

#### STRUCTURAL DESIGN

# ENCLOSED BUILDING EXPOSURE B

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

18 December 2017 Revision 4 M&A Project No. 16022S/17300S

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

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







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#### DRAWING INDEX

SHEET 1	PE SEAL COVER SHEET
SHEET 2	DRAWING INDEX
SHEET 3	INSTALLATION NOTES AND SPECIFICATIONS
SHEET 4	TYPICAL SIDE AND END ELEVATIONS
SHEET 5	TYPICAL RAFTER COLUMN END AND SIDE FRAMING SECTIONS (BOX EAVE RAFTER)
SHEET 6A	TYPICAL RAFTER COLUMN CONNECTION DETAILS (LACED COLUMN)
SHEET 6B	TYPICAL RAFTER COLUMN CONNECTION DETAILS (DOUBLE COLUMN)
SHEET 6C	TYPICAL RAFTER COLUMN CONNECTION DETAILS (SINGLE COLUMN)
SHEET 7	TYPICAL RAFTER COLUMN END AND SIDE FRAMING SECTIONS (BOW RAFTER)
SHEET 8A	TYPICAL RAFTER COLUMN CONNECTION DETAILS (DOUBLE COLUMN)
SHEET 8B	TYPICAL RAFTER COLUMN CONNECTION DETAILS (SINGLE COLUMN)
SHEET 9A	BASE RAIL ANCHDRAGE OPTIONS
SHEET 9B	OPTIONAL FOUNDATION ANCHORAGE
SHEET 10	TYPICAL END WALL AND SIDE WALL OPENING FRAMING SECTIONS (BOX EAVE RAFTER)
SHEET 11	TYPICAL END WALL AND SIDE WALL OPENING FRAMING SECTIONS (BOW RAFTER)
SHEET 12	WALL OPENING DETAILS
SHEET 13	LEAN-TO OPTIONS (BOX EAVE RAFTER)
SHEET 14	LEAN-TO OPTIONS (BOW RAFTER)
SHEET 15	VERTICAL ROOF/SIDING OPTION END AND SIDE ELEVATION AND SECTION
SHEET 16	OPTIONAL DOOR HEADER



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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 2017 FLORIDA BUILDING CODE (FBC) 6TH EDITION, 2012 INTERNATIONAL BUILDING CODE (IBC), AND 2015 IBC.
- 3. DESIGN LOADS ARE AS FOLLOWS:
  A) DEAD LOAD = 1.5 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. LOW HAZARD RISK CATEGORY I (WIND)
- 7. WIND EXPOSURE CATEGORY B.
- 8. 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 DTHERWISE NOTED).
- 9. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS, INTERIOR = 9" OR END = 6", (MAX.)
- 10 FASTENERS CONSIST OF #12-14x3/4" SELF-DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS SPECIFICATIONS APPLICABLE DNLY 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.
- 11. GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" DF EACH RAFTER COLUMN ALONG SIDES.
- 12. GROUND ANCHORS (SDIL NAILS) CONSIST OF #4 REBAR W/WELDED NUT x 30' LONG IN SUITABLE SDIL CONDITIONS MAY BE USED FOR LOW (≤ 108 MPH NOMINAL) WIND SPEEDS ONLY. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SDILS AND MUST BE USE IN UNSUITABLE SDILS AS NOTED.
- 13 OPTIONAL BASE RAIL ANCHORAGE MAY BE USED FOR LOW AND MUST BE USED FOR HIGH WIND SPEEDS
- 14 WIND FORCES GOVERN OVER SEISMIC FORCES, SEISMIC PARAMETERS ANALYZED ARE

SDIL SITE CLASS = D RISK CATEGORY I/II/III

R = 325  $I_E = 10$  $S_{DS} = 1.522$   $V = C_S W$ 

S<sup>D1</sup>= 0839

No 57170

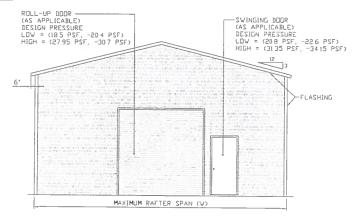
JUL 1\*2 2019

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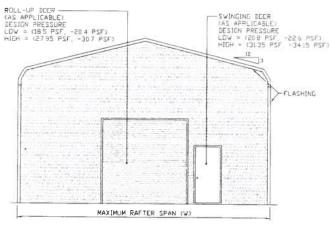
#### BOX EAVE FRAME RAFTER ENCLOSED BUILDING



