



## STRUCTURAL DESIGN

## **ENCLOSED 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:

Moore and Associates Engineering and Consulting, Inc. 1009 East Avenue North Augusta, SC 29841

> 401 S. Main Street, Suite 200 Mount Airy, NC 27030



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#### INSTALLATION NOTES AND SPECIFICATIONS

- 1. DESIGN IS FOR MAXIMUM 30'-0" WIDE  $\times$  14'-0" EAVE HEIGHT ENCLOSED 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

= 1.5 PSF

B) LIVE LOAD

= 12 PSF

C> GROUND SNOW LOAD

= 30 PSF (< 24'-0\*), 35 PSF (24'-0\* < ₩ < 30'-0\*)

NOTE: UNBALANCED SNOW LOAD DUE TO DRIFTING HAS NOT BEEN EVALUATED

- 4. 3-SECOND GUST ULTIMATE WIND SPEED ( $V_{ULT}$ ) =  $\leq$  140 MPH (NOMINAL WIND SPEED =  $\leq$  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 L
- 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' DF 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
- 14 WIND FORCES GOVERN OVER SEISMIC FORCES, SEISMIC PARAMETERS ANALYZED ARE:

SDIL SITE CLASS = D RISK CATEGORY I

I<sub>E</sub>= 1,0

R = 3.25g = 2.039 g

v= csw

 $S_{DI} = 1258 g$ 

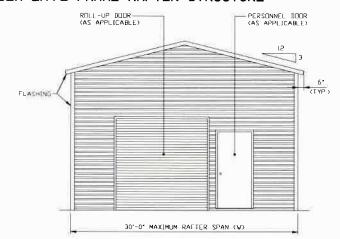


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## BOX EAVE FRAME RAFTER STRUCTURE



## TYPICAL END ELEVATION

SCALE: NTS

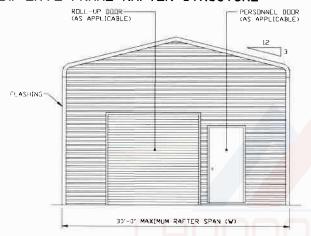
## TYPICAL SIDE ELEVATION

FLASHING

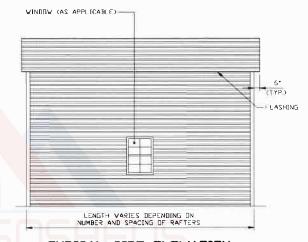
WINDOW (AS APPLICABLE)

SCALE: NTS

### BOW EAVE FRAME RAFTER STRUCTURE



### TYPICAL END ELEVATION



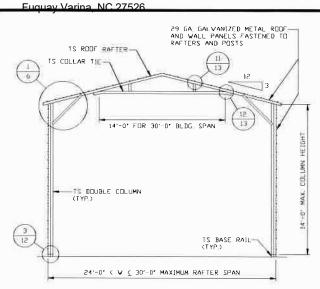
TYPICAL SIDE ELEVATION SCALE NTS

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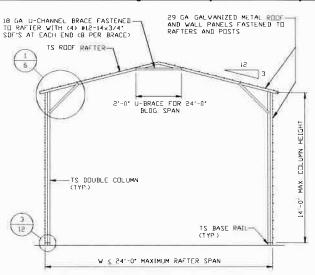
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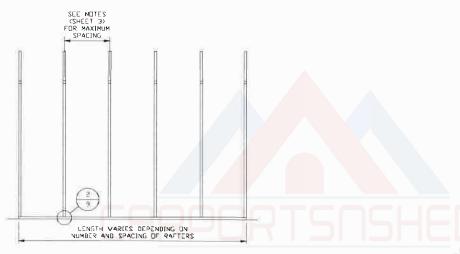
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TYPICAL RAFTER/COLUMN FRAME SECTION

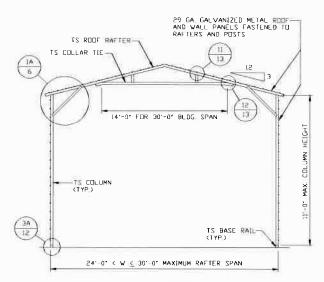


TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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## TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

