

STRUCTURAL DESIGN

PARTIALLY ENCLOSED (UTILITY) BUILDING

MAXIMUM 32'-0" WIDE X 16'- 0" EAVE HEIGHT-BOX EAVE FRAME AND BOW FRAME

1 October 2021 Revision 0 M&A Project No. 21048S

Prepared for:

SteelCraft Structures 1841 Amity Hill Rd. Statesville, NC 28677

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 32'-0" WIDE x 16'-0" EAVE HEIGHT UTILITY STRUCTURES.
- 2. DESIGN WAS DONE IN ACCORDANCE WITH ALL THE APPLICABLE BUILDING CODES LISTED ON SHEET 3A.
- 3: DESIGN LOADS ARE AS FOLLOWS:

A) DEAD LOAD = 1.5 PSF
B) LIVE LOAD = 12 PSF
C) GROUND SNOW LOAD = 20 PSF

NOTE: UNBALANCED LOADING DUE TO SNOW DRIFTING FROM AN ADJACENT TALLER STRUCTURE 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 R.
- 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 PANEL SPACING DN-CENTERS = 10 INCHES.
- 11. FASTENERS CONSIST OF #12-14×3/4' 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 AT OR WITHIN 6° OF EVERY COLUMN.
- 13. STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT × 30° LONG AND MAY ONLY BE USED 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 $I_E = 1.0$ $V = C_S W$

S_{D1}= 1.258 g

15. CONTRACTOR TO PROVIDE ADEQUATE BRACING FOR STRUCTURE SO THAT IT WILL BE STABLE DURING ALL STAGES OF CONSTRUCTION. THE STRUCTURE AND FOUNDATION ARE DESIGNED FOR A COMPLETED CONDITION ONLY AND, THEREFORE, REQUIRE ADDITIONAL SUPPORT TO MAINTAIN STABILITY BEFORE COMPLETION.

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LIST OF APPLICABLE BUILDING CODES

2018 INTERNATIONAL BUILDING CODE (IBC 2018)

2015 INTERNATIONAL BUILDING CODE (IBC 2015)

2012 INTERNATIONAL BUILDING CODE (IBC 2012)

GEORGIA STATE MINIMUM STANDARD BUILDING CODE (ADOPTS THE IBC 2018 WITH AMENDMENTS)

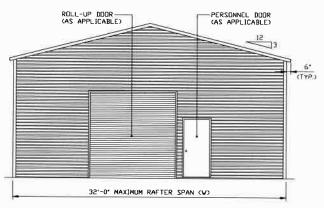
2018 NORTH CAROLINA BUILDING CODE (ADOPTS THE IBC 2015 WITH AMENDMENTS)

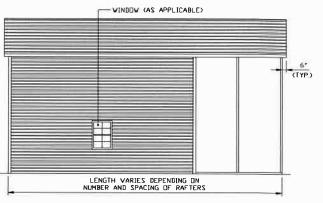
2018 SOUTH CAROLINA BUILDING CODE (ADOPTS THE IBC 2018 WITH AMENDMENTS)

BUILDING CODE 2012 OF TENNESSEE (ADOPTS THE IBC 2012 WITH AMENDMENTS)

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BOX EAVE FRAME RAFTER STRUCTURE



