



## **STRUCTURAL DESIGN** **ENCLOSED BUILDING**

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

**8 July 2022**  
**Revision 0**  
**M&A Project No. 22096S**

**Prepared for:**

**Unified Steel Structures, Inc.**  
**154 N. Renfro Street Suite 100**  
**Mount Airy, NC 27030**

**Prepared by:**

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**Mount Airy, NC 27030**



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PROJECT MGR: WSM

CLIENT: USS

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-8-22

SHT. 1

SCALE: NTS

DWG. NO: SK-3

JOB NO: 22096S

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## INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR MAXIMUM 30'-0" WIDE x 20'-0" EAVE HEIGHT ENCLOSED STRUCTURES.
2. DESIGN WAS DONE IN ACCORDANCE WITH ALL THE APPLICABLE BUILDING CODES LISTED ON SHEET 3A.
3. DESIGN LOADS ARE AS FOLLOWS:
  - A) ROOF DEAD LOAD:
    - SELF-WEIGHT = 1.5 PSF
    - MEP = 0 PSF
    - COLLATERAL = 0 PSF
  - B) ROOF LIVE LOAD = 12 PSF
  - C) FLOOR LIVE LOAD = 100 PSF (4" CONCRETE SLAB-ON-GRADE)
  - D) GROUND SNOW LOAD = 35 PSF
    - = 30 PSF (W ≤ 24'-0" WITH U-CHANNEL RAFTER TIE)

NOTE: UNBALANCED LOADING DUE TO SNOW DRIFTING FROM AN ADJACENT TALLER STRUCTURE HAS NOT BEEN EVALUATED.
4. 3-SECOND GUST ULTIMATE WIND SPEED ( $V_{ULT}$ ) 145 MPH (NOMINAL WIND SPEED 112 MPH).
5. MAXIMUM RAFTER/COLUMN AND END COLUMN SPACING = 5.0 FEET (UNLESS NOTED OTHERWISE).
6. END WALL COLUMNS (POSTS) ARE EQUIVALENT TO SIDE WALL COLUMNS IN SIZE AND SPACING (UNLESS NOTED OTHERWISE).
7. RISK CATEGORY I.
8. WIND EXPOSURE CATEGORY B/C.
9. STRUCTURAL ANALYSIS/DESIGN IS BASED ON ITS MEETING THE REQUIREMENTS OF ASTM A653 GRADE 50 WITH MINIMUM YIELD STRENGTH (FY) OF 54 KSI AND GALVANIZING MEETING THE REQUIREMENTS OF G60.
10. SPECIFICATIONS APPLICABLE TO 29 GAUGE OR 26 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2"x2 1/2"-14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS (UNLESS NOTED OTHERWISE). WHERE TS 2 1/2" x 2 1/2" - 14 GAUGE IS SPECIFIED, TS 2 1/4" x 2 1/4" - 12 GAUGE MAY BE USED AS AN OPTION.
11. CONNECTOR SLEEVES ARE MINIMUM 6" LONG, TS 2 1/4"x2 1/4"-14 GAUGE FOR 2 1/2"x2 1/2"-14 GAUGE (UNLESS NOTED OTHERWISE). WHERE 6" LONG TS 2 1/4"x2 1/4"-14 GAUGE CONNECTOR SLEEVE IS SPECIFIED, 6" LONG TS 2"x2"-12 GAUGE TS CONNECTOR SLEEVE MAY BE USED AS AN OPTION.
12. AVERAGE PANEL FASTENER SPACING ON-CENTERS = 9" O.C. (MAX.)
13. 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 LAP JOINT SEALANT.
14. ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL AT OR WITHIN 6" OF EVERY RAFTER COLUMN.
15. STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 36" LONG AND MAY BE USED IN SUITABLE SOILS. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED.
16. 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.
17. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:
  - SOIL SITE CLASS = D
  - RISK CATEGORY I
  - R = 3.25                       $J_e = 1.0$
  - $S_{DS} = 2.625 g$                $V = C_s W$
  - $S_{DI} = 2.13 g$
18. IF MORE THAN 50% OF COLUMN (LEG) ARE REMOVED IN ANY LONGITUDINAL (SIDE) WALLS OF A BUILDING, THE ENGINEER IS TO BE NOTIFIED TO DETERMINE WHETHER PORTAL FRAMES OR OTHER LONGITUDINAL STABILITY ELEMENTS WILL BE REQUIRED.
19. **THIS MASTER DESIGN IS A GENERIC MASTER DESIGN PRIMARILY INTENDED FOR PLANT FABRICATION AND ERECTION AKIN TO SHOP DRAWINGS. THE MASTER DESIGN IS NOT PRIMARILY INTENDED FOR CONSTRUCTION PERMIT. WHEN APPLYING FOR BUILDING PERMIT, THE CERTIFIED BUILDING OFFICIAL MUST BE CONSULTED TO VERIFY WHETHER THE USE OF THE MASTER DESIGN IS ADEQUATE OR IF A SITE-SPECIFIC DESIGN IS REQUIRED FOR BUILDING PERMIT. ANY VARIATION FROM THE ANALYSIS/DESIGN PARAMETERS OF THE MASTER DESIGN REQUIRES THE DEVELOPMENT OF A SITE-SPECIFIC DESIGN.**

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**JOB NO: 22096S**

**SHT. 3**

**DWG. NO: SK-3**

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## LIST OF APPLICABLE BUILDING CODES

2021 INTERNATIONAL BUILDING CODE (IBC 2021)

2018 INTERNATIONAL BUILDING CODE (IBC 2018)

2015 INTERNATIONAL BUILDING CODE (IBC 2015)

2012 INTERNATIONAL BUILDING CODE (IBC 2012)

BUILDING CODE 2021 OF ALABAMA  
(ADOPTS THE IBC 2021 WITHOUT AMENDMENTS)  
(IBC 2015, IBC 2018, IBC 2021 (DEPENDENT UPON LOCAL JURISDICTION))

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

2018 KENTUCKY BUILDING CODE  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

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

DHID BUILDING CODE 2017  
(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)  
BUILDING CODE OF THE CITY OF KNOXVILLE  
(ADOPTS THE IBC 2018 WITH AMENDMENTS)  
BUILDING CODE 2018 OF NASHVILLE AND DAVIDSON  
COUNTY (ADOPTS THE IBC 2018 WITH AMENDMENTS)

2018 VIRGINIA CONSTRUCTION CODE  
(ADOPTS THE IBC 2018 WITH AMENDMENTS)

BUILDING CODE 2015 OF WEST VIRGINIA  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

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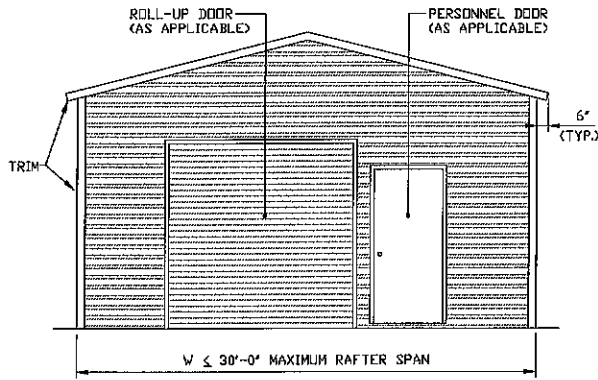
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**DWG. NO: SK-3**

**REV: 0**

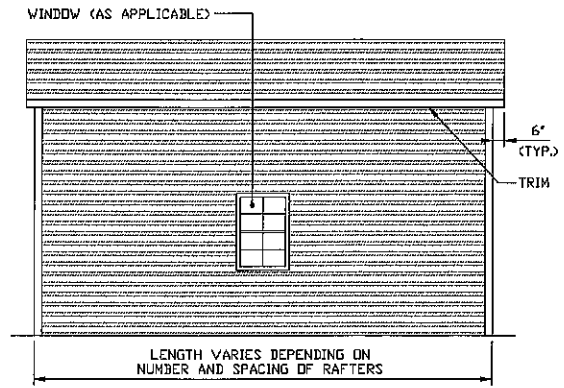
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# BOX EAVE FRAME RAFTER STRUCTURE



**TYPICAL END ELEVATION**

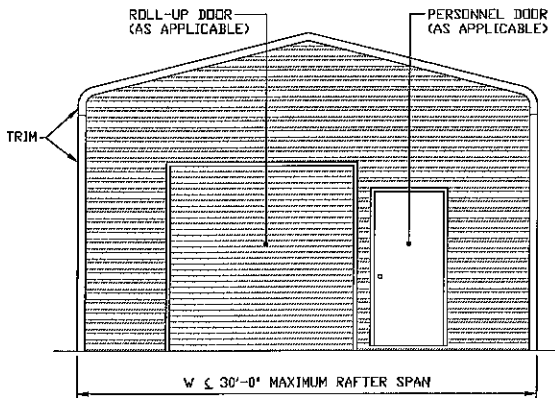
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**TYPICAL SIDE ELEVATION**

