



STRUCTURAL DESIGN

FULLY OPEN (CARPORT) BUILDING

**MAXIMUM 30'-0" WIDE X 14'- 0" EAVE HEIGHT-
BOX EAVE FRAME AND BOW FRAME**

**14 January 2021
Revision 0
M&A Project No. 20320S**

Prepared for:

**CarportsNSheds, LLC
158 Gatehouse Ln.
Dobson, NC 27017**

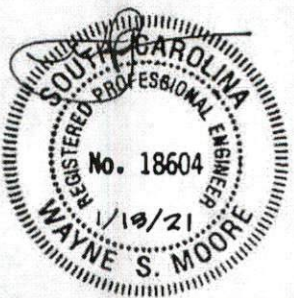
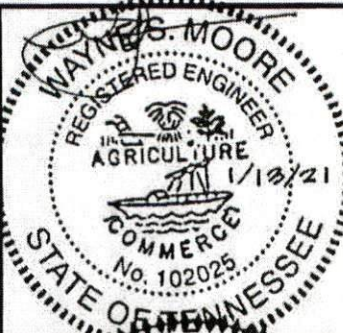

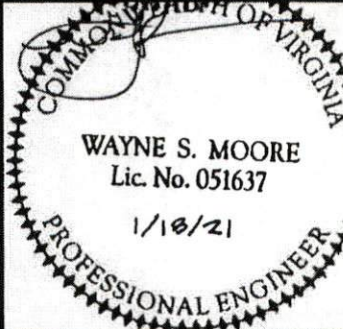




Prepared by:

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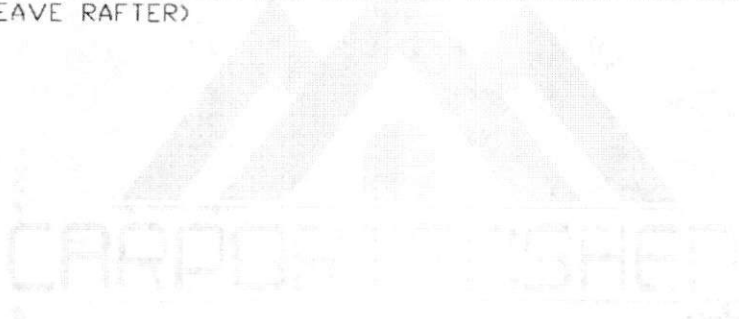
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 PROJECT MGR: VSM
 CLIENT: CARPORTSNSHEDS

CARPORTSNSHEDS, LLC
 158 GATEHOUSE LN.
 DOBSON, NC 27017
 30'-0" x 14'-0" FULLY OPEN STRUCTURE
 DATE: 1-14-21
 SCALE: NTS
 SHT. 1
 DVG. NO: SK-1
 JOB NO: 20320S
 REV: 0

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DRAWING INDEX

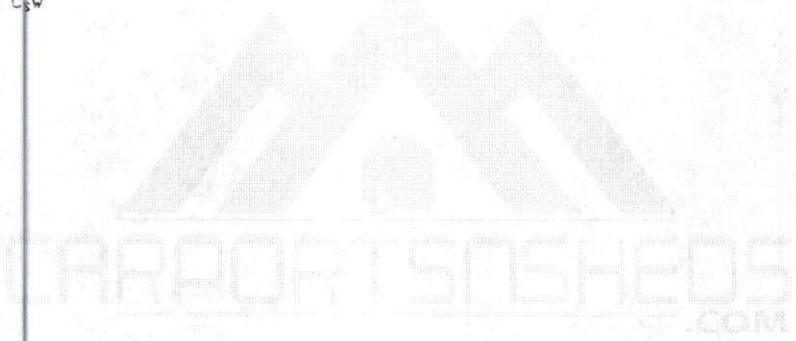
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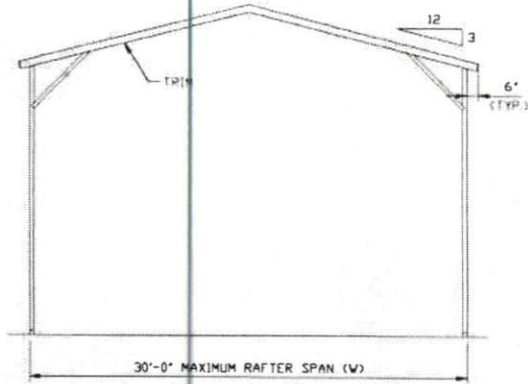
INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR MAXIMUM 30'-0" WIDE x 14'-0" EAVE HEIGHT OPEN CARPORT STRUCTURES
2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2018 NORTH CAROLINA BUILDING CODE, 2018 INTERNATIONAL BUILDING CODE (IBC), 2015 IBC AND 2012 IBC.
3. DESIGN LOADS ARE AS FOLLOWS:
 - A) DEAD LOAD = 15 PSF
 - B) LIVE LOAD = 12 PSF
 - C) GROUND SNOW LOAD = 35 PSF ($\leq 24'-0"$), 35 PSF ($24'-0" < W \leq 30'-0"$)
 NOTE: UNBALANCED SNOW LOAD DUE TO DRIFTING HAS NOT BEEN EVALUATED
4. 3-SECOND GUST ULTIMATE WIND SPEED (V_{ULT}) = ≤ 140 MPH (NOMINAL WIND SPEED = ≤ 108 MPH).
5. MAXIMUM RAFTER/COLUMN AND END COLUMN SPACING = 5.0 FEET (UNLESS NOTED OTHERWISE).
6. ENDWALL COLUMNS (POSTS) AND SIDE WALL COLUMNS ARE EQUIVALENT IN SIZE AND SPACING (UNLESS NOTED OTHERWISE).
7. RISK CATEGORY I.
8. WIND EXPOSURE CATEGORY B
9. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2" x 2 1/2" - 14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS (UNLESS NOTED OTHERWISE) 2 1/4" x 2 1/4" - 12 GAUGE TS MAY BE USED AS OPTIONAL FRAMING MEMBERS.
10. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 10 INCHES.
11. FASTENERS CONSIST OF #12-14x3/4" SELF-DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS. SPECIFICATIONS APPLICABLE ONLY FOR MEAN ROOF HEIGHT OF 16 FEET OR LESS, AND ROOF SLOPES OF 14" (3:12 PITCH) OR LESS SPACING REQUIREMENTS FOR OTHER ROOF HEIGHTS AND/OR SLOPES MAY VARY. ROOF SLOPES LESS THAN 3:12 REQUIRE USE OF JOINT SEALANT
12. ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH COLUMN.
13. STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 30" LONG AND MAY ONLY BE USED IN CONJUNCTION WITH OTHER (OPTIONAL) ANCHOR DEVICES AND ONLY IN SUITABLE SOILS. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED. COORDINATE WITH LOCAL CODES/ORDINANCES REGARDING MINIMUM LENGTH FOR FROST DEPTH PROTECTION.
14. WIND FORCES GOVERN OVER SEISMIC FORCES SEISMIC PARAMETERS ANALYZED ARE:
 - SOIL SITE CLASS = D
 - RISK CATEGORY I
 - R = 3.25 $I_E = 1.0$
 - $S_{DS} = 2.039 g$ $V = C_s W$
 - $S_{01} = 1.258 g$

