

A PLUS CARPORTS

STRUCTURAL DESIGN

ENCLOSED BUILDING

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

**11 November 2020
Revision 0
M&A Project No. 20209S**

Prepared for:

**A Plus Carports, LLC
4297 Hwy 268 East
Pilot Mountain, NC 27041**



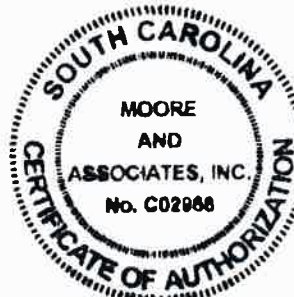
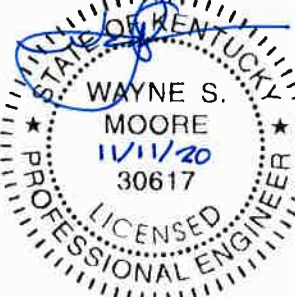

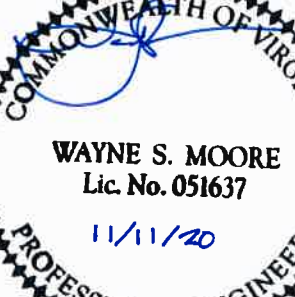




Prepared by:

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CHECKED BY: PDH
PROJECT MGR: WSM
CLIENT: A PLUS

A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30'-0" x 20'-0" ENCLOSED STRUCTURE

DATE: 11-11-20
SCALE: NTS
JOB NO: 20209S
SHT. 1
DWG. NO: SK-3
REV: 0

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DRAWING INDEX

SHEET 1	PE SEAL COVER SHEET
SHEET 2	DRAWING INDEX
SHEET 3	INSTALLATION NOTES AND SPECIFICATIONS
SHEET 4	TYPICAL SIDE AND END ELEVATIONS
SHEET 5	TYPICAL RAFTER/COLUMN END AND SIDE FRAMING SECTION (BOX EAVE RAFTER)
SHEET 5A	TYPICAL RAFTER/COLUMN END AND SIDE FRAMING SECTION (BOX EAVE RAFTER)
SHEET 6	COLUMN CONNECTION DETAILS (BOX EAVE STRUCTURE)
SHEET 7	TYPICAL RAFTER/COLUMN END AND SIDE FRAMING SECTION (BOW EAVE RAFTER)
SHEET 7A	TYPICAL RAFTER/COLUMN END AND SIDE FRAMING SECTION (BOW EAVE RAFTER)
SHEET 8	COLUMN CONNECTION DETAILS (BOW EAVE RAFTER STRUCTURE)
SHEET 9	BASE RAIL ANCHORAGE OPTIONS
SHEET 10	BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS
SHEET 11	BOW EAVE RAFTER END WALL AND SIDE WALL OPENINGS
SHEET 12	CONNECTION DETAILS
SHEET 13	CONNECTION DETAILS
SHEET 14	LEAN-TO OPTIONS (BOX EAVE RAFTER)
SHEET 14A	LEAN-TO OPTIONS (BOX EAVE RAFTER)
SHEET 15	LEAN-TO OPTIONS (BOW EAVE RAFTER)
SHEET 16	BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION
SHEET 17	SIDE WALL AND END WALL HEADER OPTIONS

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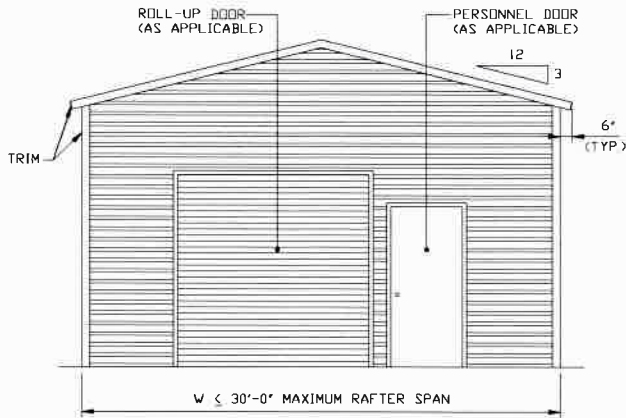
INSTALLATION NOTES AND SPECIFICATIONS

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 (NCBC), 2018 INTERNATIONAL BUILDING CODE (IBC), 2015 IBC AND 2012 IBC.
3. DESIGN LOADS ARE AS FOLLOWS:
 - A) DEAD LOAD = 115 PSF
 - B) LIVE LOAD = 20 PSF
 - C) GROUND SNOW LOAD = 25 PSF

NOTE: UNBALANCED SNOW LOAD DUE TO DRIFTING HAS NOT BEEN EVALUATED.
4. 3-SECOND GUST ULTIMATE WIND SPEED (V_{ULT}) = \leq 155 MPH (NOMINAL WIND SPEED = \leq 120 MPH).
5. MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET (UNLESS NOTED OTHERWISE).
6. END WALL COLUMNS (POSTS) ARE EQUIVALENT TO SIDE WALL POSTS IN SIZE AND SPACING (UNLESS NOTED OTHERWISE).
7. RISK CATEGORY I/II.
8. WIND EXPOSURE CATEGORY B/C.
9. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2" x 2 1/2" - 14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS (UNLESS NOTED OTHERWISE), TS 2 1/4" x 2 1/4" - 12 GAUGE MAY BE USED AS OPTIONAL FRAMING MEMBERS.
10. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 10" O.C. (MAX.) FOR RC I AND 8" O.C. (MAX.) FOR RC II.
11. FASTENERS CONSIST OF #12-14x3/4" SELF-DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS. SPECIFICATIONS APPLICABLE ONLY FOR MEAN ROOF HEIGHT OF 20 FEET OR LESS, AND ROOF SLOPES OF 14° (3:12 PITCH) OR LESS SPACING REQUIREMENTS FOR OTHER ROOF HEIGHTS AND/OR SLOPES MAY VARY. ROOF SLOPES LESS THAN 3:12 REQUIRE USE OF LAP JOINT SEALANT.
12. ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH COLUMN.
13. 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. SOIL NAILS MAY ONLY BE USED FOR WIND SPEEDS \leq 145 MPH. COORDINATE WITH LOCAL CODES/ORDINANCES REGARDING MINIMUM LENGTH FOR FROST DEPTH PROTECTION.
14. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:
 SOIL SITE CLASS = D
 RISK CATEGORY I/II
 $R = 3.25$ $I_E = 10$
 $S_{DS} = 2.039 g$ $V = C_S W$
 $S_{DI} = 1.258 g$
15. MAXIMUM THRESHOLD HEIGHT FOR PERSONNEL DOORS USED FOR MEANS OF EGRESS IN RC II STRUCTURES IS 1/2".

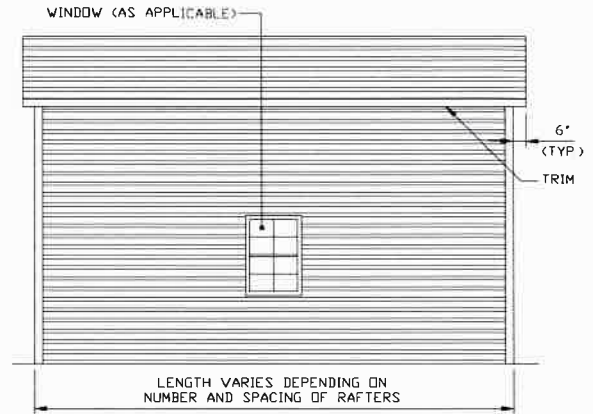
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BOX EAVE FRAME RAFTER STRUCTURE



TYPICAL END ELEVATION

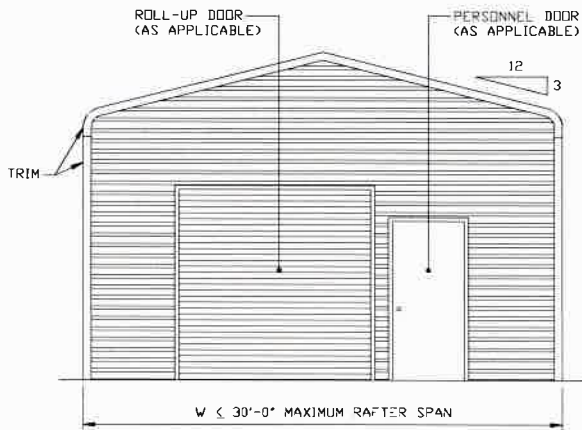
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TYPICAL SIDE ELEVATION