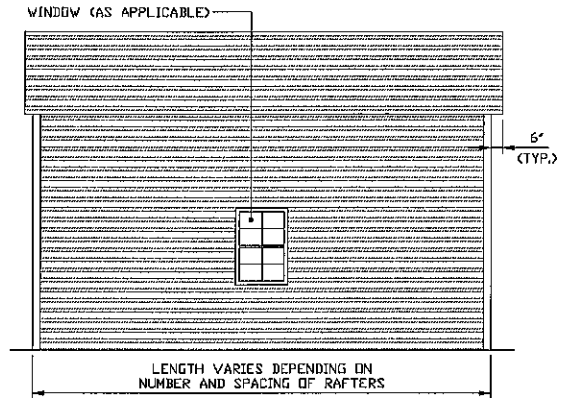
SCALE: NTS

# BDW FRAME RAFTER STRUCTURE



**TYPICAL END ELEVATION**

SCALE: NTS



**TYPICAL SIDE ELEVATION**

SCALE: NTS

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**SHT. 4**

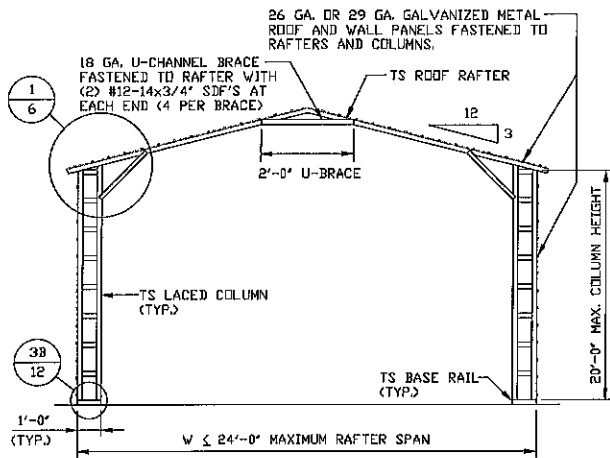
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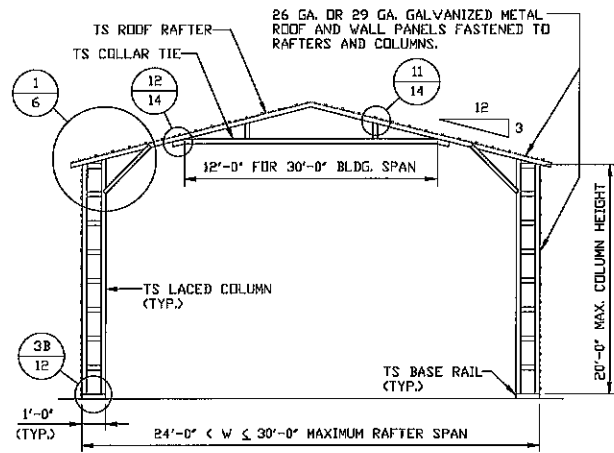
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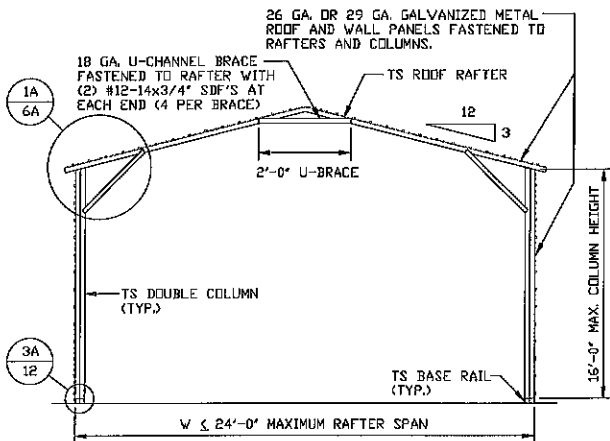
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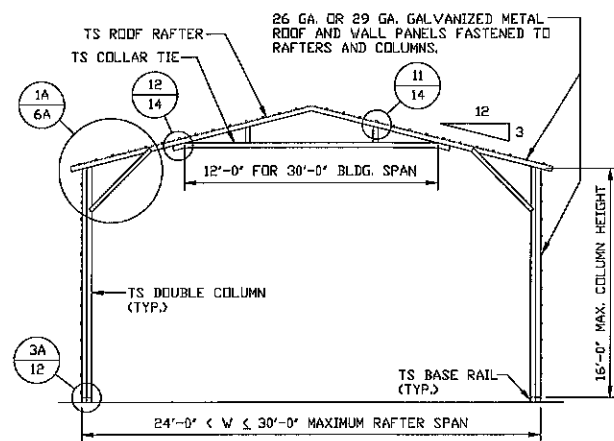
**TYPICAL INTERIOR RAFTER/  
COLUMN FRAME SECTION**  
SCALE: NTS



**TYPICAL INTERIOR RAFTER/  
COLUMN FRAME SECTION**  
SCALE: NTS



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**SHT. 5**

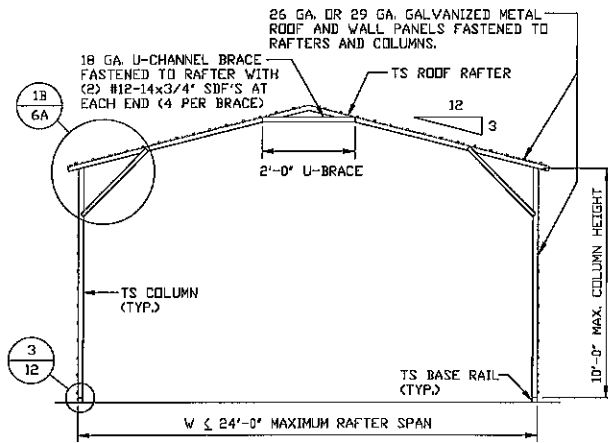
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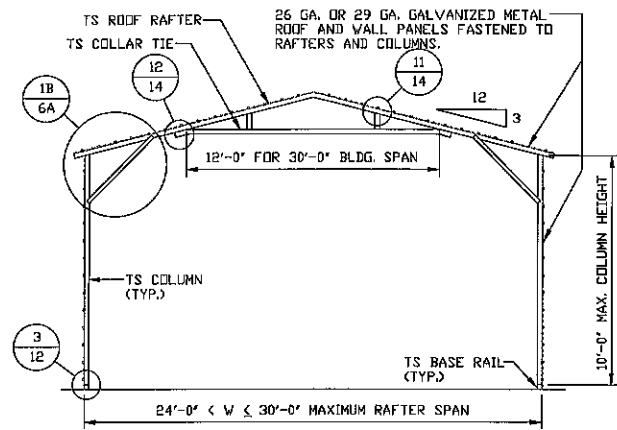
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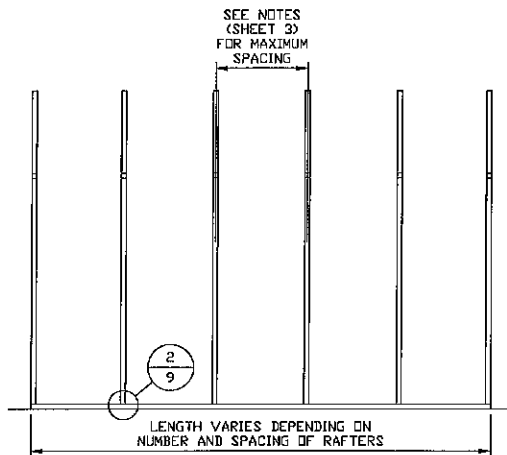
**TYPICAL INTERIOR RAFTER/  
COLUMN FRAME SECTION**

SCALE: NTS



**TYPICAL INTERIOR RAFTER/  
COLUMN FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION**

SCALE: NTS

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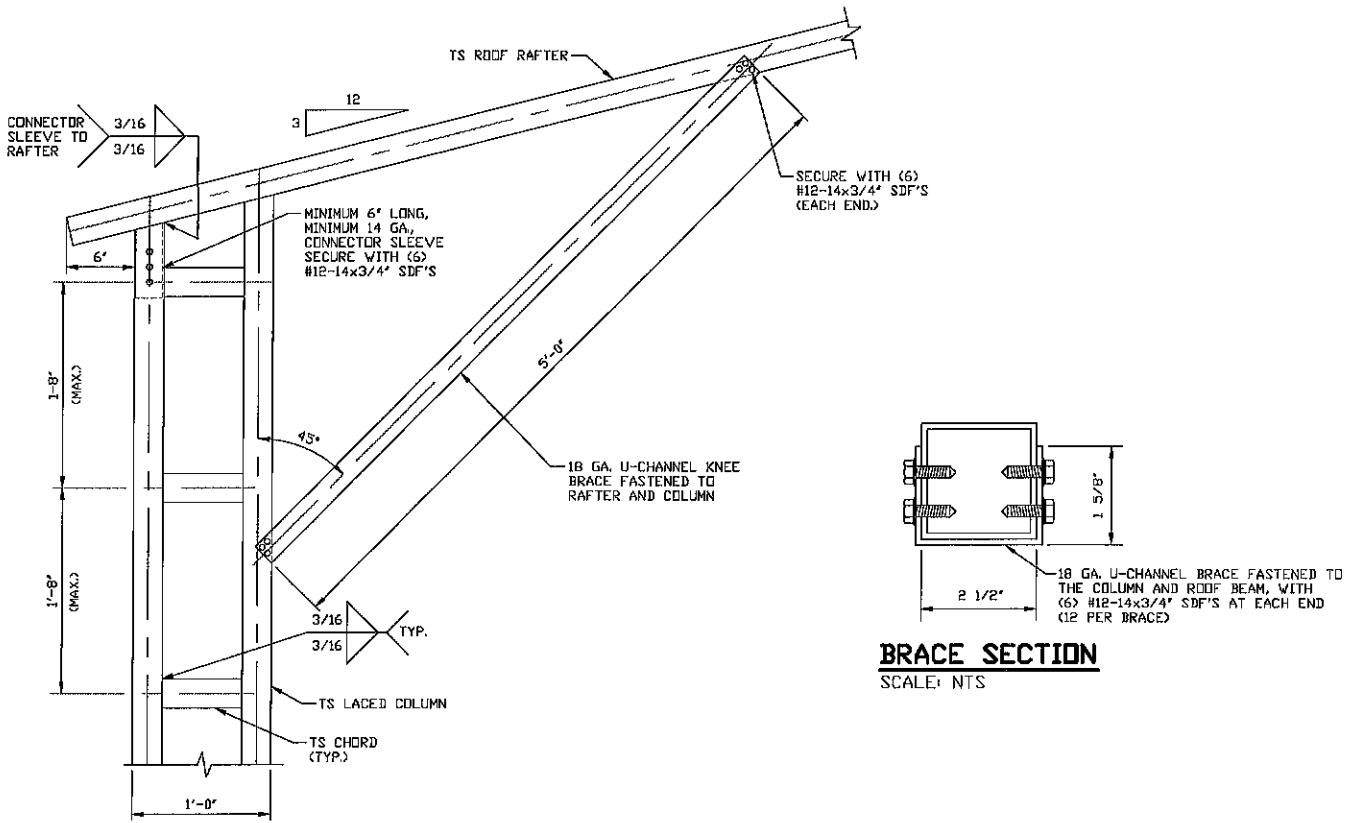
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**1** BOX EAVE RAFTER COLUMN CONNECTION  
 DETAIL FOR HEIGHTS 16'-0" < TO ≤ 20'-0"  
 SCALE: NTS

