

#### STRUCTURAL DESIGN

# STANDARD PACKAGE ENCLOSED BUILDING

#### MAXIMUM 40'- 0" WIDE X 20'- 0" HEIGHT-BOX EAVE FRAME AND BOW FRAME

24 September 2020 Revision 0 M&A Project No. 20195S

Prepared for:

Universal Metal Buildings 9283 US 601 Dobson, NC 27017

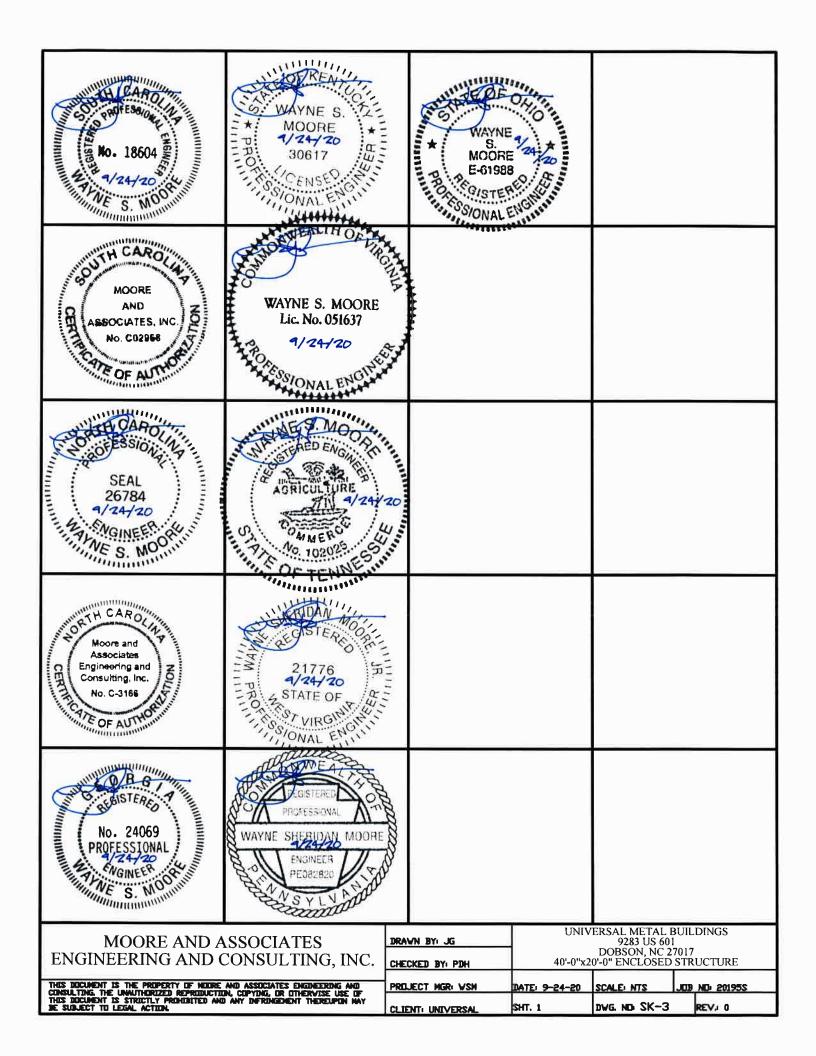
Prepared by:

Moore and Associates Engineering and Consulting, Inc.

1009 East Avenue North Augusta, SC 29841

401 South Main Street Mount Airy, NC 27030





### DRAWING INDEX

Harnett

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#### INSTALLATION NOTES AND SPECIFICATIONS

- 1\_ DESIGN IS FOR MAXIMUM 40'-0" WIDE x 20'-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, 2012 IBC AND 2009 IBC.
- 3. DESIGN LOADS ARE AS FOLLOWS:

A) DEAD LOAD = 1,5 PSF
B) LIVE LOAD = 12 PSF
C) GROUND SNOW LOAD = 35 PSF

NOTE: UNBALANCED SNOW LOADS DUE TO DRIFTING HAVE NOT BEEN EVALUATED.

