



STRUCTURAL DESIGN

ENCLOSED BUILDING

EXPOSURE B

**MAXIMUM 30'-0" WIDE X 20'-0" EAVE HEIGHT- BOX EAVE
FRAME AND BOW FRAME**

29 July 2021

Revision 6

M&A Project No. 16022S/17300S/20352S

Prepared for:

Tubular Building Systems, LLC
631 SE Industrial Circle
Lake City, Florida 32025

Prepared by:

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

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Mount Airy, NC 27030



**Wayne
S Moore**

Digitally signed
by Wayne S
Moore

Date: 2021.10.21
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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG		TUBULAR BUILDING SYSTEMS 30'-0"x20'-0" ENCLOSED BUILDING EXP. B PE SEAL COVER SHEET	
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	CLIENT: TBS	SHT. 1	DWG. NO: SK-3	REV: 6

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**TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE
LAKE CITY, FLORIDA 32025
30'-0" x 20'-0" ENCLOSED BUILDING EXP. B**

DATE: 7-29-21

SCALE: NTS

**JOB NO: 16022S/
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SHT. 2

DWG. NO: SK-3

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INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR A MAXIMUM 30'-0" WIDE x 20'-0" EAVE HEIGHT ENCLOSED STRUCTURES
2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2020 FLORIDA BUILDING CODE (FBC) 7TH EDITION, 2012 INTERNATIONAL BUILDING CODE (IBC), 2015 IBC, AND 2018 IBC
3. DESIGN LOADS ARE AS FOLLOWS:
 - A) DEAD LOAD = 15 PSF
 - B) LIVE LOAD = 12 PSF
 - C) GROUND SNOW LOAD = 10 PSF
4. LOW ULTIMATE WIND SPEED 105 TO 140 MPH (NOMINAL WIND SPEED 81 TO 108 MPH) MAXIMUM RAFTER/POST AND END POST SPACING = 5.0 FEET
5. HIGH ULTIMATE WIND SPEED 141 TO 170 MPH (NOMINAL WIND SPEED 109 TO 132 MPH) MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET
6. END WALL 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. FOR VERTICAL PANELS, 29 GAUGE METAL PANELS SHALL BE FASTENED TO 18 GAUGE HAT CHANNELS (UNLESS OTHERWISE NOTED)
10. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS INTERIOR = 9" OR END = 6" (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. ROOF SLOPES LESS THAN 3:12 REQUIRE USE OF JOINT SEALANT
12. STANDARD ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 5" OF EACH COLUMN
13. STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/WELDED NUT x 30" LONG IN SUITABLE SOIL CONDITIONS MAY BE USED FOR LOW (< 108 MPH NOMINAL) WIND SPEEDS ONLY. 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

$R = 3.25$ $I_s = 1.0$
 $S_{DS} = 1.522 g$ $V = 0.5W$
 $S_{DI} = 0.839 g$



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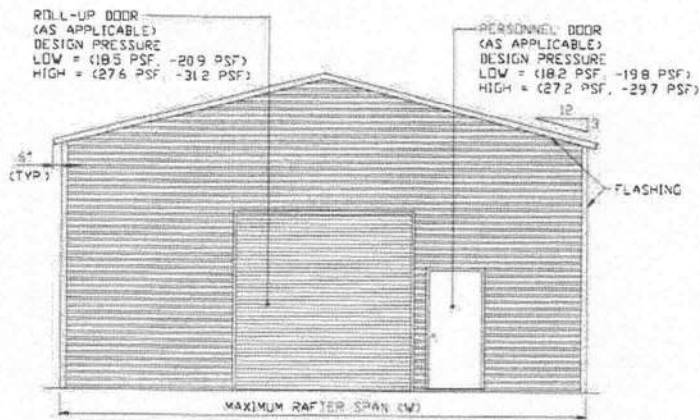
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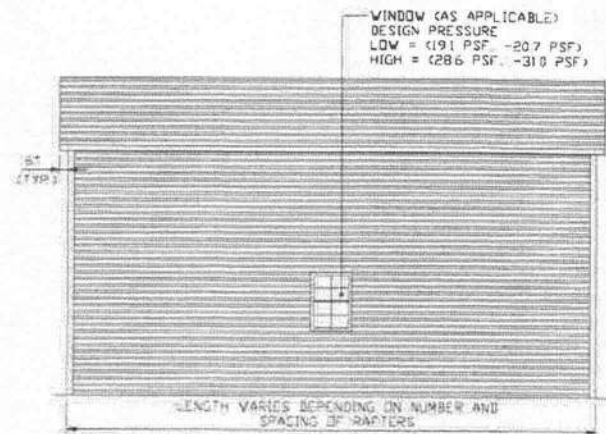
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BOX EAVE FRAME RAFTER ENCLOSED BUILDING



TYPICAL END ELEVATION

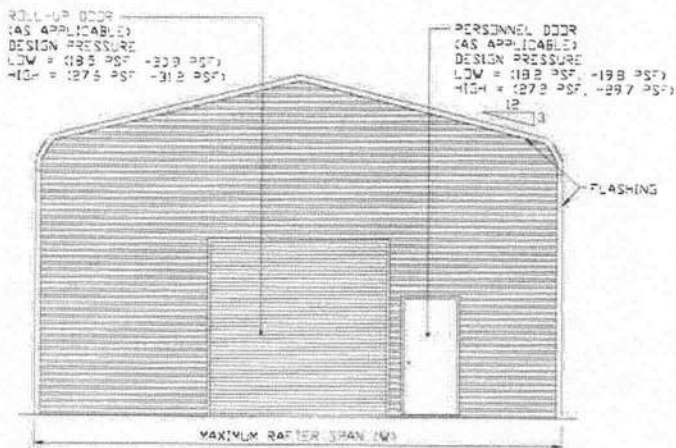
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TYPICAL SIDE ELEVATION