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SHT. 6

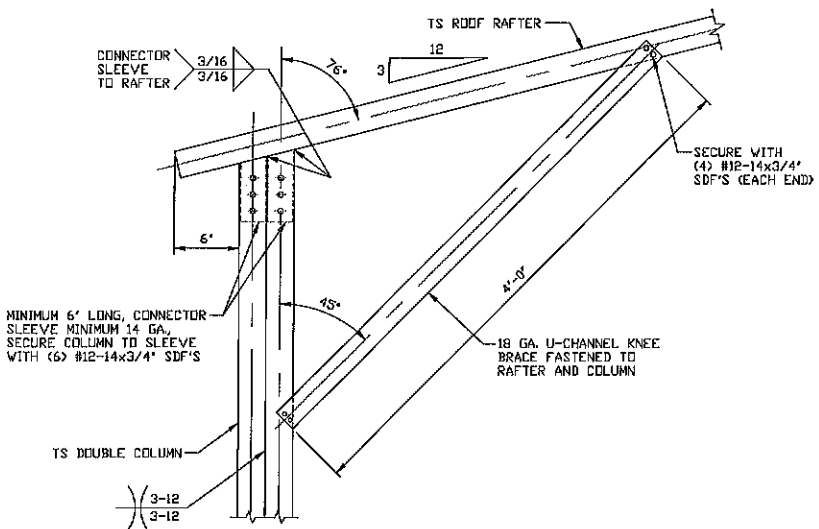
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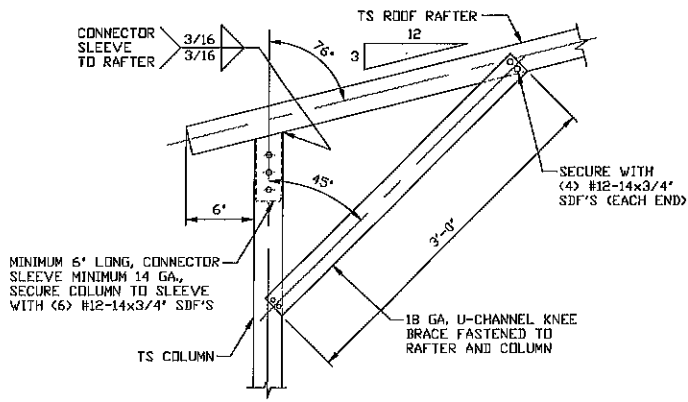
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**BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO <= 16'-0"**

**1A**

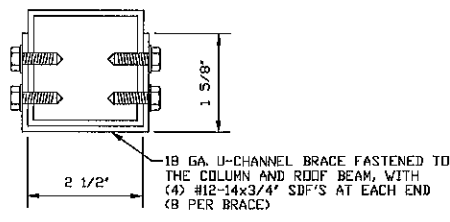
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**BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS <= 10'-0"**

**1B**

SCALE: NTS



**BRACE SECTION**  
SCALE: NTS

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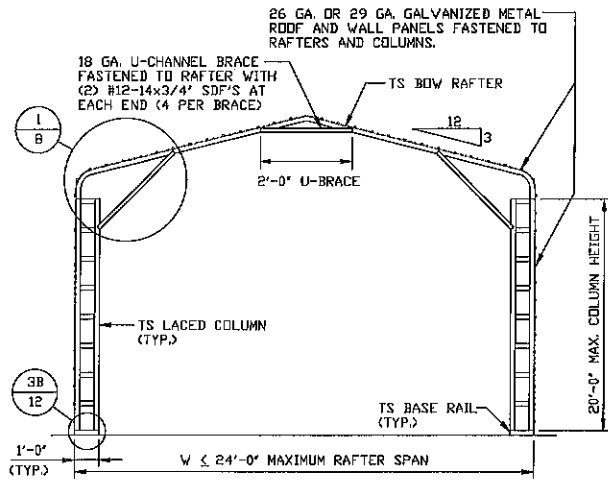
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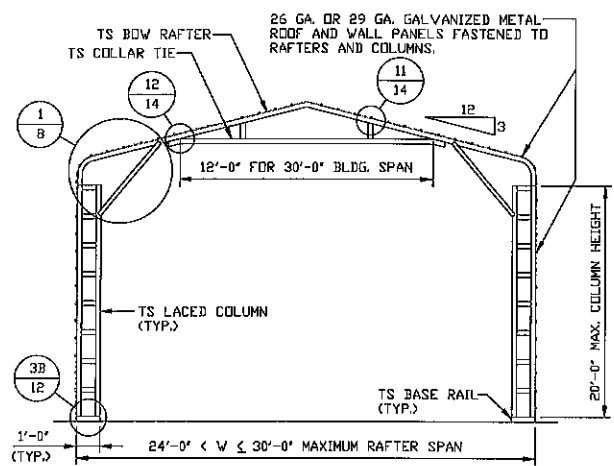
**PROJECT MGR: WSM**  
**CLIENT: USS**

**DATE: 7-8-22**  
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**SCALE: NTS**  
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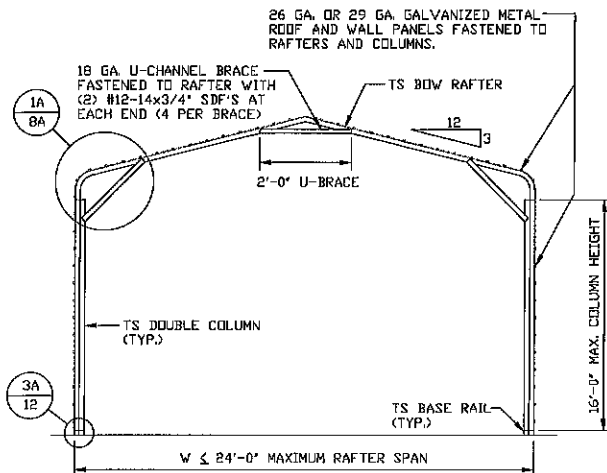
**TYPICAL INTERIOR RAFTER/  
COLUMN FRAME SECTION**

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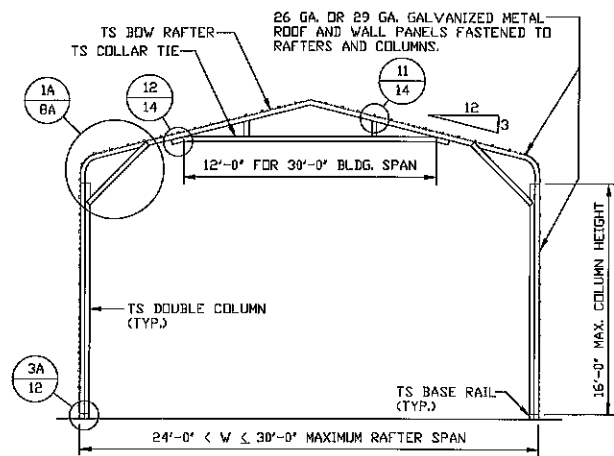
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**SHT. 7**