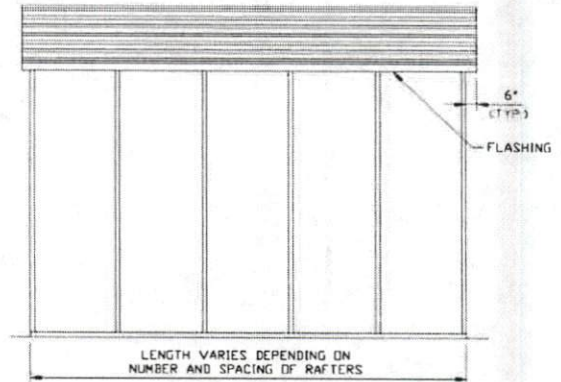


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BOX EAVE FRAME RAFTER STRUCTURE

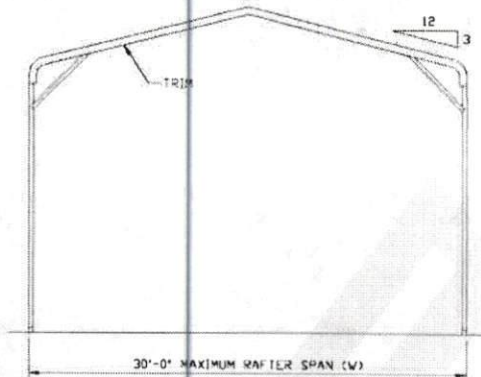


TYPICAL END ELEVATION
 SCALE: NTS

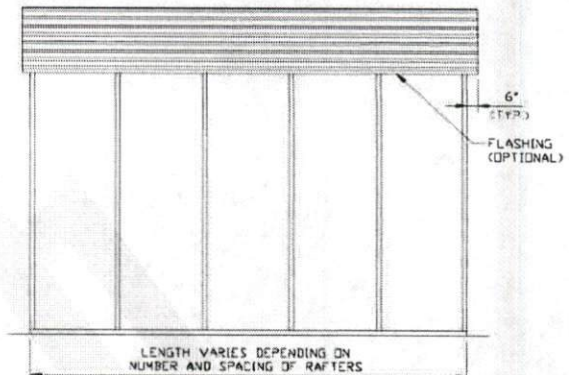


TYPICAL SIDE ELEVATION
 SCALE: NTS

BOW EAVE FRAME RAFTER STRUCTURE



TYPICAL END ELEVATION
 SCALE: NTS



TYPICAL SIDE ELEVATION
 SCALE: NTS

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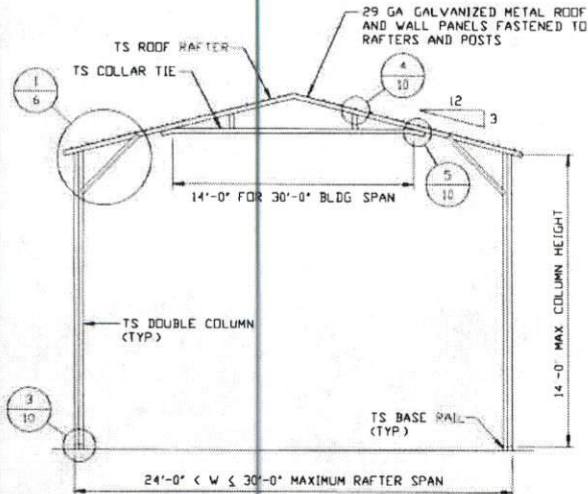
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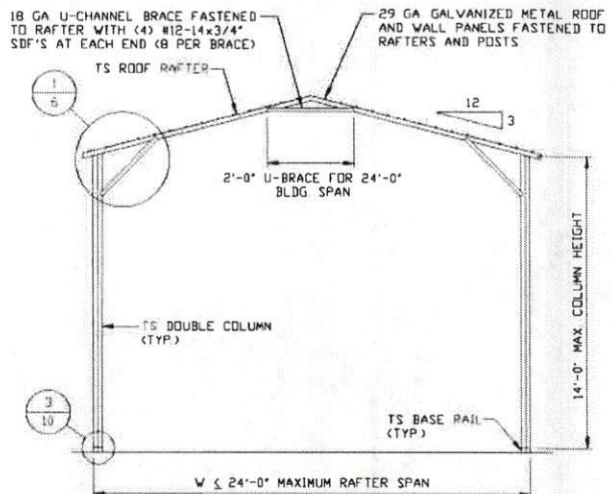
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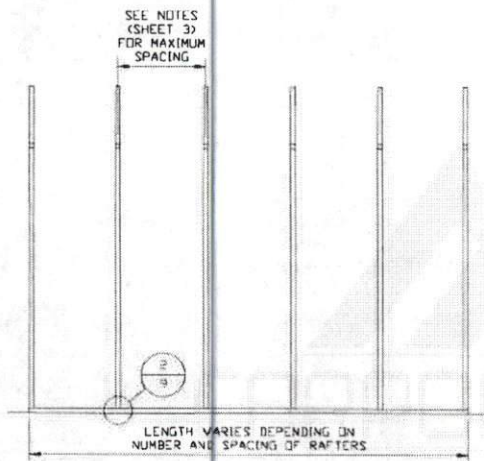
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TYPICAL RAFTER/COLUMN FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS

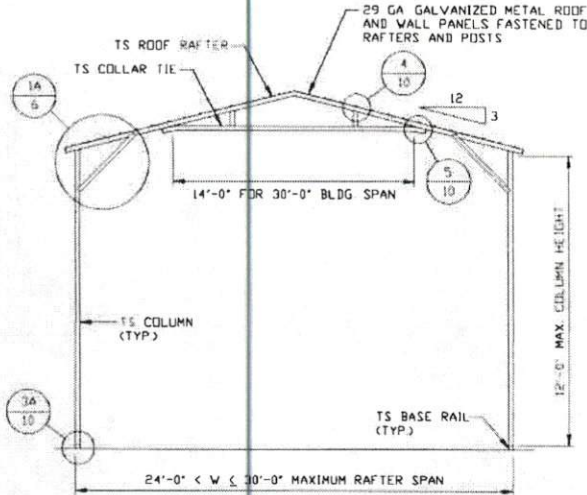
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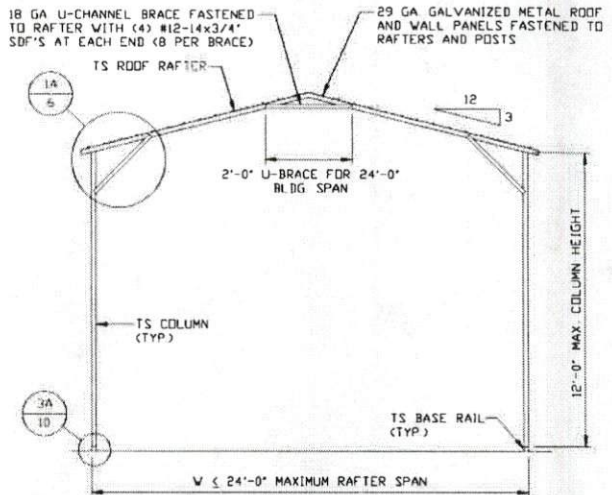
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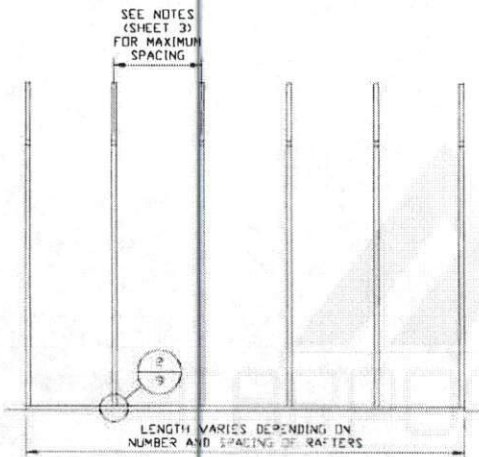
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CLIENT: CARPORTSNSHEDS	SHT. 5	DWG. NO SK-1	REV: 0