- 4 3-SECOND GUST ULTIMATE WIND SPEED ( $V_{ULT}$ ) =  $\leq$  145 MPH (NOMINAL WIND SPEED =  $\leq$  112 MPH)
- 5 MAXIMUM RAFTER/COLUMN AND END COLUMN SPACING = 50 FEET (UNLESS NOTED OTHERWISE)
- 6. SIDEWALL COLUMNS AND ENDWALL COLUMNS ARE SIMILAR IN SIZE, 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 (UNLESS NOTED OTHERWISE).
- 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 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 ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6' OF EACH COLUMN.
- 13 STANDARD GROUND FOUNDATION SYSTEM CONSISTS OF #4 REBAR W/ WELDED NUT x 36' LONG SOILS NAILS AND ARE APPLICABLE ONLY IN MEDIUM TO STIFF SOILS (SUITABLE SOIL). OPTIONAL FOUNDATION SYSTEMS MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS. COORDINATE WITH LOCAL CODES/ORDINANCES FOR FOUNDATION SYSTEM TO BE COMPLIANT WITH FROST DEPTH PROTECTION.
- 14, WIND FORCES GOVERN OVER SEISMIC FORCES, SEISMIC PARAMETERS ANALYZED ARE:

SOIL SITE CLASS = D RISK CATEGORY I

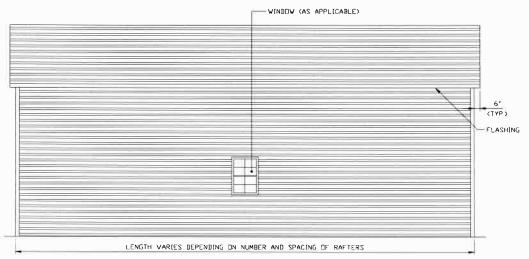
R = 3.25  $I_E = 1.0$  $S_{DS} = 2.039$  g  $V = C_S W$ 

S<sub>D1</sub>= 1.258 g

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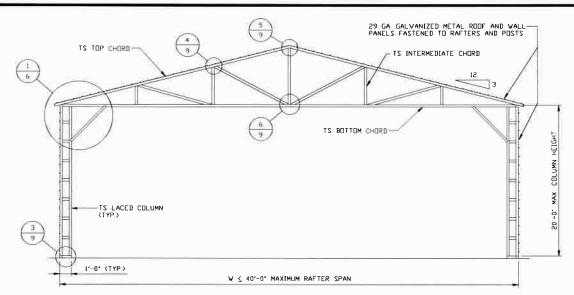
# BOX EAVE FRAME RAFTER STRUCTURE ROLL-UP DOOR — (AS APPLICABLE) PERSONNEL DOOR (AS APPLICABLE) FLASHING-40'-0' MAXIMUM RAFTER SPAN (W)

## TYPICAL END ELEVATION SCALE: NTS

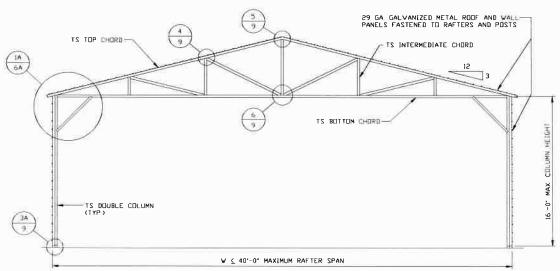


## TYPICAL SIDE ELEVATION SCALE: NTS

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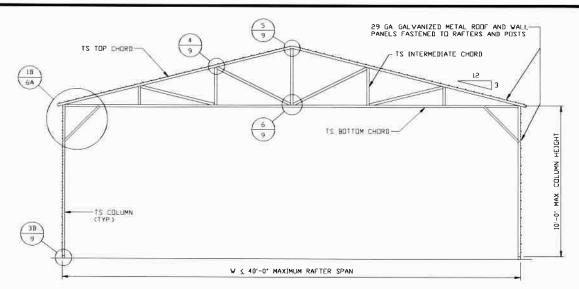


## $\frac{\texttt{TYPICAL} \ \ \, \texttt{RAFTER/COLUMN} \ \ \, \texttt{FRAME} \ \ \, \texttt{SECTION}}{\texttt{SCALE: NTS}}$

