

STRUCTURAL DESIGN

STANDARD PACKAGE ENCLOSED BUILDING

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

5 February 2018 Revision 0 M&A Project No. 17259S

Prepared for:

5-Star Metal Structures 9283 US 601 Dobson, NC 27017

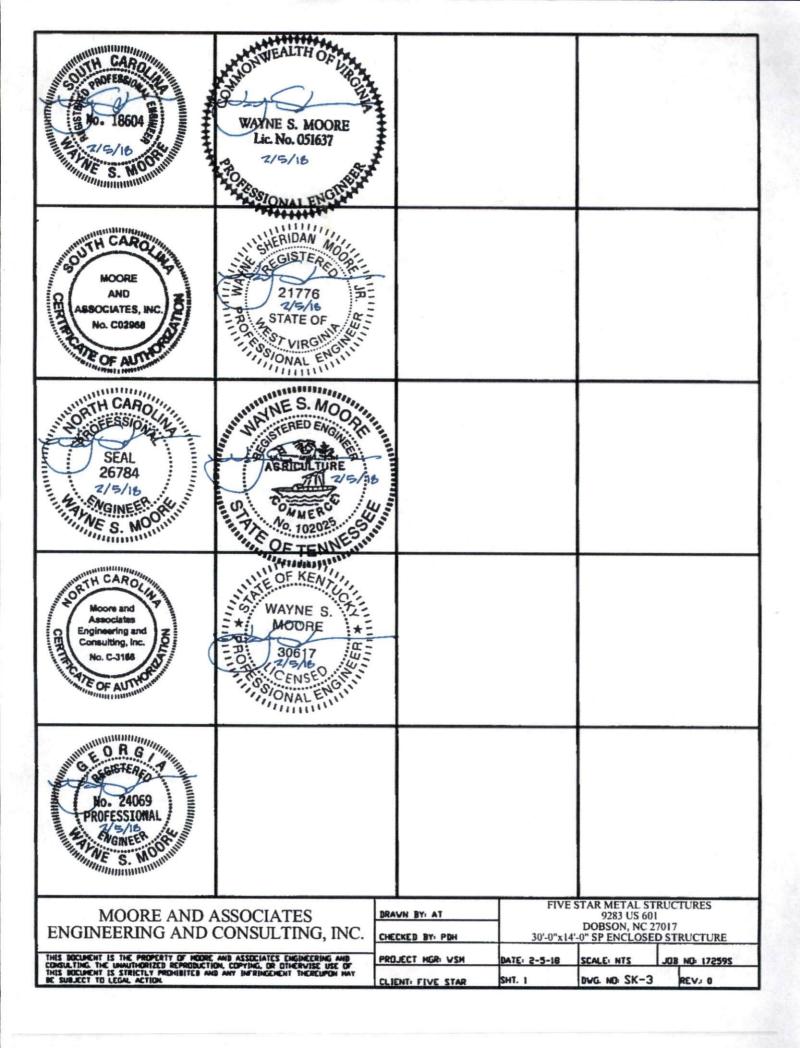
Prepared by:

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1009 East Avenue North Augusta, SC 29841

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INSTALLATION NOTES AND SPECIFICATIONS

- 1 DESIGN IS FOR MAXIMUM 30'-0' WIDE x 14'-0' EAVE HEIGHT ENCLOSED STRUCTURES
- 2 DESIGN WAS DONE IN ACCORDANCE WITH THE 2012 NORTH CAROLINA BUILDING CODE, 2009 INTERNATIONAL BUILDING CODE (IBC), 2012 IBC AND THE 2015 IBC
- 3 DESIGN LOADS ARE AS FOLLOWS

