



PILOT MOUNTAIN, NORTH CAROLINA

**STRUCTURAL DESIGN
ENCLOSED BUILDING**

**MAXIMUM 30'-0" WIDE X 16'-0" EAVE HEIGHT- BOX EAVE
FRAME**

30 November 2018
Revision 0
M&A Project No. 18315S

Prepared for:

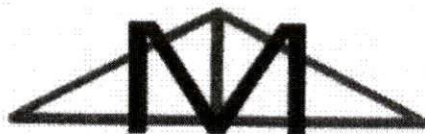
NC Carports and Garages, LLC
309 S. Depot Street
Pilot Mountain, NC 27041

Prepared by:

Moore and Associates Engineering
and Consulting, Inc.

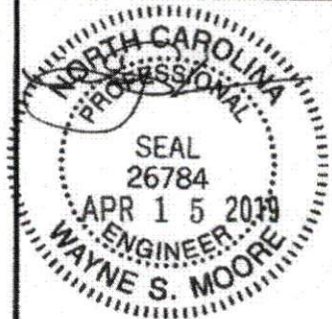
1009 East Avenue
North Augusta, SC 29841

401 S. Main St., Suite 200
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MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING





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ENGINEERING AND CONSULTING, INC.**

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CHECKED BY: PH

PROJECT MGR: WSM

CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 11-30-18

SCALE: NTS

JOB NO: 18315S

SHT. 1

DWG. NO: SK-3

REV. 0

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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: AT	NC CARPORTS AND GARAGES, LLC 309 S. DEPOT STREET PILOT MOUNTAIN, NC 27041 30'-0" x 16'-0" ENCLOSED STRUCTURE		
	CHECKED BY: PH	PROJECT MGR: VSM	DATE: 11-30-18	SCALE: NTS
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INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR MAXIMUM 30'-0" WIDE x 16'-0" EAVE HEIGHT ENCLOSED STRUCTURES.
2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2018 NORTH CAROLINA BUILDING CODE, 2009 INTERNATIONAL BUILDING CODE (IBC), 2012 IBC AND 2015 IBC.
3. DESIGN LOADS ARE AS FOLLOWS:
 - A) DEAD LOAD = 15 PSF
 - B) LIVE LOAD = 12 PSF
 - C) GROUND SNOW LOAD = 35 PSF
 - = 30 PSF (W ≤ 24'-0" WITH U-CHANNEL COLLAR TIE)
4. 3-SECOND GUST ULTIMATE WIND SPEED (V_{ULT}) 105 TO 145 MPH (NOMINAL WIND SPEED 82 TO 112 MPH)
5. MAXIMUM RAFTER/COLUMN AND END COLUMN SPACING = 5.0 FEET (UNLESS NOTED OTHERWISE)
6. SIDEWALL COLUMNS AND ENDWALL COLUMNS ARE SIMILAR IN SIZE, UNLESS NOTED OTHERWISE.
7. RISK CATEGORY I.
8. WIND EXPOSURE CATEGORY B.
9. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2" x 2 1/2" - 14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS (UNLESS NOTED OTHERWISE).
10. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 6 INCHES.
11. FASTENERS CONSIST OF #12-14x3/4" SELF-DRILLING FASTENER (SDF). USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS. SPECIFICATIONS APPLICABLE ONLY FOR MEAN ROOF HEIGHT OF 16 FEET OR LESS, AND ROOF SLOPES OF 14° (3:12 PITCH) OR LESS. SPACING REQUIREMENTS FOR OTHER ROOF HEIGHTS AND/OR SLOPES MAY VARY.
12. GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH COLUMN.
13. STANDARD SOIL NAIL FOUNDATION SYSTEM CONSIST OF #4 REBAR W/ WELDED NUT x 36" LONG AND ARE APPLICABLE ONLY IN MEDIUM TO STIFF SOILS (SUITABLE SOIL). OPTIONAL FOUNDATION SYSTEMS MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED.
14. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:
 - SOIL SITE CLASS = D
 - RISK CATEGORY I/II/III
 - R = 3.25 $I_p = 1.0$
 - $S_{MS} = 2.039$ $V = 105$
 - $S_{M1} = 1.258$



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SHT. 3A

SCALE: NTS

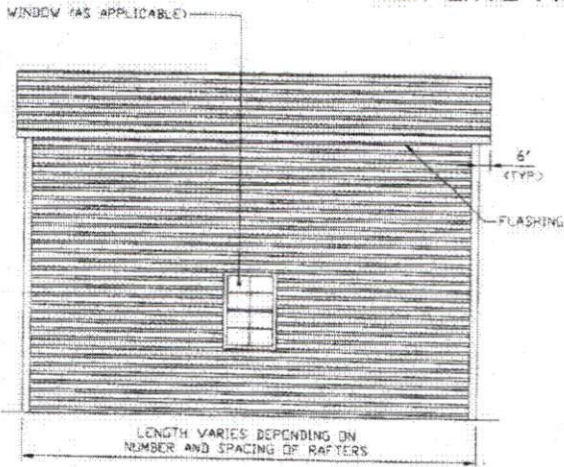
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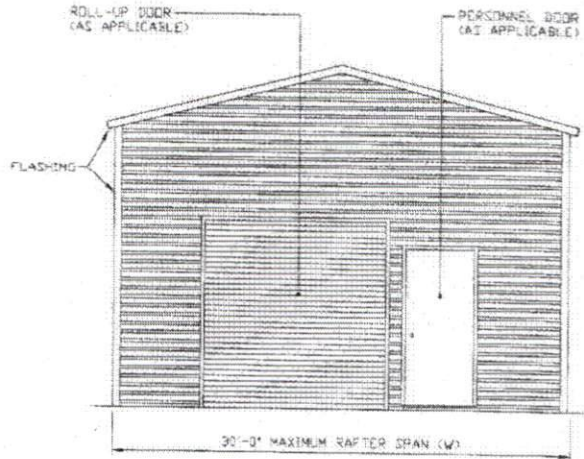
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BOX EAVE FRAME RAFTER STRUCTURE



TYPICAL SIDE ELEVATION
SCALE: NTS



TYPICAL END ELEVATION
SCALE: NTS



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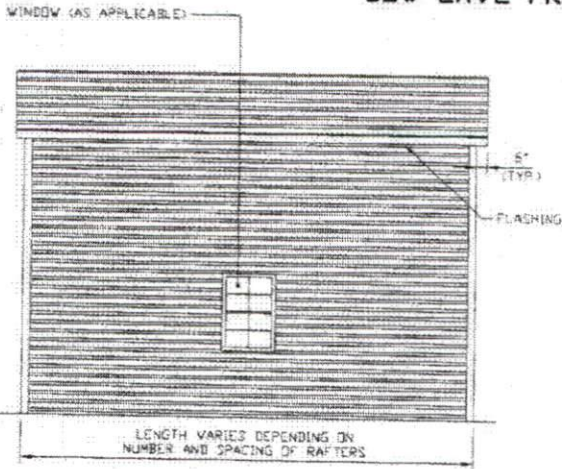
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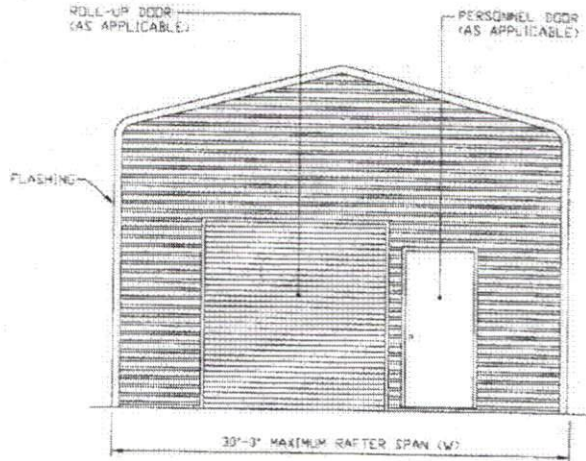
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BOW EAVE FRAME RAFTER STRUCTURE