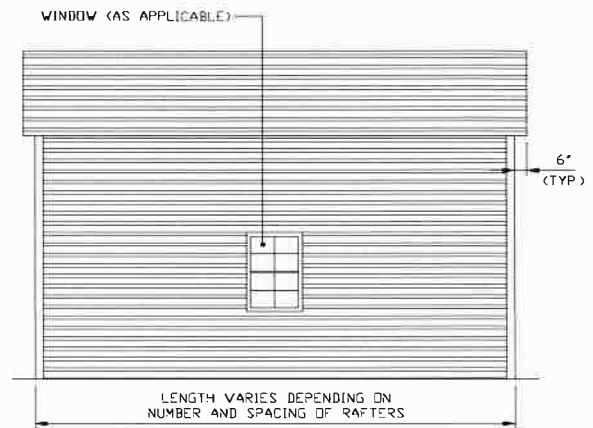
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BOW EAVE FRAME RAFTER STRUCTURE



TYPICAL END ELEVATION

SCALE: NTS



TYPICAL SIDE ELEVATION

SCALE: NTS

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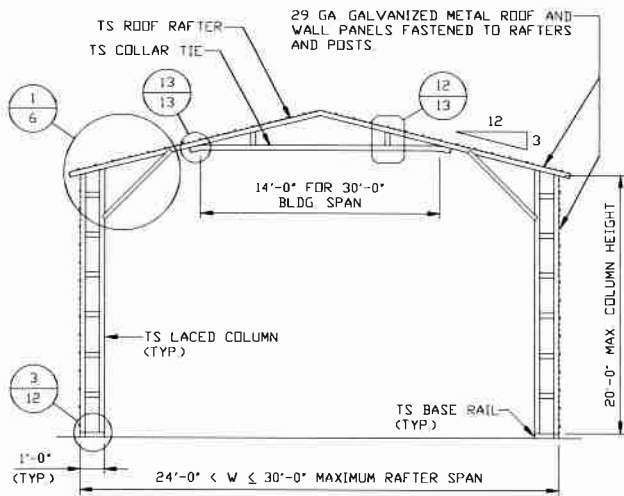
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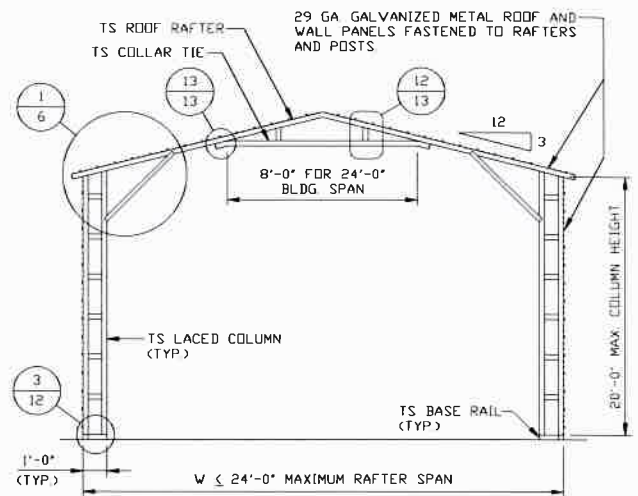
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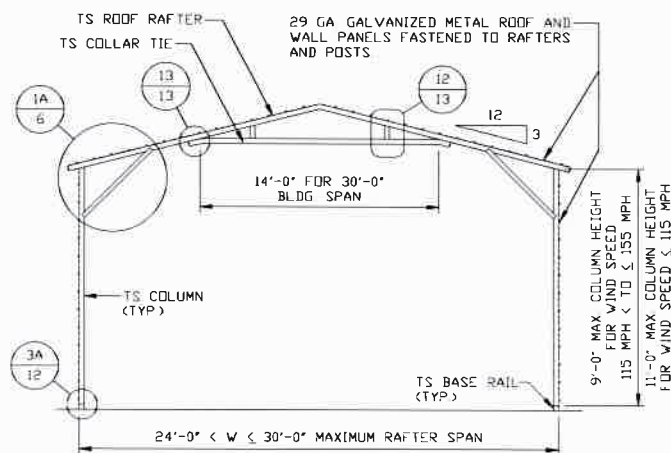
TYPICAL RAFTER/COLUMN END FRAME SECTION

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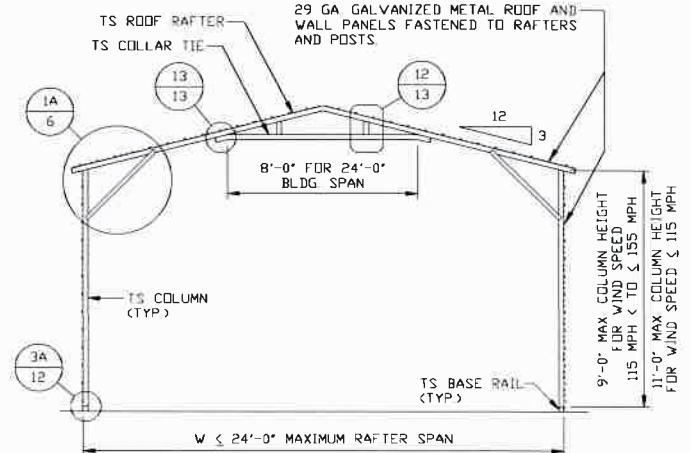
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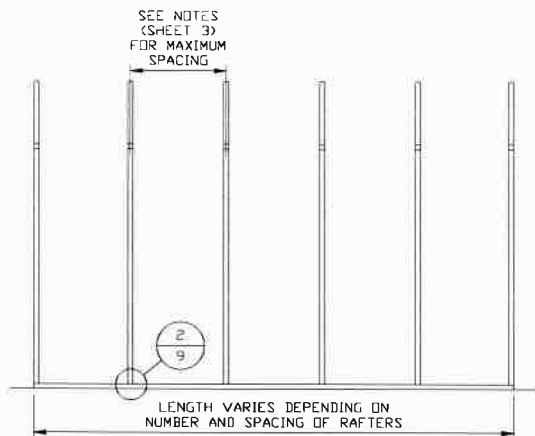
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS