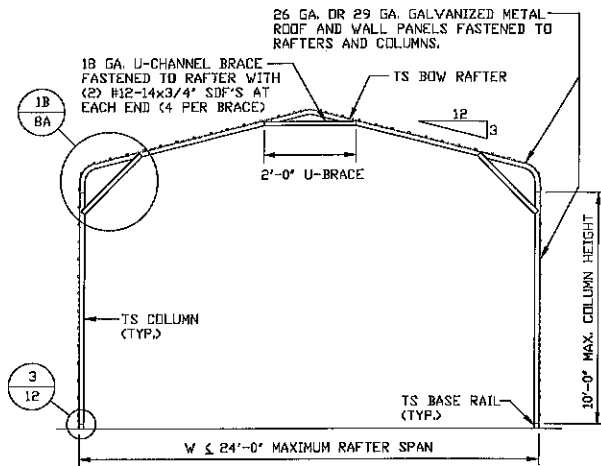
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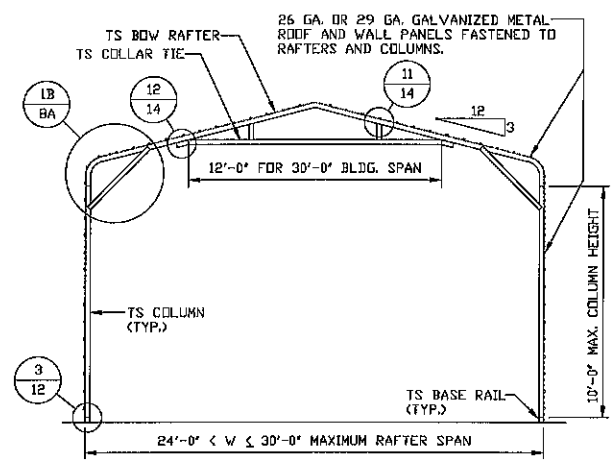
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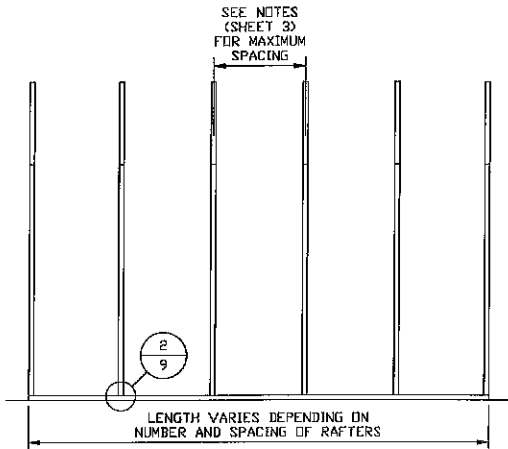
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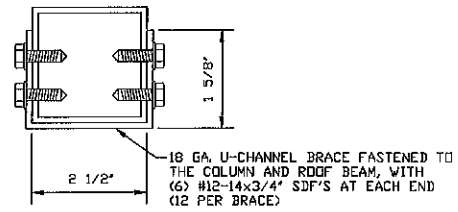
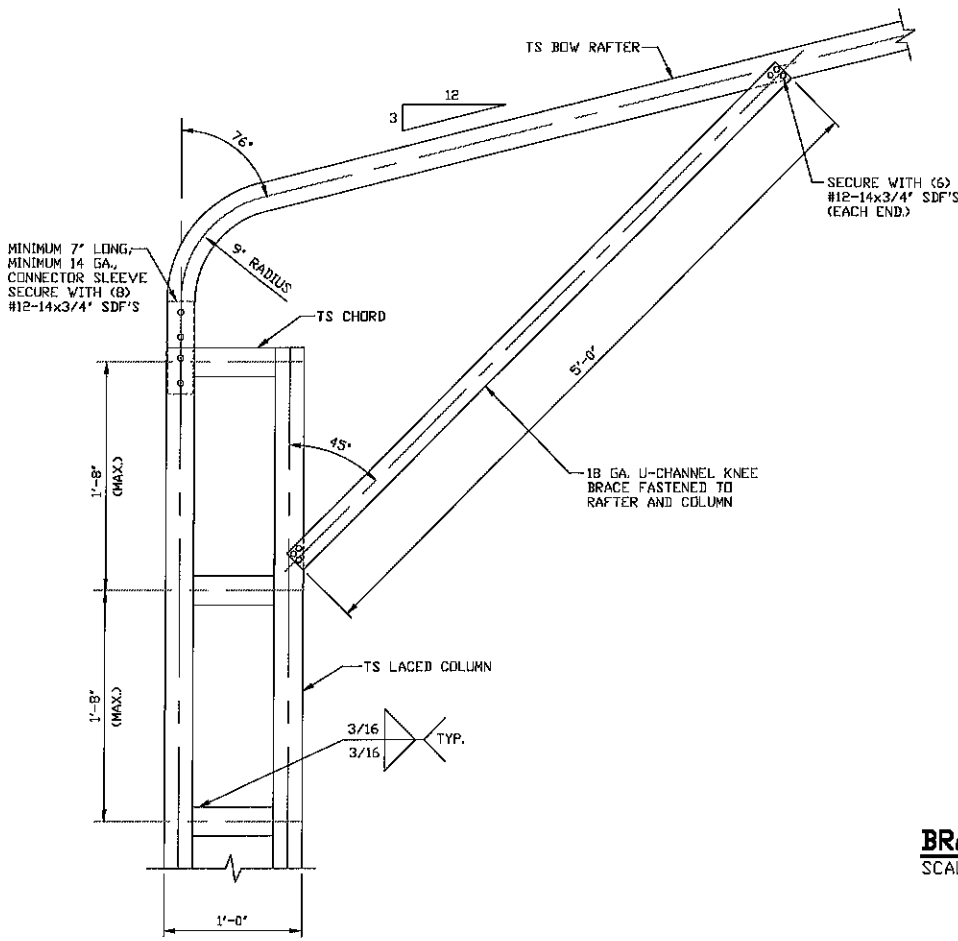


**TYPICAL RAFTER/COLUMN FRAMING SIDE SECTION**

SCALE: NTS

<b>MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.</b>	<b>DRAWN BY: JG</b>	UNIFIED STEEL STRUCTURES, INC. 154 N. RENFRO STREET SUITE 100 MOUNT AIRY, NC 27030 30'-0"x20'-0" SP ENCLOSED STRUCTURE		
	<b>CHECKED BY: PDH</b>			
<b>PROJECT MGR: WSM</b>	<b>DATE: 7-8-22</b>	<b>SCALE: NTS</b>	<b>JOB NO: 22096S</b>	
<b>CLIENT: USS</b>	<b>SHT. 7A</b>	<b>DWG. NO: SK-3</b>	<b>REV: 0</b>	

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**BRACE SECTION**  
SCALE: NTS

**1 BOW RAFTER COLUMN CONNECTION DETAIL**  
**FOR HEIGHTS 16'-0" < TO ≤ 20'-0"**  
SCALE: NTS

**MOORE AND ASSOCIATES**  
**ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**  
**CHECKED BY: PDH**

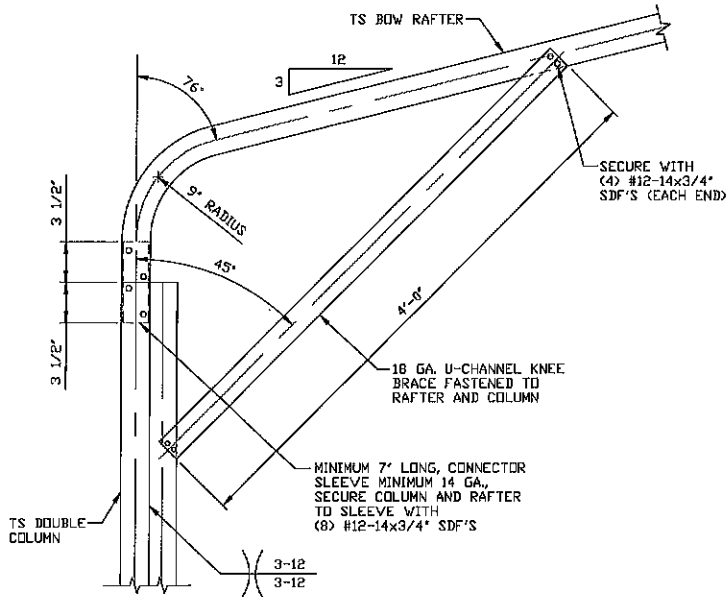
UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30-0"x20'-0" SP ENCLOSED STRUCTURE

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**PROJECT MGR: WSM**  
**CLIENT: USS**

**DATE: 7-8-22**  
**SHT. 8**

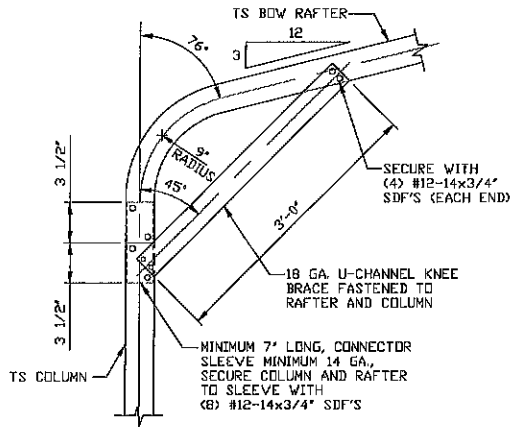
**SCALE: NTS**  
**DWG. NO: SK-3**  
**JOB NO: 22096S**  
**REV: 0**