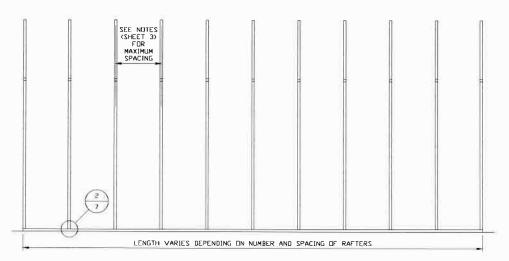


## $\frac{\text{TYPICAL RAFTER/COLUMN FRAME SECTION}}{\text{SCALE: NTS}}$

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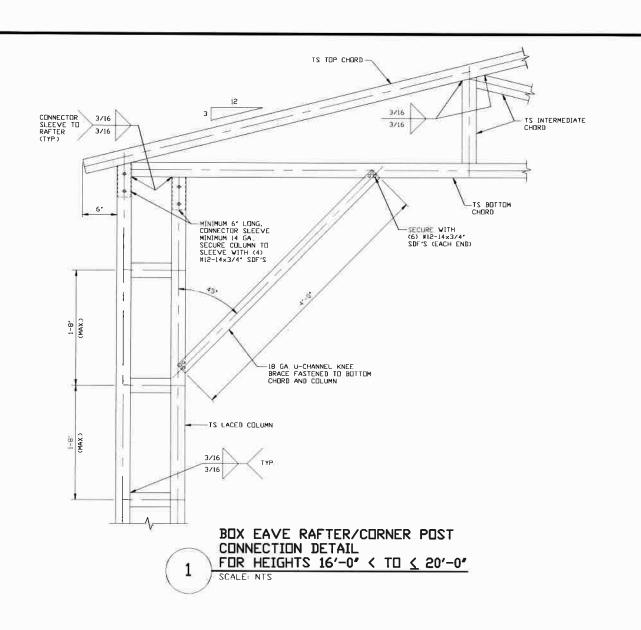


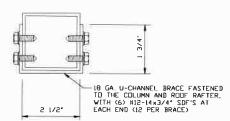
## $\frac{\texttt{TYPICAL}}{\texttt{SCALE:}} \; \mathsf{NTS} \; \frac{\texttt{RAFTER/COLUMN}}{\texttt{FRAME}} \; \frac{\texttt{SECTION}}{\texttt{SCALE:}} \; \mathsf{NTS}$



## TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE: NTS

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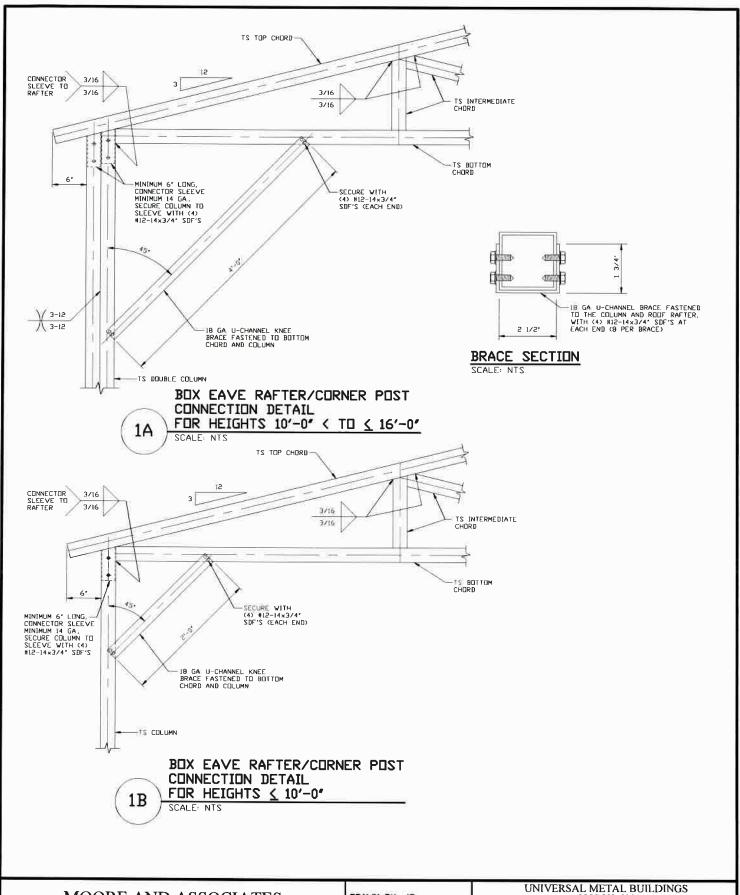


