



STRUCTURAL DESIGN

ENCLOSED BUILDING

**MAXIMUM 30'- 0" WIDE X 14'- 0" HEIGHT-
BOX EAVE FRAME AND BOW FRAME**

5 November 2018

Revision 6

M&A Project No. 17062S/17174S/17254S/18033S/18113S/18246S

Prepared for:

**Newmart Builders
1000 Cycle Lane
South Hill, VA 23970**

Prepared by:

Moore and Associates Engineering and Consulting, Inc.

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**MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING**



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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: LT	NEWMART BUILDERS, INC. 1000 CYCLE LANE SOUTH HILL, VA 23970 30'-0"x14'-0" ENCLOSED STRUCTURE		
	CHECKED BY: PDH			
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	CLIENT: NEWMART BUILDERS	SHT. 2	DWG. NO: SK-3	REV: 6

INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR MAXIMUM 30'-0" WIDE x 14'-0" EAVE HEIGHT ENCLOSED STRUCTURES.
2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2018 NORTH CAROLINA BUILDING CODE, 2006 INTERNATIONAL BUILDING CODE (IBC), 2009 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 = 30 PSF ($W \leq 24'-0"$)
 = 35 PSF ($18'-0" < W \leq 30'-0"$)
 = 45 PSF @ 4'-0" O.C. MAX. RAFTER/COLUMN AND END COLUMN SPACING ($24'-0" < W \leq 30'-0"$)
 @ 5'-0" O.C. MAX. RAFTER/COLUMN AND END COLUMN SPACING ($W \leq 24'-0"$)
4. LOW ULTIMATE WIND SPEED (LW) 105 TO 130 MPH (NOMINAL WIND SPEED 81 TO 101 MPH); MAXIMUM RAFTER/POST AND END COLUMN SPACING = 50 FEET (UNLESS NOTED OTHERWISE).
5. END WALL COLUMNS (POST) ARE SIMILAR TO SIDE WALL POSTS UNLESS NOTED OTHERWISE.
6. RISK CATEGORY I.
7. WIND EXPOSURE CATEGORY B.
8. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2"x3"-14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS FOR ($24'-0" < W \leq 30'-0"$ AND $W \leq 24'-0"$ WITH EAVE HEIGHT $12'-0" < TO \leq 14'-0"$) & 1/4"x2 1/4"-14 GAUGE TUBE STEEL (TS) FOR ($W \leq 24'-0"$) (UNLESS NOTED OTHERWISE).
9. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS AND COLUMNS (INTERIOR OR END) = 10" O.C. (MAX.)
10. FASTENERS CONSIST OF 1/4"x3/4" 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.
11. GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH RAFTER COLUMN ALONG SIDES.
12. GROUND ANCHORS CONSIST OF #4 REBAR W/ WELDED NUT/FORMED HEAD x 30" LONG IN SUITABLE SOIL CONDITIONS. OPTIGNAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED 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 $I_e = 1.0$
 $S_{DS} = 2.039$ V = $C_s W$
 $S_{DI} = 1.258$



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CLIENT: NEWMART BUILDERS

NEWMART BUILDERS, INC.

1000 CYCLE LANE

SOUTH HILL, VA 23970

30'-0"x14'-0" ENCLOSED STRUCTURE

DATE: 11-5-18

SHT: 3A

SCALE: NTS

DWG. NO: SK-3

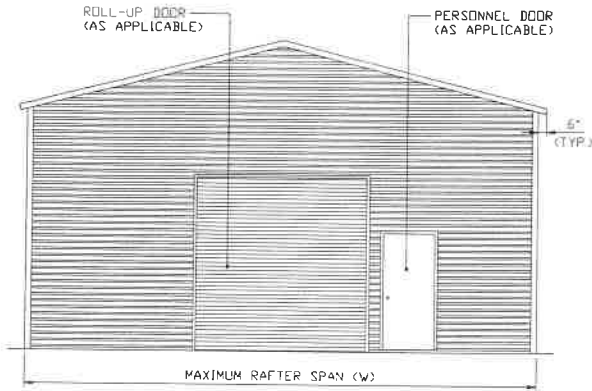
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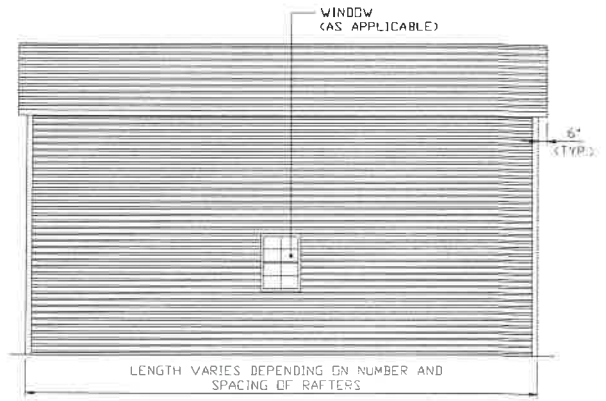
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BOX EAVE FRAME RAFTER STRUCTURE (Sheets 4, 5A, 5B, 8, 9, 11, 12, 13, 15 AND 16)



TYPICAL END ELEVATION

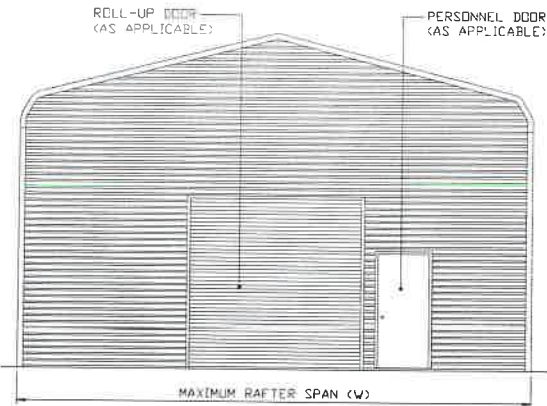
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TYPICAL SIDE ELEVATION

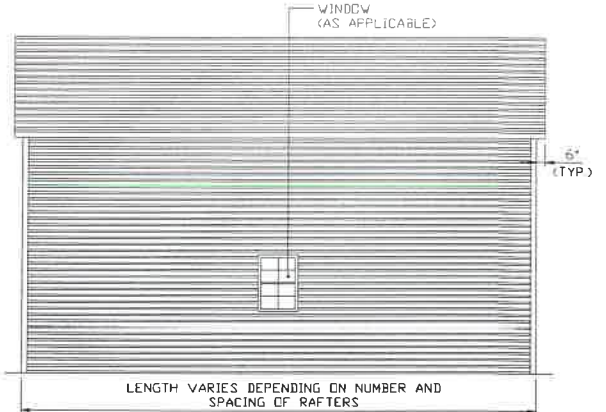
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BOW FRAME RAFTER STRUCTURE (Sheets 6, 7A, 7B, 8, 10, 11, 12, 14 AND 16)



TYPICAL END ELEVATION

SCALE: NTS



TYPICAL SIDE ELEVATION

SCALE: NTS



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30'-0"x14'-0" ENCLOSED STRUCTURE

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SHT. 3B

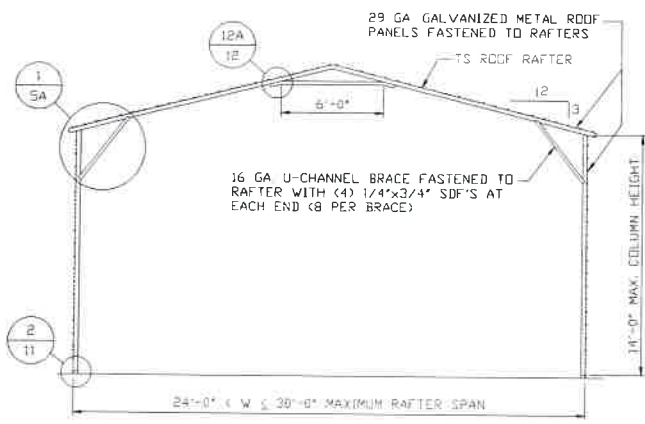
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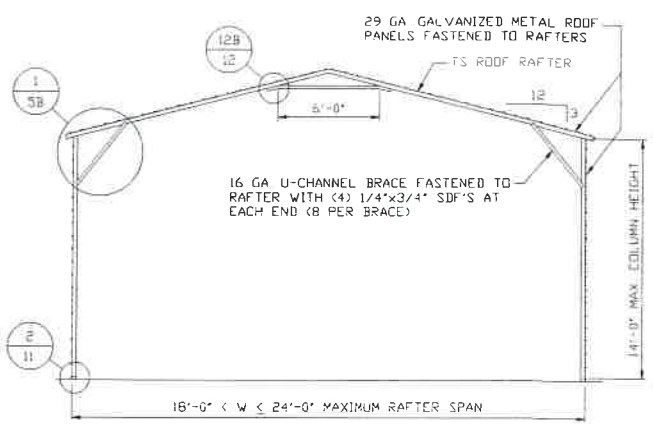
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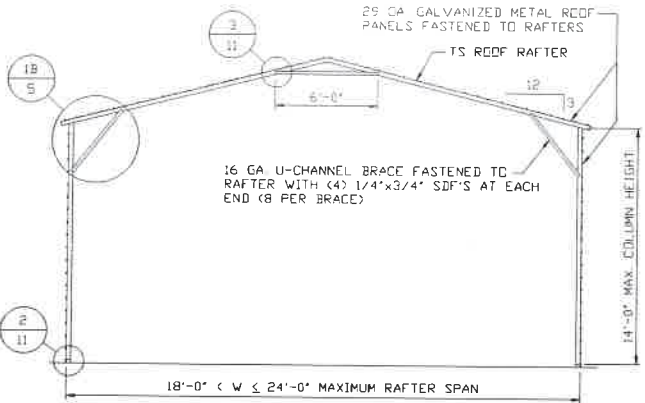
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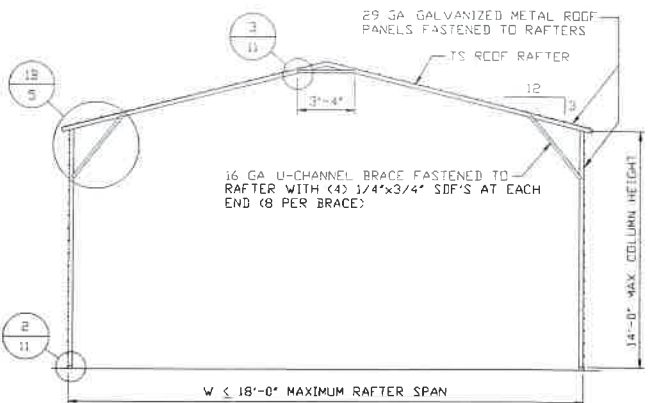
TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