TYPICAL SIDE ELEVATION
SCALE: NTS



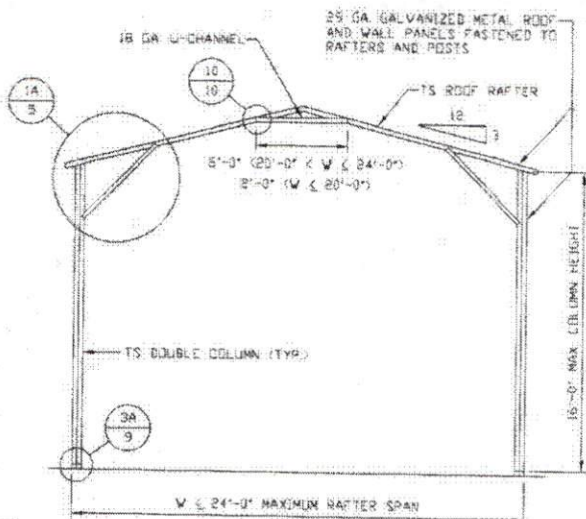
TYPICAL END ELEVATION
SCALE: NTS



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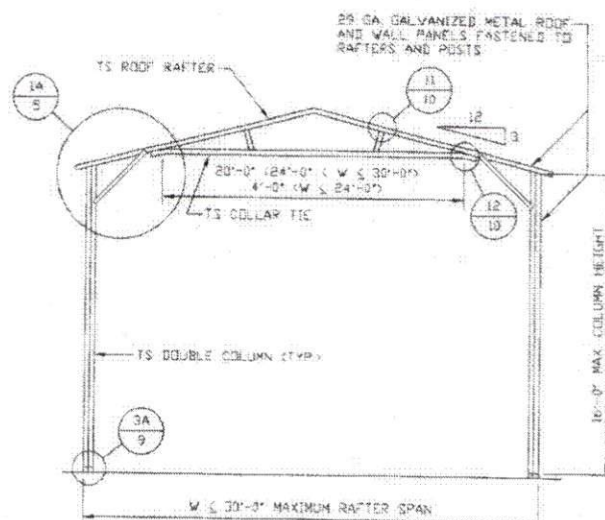
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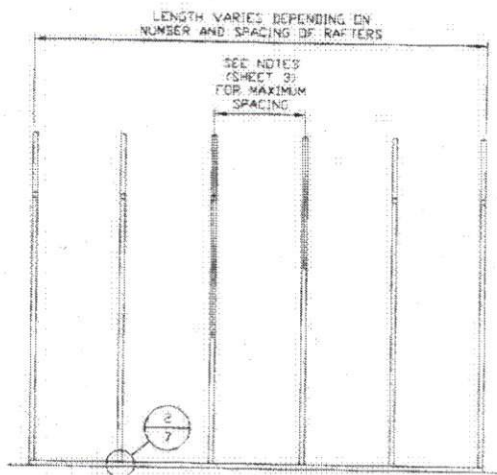
TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS



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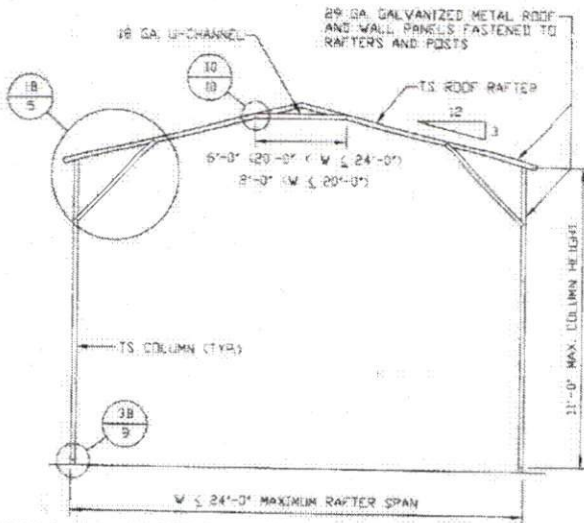
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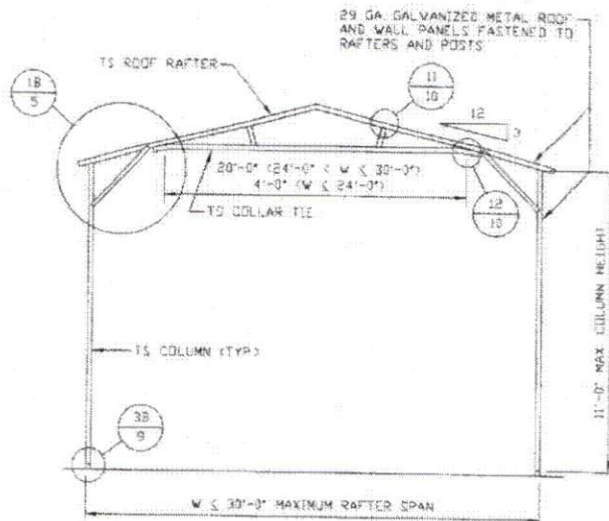
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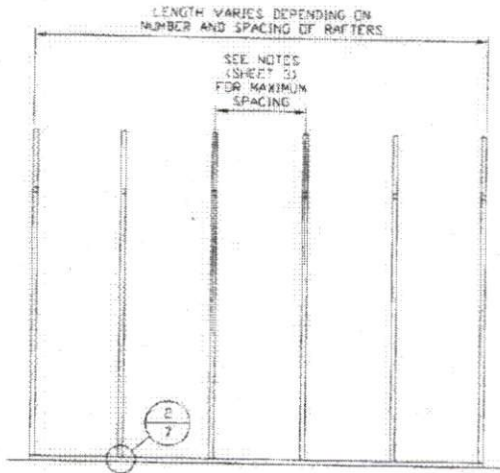
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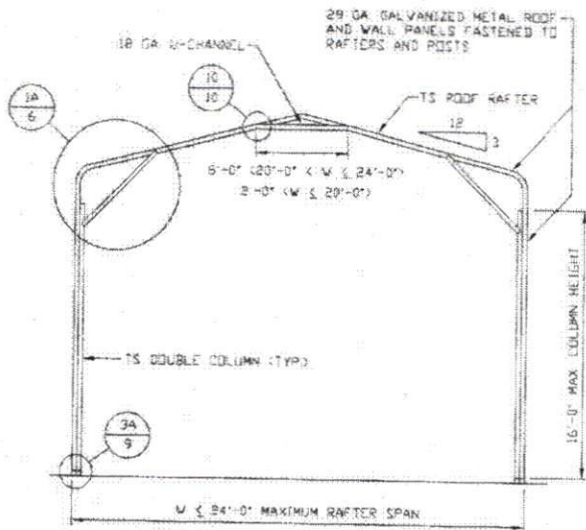
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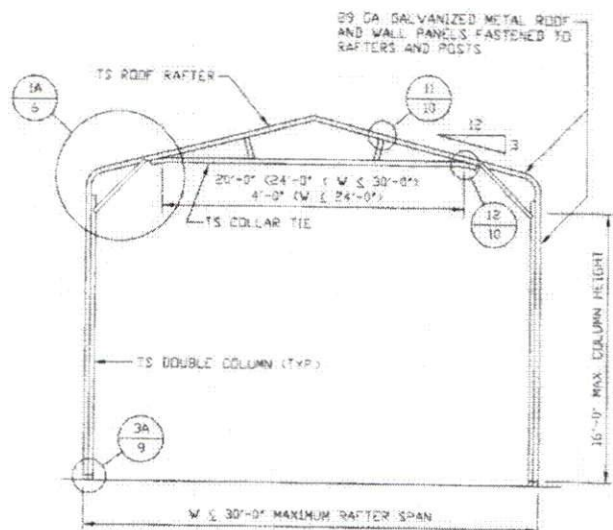
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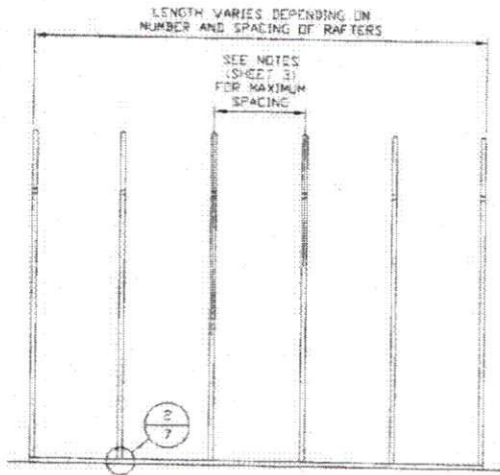
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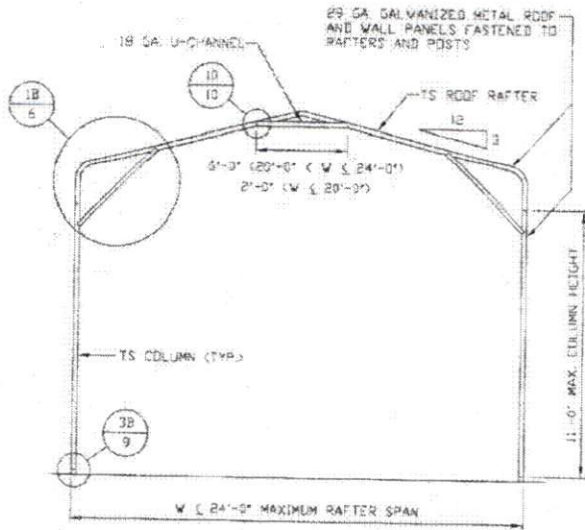
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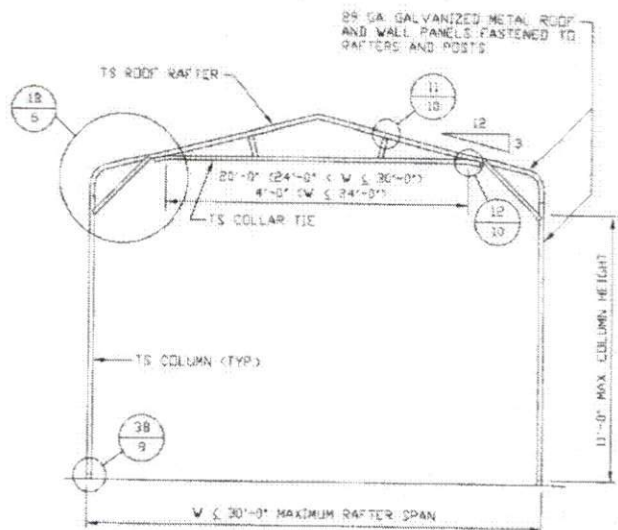
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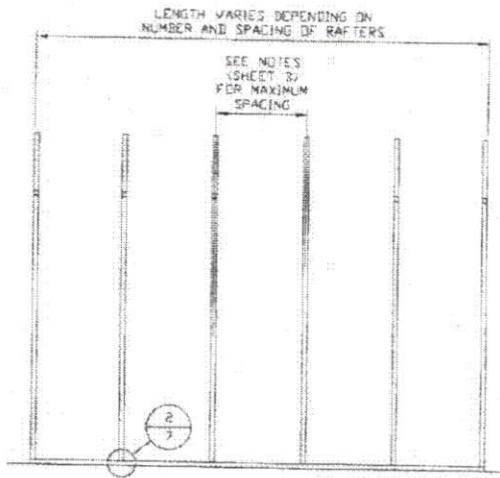
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TYPICAL RAFTER/COLUMN FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION
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TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
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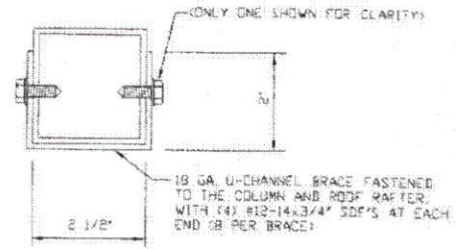
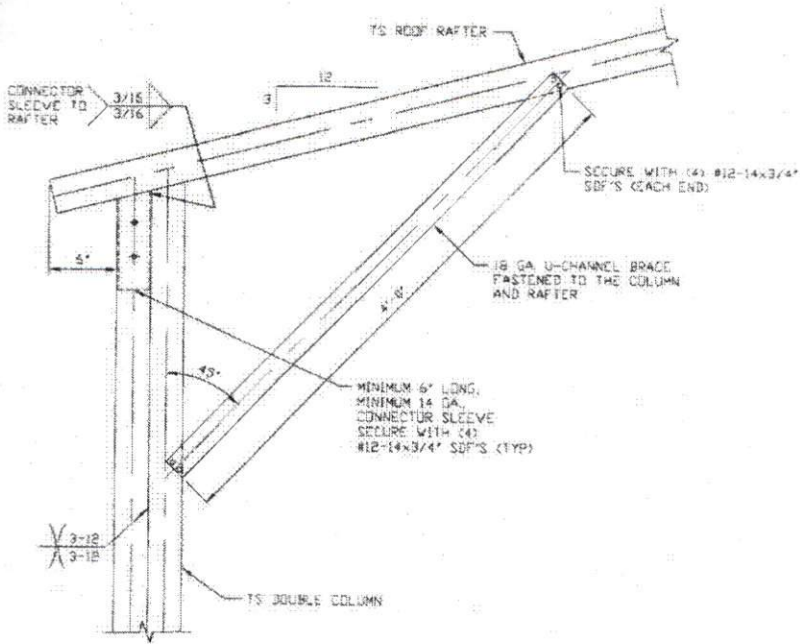
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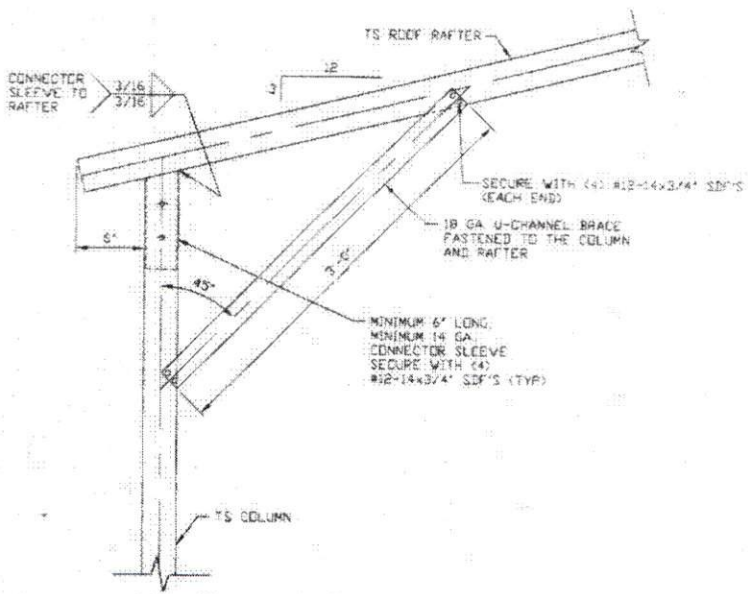
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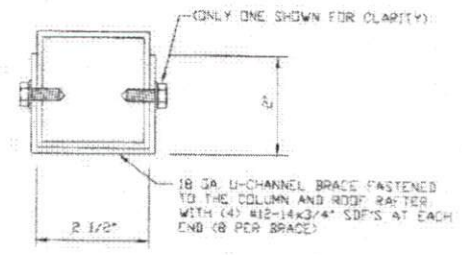
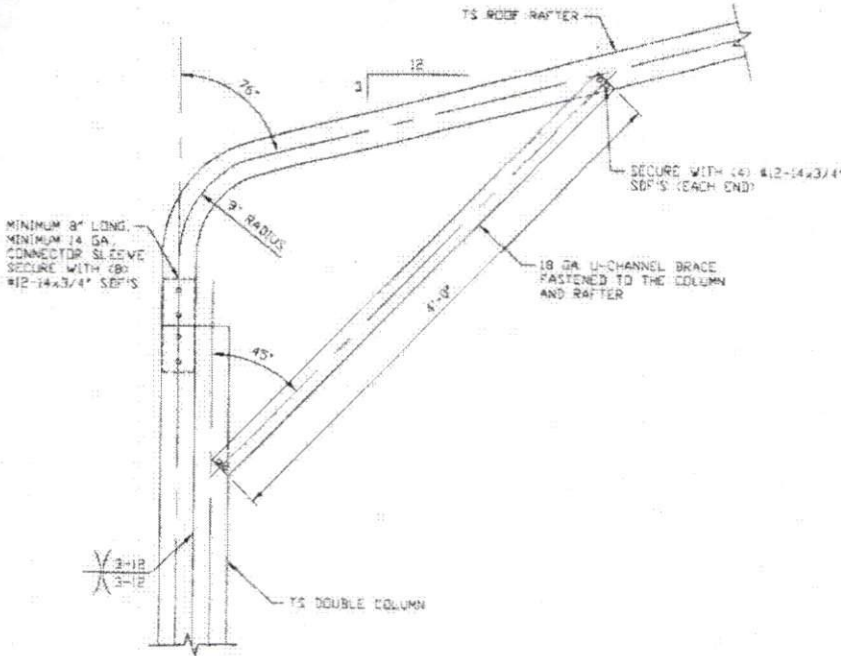
BRACE SECTION
SCALE: NTS

