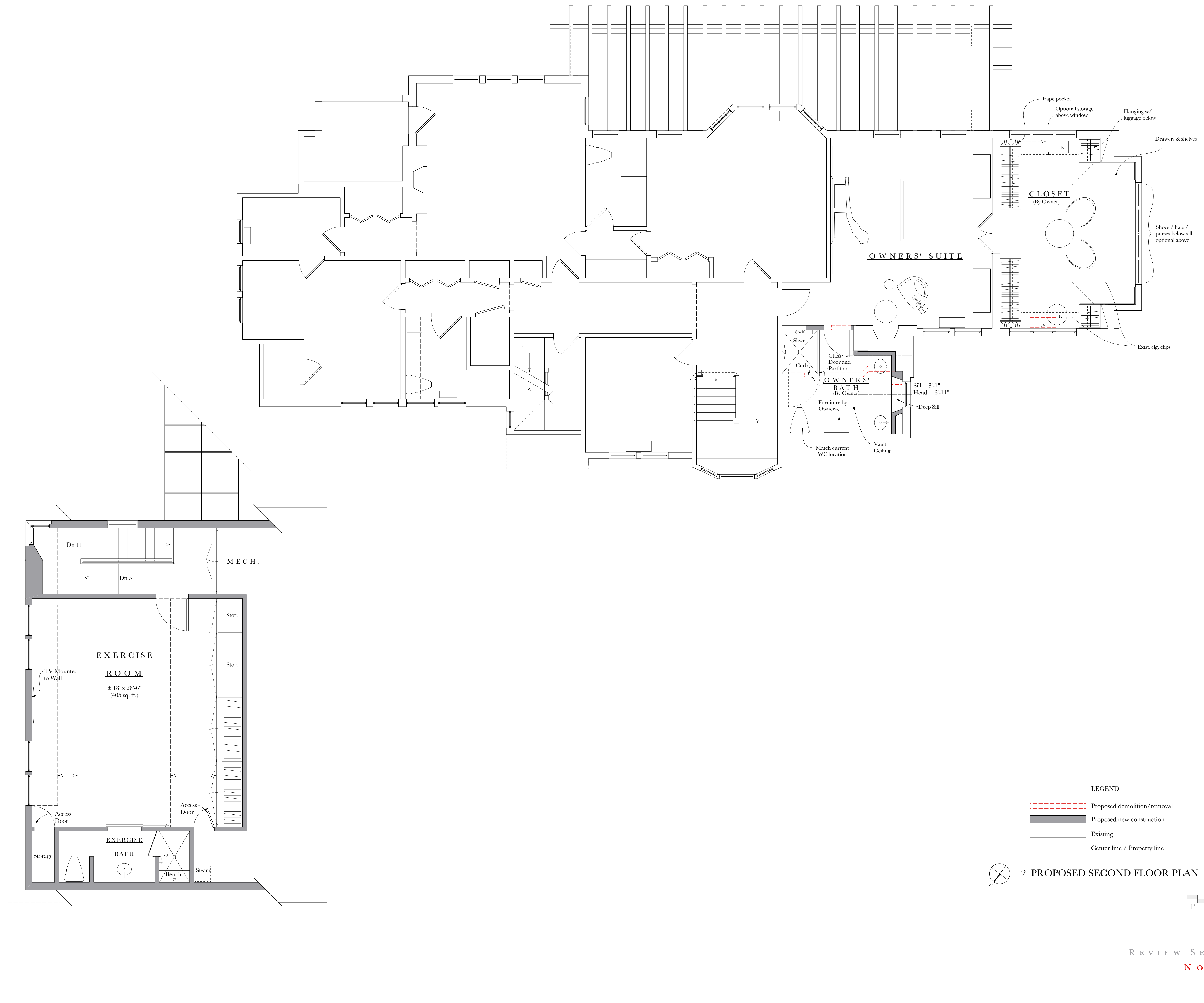
394 VANDERBILT ROAD
BILTMORE FOREST, NC



PURSLEY DIXON ARCHITECTURE
311 ATHERTON STREET
CHARLOTTE, NORTH CAROLINA 28203
P: 704.334.6500 F: 704.334.6522