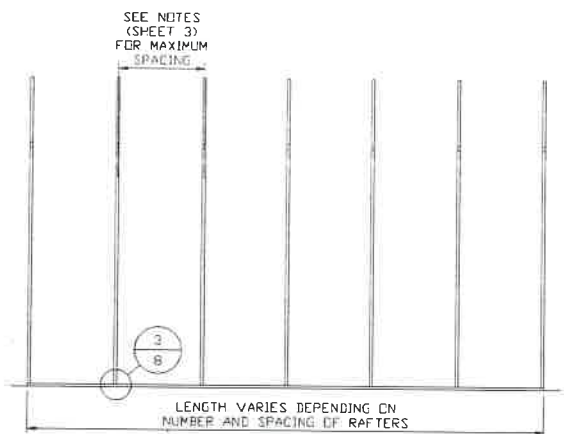
TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN 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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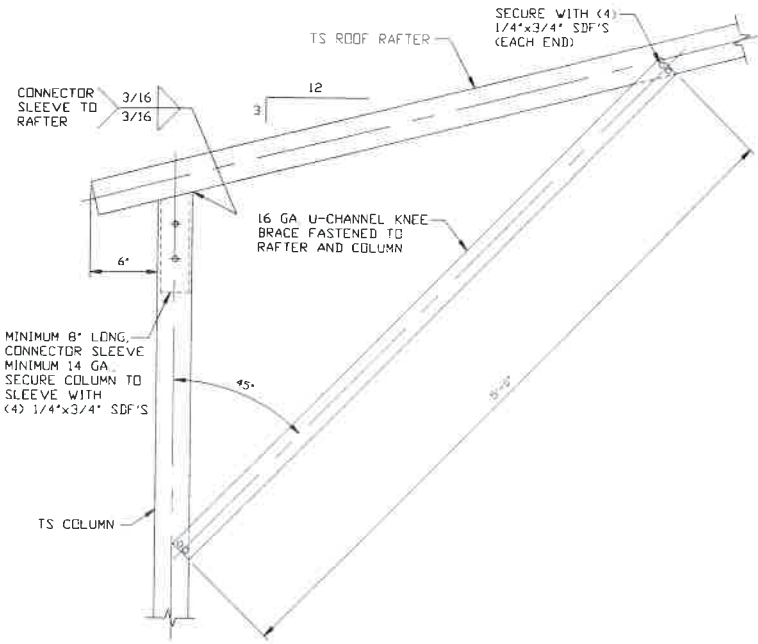
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30'-0" x 14'-0" ENCLOSED STRUCTURE

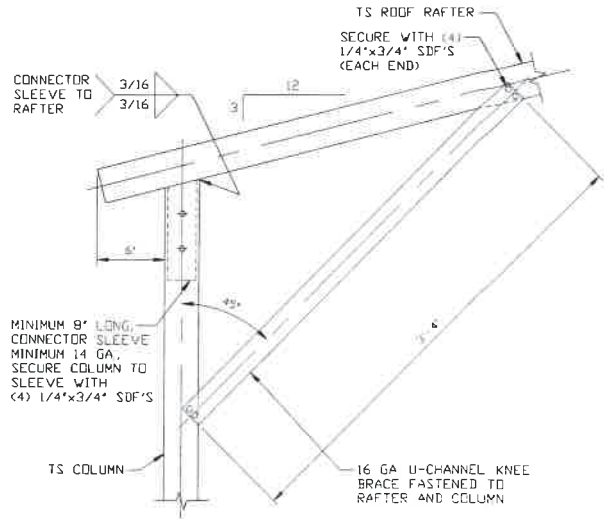
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CLIENT: NEWMART BUILDERS	SHT. 4	DWG. NO: SK-3	REV: 6

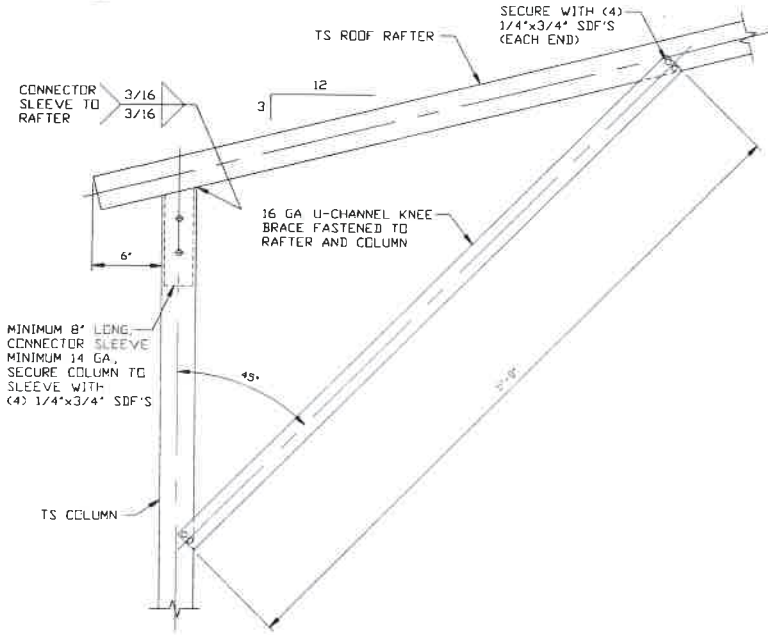
24'-0" < W ≤ 30'-0" MAXIMUM RAFTER SPAN



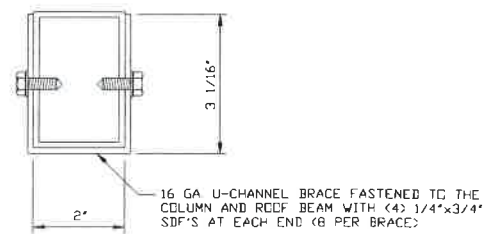
1A BOX EAVE RAFTER COLUMN CONNECTION DETAIL
HEIGHTS 12'-0" < TO ≤ 14'-0" @ 3'-6" O.C.
SCALE: NTS



1C BOX EAVE RAFTER COLUMN CONNECTION DETAIL
HEIGHTS ≤ 10'-0"
SCALE: NTS



1B BOX EAVE RAFTER COLUMN CONNECTION DETAIL
HEIGHTS 10'-0" < TO ≤ 12'-0"
SCALE: NTS



BRACE SECTION
SCALE: NTS



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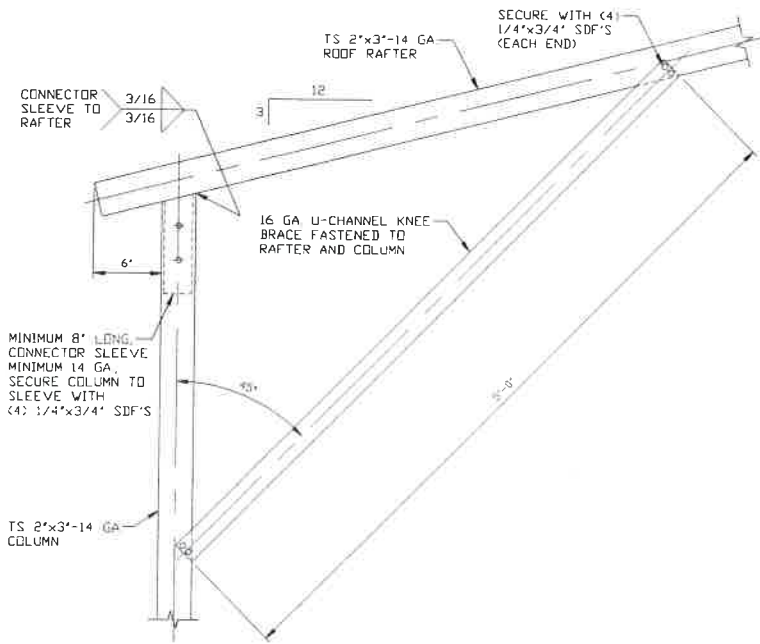
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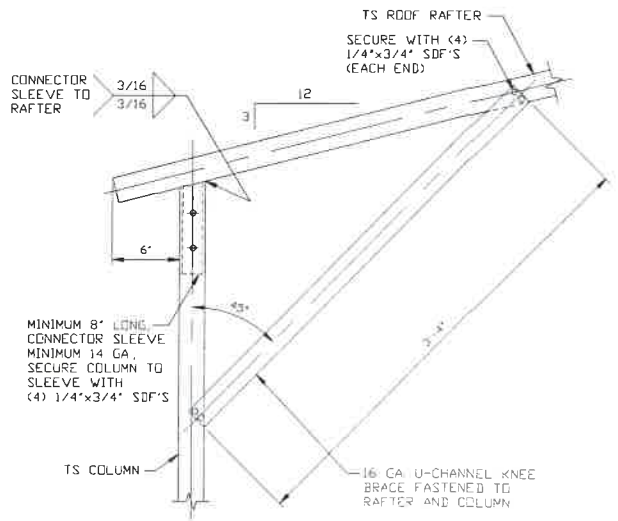
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DATE: 11-5-18 **SCALE: NTS** **JOB NO: 18033S/18113S/18246S**
SHT. 5A **DWG. NO: SK-3** **REV: 6**