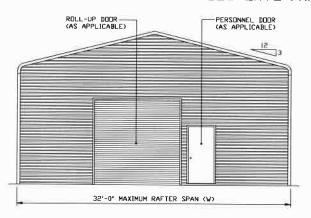


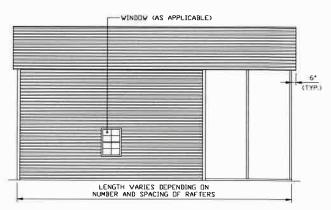
TYPICAL END ELEVATION

SCALE: NTS

TYPICAL SIDE ELEVATION SCALE: NTS

BOW EAVE FRAME RAFTER STRUCTURE

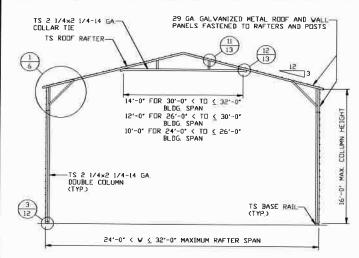




TYPICAL END ELEVATION SCALE: NTS

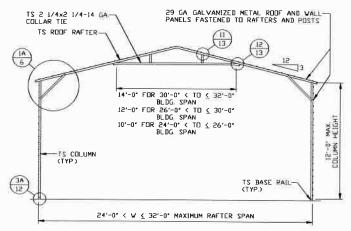
TYPICAL SIDE ELEVATION

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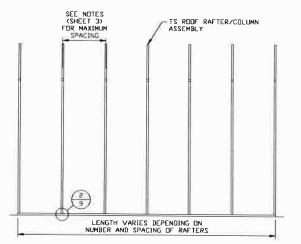
TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



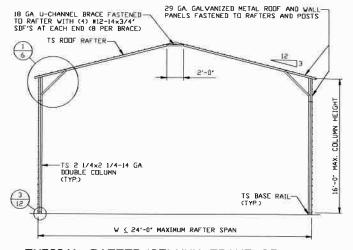
TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



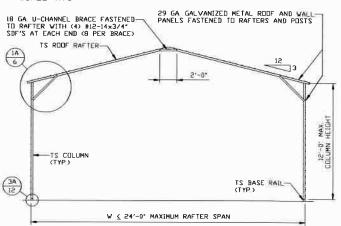
TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS

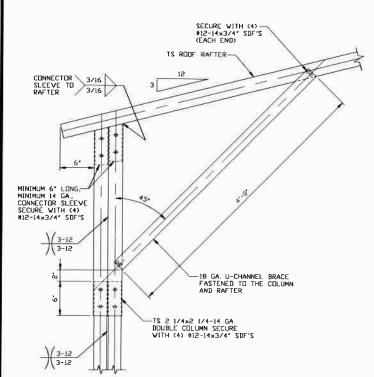


TYPICAL RAFTER/COLUMN FRAME SECTION

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BOX EAVE RAFTER/CORNER COLUMN CONNECTION DETAIL FOR HEIGHTS 12'-0" < TO ≤ 16'-0" 1 SCALE: NTS

-18 GA.: U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF RAFTER, WITH (4) #12-14x3/4* SDF'S AT EACH END (8 PER BRACE) 5 1/5.

SECURE WITH (4) #12-14x3/4' SDF'S (EACH END) TS RODF RAFTER	·
CONNECTOR 3/16 3 12	1
6-1	
MINIMUM 12" LONGT MINIMUM 14 GA CONNECTOR SLEEVE SECURE VITH (4) #12-14x3/4" SDF'S	
18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND RAFTER TS COLUMN	

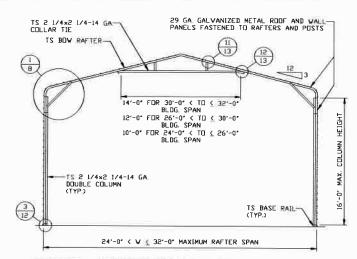
BOX EAVE RAFTER/CORNER COLUMN CONNECTION DETAIL FOR HEIGHTS ≤ 12'-0"

SCALE: NTS

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TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

TS 2 1/4×2 1/4-14 GA 29 GA GALVANIZED METAL ROOF AND VALL
COLLAR TIE PANELS FASTENCD TO RAFTERS AND POSTS

TS BOV RAFTER

14'-0' FDR 30'-0' < TO ≤ 32'-0'
BLOG SPAN

12'-0' FDR 26'-0' < TO ≤ 30'-0'
BLOG SPAN

10'-0' FDR 26'-0' < TO ≤ 26'-0'
BLOG SPAN

TS BASE RAIL

15 BASE RAIL

(TYP)

TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

24'-0" < ₩ < 32'-0" MAXIMUM RAFTER SPAN

SEE NOTES
(SHEET 3)
FOR MAXIMUM
SPACING

TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE: NTS

LENGTH VARIES DEPENDING ON NUMBER AND SPACING OF RAFTERS

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29 GA GALVANIZED METAL RODF AND VALL

10 RAFTER WITH (4) #12-14x3/4*

SDF'S AT EACH END (8 PER BRACE)

15 BOW RAFTER

12 1/4x2 1/4-14 GA

DOUBLE COLUMN

(TYP)

15 BASE RAIL

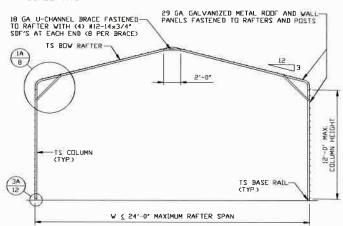
(TYP)

17 BASE RAIL

(TYP)

TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



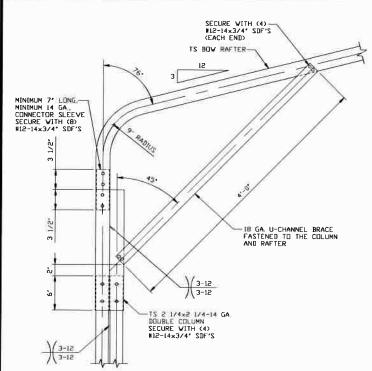
TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

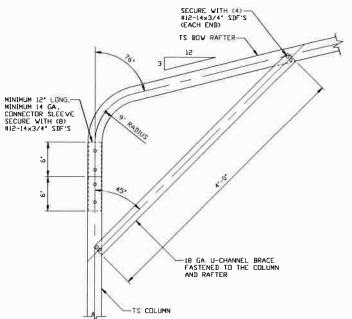
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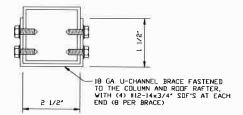
BOX EAVE RAFTER/CORNER

COLUMN CONNECTION DETAIL

BOW EAVE RAFTER/CORNER COLUMN CONNECTION DETAIL FOR HEIGHTS 12'-0' < TO < 16'-0' SCALE: NTS

(1A)

A FOR HEIGHTS & 12'-0"

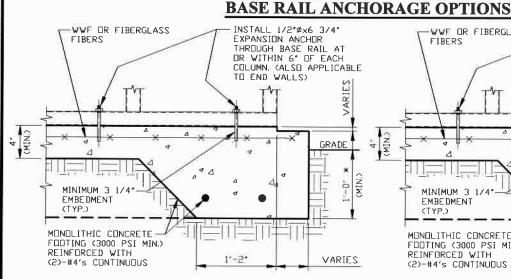


BRACE SECTION SCALE: NTS

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CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE SCALE: NTS

* 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 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 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 DR FIBERGLASS FIBER REINFORCEMENT,

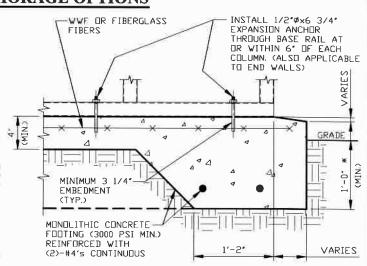
REINFORCEMENT MAY BE BENT IN THE SHOP OR THE FIELD PROVIDED:

- 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

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, VERY STIFF SILTS, AND CLAYS USE MINIMUM (2) 4' HELICES WITH MINIMUM 30 INCH EMBEDMENT OR SINGLE 6' HELIX WITH MINIMUM
- 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.