**BOX EAVE RAFTER COLUMN  
CONNECTION DETAIL FOR  
HEIGHTS 10'-0" < TO ≤ 16'-0"**

1A

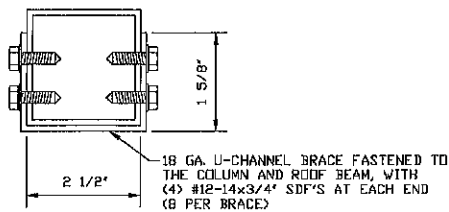
SCALE: NTS



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

1B

SCALE: NTS



**BRACE SECTION**

SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: USS

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-8-22

SCALE: NTS

JOB NO: 22096S

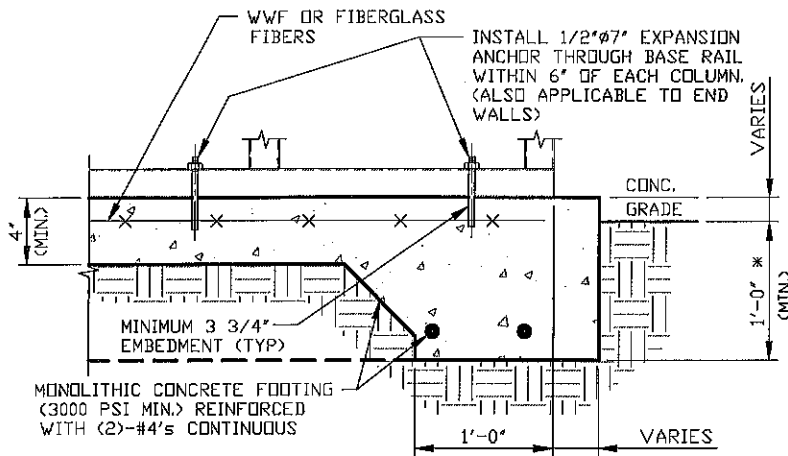
SHT. 6A

DWG. NO: SK-3

REV: 0

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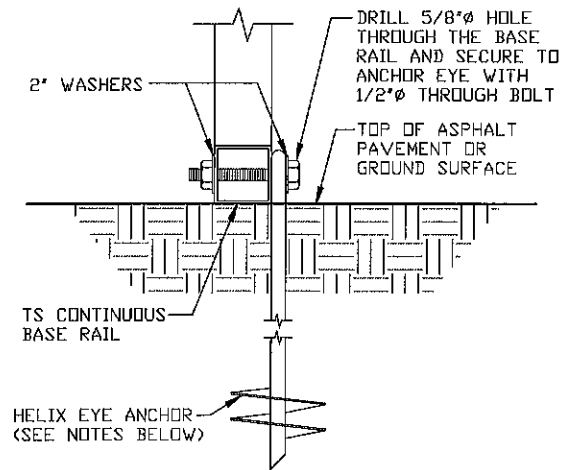
## BASE RAIL ANCHORAGE OPTIONS



2

### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS  
MINIMUM ANCHOR EDGE DISTANCE IS 4".  
\* COORDINATE WITH LOCAL BUILDING CODES/ORD.  
REGARDING REQUIRED FOOTING DEPTH.



2A

### GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)  
\* COORDINATE WITH LOCAL CODES/ORD.  
REGARDING REQUIRED ANCHOR LENGTH.

### GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN BASED ON MINIMUM SOIL 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:

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, 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 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.

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 9**

**SCALE: NTS**

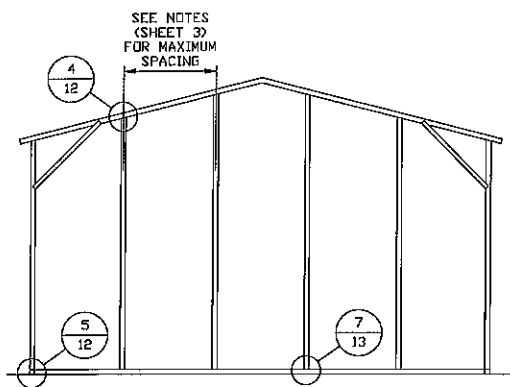
**DWG. NO: SK-3**

**JOB NO: 22096S**

**REV: 0**

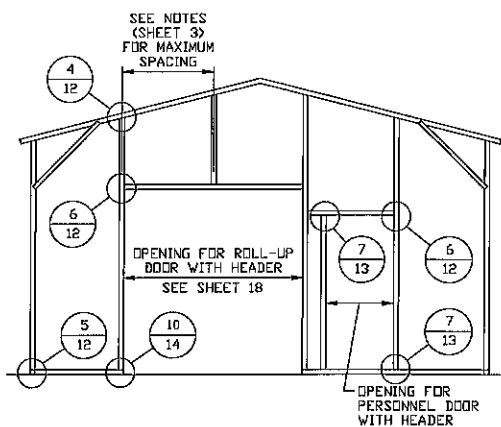
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# TYPICAL END WALL AND SIDE WALL FRAMING SECTIONS (BOX EAVE RAFTER)



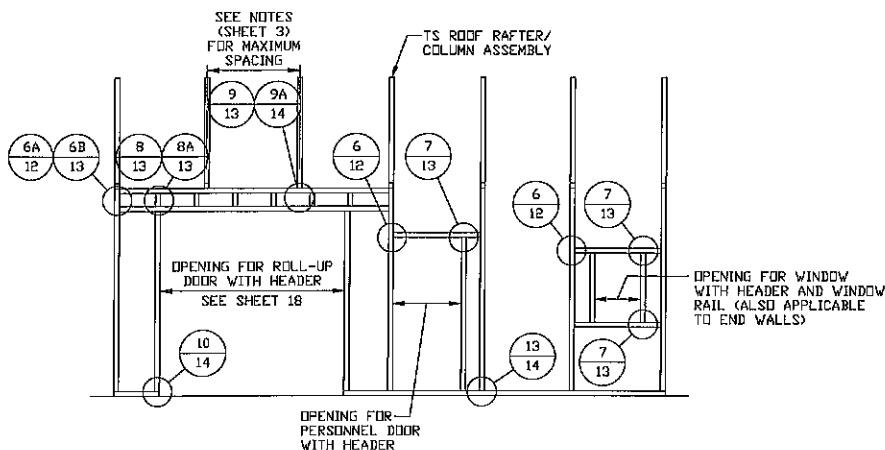
**TYPICAL BOX EAVE RAFTER  
END WALL FRAMING SECTION**

SCALE: NTS



**TYPICAL BOX EAVE RAFTER END  
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



**TYPICAL BOX EAVE RAFTER  
SIDE WALL OPENINGS FRAMING SECTION**

SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 10**

**SCALE: NTS**

**DWG. NO: SK-3**

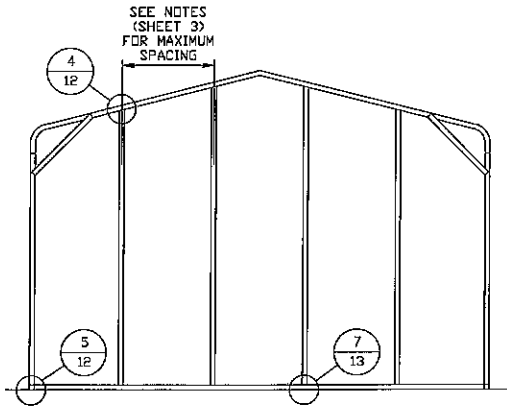
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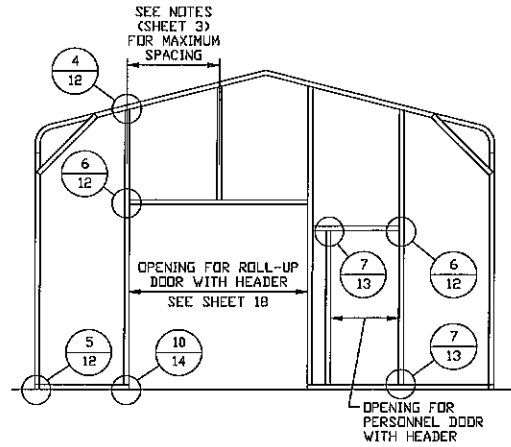
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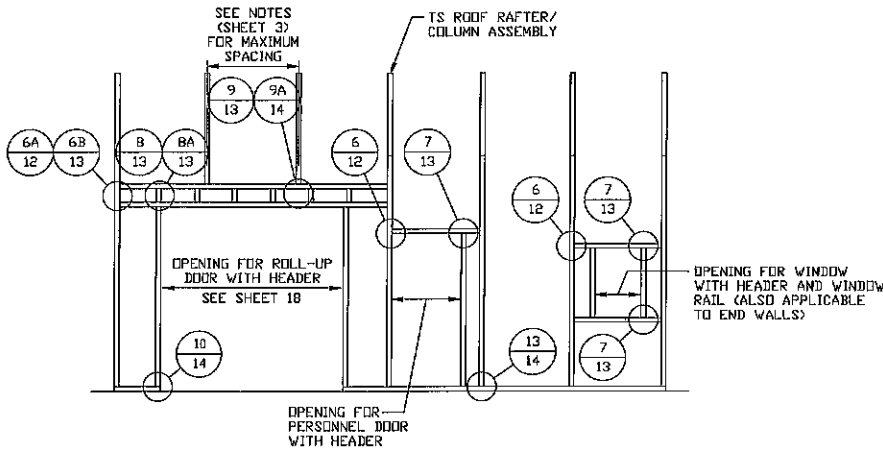
# TYPICAL END WALL AND SIDE WALL FRAMING SECTIONS (BOW RAFTER)



**TYPICAL BOW RAFTER  
END WALL FRAMING SECTION**  
SCALE: NTS



**TYPICAL BOW RAFTER END  
WALL OPENINGS FRAMING SECTION**  
SCALE: NTS



**TYPICAL BOW RAFTER SIDE  
WALL OPENINGS FRAMING SECTION**  
SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 11**

**SCALE: NTS**

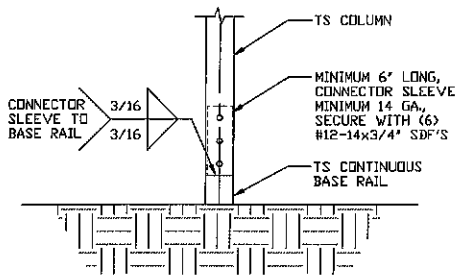
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**JOB NO: 22096S**

**REV: 0**

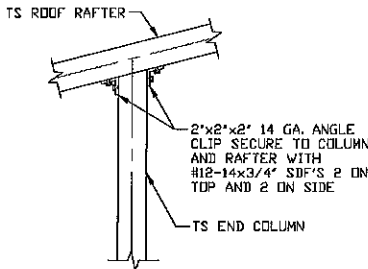
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# CONNECTION DETAILS