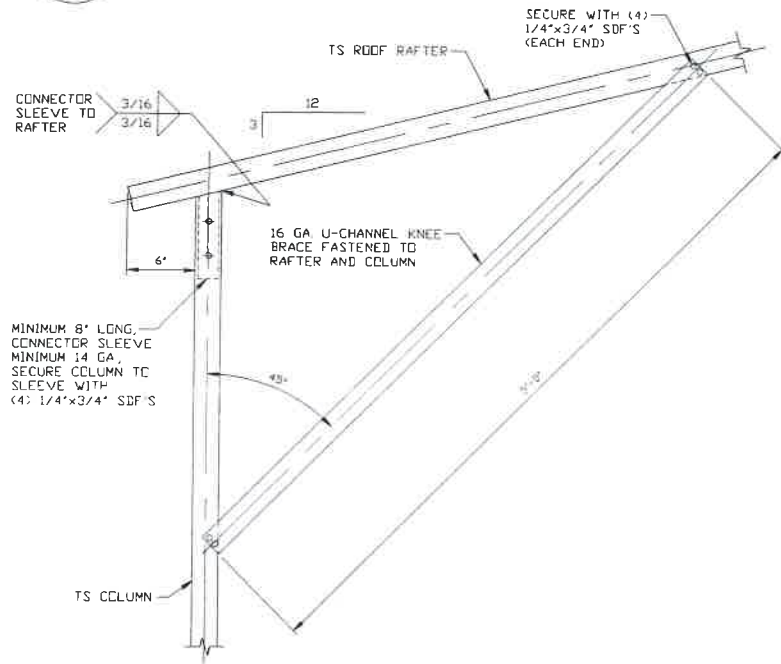
W ≤ 24'-0" MAXIMUM RAFTER SPAN



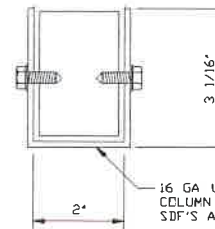
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HEIGHTS 12'-0" < TO ≤ 14'-0" @ 4'-0" O.C.
SCALE: NTS



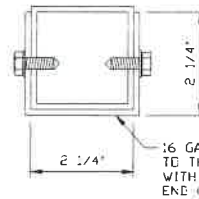
1C BOX EAVE RAFTER COLUMN CONNECTION DETAIL
HEIGHTS ≤ 10'-0"
SCALE: NTS



1B BOX EAVE RAFTER COLUMN CONNECTION DETAIL
HEIGHTS 10'-0" < TO ≤ 12'-0" @ 4'-0" O.C.
SCALE: NTS



BRACE SECTION
SCALE: NTS



BRACE SECTION
SCALE: NTS



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SHT. 5B

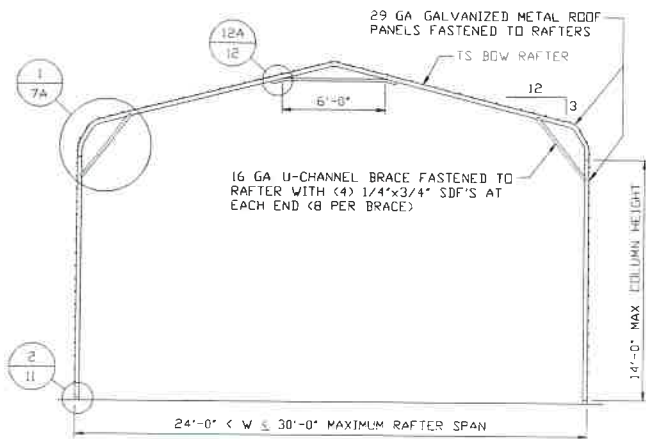
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DWG. NO: SK-3

JOB NO: 18033S/18113S/18246S

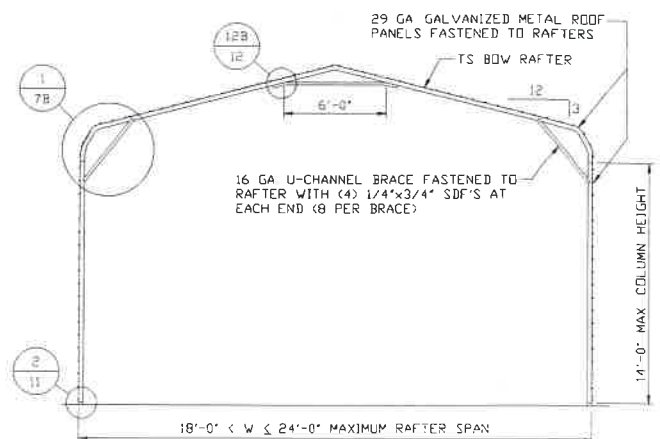
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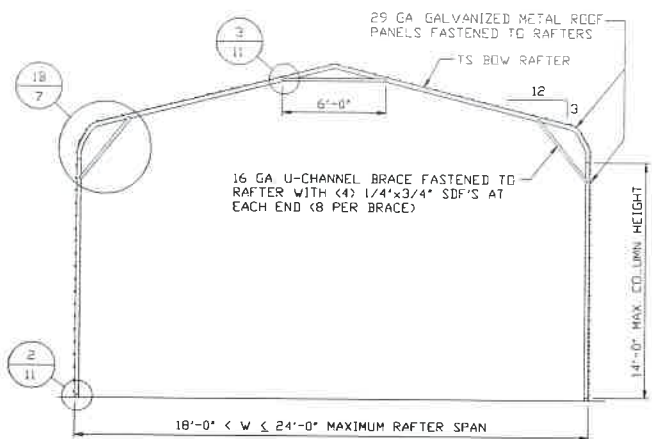
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



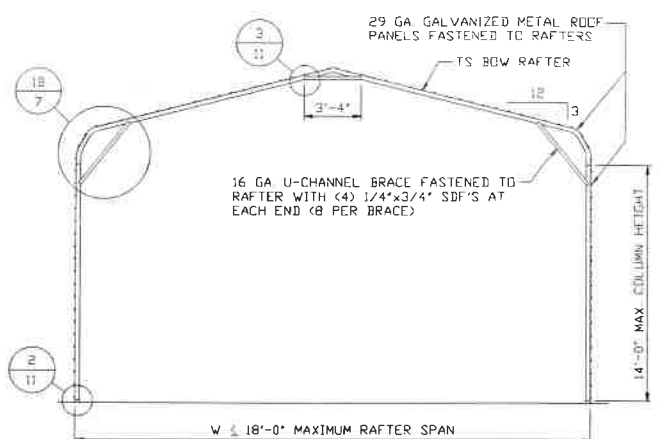
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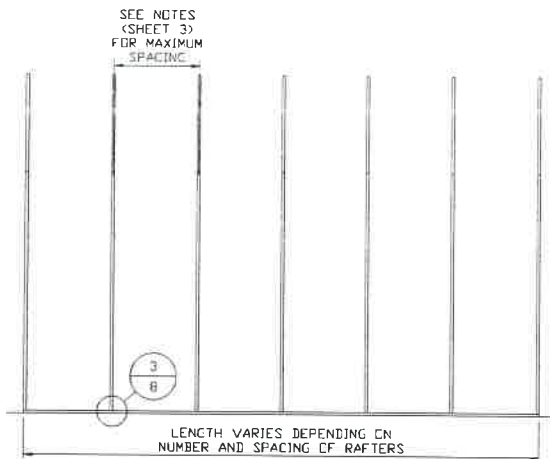
TYPICAL RAFTER/COLUMN END FRAME SECTION

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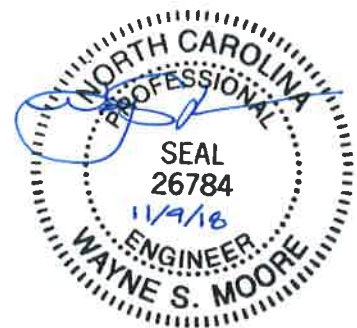
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS