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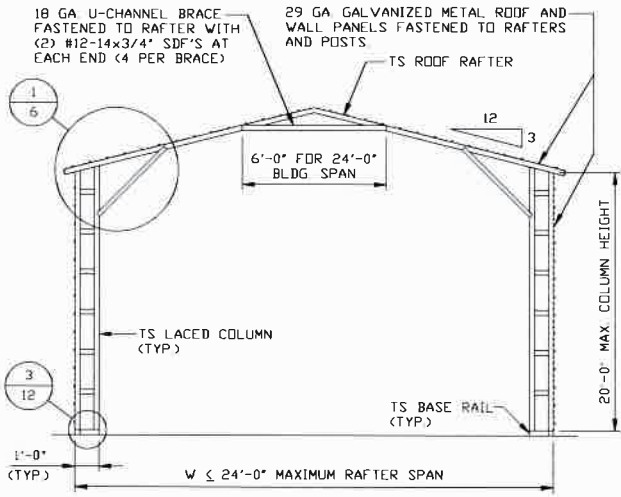
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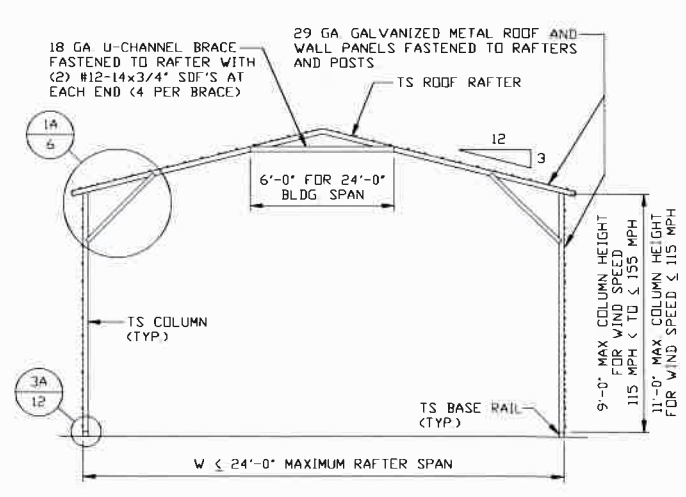
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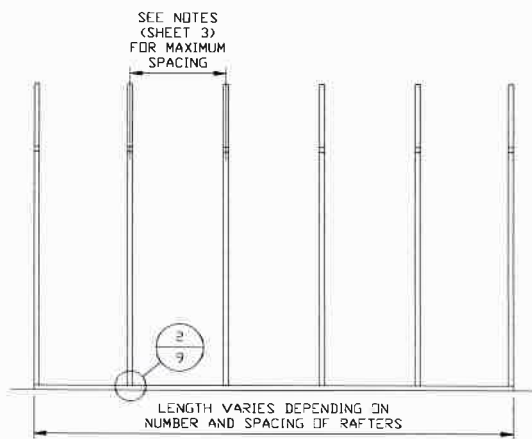
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TYPICAL RAFTER/COLUMN END FRAME SECTION
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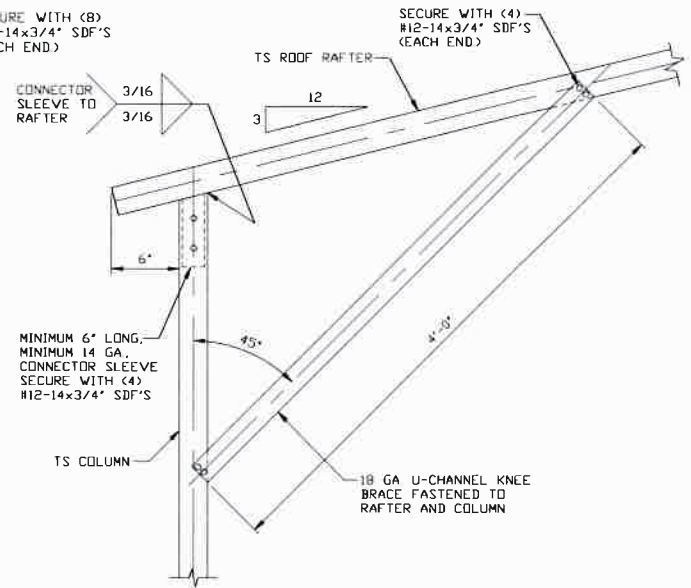
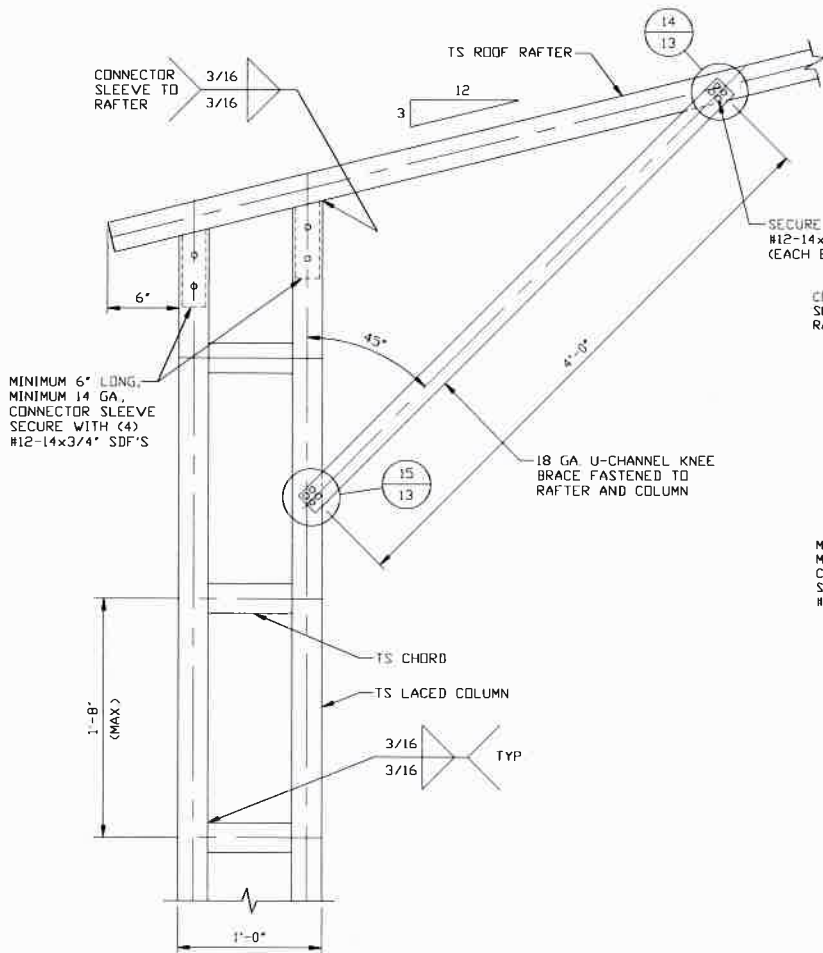


TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

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BOX EAVE RAFTER COLUMN CONNECTION DETAIL
 HEIGHTS $\leq 9'-0"$ FOR WIND SPEED $115 \text{ MPH} < \text{TO} \leq 155 \text{ MPH}$
 HEIGHTS $\leq 11'-0"$ FOR WIND SPEED $\leq 115 \text{ MPH}$

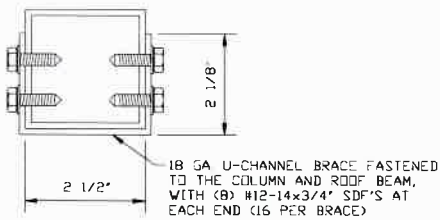
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SCALE: NTS
 NOTE: 3'-0" KNEE BRACE MAY BE USED FOR BUILDING WIDTH $\leq 24'-0"$

1

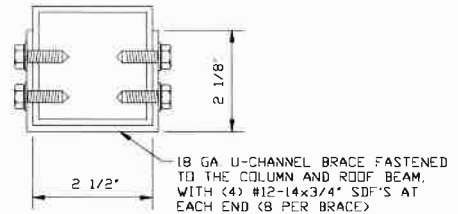
BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS $9'-0" < \text{TO} \leq 20'-0"$

SCALE: NTS



BRACE SECTION

SCALE: NTS



BRACE SECTION

SCALE: NTS

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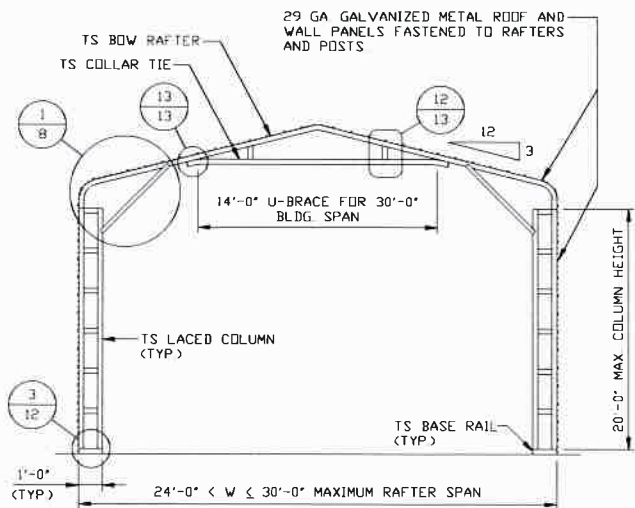
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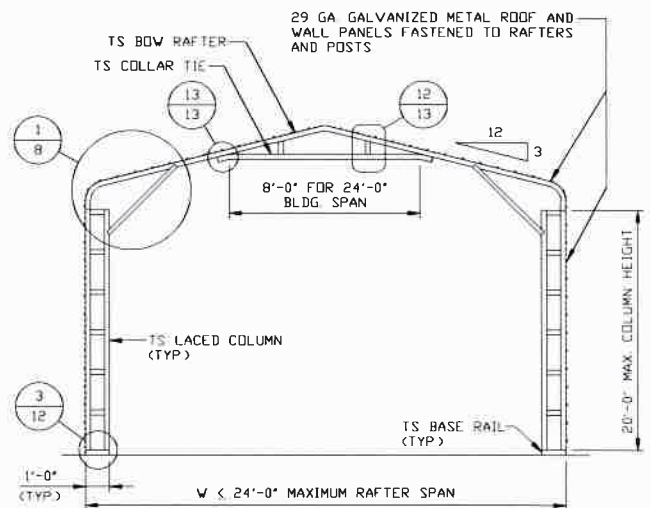
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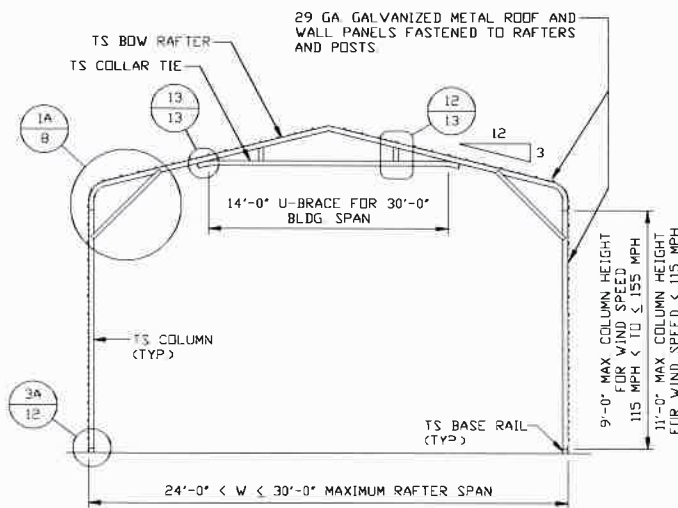
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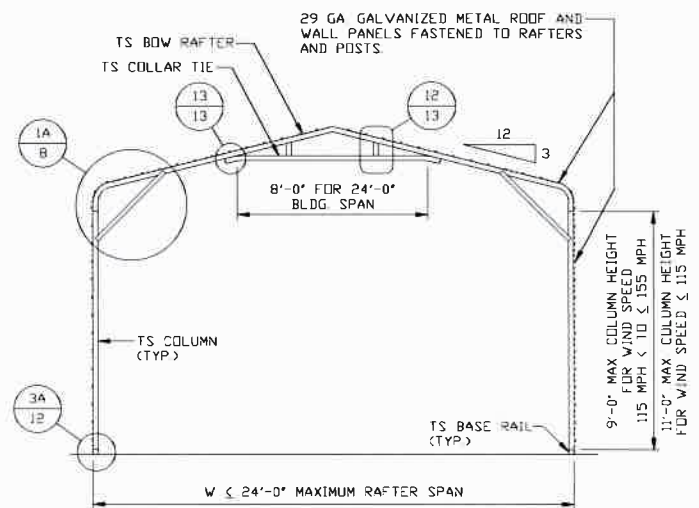
TYPICAL RAFTER/COLUMN END FRAME SECTION
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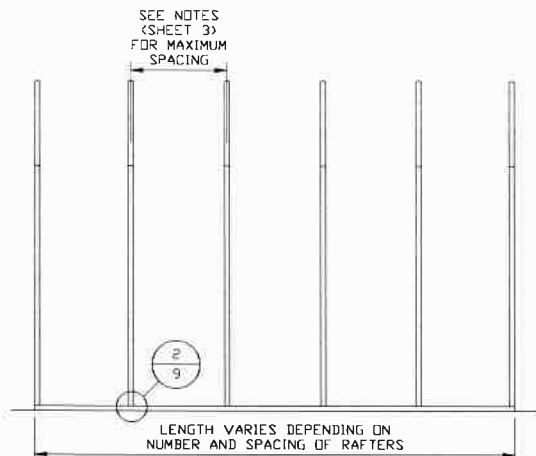
TYPICAL RAFTER/COLUMN END FRAME SECTION
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TYPICAL RAFTER/COLUMN END FRAME SECTION
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TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN FRAMING SIDE SECTION
SCALE: NTS

