

STRUCTURAL DESIGN

FULLY OPEN (CARPORT) 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:

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401 S. Main Street, Suite 200 Mount Airy, NC 27030







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DRAWING INDEX

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



ENGINEERING AND CONSULTING, INC.	CKED BY: PDH	NEWMART BUILDERS 1000 CYCLE LANE SOUTH HILL, VA 23970 30'-0"x14'-0" FULLY OPEN STRUCTURE			
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INSTALLATION NOTES AND SPECIFICATIONS

- I DESIGN IS FOR MAXIMUM 30'-0" WIDE x 14'-0" EAVE HEIGHT OPEN CARPORT 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

= 1.5 PSF

DAD AVIL (8

= 12 PSF

= 30 PSF (W ≤ 24'-0') C) GROUND SNOW LOAD

= 35 PSF (18'-0" < W ≤ 30'-0")

= 45 PSF @ 4'-0" D.C MAX RAFTER/COLUMN AND END COLUMN SPACING (24'-0" < W \leq 30'-0")

@ 5'-0" □C MAX, RAFTER/CDLUMN AND END COLUMN SPACING (W < 24'-0")

- 4 LOW ULTIMATE WIND SPEED (LW) 105 TO 140 MPH (NOMINAL WIND SPEED 81 TO 108 MPH): MAXIMUM RAFTER/POST AND END POST SPACING = 5.0 FEET (UNLESS NOTED OTHERWISE)
- 5 END WALL COLUMNS (POST) ARE SIMILAR TO SIDE WALL POSTS UNLESS NOTED OTHERWISE
- 6 LOW HAZARD RISK CATEGORY I (WIND)
- 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 & 30'-0") AND 2 1/4"x2 1/4"-14 GAUGE TUBE STEEL (TS) FOR (W & 24'-0") (UNLESS NOTED OTHERWISE)
- 9. AVERAGE FASTENER SPACING ON-CENTERS ALGNG 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 DNLY 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, OPTIONAL 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 V= C2M

g PE05 = 202 S_{DI}= 1258 g

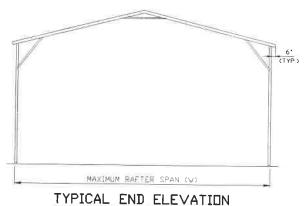
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PROJECT MGR: WSM	DATE: 11-5-18	SCALE: NTS	JUB NO: 180335/181135/182465
CLIENTI NEWHART	SHT, 3A	DVG. ND: SK-1	REV. 6

BOX EAVE FRAME RAFTER STRUCTURE (Sheets 4, 5, 8, 9, 10, 12, 14, 16 AND 17)

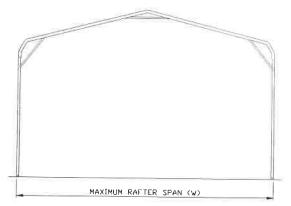


LENGTH VARIES DEPENDING ON NUMBER AND
SPACING OF RAPTERS

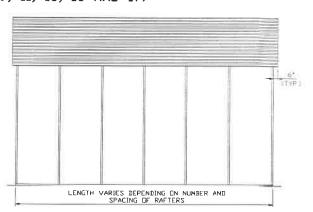
TYPICAL SIDE ELEVATION

SCALE: NTS

BOW FRAME RAFTER STRUCTURE (Sheets 6, 7, 8, 9, 11, 13, 15 AND 17)



TYPICAL END ELEVATION SCALE NTS



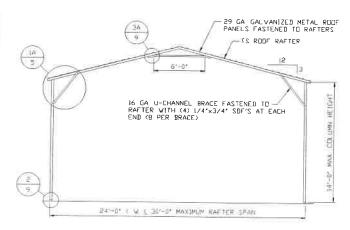
TYPICAL SIDE ELEVATION



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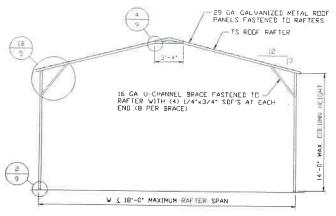
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\dashv	PROJECT MGR: WSM	DATE: 11-5-18	SCALE: NTS	JUB 1	ND: S/18113S/18246S	
	CLIENT: NEVMART BUILDERS	SHT. 3B	DVG. ND SK-1		REV. 6	