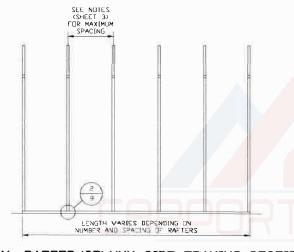
18 GA U-CHANNEL BRACE FASTENED
TO RAFTER WITH (4) HI2-14x3/4'
SDF'S AT EACH END (8) PER BRACE)
TS ROUF RAFTER

2'-0' U-BRACE FIR 24'-0'
BLDG SPAN

15 BASE RAIL
(TYP)

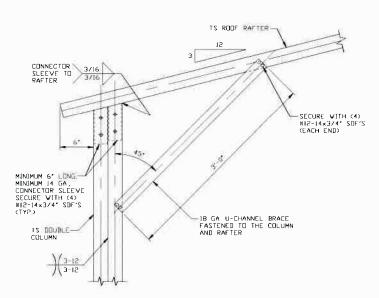
V < 24'-0' MAXIMUM RAFTER SPAN

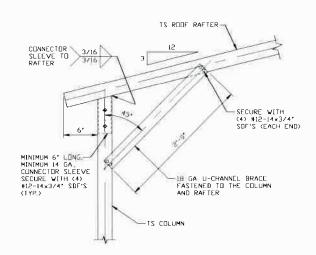
TYPICAL RAFTER/COLUMN FRAME SECTION



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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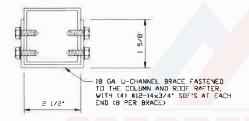




BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS 11'-0' < TO < 14'-0'

BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS & 11'-0"

1A SCALE: NTS

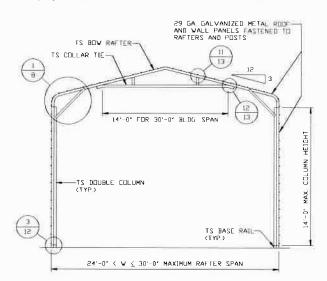


BRACE SECTION

SCALE: NTS

1

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## TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

18 GA U-CHANNEL BRACE FASTENED
TD RAFTER WITH (4) MI2-143/4\*
SDF'S AT EACH END (8 PER BRACE)
TS BOW RAFTER

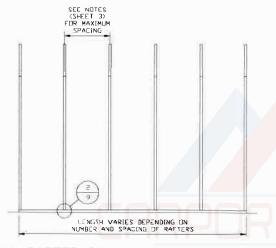
2'-0' U-BRACE FDR 24'-0'
BL DG SPAN

15 BOUBLE COLUMN
(TYP)

V ( 24'-0' MAXIMUM RAFTER SPAN

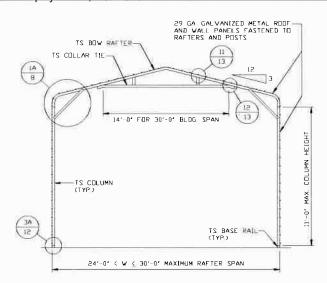
## TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS

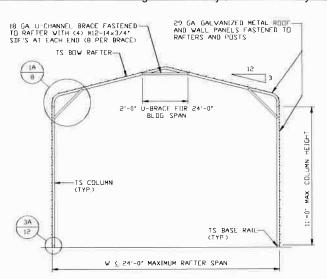


### TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

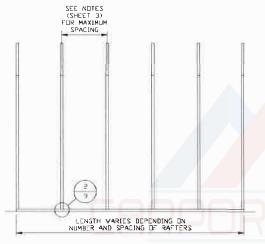
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TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

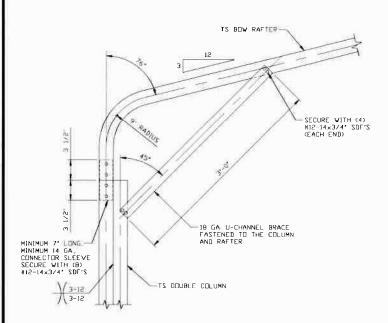


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE: NTS

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TS BOW RAFTER-SECURE WITH (4) #12-14×3/4" SDF'S (EACH END) 18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND RAFTER MINIMUM 7' LONG. — MINIMUM 14 GA. CONNECTOR SLEEVE SECURE WITH (8) #12-14x3/4' SDF'S TS COLUMN

BOW EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS 11'-0" < TO ≤ 14'-0"