A) DEAD LOAD

- = 15 PSF
- B) LIVE LOAD
- = 12 PSF
- C) GROUND SNOW LOAD = 35 PSF
- 4 3-SECOND GUST ULTIMATE WIND SPEED (VULT) 105 TO 145 MPH (NOMINAL WIND SPEED 81 TO 112 MPH).
- 5 MAXIMUM RAFTER/POST SPACING = 5.0 FEET (W & 24'-0") AND SPACING = 40 FEET (24'-0" (W & 30'-0") (UNLESS NOTED DTHERWISE)
- 6 END POST SPACING = 5.0 FEET
- 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
- 10 AVERAGE FASTENER SPACING DN-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 10° D.C (MAX)
- 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 20 FEET OR LESS, AND ROOF SLOPES OF 14" (3:12 PITCH) OR LESS SPACING
 REQUIREMENTS FOR OTHER ROOF HEIGHTS AND/OR SLOPES MAY VARY.
- 12 GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH RAFTER COLUMN ALONG SIDES AND ENDS
- 13. GROUND ANCHORS CONSIST OF #4 REBAR W/ WELDED NUT x 36" LONG IN SUITABLE SOIL CONDITIONS. DPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED.
- 14 WIND FORCES GOVERN OVER SEISMIC FORCES SEISMIC PARAMETERS ANALYZED ARE

SDIL SITE CLASS = D RISK CATEGORY 1/11/111

R= 325

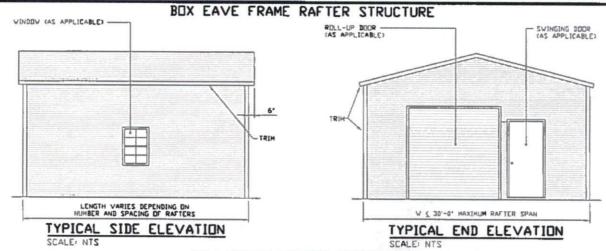
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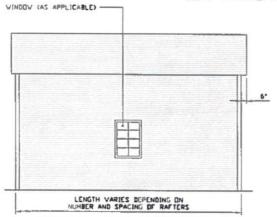
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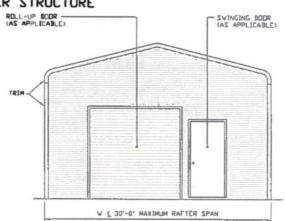
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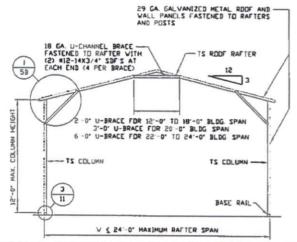


TYPICAL SIDE ELEVATION



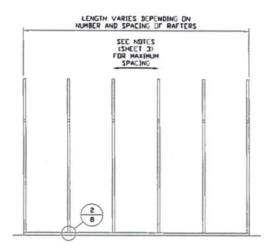
TYPICAL END ELEVATION

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TYPICAL RAFTER/COLUMN END FRAME SECTION