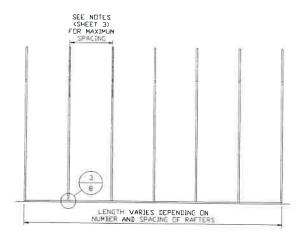


TYPICAL RAFTER/COLUMN END FRAME SECTION

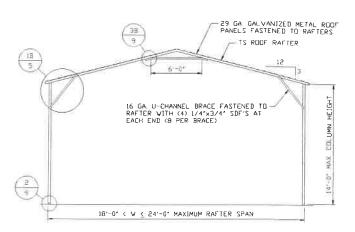
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TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS

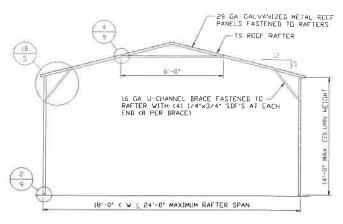


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS

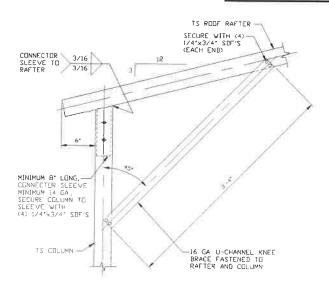


TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS



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CONSULTING THE UNNOTHER LEFT REPRODUCTION, COPYING, OR ITHERWISE INC. OF		PROJECT MGR: VSM	DATE: 11-5-18	SCALE: NTS		2/181135/182465	
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CONNECTION DETAILS

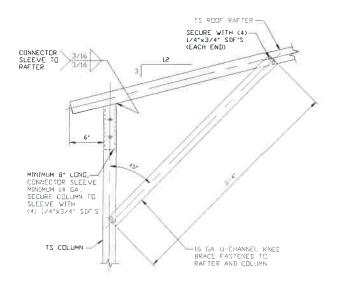


BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR 24'-0" < W \(\) 30'-0" AND HEIGHTS < 14'-0"

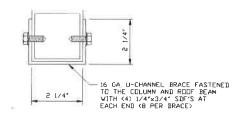
16 GA. U-CHANNEL BRACE FASTENED
TO THE COLUMN AND ROOF BEAM
VIIH (4) 1/4*x3/4*SDF'S AT
EACH END (6 FER BRACE)

BRACE SECTION

1A



BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR W \(24'-0' \)
AND HEIGHTS \(\) 14'-0'



BRACE SECTION

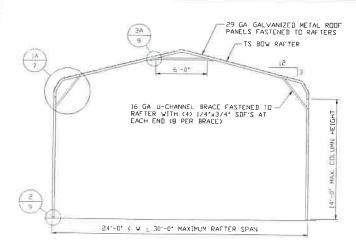
1B



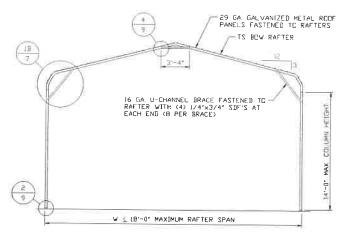
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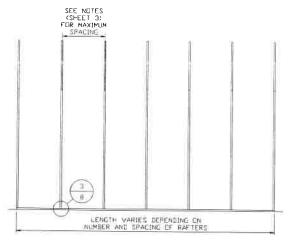
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CHECKED BY	(PDH	SOUTH HILL, VA 23970 30'-0"x14'-0" FULLY OPEN STRUCTURE				
PROJECT MO	iri wsm	DATE: 11-5-18	SCALE: NTS	JEB 1	S/18113S/18246S	
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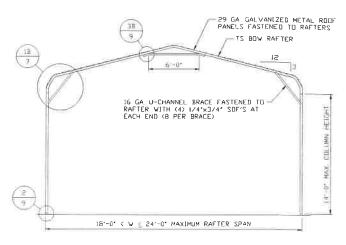
TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE NTS



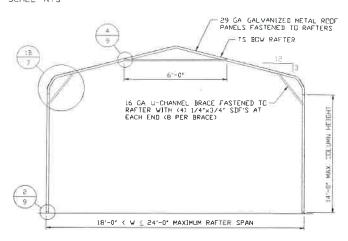
TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE: NTS

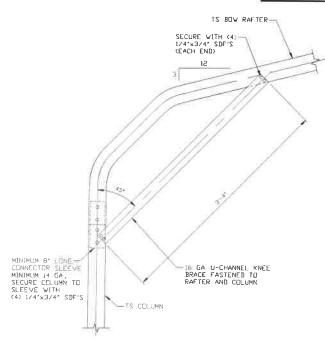


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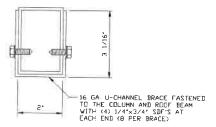
CLIENT: NEWMART BUILDERS	SHT. 6	DVG. NO SK-	1	REV. 6	
PROJECT MGR: WSM	DATE: 11-5-18	SCALE: NTS	JDB 1	ND: S/18113S/18246S	
CHECKED BY: PDH		SOUTH HILL, 4'-0" FULLY OF			
DRAWN BY: LT	NEWMART BUILDERS 1000 CYCLE LANE				