CONNECTION DETAIL FOR HEIGHTS ≤ 11'-0" SCALE: NTS

BOW EAVE RAFTER/CORNER POST

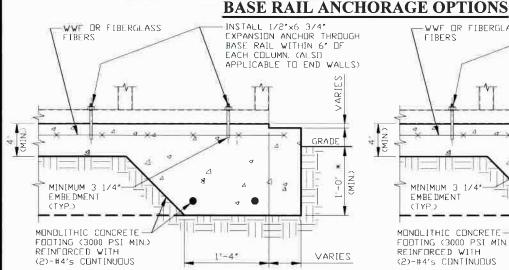
18 SA U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF RAFTER, WITH (4) H12-14-32/4' SDF'S AT EACH END (8 PER BRACE) 2 1/2\*

BRACE SECTION SCALE: NTS

1

1A

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#### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

MINIMUM ANCHOR EDGE DISTANCE IS 4'
\* COORDINATE WITH LOCAL CODES/ORD REGARDING MINIMUM FROST DEPTH REQ

### GENERAL NOTES

NOTE: CONCRETE MONDLITHIC 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:

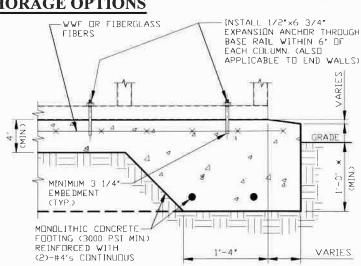
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM 4615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM 4185 OR FIBERGLASS FIBER REINFORCEMENT.

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

- REINFORCEMENT IS BENT COLD 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:

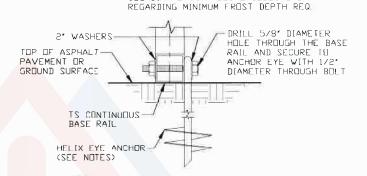
- 1 FOR VERY DENSE AND/OR CEMENTED SANDS, COARSE GRAVEL AND COBBLES, CALICHE, PRELOADED SILTS AND CLAYS, USE MINIMUM (2) 4' HELICES WITH MINIMUM 30' EMBEDMENT OR SINGLE 6' HELIX WITH MINIMUM 50' EMBEDMENT
- 2 FOR CORAL USE MINIMUM (2) 4" HELICES WITH MINIMUM 30' EMBEDMENT OR SINGLE 6' HELIX WITH MINIMUM 50" EMBEDMENT
- FOR MEDIUM DENSE COARSE SANDS, SANDY GRAVELS, 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



2A

### CONCRETE SLAB BASE RAIL ANCHURAGE

MINIMUM ANCHOR EDGE DISTANCE IS 4'.
\* COORDINATE WITH LOCAL CODES/ORD.



#### GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)

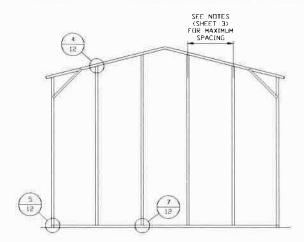
COORDINATE WITH LOCAL CODES/ORD REGARDING MINIMUM FROST DEPTH REQ

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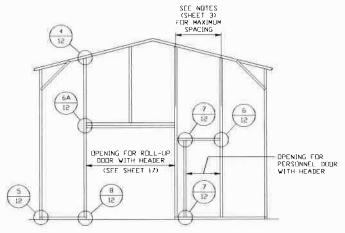
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## BOX EAVE RAFTER END WALL AND SIDE WALL FRAMING SECTIONS



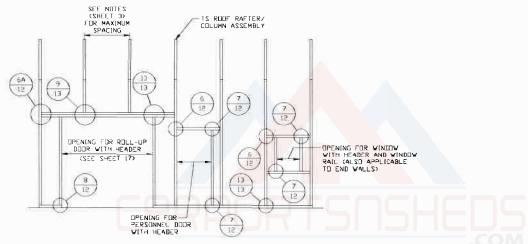
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



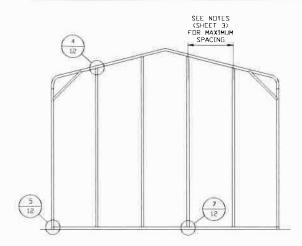
TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