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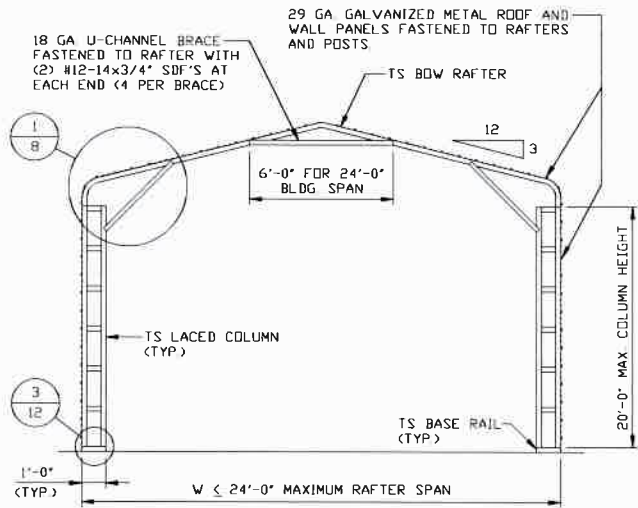
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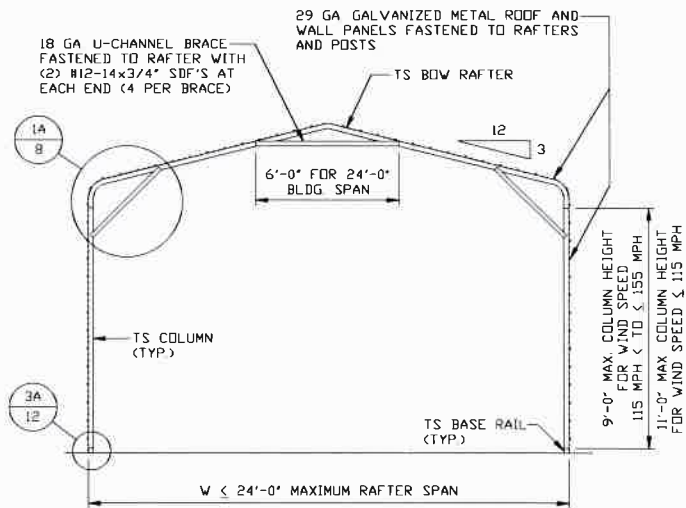
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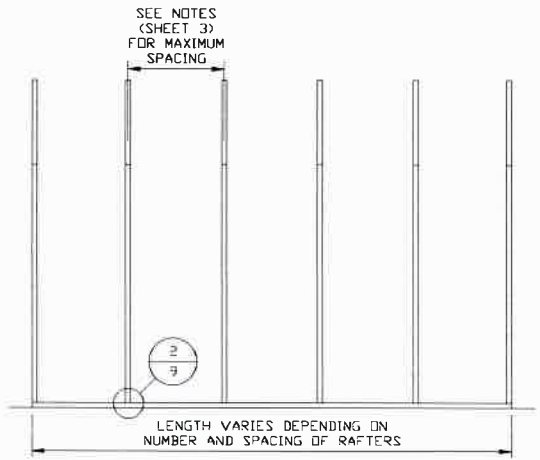
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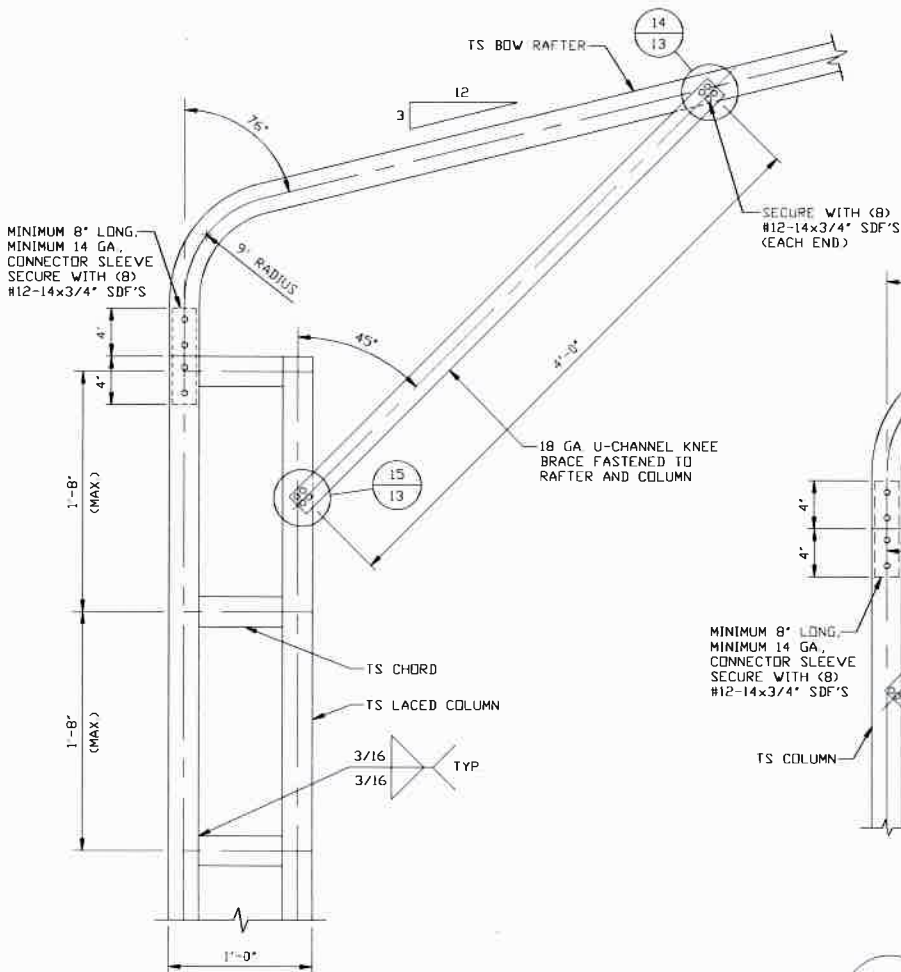