REVIEW SET OCTOBER 21, 2020
NOT FOR CONSTRUCTION

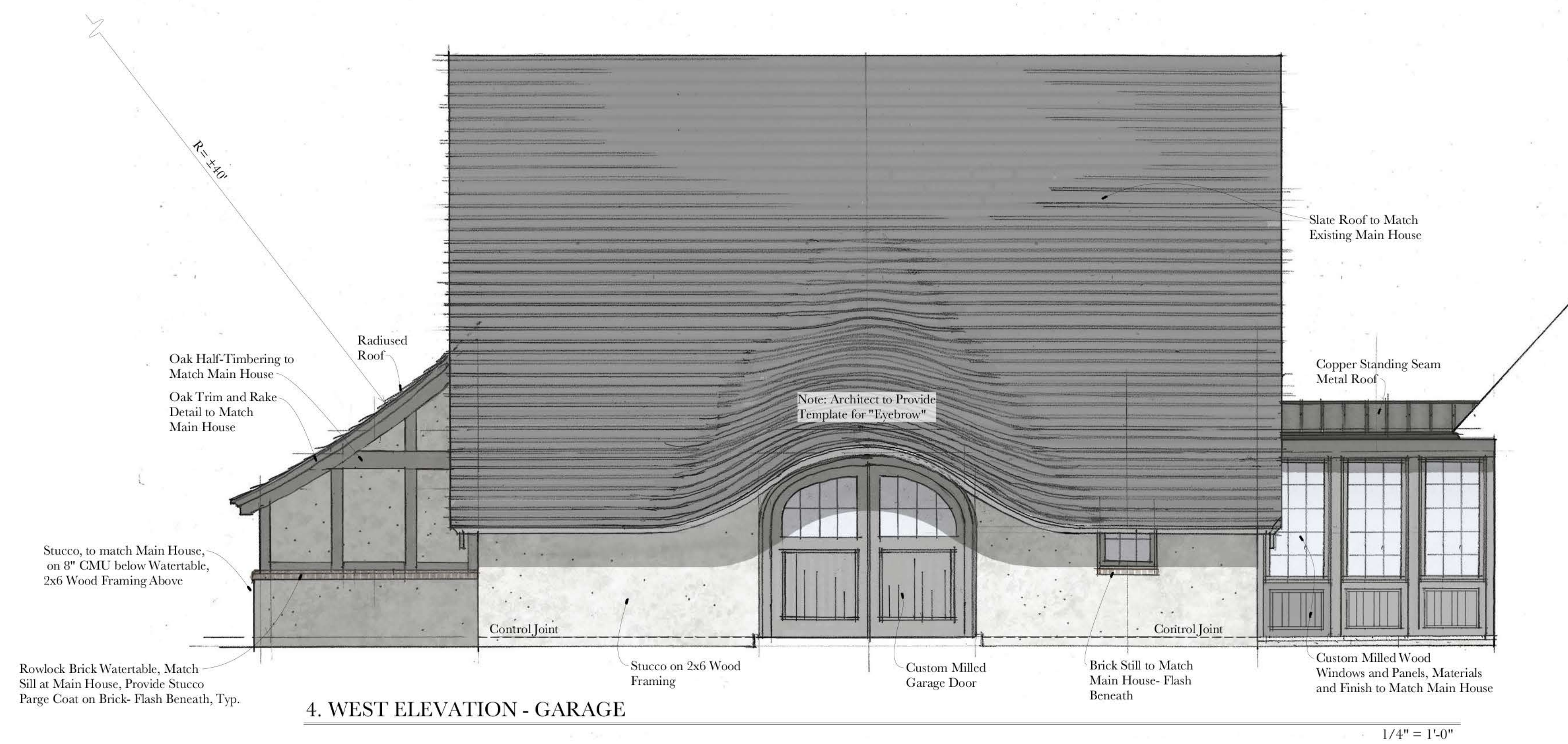






3. WEST ELEVATION (SIDE)

1/4" = 1'-0"



4. WEST ELEVATION - GARAGE

1/4" = 1'-0"