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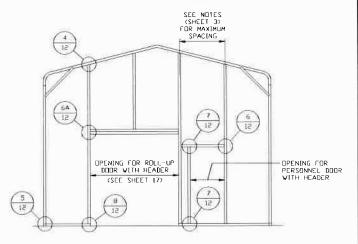
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## BOW EAVE RAFTER END WALL AND SIDE WALL FRAMING SECTIONS



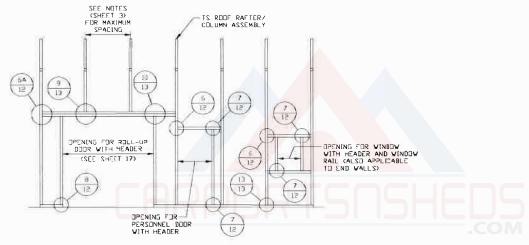
TYPICAL BOW EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOW EAVE RAFTER END WALL OPENINGS FRAMING SECTION

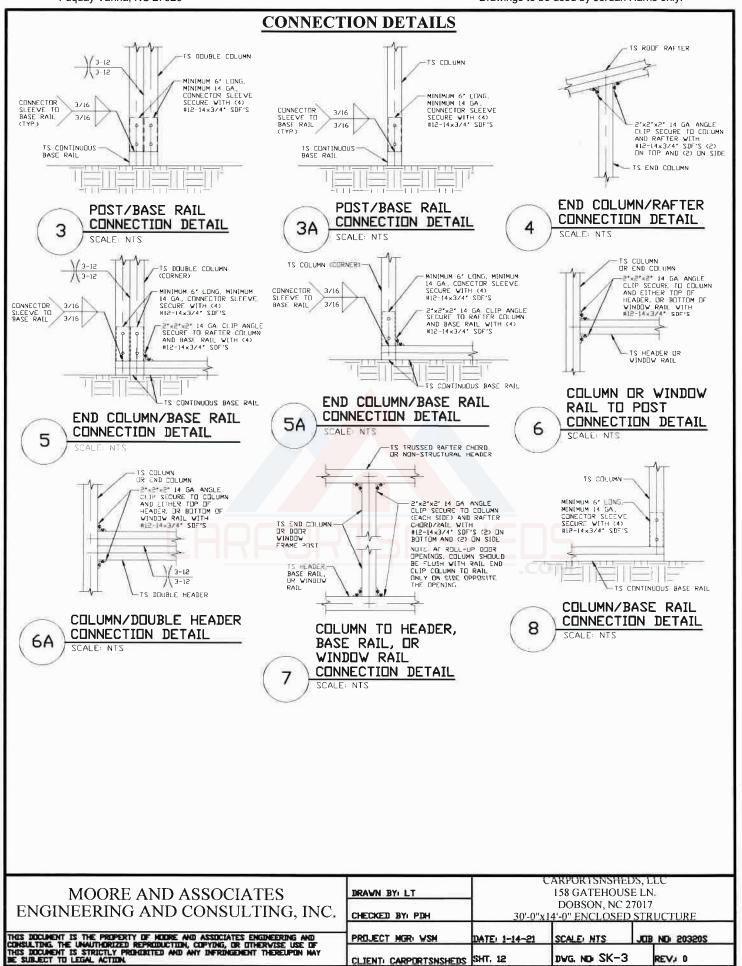
SCALE: NTS



TYPICAL BOW EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

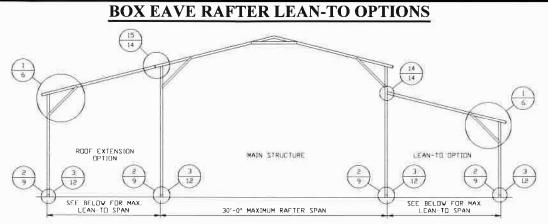
MOORE AND ASSOCIATES	DRAW
ENGINEERING AND CONSULTING, INC.	CHEC
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CLIENT, CADDIDTONOLICIO	SHT. 11	DVG. ND SK-	REV. 0			
PROJECT MGR: WSM	DATE: 1-14-21	SCALE: NTS	JOE	ND 20320S		
CHECKED BY: PDH	30'-0"x	14'-0" ENCLOSE	D STR	UCTURE		
DRAWN BY: LT	-	158 GATEHOU DOBSON, NO	27017			
	CARPORTSNSHEDS, LLC					