TYPICAL RAFTER/COLUMN END FRAME SECTION
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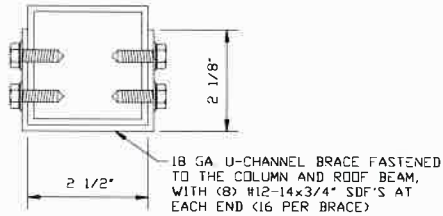
TYPICAL RAFTER/COLUMN FRAMING SIDE SECTION
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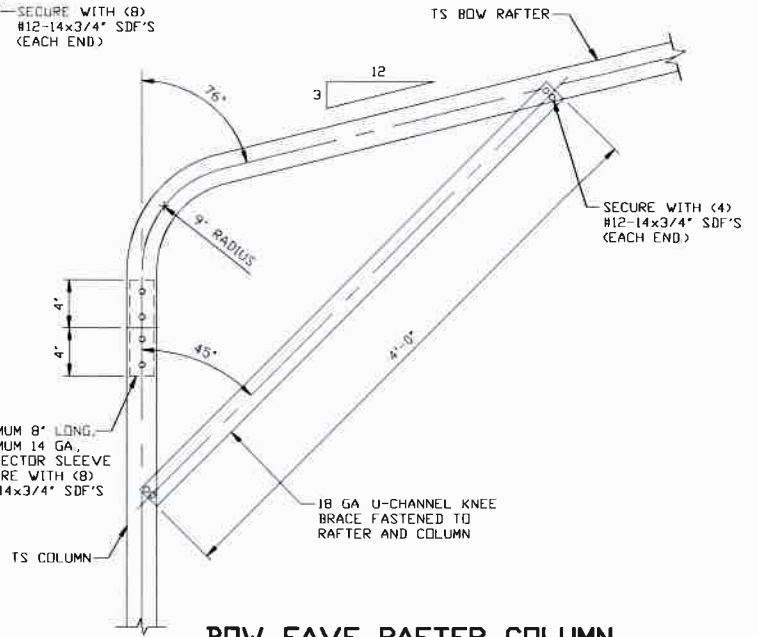
1 BOW EAVE RAFTER COLUMN CONNECTION
DETAIL FOR HEIGHTS 9'-0" < TO <= 20'-0"

SCALE: NTS



BRACE SECTION

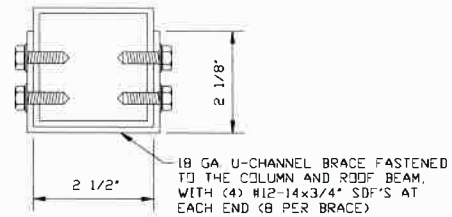
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1A BOW EAVE RAFTER COLUMN
CONNECTION DETAIL
HEIGHTS <= 9'-0" FOR WIND SPEED
115 MPH < TO <= 155 MPH
HEIGHTS <= 11'-0" FOR
WIND SPEED <= 115 MPH

SCALE: NTS

NOTE: 3'-0" KNEE BRACE MAY BE USED
FOR BUILDING WIDTH <= 24'-0"



BRACE SECTION

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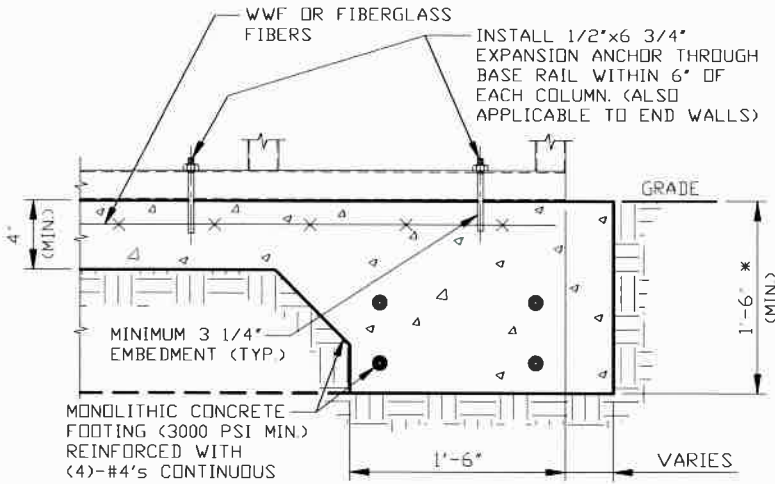
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BASE RAIL ANCHORAGE OPTIONS



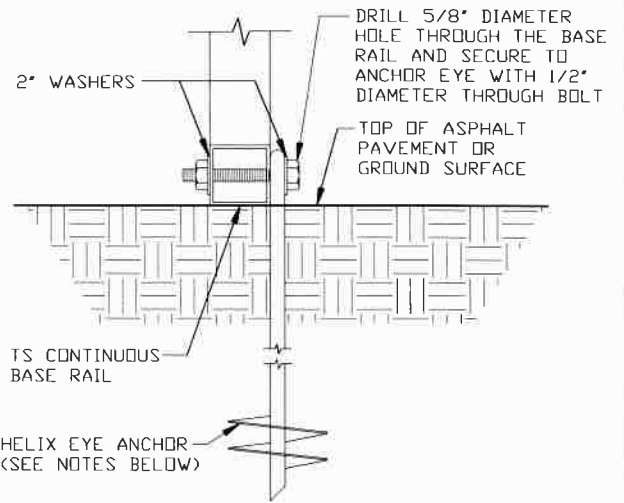
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CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS

MINIMUM ANCHOR EDGE DISTANCE IS 4"

* COORDINATE WITH LOCAL BUILDING CODE
AND/OR BUILDING OFFICIAL REGARDING
REQUIRED FOOTING DEPTH.



2A

GROUND BASE HELIX ANCHORAGE

SCALE: NTS

(CAN BE USED FOR ASPHALT)

* COORDINATE WITH LOCAL CODES/ORD.
REGARDING MIN. FROST DEPTH (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, 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.

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

DRAWN BY: LT

CHECKED BY: PIDH

PROJECT MGR: VSM

CLIENT: A PLUS

A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30'-0"x20'-0" ENCLOSED STRUCTURE

DATE: 11-11-20

SHT. 9

SCALE: NTS

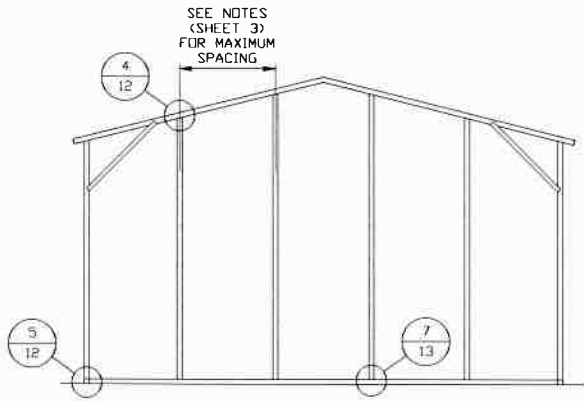
DWG. NO: SK-3

JOB NO: 20209S

REV: 0

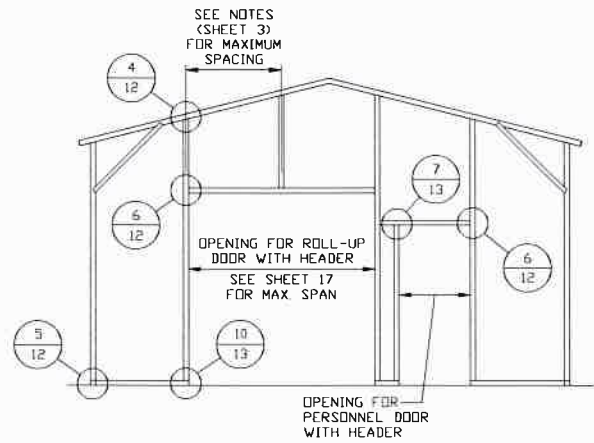
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



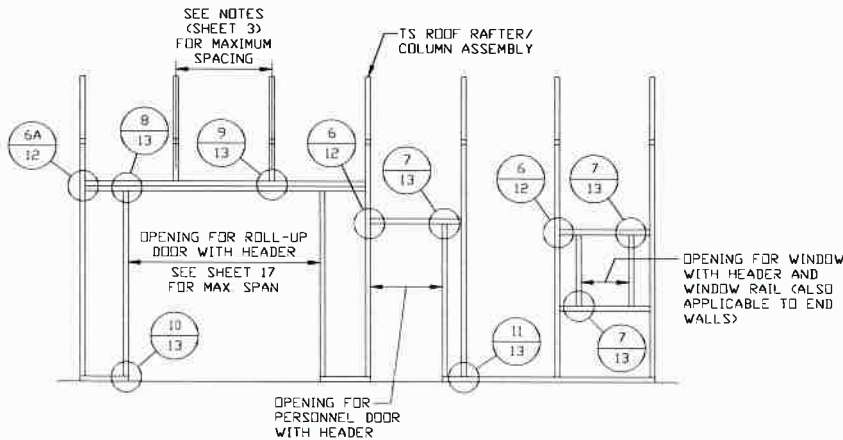
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

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: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: A PLUS