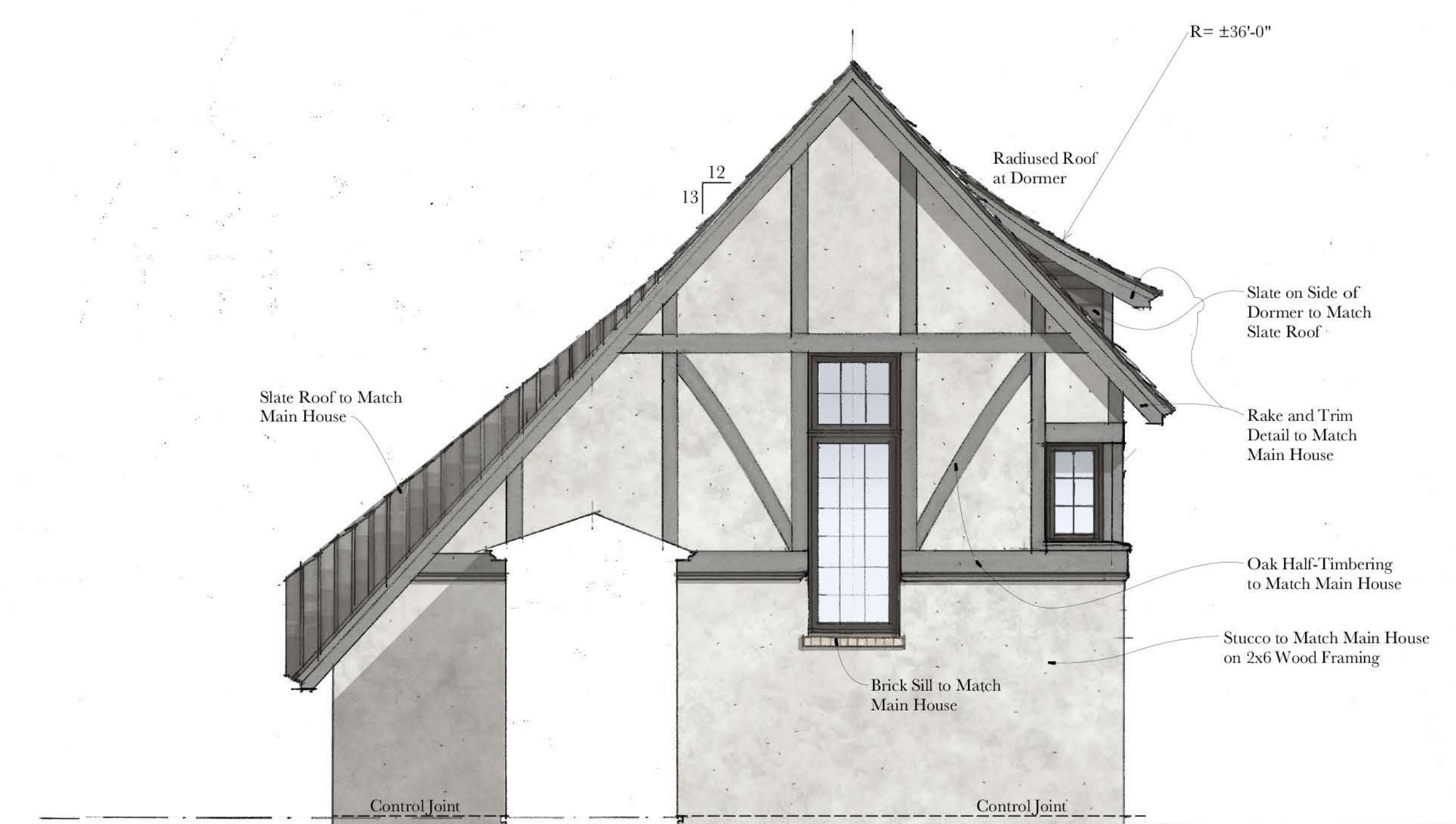
WINDOW AND DOOR SPECIFICATIONS, TYP. U.N.O:

- CUSTOM MILLED WOOD, MAHOGANY OR SABLE- MATCH MAIN HOUSE PROFILES
- EXTERIOR TO BE PAINTED, INTERIOR FINISH T.B.D.
- 1/4" THICK LAMINATED GLASS (NO LABELS)
- WINDOW HARDWARE: HINGES BY BALDWIN OR EQUAL, CASEMENT STAYS BY PHELPS OR EQUAL
- NO SCREENS



5. SOUTH ELEVATION (REAR)

1/4" = 1'-0"



6. SOUTH ELEVATION - GARAGE

1/4" = 1'-0"



7. EAST ELEVATION (SIDE)

1/4" = 1'-0"



8. NORTH ELEVATION (FRONT)

1/4" = 1'-0"

