



STRUCTURAL DESIGN

ENCLOSED BUILDING

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

**20 August 2019
Revision 0
M&A Project No. 19164S**

Prepared for:

**TOL Buildings, Inc.
330 N. Meridian Rd.
Youngstown, Ohio 44509**

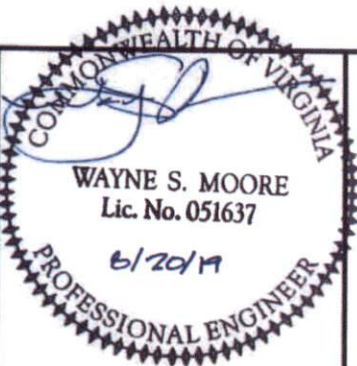
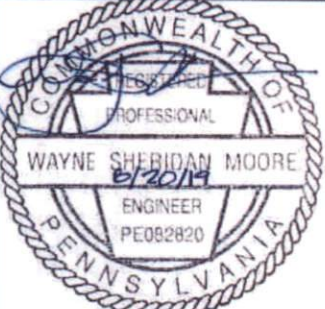
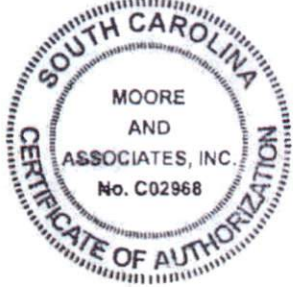
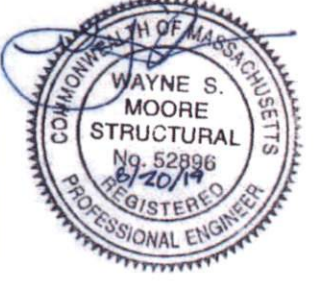
Prepared by:

**Moore and Associates Engineering and Consulting, Inc.
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North Augusta, SC 29841**

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**MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING**

				
				
				
				
				
MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.		DRAWN BY: JG CHECKED BY: PDH	TOL BUILDINGS, INC. 330 N. MERIDIAN RD. YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE	
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PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

SHT. 2

DWG. NO: SK-3

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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 THE 2018 NORTH CAROLINA BUILDING CODE, 2015 INTERNATIONAL BUILDING CODE (IBC), AND 2012 IBC
3. DESIGN LOADS ARE AS FOLLOWS
 - A) DEAD LOAD = 15 PSF
 - B) LIVE LOAD = 12 PSF (20 PSF FOR RISK CAT II)
 - C) GROUND SNOW LOAD = 30 PSF ($\leq 24'-0"$) FOR U-CHANNEL PEAK BRACE
 = 60 PSF ($\leq 30'-0"$), WITH WELDED RAFTER TIE TO SINGLE 12 GA TS @ 3'-0" OC
 = 70 PSF ($24'-0" < W \leq 30'-0"$)
 (UNBALANCED SNOW LOADS DUE TO DRIFTING HAVE NOT BEEN EVALUATED)
4. ULTIMATE WIND SPEED (LW) 105 (RC I) (115 MPH (RC I/II) TO 145 (RC I) (155 MPH (RC I/II)) (NOMINAL WIND SPEED 81 (B9) TO 108 (120) MPH)
5. END WALL COLUMN/POSTS ARE EQUIVALENT TO SIDE WALL COLUMN/POSTS IN SIZE AND SPACING UNLESS NOTED OTHERWISE
6. RISK CATEGORY I AND II
7. WIND EXPOSURE CATEGORY B OR C
8. SPECIFICATIONS APPLICABLE TO 29 GAUGE (FOR SL ≤ 60 PSF) AND 26 GAUGE (FOR SL > 60 PSF) METAL PANELS FASTENED DIRECTLY TO 2 1/2"x2 1/2"-14 GAUGE TUBE STEEL (TS) FOR (RC I) AND 2 1/4"x2 1/4"-12 GAUGE (TS) FOR (RC II) FRAMING MEMBERS (UNLESS NOTED OTHERWISE)
9. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS AND COLUMNS (INTERIOR OR END) = 8" OC (MAX)
10. 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. ROOF SLOPES VARY FROM 4:12, 3:12, 2:12 TO 1:12
11. ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH RAFTER COLUMN ALONG SIDES
12. STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 30" LONG. SOIL NAILS MAY BE USED FOR WIND SPEEDS ≤ 145 MPH AND IN SUITABLE SOIL CONDITIONS. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED FOR WIND SPEEDS > 145 MPH AND/OR IN UNSUITABLE SOILS AS NOTED
13. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:
 SOIL SITE CLASS = D
 RISK CATEGORY I/II/III
 $R = 3.25$ $I_E = 10$
 $S_{DS} = 2039$ g $V = C_S W$
 $S_{DI} = 1258$ g
14. FOR RISK CATEGORY II, MAXIMUM THRESHOLD HEIGHT FOR PERSONNEL DOOR(S) USED FOR DEFINED MEANS OF EGRESS IS 1/2"
15. APPLY LAP SEALANT TO METAL ROOF PANELS FOR ROOF SLOPES LESS THAN 3:12

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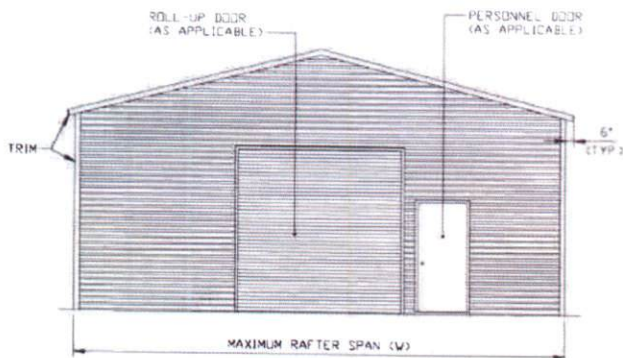
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DWG. NO: SK-3

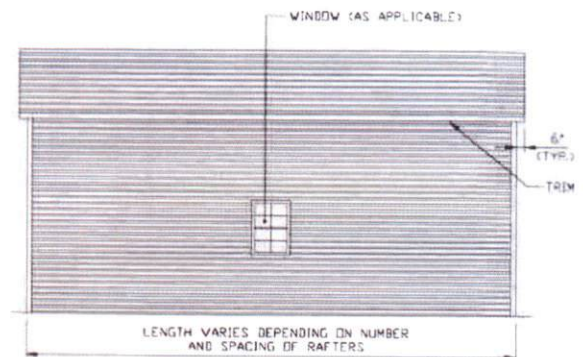
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BOX EAVE FRAME RAFTER STRUCTURE (Sheets 4, 5, 5A, 5B, 5C, 5D, 5E, 6, 6A, 6B, 6C, 6D, 6E, 6F, 6G, 9, 9A, 10, 12, 13, 14, 14A, 16, 17, AND 18)

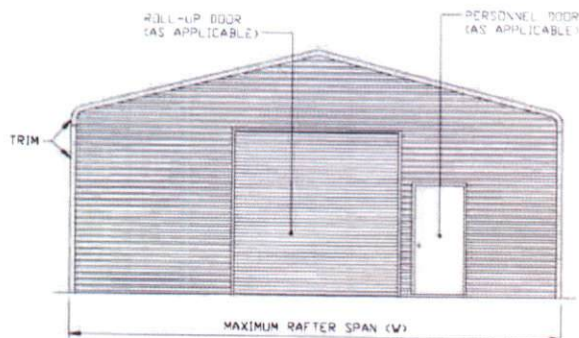


TYPICAL END ELEVATION
SCALE: NTS

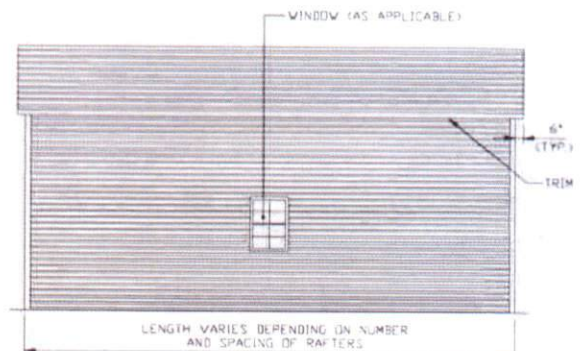


TYPICAL SIDE ELEVATION
SCALE: NTS

BOW FRAME RAFTER STRUCTURE (Sheets 4, 7, 7A, 7B, 7C, 7D, 7E, 8, 8A, 8B, 8C, 8D, 8E, 8F, 8G, 9, 9A, 11, 12, 13, 15, 15A, 17 AND 18)



TYPICAL END ELEVATION
SCALE: NTS



TYPICAL SIDE ELEVATION
SCALE: NTS

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SHT. 4

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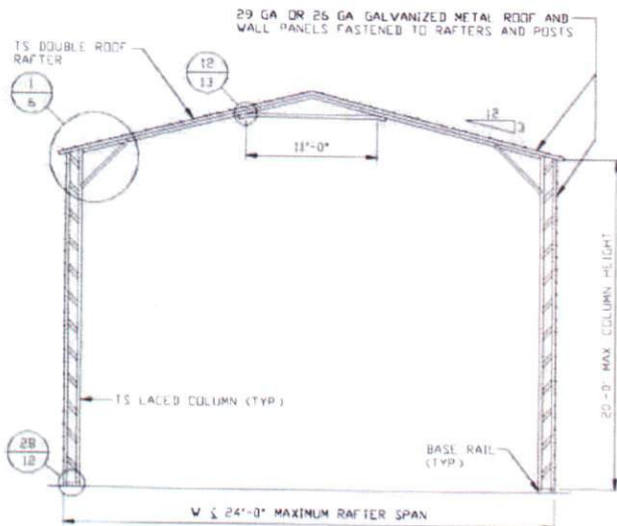
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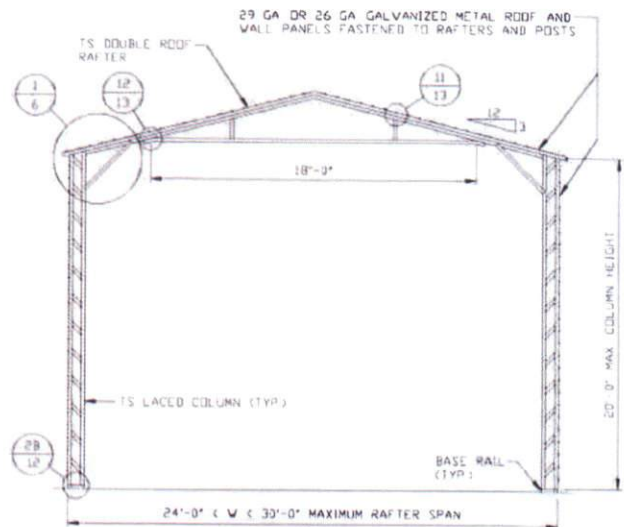
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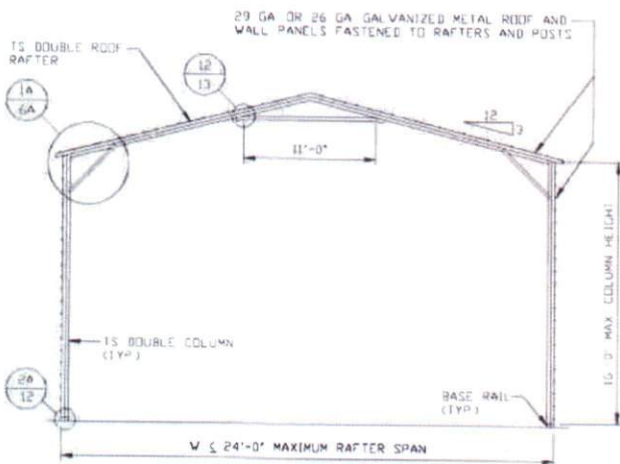
60 PSF < SL ≤ 70 PSF
EXPOSURE B



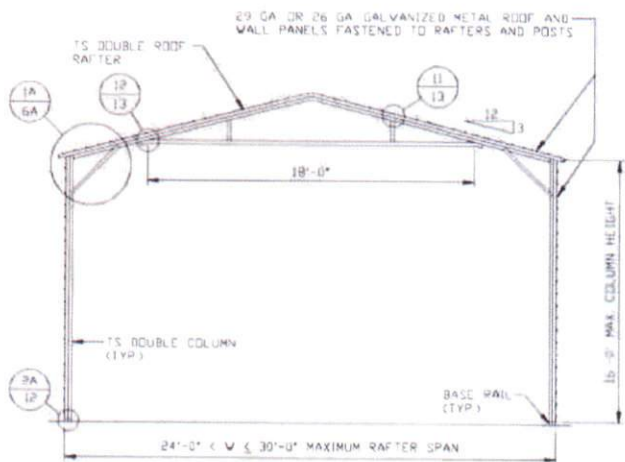
TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



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 SCALE: NTS



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TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS

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SHT. 5

SCALE: NTS

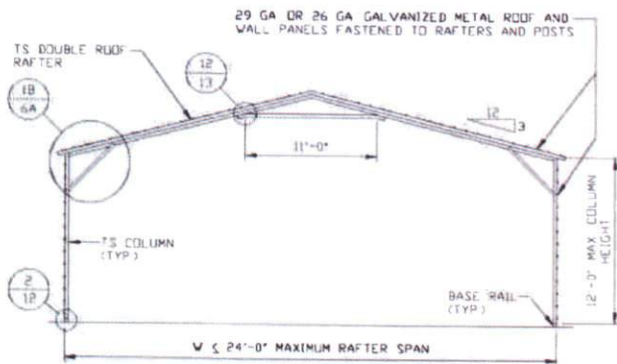
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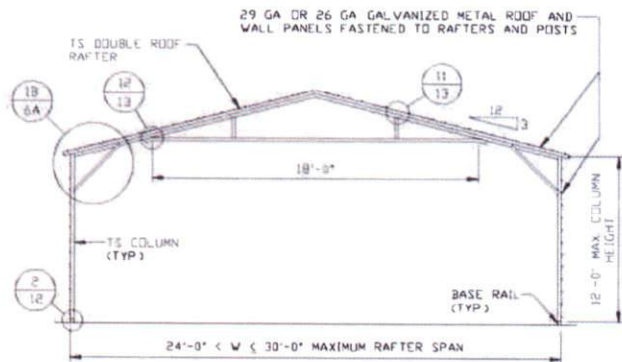
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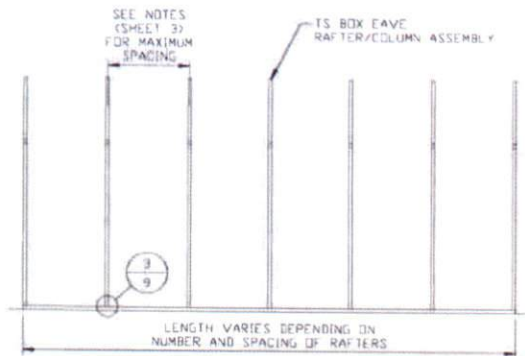
60 PSF < SL ≤ 70 PSF
EXPOSURE B