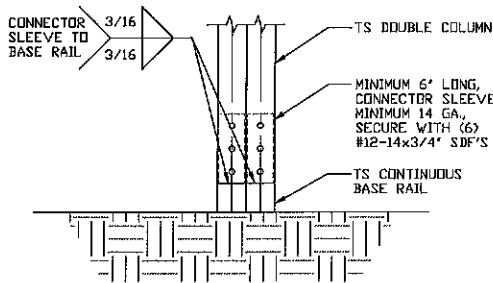
**3**  
**RAFTER COLUMN/  
BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



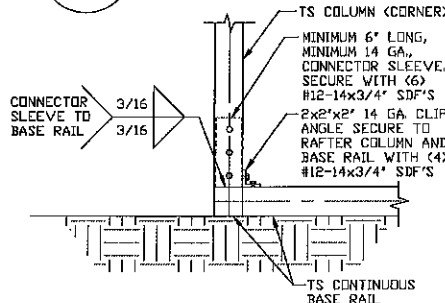
**4**  
**END COLUMN/RAFTER  
CONNECTION DETAIL**

SCALE: NTS



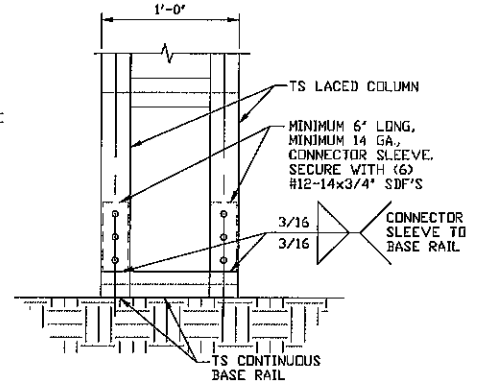
**3A**  
**RAFTER COLUMN/  
BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



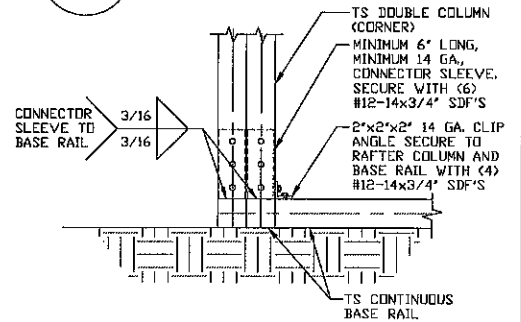
**5**  
**END COLUMN/BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



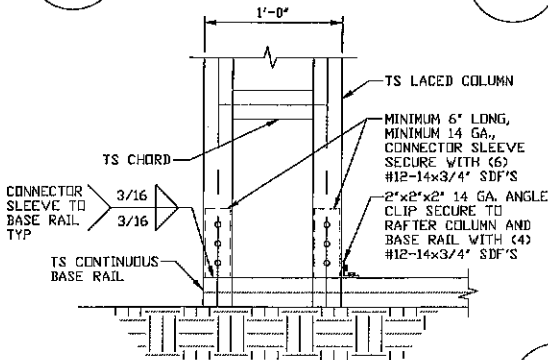
**3B**  
**RAFTER COLUMN/  
BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



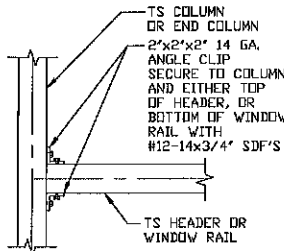
**5A**  
**END COLUMN/BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



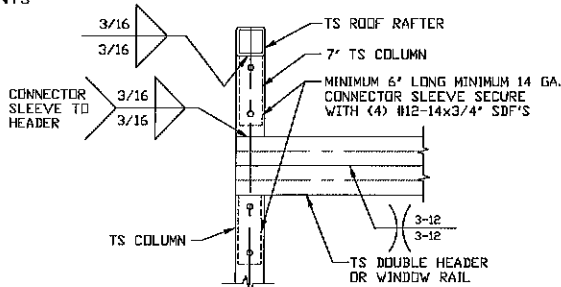
**5B**  
**END COLUMN/BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



**6**  
**COLUMN OR WINDOW  
RAIL TO POST  
CONNECTION DETAIL**

SCALE: NTS



**6A**  
**DOUBLE HEADER TO COLUMN  
CONNECTION DETAIL**

SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

**UNIFIED STEEL STRUCTURES, INC.**  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 12**

**SCALE: NTS**

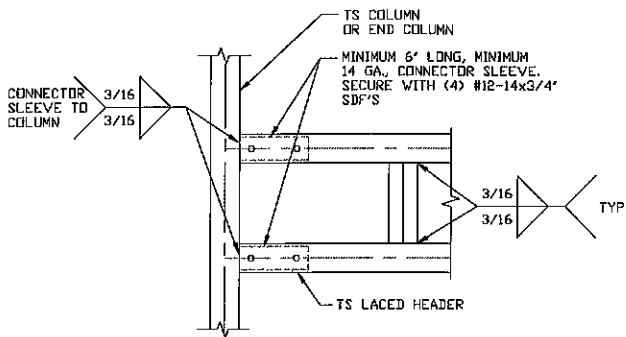
**DWG. NO: SK-3**

**JOB NO: 22096S**

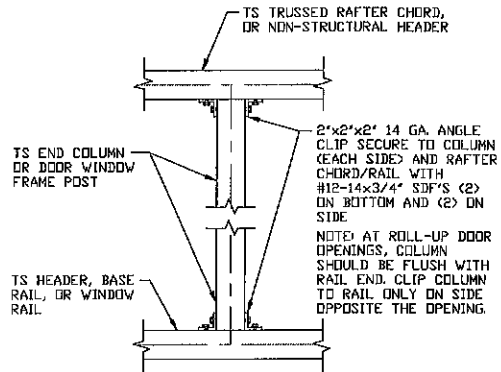
**REV: 0**

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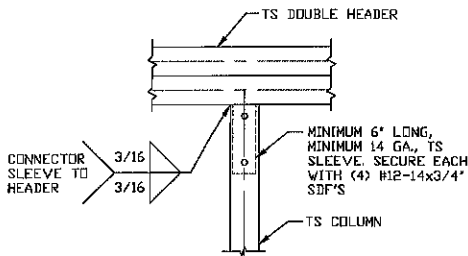
# CONNECTION DETAILS



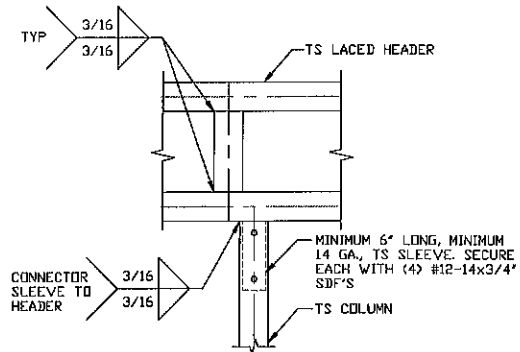
**6B**  
**LACED HEADER TO COLUMN CONNECTION DETAIL**  
 SCALE: NTS



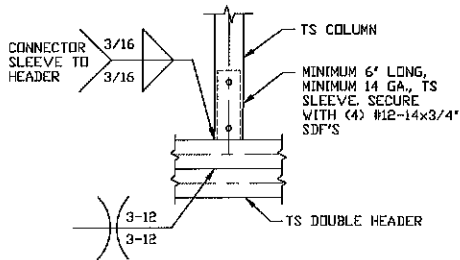
**7**  
**COLUMN TO WINDOW RAIL CONNECTION DETAIL**  
 SCALE: NTS



**8**  
**DOUBLE HEADER/COLUMN CONNECTION DETAIL**  
 SCALE: NTS



**8A**  
**LACED HEADER/COLUMN CONNECTION DETAIL**  
 SCALE: NTS



**9**  
**COLUMN/DOUBLE HEADER CONNECTION DETAIL**  
 SCALE: NTS

**MOORE AND ASSOCIATES  
 ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**  
**CHECKED BY: PDH**

UNIFIED STEEL STRUCTURES, INC.  
 154 N. RENFRO STREET SUITE 100  
 MOUNT AIRY, NC 27030  
 30'-0"x20'-0" SP ENCLOSED STRUCTURE

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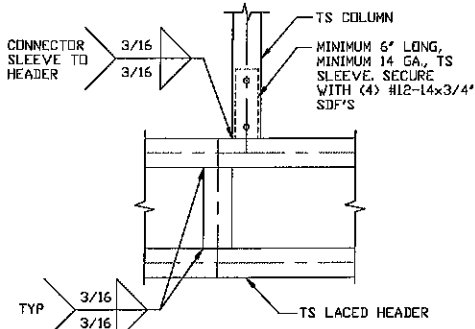
**PROJECT MGR: WSM**  
**CLIENT: USS**

**DATE: 7-8-22**  
**SHT. 13**

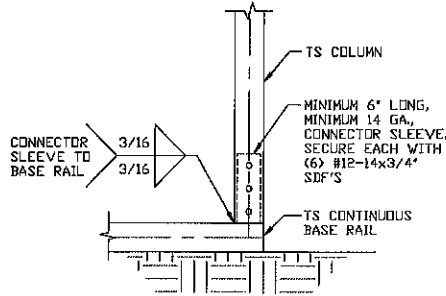
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**DWG. NO: SK-3**