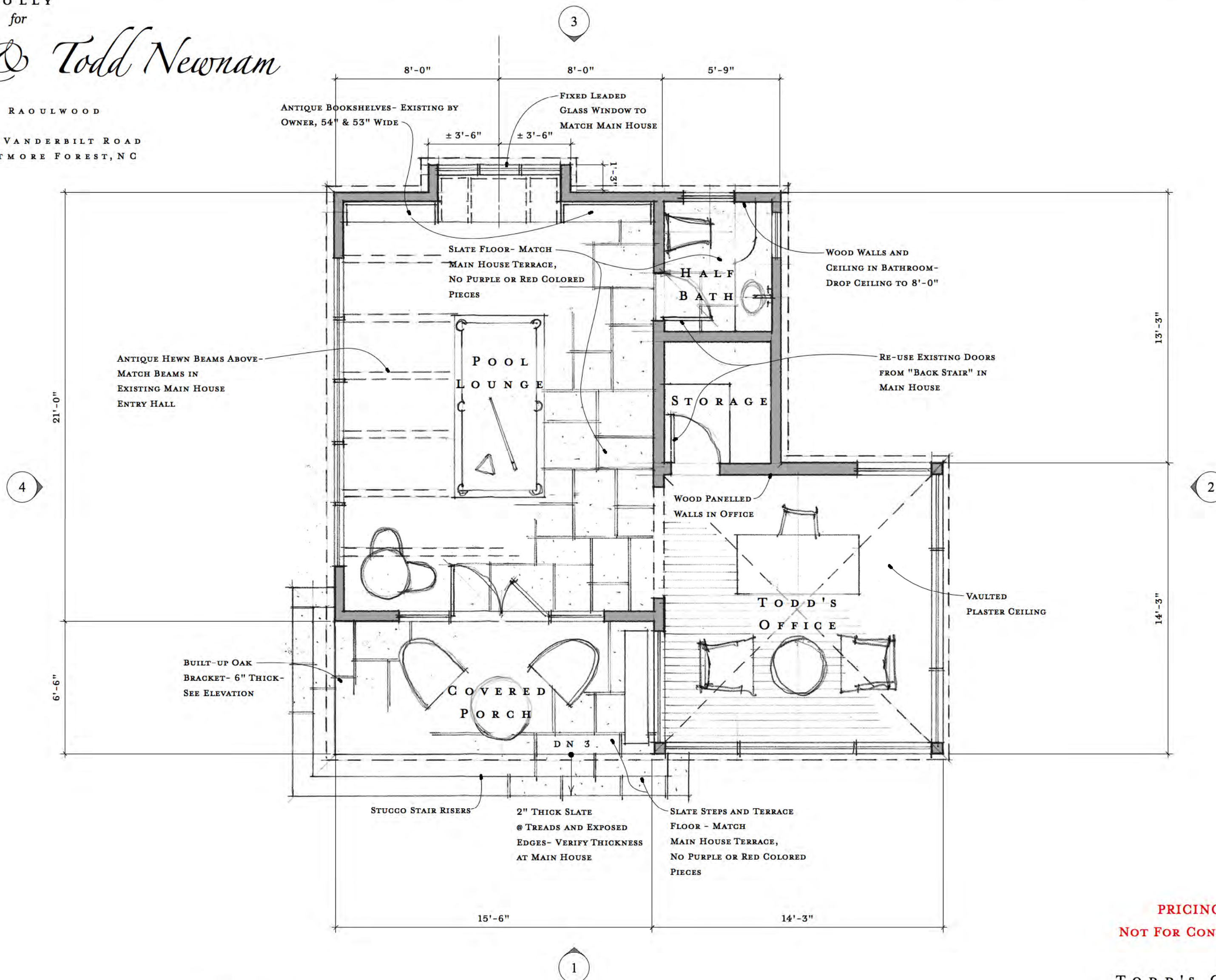
AN OFFICE FOLLY

for

Angela & Todd Newnam

RAOULWOOD

394 VANDERBILT ROAD
BILTMORE FOREST, NC



PRICING SET
NOT FOR CONSTRUCTION

TODD'S OFFICE
REVISED: OCTOBER 26, 2020
~~OCTOBER 21, 2020~~
~~OCTOBER 8, 2020~~
~~OCTOBER 2, 2020~~



PURSLEY DIXON ARCHITECTURE
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OFFICE PLAN