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS

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SHT. 5A

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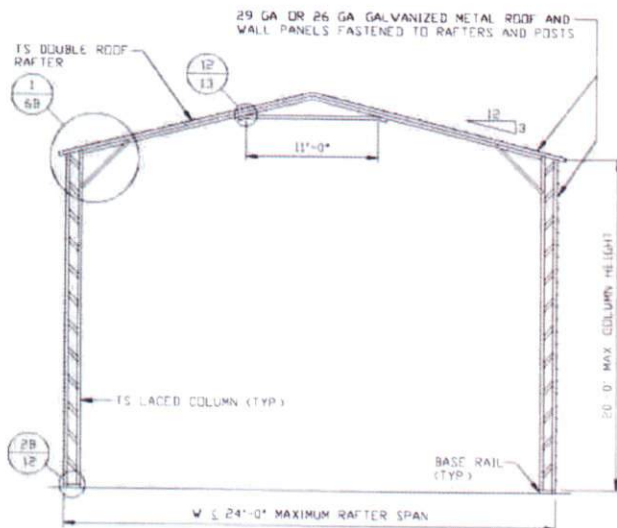
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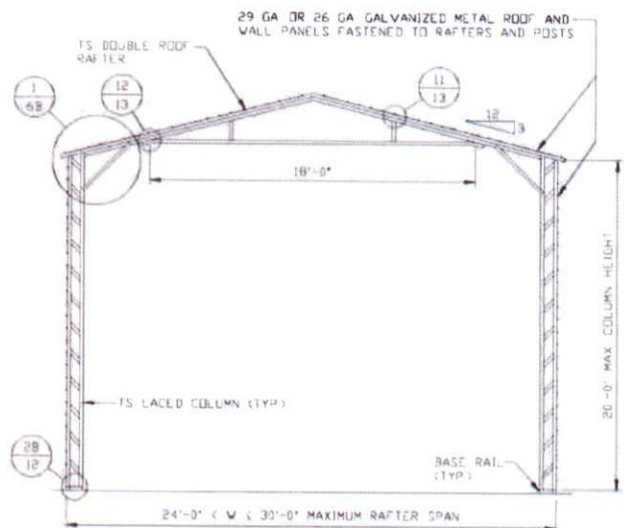
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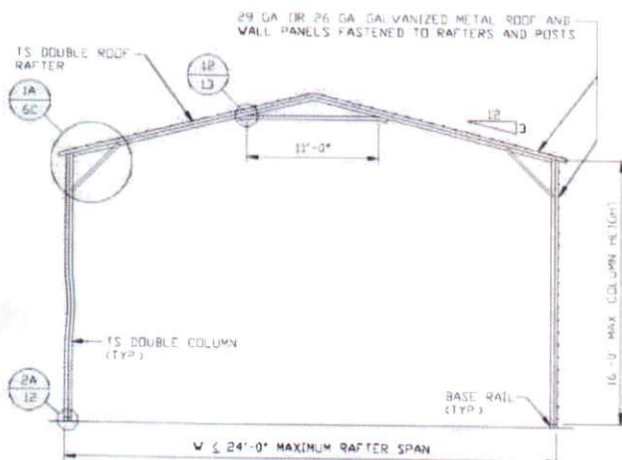
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EXPOSURE C



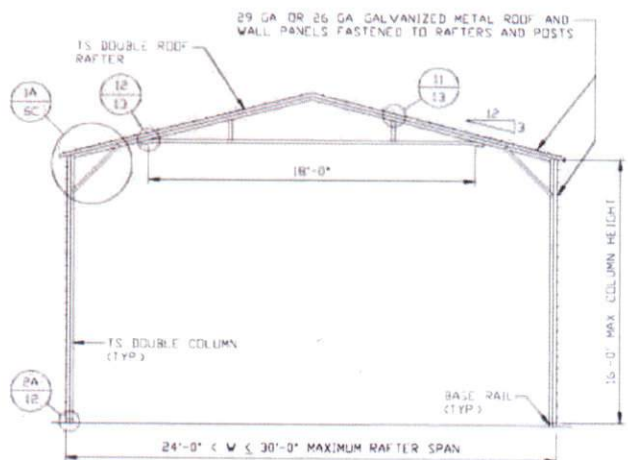
TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
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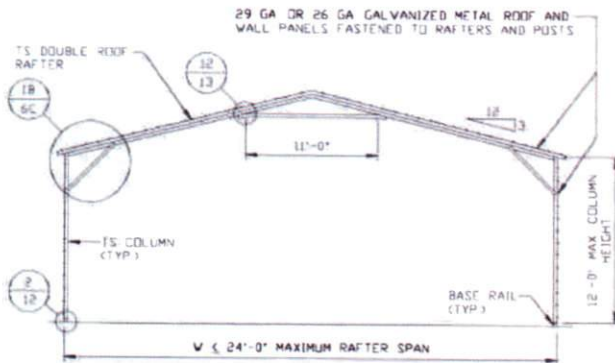
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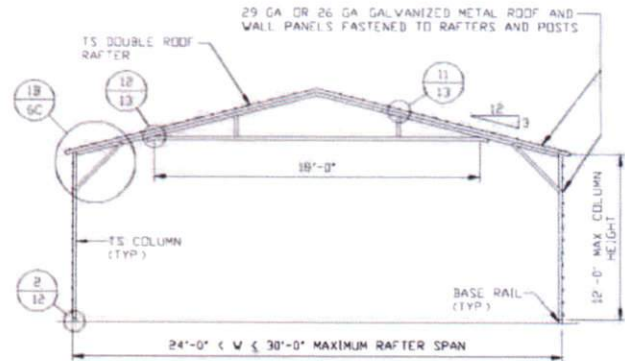
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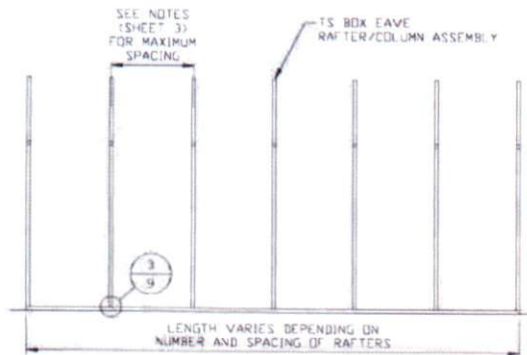
EXPOSURE C



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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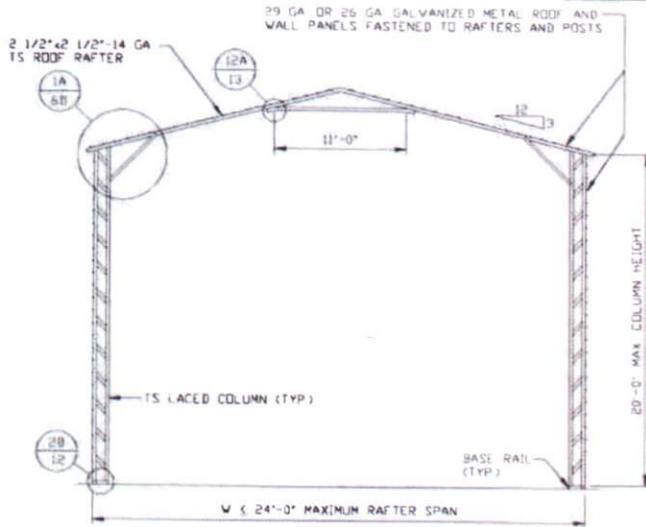
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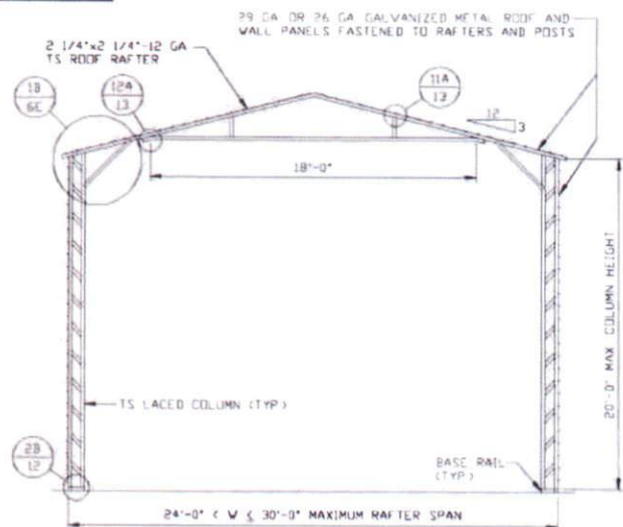
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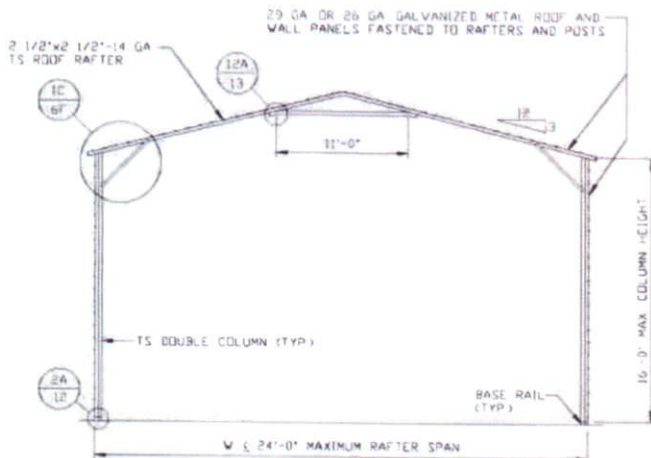
**SL ≤ 60 PSF
EXPOSURE B/C**



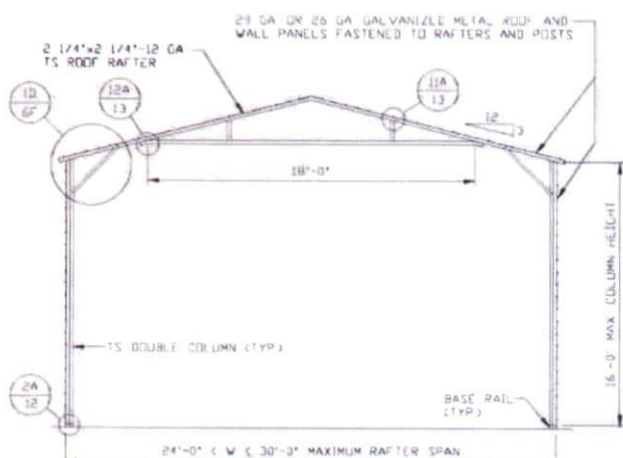
TYPICAL RAFTER/COLUMN END FRAME SECTION
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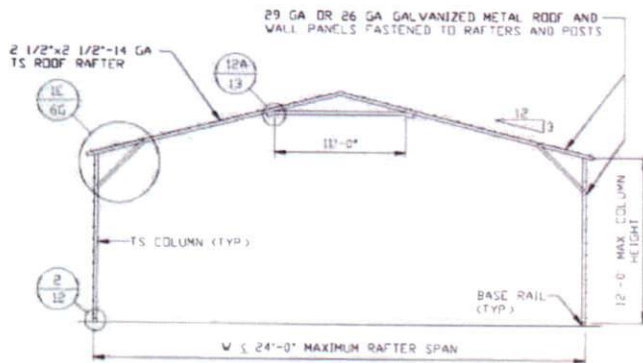
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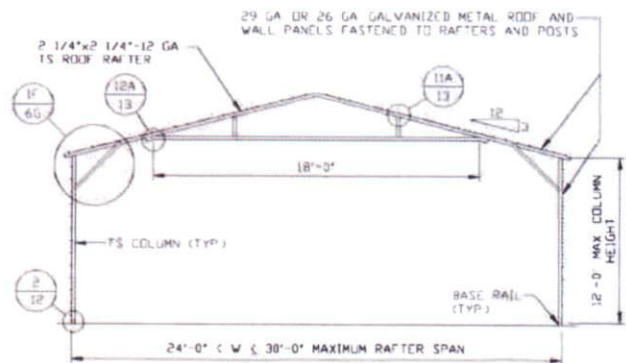
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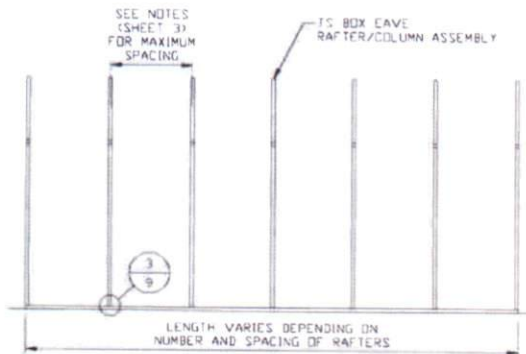
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TYPICAL RAFTER/COLUMN END FRAME SECTION
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TYPICAL RAFTER/COLUMN END FRAME SECTION
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TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
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CLIENT: TOL

**TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE**

DATE: 8-20-19

SHT. 5E

SCALE: NTS

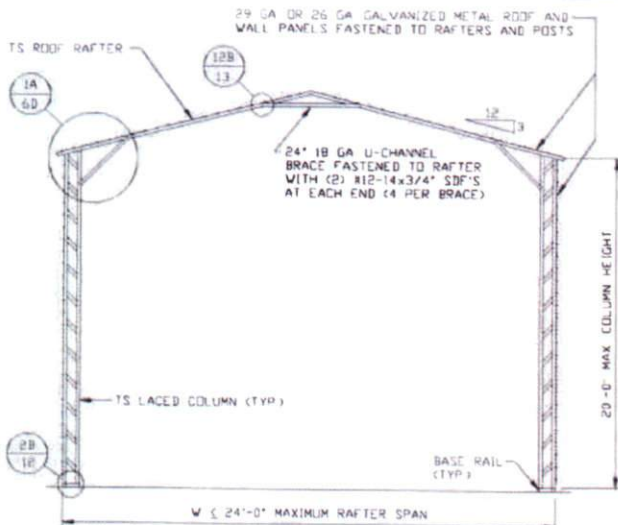
DWG. NO: SK-3

JOB NO: 19164S

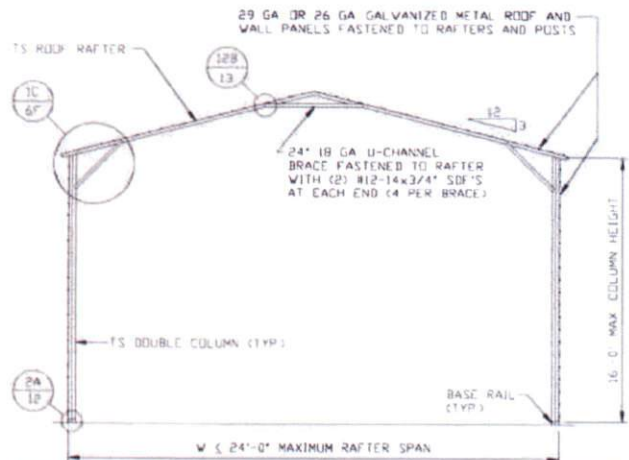
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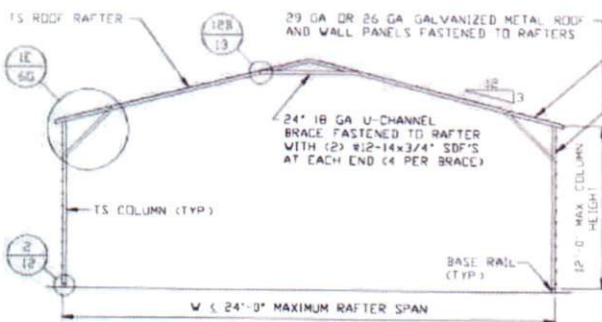
SL < 30 PSF
EXPOSURE B/C



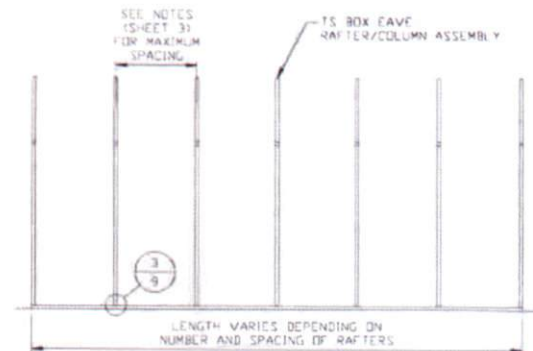
TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

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DRAWN BY: JG

CHECKED BY: PMH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 5F

SCALE: NTS

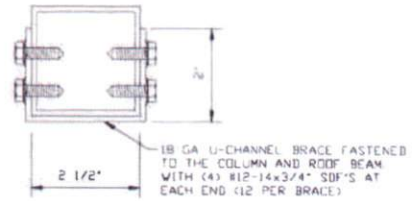
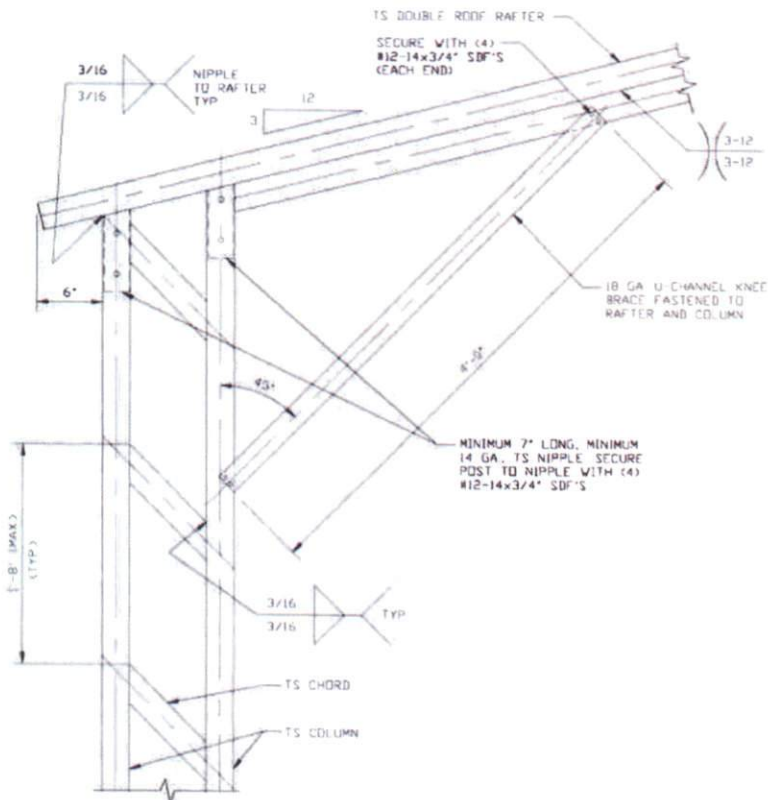
DWG. NO SK-3