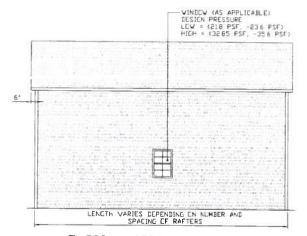
#### TYPICAL END ELEVATION-HORIZONTAL ROOF

SCALE NTS

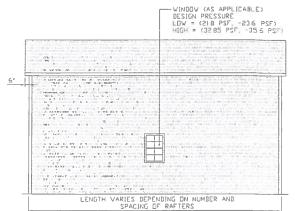
#### BOW FRAME RAFTER ENCLOSED BUILDING



#### TYPICAL END ELEVATION



TYPICAL SIDE ELEVATION



#### TYPICAL SIDE ELEVATION-HORIZONTAL ROOF

No 57170

JUL 1 2 2019

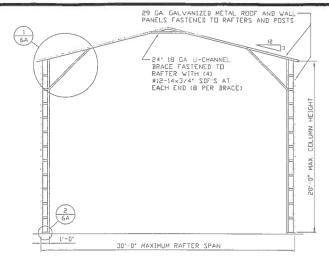
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#### TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE NTS

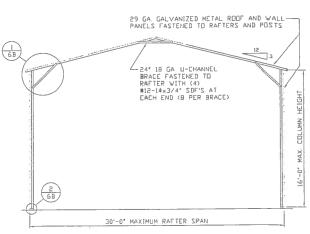
29 GA GALVANIZED METAL ROOF AND WALL
PANELS FASTENED TO RAFTERS AND POSTS

24\* 18 GA. U-CHANNEL
BRACE FASTENED TO
RAFTER WITH (4)
HI2-14x3/4\* SBF'S AT
EACH END (8 PER BRACE)

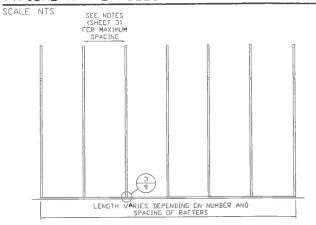
20'-0" MAXIMUM RAFTER SPAN

#### TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS

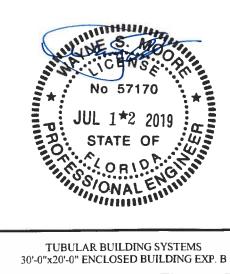


#### TYPICAL RAFTER/COLUMN END FRAME SECTION



#### TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

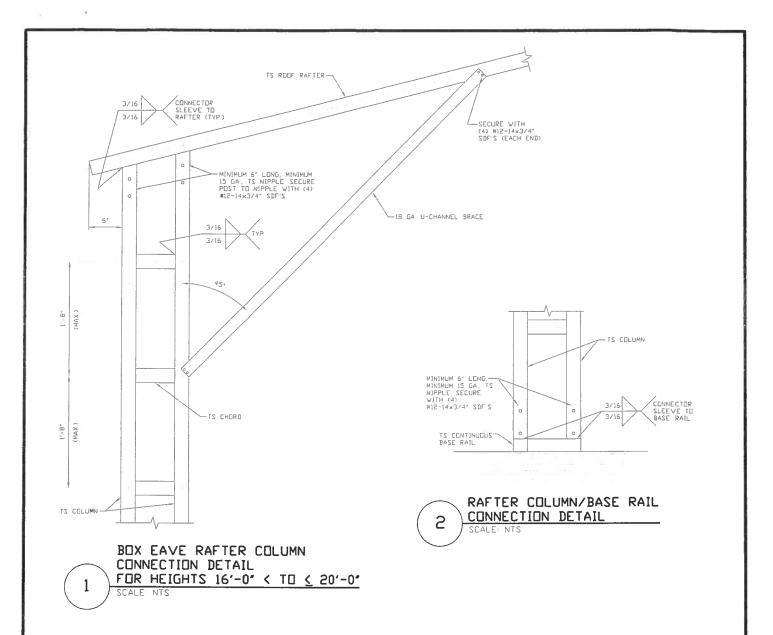
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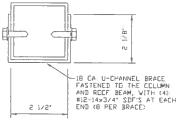