1/4" = 1'-0"



1. SOUTH ELEVATION

WINDOW AND DOOR SPECIFICATIONS, TYP. U.N.O:

- CUSTOM MILLED WOOD, MAHOGANY OR SAPELE- MATCH MAIN HOUSE PROFILES
- EXTERIOR TO BE PAINTED, INTERIOR TO BE STAINED EBONY FINISH
- 1/4" THICK LAMINATED GLASS (NO LABELS)
- WINDOW HARDWARE: HINGES BY BALDWIN OR EQUAL, CASEMENT STAYS BY PHELPS OR EQUAL
- NO SCREENS

1/4" = 1'-0"

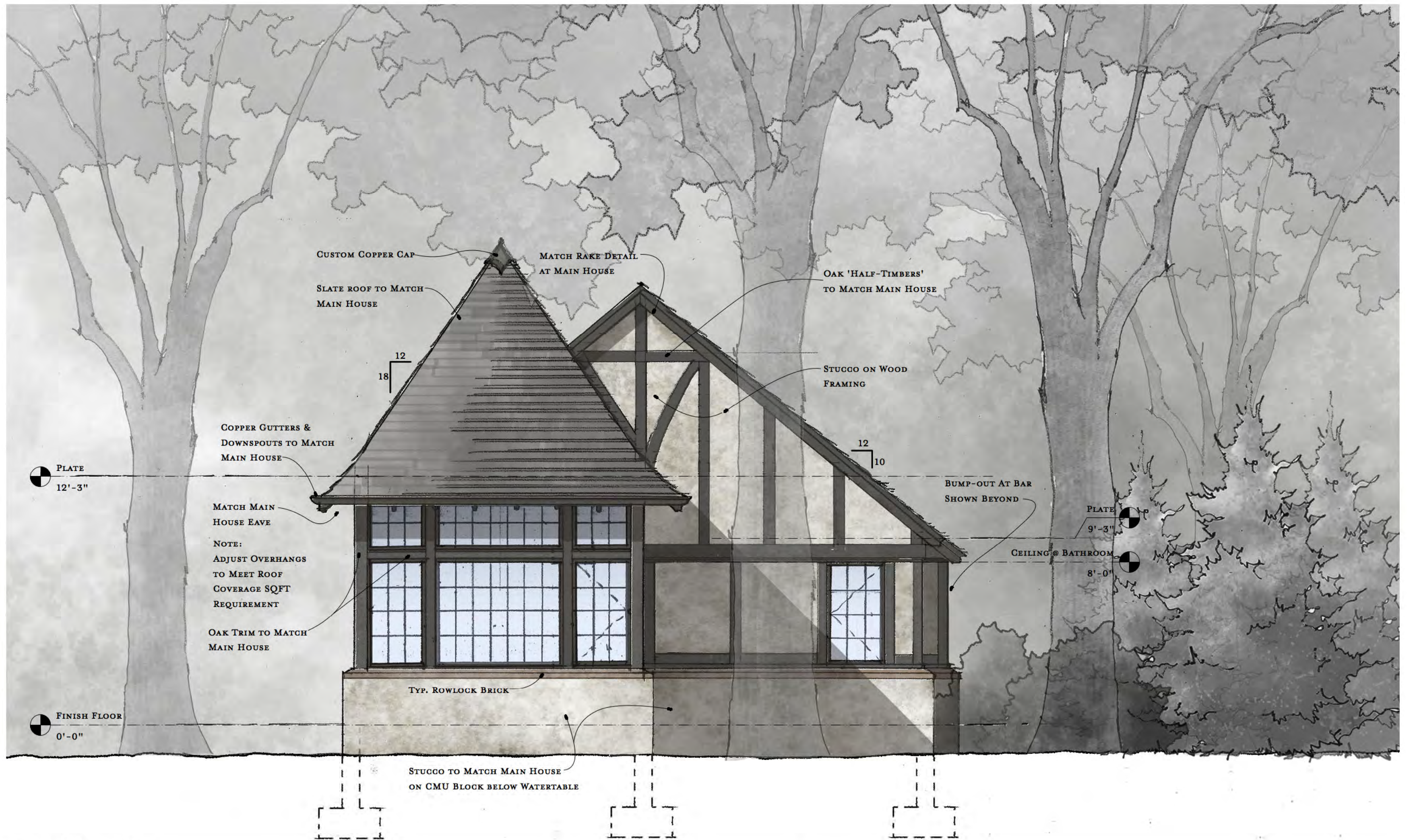
TODD'S OFFICE

REVISED: OCTOBER 26, 2020

OCTOBER 21, 2020

OCTOBER 8, 2020

OCTOBER 2, 2020



2. EAST ELEVATION

1/4" = 1'-0"