TYPICAL RAFTER/COLUMN END FRAME SECTION

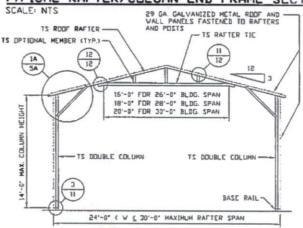


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

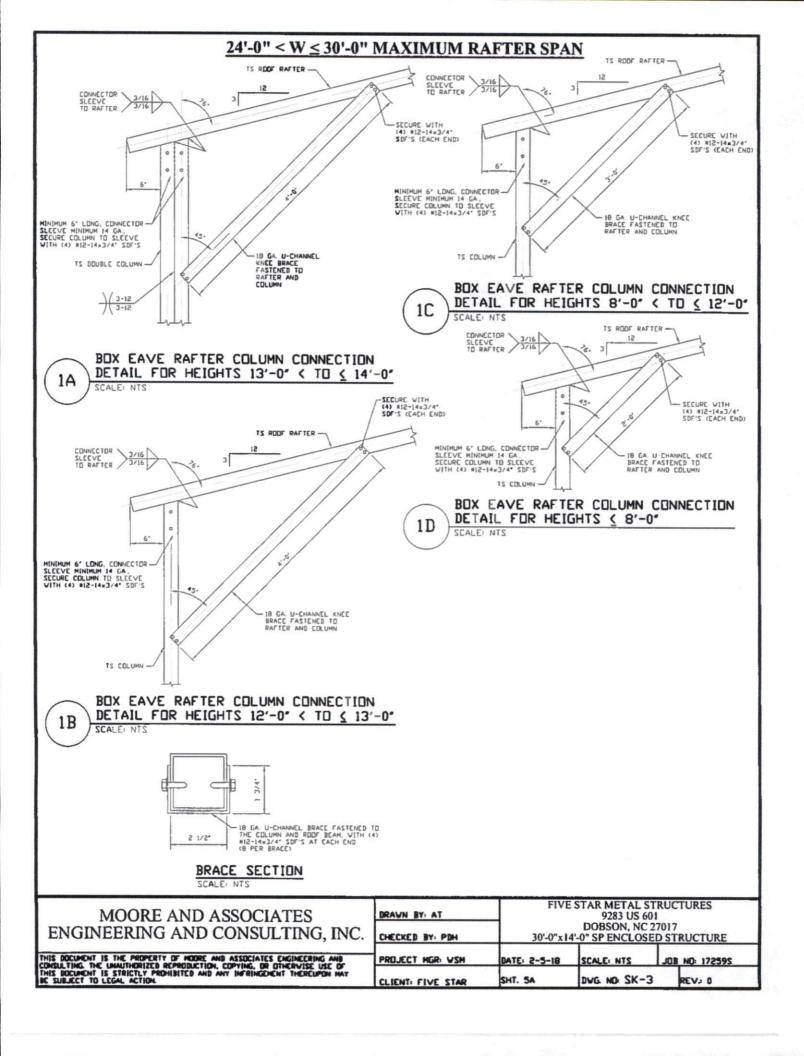
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29 GA. GALVANIZED METAL ROOF AND VALL PANELS FASTENED TO RAFTERS AND POSTS TS ROOF RAFTER TS RAFTER TIE TS OPTIONAL MEMBER (TYP.) 12 12 5A]3 16'-0" FOR 26'-0" BLDG. 18'-0" FOR 28'-0" BLDG. SPAN COLUMN HEIGHT 20'-0' FOR 30'-0' BLOG. SPAN TS COLUMN TS COLUMN -MAX. 11 BASE RAIL 24'-0' C V & 30'-0' HAXIHUM RAFTER SPAN

TYPICAL RAFTER/COLUMN END FRAME SECTION

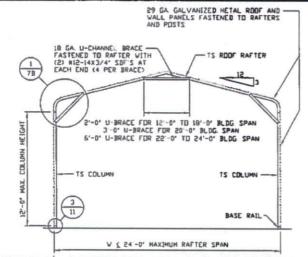


TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE NTS

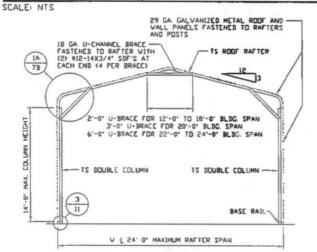


W ≤ 24'-0" MAXIMUM RAFTER SPAN TS ROOF RAFTER -CONNECTOR 3/16 SLEEVE TO RAFTER 3/16 SECURE VITH (4) #12-14×3/4* SDF'S (EACH END) TS ROOF RAFTER CONNECTOR SLEEVE TO RAFTER 3/16 MINIMUM 6' LONG, CONNECTOR-SLEEVE MINIMUM 14 GA. SECURE COLUMN TO SLEEVE VITH (4) #12-14x3/4' SDF'S SECURE VITH (4) #12-14x3/4* SDF'S (EACH END) -18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN TS DOUBLE COLUMN MINIMUM 6" LDNG, CDNNECTOR SLEEVE MINIMUM 14 GA. SECURE CDLUMN TD SLEEVE VITH (4) M12-14x3/4" SDF'S IB GA. U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN TS COLUMN BOX EAVE RAFTER COLUMN BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR CONNECTION DETAIL FOR HEIGHTS 12'-0" < TO < 14'-0" HEIGHTS < 8'-0" 10 1A SCALE: NTS SCALE: NTS TS ROOF RAFTER -CONNECTOR \ SLEEVE TO RAFTER / 12 SECURE VITH (4) #12-14×3/4" SDF'S (EACH END) MINIMUM 6" LDNG, EDNNECTOR SLEEVE MINIMUM 14 GA., SECURE COLUMN TO SLEEVE VITH (4) BIZ-14x3/4" SDF'S - 18 GA. U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN TS COLUMN BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 8'-0" < T□ < 12'-0" 1B SCALE: NTS 3/4 18 GA. U-CHANNEL BRACE FASTENED TO THE COLUMN AND RODF BEAM, WITH (4) B12-14×3/4' SDF'S AT EACH END (8 PER BRACE) BRACE SECTION SCALE: NTS FIVE STAR METAL STRUCTURES