CONCRETE SLAB BASE RAIL ANCHORAGE

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

DRILL 5/8'Ø HOLE THROUGH 2" WASHERS-THE BASE RAIL AND SECURE TO ANCHOR EYE WITH 1/2 0 TOP OF ASPHALT PAVEMENT OR THROUGH BOLT GROUND SURFACE TS CONTINUOUS BASE RAIL HELIX EYE ANCHOR=

GROUND BASE HELIX ANCHORAGE

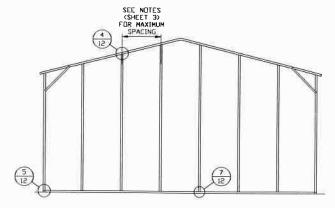
SCALE: NTS (CAN BE USED FOR ASPHALT) * COORDINATE WITH LOCAL CODES/ORD REGARDING MINIMUM FROST DEPTH REQ

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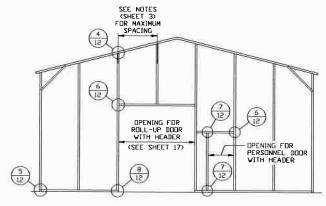
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BOX EAVE RAFTER END WALL AND SIDE WALL FRAMING SECTIONS



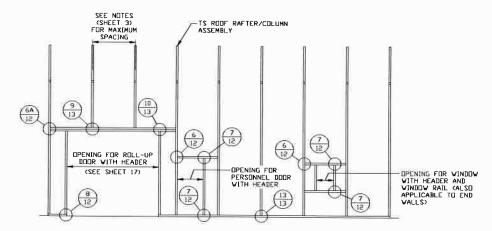
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

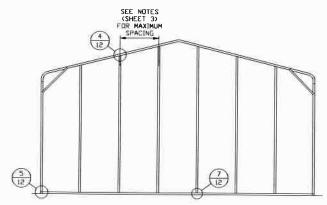
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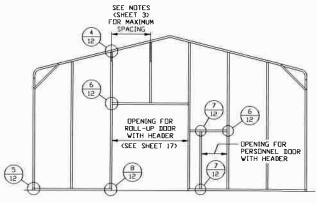
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BOW EAVE RAFTER END WALL AND SIDE WALL FRAMING SECTIONS



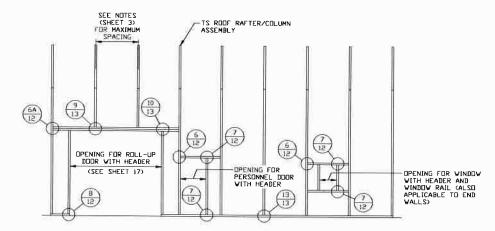
TYPICAL BOW EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOW EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



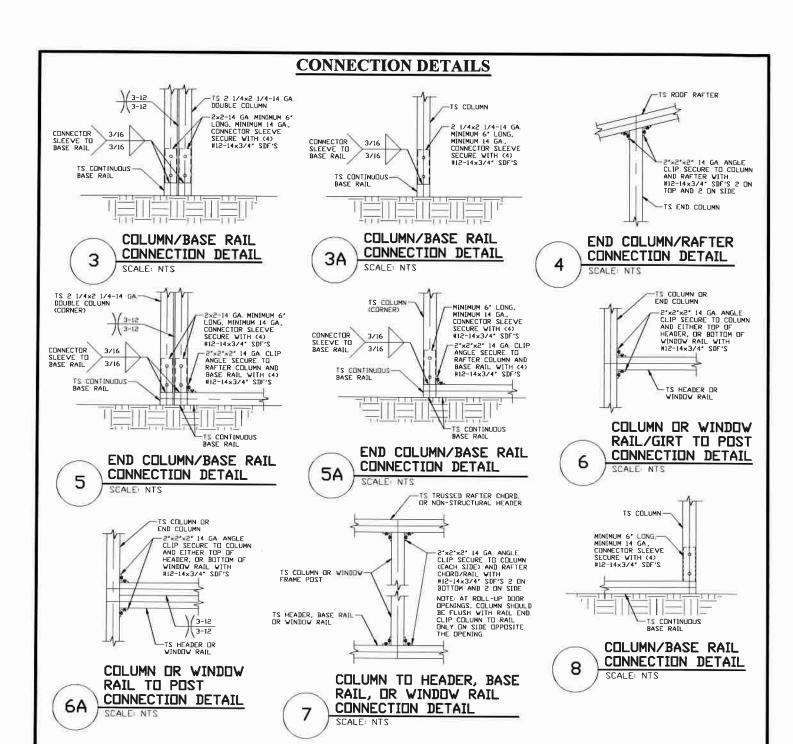
TYPICAL BOW EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