JOB NO: 19164S

REV: 0

60 PSF < SL ≤ 70 PSF

EXPOSURE B



BRACE SECTION

SCALE: NTS

BOX EAVE 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

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 6

SCALE: NTS

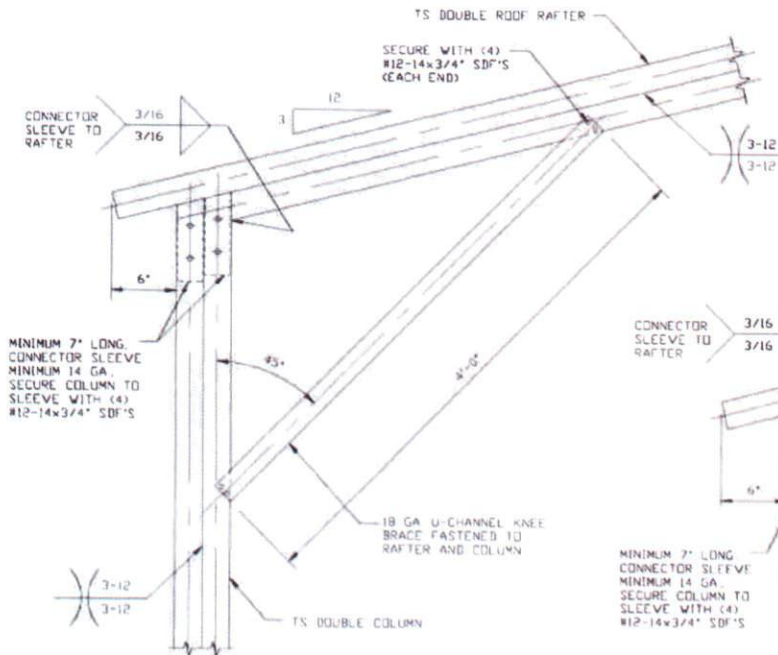
DWG. NO SK-3

JOB NO: 19164S

REV: 0

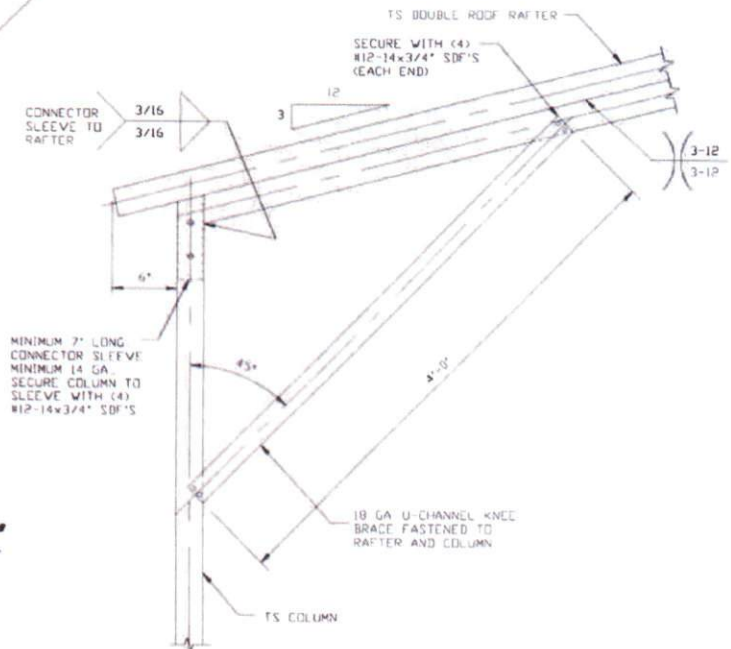
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60 PSF < SL ≤ 70 PSF
EXPOSURE B



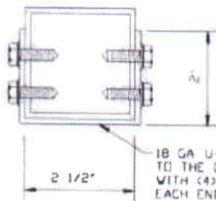
1A

**BOX EAVE RAFTER COLUMN
 CONNECTION DETAIL FOR
 HEIGHTS 12'-0" < TO ≤ 16'-0"**
 SCALE: NTS



1B

**BOX EAVE RAFTER COLUMN
 CONNECTION DETAIL FOR
 HEIGHTS ≤ 12'-0"**
 SCALE: NTS



BRACE SECTION
 SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 6A

SCALE: NTS

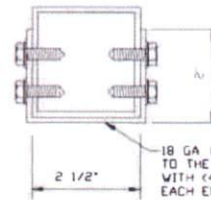
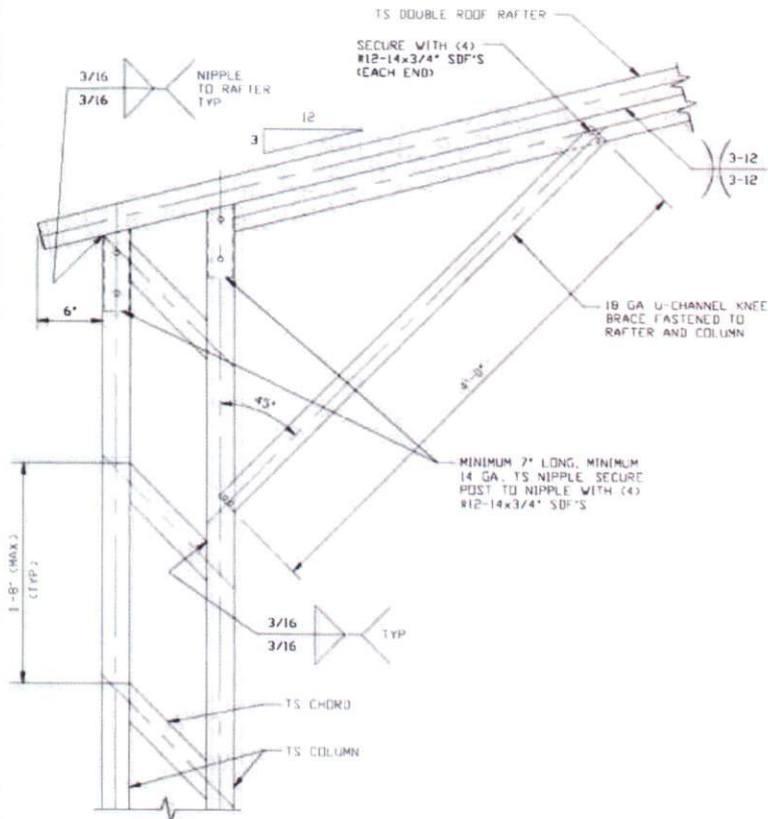
DWG. NO SK-3

JOB NO: 19164S

REV: 0

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60 PSF < SL ≤ 70 PSF
EXPOSURE C



BRACE SECTION
 SCALE: NTS

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

1

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDM

PROJECT MGR: WSH

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

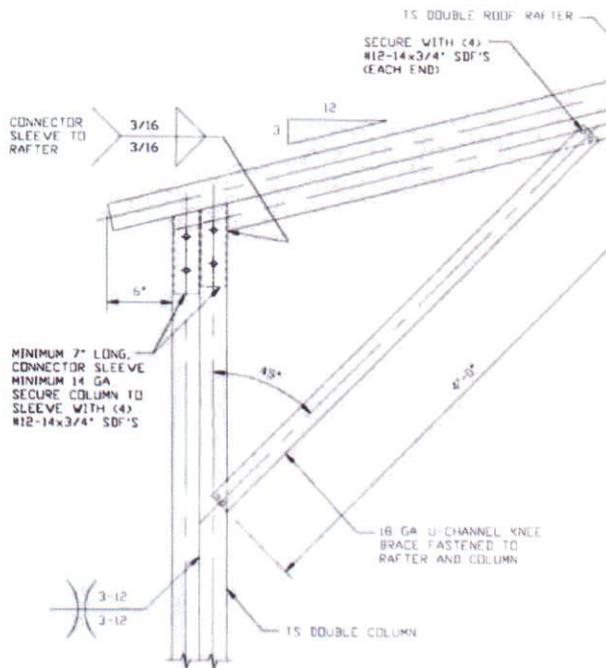
SHT. 6B

DWG. NO: SK-3

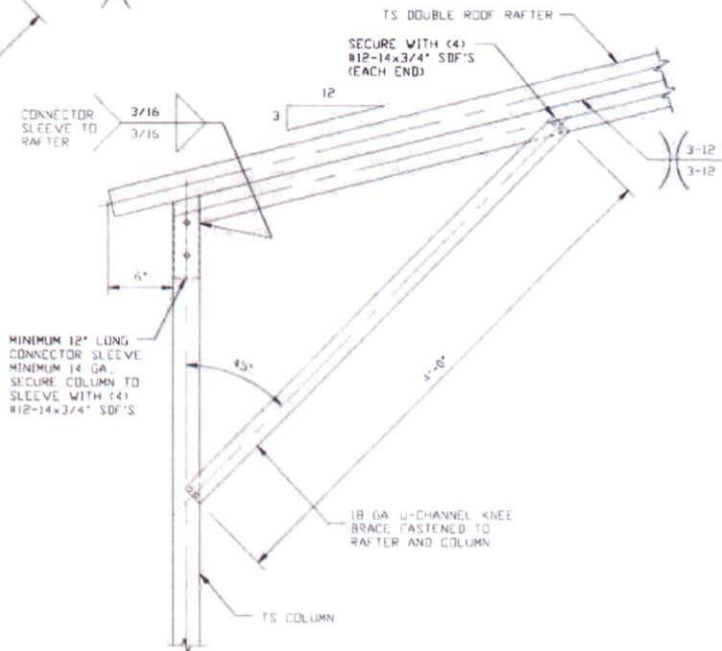
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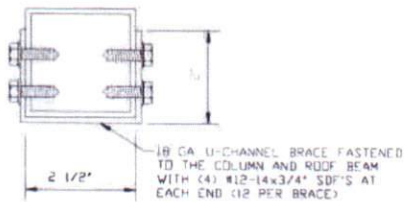
60 PSF < SL ≤ 70 PSF
EXPOSURE C



1A
BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 12'-0" < TO ≤ 16'-0"
 SCALE: NTS



1B
BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS ≤ 12'-0"
 SCALE: NTS



BRACE SECTION
 SCALE: NTS

MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 6C

SCALE: NTS

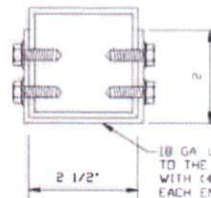
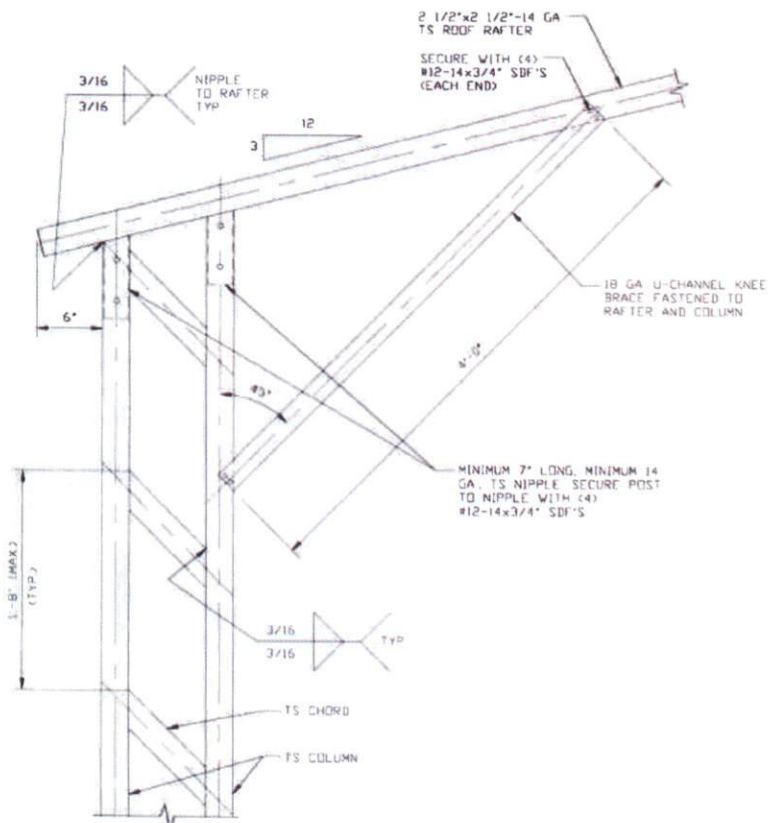
DWG. NO: SK-3

JOB NO: 19164S

REV: 0

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**SL ≤ 60 PSF
EXPOSURE B/C**



BRACE SECTION
SCALE: NTS

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

1A

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

**TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE**

DATE: 8-20-19

SHT. 6D

SCALE: NTS

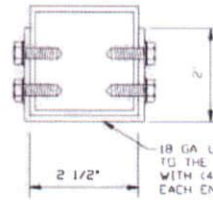
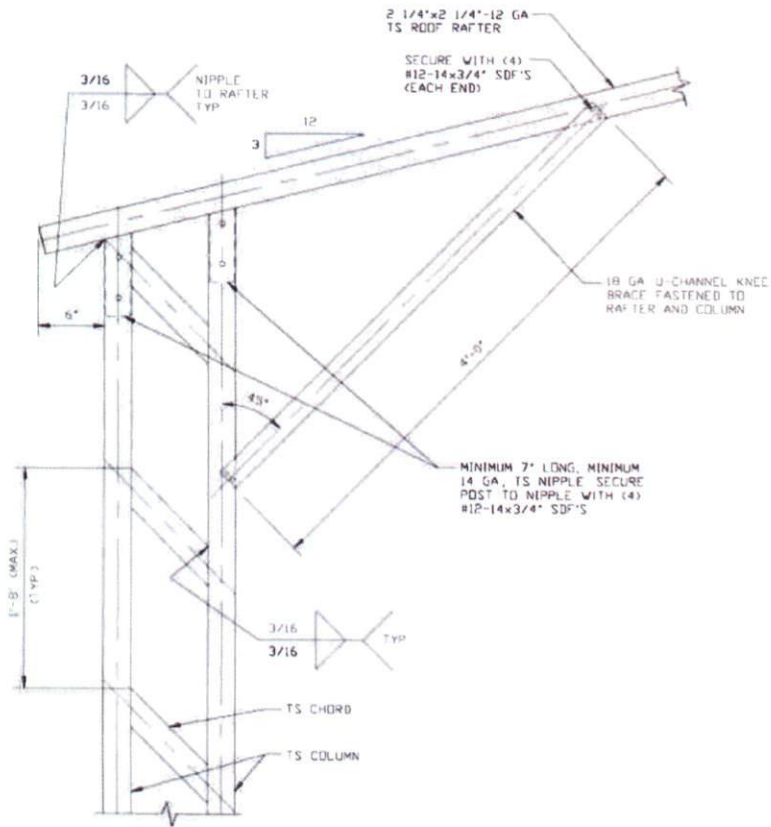
DWG. NO SK-3

JOB NO: 19164S

REV: 0

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SL ≤ 60 PSF
EXPOSURE B/C



BRACE SECTION
SCALE: NTS

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

1B

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 6E

SCALE: NTS

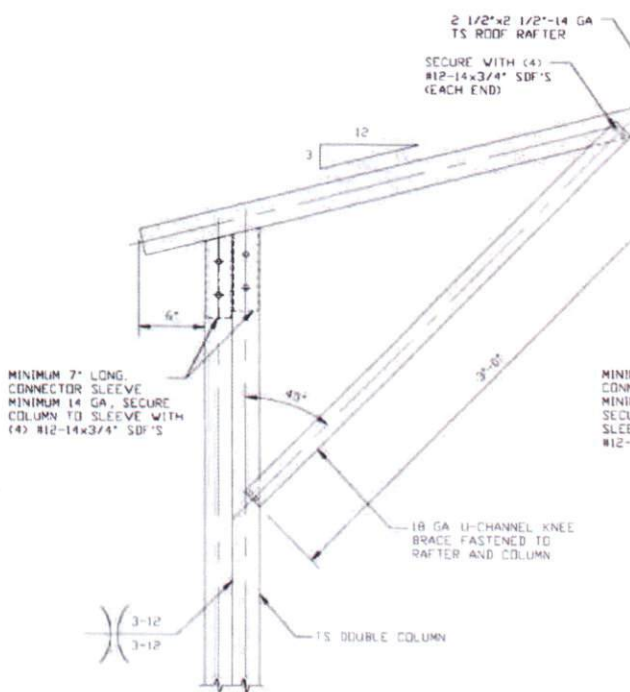
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JOB NO: 19164S