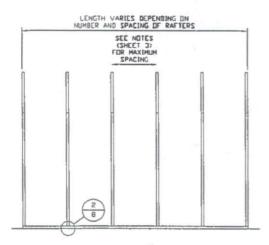
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TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS



TYPICAL RAFTER/COLUMN FRAMING SIDE SECTION SCALE: NTS

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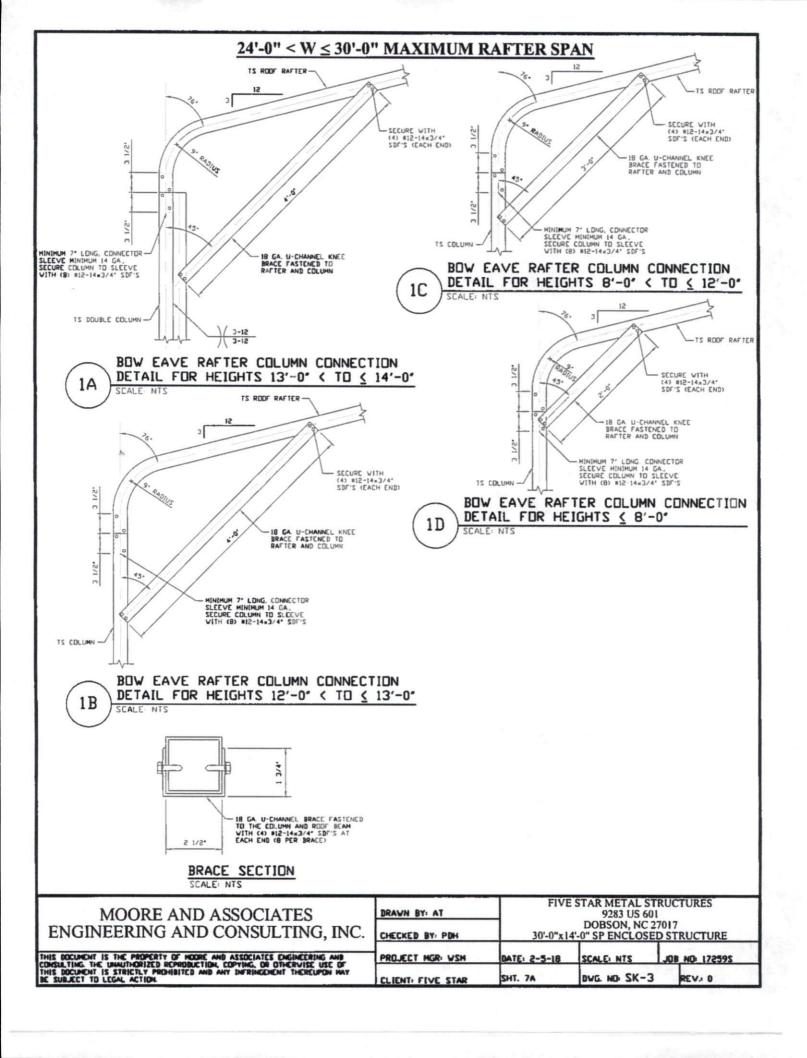
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TYPICAL RAFTER/COLUMN END FRAME SECTION