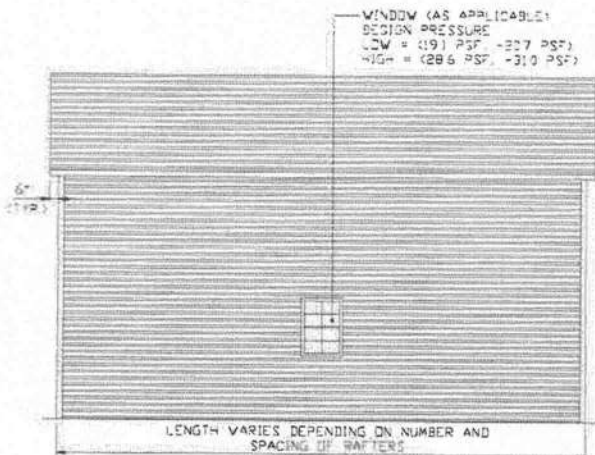
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BOW FRAME RAFTER ENCLOSED BUILDING



TYPICAL END ELEVATION

SCALE: NTS



TYPICAL SIDE ELEVATION

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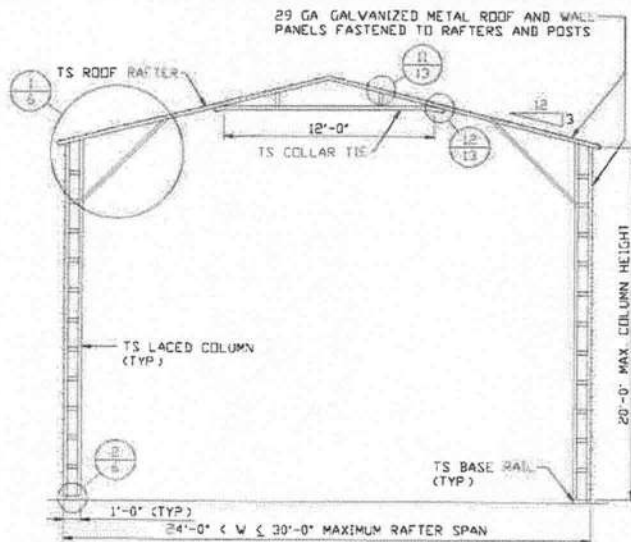
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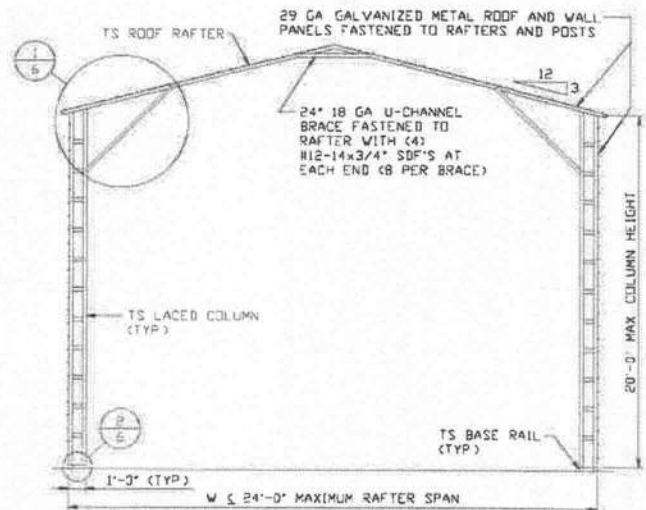
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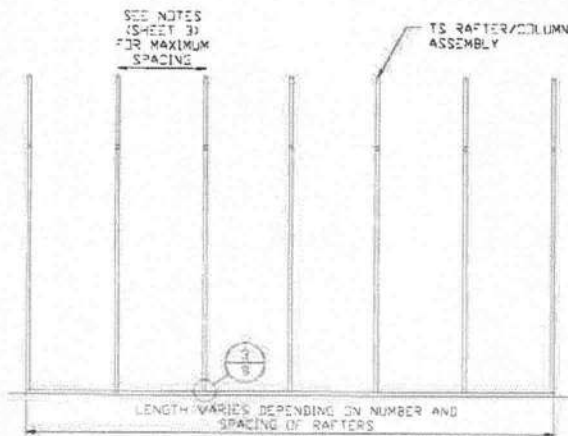
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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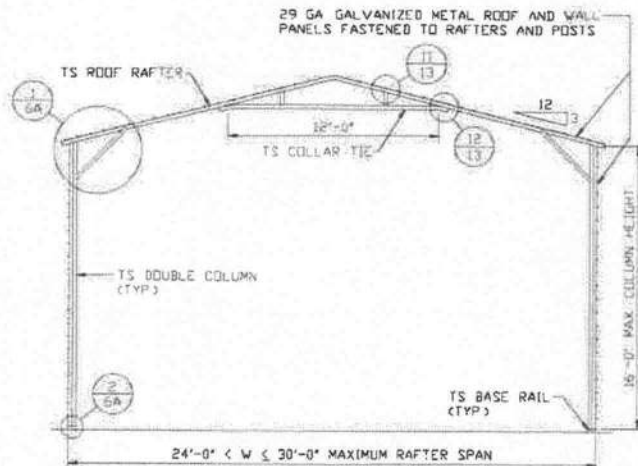
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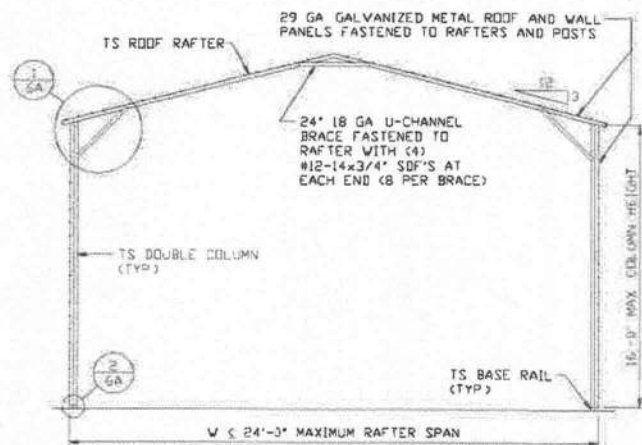
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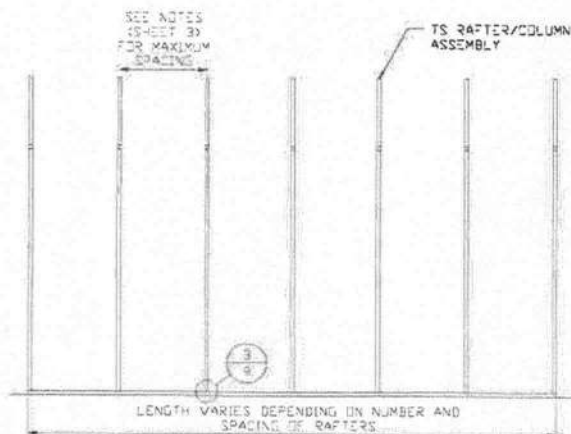
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE NTS