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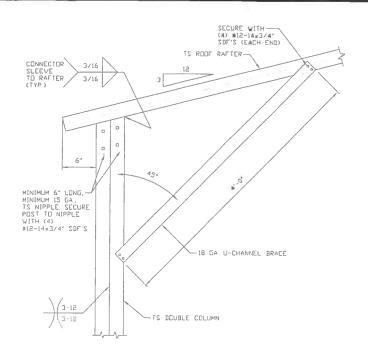




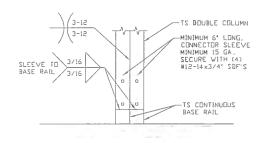
BRACE SECTION



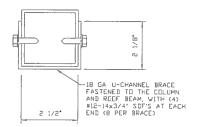
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BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 14'-0" < TO < 16'-0"



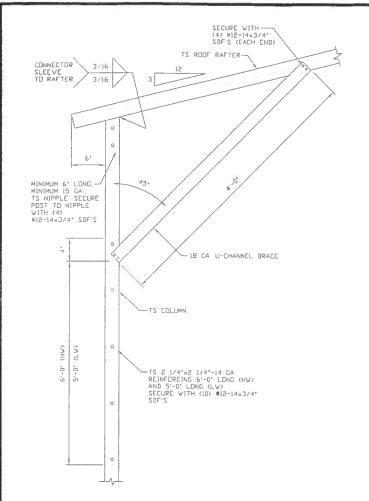
RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE: NTS



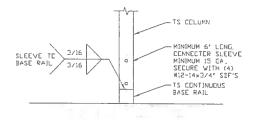
BRACE SECTION SCALE NTS



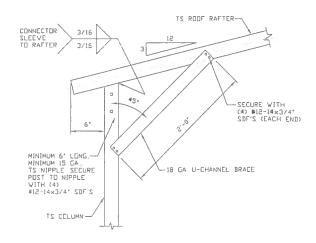
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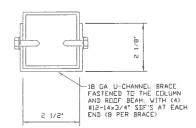
BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0' < TO < 14'-0' SCALE NTS



2 RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE NTS



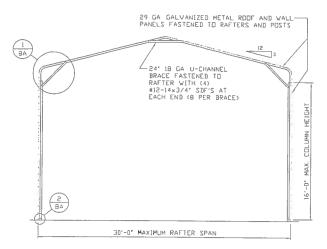
BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS & 10'-0"



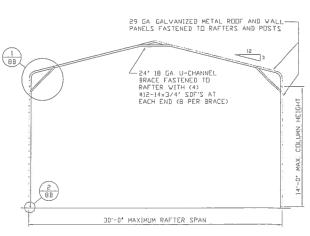
BRACE SECTION SCALE NTS



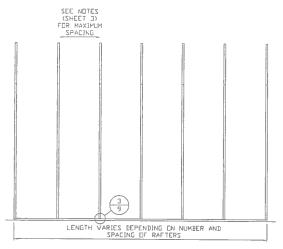
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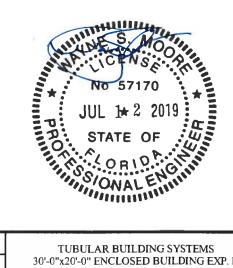
TYPICAL RAFTER/COLUMN END FRAME SECTION



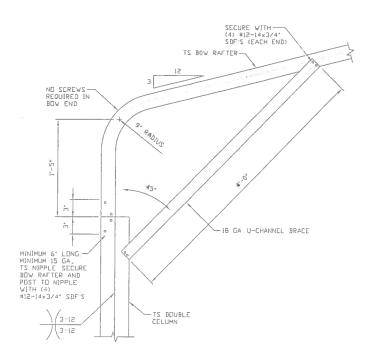
TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE NTS