1A
BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL
FOR HEIGHTS 11'-0" < TO ≤ 16'-0"
SCALE: NTS



1B
BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL
FOR HEIGHTS ≤ 11'-0"
SCALE: NTS

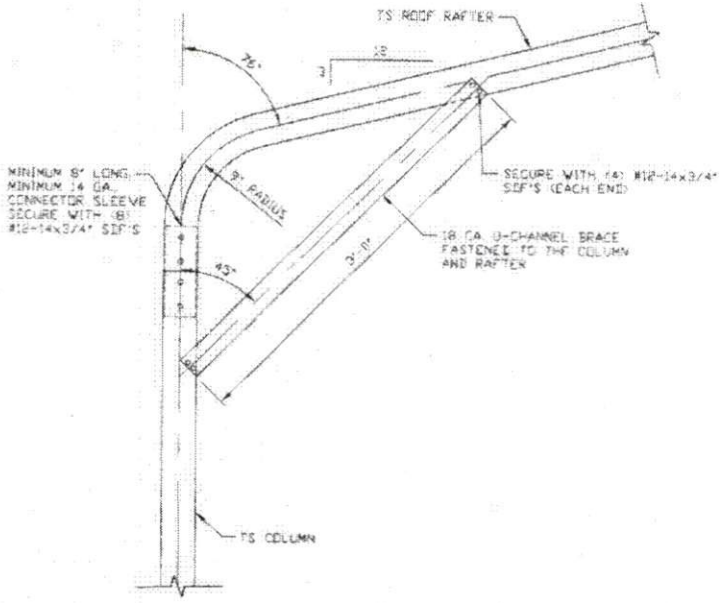
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BRACE SECTION
SCALE: NTS

1A

BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS 11'-0" < TO ≤ 16'-0"
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1B

BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS ≤ 11'-0"
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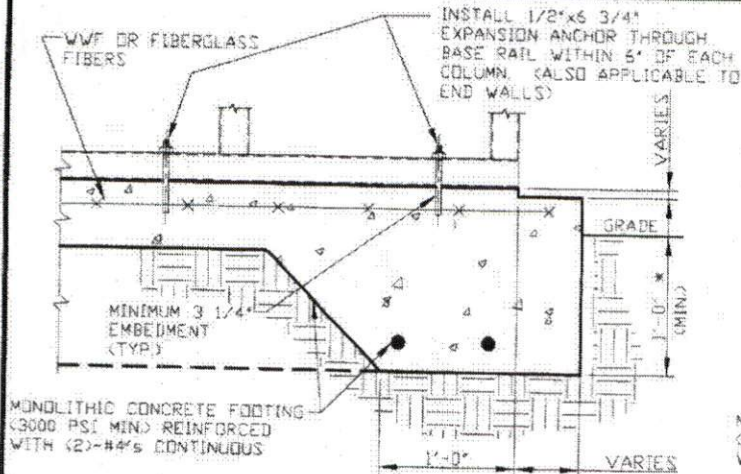


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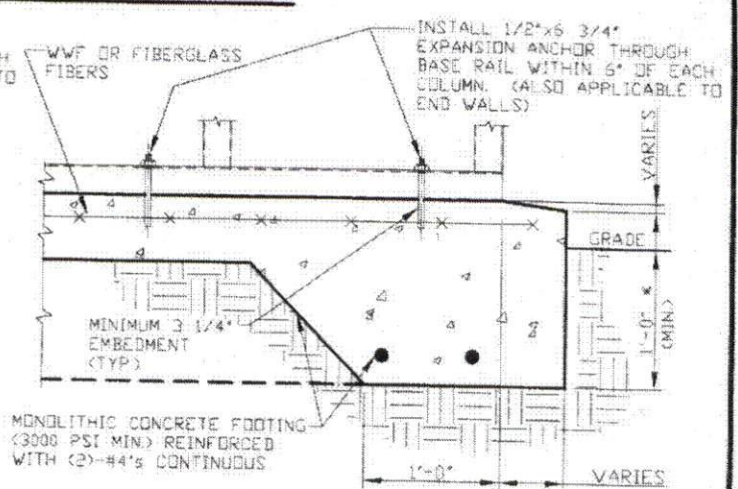
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BASE RAIL ANCHORAGE OPTIONS



2A CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE
 SCALE: NTS
 MINIMUM ANCHOR EDGE DISTANCE IS 4"
 * COORDINATE WITH LOCAL CODES/ORD.



2B CONCRETE SLAB BASE RAIL ANCHORAGE
 SCALE: NTS
 MINIMUM ANCHOR EDGE DISTANCE IS 4"
 * COORDINATE WITH LOCAL CODES/ORD.