#### BRACE SECTION

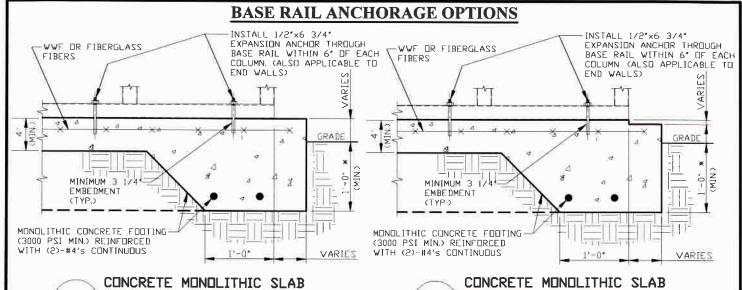
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2B



#### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

MINIMUM ANCHOR EDGE DISTANCE IS 4" \* COORDINATE WITH LOCAL BUILDING CODE AND/OR BUILDING OFFICIAL REGARDING REQUIRED MINIMUM FOOTING DEPTH.

#### **GENERAL NOTES**

NOTE: CONCRETE MONOLITHIC SLAB DESIGN BASED ON MINIMUM SUIL 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 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:

- REINFORCEMENT IS BENT COLD.
  THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS
- 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.
- 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
- 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.

#### SCALE NTS MINIMUM ANCHOR EDGE DISTANCE IS 4" \* COURDINATE WITH LOCAL BUILDING CODE AND/OR BUILDING OFFICIAL REGARDING

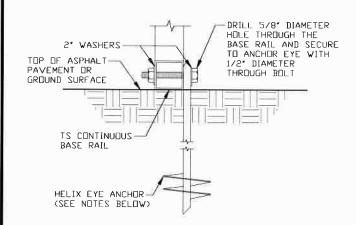
BASE RAIL ANCHORAGE

REQUIRED MINIMUM FOOTING DEPTH.

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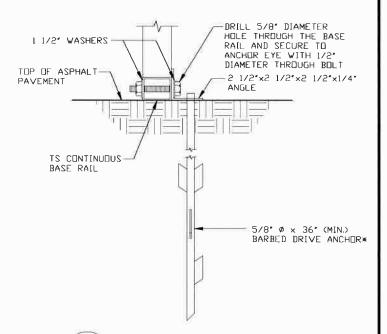
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#### **BASE RAIL ANCHORAGE OPTIONS**



GROUND BASE
HELIX ANCHORAGE
SCALE NTS
(CAN BE USED FOR ASPHALD)

SCALE NTS
(CAN BE USED FOR ASPHALT)
\* COORDINATE WITH LOCAL BUILDING CODE
AND/OR BUILDING OFFICIAL REGARDING
REQUIRED FOOTING DEPTH.



2D ASPHALT BASE ANCHURAGE

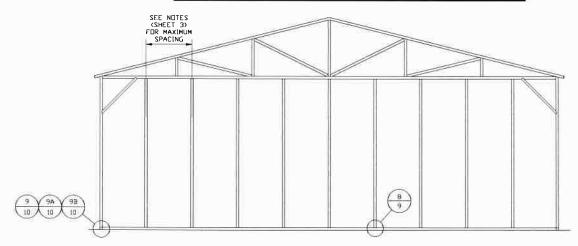
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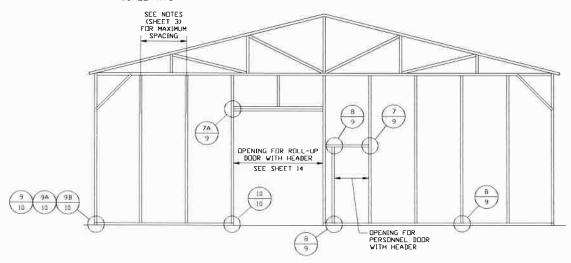
CLIENT UNIVERSAL SHT. 7A DVG. ND SK-3 REVJ 0		
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#### **BOX EAVE RAFTER END WALL OPENINGS**



#### TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



 $\frac{\texttt{TYPICAL BUX EAVE RAFTER END WALL UPENINGS FRAMING SECTION}}{\texttt{SCALE: NTS}}$ 