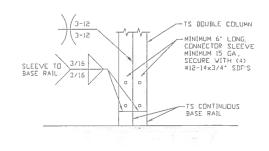


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE NTS



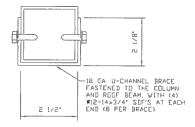
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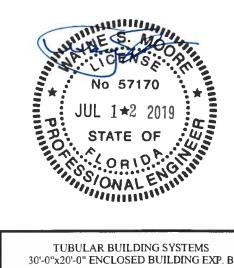


BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 14'-0" < TO < 16'-0" SCALE NTS 1

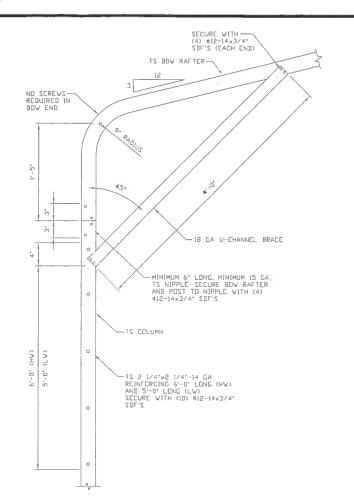
RAFTER COLUMN/BASE RAIL CONNECTION DETAIL 2 SCALE NTS



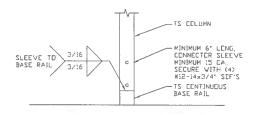
#### BRACE SECTION SCALE NTS



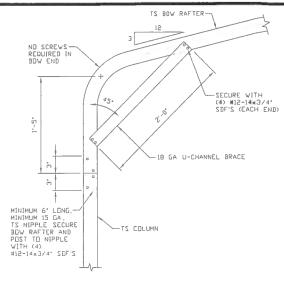
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BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO < 14'-0"



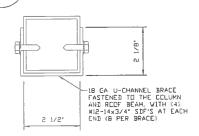
RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE: NTS



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

SCALE NTS

1B



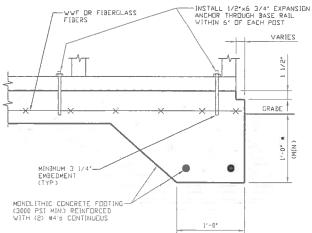
BRACE SECTION



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#### BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED

2" WASHERS





SCALE NTS (MINIMUM ANCHOR EDGE DISTANCE IS 4') \* COORDINATE WITH LOCAL CODES/ORD

## DRILL 5/8" DIAMETER HOLE 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 HELIX EYE ANCHER-

GROUND BASE HELIX ANCHORAGE 3B (CAN BE USED FOR ASPHALT)

#### GENERAL NOTES

#### CONCRETE:

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

COVER OVER REINFORCING STEEL:

FOR FDUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING SHALL BE PER ACI 318 O 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 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

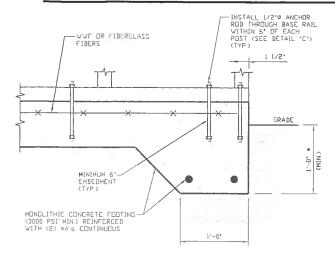
#### HELIX ANCHOR NOTES:

- 1 FOR VERY DENSE AND/OR CEMENTED SANDS COARSE GRAVEL AND COBBLES, CALICHE, 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 LODSE 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 LOSE 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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#### OPTIONAL FOUNDATION ANCHORAGE FOR LOW & HIGH WIND SPEED



1A

#### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

(MINIMUM ANCHOR EDGE DISTANCE IS 1 1/2")
\* COORDINATE WITH LOCAL CODES/ORD

#### **GENERAL NOTES**

#### CONCRETE:

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

#### COVER OVER REINFORCING STEEL:

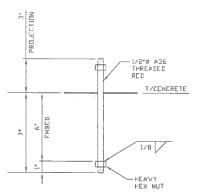
FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE PER ACI-318
3 INCHES IN FOUNDATIONS WHERE THE CONCRETE IS CAST AGAINST AND PERMANENTLY IN CONTACT WITH THE EARTH OR EXPOSED TO THE EARTH OR WEATHER, AND 1 1/2 INCHES ELSEWHERE

#### REINFORCING STEEL:

THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT.