**JOB NO: 22096S**  
**REV: 0**

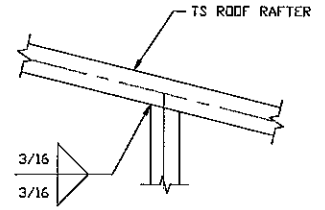
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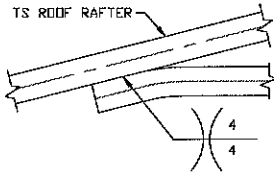
**9A**  
**COLUMN/  
 LACED HEADER  
 CONNECTION DETAIL**  
 SCALE: NTS



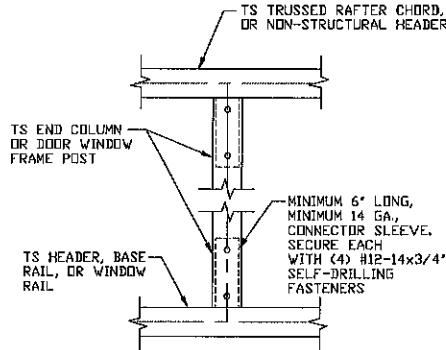
**10**  
**COLUMN/BASE RAIL  
 CONNECTION DETAIL**  
 SCALE: NTS



**11**  
**RAFTER TO CHORD  
 CONNECTION DETAIL**  
 SCALE: NTS



**12**  
**COLLAR TIE  
 CONNECTION DETAIL**  
 SCALE: NTS



**13**  
**COLUMN TO HEADER  
 OR BASE RAIL  
 CONNECTION DETAIL**  
 SCALE: NTS

**MOORE AND ASSOCIATES  
 ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
 154 N. RENFRO STREET SUITE 100  
 MOUNT AIRY, NC 27030  
 30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 14**

**SCALE: NTS**

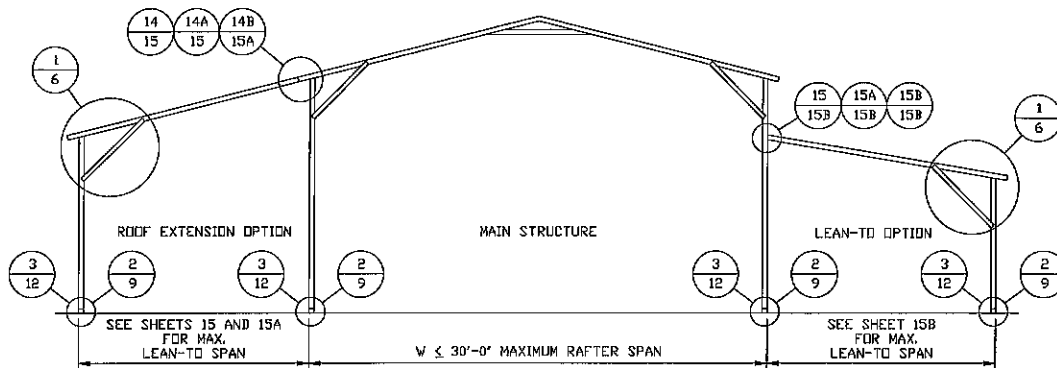
**DWG. NO: SK-3**

**JOB NO: 22096S**

**REV: 0**

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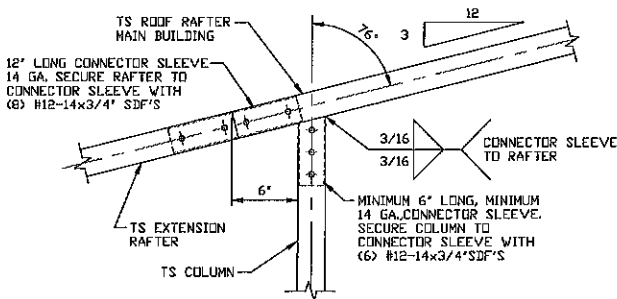
# BOX EAVE RAFTER LEAN-TO OPTIONS



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

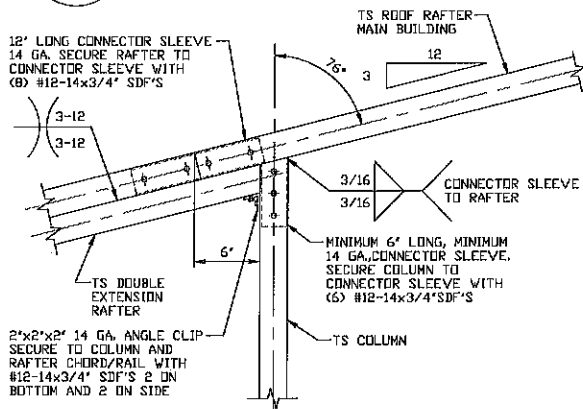
SCALE: NTS

MAXIMUM WIDTH OF LACED MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 20'-0".  
 MAXIMUM WIDTH OF DOUBLE MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 16'-0".  
 MAXIMUM WIDTH OF SINGLE MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 12'-0".  
 MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE LACED COLUMNS FOR EAVE HEIGHTS 16'-0" < TO ≤ 20'-0".  
 MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 10'-0" < TO ≤ 16'-0".  
 MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS ≤ 10'-0".



### 14 SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS ≤ 12'-0"

SCALE: NTS



### 14A SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS 12'-0" < TO ≤ 16'-0"

SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 15**

**SCALE: NTS**

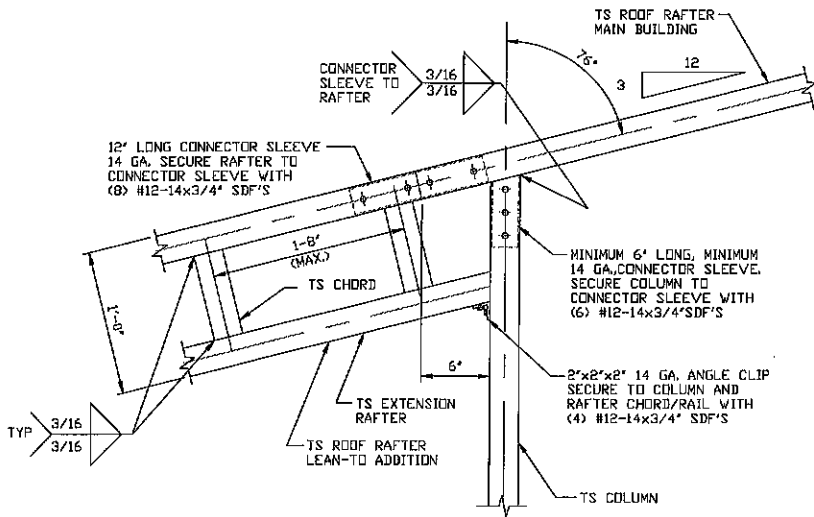
**DWG. NO: SK-3**

**JOB NO: 22096S**

**REV: 0**

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# BOX EAVE RAFTER LEAN-TO OPTION



**SIDE EXTENSION RAFTER/  
COLUMN DETAIL FOR RAFTER  
SPANS 16'-0" < TO ≤ 20'-0"**

**14B**

SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
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30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 15A**

**SCALE: NTS**

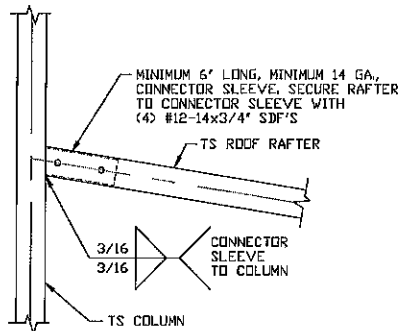
**DWG. NO: SK-3**

**JOB NO: 22096S**

**REV: 0**

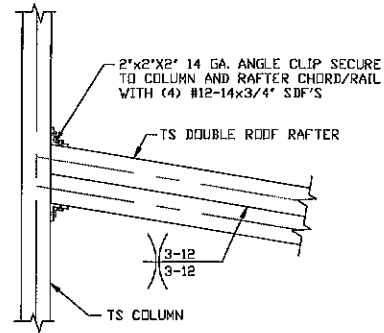
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## BOX EAVE RAFTER LEAN-TO OPTIONS



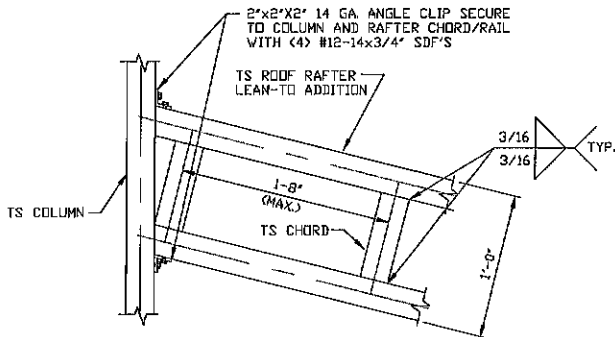
**15** LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS  $\leq 12'-0''$

SCALE: NTS



**15A** LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS  $12'-0'' < TO \leq 16'-0''$

SCALE: NTS



**15B** LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS  $16'-0'' < TO \leq 20'-0''$

SCALE: NTS

MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: USS

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-8-22

SHT. 15B

SCALE: NTS

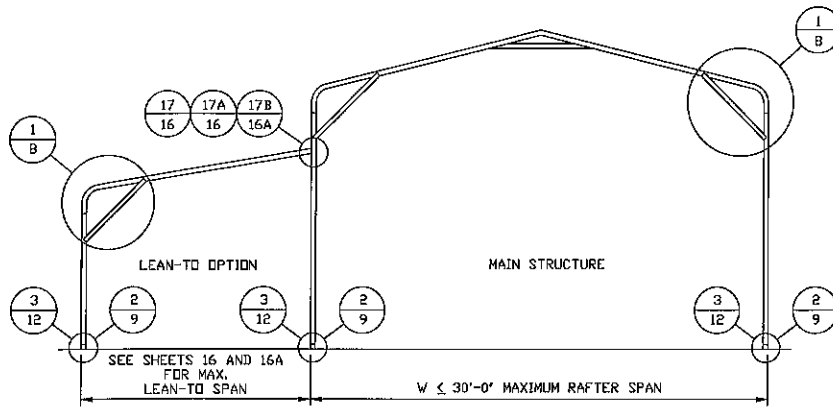
DWG. NO: SK-3

JOB NO: 22096S

REV: 0

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# BOW RAFTER LEAN-TO OPTIONS

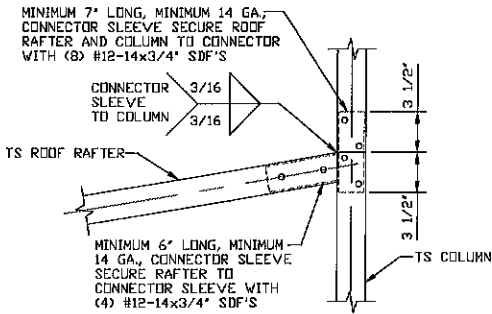


## TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION

SCALE: NTS

MAXIMUM WIDTH OF LACED MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 20'-0".  
 MAXIMUM WIDTH OF DOUBLE MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 16'-0".  
 MAXIMUM WIDTH OF SINGLE MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 12'-0".