**A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30'-0" x 20'-0" ENCLOSED STRUCTURE**

DATE: 11-11-20

SHT. 10

SCALE: NTS

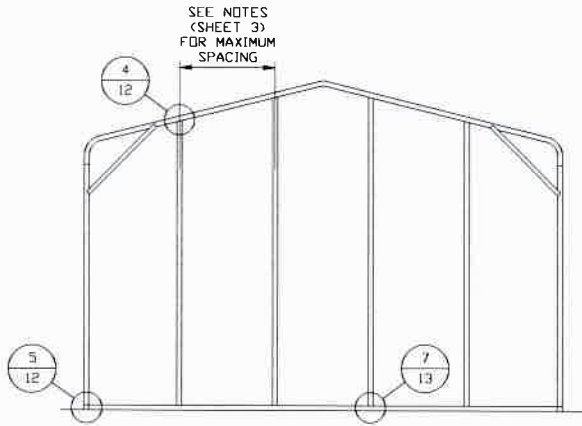
DWG. NO: SK-3

JOB NO: 20209S

REV: 0

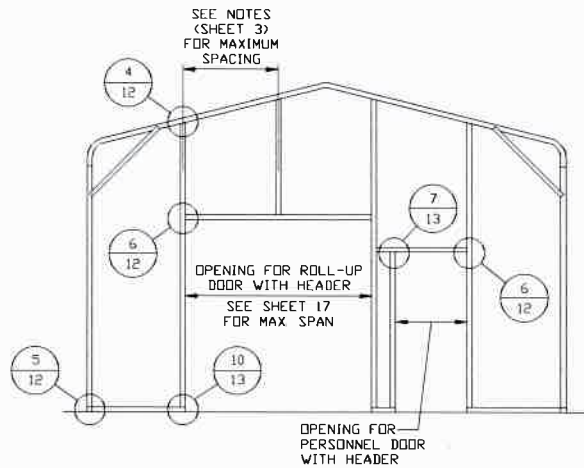
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BOW EAVE RAFTER END WALL AND SIDE WALL OPENINGS



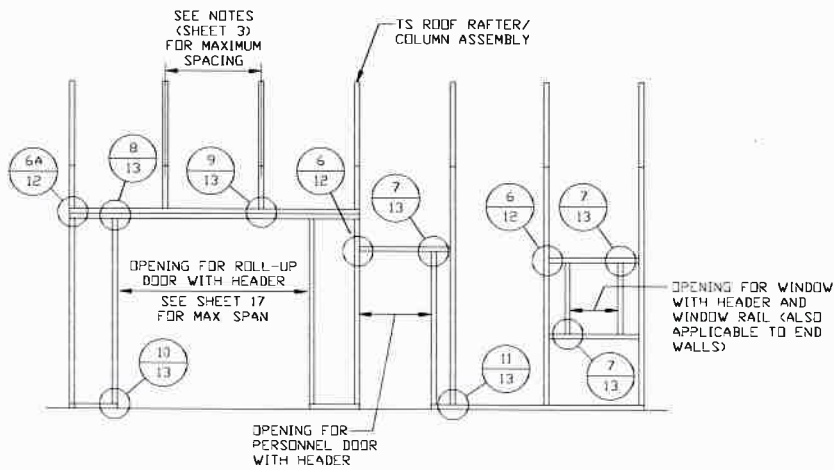
**TYPICAL BOW RAFTER
END WALL FRAMING SECTION**

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: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: A PLUS

**A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30'-0"X20'-0" ENCLOSED STRUCTURE**

DATE: 11-11-20

SHT. 11

SCALE: NTS

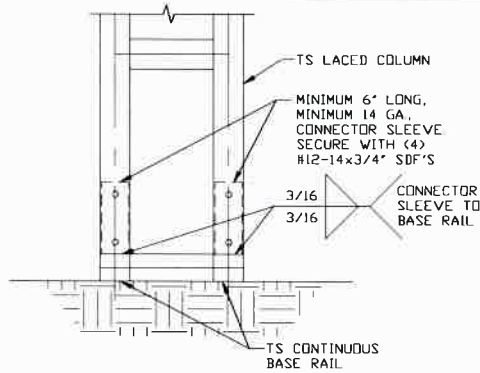
DWG. NO: SK-3

JOB NO: 20209S

REV: 0

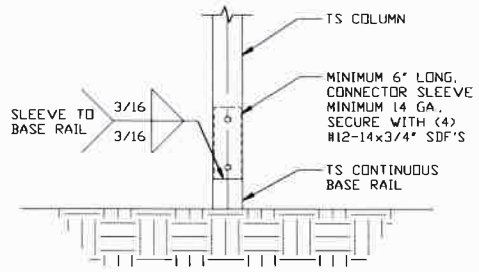
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CONNECTION DETAILS



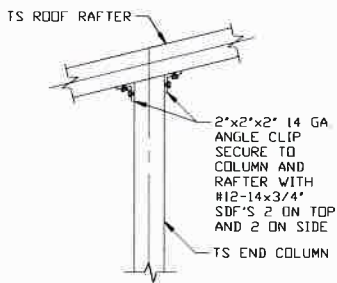
3 RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



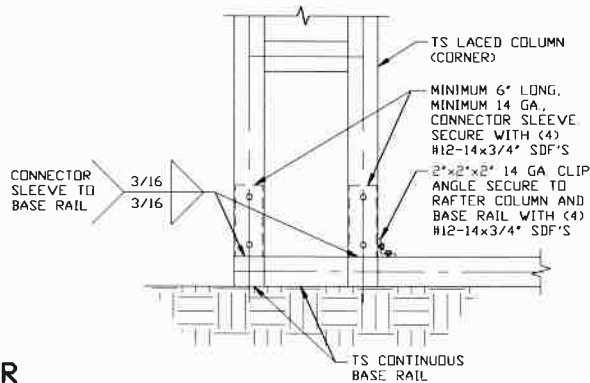
3A RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



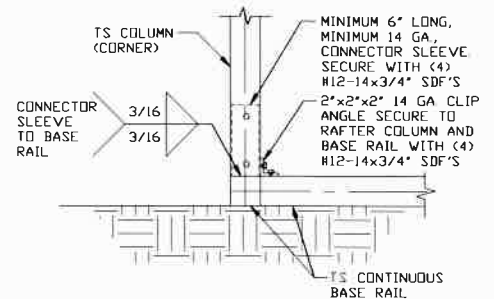
4 END COLUMN/RAFTER CONNECTION DETAIL

SCALE: NTS



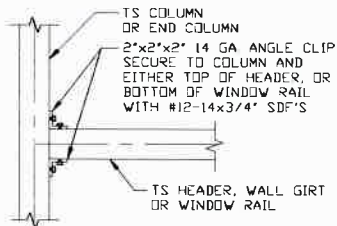
5 END COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



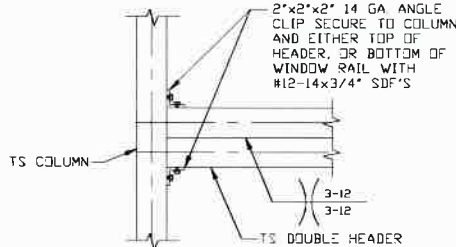
5A END COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



6 COLUMN OR WINDOW RAIL/WALL GIRT TO POST CONNECTION DETAIL

SCALE: NTS



6A COLUMN OR DOUBLE HEADER TO POST CONNECTION DETAIL

SCALE: NTS

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

DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: A PLUS

**A PLUS CARPORTS, LLC
 4297 HWY 268 EAST
 PILOT MOUNTAIN, NC 27041
 30'-0"x20'-0" ENCLOSED STRUCTURE**

DATE: 11-11-20

SHT. 12

SCALE: NTS

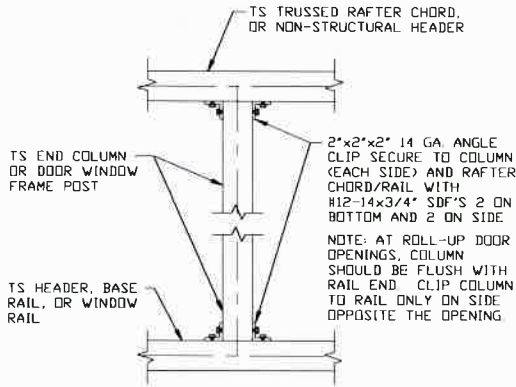
DWG. NO: SK-3

JOB NO: 20209S

REV: 0

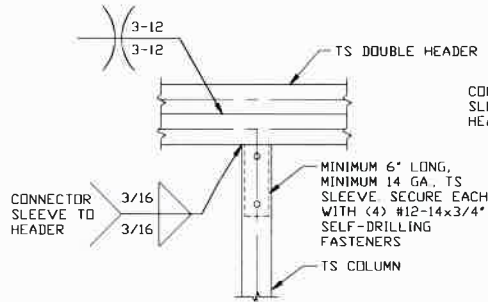
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CONNECTION DETAILS



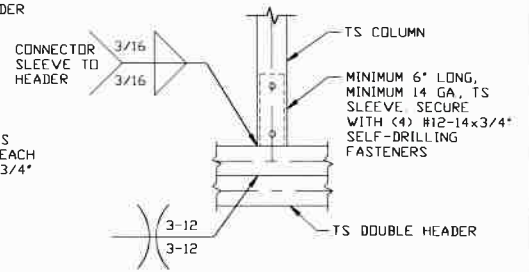
7 COLUMN TO WINDOW RAIL CONNECTION DETAIL