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SHT. 6

SCALE: NTS

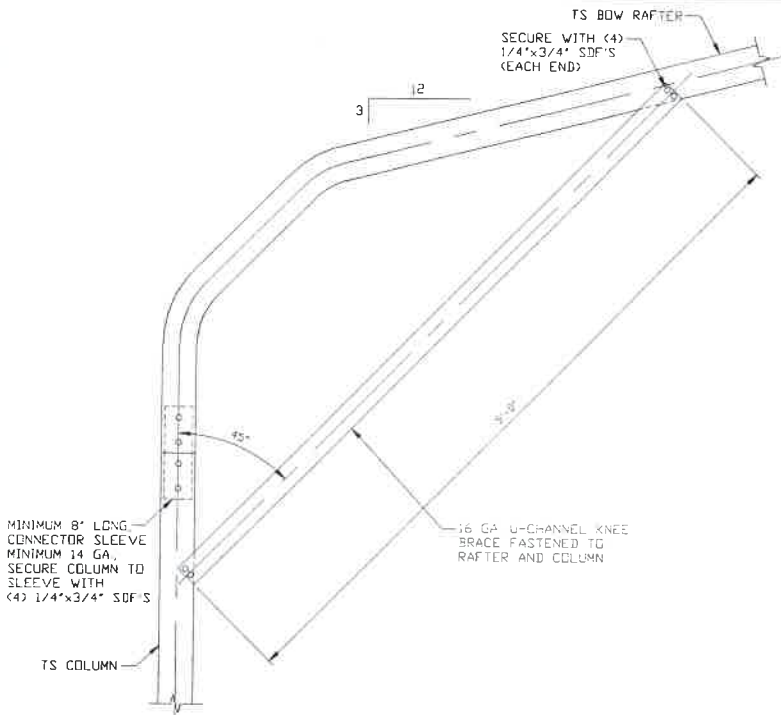
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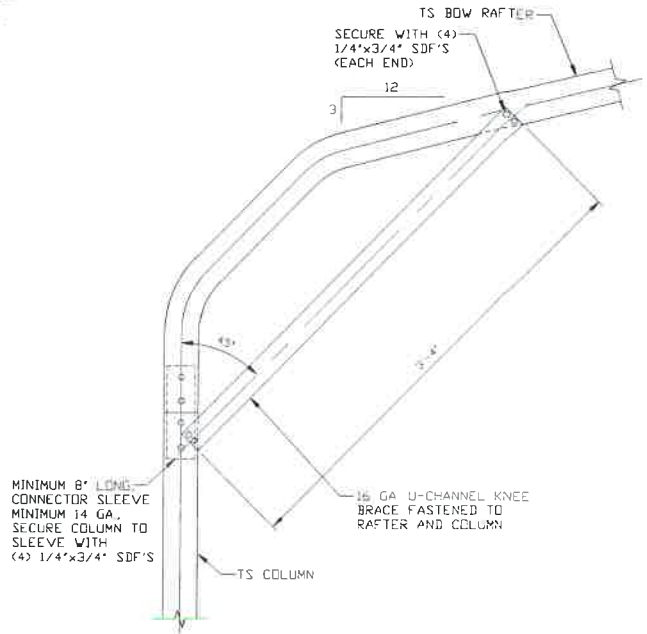
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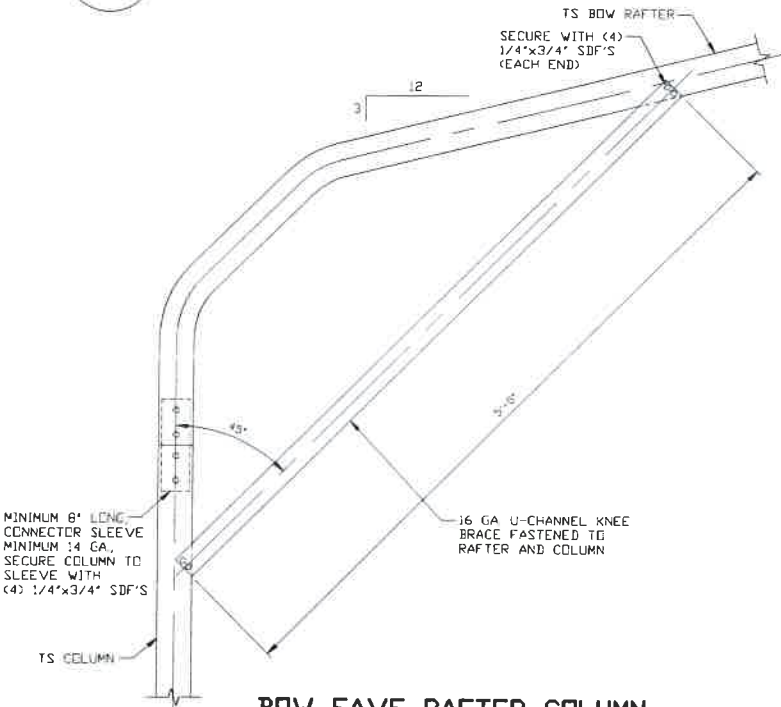
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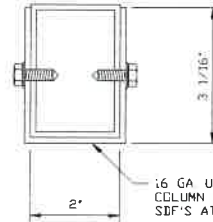
1A
BOW RAFTER COLUMN CONNECTION DETAIL
 HEIGHTS 12'-0" < TO ≤ 14'-0" @ 3'-6" O.C.
 SCALE: NTS



1C
BOW RAFTER COLUMN CONNECTION DETAIL
 HEIGHTS ≤ 10'-0"
 SCALE: NTS



1B
BOW EAVE RAFTER COLUMN CONNECTION DETAIL
 HEIGHTS 10'-0" < TO ≤ 12'-0"
 SCALE: NTS



BRACE SECTION
 SCALE: NTS



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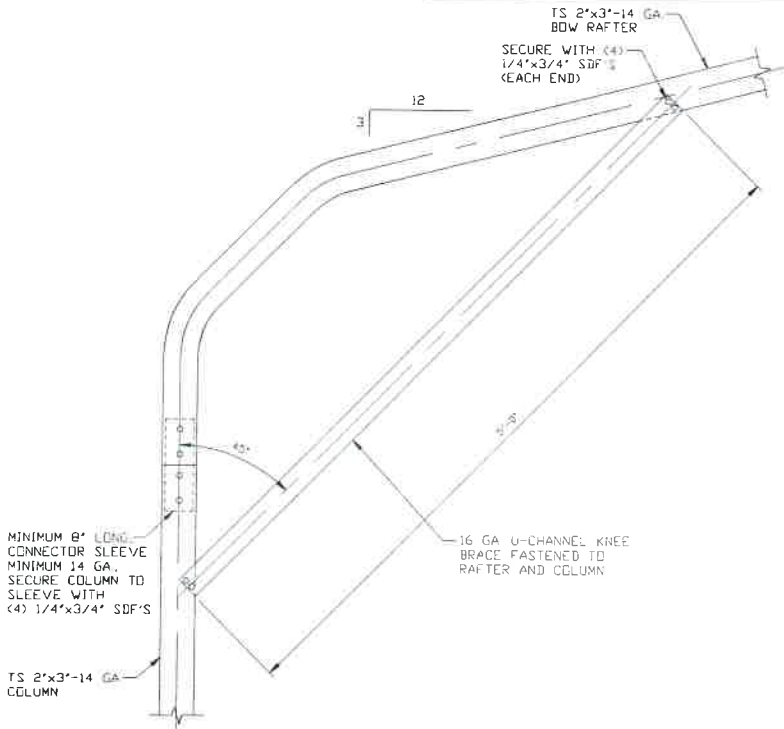
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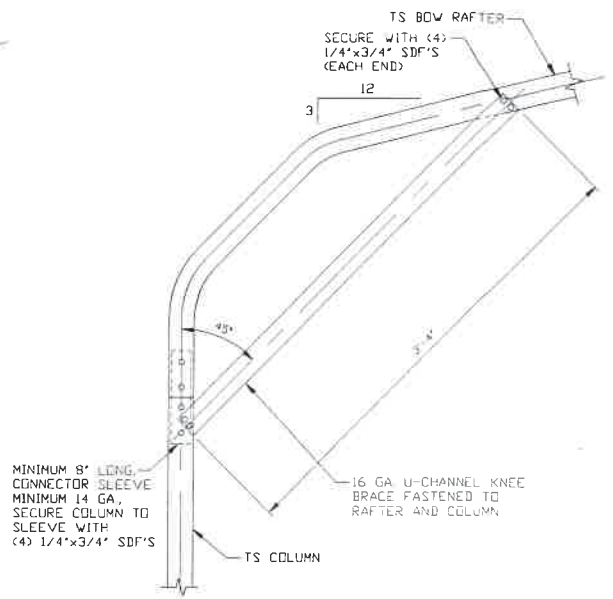
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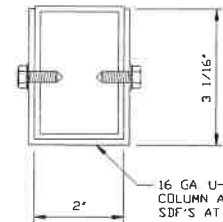
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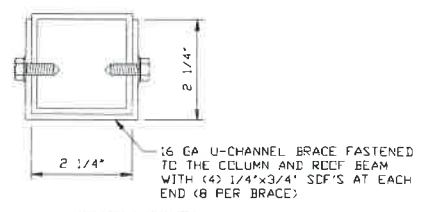
1A
BOW RAFTER COLUMN CONNECTION DETAIL
 HEIGHTS 12'-0" < TO ≤ 14'-0" @ 4'-0" O.C.
 SCALE: NTS



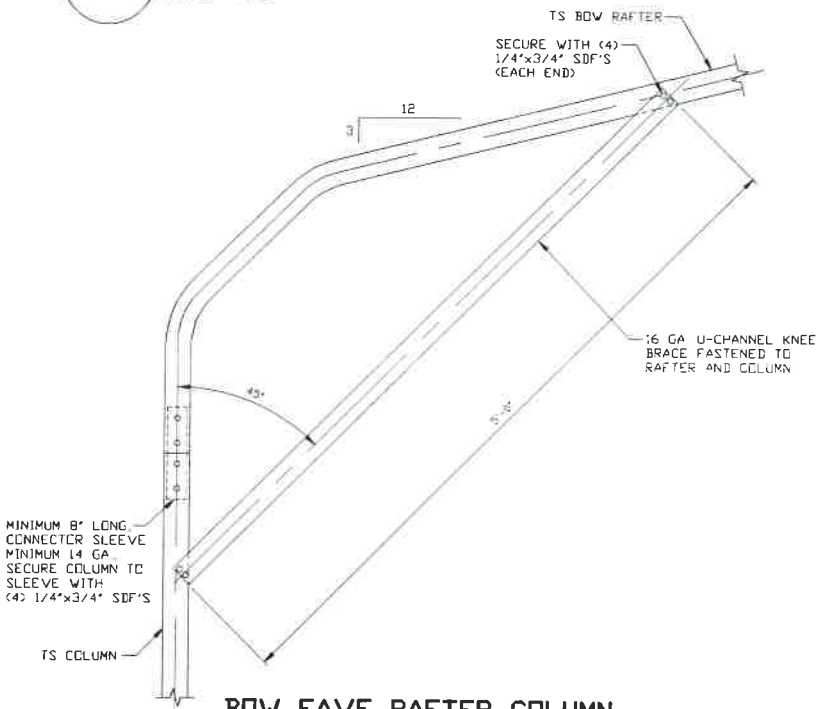
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BOW RAFTER COLUMN CONNECTION DETAIL
 HEIGHTS ≤ 10'-0"
 SCALE: NTS