TYPICAL RAFTER/COLUMN FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS

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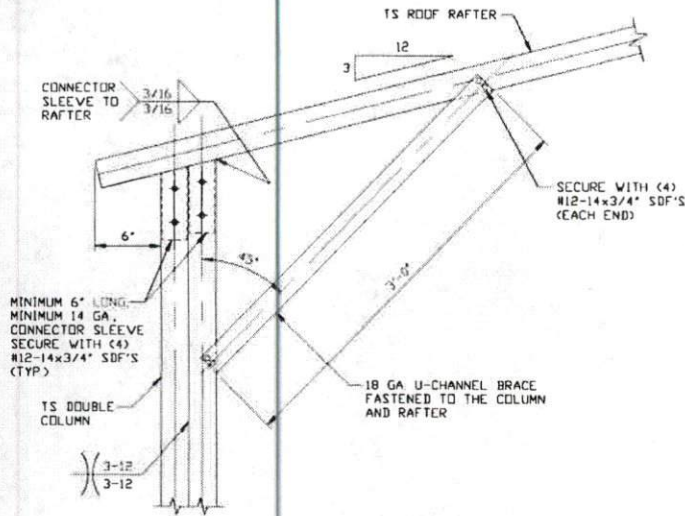
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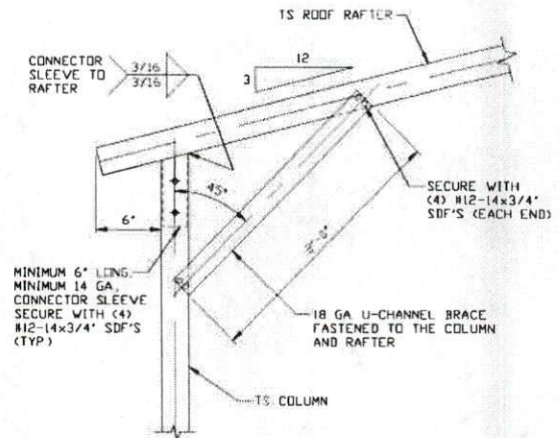
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BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS 12'-0" < TO ≤ 14'-0"

1

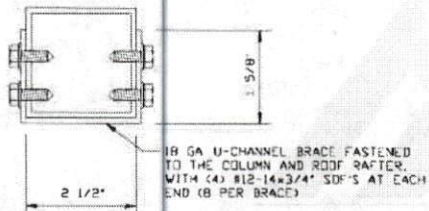
SCALE: NTS



BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS ≤ 12'-0"

1A

SCALE: NTS



BRACE SECTION

SCALE: NTS

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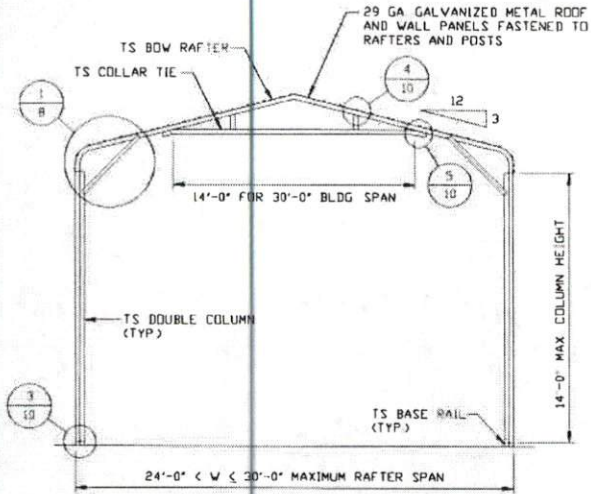
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SHT. 6

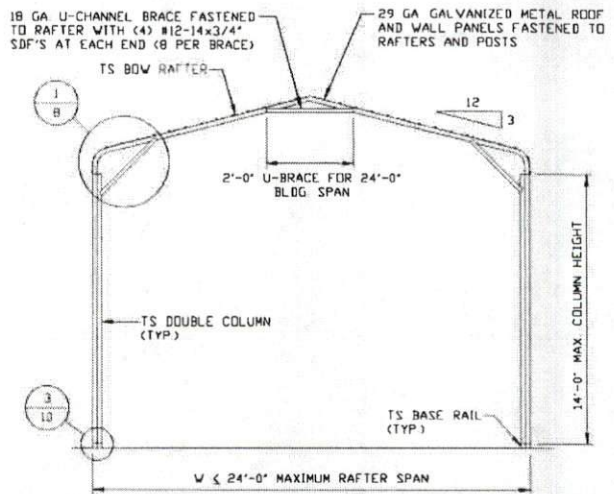
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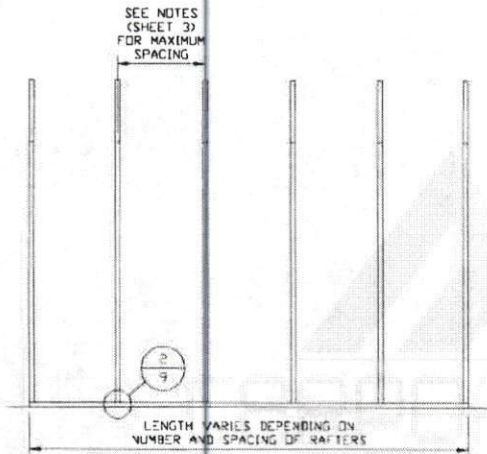
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TYPICAL RAFTER/COLUMN FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS

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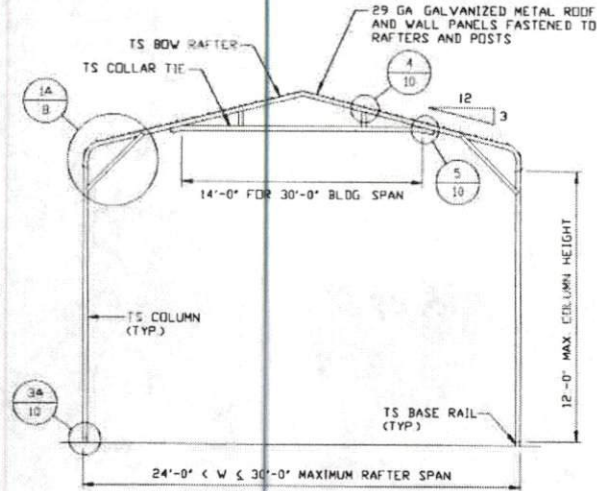
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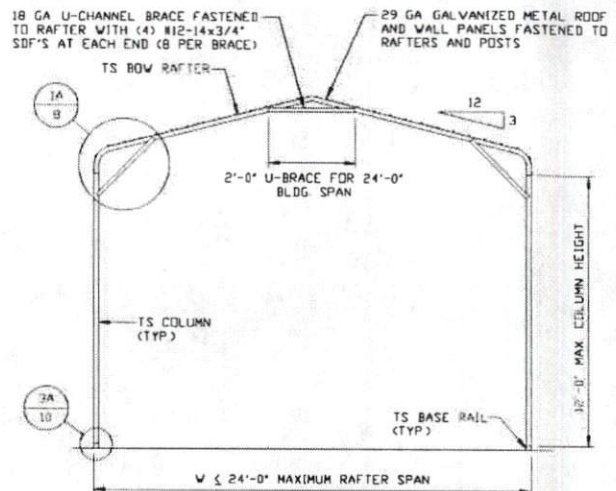
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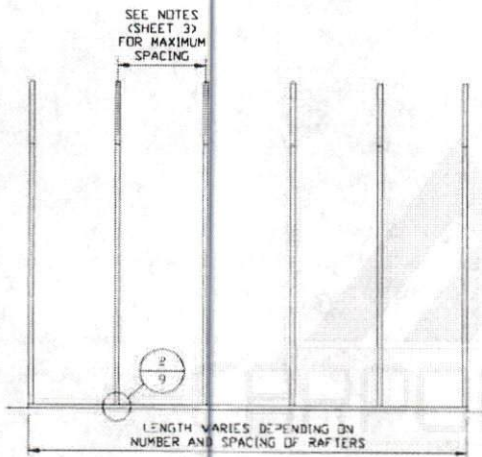
TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS

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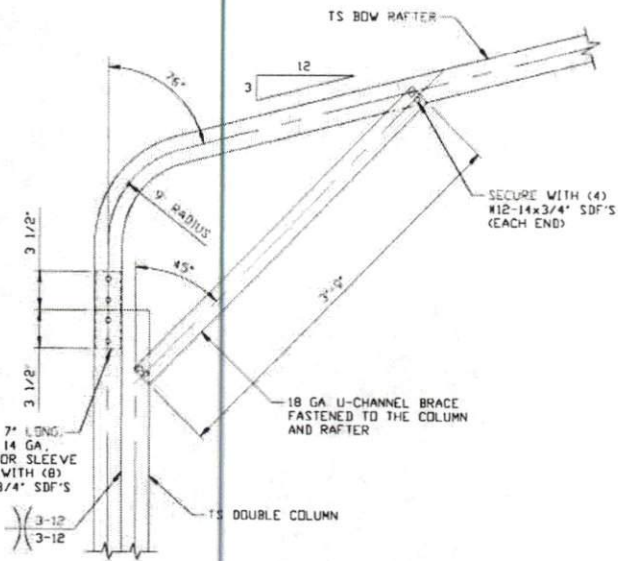
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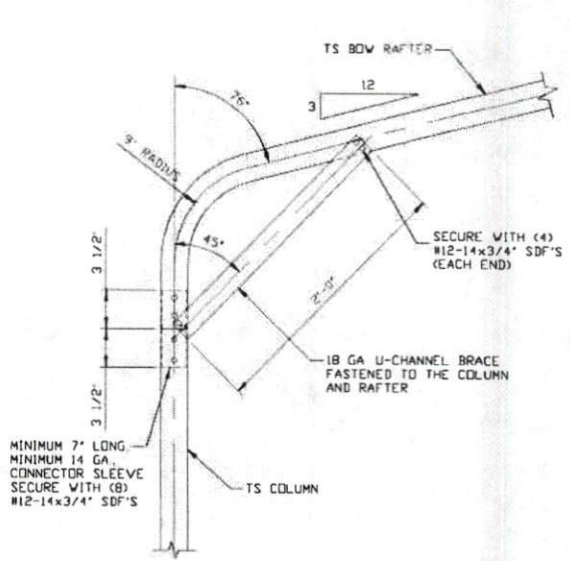
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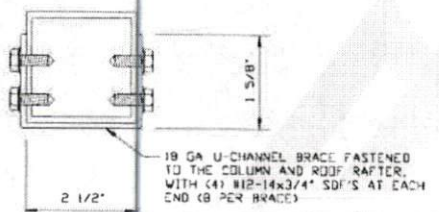
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1 BOW EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS 12'-0" < TO < 14'-0"
 SCALE: NTS



1A BOW EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS < 12'-0"
 SCALE: NTS

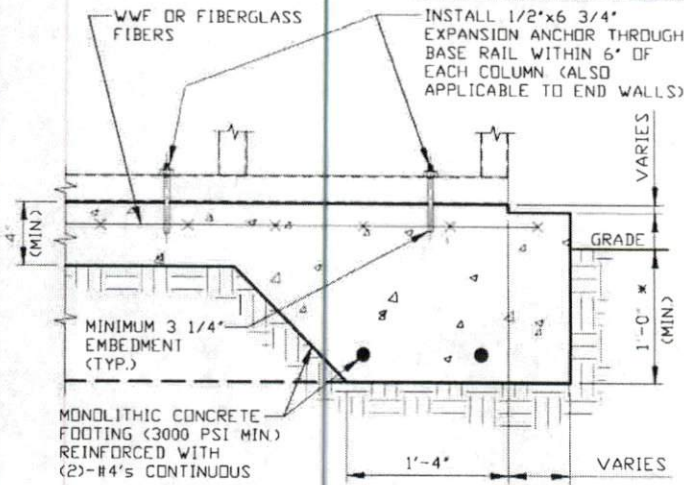


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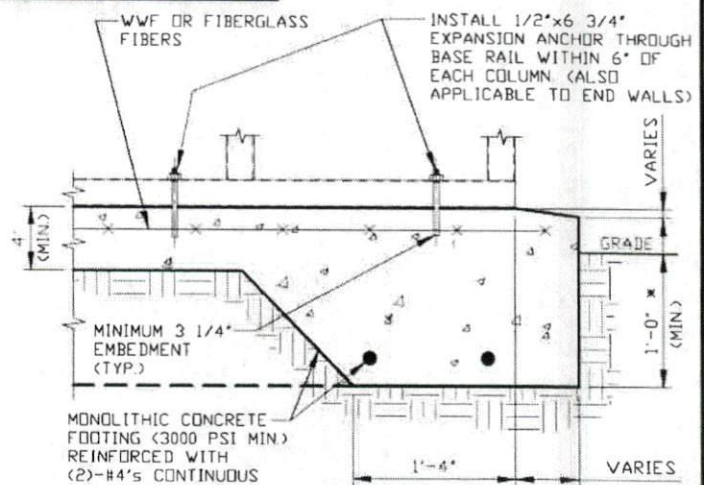
BASE RAIL ANCHORAGE OPTIONS