SCALE: NTS



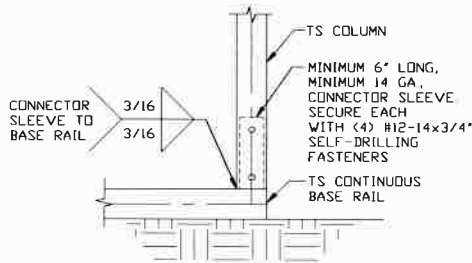
8 DOUBLE HEADER/COLUMN CONNECTION DETAIL

SCALE: NTS



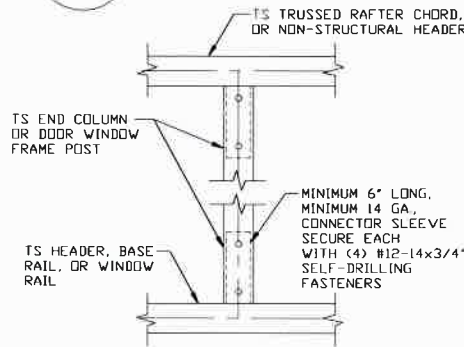
9 COLUMN/DOUBLE HEADER CONNECTION DETAIL

SCALE: NTS



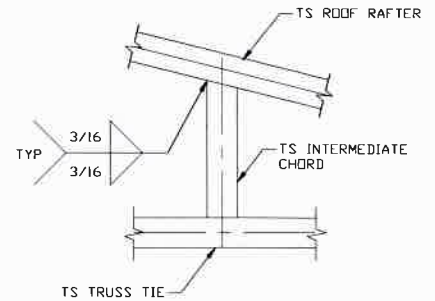
10 COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



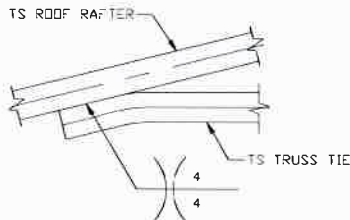
11 COLUMN TO HEADER OR BASE RAIL CONNECTION DETAIL

SCALE: NTS



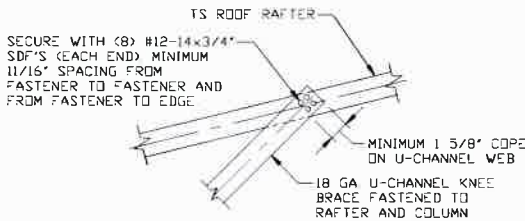
12 RAFTER TO CHORD CONNECTION DETAIL

SCALE: NTS



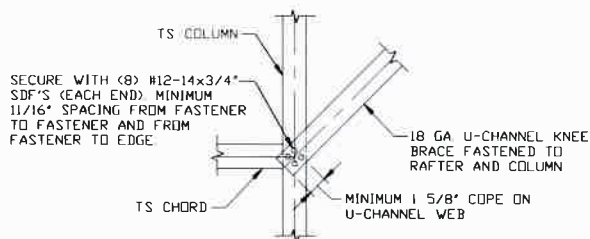
13 COLLAR TIE CONNECTION DETAIL

SCALE: NTS



14 U-CHANNEL TO RAFTER CONNECTION DETAIL

SCALE: NTS



15 U-CHANNEL TO COLUMN CONNECTION DETAIL

SCALE: NTS

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

DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: A PLUS

A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30-0"x20'-0" ENCLOSED STRUCTURE

DATE: 11-11-20

SHT. 13

SCALE: NTS

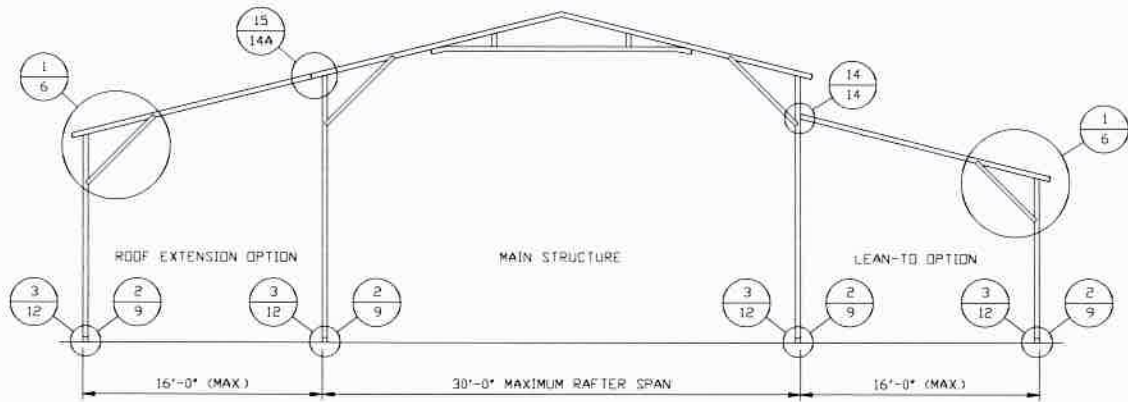
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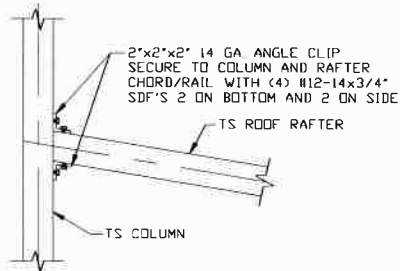
BOX EAVE RAFTER LEAN-TO OPTIONS



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

SCALE: NTS

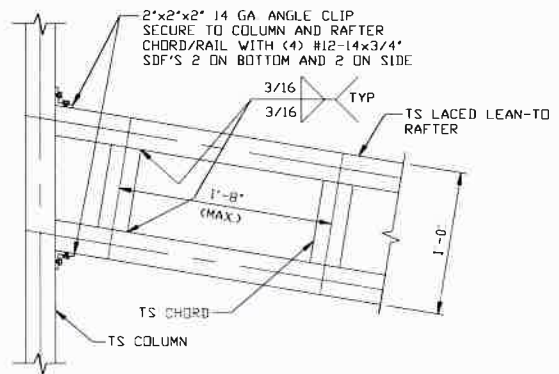
MAXIMUM WIDTH OF LACED TUBE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 16'-0".
 MAXIMUM WIDTH OF SINGLE TUBE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 11'-0".
 REFERENCE RAFTER COLUMN CONNECTION DETAILS FOR APPROPRIATE COLUMN HEIGHT AND TUBING SPECIFICATION.



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS $\leq 11'-0''$

14

SCALE: NTS



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS $11'-0'' < \text{TO } \leq 16'-0''$

14A

SCALE: NTS

**MOORE AND ASSOCIATES
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PROJECT MGR: WSM

CLIENT: A PLUS

**A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30-0"x20'-0" ENCLOSED STRUCTURE**

DATE: 11-11-20

SHT. 14

SCALE: NTS

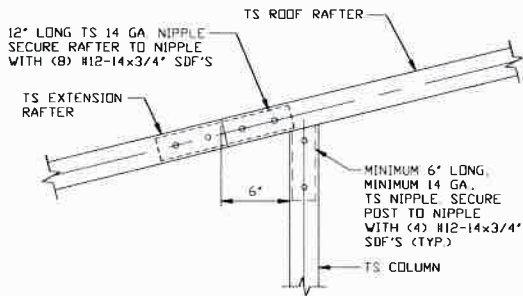
DWG. NO: SK-3

JOB NO: 20209S

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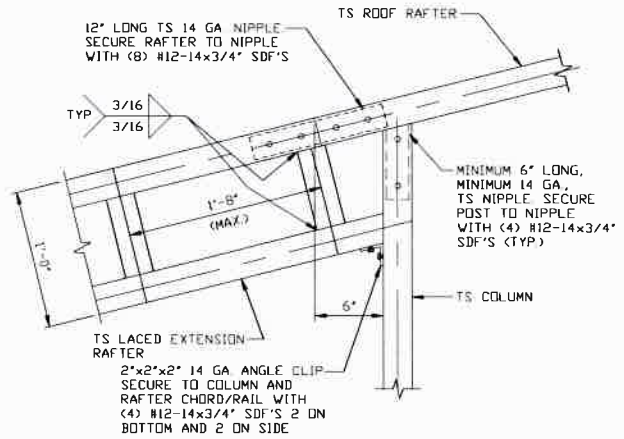
BOX EAVE RAFTER LEAN-TO OPTIONS