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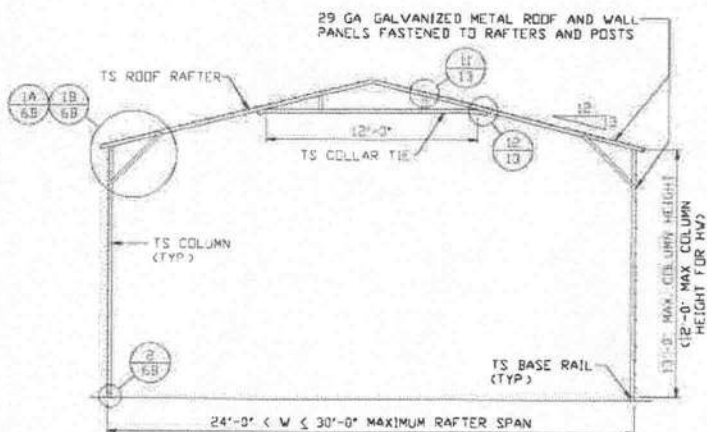
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SHT. 5A

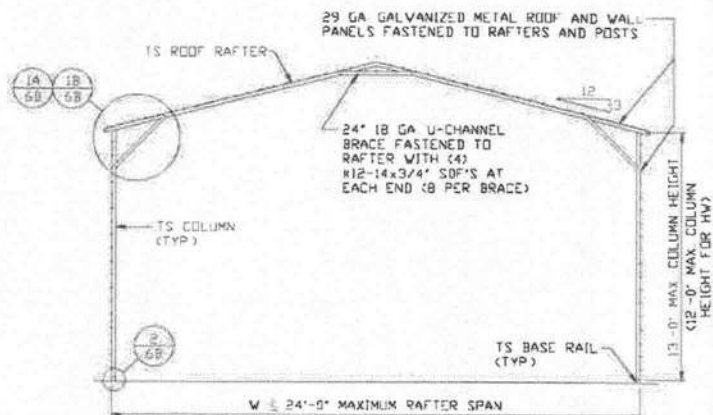
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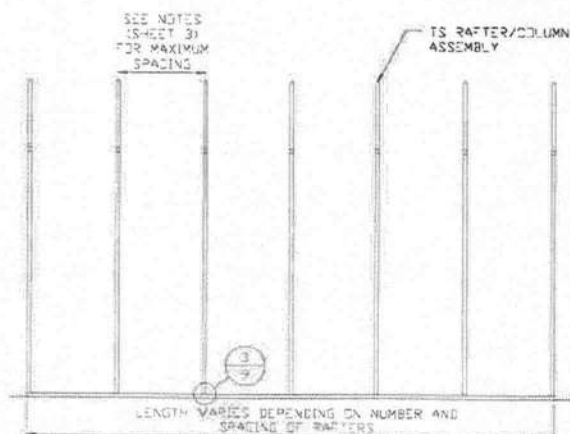
TYPICAL RAFTER/COLUMN END FRAME SECTION