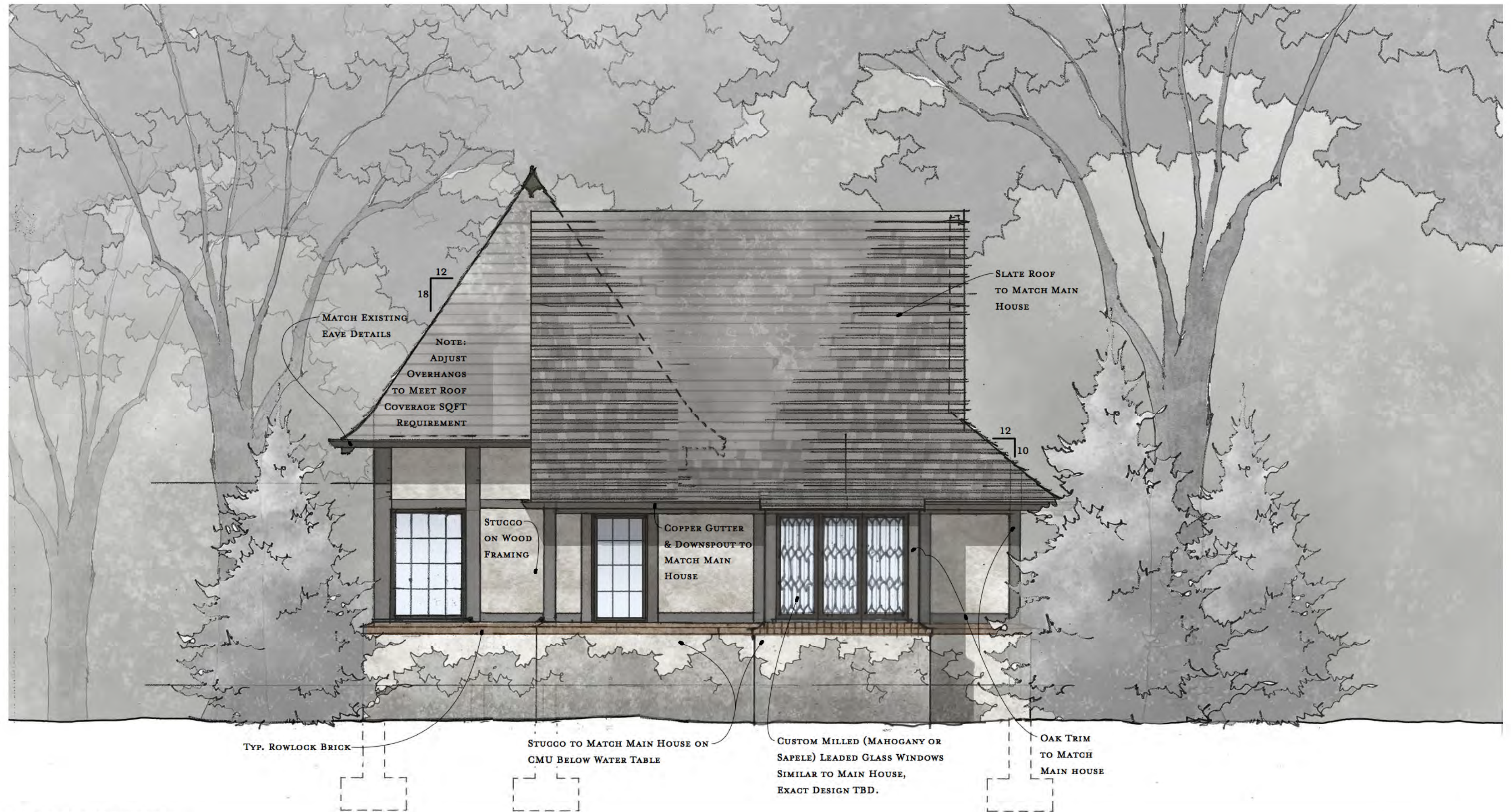
TODD'S OFFICE

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OCTOBER 21, 2020

OCTOBER 8, 2020

OCTOBER 2, 2020



3. NORTH ELEVATION

1/4" = 1'-0"