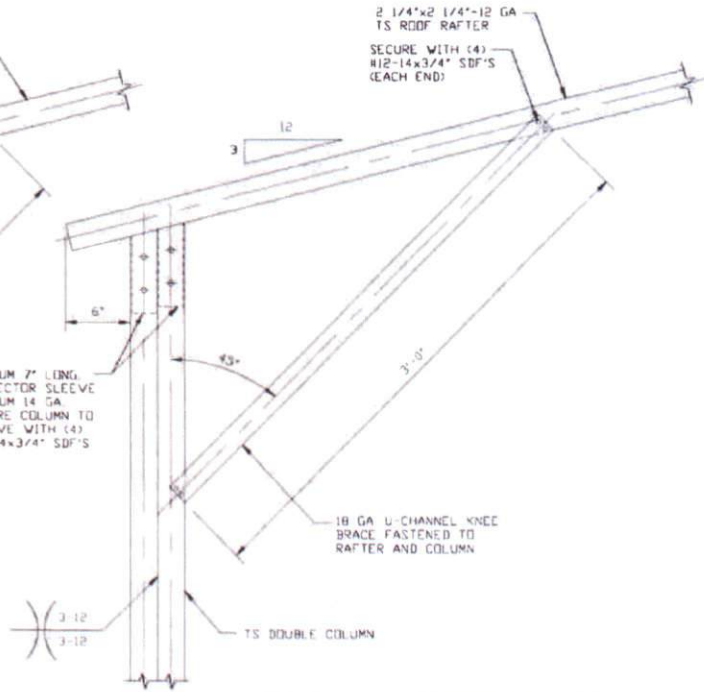
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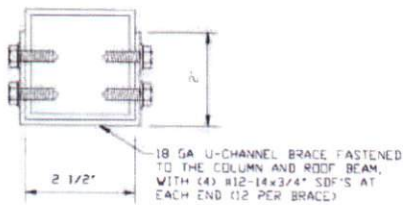
**SL ≤ 60 PSF
EXPOSURE B/C**



1C
**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 12'-0" < TO ≤ 16'-0"**
SCALE: NTS



1D
**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 12'-0" < TO ≤ 16'-0"**
SCALE: NTS



BRACE SECTION
SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 6F

SCALE: NTS

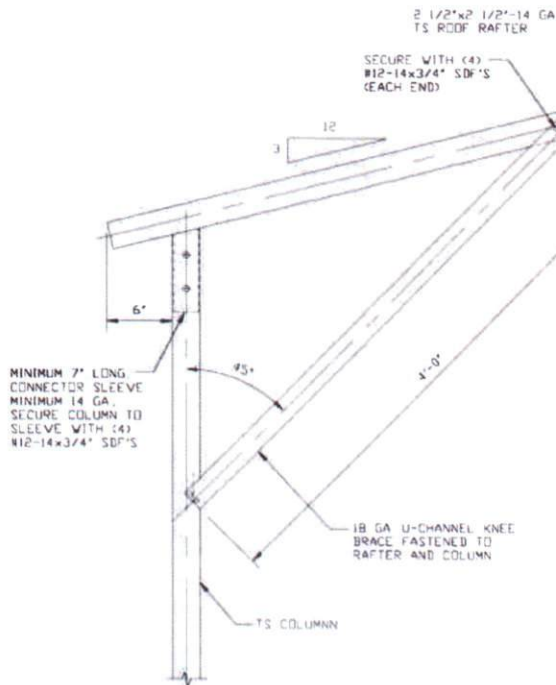
DWG. NO SK-3

JOB NO: 19164S

REV: 0

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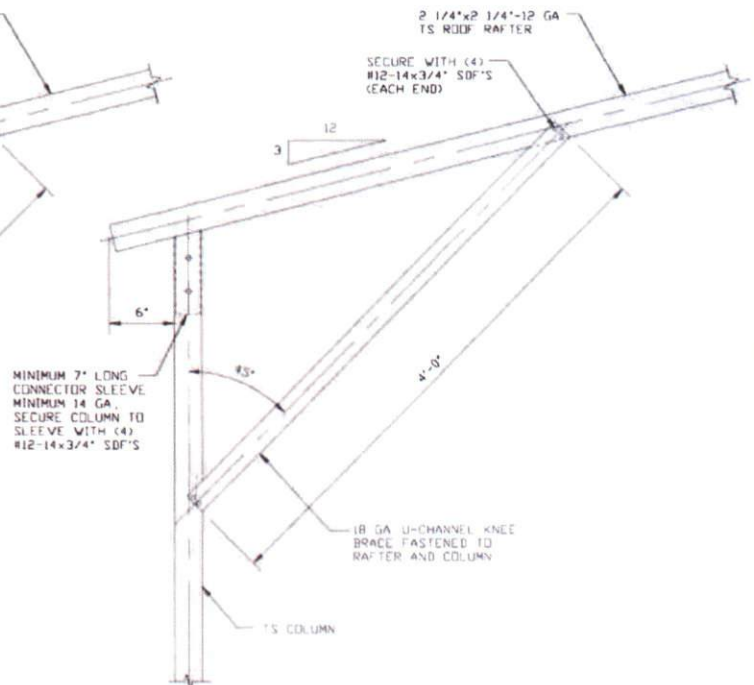
SL ≤ 60 PSF
EXPOSURE B/C



1E

**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS ≤ 12'-0"**

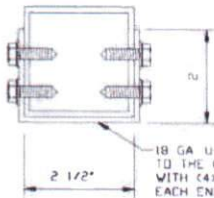
SCALE: NTS



1F

**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS ≤ 12'-0"**

SCALE: NTS



BRACE SECTION

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 6G

SCALE: NTS

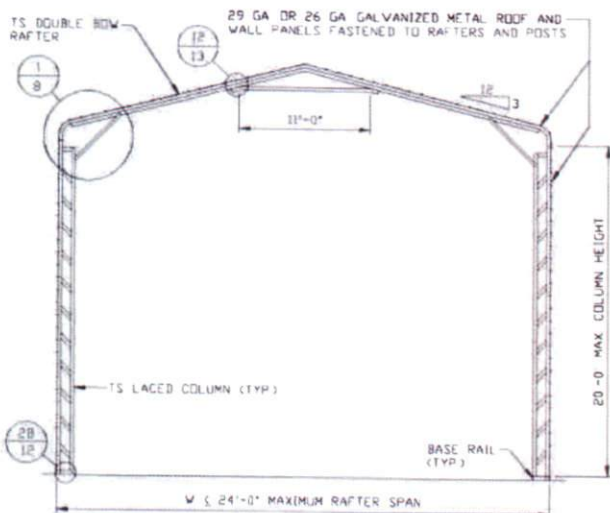
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JOB NO: 19164S

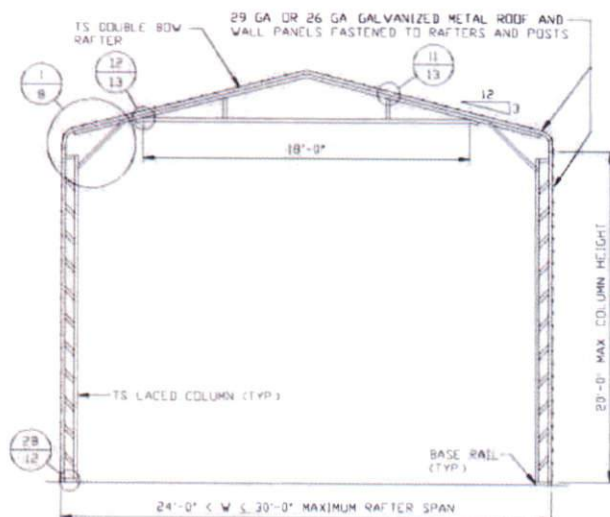
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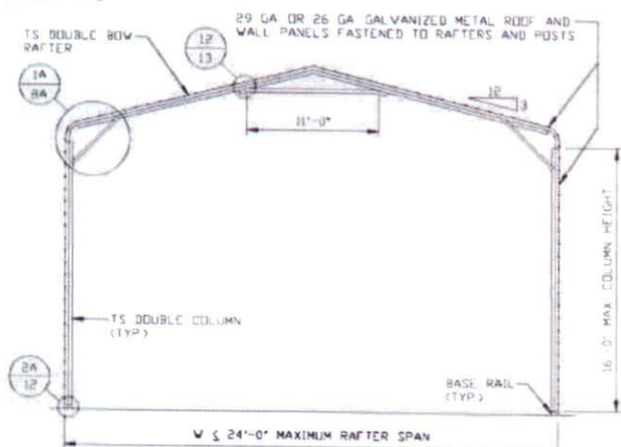
60 PSF < SL ≤ 70 PSF
EXPOSURE B



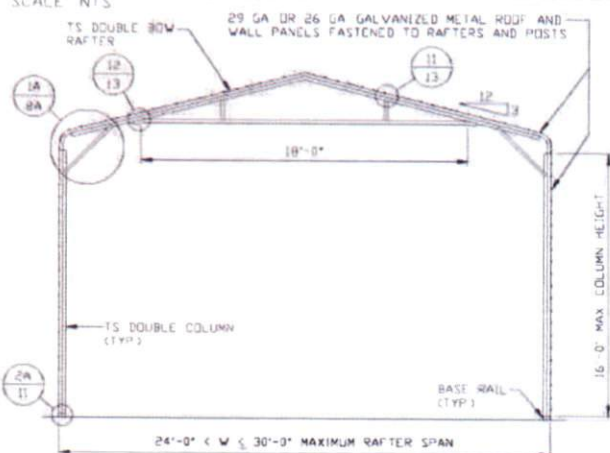
TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS

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

DRAWN BY: JG
CHECKED BY: PMH

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

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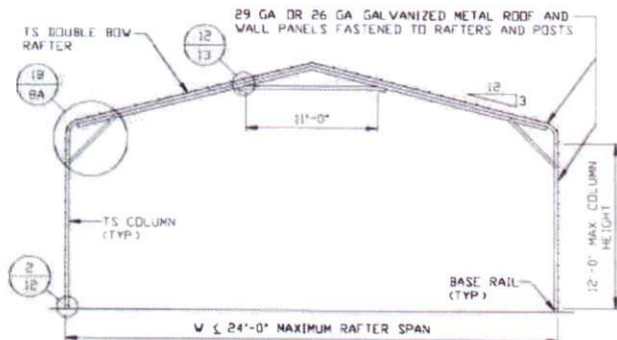
PROJECT MGR: WSM
CLIENT: TOL

DATE: 8-20-19
SHT. 7

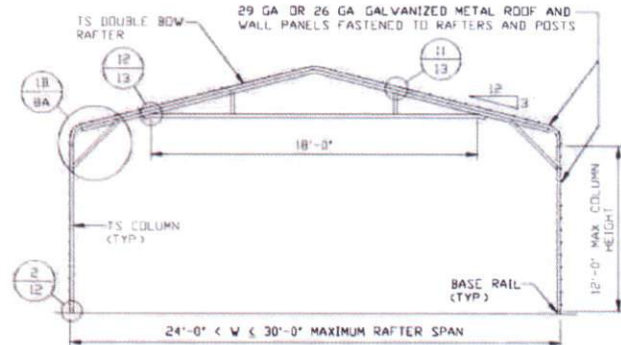
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DWG. NO SK-3

JOB NO: 19164S
REV: 0

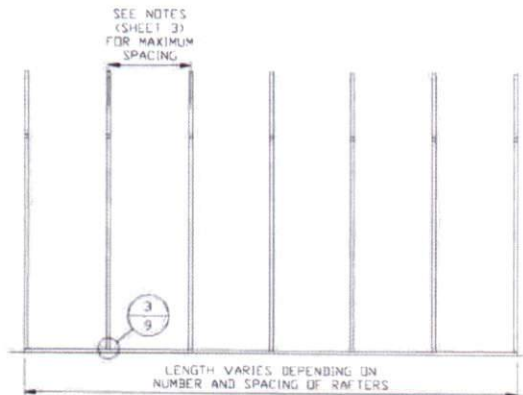
60 PSF < SL ≤ 70 PSF
EXPOSURE B



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 7A

SCALE: NTS

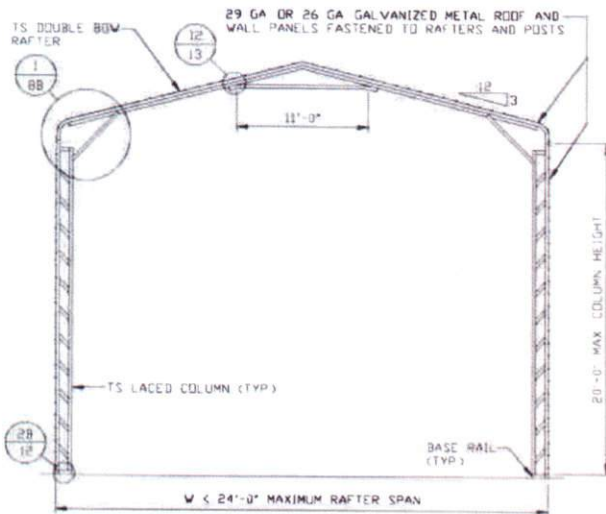
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JOB NO: 19164S

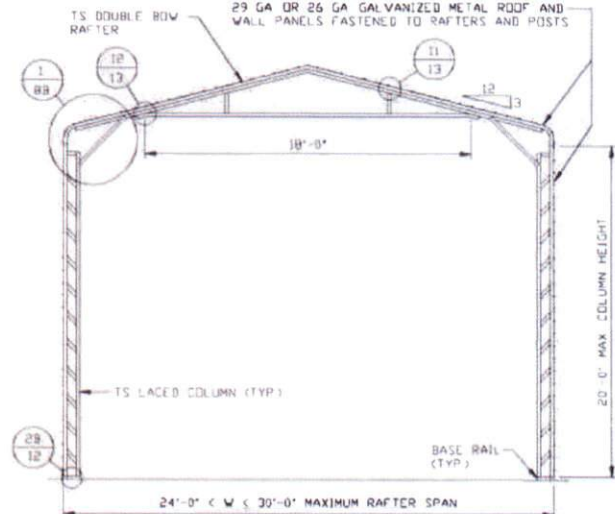
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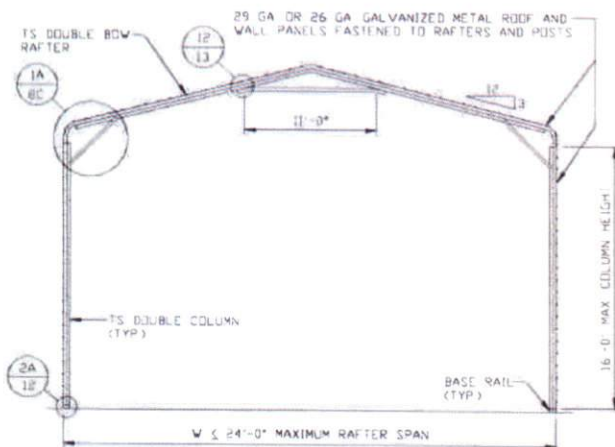
60 PSF < SL ≤ 70 PSF
EXPOSURE C



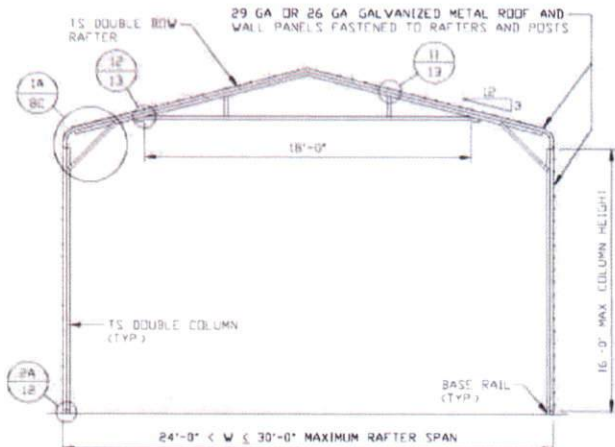
TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSH