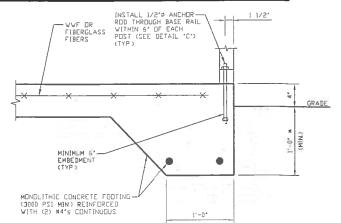
#### REINFORCEMENT MAY BE BENT IN THE SHOP OR THE FIELD PROVIDED:

- 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



1C

ANCHOR ROD THROUGH BASE RAIL DETAIL



1B

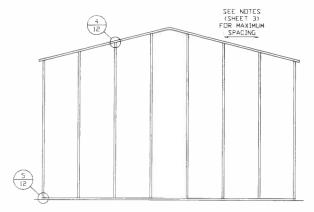
#### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

(MINIMUM ANCHOR EDGE DISTANCE IS 1 1/2")
\* COORDINATE WITH LOCAL CODES/ORD



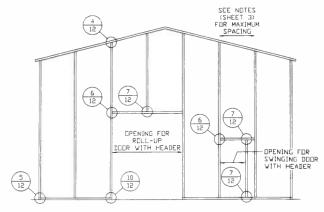
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#### BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



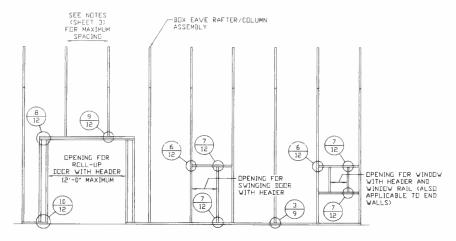
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



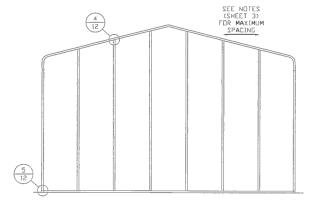
TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

SCALE: NTS



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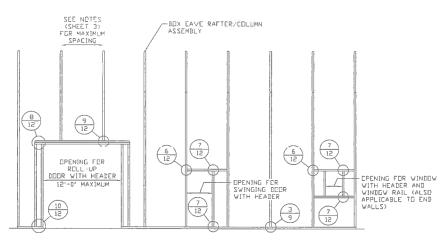
#### BOW RAFTER END WALL AND SIDE WALL OPENINGS



TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE NTS



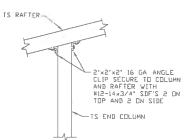
TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

SCALE NTS



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#### BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



TS COLUMN (CORNER) MINIMUM 6" LDNG, MINIMUM 15 GA, TS NIPPLE SECURE WITH (4) #12-14x3/4" SDF'S 2"x2"x2" 16 GA CLIP ANGLE SECURE TO RAFTER COLUMN AND BASE RAIL W/(4) #12-14x3/4" SDF'S NIPPLE TO BASE RAIL 3/16 TS CONTINUOUS BASE RAIL

OR END COLUMN 2°x2°x2° 16 GA ANGLE
CLIP SECURE TO COLUMN
AND EITHER TOP OF
HEADER, OR BOTTOM OF
VINDOV RAIL WITH
#12-14x3/4° SDF'S TS HEADER OR

END COLUMN/RAFTER CONNECTION DETAIL 4

END COLUMN/BASE RAIL CONNECTION DETAIL 5 SCALE! NTS

HEADER OR WINDOW RAIL TO COLUMN CONNECTION DETAIL 6 SCALE: NTS

SCALE: NTS

TS TRUSSED RAFTER CHORD, OR HEADER TS END COLUMN-GR DEER WINDGW FRAME POST TS HEADER, BASE RAIL, OR WINDOW RAIL

-2'x2'x2' 16 GA ANGLE CLIP SECURE TO COLUMN (EACH SIBE) AND RAFTER CHORD/RAIL WITH #12-14x3/4' SDF'S 2 GN BOTTOM AND 2 DN SIDE

SIDE

NOTE AT ROLL-UP DOCR
OPENINGS, POST SHOULD
BE FLUSH WITH RAIL
END CLIP POST TO
RAIL ONLY ON SIDE
CPPOSITE THE OPENING.