CONNECTION DETAILS

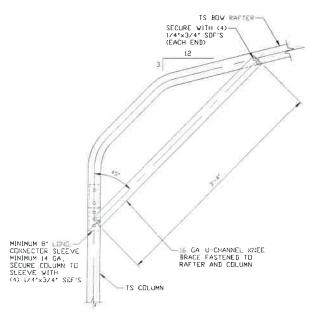


BOW RAFTER COLUMN CONNECTION DETAIL FOR $24'-0'' < W \le 30'-0''$ AND HEIGHTS ≤ 14'-0"

1A

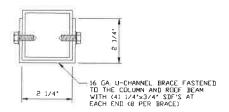


BRACE SECTION



BOW EAVE RAFTER COLUMN CONNECTION DETAIL F□R W ≤ 24'-0" AND HEIGHTS ≤ 14'-0"

1B



BRACE SECTION

SCALE: NTS

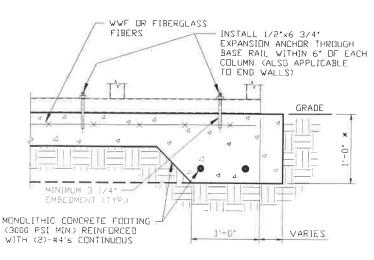


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ŀ	CHECKED BY: PDH				
1	PROJECT MGRI WSM	DATE: 11-5-18	SCALE: NTS	JUB 18033	ND 35/181135/182465
	CLIENT: NEVMART BUILDERS	SHT. 7	DVG. ND: SK-1	l _	REV. 6

BASE RAIL ANCHORAGE OPTIONS FOR LOW WIND SPEEDS



CONCRETE MONOLITHIC SLAB BASE RAIL ANCHURAGE

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

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

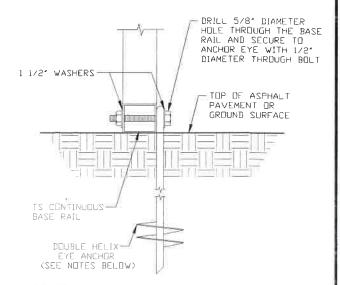
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT.

REINFORCEMENT MAY BE BENT IN THE SHOP OR THE FIELD PROVIDED:

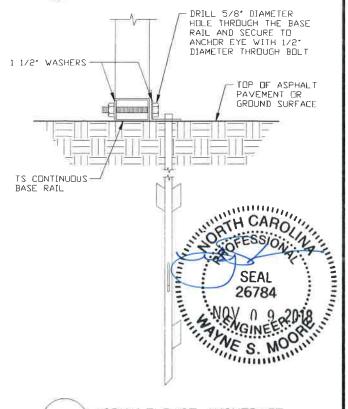
- 1 REINFORCEMENT IS BENT COLD 2 THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS
- 3 REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT.

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 CHARSE 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 6C' EMBEDMENT.



GROUND BASE HELIX ANCHORAGE ЗВ (CAN BE USED FOR ASPHALT)



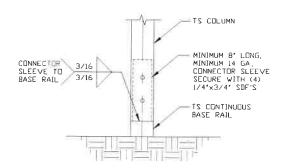
ASPHALT BASE ANCHORAGE SCALE: NTS

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-	PROJECT MGR: VSM	DATE: 11-5-18 SCALE: NTS 18033S/18113S/18246		10	
	CLIENT: NEVMART BUILDERS	SHT. 8	DVG. ND SK-1		REV. 6