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SHT. 5B

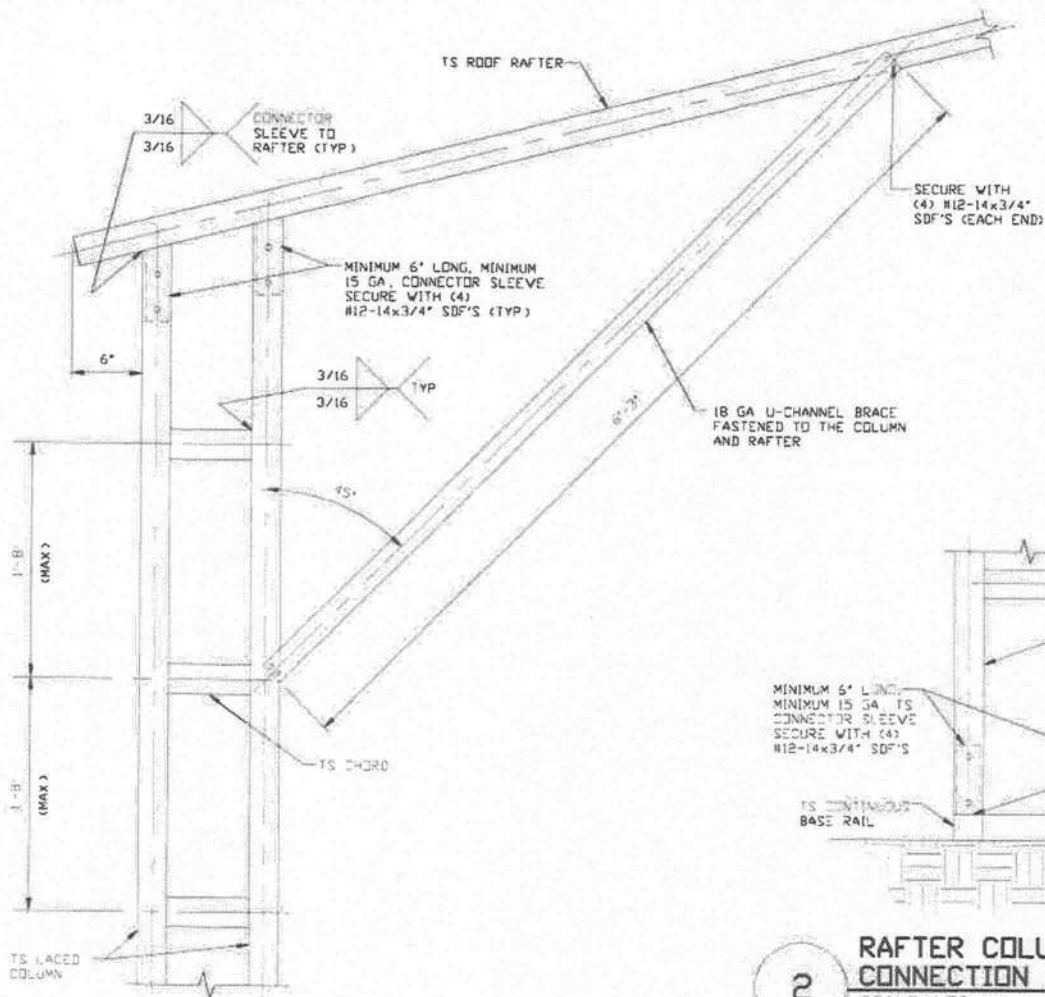
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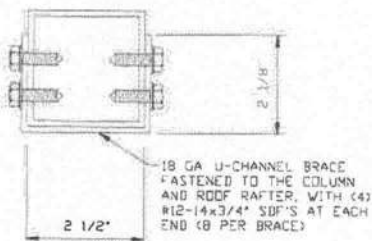
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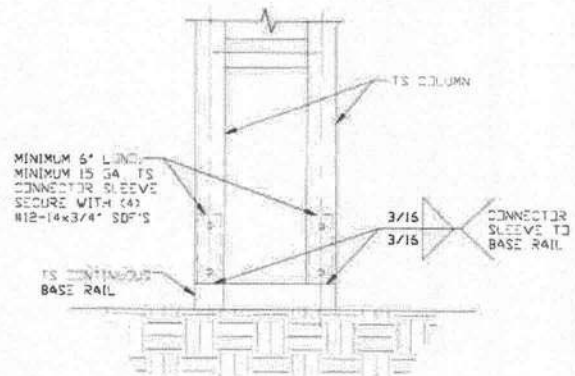
1 BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 16'-0" < TO ≤ 20'-0"

SCALE: NTS



BRACE SECTION

SCALE: NTS



2 RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL

SCALE: NTS



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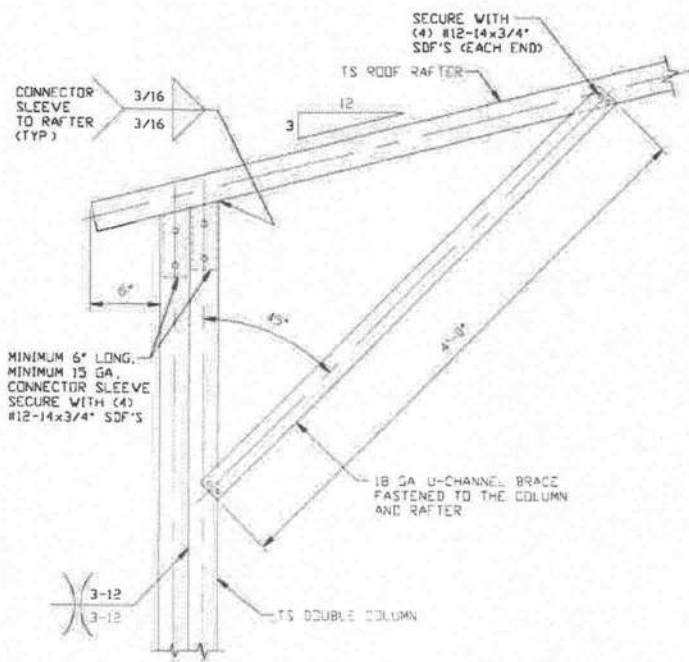
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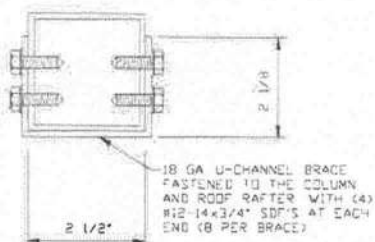