SCALE: NTS

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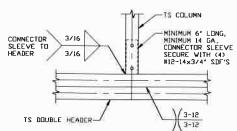
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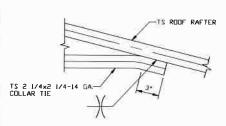


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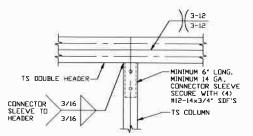
CONNECTION DETAILS



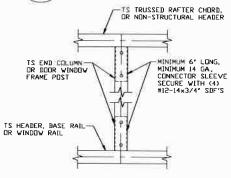




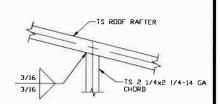
12 COLLAR TIE CONNECTION DETAIL
SCALE: NTS



10 DOUBLE HEADER/COLUMN
CONNECTION DETAIL
SCALE: NTS



COLUMN TO HEADER
OR BASE RAIL
CONNECTION DETAIL
SCALE NTS



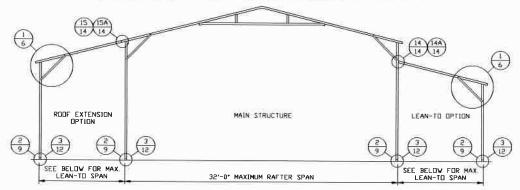
11 RAFTER TO CHORD CONNECTION DETAIL
SCALE: NTS

|--|

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PROJECT MGR: VSM	DATE: 10-1-21	SCALE: NTS	Jos	ND 21048S		
CHECKED BY: PDH		STATESVILLE, NC 28677 32'-0"x16'-0" UTILITY STRUCTURE				
DRAWN BY: LT		1841 AMITY H	ILL RI	D.		

BOX EAVE RAFTER LEAN-TO OPTIONS



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

14A

SCALE: NTS

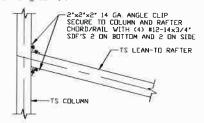
SCALE: NTS

MAXIMUM WIDTH OF SINGLE MEMBER RAFTER ROOF EXTENSION AND LEAN-TO IS 12'-0".

MAXIMUM WIDTH OF DOUBLE MEMBER RAFTER ROOF EXTENSION AND LEAN-TO IS 16'-0".

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 12'-0" < TO < 16'-0".

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMN FOR EAVE HEIGHTS < 12'-0".



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

SCALE: NTS

IZ' LONG TS I4 GA NIPPLE
SECURE RAFTER TO NIPPLE
WITH 489 MIZ-14-3/4* SUF'S

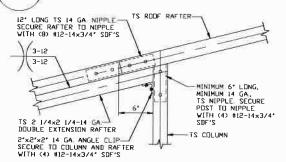
TS EXTENSION RAFTER

MINIMUM 6' LONG,
MINIMUM 14 GA,
TS NIPPLE SECURE
POST TO NIPPLE
WITH (4) MIZ-14-3/4*
SDF'S

SDF'S

14

SIDE EXTENSION RAFTER COLUMN
DETAIL FOR SPANS & 12'-0"



SIDE EXTENSION RAFTER COLUMN
DETAIL FOR SPANS 12'-0' < TO < 16'-0'
SCALE: NTS

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2'x2'x2' 14 GA, ANGLE CLIP SECURE TO COLUMN AND RAFTER CHORD/RAIL WITH (4) #12-14x3/4' SDF'S 2 ON BOTTOM AND 2 ON SIDE

TS COLUMN

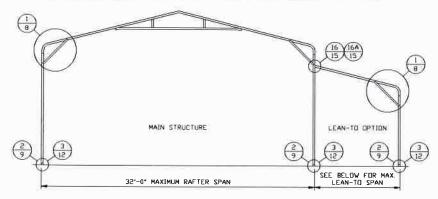
LEAN-TO RAFTER TO RAFTER

COLUMN CONNECTION DETAIL FOR

RAFTER SPANS 12'-0" < TO < 16'-0"