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:

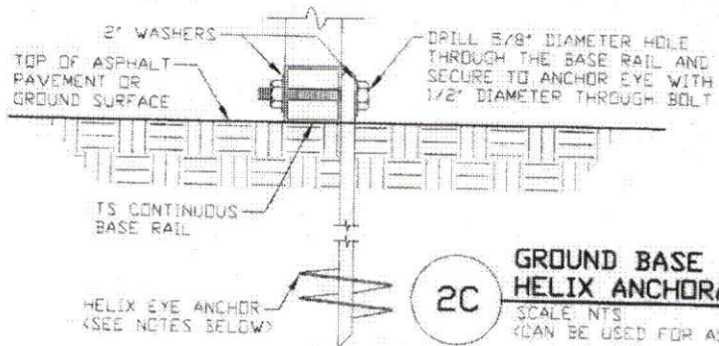
THE TURN-DOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT.

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" 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 LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL, USE MINIMUM (2) 8" HELICES WITH MINIMUM 60" EMBEDMENT.



2C GROUND BASE HELIX ANCHORAGE
 SCALE: NTS
 (CAN BE USED FOR ASPHALT)

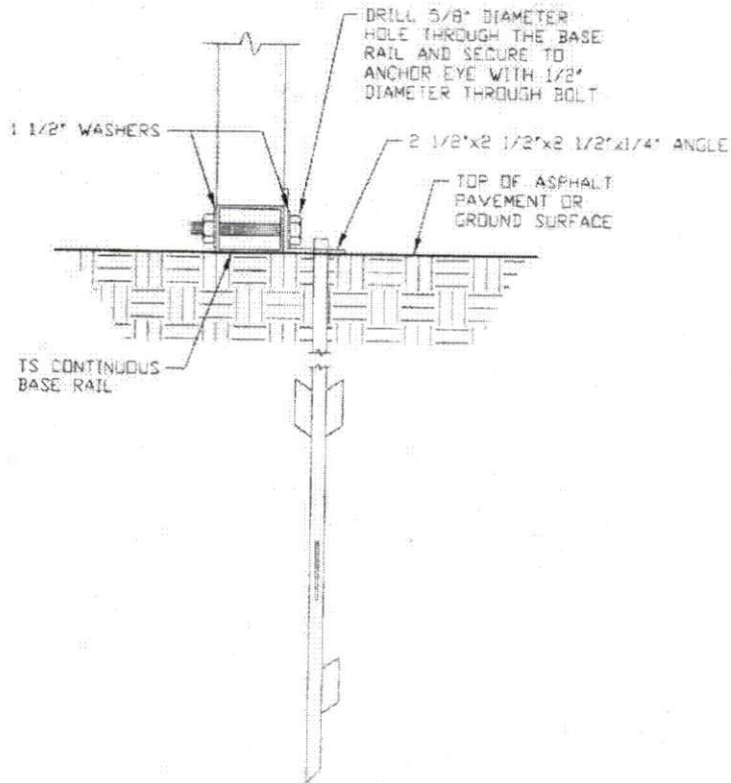


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BASE RAIL ANCHORAGE OPTIONS



2D
ASPHALT BASE ANCHORAGE
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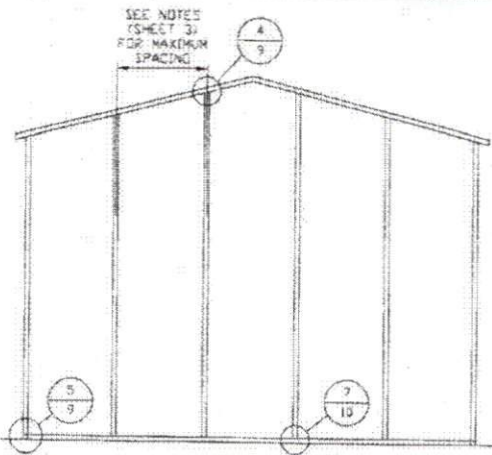


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CLIENT: NC CARPORTS	SHT: 7A	DWG. NO: SK-3	REV: 0

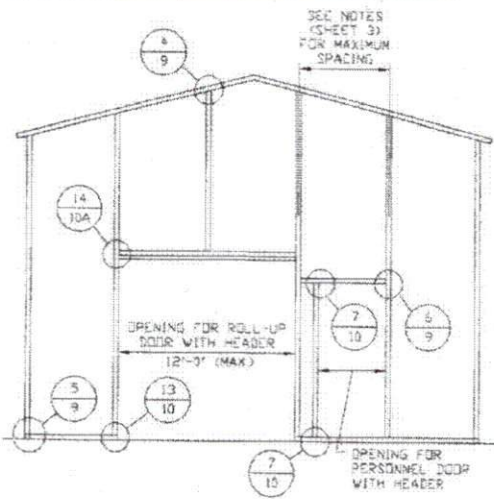
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



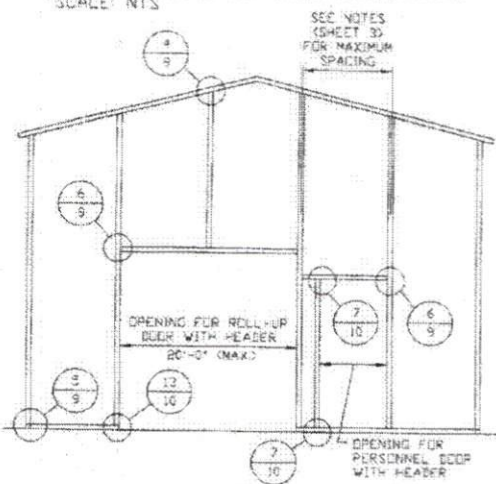
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

SCALE: NTS



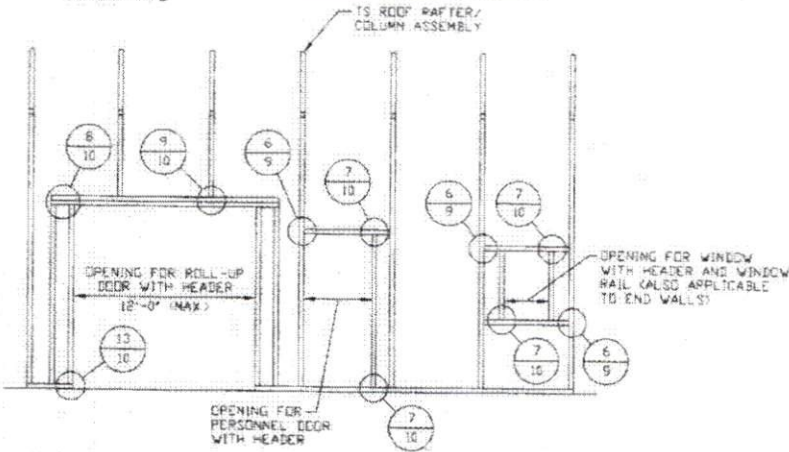
**TYPICAL BOX EAVE RAFTER END
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



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

SCALE: NTS



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

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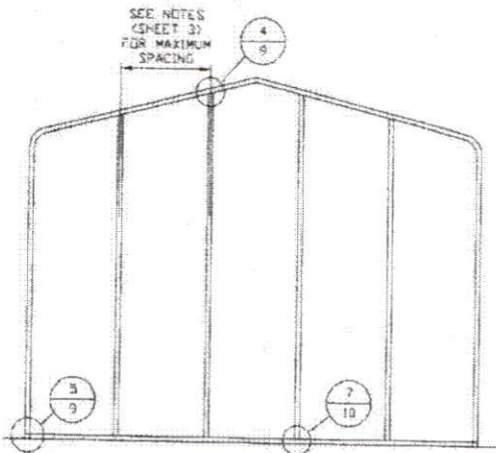