**SIDE EXTENSION RAFTER
COLUMN DETAIL FOR
RAFTER SPANS $\leq 11'-0''$**

SCALE: NTS

15



**SIDE EXTENSION RAFTER
COLUMN DETAIL FOR RAFTER
SPANS $11'-0'' < TO \leq 16'-0''$**

SCALE: NTS

15A

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

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PROJECT MGR: WSM

CLIENT: A PLUS

**A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30'-0" x 20'-0" ENCLOSED STRUCTURE**

DATE: 11-11-20

SHT. 14A

SCALE: NTS

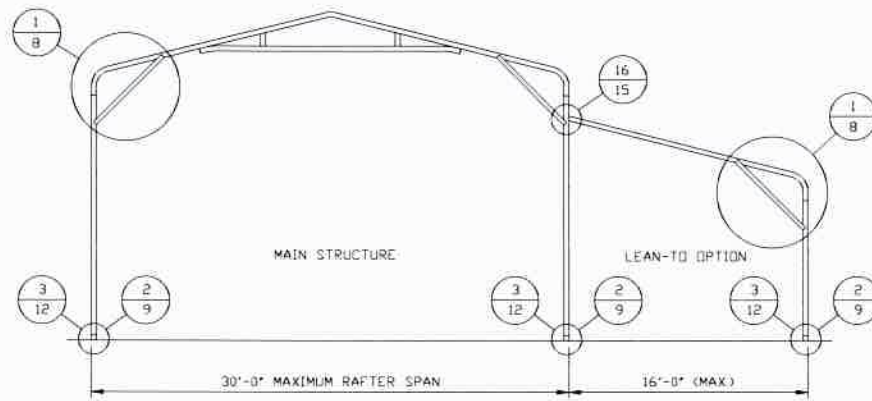
DWG. NO: SK-3

JOB NO: 20209S

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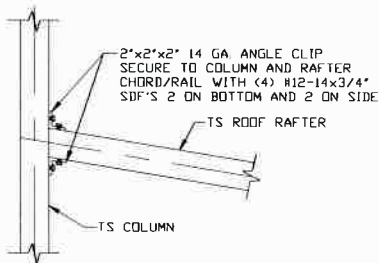
BOW EAVE RAFTER LEAN-TO OPTION



TYPICAL BOW EAVE RAFTER LEAN-TO OPTION FRAMING SECTION

SCALE: NTS

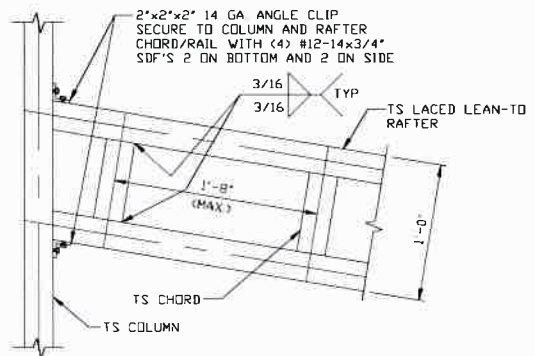
MAXIMUM WIDTH OF LACED TUBE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 16'-0".
 MAXIMUM WIDTH OF SINGLE TUBE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 11'-0".
 REFERENCE RAFTER COLUMN CONNECTION DETAILS FOR APPROPRIATE COLUMN HEIGHT AND TUBING SPECIFICATION.



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS \leq 11'-0"

SCALE: NTS

16



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 11'-0" < TO \leq 16'-0"

SCALE: NTS

16A

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

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PROJECT MGR: WSM

CLIENT: A PLUS

**A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30-0"x20'-0" ENCLOSED STRUCTURE**

DATE: 11-11-20

SHT. 15

SCALE: NTS

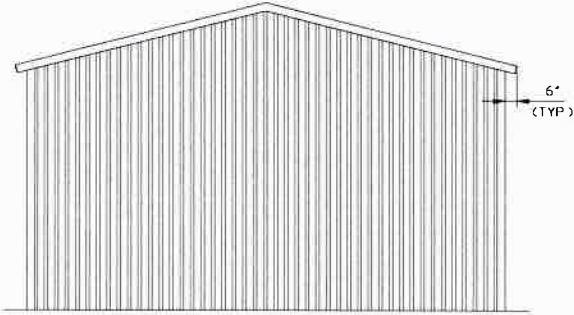
DWG. NO: SK-3

JOB NO: 20209S

REV: 0

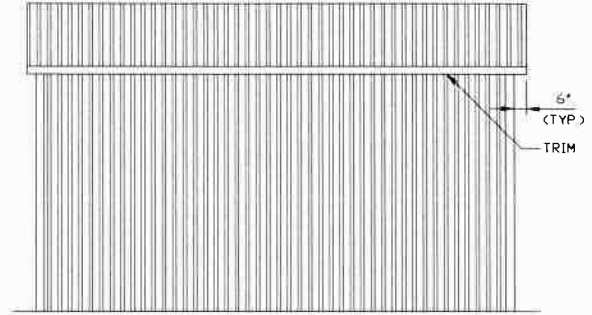
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BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



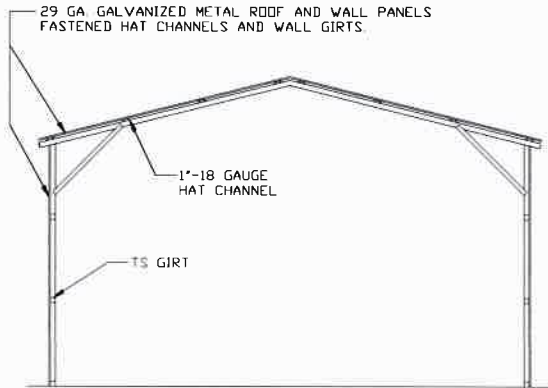
**TYPICAL END ELEVATION
VERTICAL ROOF/SIDING**

SCALE: NTS



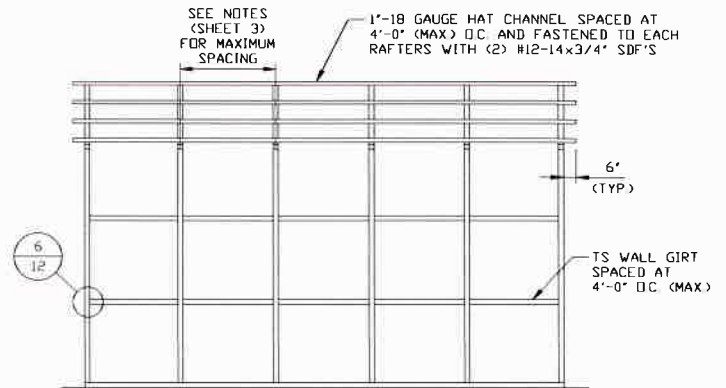
**TYPICAL SIDE ELEVATION
VERTICAL ROOF/SIDING**

SCALE: NTS



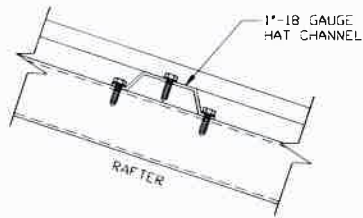
**TYPICAL SECTION VERTICAL
ROOF/SIDING OPTION**

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.**

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PROJECT MGR: WSM

CLIENT: A PLUS

A PLUS CARPORTS, LLC
4297 HWY 268 EAST
PILOT MOUNTAIN, NC 27041
30-0"x20'-0" ENCLOSED STRUCTURE

DATE: 11-11-20

SHT. 16

SCALE: NTS

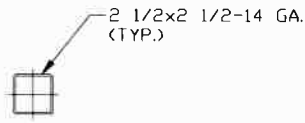
DWG. NO: SK-3

JOB NO: 20209S

REV: 0

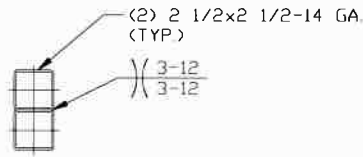
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SIDE WALL HEADER OPTIONS



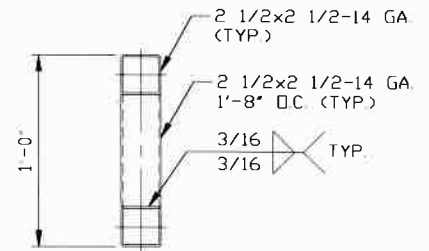
HEADER DETAIL FOR DOOR OPENINGS LENGTHS $\leq 6'-0"$

SCALE: NTS



HEADER DETAIL FOR DOOR OPENINGS $6'-0" < \text{LENGTHS} \leq 10'-0"$

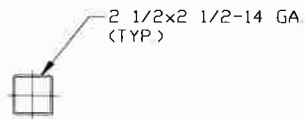
SCALE: NTS



HEADER DETAIL FOR DOOR OPENINGS $10'-0" < \text{LENGTHS} \leq 20'-0"$

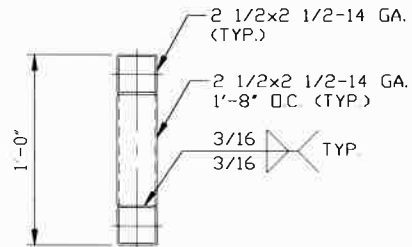
SCALE: NTS

END WALL HEADER OPTIONS



HEADER DETAIL FOR DOOR OPENINGS LENGTHS $\leq 7'-0"$

SCALE: NTS



HEADER DETAIL FOR DOOR OPENINGS $7'-0" < \text{LENGTHS} \leq 20'-0"$

SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

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PROJECT MGR: WSM

CLIENT: A PLUS

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SHT. 17

SCALE: NTS

DWG. NO: SK-3

JOB NO: 20209S

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