2

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
MINIMUM ANCHOR EDGE DISTANCE IS 4"
* COORDINATE WITH LOCAL CODES/ORD.
REGARDING MINIMUM FROST DEPTH REQ



2A

CONCRETE SLAB BASE RAIL ANCHORAGE

SCALE: NTS
MINIMUM ANCHOR EDGE DISTANCE IS 4"
* COORDINATE WITH LOCAL CODES/ORD.
REGARDING MINIMUM FROST DEPTH REQ

GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN BASED ON MINIMUM SOIL BEARING CAPACITY OF 1,500 PSF.

CONCRETE:

CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

COVER OVER REINFORCING STEEL:

FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE PER ACI-318:
3" IN FOUNDATIONS WHERE THE CONCRETE IS CAST AGAINST AND PERMANENTLY IN CONTACT WITH THE EARTH OR EXPOSED TO THE EARTH OR WEATHER, AND 1 1/2" ELSEWHERE.

REINFORCING STEEL:

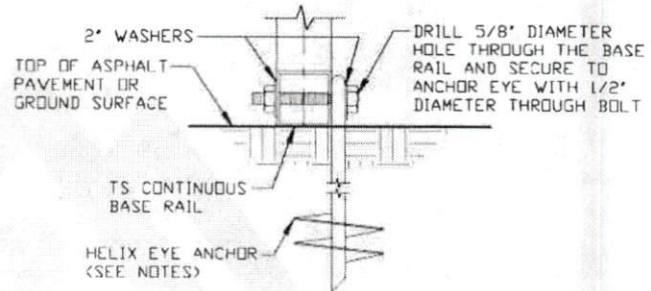
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 50 THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A195 OR FIBERGLASS FIBER REINFORCEMENT

REINFORCEMENT MAY BE BENT IN THE SHOP OR THE FIELD PROVIDED:

1. REINFORCEMENT IS BENT COLD.
2. THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS.
3. REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT.

HELIX ANCHOR NOTES:

1. FOR VERY DENSE AND/OR CEMENTED SANDS, COARSE GRAVEL AND COBBLES, CALICHE, PRELOADED SILTS AND CLAYS, USE MINIMUM (2) 4" HELICES WITH MINIMUM 30" EMBEDMENT OR SINGLE 6" HELIX WITH MINIMUM 50" EMBEDMENT.
2. FOR CORAL USE MINIMUM (2) 4" HELICES WITH MINIMUM 30" EMBEDMENT OR SINGLE 6" HELIX WITH MINIMUM 50" EMBEDMENT.
3. FOR MEDIUM DENSE COARSE SANDS, SANDY GRAVELS, VERY STIFF SILTS, AND CLAYS USE MINIMUM (2) 4" HELICES WITH MINIMUM 30 INCH EMBEDMENT OR SINGLE 6" HELIX WITH MINIMUM 50" EMBEDMENT.
4. FOR LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFF CLAYS AND SILTS ALLUVIAL FILL, USE MINIMUM (2) 6" HELICES WITH MINIMUM 50" EMBEDMENT.
5. FOR VERY LOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL, USE MINIMUM (2) 8" HELICES WITH MINIMUM 60" EMBEDMENT.



2B

GROUND BASE HELIX ANCHORAGE

SCALE: NTS
(CAN BE USED FOR ASPHALT)
* COORDINATE WITH LOCAL CODES/ORD.
REGARDING MINIMUM FROST DEPTH REQ

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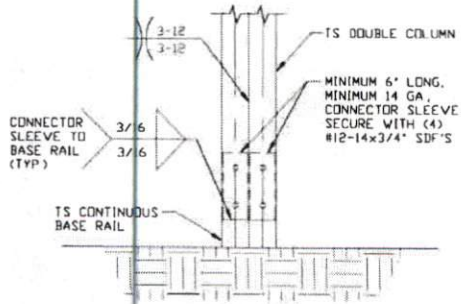
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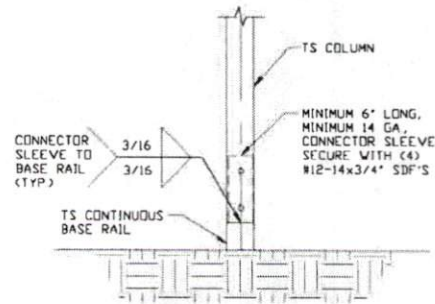
CONNECTION DETAILS



3

POST/BASE RAIL CONNECTION DETAIL

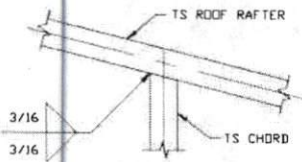
SCALE: NTS



3A

POST/BASE RAIL CONNECTION DETAIL

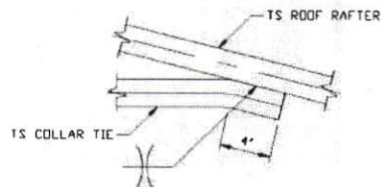
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4

RAFTER TO CHORD CONNECTION DETAIL

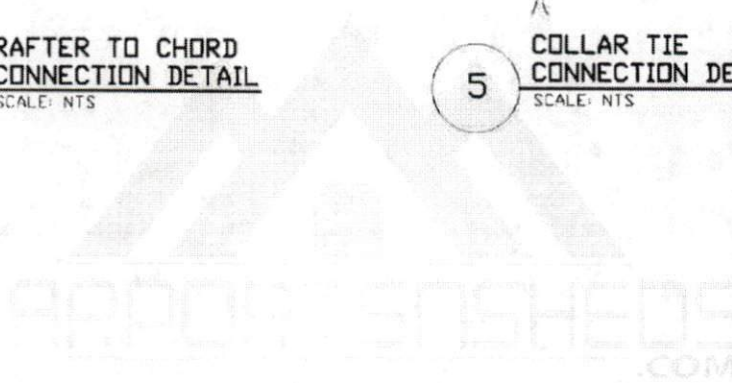
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5