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BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 13'-0" < TO ≤ 16'-0"

SCALE: NTS

NOTE: COLUMN HEIGHTS 12'-3" < TO ≤ 15'-3" FOR HIGH WIND



2 RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS

BRACE SECTION

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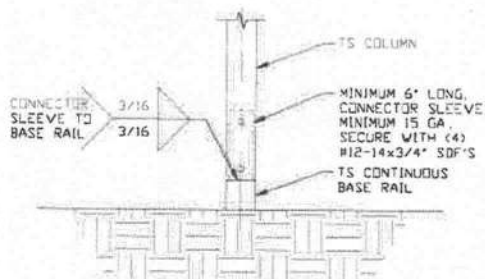
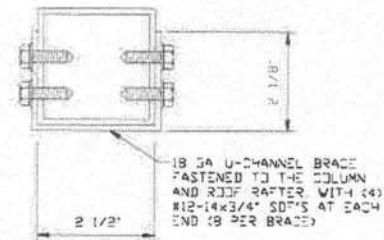
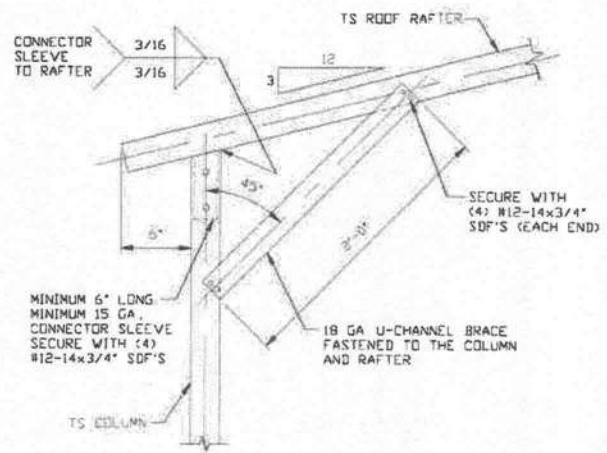
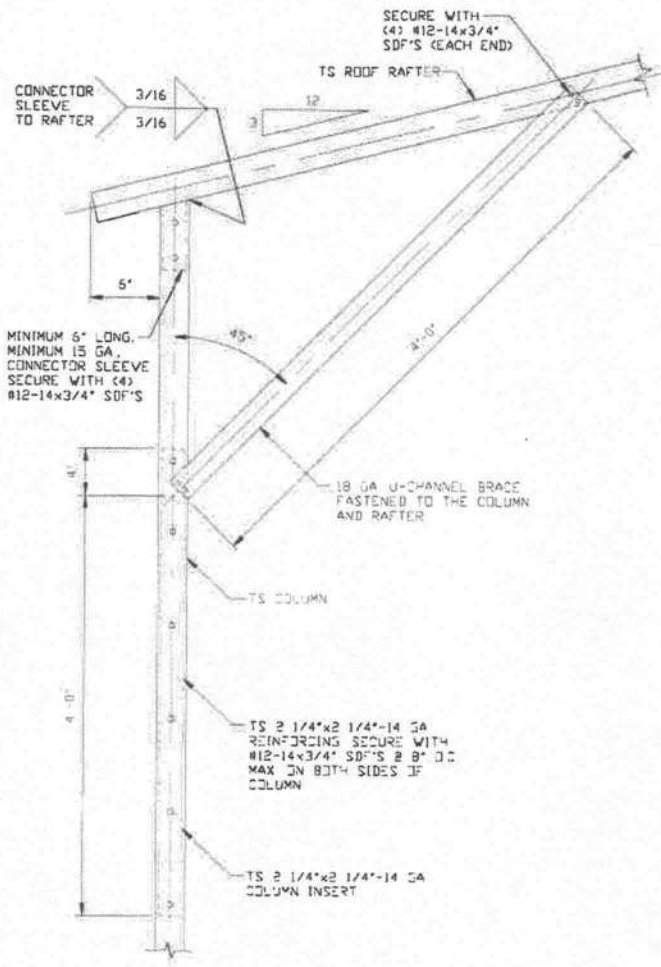
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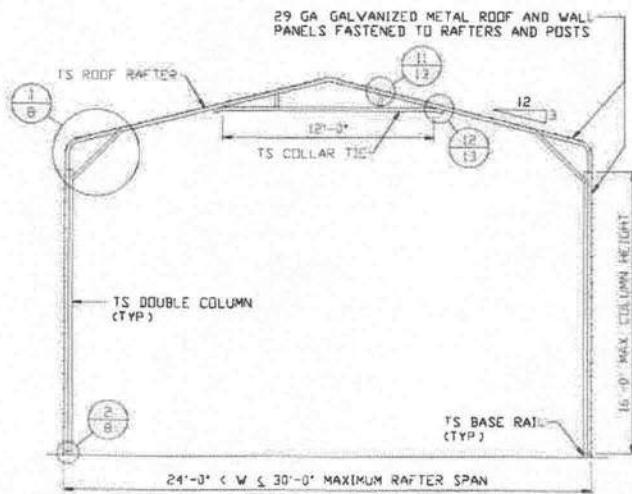
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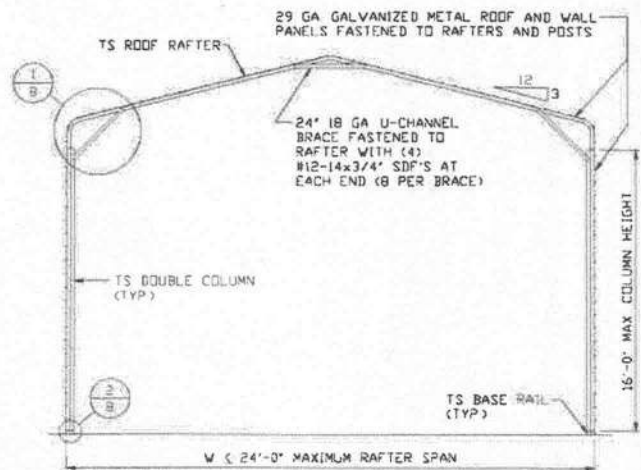
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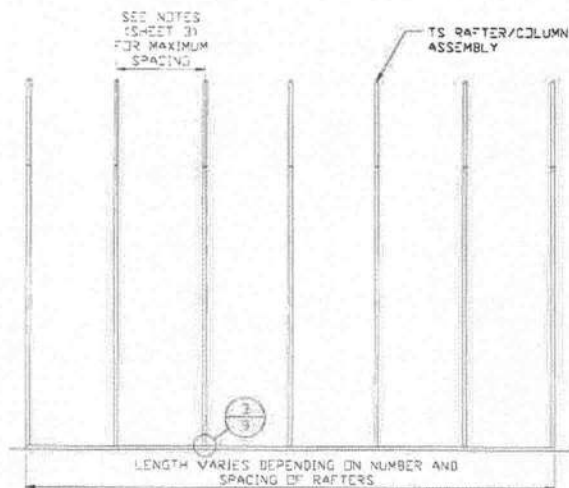
TYPICAL RAFTER/COLUMN END FRAME SECTION