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NC CARPORTS AND GARAGES, LLC 309 S. DEPOT STREET PILOT MOUNTAIN, NC 27041 30'-0" x 16'-0" ENCLOSED STRUCTURE	DATE: 11-30-18	SCALE: NTS	JOB NO: 183155
CLIENT: NC CARPORTS	SHT. 8	DWG. NO: SK-3	REV.: 0

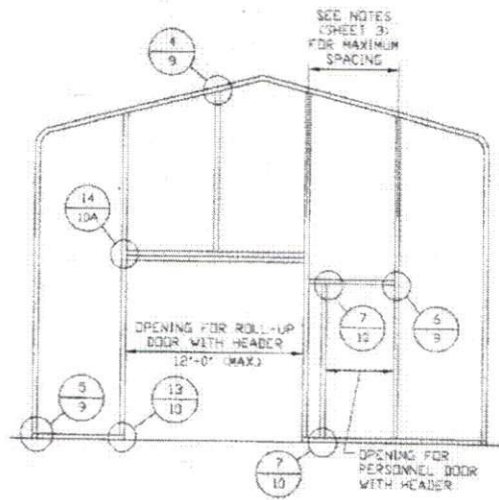
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



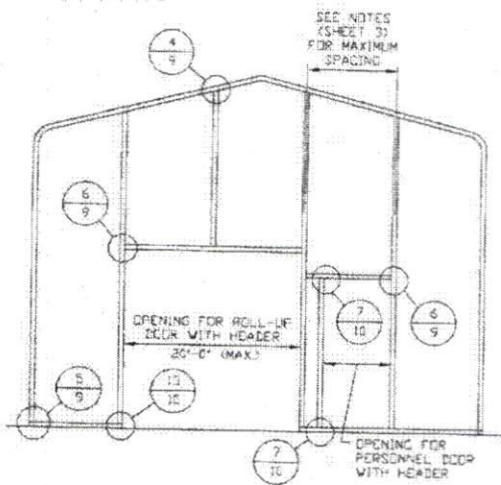
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

SCALE: NTS



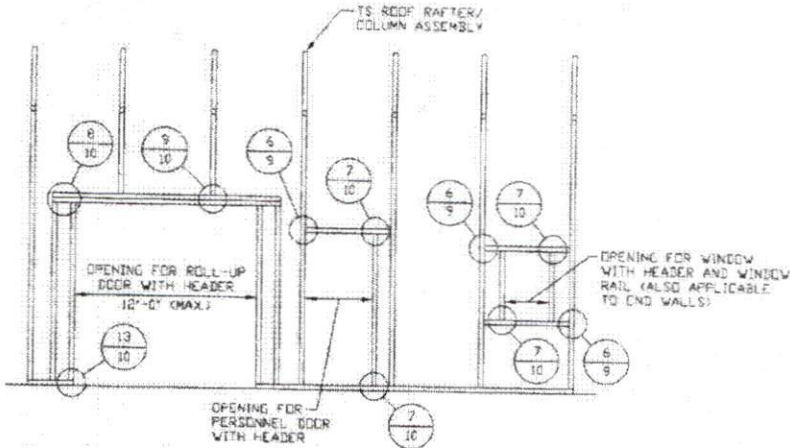
**TYPICAL BOX EAVE RAFTER END
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



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

SCALE: NTS



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

SCALE: NTS



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DATE: 11-30-18

SCALE: NTS

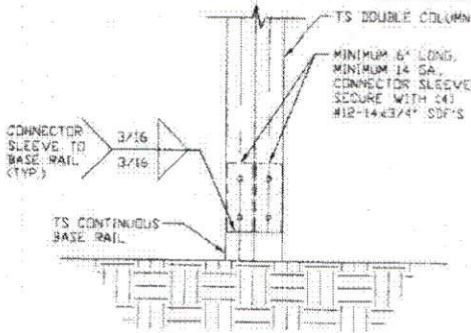
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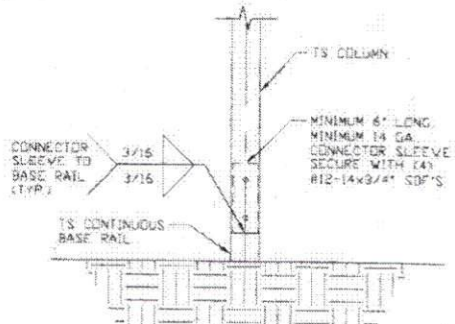
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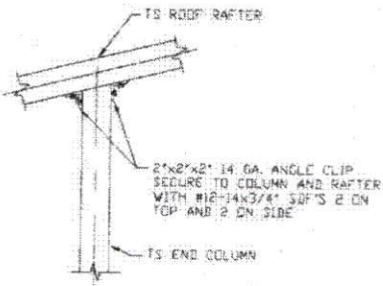
CONNECTION DETAILS



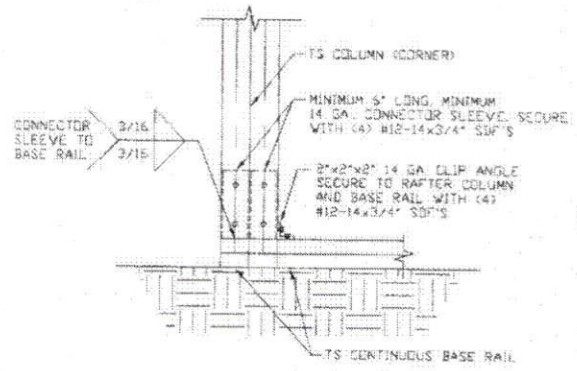
3A
POST/BASE RAIL CONNECTION DETAIL
 SCALE: NTS



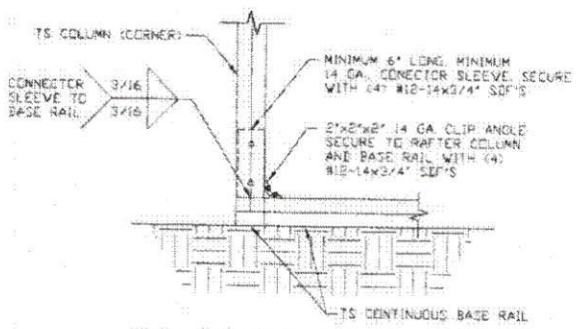
3B
POST/BASE RAIL CONNECTION DETAIL
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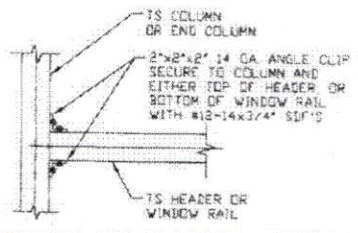
4
END COLUMN/RAFTER CONNECTION DETAIL
 SCALE: NTS



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

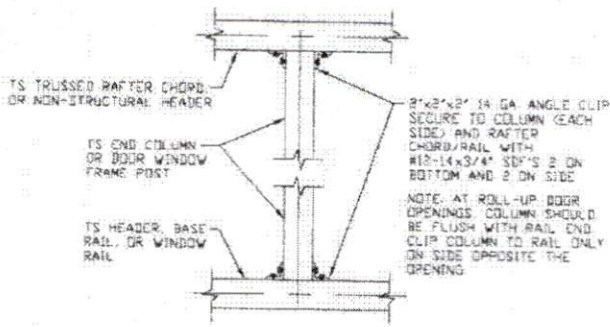


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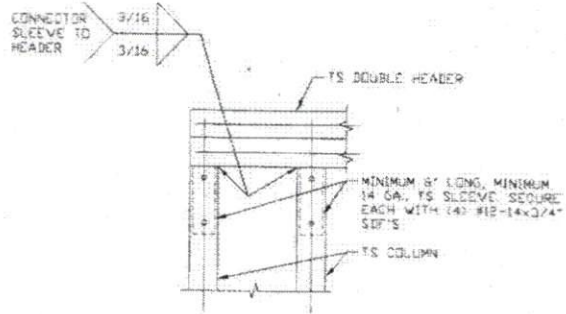
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PROJECT MGR: VSM	DATE: 11-30-18	SCALE: NTS	JOB NO: 183155	
CLIENT: NC CARPORTS	SHT. 9	DWG. NO: SK-3	REV: 0	