#### **CONNECTION DETAILS** 3-15 TS COLUMN MINIMUM 6' LONG, MINIMUM 14 GA, TS SLEEVE SECURE WITH (4) #12-14x3/4' SDF'S TS ROOF RAFTER CONNECTOR SLEEVE TO HEADER 3/16 MINIMUM 6' LONG, MINIMUM 14 GA, CONNECTOR SLEEVE SECURE EACH WITH (4) #12-14×3/4' SDF'S TS DOUBLE HEADER 3/16 CONNECTOR SLEEVE TO HEADER 3-15 3/16 TS COLUMN RAFTER TO CHORD DOUBLE HEADER/COLUMN CONNECTION DETAIL COLUMN/DOUBLE HEADER 11 CONNECTION DETAIL SCALE: NTS CONNECTION DETAIL 10 9 SCALE: NTS - 12 TRUSSED RAFTER CHORD, OR NON-STRUCTURAL HEADER TS ROOF RAFTER -MINIMUM 6' LONG, MINIMUM 14 GA, CONNECTOR SLEEVE SECURE EACH WITH (4) #12-14×3/4' SDF'S TS END COLUMN — OR DOOR VINDOV FRAME POST TS COLLAR TIE TS HEADER, BASE RAIL, DR WINDOW RAIL COLLAR TIE CONNECTION DETAIL 12 COLUMN TO HEADER OR BASE RAIL CONNECTION DETAIL 13 SCALE: NTS

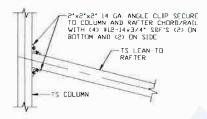
THIS DOCUMENT IS STRICTLY PROHIBITED AND ANY INFRINGEMENT THEREUPON MAY	CLIENT: CARPORTSNSHEDS	SHT. 13	DWG. NO SK-3	REV: 0		
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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: LT CHECKED BY: PDH	30'-0"x	158 GATEHOUSE L DOBSON, NC 2701 14'-0" ENCLOSED ST	7		
MOODE AND AGGOGLATEG		CARPORTSNSHEDS, LLC				



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

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 11'-0" < TO < 14'-0".

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS ≤ 11'-0"



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS ₹ 12'-0' 14

STALE: NTS

15

15A

IS ROOF RAFTER-LS' LONG IS 14 GA NEDD E-SECURE RAFTER ID NIPPLE WITH (8) #18-14×3/4' SDF'S TS EXTENSION-RAFTER MINIMUM 6" LONG, MINIMUM 14 GA, TS NIPPLE SECURE POST TO NIPPLE WITH (4) H12-14×3/4" SDF'S (TYP) TS COLUMN

2\*\*2\*\*2\* 14 GA ANGLE CLIP SECURE TO COLUMN AND RAFTER CHORD/RAIL WITH (4) #12-14\*3/4\* SDF'S (2) ON BOTTOM AND (2) ON SIDE TS DOUBLE LEAN-TO RAFTER 3-12 TS COLUMN

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 12'-0' < L < 15'-0" 14A SCALE: NTS

#### SIDE EXTENSION RAFTER COLUMN DETAIL FOR SPANS ( 12'-0' SCALE: NTS

TS ROOF RAFTER 12' LONG TS 14 GA NIPPLE-SECURE RAFTER TO NIPPLE WITH (8) #12-14x3/4' SDF'S TS EXTENSION RAFTER MINIMUM 6' LONG,MINIMUM 14 GA, TS NIPPLE SECURE POST TO NIPPLE WITH (4) #12-14×3/4' SDF'S (TYP) 3-12 3-12 TS COLUMN 2'x2'x2' 16 GA ANGLE CLIP— SECURE TO COLUMN AND RAFTER WITH #12-14x3/4' SDF'S 2 ON TOP AND 2 ON SIDE

SIDE EXTENSION RAFTER/COLUMN DETAIL FOR SPAN 12'-0" < L ≤ 15'-0" SCALE: NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.

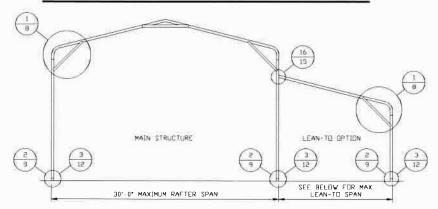
HIS	DOCUME	ENT IS T	HE PROPER	TY IF	MOORE	AND A	SSOCIATE	S ENG	INEERING	AND
THES	DOCUME	ENT IS S	TRICTLY P	SOHOBI						
	SUBJECT	IU LEG	AL ACTION							

CLIENT: CARPORTSNSHEDS	SHT. 14	DVG. ND. SK-3		REV. 0
PROJECT MGR: VSM	DATE: 1-14-21	SCALE: NTS	JOB	ND 20320S
CHECKED BY: PDH	30'-0"x	14'-0" ENCLOSED		
DRAWN BY: LT		AKPUK I SNSHEI 158 GATEHOUS DOBSON, NC 2	E ĹN	I.