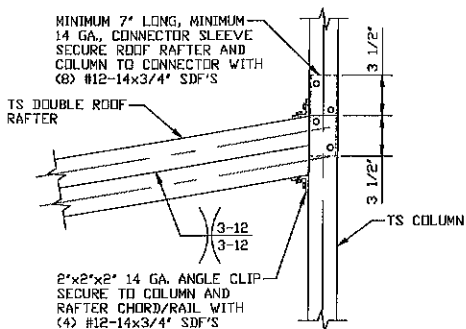
MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE LACED COLUMNS FOR EAVE HEIGHTS 16'-0" < TO ≤ 20'-0".  
 MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 10'-0" < TO ≤ 16'-0".  
 MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS ≤ 10'-0".



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

SCALE: NTS

17



### LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 12'-0" < TO < 16'-0"

SCALE: NTS

17A

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 16**

**SCALE: NTS**

**DWG. NO: SK-3**

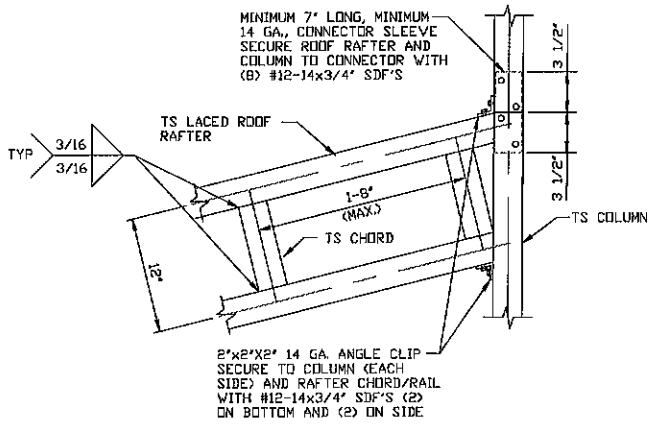
**JOB NO: 22096S**

**REV: 0**

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## BOW RAFTER LEAN-TO OPTION



**LEAN-TO RAFTER TO RAFTER COLUMN  
CONNECTION DETAIL FOR  
RAFTER SPANS 16'-0" < TO < 20'-0"**

17B

SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

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**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 16A**

**SCALE: NTS**

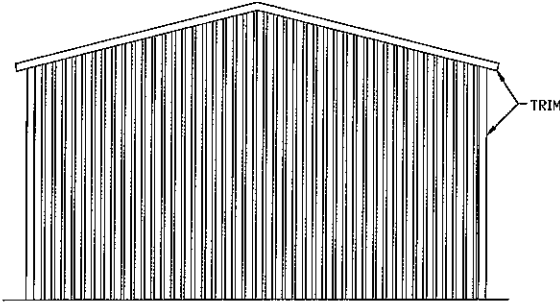
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**JOB NO: 22096S**

**REV: 0**

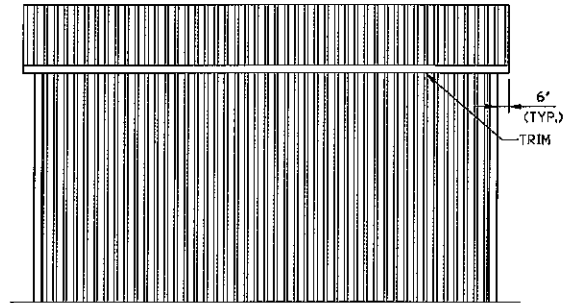
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# BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



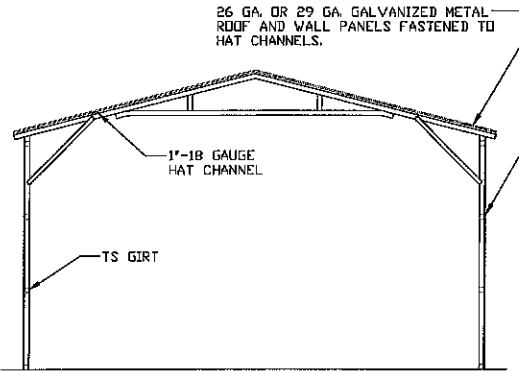
**TYPICAL END ELEVATION  
VERTICAL ROOF/SIDING**

SCALE: NTS



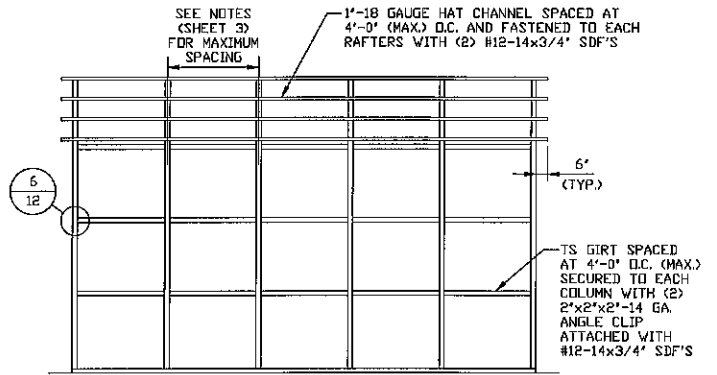
**TYPICAL SIDE ELEVATION  
VERTICAL ROOF/SIDING**

SCALE: NTS



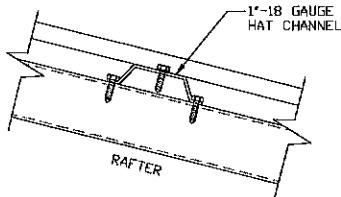
**TYPICAL SECTION VERTICAL  
ROOF/SIDING OPTION**

SCALE: NTS



**TYPICAL FRAMING SECTION  
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS



**PANEL ATTACHMENT**

(ALTERNATE FOR VERTICAL ROOF PANELS)  
SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 17**

**SCALE: NTS**

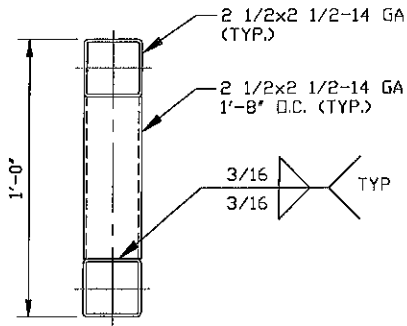
**DWG. NO: SK-3**

**JOB NO: 22096S**

**REV: 0**

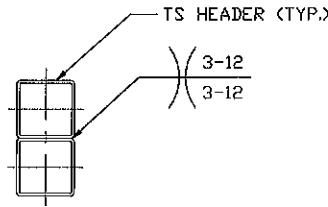
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## SIDE WALL HEADER OPTIONS



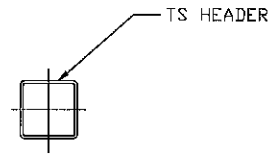
**HEADER DETAIL FOR  
 $12'-0'' < \text{LENGTHS} \leq 20'-0''$**

SCALE: NTS



**HEADER DETAIL FOR  
 $7'-0'' < \text{LENGTHS} \leq 12'-0''$**

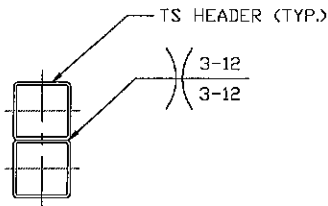
SCALE: NTS



**HEADER DETAIL FOR  
 $\text{LENGTHS} \leq 7'-0''$**

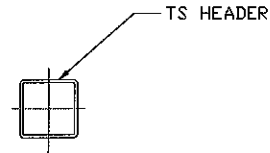
SCALE: NTS

## END WALL HEADER OPTIONS



**HEADER DETAIL FOR  
 $13'-0'' < \text{LENGTHS} \leq 20'-0''$**

SCALE: NTS



**HEADER DETAIL FOR  
 $\text{LENGTHS} \leq 13'-0''$**

SCALE: NTS

**MOORE AND ASSOCIATES  
ENGINEERING AND CONSULTING, INC.**

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: USS**

UNIFIED STEEL STRUCTURES, INC.  
154 N. RENFRO STREET SUITE 100  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-8-22**

**SHT. 18**

**SCALE: NTS**

**DWG. NO: SK-3**

**JOB NO: 22096S**

**REV: 0**

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