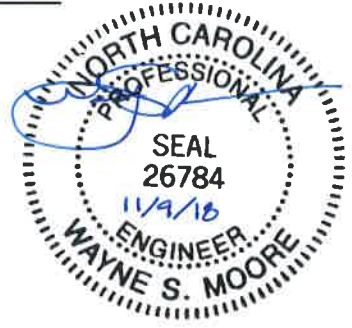
BRACE SECTION
 SCALE: NTS



BRACE SECTION
 SCALE: NTS



1B
BOW EAVE RAFTER COLUMN CONNECTION DETAIL
 HEIGHTS 10'-0" < TO ≤ 12'-0" @ 4'-0" O.C.
 SCALE: NTS



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 1000 CYCLE LANE
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 30'-0"x14'-0" ENCLOSED STRUCTURE

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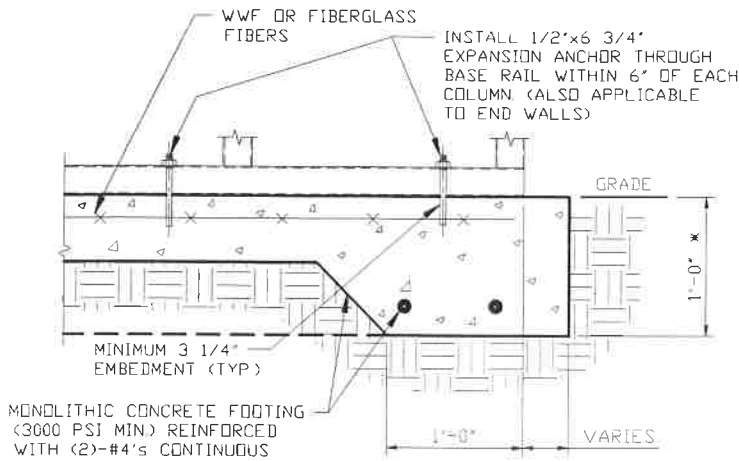
PROJECT MGR: WSM
CLIENT: NEWMART BUILDERS

DATE: 11-5-18
SHT. 7B

SCALE: NTS
DWG. NO: SK-3

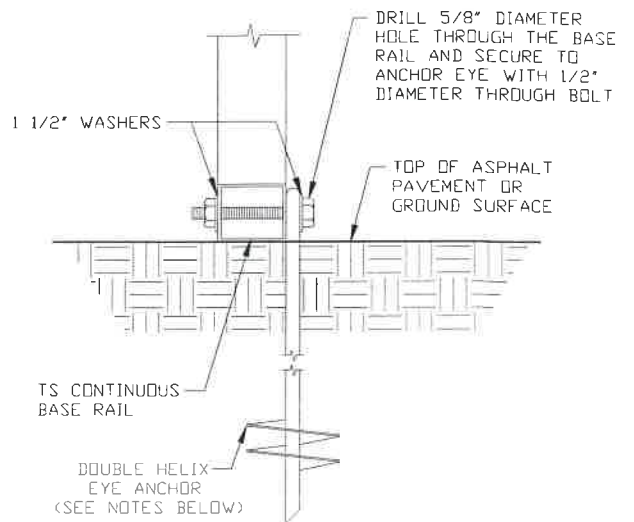
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REV: 6

BASE RAIL ANCHORAGE OPTIONS FOR LOW WIND SPEEDS



3A CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
 NOTE: MIN ANCHOR EDGE DISTANCE IS 4"
 * COORDINATE WITH LOCAL CODES/ORD.



3B GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)

GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN BASED ON MINIMUM SDIL 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:

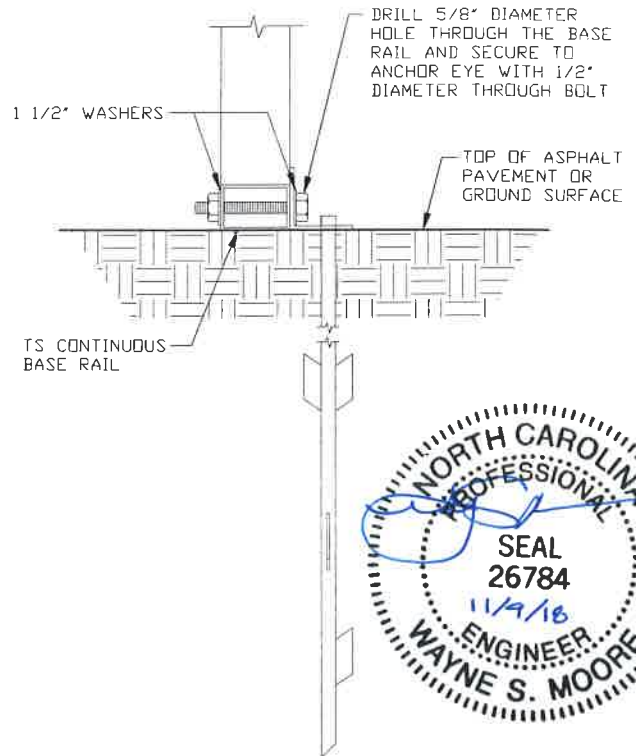
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT.

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.

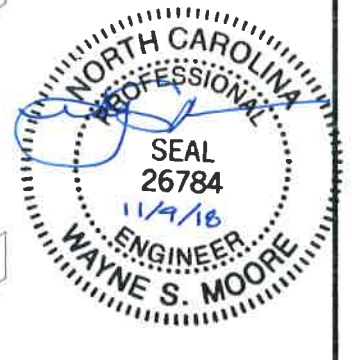
HELIX ANCHOR NOTES:

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 ASPHALT BASE ANCHORAGE

SCALE: NTS



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

DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: NEWMART BUILDERS

NEW MART BUILDERS, INC.

1000 CYCLE LANE
 SOUTH HILL, VA 23970
 30'-0" x 14'-0" ENCLOSED STRUCTURE

DATE: 11-5-18

SHT. 8

SCALE: NTS

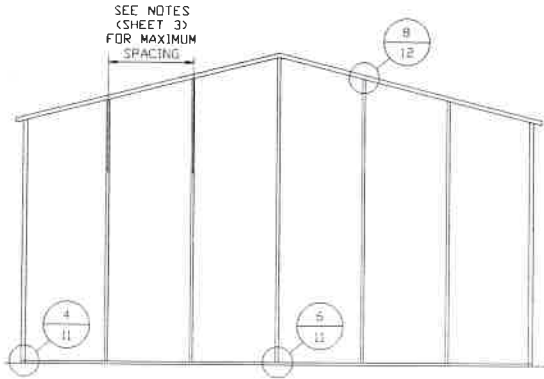
DWG. NO.: SK-3

JOB NO.: 18033S/18113S/18246S

REV.: 6

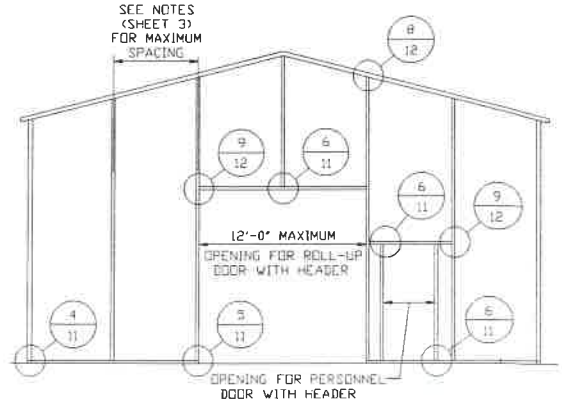
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



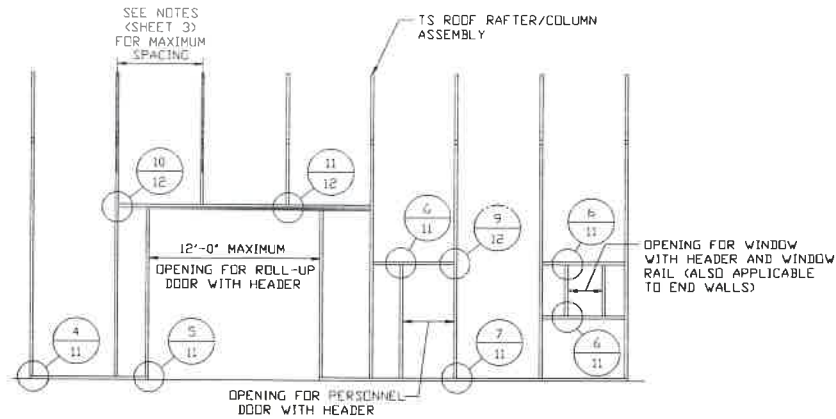
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

SCALE: NTS



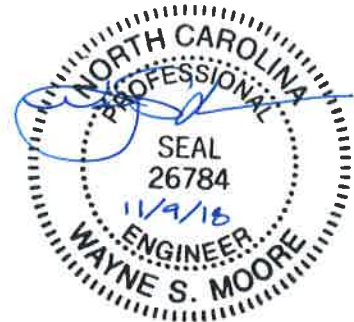
**TYPICAL BOX EAVE RAFTER END
WALL OPENING FRAMING SECTION**

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: NEWMART BUILDERS

NEWMART BUILDERS, INC.