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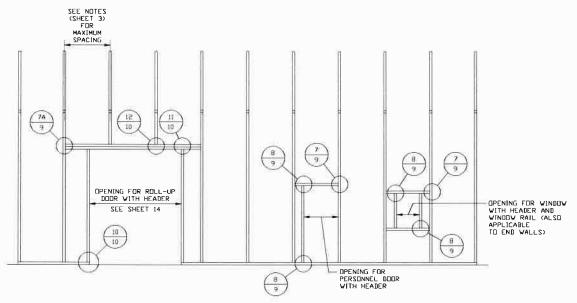
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DOBSON, NC 2	
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#### **BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS**



TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

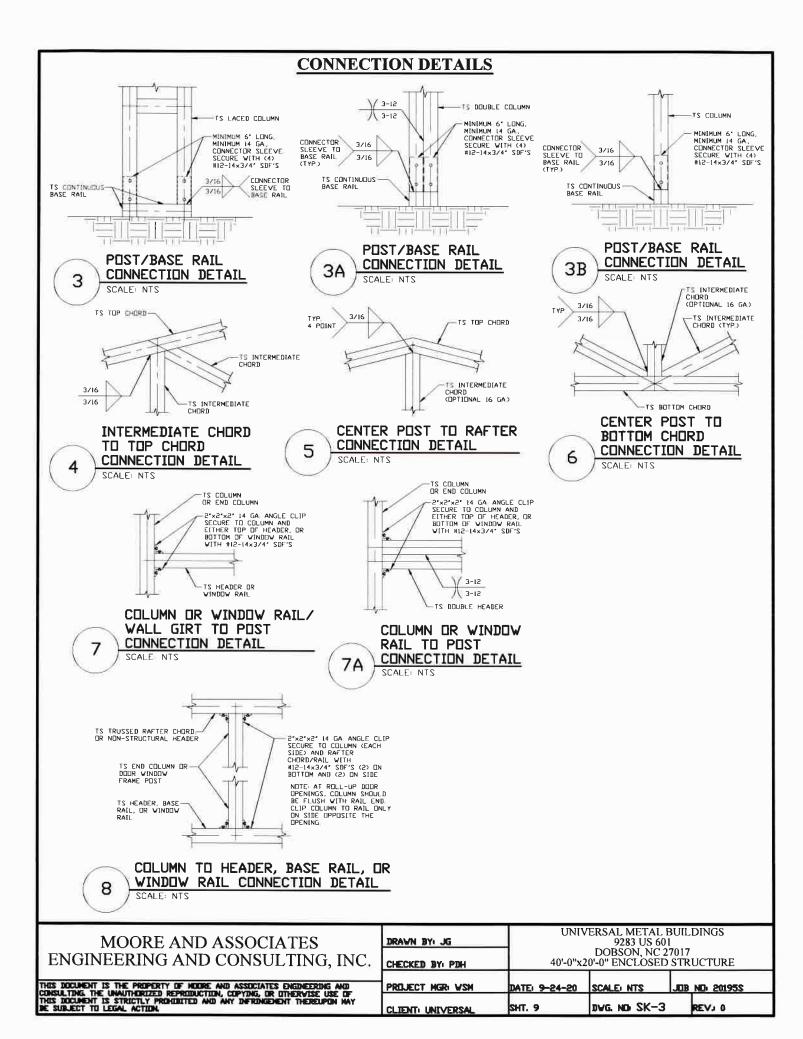
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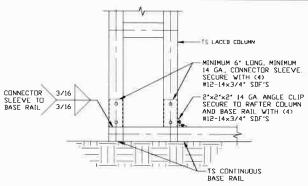
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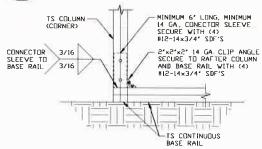
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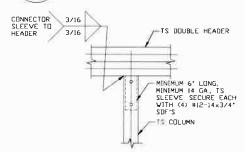
#### **CONNECTION DETAILS**



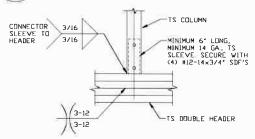
## 9 END COLUMN/BASE RAIL CONNECTION DETAIL SCALE: NTS



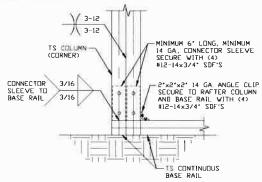
## 9B COLUMN/BASE RAIL



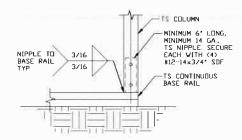
## DOUBLE HEADER/COLUMN CONNECTION DETAIL SCALE: NTS