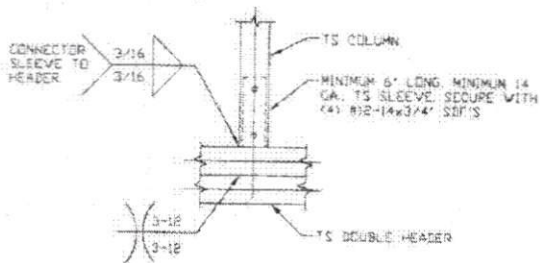
CONNECTION DETAILS



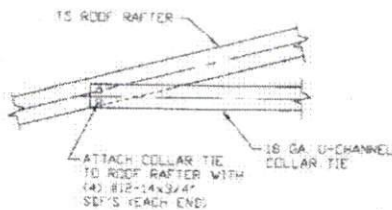
7 COLUMN TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL
SCALE: NTS



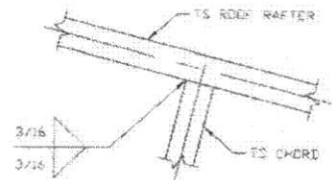
8 DOUBLE HEADER/COLUMN CONNECTION DETAIL
SCALE: NTS



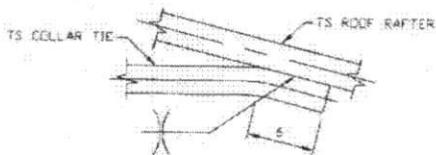
9 COLUMN/DOUBLE HEADER CONNECTION DETAIL
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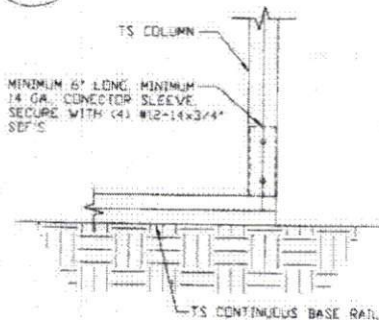
10 COLLAR TIE CONNECTION DETAIL
SCALE: NTS



11 RAFTER TO CHORD CONNECTION DETAIL
SCALE: NTS



12 COLLAR TIE CONNECTION DETAIL
SCALE: NTS



13 COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



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30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 11-30-18

SCALE: NTS

DWG. NO: SK-3

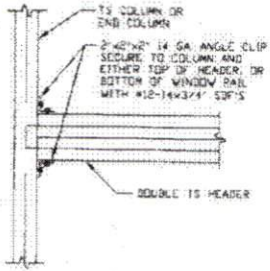
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REV. 0

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CONNECTION DETAILS



DOUBLE HEADER TO COLUMN CONNECTION DETAIL

14

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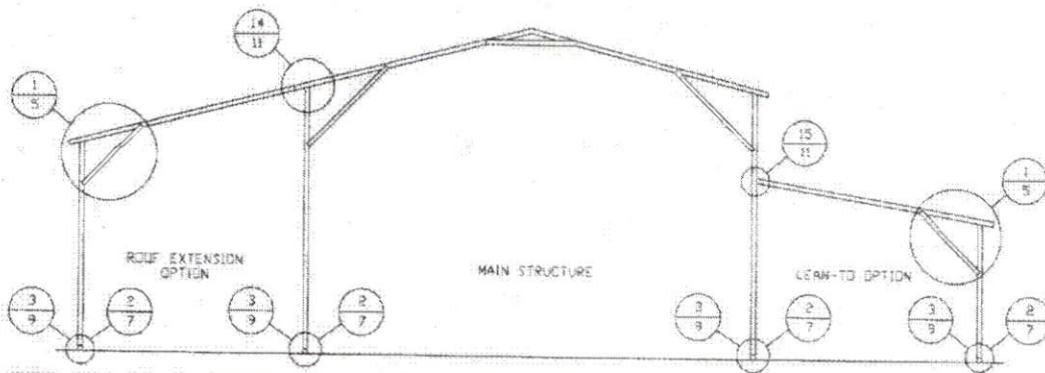
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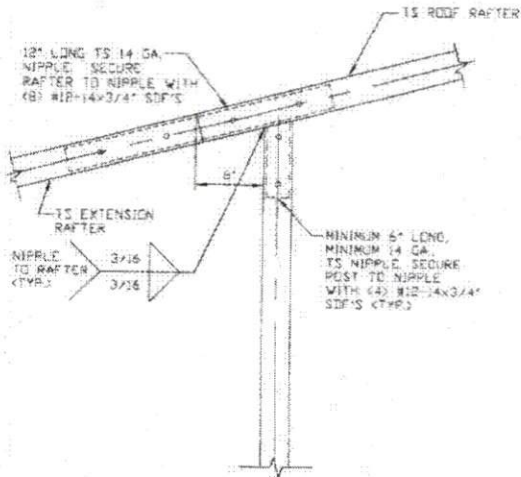
BOX EAVE RAFTER LEAN-TO OPTIONS



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

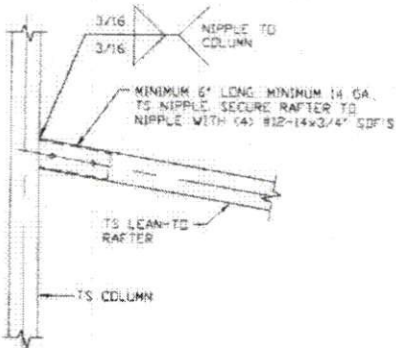
SCALE: NTS

MAXIMUM WIDTH OF ROOF EXTENSION AND LEAN-TO OPTION IS 12'-0"



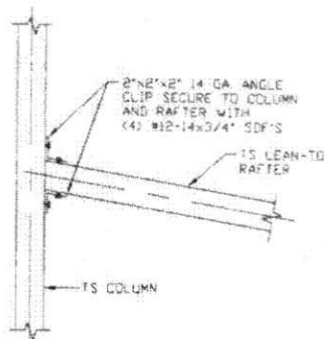
14 ROOF EXTENSION RAFTER/CORNER POST DETAIL FOR WIDTHS \leq 12'-0"

SCALE: NTS



15A LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS \leq 12'-0"

SCALE: NTS



15B LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS \leq 12'-0"

SCALE: NTS



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SCALE: NTS

JOB NO: 18315S

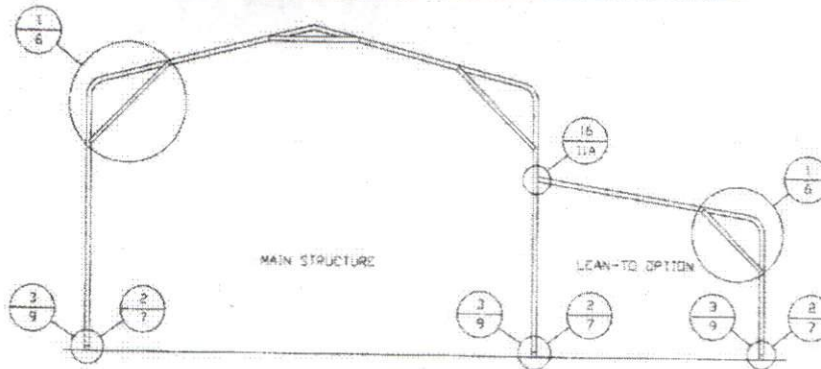
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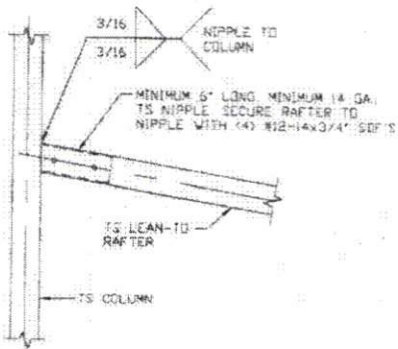
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BOW EAVE RAFTER LEAN-TO OPTIONS