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TYPICAL RAFTER/COLUMN END FRAME SECTION

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TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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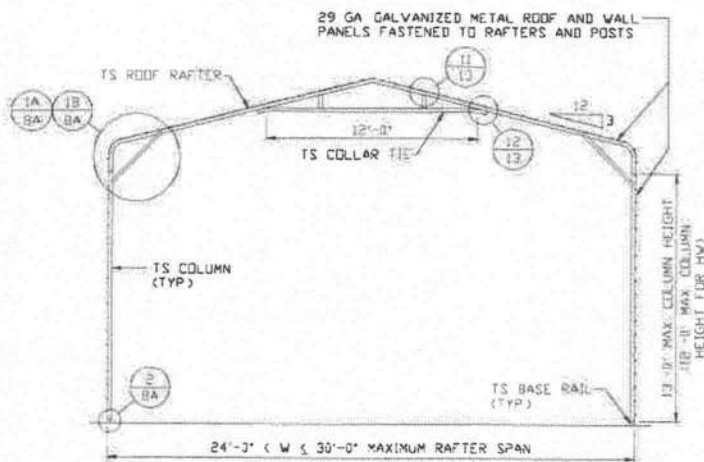
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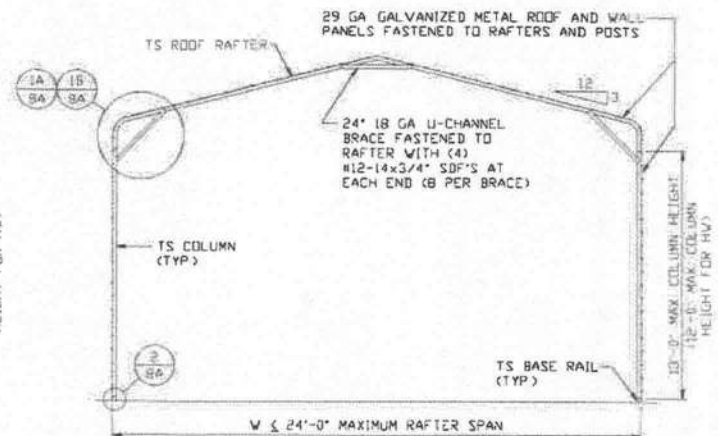
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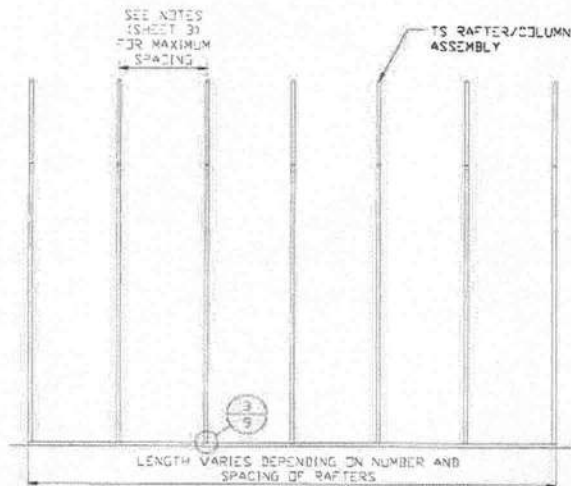
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TYPICAL RAFTER/COLUMN END FRAME SECTION
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TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
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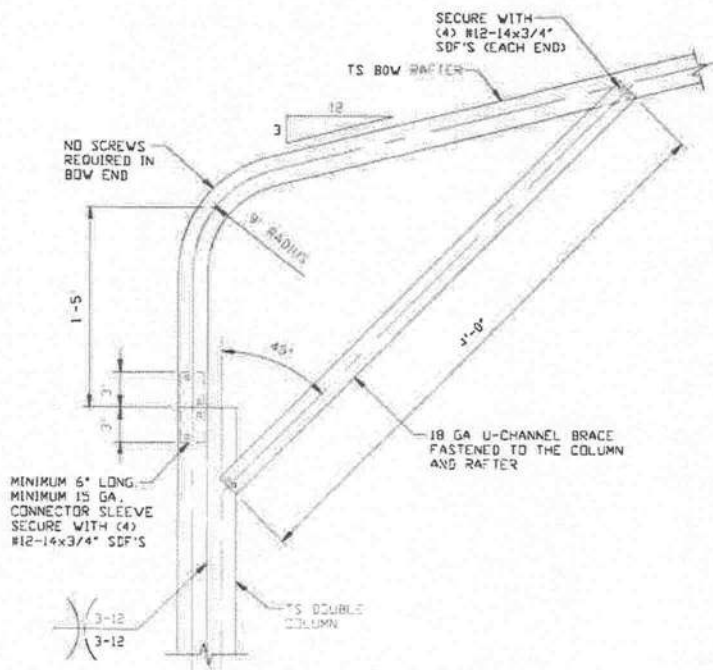
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DWG. NO: SK-3