1000 CYCLE LANE

SOUTH HILL, VA 23970

30'-0" x 14'-0" ENCLOSED STRUCTURE

DATE: 11-5-18

SHT. 9

SCALE: NTS

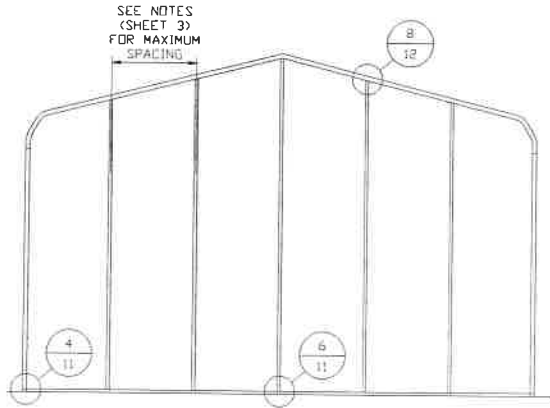
DWG. NO: SK-3

JOB NO: 18033S/18113S/18246S

REV: 6

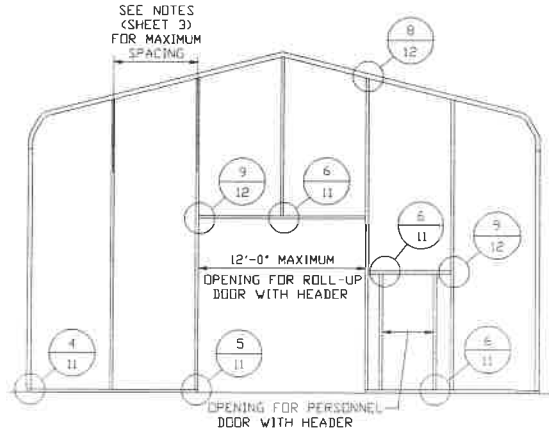
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BOW EAVE RAFTER END WALL AND SIDE WALL OPENINGS



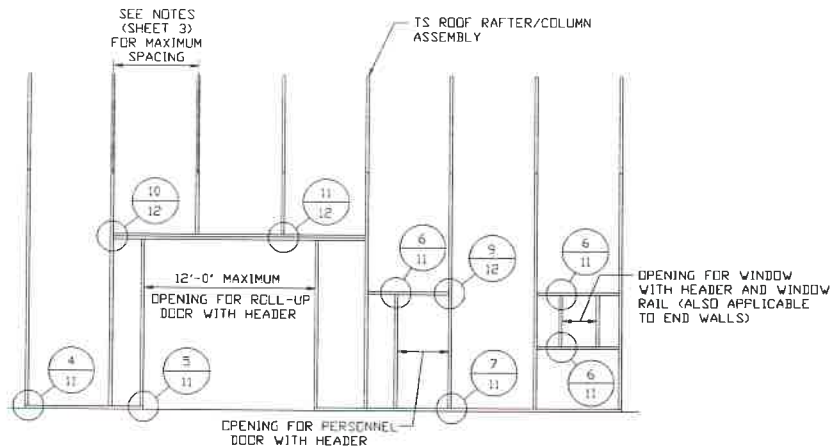
**TYPICAL BOW EAVE RAFTER
END WALL FRAMING SECTION**

SCALE: NTS



**TYPICAL BOW EAVE RAFTER END
WALL OPENING FRAMING SECTION**

SCALE: NTS



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

SCALE: NTS



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

DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: VSM

**CLIENT: NEWMART
BUILDERS**

NEWMART BUILDERS, INC.

1000 CYCLE LANE

SOUTH HILL, VA 23970

30'-0" x 14'-0" ENCLOSED STRUCTURE

DATE: 11-5-18

SHT. 10

SCALE: NTS

DWG. NO: SK-3

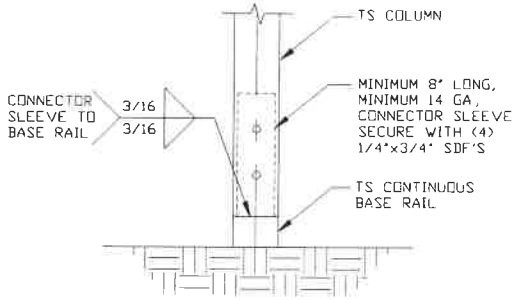
JOB NO:

18033S/18113S/18246S

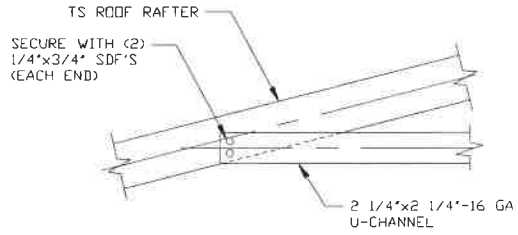
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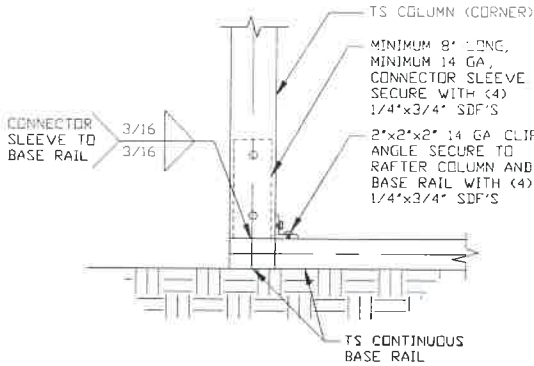
BOX AND BOW EAVE RAFTER WALL OPENING DETAILS



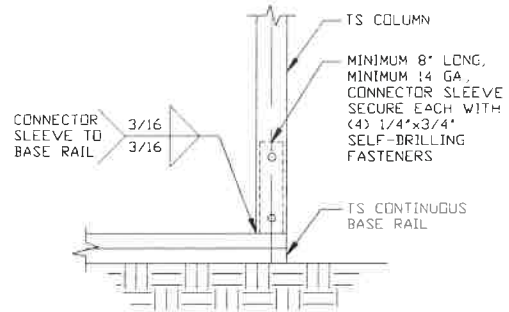
2 RAFTER COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



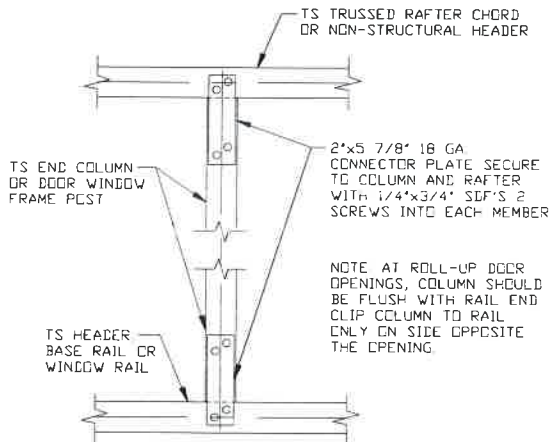
3 3'-4' ROOF RAFTER TIE CONNECTION DETAIL
SCALE: NTS



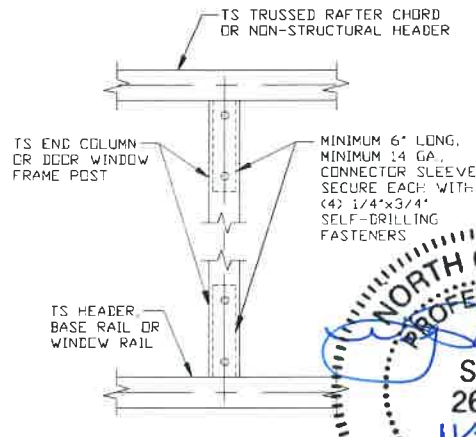
4 END COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



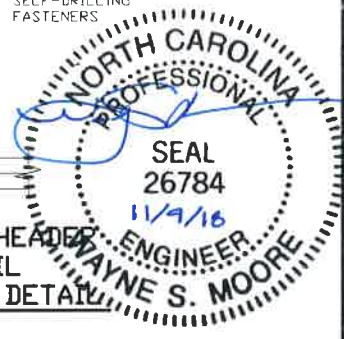
5 COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



6 COLUMN TO WINDOW RAIL CONNECTION DETAIL
SCALE: NTS



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

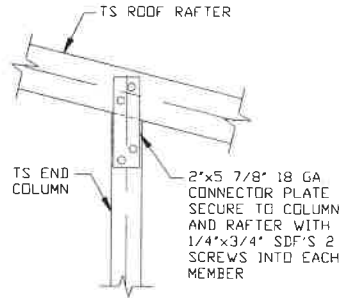


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ENGINEERING AND CONSULTING, INC.**

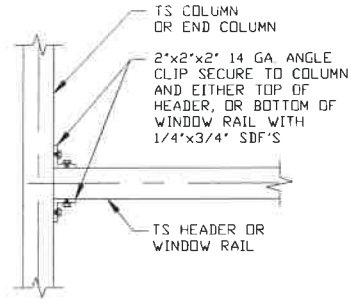
DRAWN BY: LT		NEW MART BUILDERS, INC. 1000 CYCLE LANE SOUTH HILL, VA 23970 30'-0" x 14'-0" ENCLOSED STRUCTURE	
CHECKED BY: PDH			
PROJECT MGR: VSM	DATE: 11-5-18	SCALE: NTS	JOB NO: 18033S/18113S/18246S
CLIENT: NEW MART BUILDERS	SHT. 11	DWG. NO: SK-3	REV: 6

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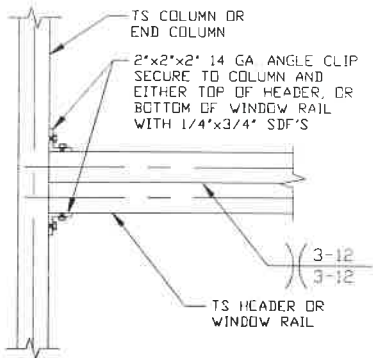
BOX AND BOW EAVE RAFTER WALL OPENING DETAILS



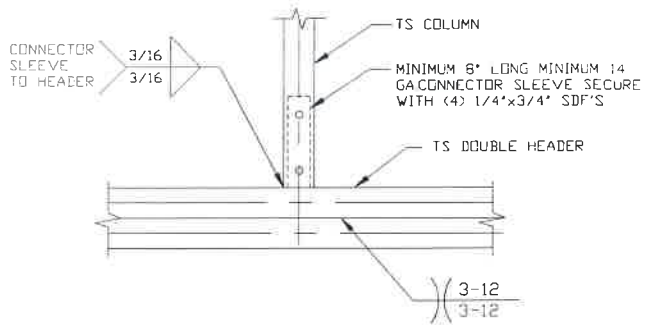
8 RAFTER TO CHORD CONNECTION DETAIL
SCALE: NTS