12 COLUMN/DOUBLE HEADER
CONNECTION DETAIL
SCALE NTS



# 9A CONNECTION DETAIL SCALE NTS



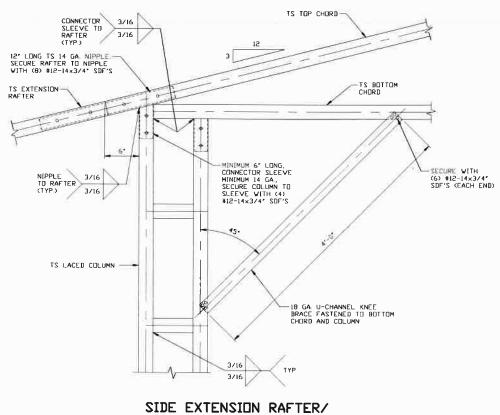
10 COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE: NTS

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	DRAWN BY: JG				

#### **BOX EAVE RAFTER LEAN-TO OPTIONS** 15 15 15 15 118 11C MAIN STRUCTURE LEAN-TO OPTION (3) 9 (3) 9 9 W & 40'-0" MAXIMUM RAFTER SPAN

## TYPICAL BUX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN) SCALE: NTS MAXIMUM WIDTH OF SINGLE MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 12'-0'.



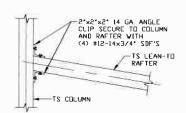
COLUMN DETAIL FOR HEIGHTS 16'-0' < T□ < 20'-0' 13 SCALE: NTS

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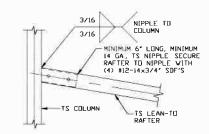
### **BOX EAVE RAFTER LEAN-TO OPTIONS** TS TOP CHORD CONNECTOR SLEEVE TO RAFTER 3/16 I2' LONG TS 14 GA NIPPLE SECURE RAFTER TO NIPPLE WITH (8) #I2-I4×3/4' SDF'S TS BOTTOM TS EXTENSION MINIMUM 6' LONG, CONNECTOR SLEEVE MINIMUM 14 GA, SECURE COLUMN TO SLEEVE WITH (4) #12-14×3/4' SDF'S SECURE WITH (4) #12-J4x3/4" SDF'S (EACH END) NIPPLE 3/16 TO RAFTER 3/16 (TYP) 3/16 3-12 -18 GA U-CHANNEL KNEE BRACE FASTENED TO BOTTOM CHORD AND COLUMN TS DOUBLE COLUMN SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR HEIGHTS 10'-0' < T□ < 16'-0' 13A SCALE: NTS CONNECTOR SLEEVE TO RAFTER 3/16 TS TOP CHORD 3/16 12' LONG TS 14 GA NIPPLE -SECURE RAFTER TO NIPPLE -WITH (8) #12-14x3/4' SDF'S TS BOTTOM SECURE WITH (4) #12-14x3/4° SDF'S (EACH END) NIPPLE TO RAFTER (TYP) 3/16 MINIMUM 6' LONG, CONNECTOR SLEEVE MINIMUM 14 GA., SECURE COLUMN TO SLEEVE WITH (4) H12-14x3/4' SDF'S 18 GA. U-CHANNEL KNEE BRACE FASTENED TO BOTTOM CHORD AND COLUMN TS COLUMN SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR HEIGHTS ≤ 10'-0" 13B

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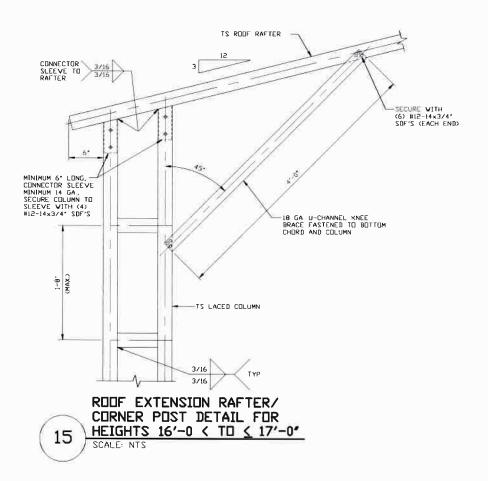
#### **BOX EAVE RAFTER LEAN-TO OPTIONS**



LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS & 12'-0'