NIPPLE TO 3/16 3-12 3/16 / 3-12 0 -MINIMUM 6' LENG, MINIMUM 15 GA., TS NIPPLE. SECURE EACH WITH (4) #12-14×3/4' TS COLUMN

TS COLUMN NIPPLE TO HEADER MINIMUM 6' LONG, MINIMUM 15 GA TS NIPPLE SECURE WITH (4) #12-14x3/4' SDF'S 3/16 3-12 TS DOUBLE HEADER 3-12

COLUMN TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL STALE: NTS

DOUBLE HEADER/COLUMN CONNECTION DETAIL 8

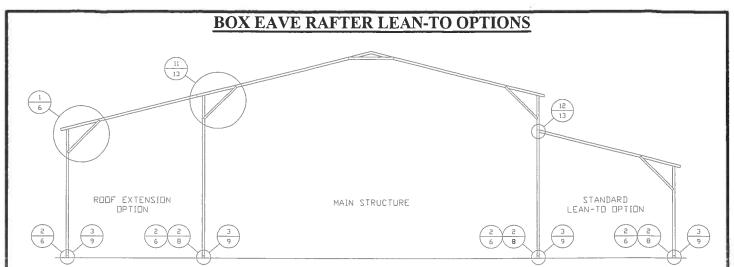
COLUMN/DOUBLE HEADER CONNECTION DETAIL 9 SCALE NTS

TS CELUMN -MINIMUM 6' LENG, MINIMUM 15 CA, TS MISTEL SECURE EACH WITH (4) #12-14×3/4' SEF'S NIPPLE TO BASE RAIL 3/16 TS CENTINUEUS BASE RAIL

COLUMN/BASE RAIL CONNECTION DETAIL 10 SCALE NTS

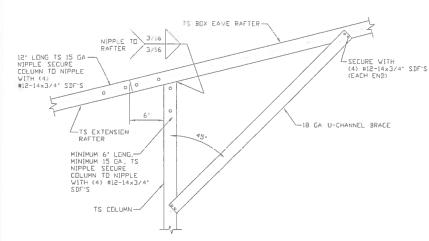


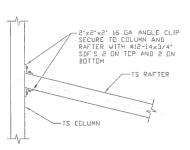
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#### BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

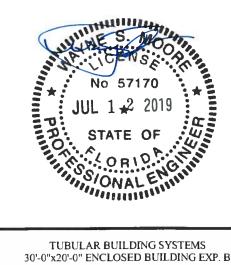
SCALE NTS MAXIMUM WIDTH OF SINGLE MEMBER RAFTER LEAN-TO IS 16'-0"





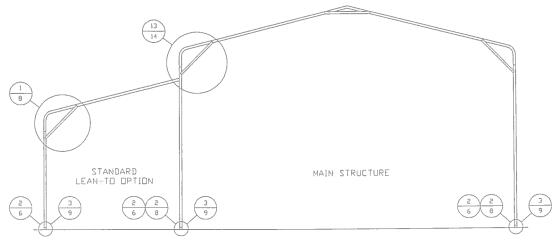
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL 12

SIDE EXTENSION RAFTER/COLUMN DETAIL 11A



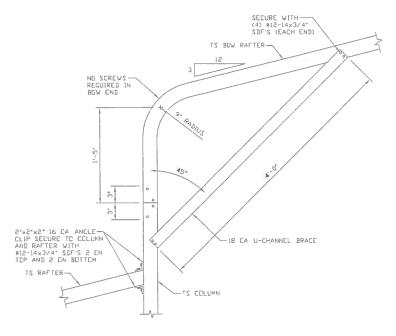
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#### **BOW RAFTER LEAN-TO OPTIONS**



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

SCALE NTS MAXIMUM WIDTH OF SINGLE MEMBER RAFTER LEAN-TO IS 16'-0'.