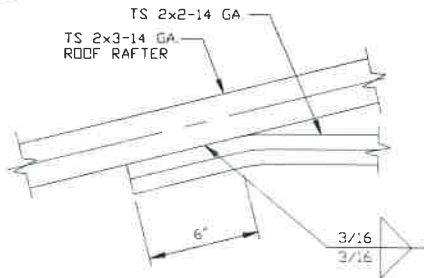
9 COLUMN OR WINDOW RAIL TO POST CONNECTION DETAIL
SCALE: NTS



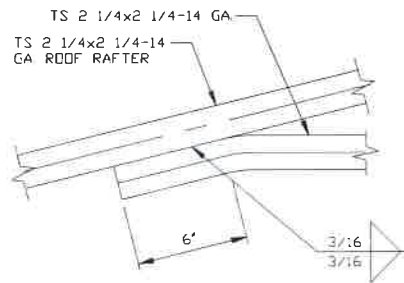
10 DOUBLE HEADER TO COLUMN CONNECTION DETAIL
SCALE: NTS



11 COLUMN/DOUBLE HEADER CONNECTION DETAIL
SCALE: NTS



12A 6'-0" ROOF RAFTER TIE CONNECTION DETAIL
SCALE: NTS



12B 6'-0" ROOF RAFTER TIE CONNECTION DETAIL
SCALE: NTS



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

DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: NEWMART BUILDERS

NEWMART BUILDERS, INC.
1000 CYCLE LANE
SOUTH HILL, VA 23970
30'-0"x14'-0" ENCLOSED STRUCTURE

DATE: 11-5-18

SHT. 12

SCALE: NTS

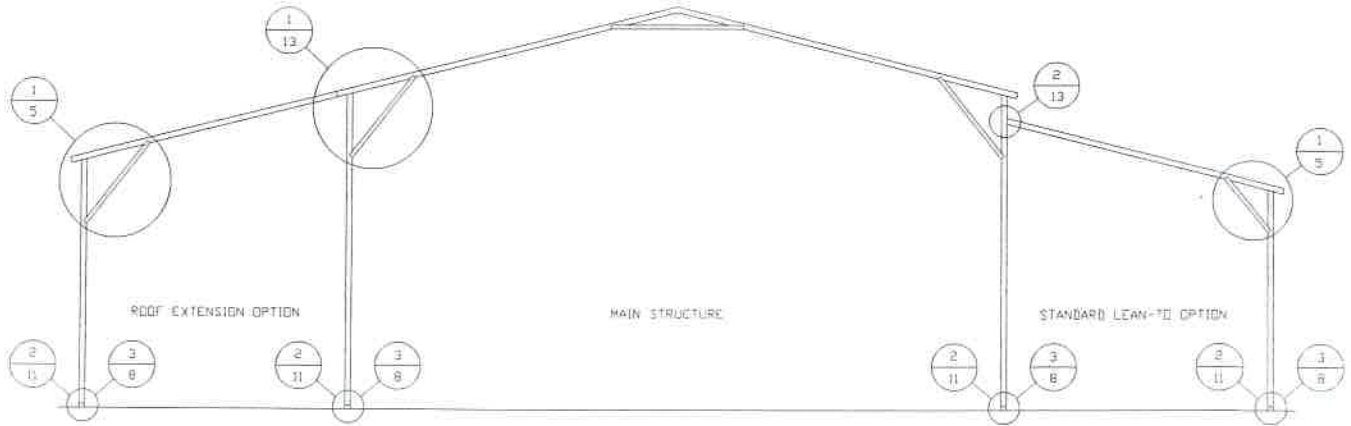
DWG. NO: SK-3

JOB NO:
18033S/18113S/18246S

REV: 6

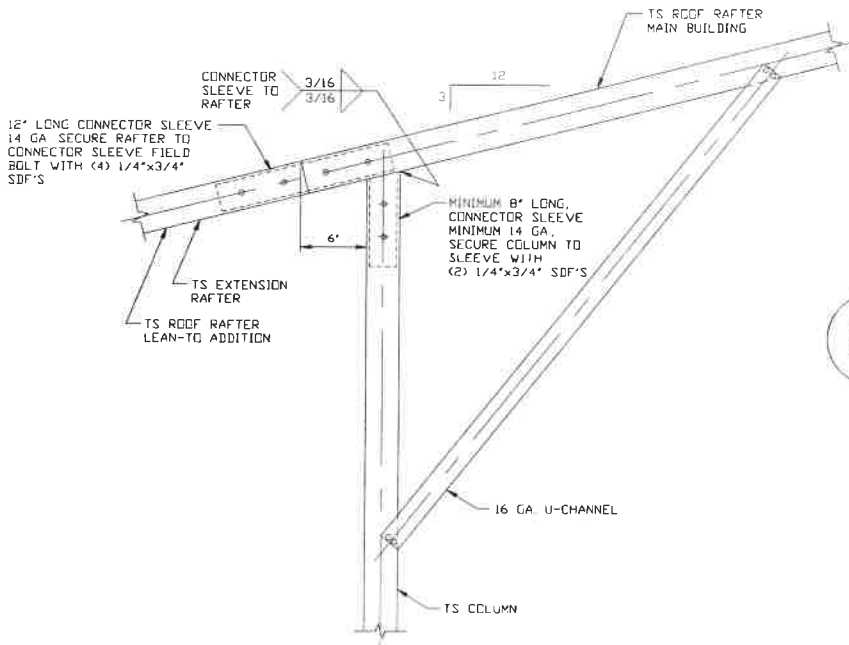
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BOX EAVE RAFTER LEAN-TO OPTIONS

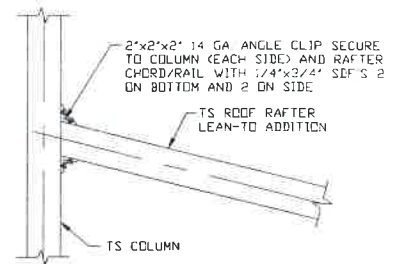


TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

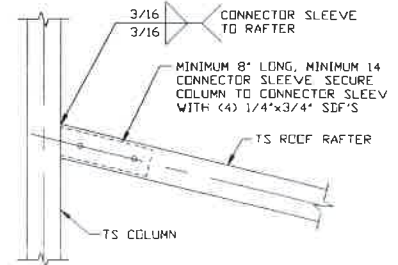
SCALE: NTS
 MAXIMUM WIDTH OF STANDARD LEAN-TO IS 12'-0"



1 SIDE EXTENSION RAFTER/COLUMN DETAIL
 SCALE: NTS



2A LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL
 SCALE: NTS



2B LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL
 SCALE: NTS



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

DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: NEWMART BUILDERS

NEWMART BUILDERS, INC.

1000 CYCLE LANE

SOUTH HILL, VA 23970

30'-0"x14'-0" ENCLOSED STRUCTURE

DATE: 11-5-18

SHT. 13

SCALE: NTS

DWG. NO: SK-3

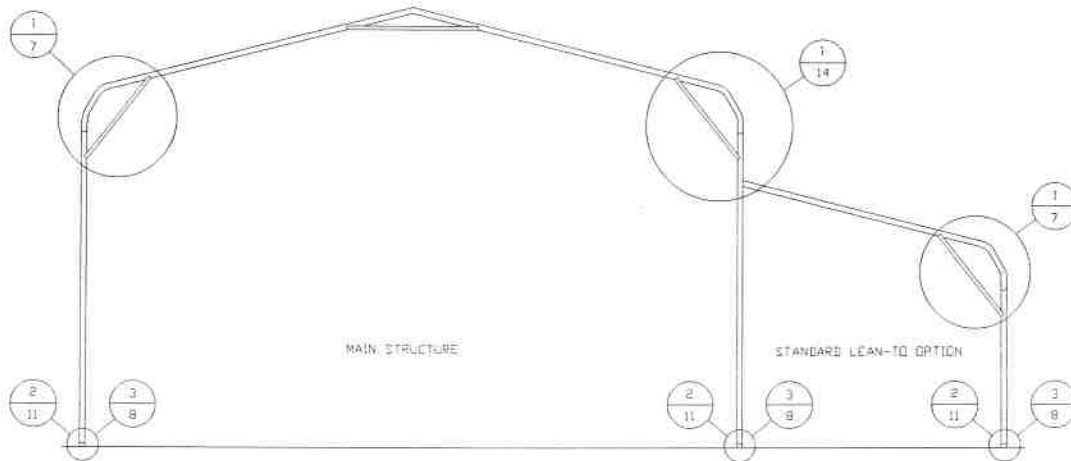
JOB NO:

18033S/18113S/18246S

REV: 6

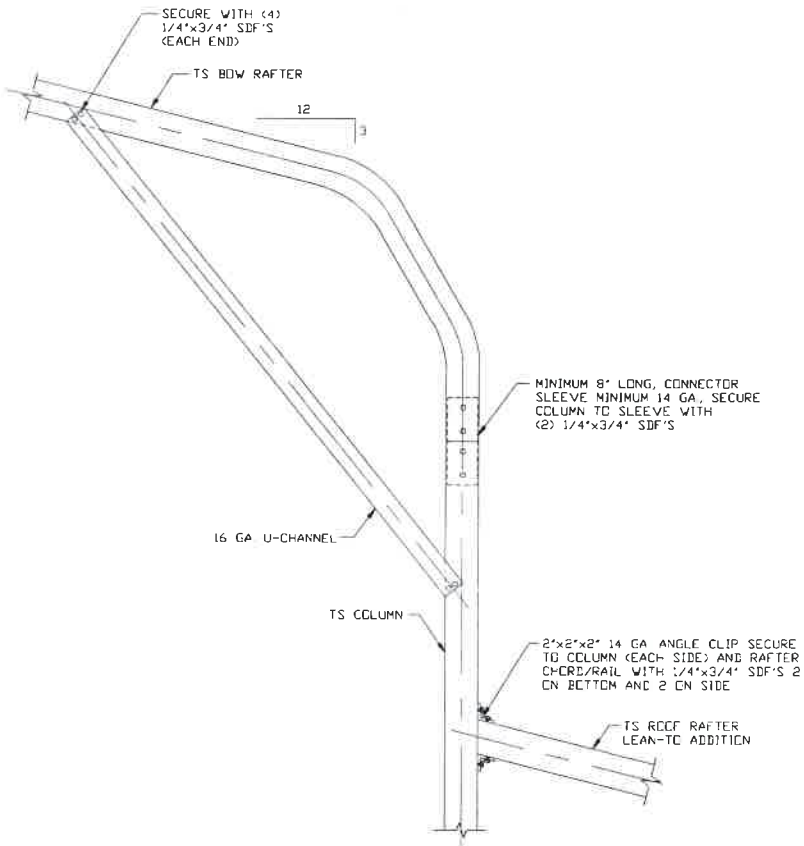
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BOW RAFTER LEAN-TO OPTIONS