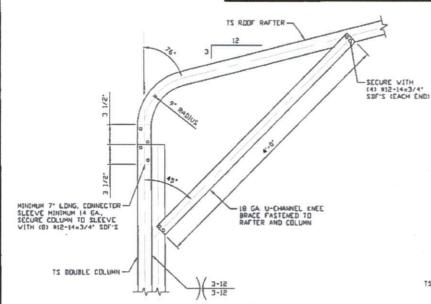
GA. GALVANIZED METAL ROOF AND -
LL PANELS FASTENED TO RAFTERS
TIS RAFTER TIE
(11)
18
3
26'-0' BLDG SPAN
28"-0" BLDG. SPAN
30-0 31-31
1
75 DOUBLE COLUMN
BASE RAIL
O' MAXIMUM RAFTER SPAN
IMN FUD FRAME SECTION

RAFTER/CULUMN END FRAME SECTION

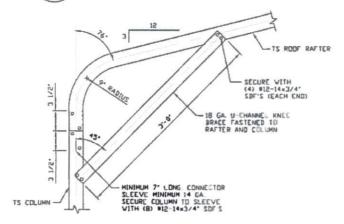
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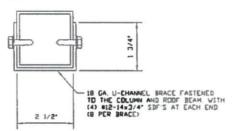
W ≤ 24'-0" MAXIMUM RAFTER SPAN



BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 12'-0' < T□ < 14'-0" 1A SCALE: NTS



BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 8-0° < TO € 12'-0° SCALE NTS



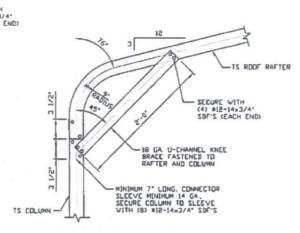
BRACE SECTION SCALE: NTS

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1B

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BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS ≤ 8'-0" 1C

SCALE: NTS

BASE RAIL ANCHORAGE OPTIONS WWF DR FIBERGLASS WWF DR FIBERGLASS FIBERS INSTALL 1/2°x6 3/4° FIBERS INSTALL 1/2'x6 3/4" EXPANSION ANCHOR THROUGH BASE RAIL WITHIN 6° DF EACH EXPANSION ANCHOR THROUGH BASE RAIL WITHIN 6' OF EACH COLUMN (ALSO APPLICABLE COLUMN (ALSO APPLICABLE TO END WALLS) TO END WALLS) GRADE GRADE CMIM CMIN.) 1,-0" MINIMUM 3 1/4" -MINIMUM 3 1/4" -EMBEDMENT (TYP.) EMBEDMENT (TYP) MONDLITHIC CONCRETE FOOTING MONOLITHIC CONCRETE FOOTING (3000 PSI MIN.) REINFORCED (3000 PSI MIN.) REINFORCED 1'-0' VARIES. 1'-0' VARIES WITH (2)-#4's CONTINUOUS

2B

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHURAGE

MINIMUM ANCHOR EDGE DISTANCE IS 4"

* COORDINATE WITH LOCAL BUILDING CODE AND/OR BUILDING OFFICIAL REGARDING REQUIRED FOOTING DEPTH.

GENERAL NOTES

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 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:

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, PRELDADED 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 LODSE 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.

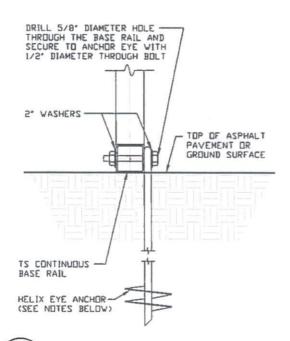
CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS MINIMUM ANCHOR EDGE DISTANCE IS 4".

* CODRDINATE WITH LOCAL BUILDING CODE AND/OR BUILDING OFFICIAL REGARDING REQUIRED FOOTING DEPTH.