**JOB NO: 16022S/
17300S/20352S**

REV: 6

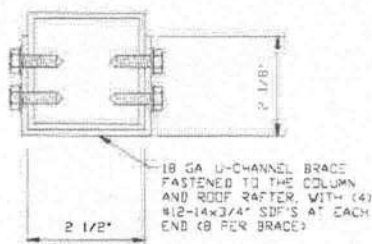
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1 BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 13'-0" < TO ≤ 16'-0"

SCALE: NTS

NOTE: COLUMN HEIGHTS 12'-0" < TO ≤ 16'-0" FOR HIGH WIND



2 RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL

SCALE: NTS

BRACE SECTION

SCALE: NTS



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DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TBS

TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE
LAKE CITY, FLORIDA 32025
30'-0"x20'-0" ENCLOSED BUILDING EXP. B

DATE: 7-29-21

SCALE: NTS

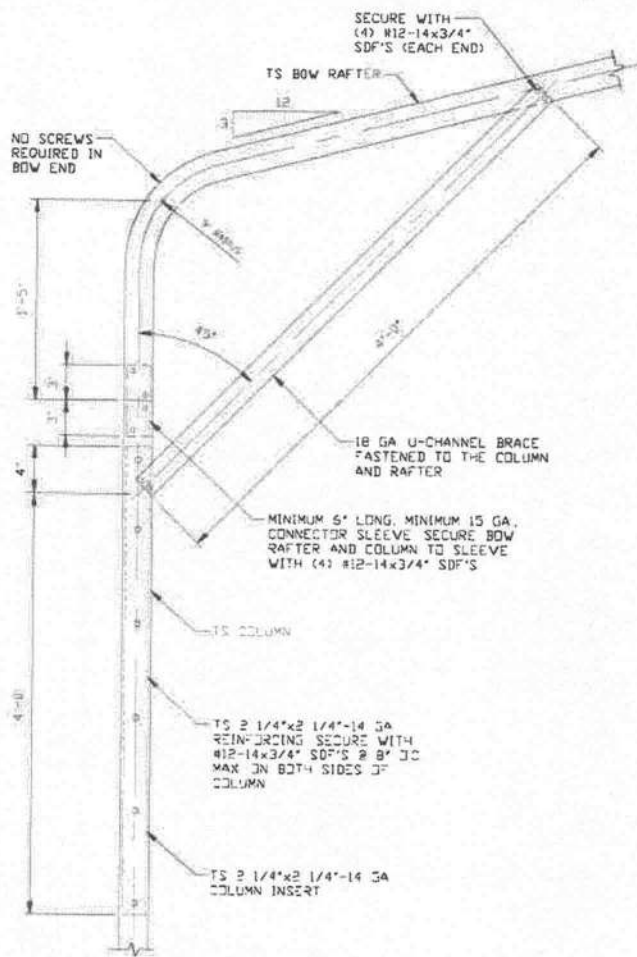
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REV: 6

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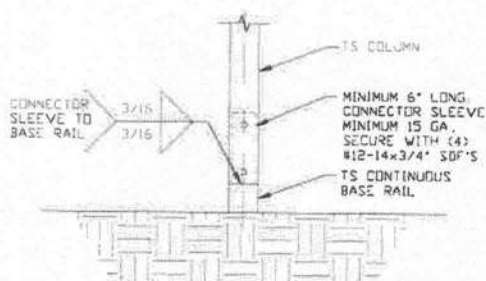


1A

BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO ≤ 13'-0"