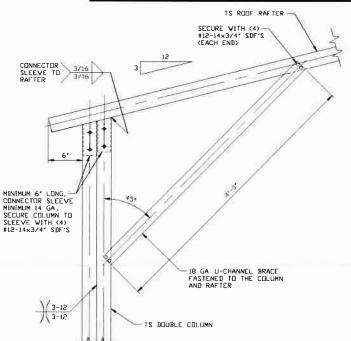


LEAN-TO RAFTER
TO RAFTER POST
CONNECTION DETAIL
FOR WIDTHS & 12'-0'
SCALE NTS

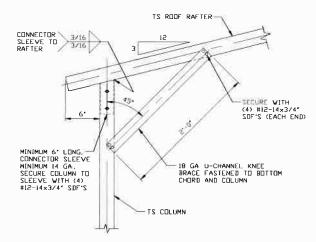


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#### **BOX EAVE RAFTER LEAN-TO OPTIONS**



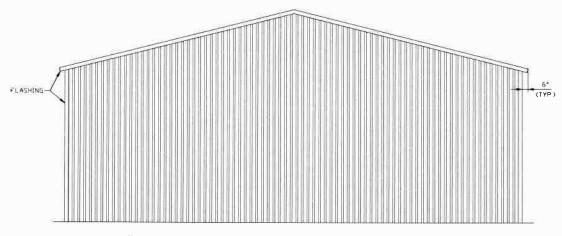
ROOF EXTENSION RAFTER/
CORNER POST DETAIL FOR
HEIGHTS 10'-0 < TO < 16'-0'
SCALE: NTS



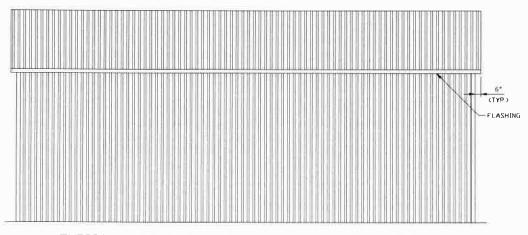
ROOF EXTENSION RAFTER/CORNER POST DETAIL FOR HEIGHTS & 10'-0'

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		UNIV	ERSAL METAL I	BUILDINGS	

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



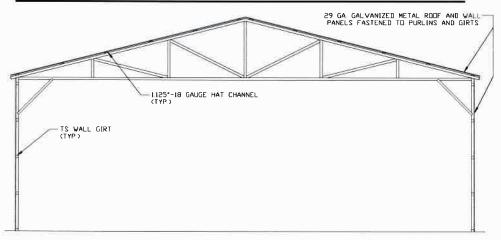
#### TYPICAL END ELEVATION VERTICAL ROOF/SIDING



TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING

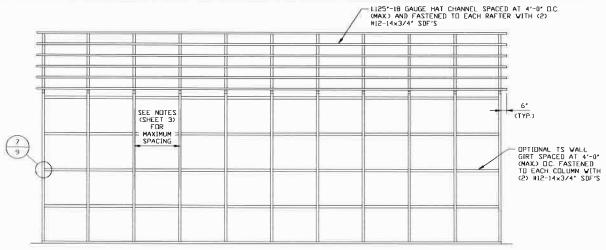
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#### **BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION**



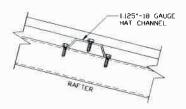
#### TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

SCALE: NTS



#### TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION WITH TS GIRTS

SCALE: NTS

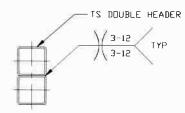


#### PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS) SCALE: NTS

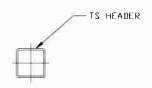
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#### **END WALL HEADER OPTIONS**



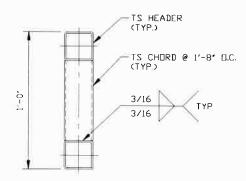


SCALE: NTS



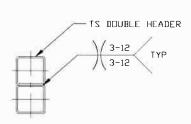
HEADER DETAIL FOR SPANS & 12'-0'

#### SIDE WALL HEADER OPTIONS



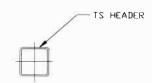
HEADER DETAIL FOR SPANS 10'-0" < TO < 12'-0"

SCALE: NTS



HEADER DETAIL FOR SPANS 6'-0' < T□ < 10'-0"

SCALE: NTS



HEADER DETAIL FOR 

SCALE: NTS

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