COLLAR TIE CONNECTION DETAIL

SCALE: NTS

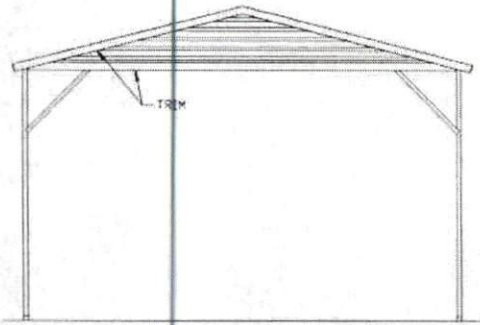


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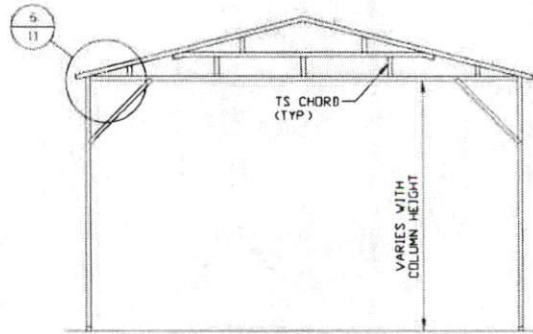
DRAWN BY: LT		CARPORTSNSHEDS, LLC	
CHECKED BY: PDH		158 GATEHOUSE LN.	
PROJECT MGR: WSM		DOBSON, NC 27017	
DATE: 1-14-21		30'-0"X14'-0" FULLY OPEN STRUCTURE	
SCALE: NTS	JOB NO: 20320S		
CLIENT: CARPORTSNSHEDS	SHT. 10	DWG. NO: SK-1	REV: 0

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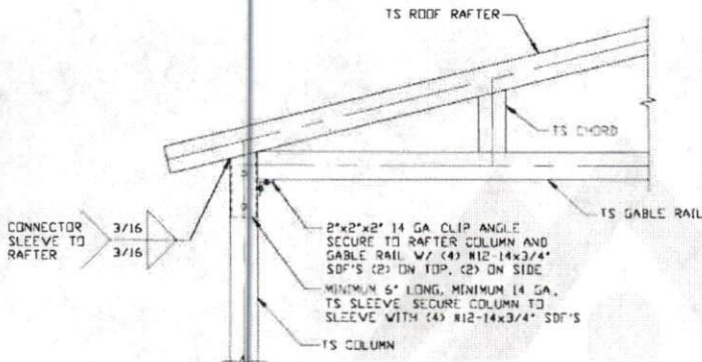
BOX EAVE RAFTER GABLE END OPTION



TYPICAL BOX EAVE RAFTER GABLE END ELEVATION
 SCALE: NTS



TYPICAL BOX EAVE RAFTER GABLE END FRAMING SECTION
 SCALE: NTS

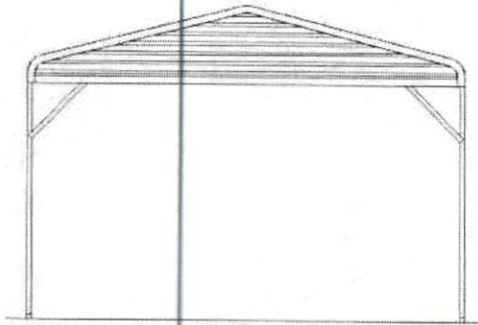


BOX EAVE RAFTER GABLE RAIL TO RAFTER COLUMN CONNECTION DETAIL
 SCALE: NTS
 NOTE: KNEE BRACE NOT SHOWN FOR CLARITY

SHEDS.COM

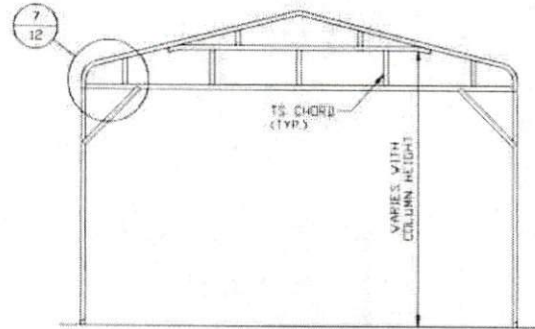
MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: LT		CARPORTSNSHEDS, LLC 158 GATEHOUSE LN. DOBSON, NC 27017 30'-0" x 14'-0" FULLY OPEN STRUCTURE	
	CHECKED BY: PDH			
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	CLIENT: CARPORTSNSHEDS	SHT. 11	DWG. NO: SK-1	REV: 0

BOW EAVE RAFTER GABLE END OPTION



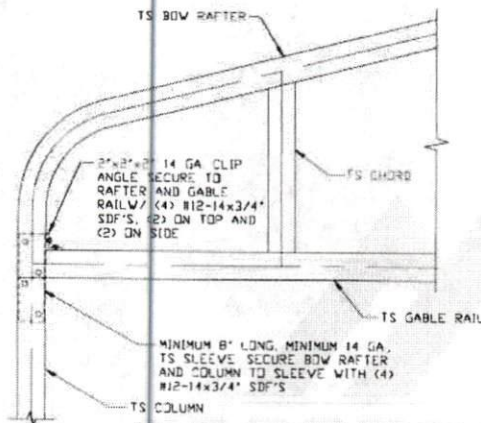
TYPICAL BOX EAVE RAFTER GABLE END ELEVATION

SCALE: NTS



TYPICAL BOX EAVE RAFTER GABLE END FRAMING SECTION

SCALE: NTS



BOX EAVE RAFTER GABLE RAIL TO RAFTER COLUMN CONNECTION DETAIL

SCALE: NTS

NOTE: KNEE BRACE NOT SHOWN FOR CLARITY

7

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CARPORTSNSHEDS, LLC

158 GATEHOUSE LN.

DOBSON, NC 27017

30'-0" x 14'-0" FULLY OPEN STRUCTURE

DATE: 1-14-21

SCALE: NTS

JOB NO: 20320S

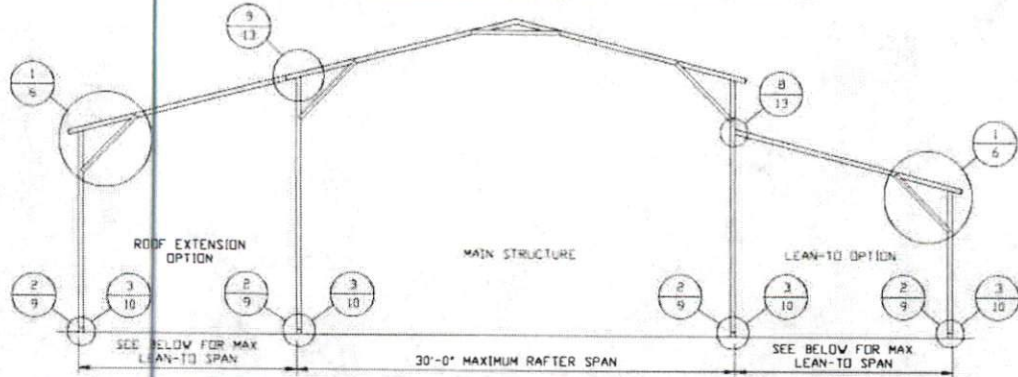
SHT. 12

DWG. NO SK-1

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BOX EAVE RAFTER LEAN-TO OPTIONS



TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

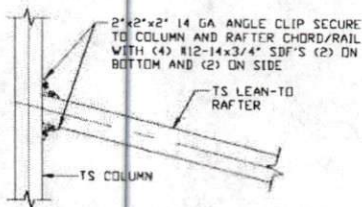
SCALE: NTS

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR

EAVE HEIGHTS 12'-0" < TO < 14'-0"

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR

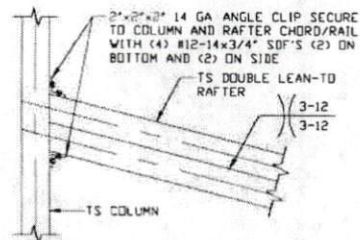
EAVE HEIGHTS < 12'-0"



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS <= 12'-0"

8

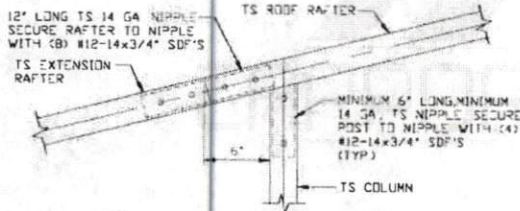
SCALE: NTS



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 12'-0" < L <= 15'-0"

8A

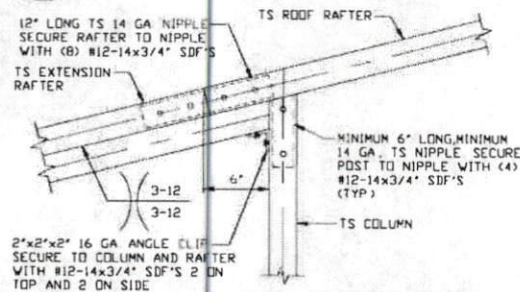
SCALE: NTS



SIDE EXTENSION RAFTER/COLUMN DETAIL FOR SPANS <= 12'-0"

9

SCALE: NTS



SIDE EXTENSION RAFTER/COLUMN DETAIL FOR SPAN 12'-0" < L <= 15'-0"

9A

SCALE: NTS

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CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: CARPORTSNSHEDS

CARPORTSNSHEDS, LLC

158 GATEHOUSE LN.

DOBSON, NC 27017

30'-0"x14'-0" FULLY OPEN STRUCTURE

DATE: 1-14-21

SCALE: NTS

JOB NO: 20320S

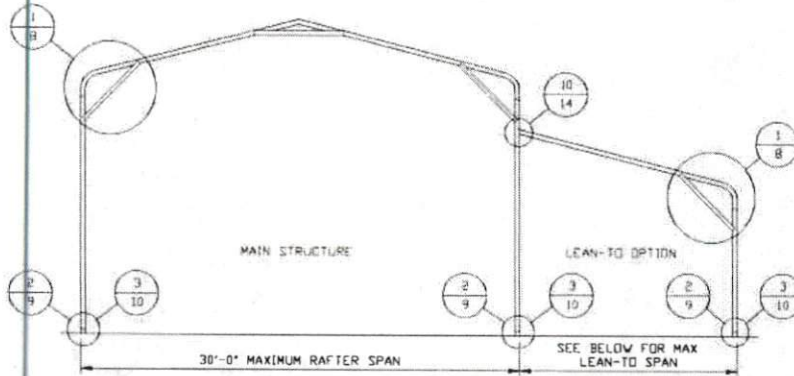
SHT. 13

DWG. NO: SK-1

REV: 0

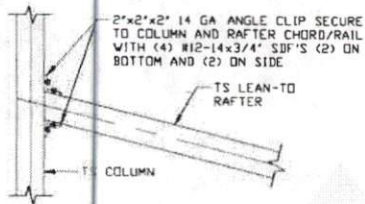
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BOW EAVE RAFTER LEAN-TO OPTIONS



TYPICAL BOW EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION

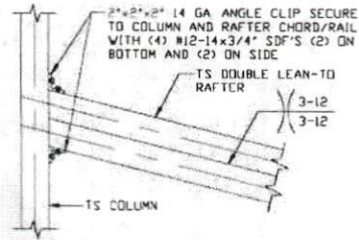
SCALE: NTS
 MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 12'-0" < TO ≤ 14'-0".
 MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS ≤ 12'-0".



10

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS ≤ 12'-0"

SCALE: NTS



10A

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 12'-0" < L ≤ 15'-0"

SCALE: NTS

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CARPORTSANDSHEDS, LLC
 158 GATEHOUSE LN.
 DOBSON, NC 27017
 30'-0"x14'-0" FULLY OPEN STRUCTURE

DATE: 1-14-21

SCALE: NTS

JOB NO: 20320S

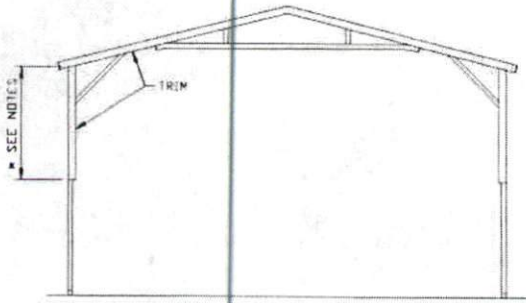
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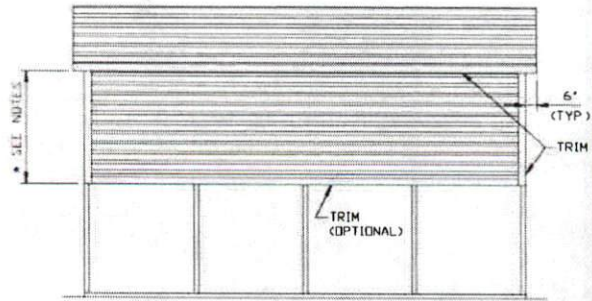
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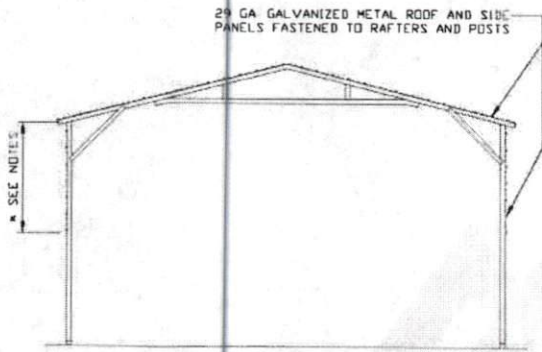
BOX EAVE RAFTER EXTRA SIDE PANEL OPTION



**TYPICAL END ELEVATION
 EXTRA SIDE PANELS**
 SCALE: NTS



**TYPICAL SIDE ELEVATION
 EXTRA SIDE PANELS**
 SCALE: NTS



**TYPICAL RAFTER/COLUMN FRAME
 SECTION - EXTRA SIDE PANELS**
 SCALE: NTS

NOTES:

- * 12'-0" PANEL FOR EAVE HEIGHT 12'-0" < TO < 14'-0"
- * 9'-0" PANEL FOR EAVE HEIGHT < 12'-0"

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158 GATEHOUSE LN.