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BASE RAIL ANCHORAGE OPTIONS



GROUND BASE HELIX ANCHORAGE

(CAN BE USED FOR ASPHALT)

20

SCALE NTS

BRILL 5/8' DIAMETER
HDLE THROUGH THE BASE
RAIL AND SECURE TO
ANCHOR EYE WITH 1/2'
DIAMETER THROUGH BOLT

TOP OF ASPHALT
PAVEMENT OR
GROUND SURFACE

TS CONTINUOUS
BASE RAIL

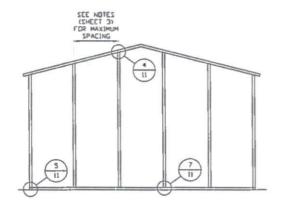
2D ASPHALT BASE ANCHORAGE

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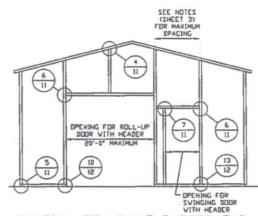
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



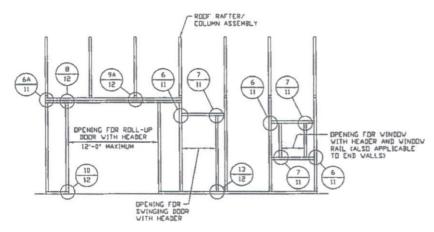
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS

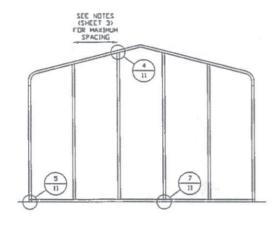


TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

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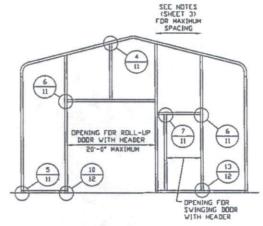
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BOW RAFTER END WALL AND SIDE WALL OPENINGS



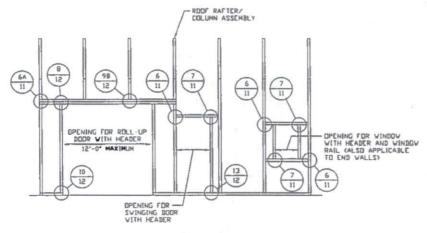
TYPICAL BOW RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOW RAFTER END WALL OPENINGS FRAMING SECTION

SCALE NTS

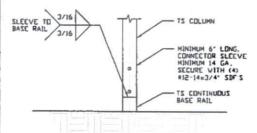


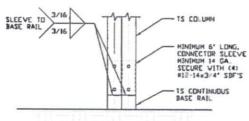
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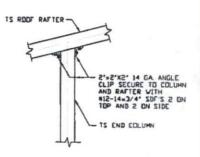
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CONNECTION DETAILS



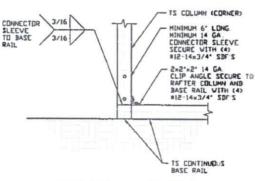


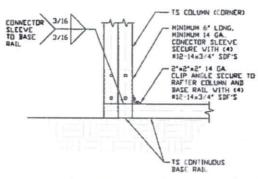


RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE NTS

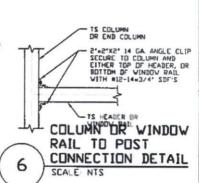
3A SCALE NTS

4 CONNECTION DETAIL
SCALE NTS





END COLUMN/BASE RAIL



END COLUMN/BASE RAIL CONNECTION DETAIL

5A CONNECTION DETAIL

O MINIMUM 6' LUNG
MINIMUM 6' LUNG
MINIMUM 14 GA.
CUNNECTOR SLEEVE
SECURE VITH
(4) #12-14#J/4' SDF'S

15 HEADER DR
VINDOV RAIL

3/16

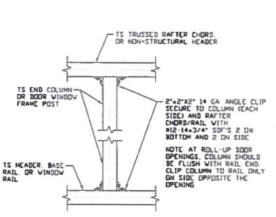
CUNNECTOR
SLEEVE
17 HEADER DR
VINDOV RAIL

3/16

CUNNECTOR
SLEEVE
17 HEADER DR
VINDOV RAIL

17 HEADER

6A



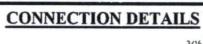
COLUMN OR WINDOW RAIL TO POST CONNECTION DETAIL SCALE: NTS

COLUMN TO WINDOW RAIL
CONNECTION DETAIL
SCALE NTS

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·.	CHECKED BY: PDH		STAR METAL: 9283 US (DOBSON, NO 4'-0" SP ENCLOS	01 27017		
	PROJECT MGR: VSM	DATE: 2-5-18	SCALE: NTS	JOI	ND: 17259S	
	CLIENT: FIVE STAR	SHT. 11	DVG. NO. SK-3		REV. D	