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 7B

SCALE: NTS

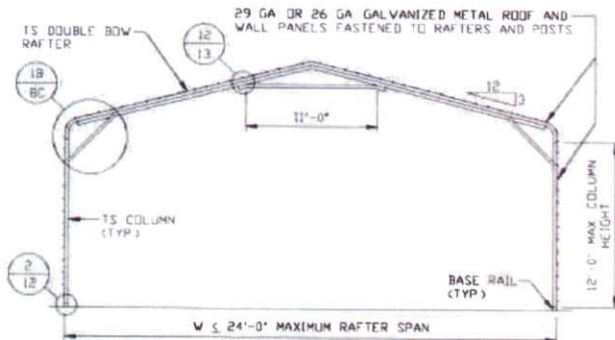
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JOB NO: 19164S

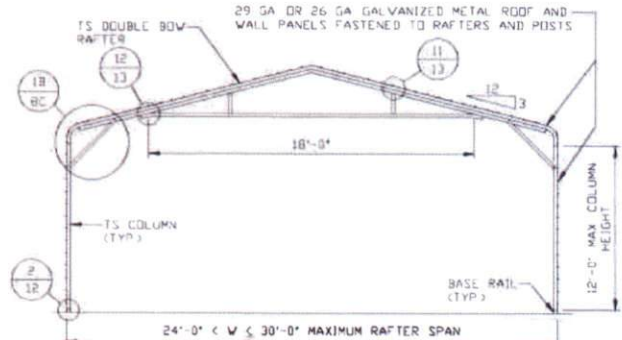
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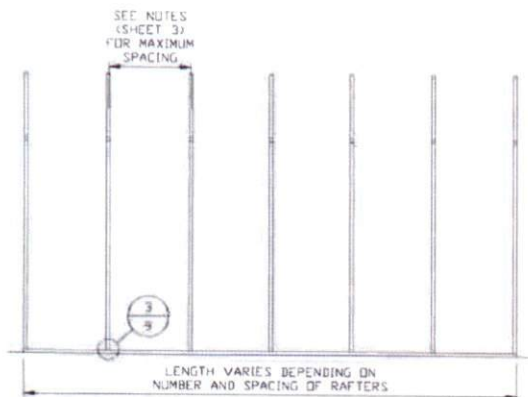
60 PSF < SL ≤ 70 PSF
EXPOSURE B/C



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 7C

SCALE: NTS

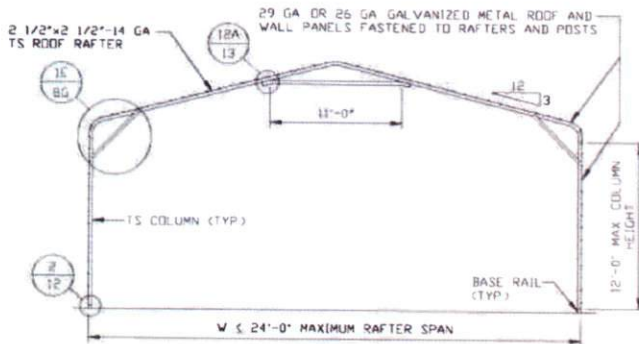
DWG. NO SK-3

JOB NO: 19164S

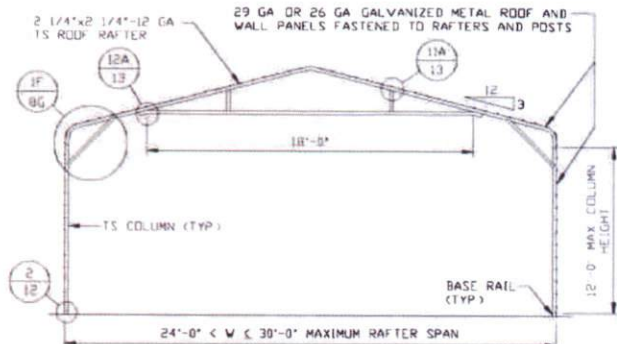
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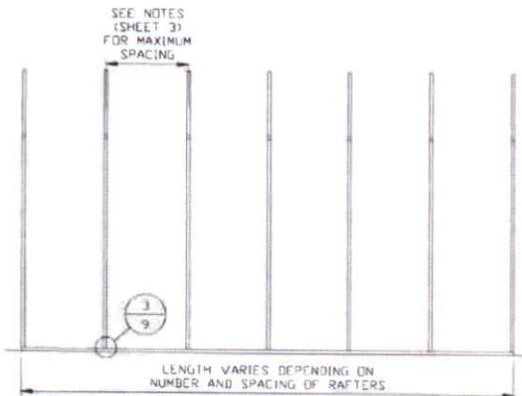
SL ≤ 60 PSF
EXPOSURE B/C



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
 SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
 SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

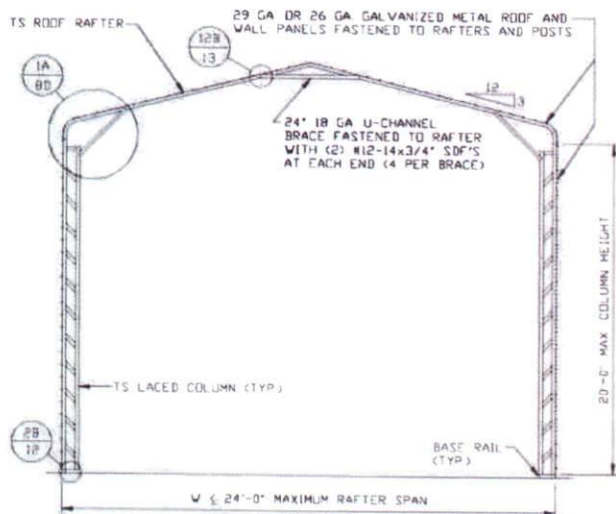
SHT. 7E

DWG. NO: SK-3

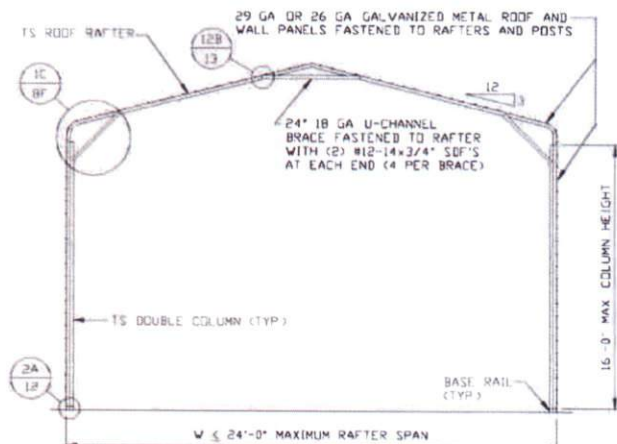
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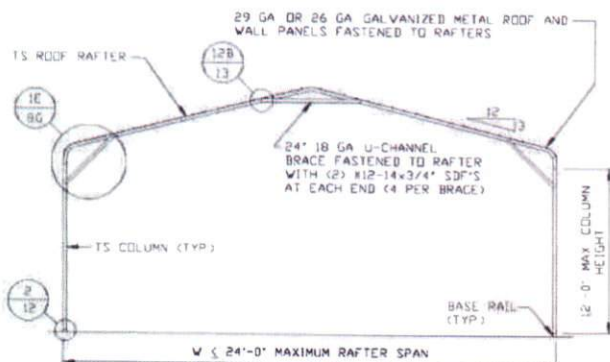
SL ≤ 30 PSF
EXPOSURE B/C



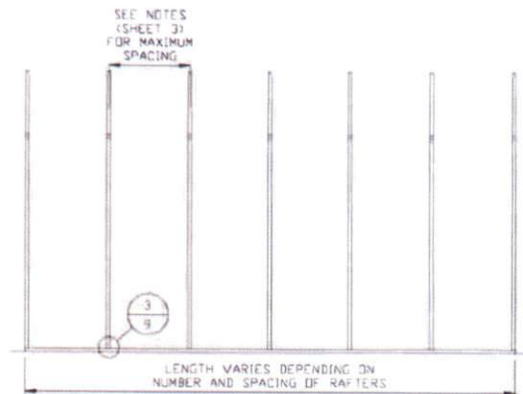
TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 7F

SCALE: NTS

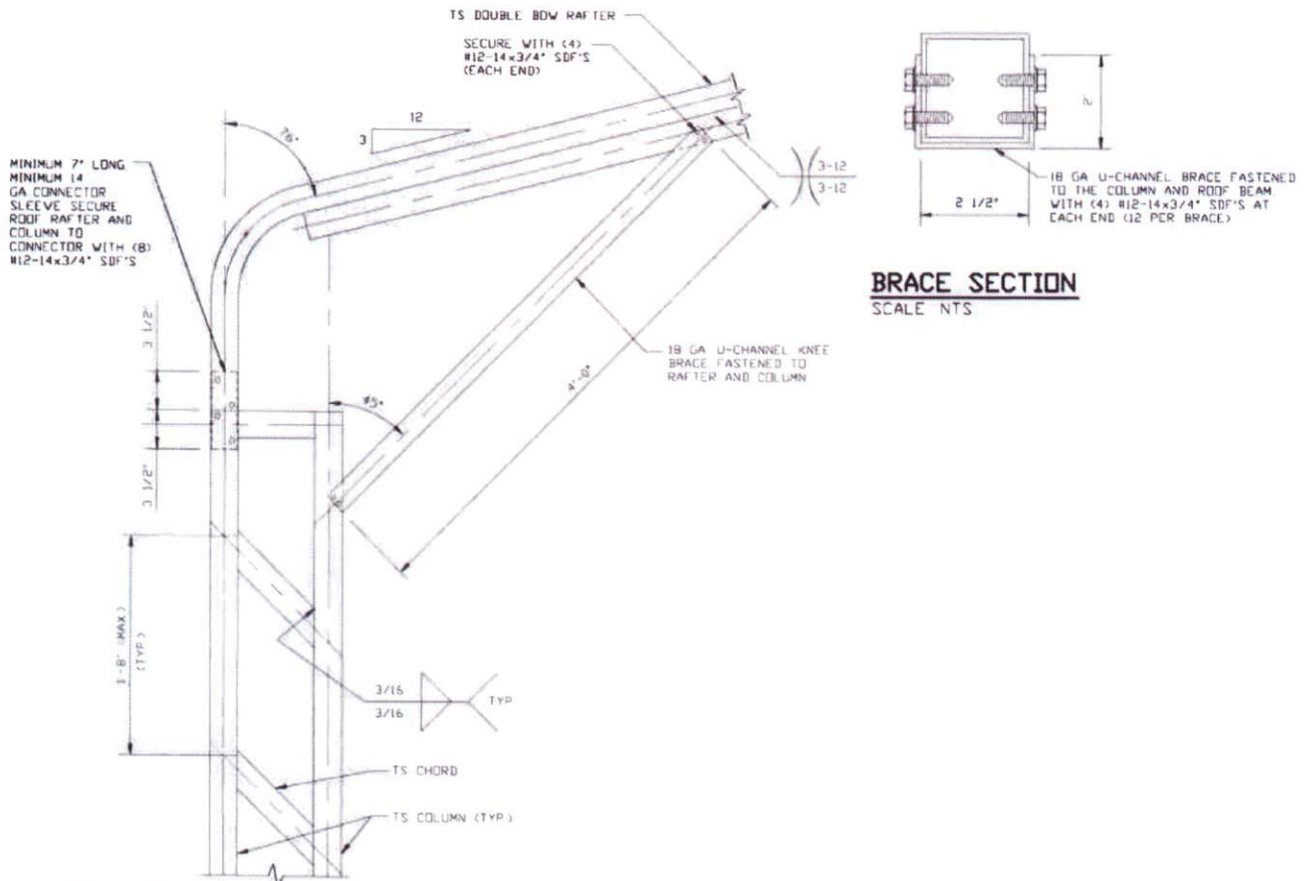
DWG. NO: SK-3

JOB NO: 19164S

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60 PSF < SL ≤ 70 PSF
EXPOSURE B

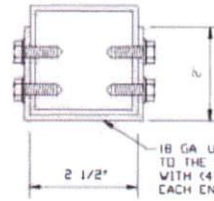


**BOW EAVE RAFTER COLUMN
 CONNECTION DETAIL FOR
 HEIGHTS 16'-0" < TO ≤ 20'-0"**

1

SCALE: NTS

BRACE SECTION
 SCALE: NTS



18 GA U-CHANNEL BRACE FASTENED
 TO THE COLUMN AND ROOF BEAM
 WITH (4) #12-14x3/4" SDF'S AT
 EACH END (12 PER BRACE)

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

SHT. 8

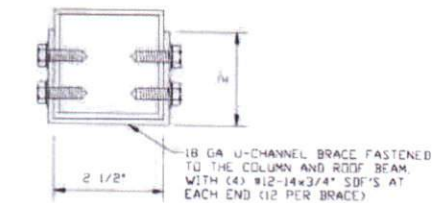
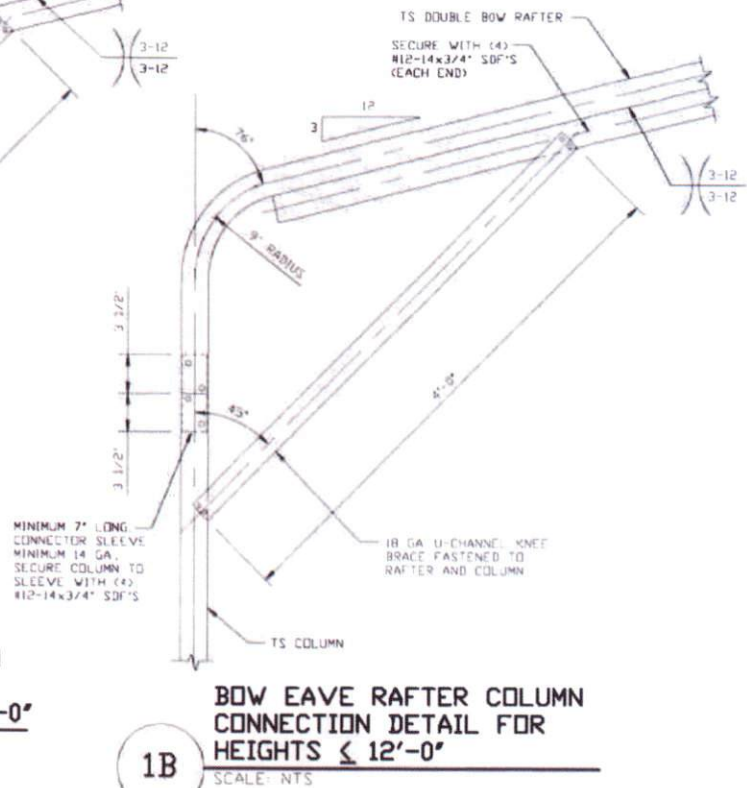
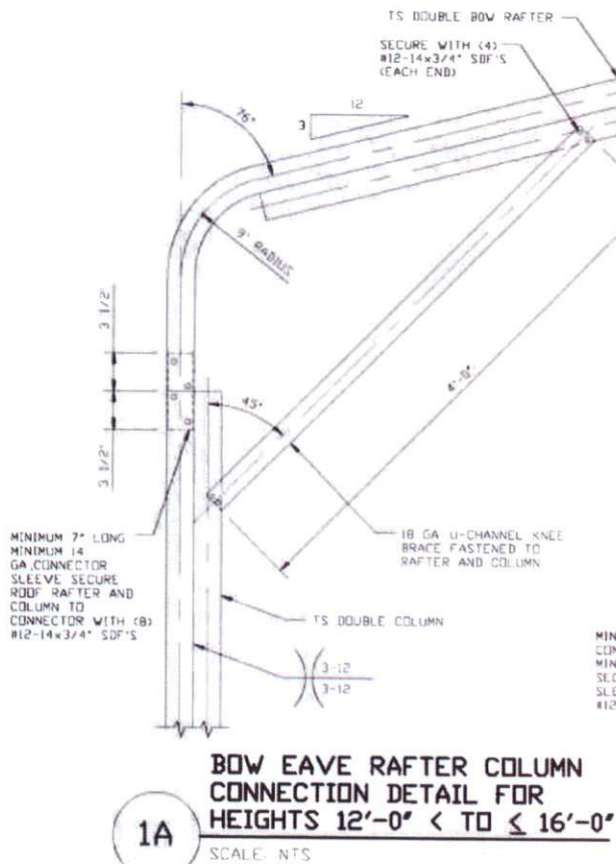
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60 PSF < SL ≤ 70 PSF