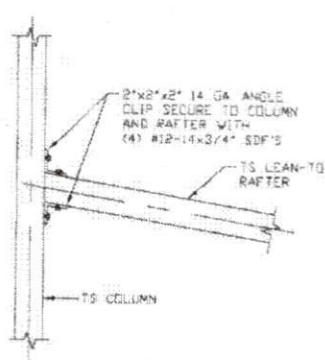
TYPICAL BOW EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION

SCALE: NTS
 MAXIMUM WIDTH OF LEAN-TO OPTION IS 12'-0".



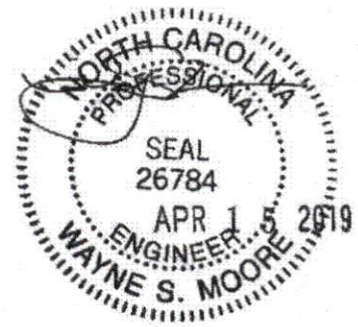
16A

LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 12'-0"$
 SCALE: NTS



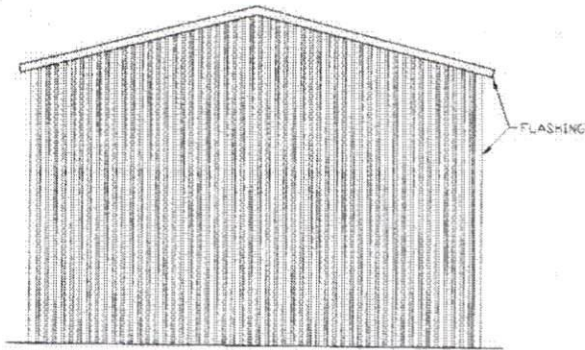
16B

LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 12'-0"$
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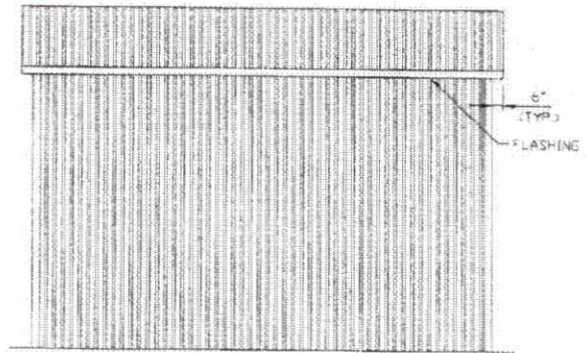
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	CLIENT: NC CARPORTS	SHT. 11A	DWG. NO: SK-3	REV. 0

BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



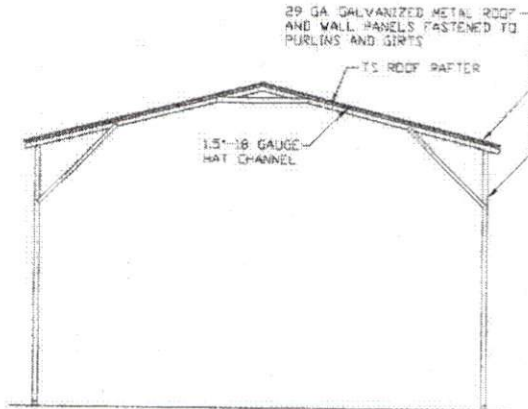
**TYPICAL END ELEVATION
VERTICAL ROOF/SIDING**

SCALE: NTS



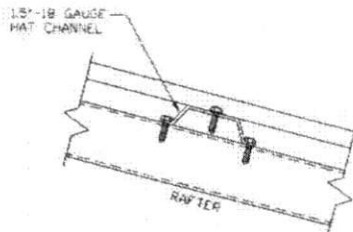
**TYPICAL SIDE ELEVATION
VERTICAL ROOF/SIDING**

SCALE: NTS



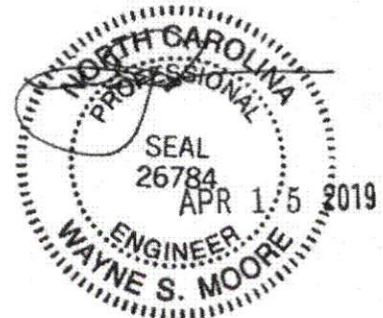
**TYPICAL SECTION
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS



PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE: NTS



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SCALE: NTS

JOB NO: 18315S

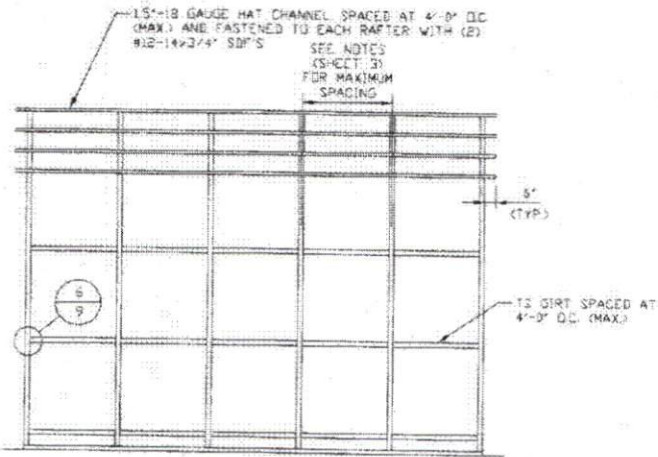
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DWG. NO: SK-3

REV: 0

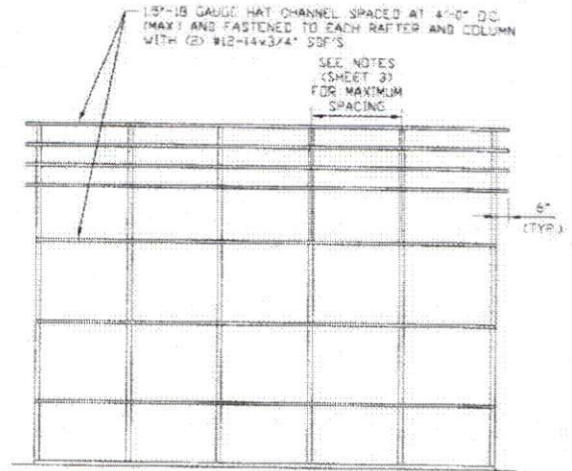
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BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



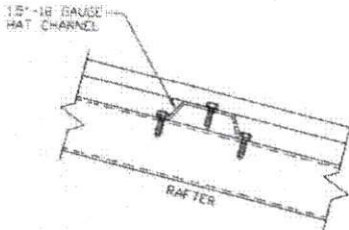
**TYPICAL FRAMING SECTION
VERTICAL ROOF/SIDING OPTION
WITH TS GIRTS**

SCALE: NTS



**TYPICAL FRAMING SECTION
VERTICAL ROOF/SIDING OPTION
WITH HAT CHANNEL GIRTS**

SCALE: NTS



PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE: NTS



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