CONNECTOR 3/16
SLEEVE
TO HEADER 3/16

TS ROOF RAFTER

7" TS COLUMN

DOUBLE TS HEADER

COLUMN/DOUBLE HEADER

COLUMN/BASE RAIL

CONNECTION DETAIL

SCALE NTS

CONNECTION DETAIL

SCALE NTS

3/16

CONNECTOR SLEEVE

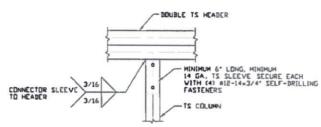
10

MINIMUM 6" LDNG, MINIMUM 14 GA., TS SLEEVE. SECURE VITH (4) #12-14x3/4" SELF-DRILLING FASTENERS

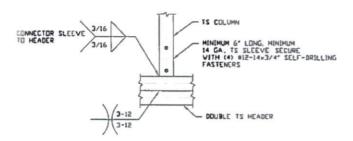
TS COLUMN

MINIMUM 6' LONG, MINIMUM 14 GA, CONNECTOR SLEEVE SECURE EACH WITH (4) #12-14×3/4' SELF-DRILLING FASTENERS

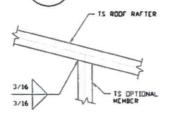
TS CONTINUOUS BASE RAIL



DOUBLE HEADER/COLUMN CONNECTION DETAIL 8



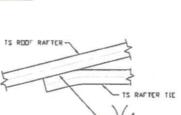
COLUMN/DOUBLE HEADER CONNECTION DETAIL SCALE: NTS



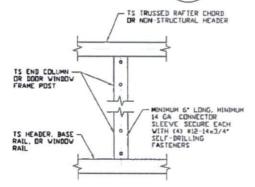
9B

11

RAFTER TO OPTIONAL MEMBER CONNECTION DETAIL



RAFTER TIE CONNECTION DETAIL



COLUMN TO HEADER OR BASE RAIL CONNECTION DETAIL SCALE NTS

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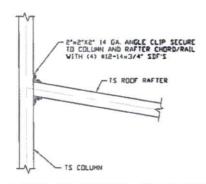
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13

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CHECKED BY: PBH	DOBSON, NC 27017 30'-0"x14'-0" SP ENCLOSED STRUCTURE					
PROJECT MGR: VSM	DATE: 2-5-18	2-5-18 SCALE: NTS JOB NO 1				
CLIENT: FIVE STAR	SHT. 12	DVG. NO SK-	REV. 0			

BOX EAVE RAFTER LEAN-TO OPTIONS 13 13 ROOF EXTENSION DETION MAIN STRUCTURE EAN-TO OPTION 3 5 11 11 (3) 8 8 TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN) TS ROOF RAFTER MAIN BUILDING 12' LONG CONNECTOR SLEEVE 14 GA SECURE RAFTER 10 CONNECTOR SLEEVE VITH (8) #12-14x3/4' SDF'S HINIHUM 6' LDNG, HINIHUM 14 GA, CDNNECTOR SLEEVE SECURE COLUMN TO CDNNECTOR SLEEVE VITH (4) #2-14*3/4 SDF'S TS EXTENSION 18 GA U-CHANNEL BRACE TS CD.UMN SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS & 12'-0' 14A CONNECTOR 3/16 SLEEVE TO RAFTER 3/16 3/16 12" LONG CONNECTOR SLEEVE 14 GA. SECURE RAFTER TO CONNECTOR SLEEVE WITH (8) 812-14x3/4" SDF'S HINIMUM 6' LONG, HINIMUM 14 GA CONNECTOR SLEEVE SECURE COLUMN TO CONNECTOR SLEEVE WITH (4) BIZ-14x3/4"SDF"S TS DOUBLE EXTENSION RAFTER 18 GA U-CHANNEL BRACE 2"x2"x2" 14 GA. ANGLE CLIP SECURE TO COLUMN AND RAFTER CHORD/RAIL VITH (4) #12-14x3/4" SDF'S TS COLUMN SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS 12'-0' < L \(\) 18'-0" 14B SCALE: NTS FIVE STAR METAL STRUCTURES MOORE AND ASSOCIATES DRAWN BY: AT 9283 US 601 DOBSON, NC 27017 ENGINEERING AND CONSULTING, INC. CHECKED BY: PDH 30'-0"x14'-0" SP ENCLOSED STRUCTURE THIS DOCUMENT IS THE PROPERTY OF MODRE AND ASSOCIATES ENGINEERING AND COMMUNITIES. THE UNAUTHORIZED REPODDUCTION, COPYING, OR DTHERVISE USE OF THIS DOCUMENT IS STRICTLY PROHIBITED AND ANY INFRINGEMENT THEREUPON MAY BE SUBJECT TO LEGAL ACTION. PROJECT MGR: WSM DATE: 2-5-18 SCALE: NTS JOB NO: 172595 DVG. NO: SK-3 SHT. 13 REV. 0 CLIENT: FIVE STAR