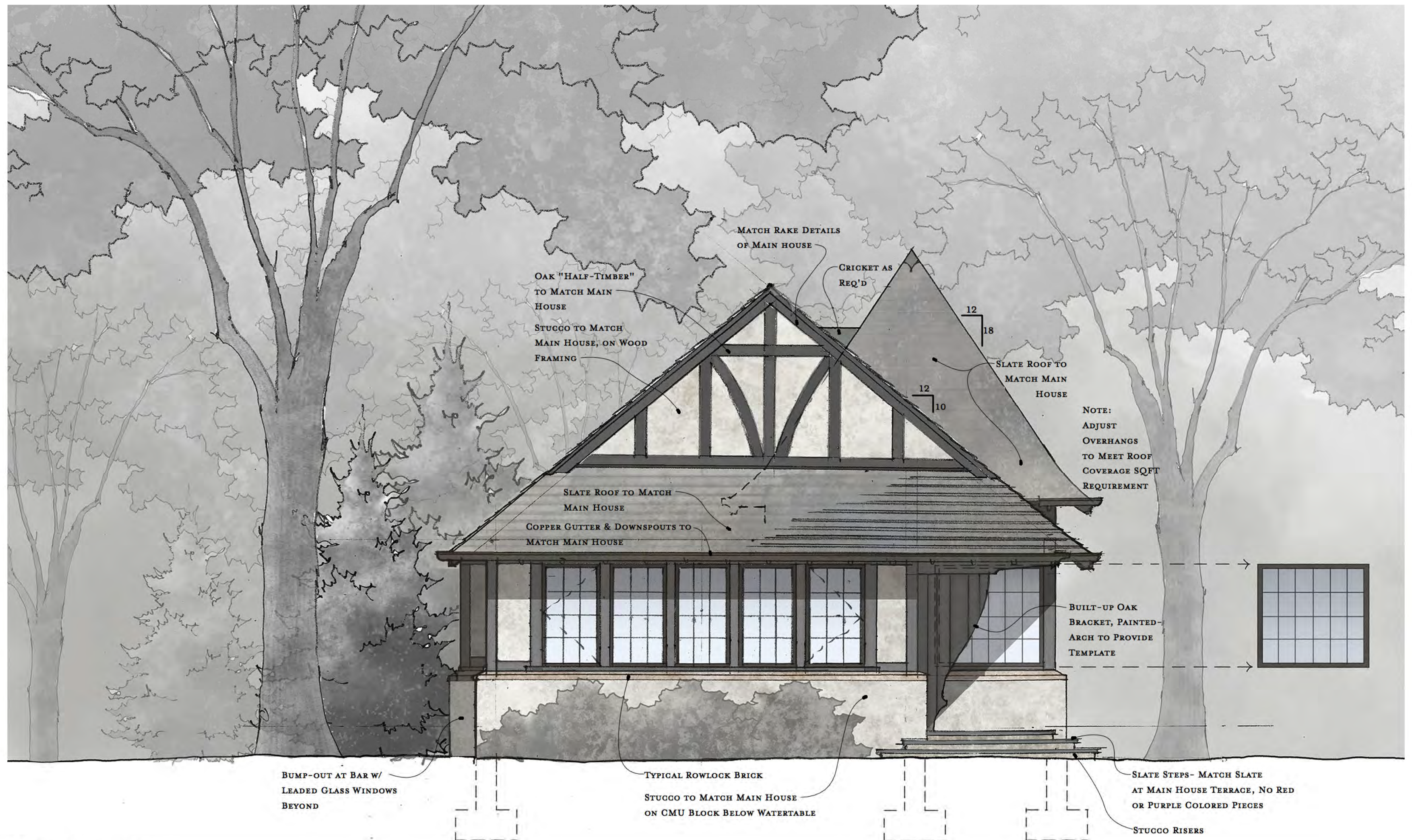
TODD'S OFFICE

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OCTOBER 2, 2020



4. WEST ELEVATION

1/4" = 1'-0"

TODD'S OFFICE

REVISED: OCTOBER 26, 2020

OCTOBER 21, 2020

OCTOBER 8, 2020

OCTOBER 2, 2020