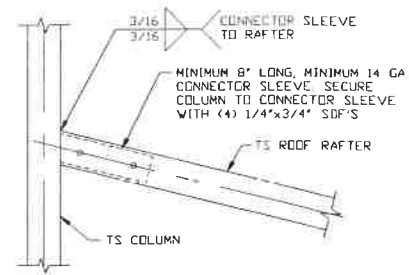


TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION

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



1A LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL
 SCALE: NTS



1B LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL
 SCALE: NTS



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

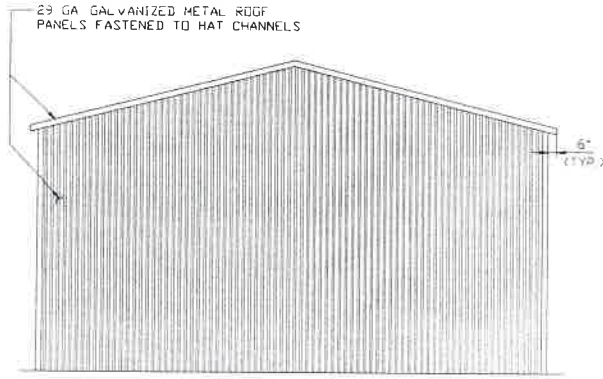
DRAWN BY: LT
CHECKED BY: PDH

NEWMART BUILDERS, INC.
 1000 CYCLE LANE
 SOUTH HILL, VA 23970
 30'-0"x14'-0" ENCLOSED STRUCTURE

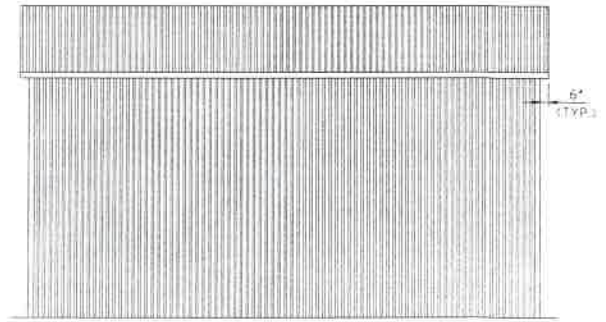
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PROJECT MGR: WSM	DATE: 11-5-18	SCALE: NTS	JOB NO: 18033S/18113S/18246S
CLIENT: NEWMART BUILDERS	SHT. 14	DWG. NO: SK-3	REV: 6

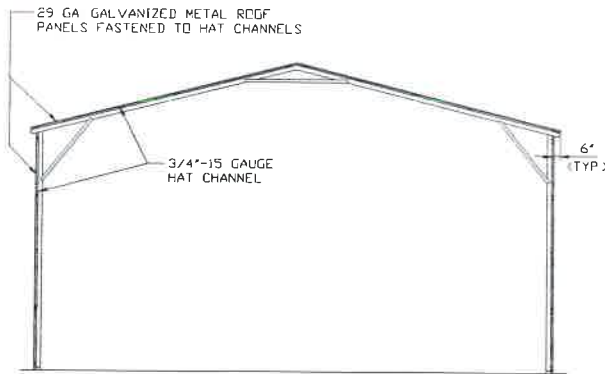
BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



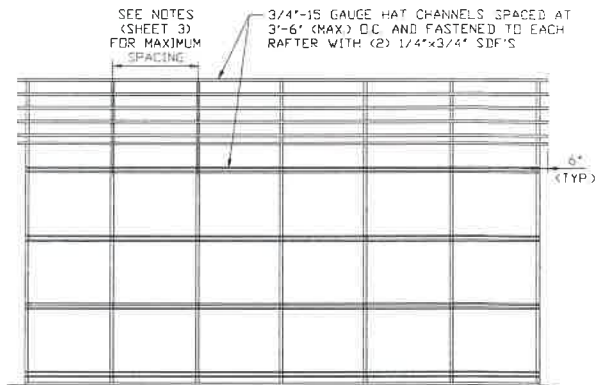
**TYPICAL END ELEVATION
VERTICAL ROOF/SIDING**
SCALE: NTS



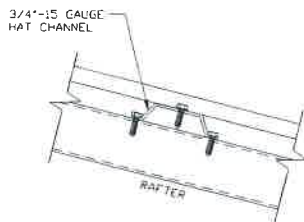
**TYPICAL SIDE ELEVATION
VERTICAL ROOF/SIDING OPTION**
SCALE: NTS



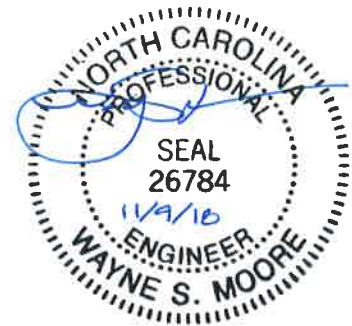
**TYPICAL SECTION
VERTICAL ROOF/SIDING OPTION**
SCALE: NTS



**TYPICAL FRAMING SECTION
VERTICAL ROOF/SIDING OPTION**
SCALE: NTS



PANEL ATTACHMENT
(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE: NTS



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CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: NEWMART BUILDERS

NEWMART BUILDERS, INC.

1000 CYCLE LANE

SOUTH HILL, VA 23970

30'-0" x 14'-0" ENCLOSED STRUCTURE

DATE: 11-5-18

SHT. 15

SCALE: NTS

DWG. NO: SK-3

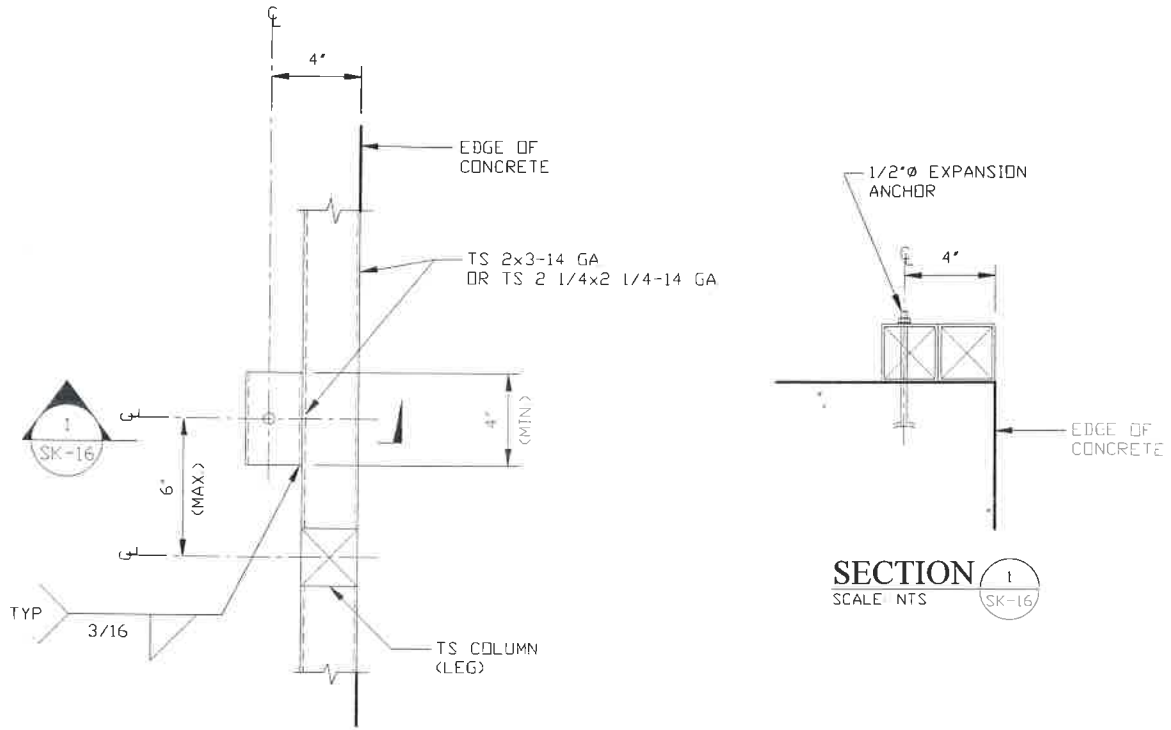
JOB NO:

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ADDITIONAL BASE RAIL ANCHORAGE OPTION



TYPICAL ANCHOR DETAIL WHEN BASE RAIL IS NEAR EDGE OF CONCRETE

SCALE: NTS



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DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: NEWMART BUILDERS

**NEWMART BUILDERS, INC.
1000 CYCLE LANE
SOUTH HILL, VA 23970
30'-0" x 14'-0" ENCLOSED STRUCTURE**

DATE: 11-5-18

SCALE: NTS

**JOB NO:
18033S/18113S/18246S**

SHT. 16

DWG. NO: SK-3

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