DOBSON, NC 27017

30'-0" x 14'-0" FULLY OPEN STRUCTURE

DATE: 1-14-21

SCALE: NTS

JOB NO: 20320S

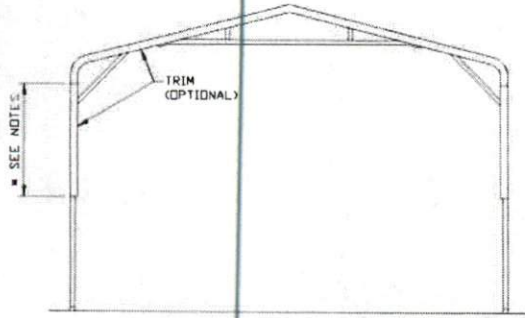
SHT. 15

DWG. NO: SK-1

REV: 0

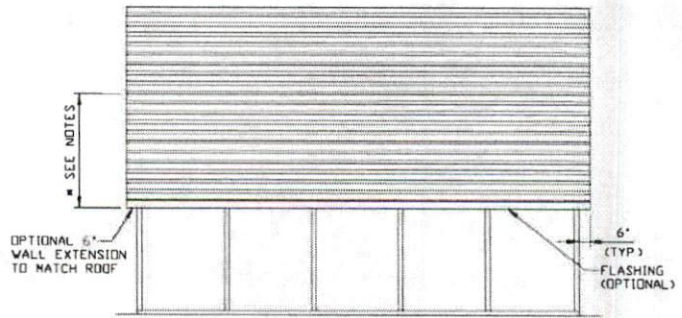
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BOW EAVE RAFTER EXTRA SIDE PANEL OPTION



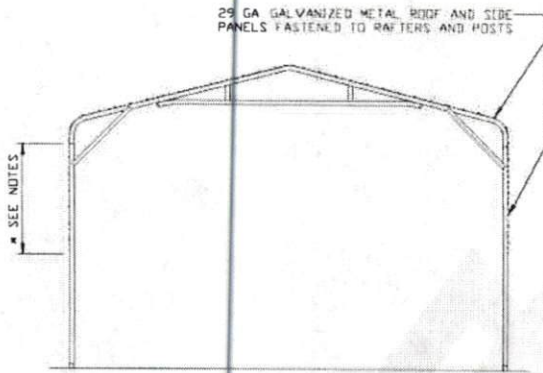
**TYPICAL END ELEVATION
 EXTRA SIDE PANELS**

SCALE: NTS



**TYPICAL SIDE ELEVATION
 EXTRA SIDE PANELS**

SCALE: NTS



**TYPICAL RAFTER/COLUMN FRAME
 SECTION - EXTRA SIDE PANELS**

SCALE: NTS

NOTES:

- * 12'-0" PANEL FOR EAVE HEIGHT 12'-0" < TO < 14'-0"
- * 9'-0" PANEL FOR EAVE HEIGHT < 12'-0"

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DATE: 1-14-21

SCALE: NTS

JOB NO: 20320S

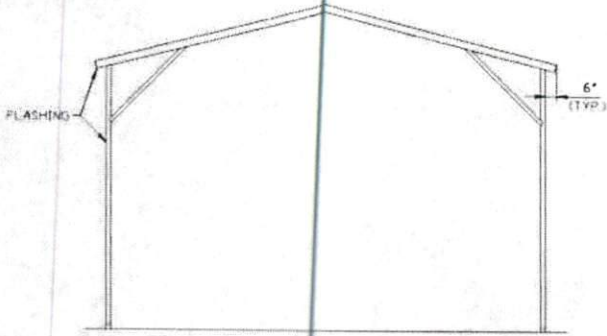
SHT. 16

DWG. NO: SK-1

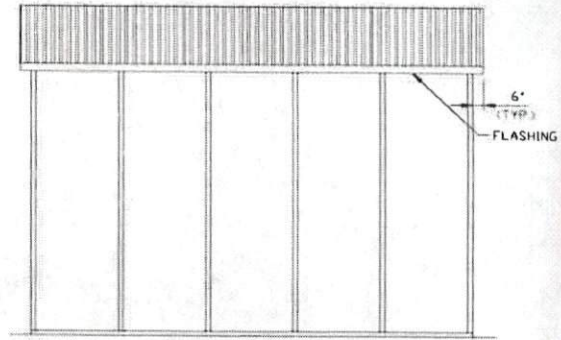
REV: 0

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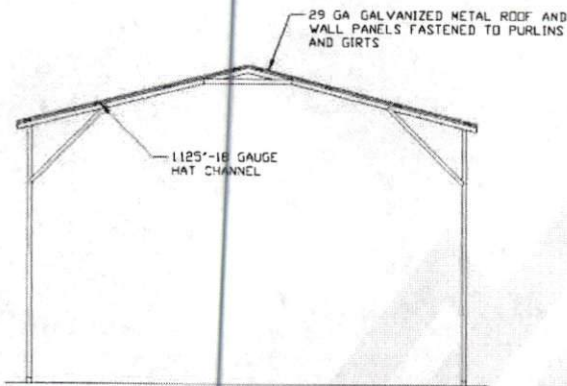
BOX EAVE RAFTER VERTICAL ROOF OPTION



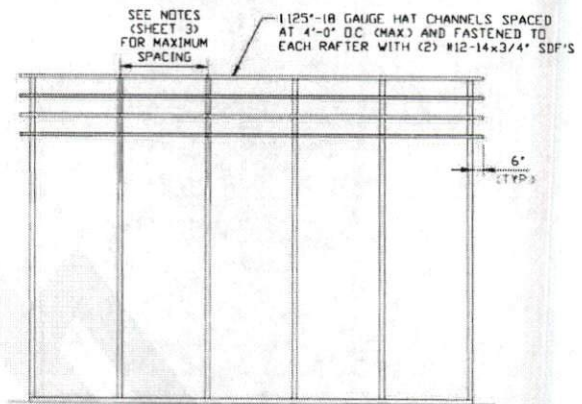
**TYPICAL END ELEVATION
 VERTICAL ROOF/SIDING**
 SCALE: NTS



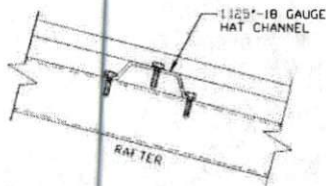
**TYPICAL SIDE ELEVATION
 VERTICAL ROOF/SIDING**
 SCALE: NTS



**TYPICAL SECTION VERTICAL
 ROOF/SIDING OPTION**
 SCALE: NTS



**TYPICAL FRAMING SECTION
 VERTICAL ROOF OPTION**
 SCALE: NTS



ROOF PANEL ATTACHMENT
 (ALTERNATE FOR VERTICAL ROOF PANELS)
 SCALE: NTS

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SCALE: NTS

JOB NO: 20320S

SHT. 17

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