EXPOSURE B



BRACE SECTION
SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 8A

SCALE: NTS

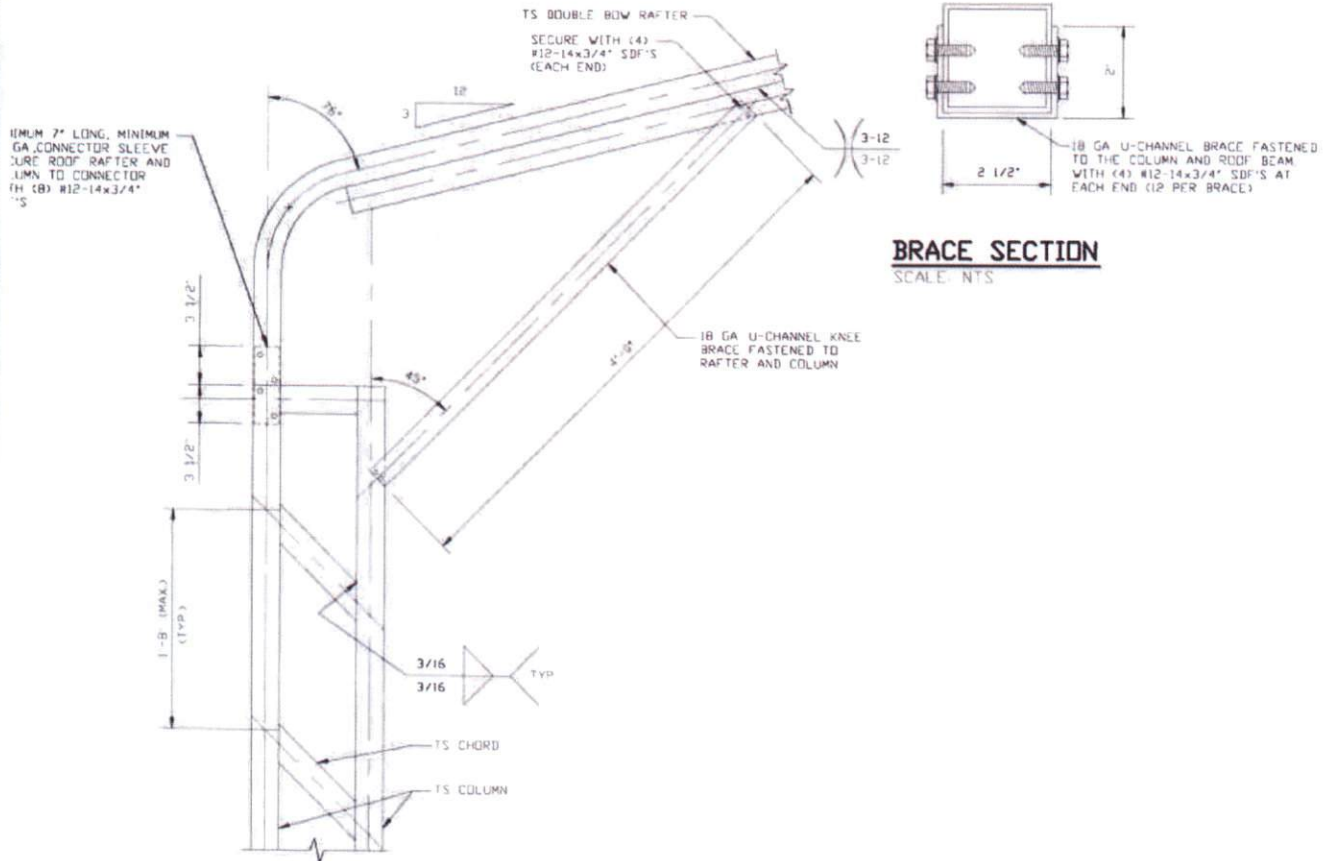
DWG. NO SK-3

JOB NO: 19164S

REV: 0

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60 PSF < SL ≤ 70 PSF
EXPOSURE C



BRACE SECTION
 SCALE: NTS

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

1

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PMH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

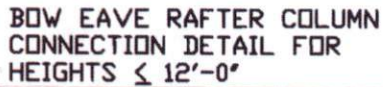
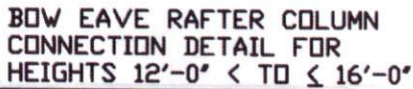
SHT. 08

DWG. NO: SK-3

REV: 0

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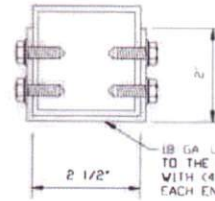
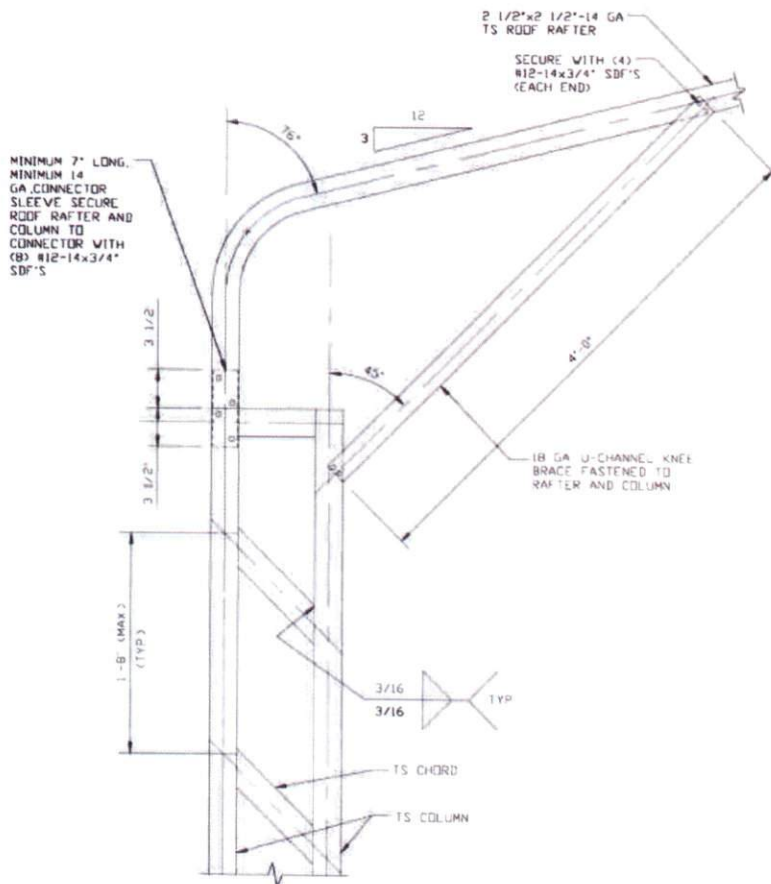
EXPOSURE C



REV. 0

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**SL ≤ 60 PSF
EXPOSURE B/C**



BRACE SECTION

SCALE: NTS

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

1A

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSH

CLIENT: TOL

TOL BUILDINGS, INC.

330 N. MERIDIAN RD.

YOUNGSTOWN, OH 44509

30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

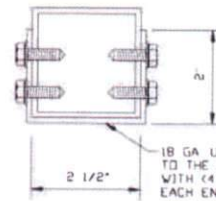
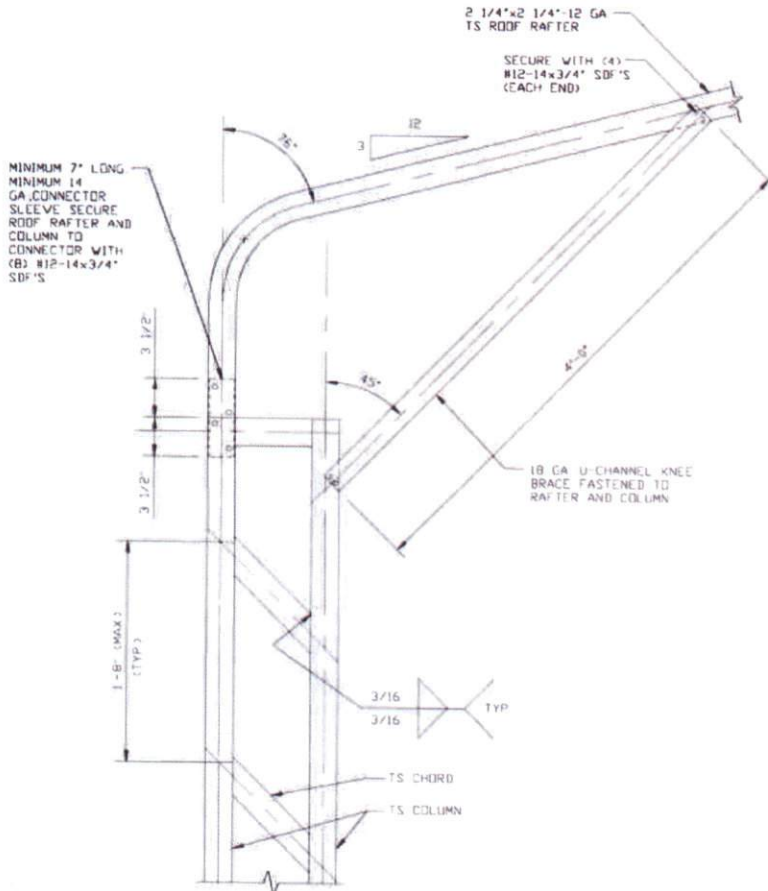
SHT. 8D

DWG. NO SK-3

REV: 0

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SL ≤ 60 PSF
EXPOSURE B/C



BRACE SECTION
 SCALE: NTS

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

1B

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSH

CLIENT: TOL

TOL BUILDINGS, INC.
 330 N. MERIDIAN RD.
 YOUNGSTOWN, OH 44509
 30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 0E

SCALE: NTS

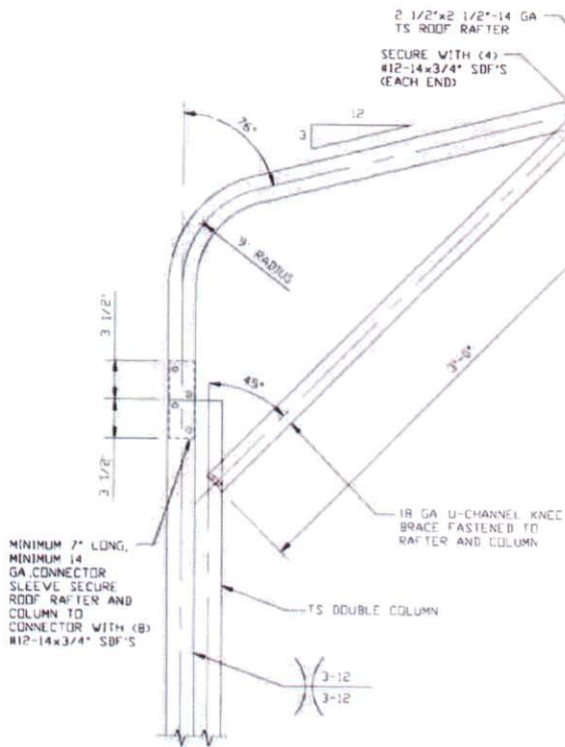
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JOB NO: 19164S

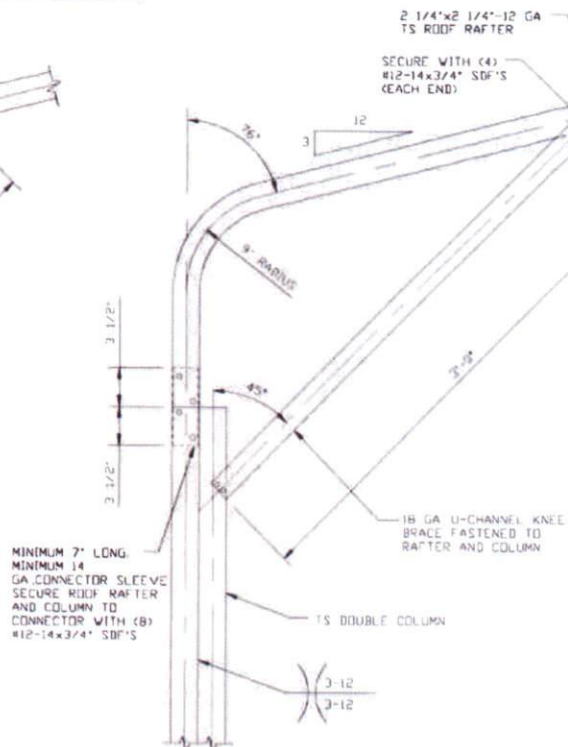
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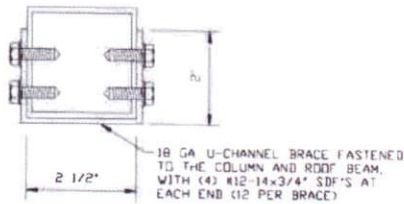
SL ≤ 60 PSF
EXPOSURE B/C



1C BOW EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 12'-0" < TO ≤ 16'-0"
SCALE: NTS



1D BOW EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 12'-0" < TO ≤ 16'-0"
SCALE: NTS



BRACE SECTION
SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. OF

SCALE: NTS

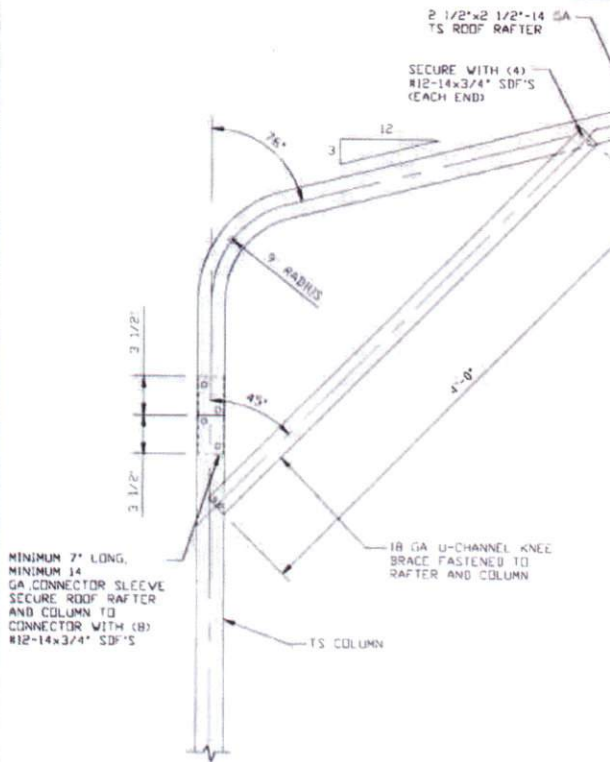
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JOB NO: 19164S

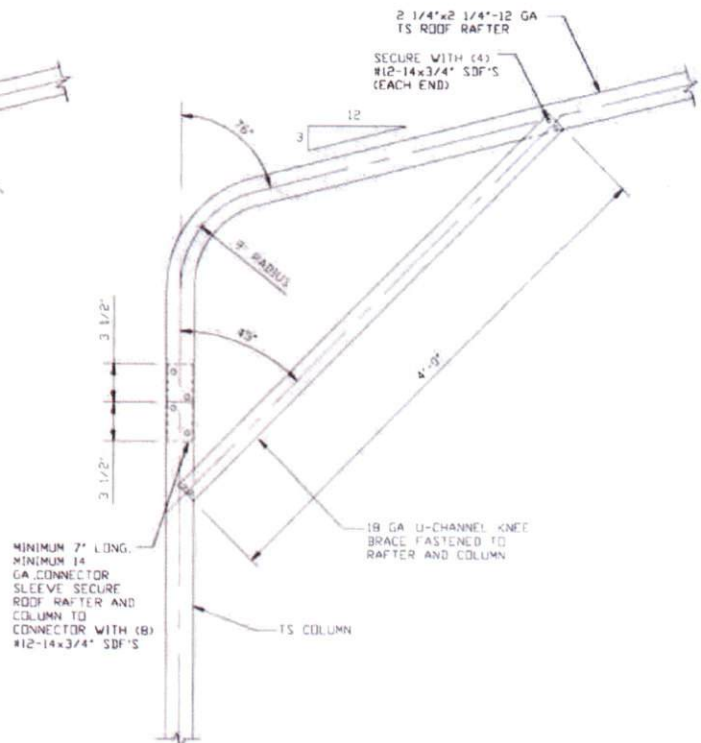
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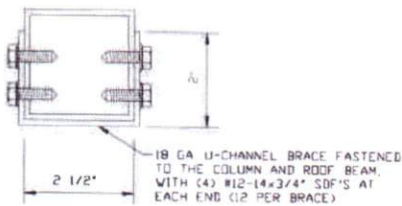
SL ≤ 60 PSF
EXPOSURE B/C