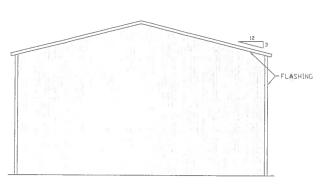


13 SIDE EXTENSION RAFTER/COLUMN DETAIL

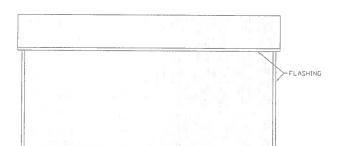


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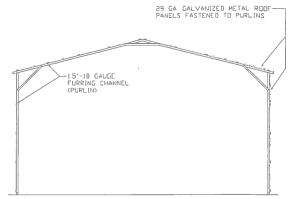
#### BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



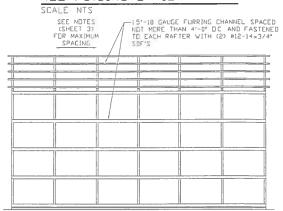
TYPICAL END ELEVATION VERTICAL ROOF/SIDING OPTION



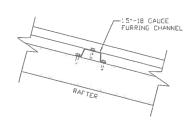
TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING OPTION SCALE: NTS



#### TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

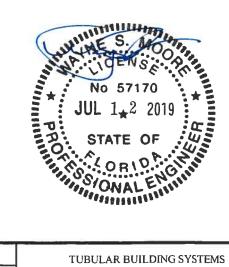


TYPICAL FRAMING SECTION
VERTICAL ROOF/SIDING OPTION
SCALE NTS



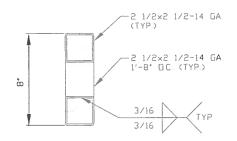
ROOF PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE NTS



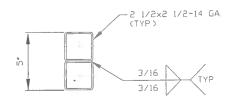
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#### **OPTIONAL DOOR HEADER**



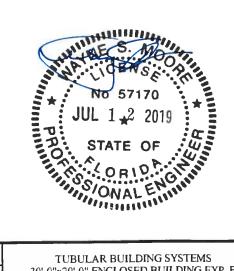
HEADER DETAIL FOR DOOR OPENINGS 12'-0" < LENGTH < 15'-0"

SCALERNIS



HEADER DETAIL FOR DOOR OPENINGS LENGTH < 12'-0"

SCALE NTS



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#### **Florida Product Approval Codes**

Roll-Up Doors:

Janus International Corporation Model 750: 21450.8

EXP 12/31/2019

Walk-In Door:

Elixir Door & Metal Company blank (no window): 17996.5

EXP 9/14/2020

Window:

Kinro 993.7

EXP 10/19/21

Roof Deck:

Capital Metal Supply Inc. Ag Panel: 20147.1

EXP 07/20/2020

Wall Panel:

Capital Metal Supply Inc. Ag Panel: 20148.1

EXP 07/20/2020

If you have any questions on concern, please contact Donald Little at 386-961-0006 or at tubularbuildingsystems@gmail.com.

Outside edge of foundation / footing See Corner Detail Sheet 3 **BUILDING SLAB** to Outside of Basic Palitand of Basic Pulmore Palitand of Basic Pulmore Palitand of Basic Palitand of

# IMPORTANT - NOTES

Record Measurements in these spaces provided

All basic building diagonal dimensions are to the outside corner of the frame Base Rail and DO NOT INCLUDE the 3-1/2" x 1-1/2" notch in the concrete footing

See Sheet 3 of 3 for Detail of Building corner configuration

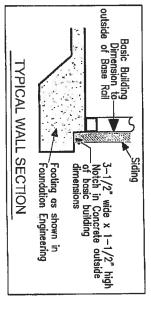
# TYPICAL BUILDING

FOUNDATION MEASUREMENTS
DIAGONALS

TUBULAR BUILDING

Building Base Rail

3-1/2" wide x 1-1/2" high Notch in Concrete outside of basic building dimensions



SHEET 2 of 3