SCALE: NTS

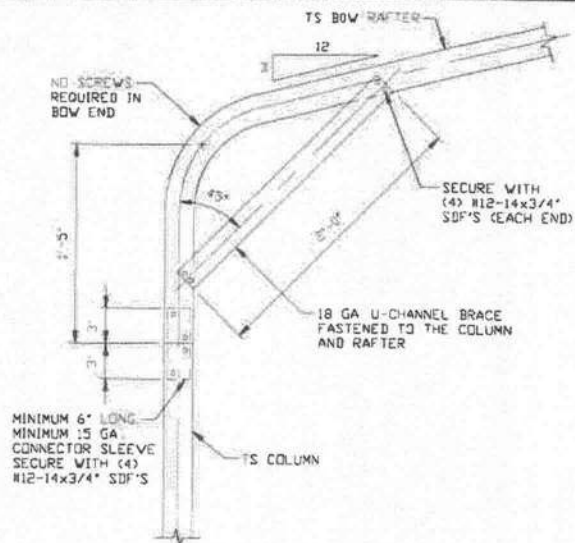
NOTE: MAXIMUM COLUMN HEIGHT IS 12'-0" FOR HIGH WIND



2

RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

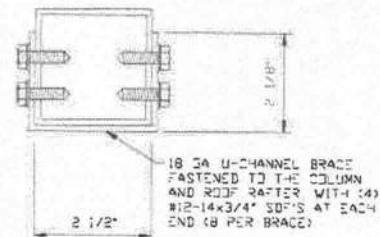
SCALE: NTS



1B

BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS ≤ 10'-0"

SCALE: NTS



BRACE SECTION

SCALE: NTS



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DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: VSM

CLIENT: TBS

TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE
LAKE CITY, FLORIDA 32025
30'-0" x 20'-0" ENCLOSED BUILDING EXP. B

DATE: 7-29-21

SHT. 8A

SCALE: NTS

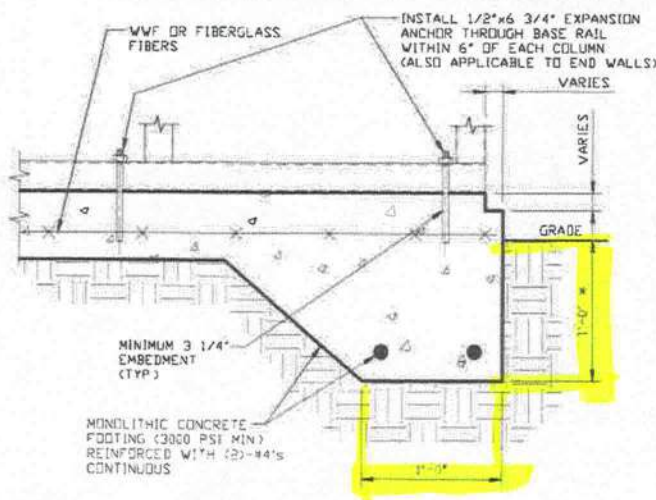
DWG. NO: SK-3

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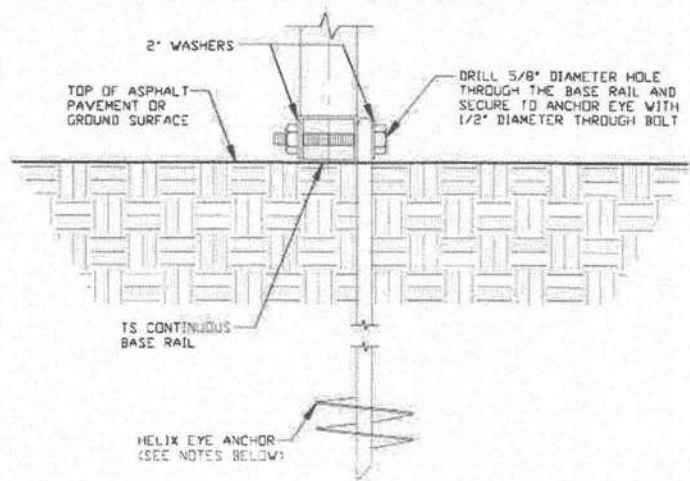
BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED



3A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

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



3B

GROUND BASE HELIX ANCHORAGE

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

GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN ON MINIMUM SOIL BEARING CAPACITY OF 1500 PSF

CONCRETE:

CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS

COVER OVER REINFORCING STEEL:

FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE PER ACI-318

3 INCHES 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 INCHES ELSEWHERE

REINFORCING STEEL:

THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE SO THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 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 INCH EMBEDMENT
- 2 FOR CORAL USE MINIMUM (2) 4" HELICES WITH MINIMUM 30 INCH EMBEDMENT
- 3 FOR MEDIUM DENSE COARSE SANDS, SANDY GRAVELS, VERY STIFF SILTS, AND CLAYS USE MINIMUM (2) 4" HELICES WITH MINIMUM 30 INCH EMBEDMENT
- 4 FOR LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFF CLAYS AND SILTS ALLUVIAL FILL USE MINIMUM (2) 6" HELICES WITH MINIMUM 50 INCH EMBEDMENT
- 5 FOR VERY LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL USE MINIMUM (2) 8" HELICES WITH MINIMUM 60 INCH EMBEDMENT



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PROJECT MGR: VSM

CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE
LAKE CITY, FLORIDA 32025
30'-0" x 20'-0" ENCLOSED BUILDING EXP. B**

DATE: 7-29-21

SHT. 9

SCALE: NTS

DWG. NO: SK-3

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