1E BOW EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS ≤ 12'-0"
SCALE: NTS



1F BOW EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS ≤ 12'-0"
SCALE: NTS



BRACE SECTION
SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TDL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 06

SCALE: NTS

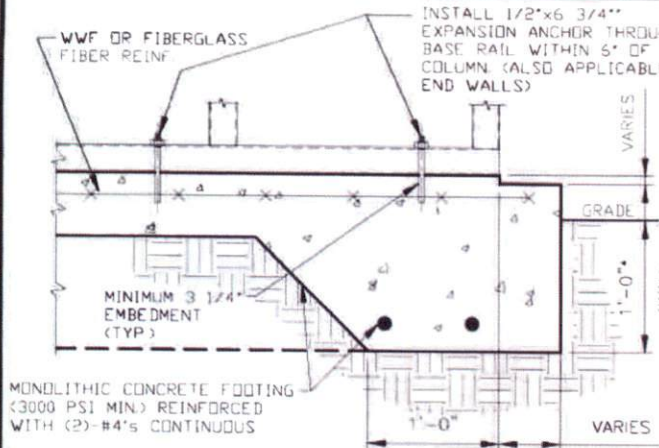
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JOB NO: 19164S

REV: 0

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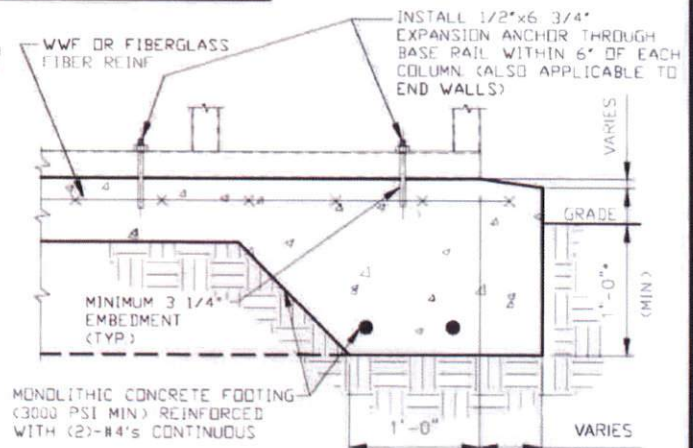
BASE RAIL ANCHORAGE OPTIONS



3A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
(MINIMUM ANCHOR EDGE DISTANCE IS 4")
* COORDINATE WITH LOCAL BUILDING CODE
AND/OR BUILDING OFFICIAL REGARDING
REQUIRED FOOTING DEPTH



3B

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
(MINIMUM ANCHOR EDGE DISTANCE IS 4")
* COORDINATE WITH LOCAL BUILDING CODE
AND/OR BUILDING OFFICIAL REGARDING
REQUIRED FOOTING DEPTH

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:

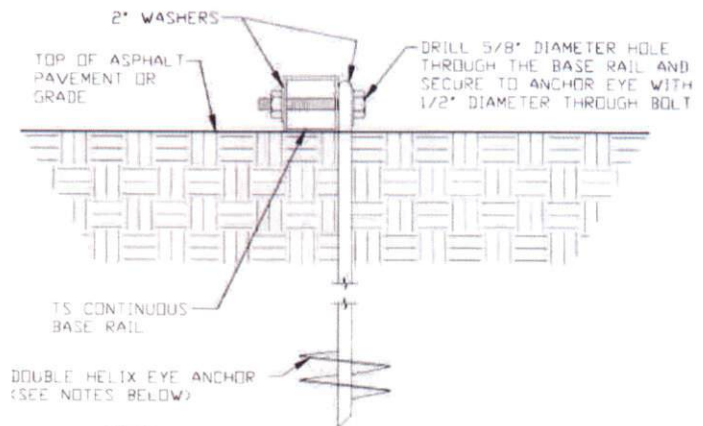
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE
60 THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC
MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT

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, 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
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



3C

GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)

MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 9

SCALE: NTS

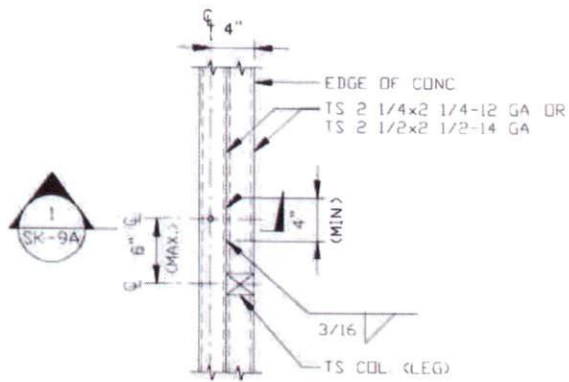
DWG. NO: SK-3

JOB NO: 19164S

REV: 0

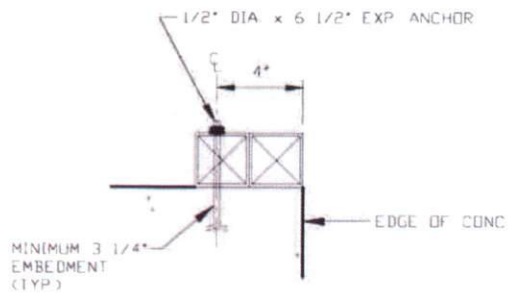
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BASE RAIL ANCHORAGE OPTIONS



**TYPICAL ANCHOR DETAIL WHEN BASE
RAIL IS NEAR EDGE OF CONCRETE**

SCALE: NTS



SECTION 1
SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSH

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

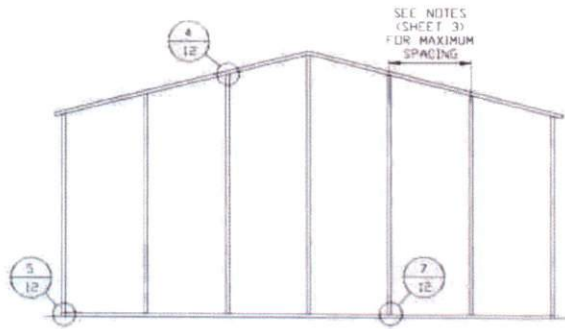
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DWG. NO: SK-3

REV: 0

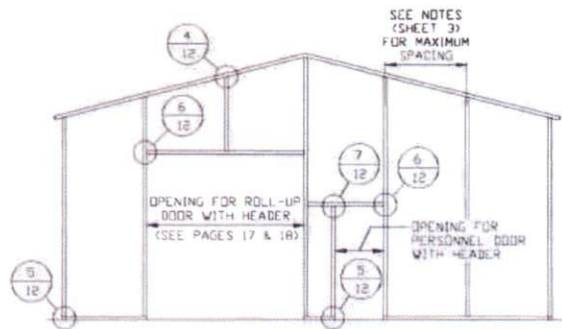
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



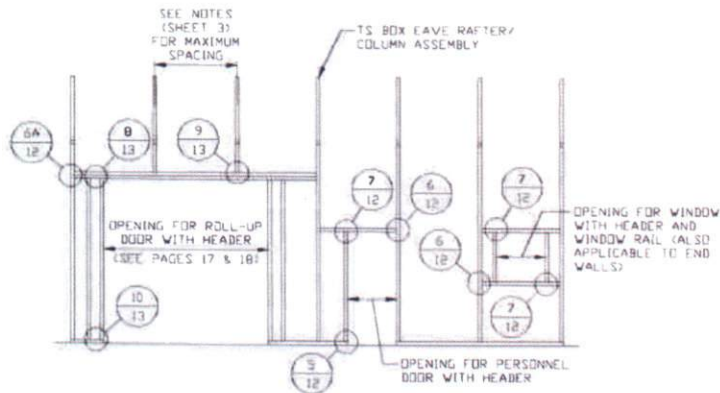
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

SCALE: NTS



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

SCALE: NTS



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

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

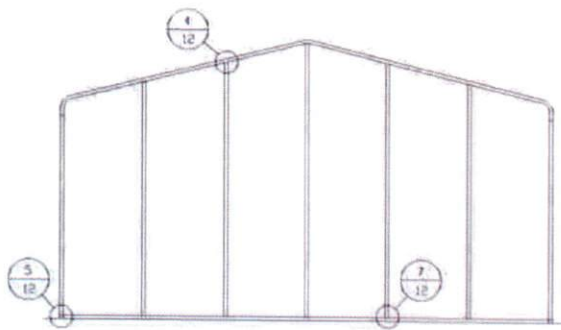
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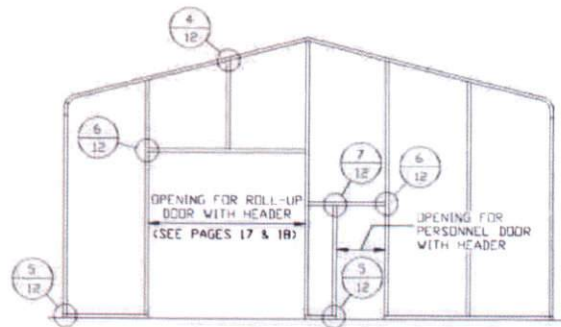
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BOW RAFTER END WALL AND SIDE WALL OPENINGS



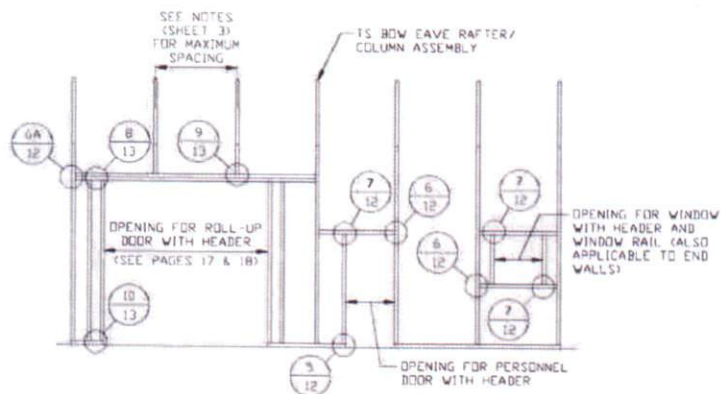
TYPICAL BOW RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOW RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



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: VSM

CLIENT: TOL

**TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE**

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

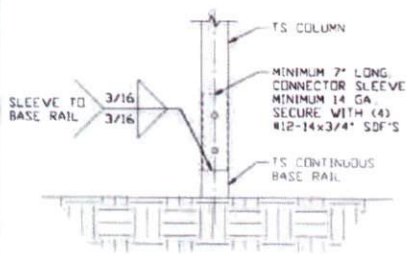
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DWG. NO: SK-3

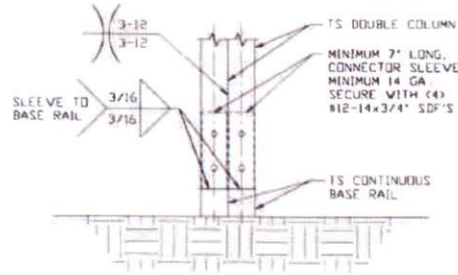
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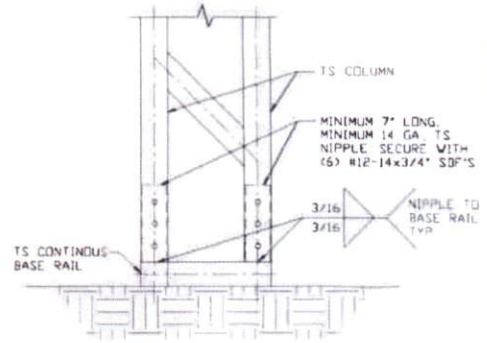
BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



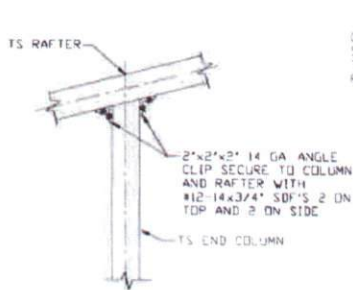
2 COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



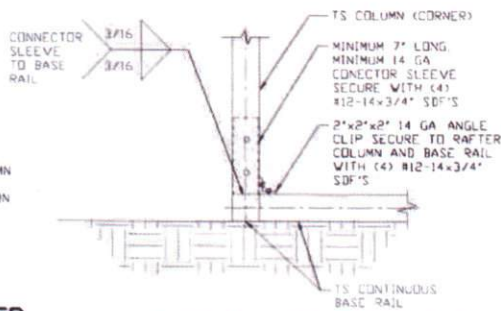
2A COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



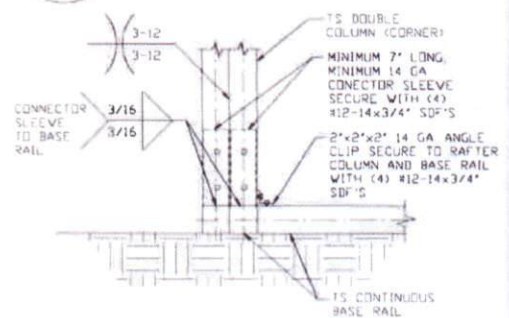
2B COLUMN/BASE RAIL CONNECTION DETAIL



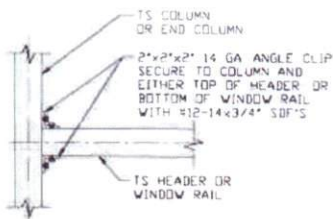
4 END COLUMN/RAFTER CONNECTION DETAIL
SCALE: NTS



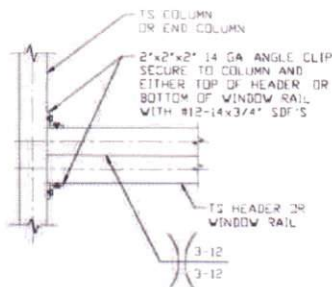
5 END COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



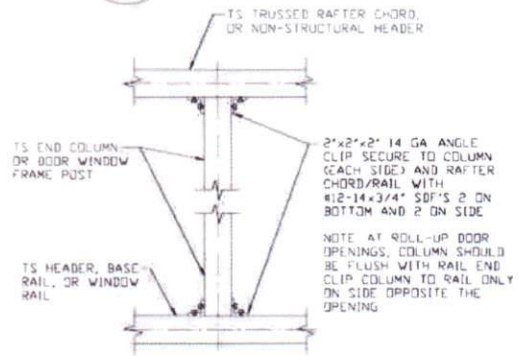
5A END COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



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



6A COLUMN OR WINDOW RAIL TO POST CONNECTION DETAIL
SCALE: NTS



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

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

DRAWN BY: JG

CHECKED BY: PMH

PROJECT MGR: WSM

CLIENT: TOL

**TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE**

DATE: 8-20-19

SHT. 12

SCALE: NTS

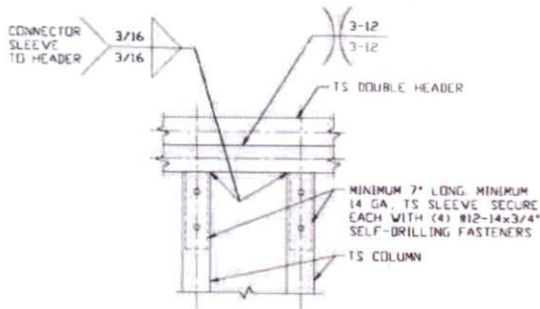
DWG. NO SK-3

JOB NO: 19164S

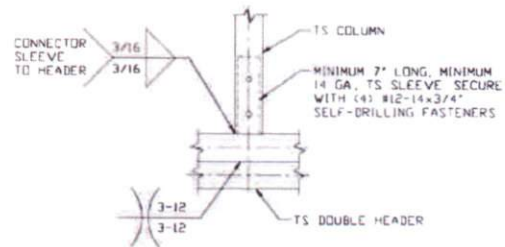
REV: 0

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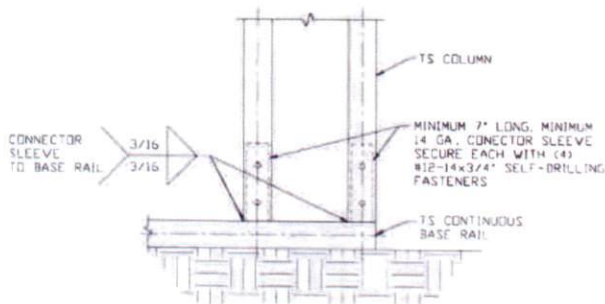
BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