TS 2 1/4×2 1/4-14 GA DOUBLE LEAN-TO RAFTER

BOW EAVE RAFTER LEAN-TO OPTIONS



TYPICAL BOW EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION

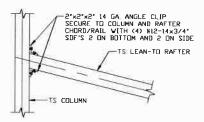
SCALE: NTS

MAXIMUM WIDTH OF SINGLE MEMBER RAFTER ROOF EXTENSION AND LEAN-TO IS 12'-0'.

MAXIMUM WIDTH OF DOUBLE MEMBER RAFTER ROOF EXTENSION AND LEAN-TO IS 16'-0'.

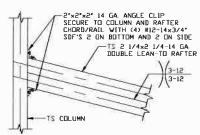
MAIN BUILDING COLUMNS WITH LEAN-TO DR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 12'-0' < TO \(\lefta \) 16'-0'.

MAIN BUILDING COLUMNS WITH LEAN-TO DR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMN FOR EAVE HEIGHTS \(\lefta \) 12'-0'.



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

16

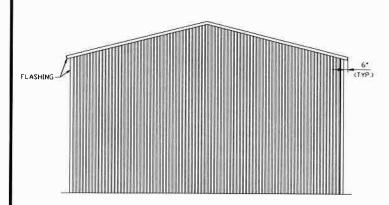


LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 12'-0" < T□ < 16'-0"

16A SCALE: NTS

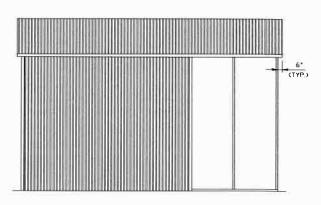
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	PROJECT MGR: VSM	DATE: 10-1-21	I	JEB ND 21048S		

BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION

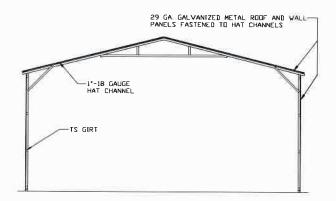


TYPICAL END ELEVATION VERTICAL ROOF/SIDING

SCALE: NTS

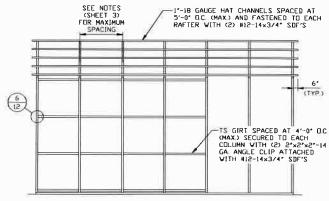


TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING



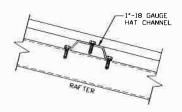
TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

SCALE: NTS



TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

SCALE: NTS



PANEL ATTACHMENT

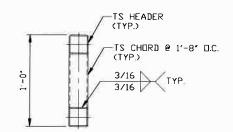
(ALTERNATE	FOR	VERTICAL	ROOF	PANELS>
SCALE: NTS				

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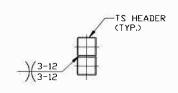
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CHECKED BY: PDH	STATESVILLE, NC 28677 32'-0"x16'-0" UTILITY STRUCTURE			
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CLIENT: STEELCRAFT	SHT. 16	DWG. ND SK-2		REV. 0

SIDE WALL HEADER OPTIONS



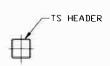
HEADER DETAIL FOR SIDE WALL DOOR OPENINGS 14'-0' < LENGTH \(\) 16'-0'

SCALE: NTS



HEADER DETAIL FOR SIDE WALL DOOR OPENINGS 8'-0' < LENGTH \(\) 14'-0'

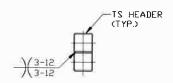
SCALE: NTS



HEADER DETAIL FOR SIDE WALL DOOR OPENINGS & 8'-0'

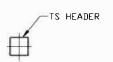
SCALE: NTS

END WALL HEADER OPTIONS



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

SCALE: NTS



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

SCALE: NTS

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