16

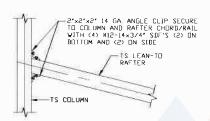
SCALE NIS

## **BOW EAVE RAFTER LEAN-TO OPTIONS**



## TYPICAL BOW EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS € 11'-0"



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

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 12'-0" < L < 15'-0" 16A

TS COLUMN

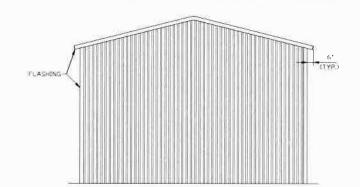
2\*2\*2\*14 GA ANGLE CLIP SECURE TO COLUMN AND RAFTER CHORD/RAIL WITH (4) H12-14\*3/4\* SDF'S (2) ON BOTTOM AND (2) ON SIDE

TS DOUBLE LEAN-TO RAFTER V 3−15 3-15

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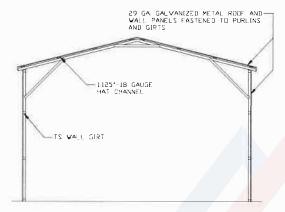
CLIENT: CARPORTSNSHEDS	SHT. 15	DWG. NO SK-3		REV. 0	
PROJECT MGR: VSM	DATE: 1-14-21	SCALE: NTS	J.00	ND 20320S	
CHECKED BY: PDH	DOBSON, NC 27017 30'-0"x14'-0" ENCLOSED STRUCTURE				
DRAWN BY: LT	158 GATEHOUSE LN				

## BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



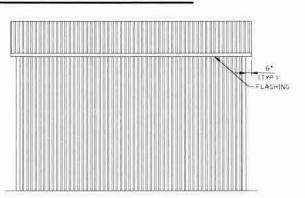
#### TYPICAL END ELEVATION VERTICAL ROOF/SIDING

SCALE: NTS

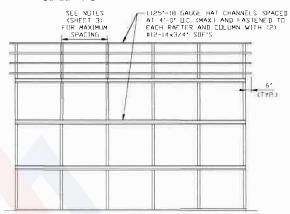


### TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

SCALE: NTS

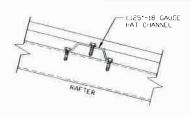


## TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING SCALE: NTS



#### TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

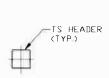
SCALE: NTS



PANEL ATTACHMENT
(ALTERNATE FOR VERTICAL ROOF PANELS)

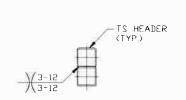
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## SIDE WALL HEADER OPTIONS



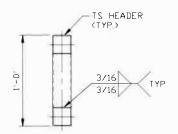
HEADER DETAIL FOR SIDE WALL DOOR OPENINGS < 7'-0"

SCALE: NTS



HEADER DETAIL FOR SIDE WALL DOOR OPENINGS 7'-0' < LENGTH \( \) 11'-0'

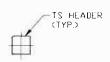
SCALE: NTS



HEADER DETAIL FOR SIDE WALL DOOR OPENINGS 11'-0' < LENGTH \( \) 16'-0'

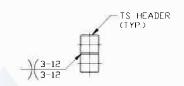
SCALE: NTS

## **END WALL HEADER OPTIONS**



HEADER DETAIL FOR END WALL DOOR OPENINGS ≤ 13'-0"

SCALE: NTS



HEADER DETAIL FOR END WALL DOOR OPENINGS 13'-0' < LENGTH \( \) 16'-0'

SCALE: NTS

CARPORTSOSHEDS

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PREJECT NGR: WSN	30'-0"x	DOBSON, NC 27017 '-0"x14'-0" ENCLOSED STRUCTURE -21 SCALE NTS JUB ND 20320S			
PROJECT MGR: VSM  CLIENT: CARPORTSNSHEDS		DWG. NO SK-			