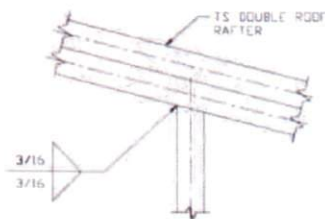
8 **DOUBLE HEADER/COLUMN CONNECTION DETAIL**
SCALE: NTS



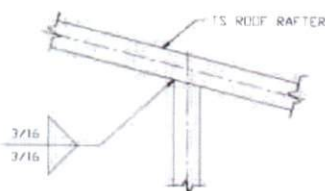
9 **COLUMN/DOUBLE HEADER CONNECTION DETAIL**
SCALE: NTS



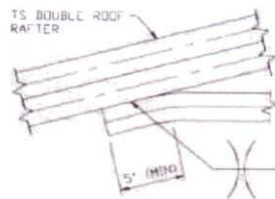
10 **COLUMN/BASE RAIL CONNECTION DETAIL**
SCALE: NTS



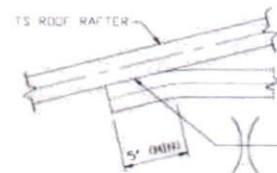
11 **RAFTER TO CHORD CONNECTION DETAIL**
SCALE: NTS



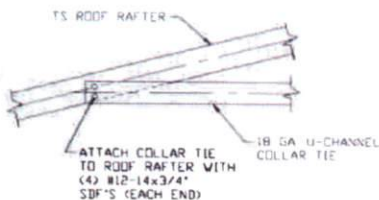
11A **RAFTER TO CHORD CONNECTION DETAIL**
SCALE: NTS



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



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



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

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"X20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 13

SCALE: NTS

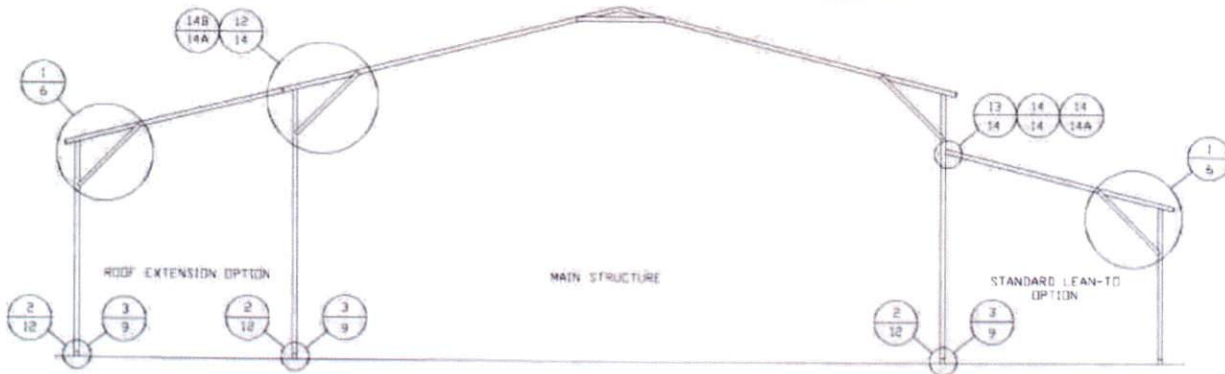
DWG. NO SK-3

JOB NO: 19164S

REV: 0

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BOX EAVE RAFTER LEAN-TO OPTIONS

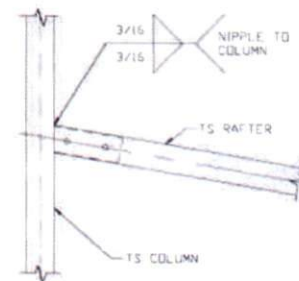
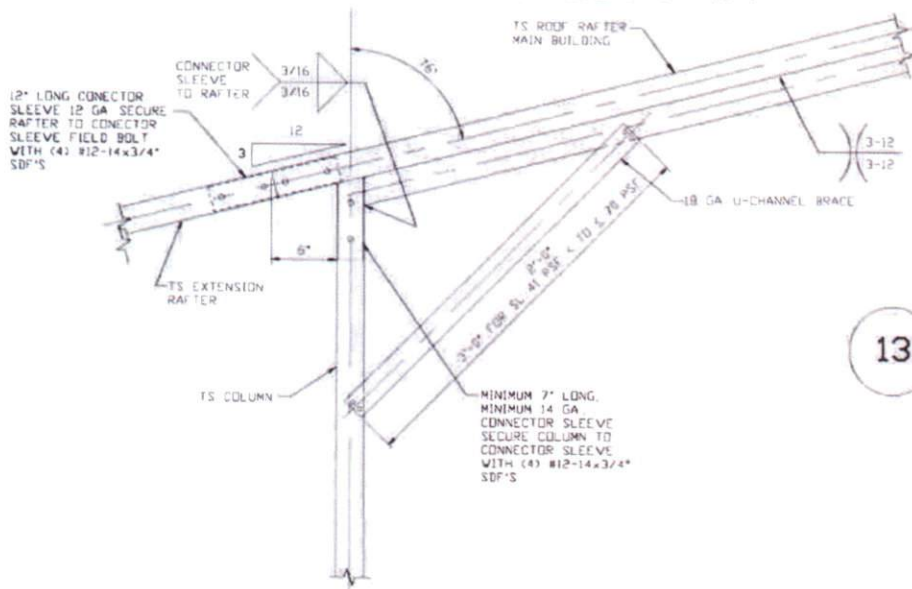


TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

SCALE: NTS

NOTE:

- MAX WIDTH OF SINGLE MEMBER RAFTER LEAN-TO W/SL 41 PSF < TO ≤ 70 PSF = 9'-0"
- MAX WIDTH OF SINGLE MEMBER RAFTER LEAN-TO W/SL ≤ 40 PSF = 11'-0"
- MAX WIDTH OF DOUBLE MEMBER RAFTER LEAN-TO W/SL 41 PSF < TO ≤ 70 PSF = 16'-0"
- MAX WIDTH OF DOUBLE MEMBER RAFTER LEAN-TO W/SL ≤ 40 PSF = 18'-0"



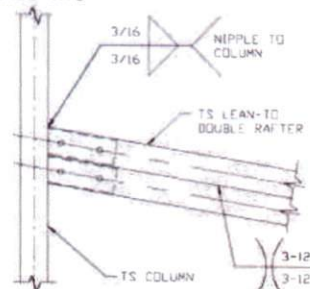
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL

13

SCALE: NTS

12 SIDE EXTENSION RAFTER/COLUMN DETAIL

SCALE: NTS



DOUBLE TUBE LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL

14

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 14

SCALE: NTS

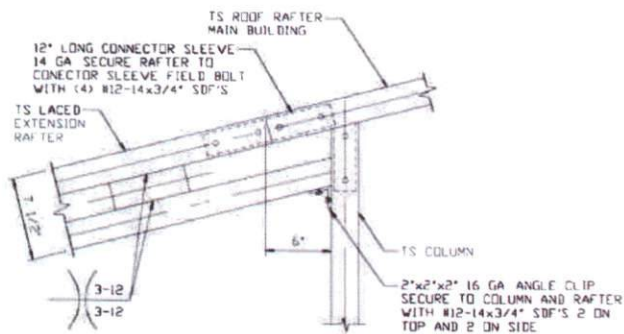
DWG. NO SK-3

JOB NO: 19164S

REV: 0

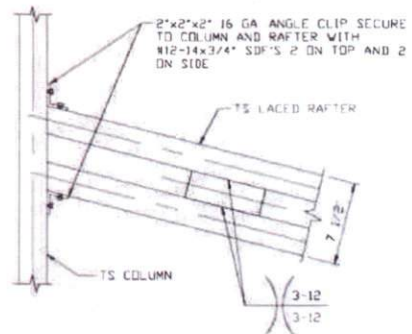
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BOX EAVE RAFTER LEAN-TO OPTIONS



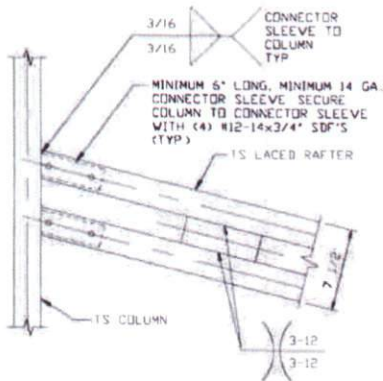
14B

**SIDE EXTENSION RAFTER/COLUMN
DETAIL FOR SPAN 16'-0" < L ≤ 24'-0"**
SCALE: NTS



14C

**LEAN-TO RAFTER TO
RAFTER COLUMN
CONNECTION DETAIL FOR
SPAN 16'-0" < L ≤ 24'-0"**
SCALE: NTS



14D

**LEAN-TO RAFTER TO
RAFTER COLUMN
CONNECTION DETAIL FOR
SPAN 16'-0" < L ≤ 24'-0"**
SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSH

CLIENT: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

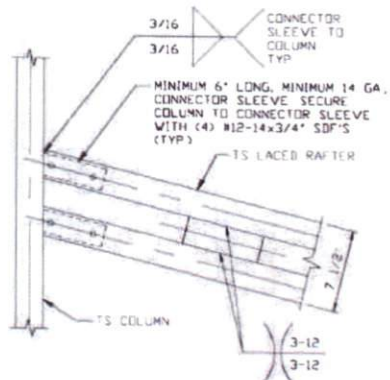
SHT. 14A

DWG. NO SK-3

REV: 0

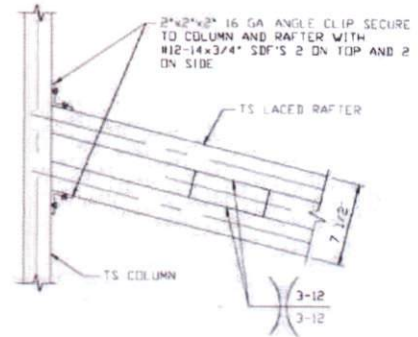
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BOW RAFTER LEAN-TO OPTION



15B

LEAN-TO RAFTER TO
RAFTER COLUMN
CONNECTION DETAIL FOR
SPAN 16'-0" < L ≤ 24'-0"
SCALE: NTS



15C

LEAN-TO RAFTER TO
RAFTER COLUMN
CONNECTION DETAIL FOR
SPAN 16'-0" < L ≤ 24'-0"
SCALE: NTS

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ENGINEERING AND CONSULTING, INC.

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CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.

330 N. MERIDIAN RD.

YOUNGSTOWN, OH 44509

30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SHT. 15A

SCALE: NTS

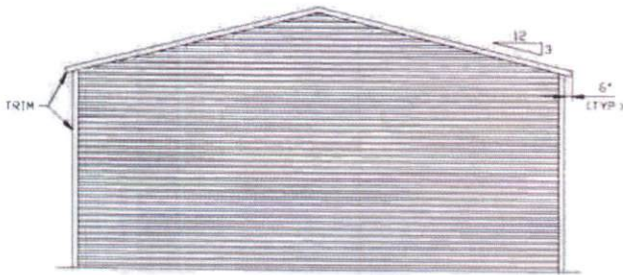
DWG. NO SK-3

JOB NO: 19164S

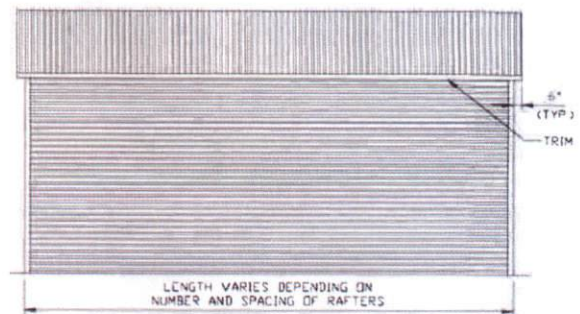
REV: 0

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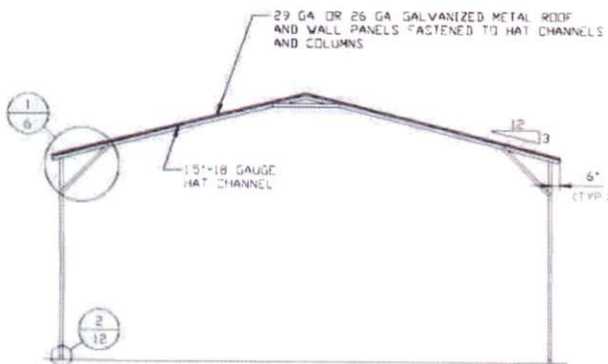
BOX EAVE RAFTER VERTICAL ROOF OPTION



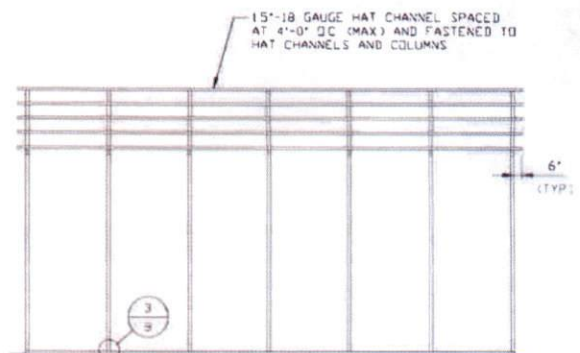
TYPICAL END ELEVATION-VERTICAL ROOF
SCALE: NTS



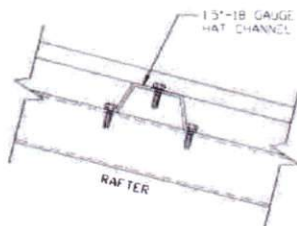
TYPICAL SIDE ELEVATION-VERTICAL ROOF OPTION
SCALE: NTS



TYPICAL SECTION-VERTICAL ROOF
SCALE: NTS



TYPICAL FRAMING SECTION-VERTICAL ROOF OPTION
SCALE: NTS



ROOF 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: TOL

TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"X20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

SHT. 16

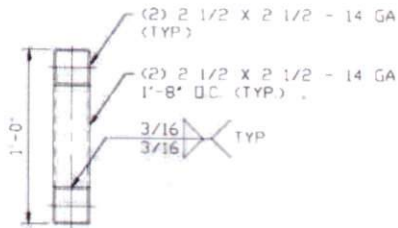
DWG. NO SK-3

REV: 0

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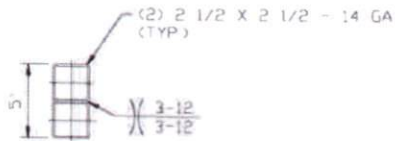
OPTIONAL HEADER

41 PSF < TD ≤ 70 PSF



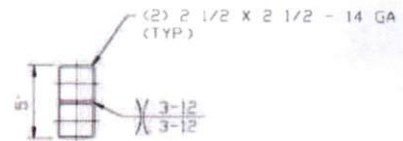
**HEADER DETAIL FOR SIDE WALL DOOR
OPENINGS 8'-0" < LENGTH < 16'-0"**

SCALE: NTS



**HEADER DETAIL FOR SIDE WALL DOOR
OPENINGS < 8'-0"**

SCALE: NTS



**HEADER DETAIL FOR END WALL DOOR
OPENINGS 14'-0" < LENGTH < 20'-0"**

SCALE: NTS



**HEADER DETAIL FOR END WALL DOOR
OPENINGS < 14'-0"**

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

**TOL BUILDINGS, INC.
330 N. MERIDIAN RD.
YOUNGSTOWN, OH 44509
30'-0"x20'-0" ENCLOSED STRUCTURE**

DATE: 8-20-19

SHT. 17

SCALE: NTS

DWG. NO: SK-3

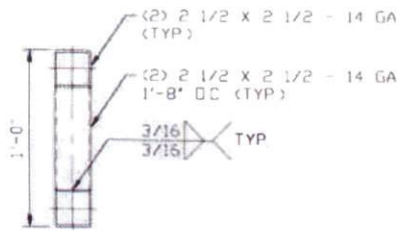
JOB NO: 19164S

REV: 0

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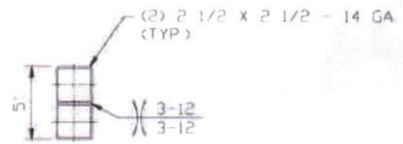
OPTIONAL HEADER

≤ 40 PSF



**HEADER DETAIL FOR SIDE WALL DOOR
OPENINGS 11'-0" < LENGTH < 18'-0"**

SCALE: NTS



**HEADER DETAIL FOR SIDE WALL DOOR
OPENINGS < 11'-0"**

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TOL

TOL BUILDINGS, INC.

330 N. MERIDIAN RD.

YOUNGSTOWN, OH 44509

30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 8-20-19

SCALE: NTS

JOB NO: 19164S

SHT. 18

DWG. NO SK-3

REV: 0

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