BOX EAVE RAFTER LEAN-TO OPTIONS



LEAN-TO RAFTER TO RAFTER
COLUMN CONNECTION DETAIL
FOR RAFTER SPANS (12'-0'
SCALE: NTS

2'x2'x2' 14 GA. ANGLE CLIP SECURE
TO COLUMN AND RAFTER CHORD/RAIL
VITH (4) \$12-14x3/4' SDF'S

TS DOUBLE ROOF RAFTER

13-12

73-12

TS COLUMN

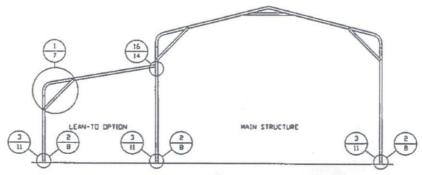
LEAN-TO RAFTER TO RAFTER
COLUMN CONNECTION DETAIL
FOR RAFTER SPANS 12'-0" < L < 18'-0"

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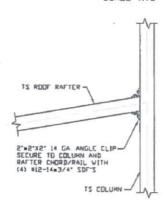
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PROJECT HGR: VSH	DATE: 2-5-18	SCALE: NTS	ەر ا	B ND: 172595
CLIENT: FIVE STAR	SHT. 13A	DVG. NO: SK-	3	REV. 0

BOW RAFTER LEAN-TO OPTION

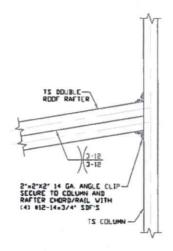


TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION



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

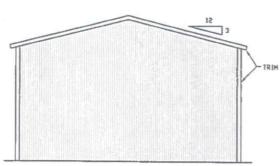
16A



LEAN-TO RAFTER TO RAFTER
COLUMN CONNECTION DETAIL
FOR RAFTER SPANS 12'-0' < L < 18'-0'

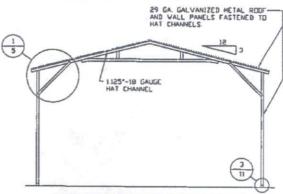
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BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION

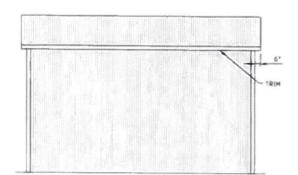


TYPICAL END ELEVATION VERTICAL ROOF/SIDING

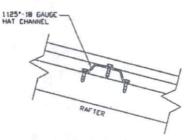
SCALE: NTS



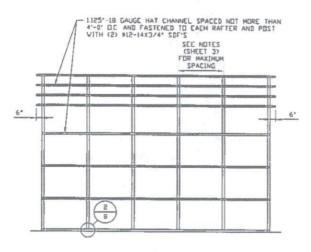
TYPICAL SECTION VERTICAL ROOF/SIDING OPTION



TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING



PANEL ATTACHMENT
(ALTERNATE FOR VERTICAL ROOF PANELS) SCALE NTS



TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION SCALE NTS

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1	CLIENT: FIVE STAR	SHT. 15	DVG. NO: SK-	3	REV. 0		