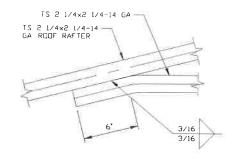
CONNECTION DETAILS





RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

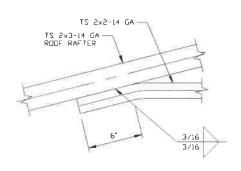
SCALE: NTS



ЗВ

6'-0' ROOF RAFTER TIE CONNECTION DETAIL

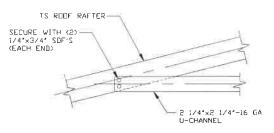
SCALE: NTS



3A) CI

6'-0' ROOF RAFTER TIE CONNECTION DETAIL

SCALE: NTS



4

3'-4" ROOF RAFTER TIE CONNECTION DETAIL

SCALE NTS

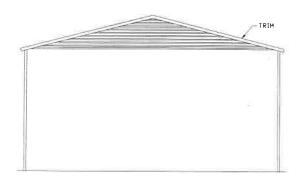


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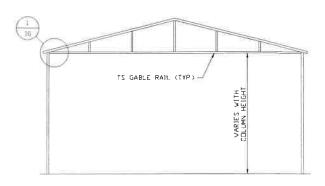
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	CHECKED BY: PDH	30'-0"x1	SOUTH HILL, V 4'-0" FULLY OP		
_	PROJECT MGR: WSM	DATE: 11-5-18	SCALE: NTS	JEIB	ND IS/18113S/18246S
	CLIENT: NEVMART BUILDERS	SHT. 9	DVG. NO SK-1		REVJ 6

BOX EAVE RAFTER GABLE END OPTION



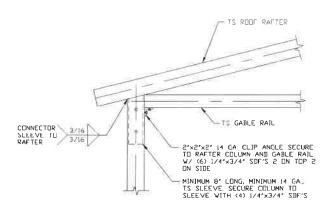
TYPICAL BOX EAVE RAFTER GABLE END ELEVATION

SCALE: NTS



TYPICAL BOX EAVE RAFTER GABLE END FRAMING SECTION

SCALE NTS



BOX EAVE RAFTER GABLE RAIL TO RAFTER COLUMN CONNECTION DETAIL SCALE: NTS

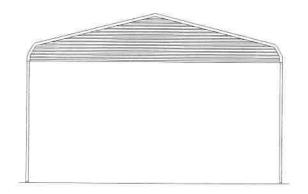
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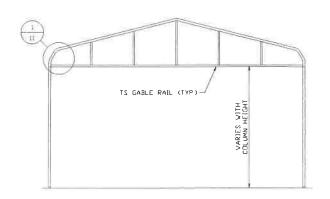
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PROJECT MGR: VSM	DATE: 11-5-18	SCALE: NTS	JEB 1 18033	(C i S/18113S/18246S
CHECKED BY: PDH	30'-0"x1	SOUTH HILL, ' 4'-0" FULLY OF		
DRAWN BY: LT		NEWMART BU 1000 CYCLE	LANE	

BOW RAFTER GABLE END OPTION



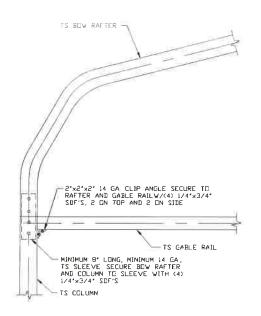
TYPICAL BOW RAFTER GABLE END ELEVATION

SCALE NTS



TYPICAL BOW RAFTER GABLE END FRAMING SECTION

SCALE NTS



BOW RAFTER GABLE RAIL TO RAFTER/COLUMN CONNECTION DETAIL

SCALE: NTS

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PROJECT NGR: VSM CLIENT: NEVMART	DATE: 11-5-18 SHT. 11	SCALE: NTS	JUB NU 180335/181135/182465 REV.1 6	

BOX EAVE RAFTER LEAN-TO OPTIONS

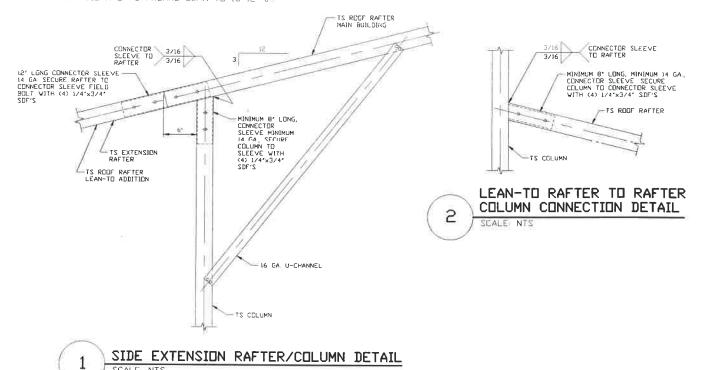
TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

MAIN STRUCTURE

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

SCALE NTS

ROOF EXTENSION OFFICEN

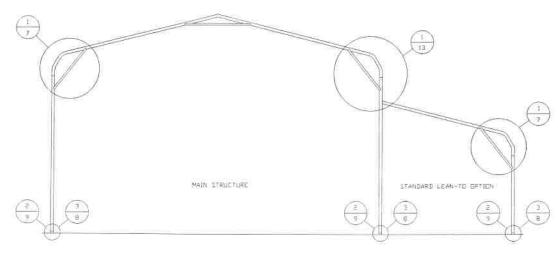


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STANDARD LEAN-TO OPTION

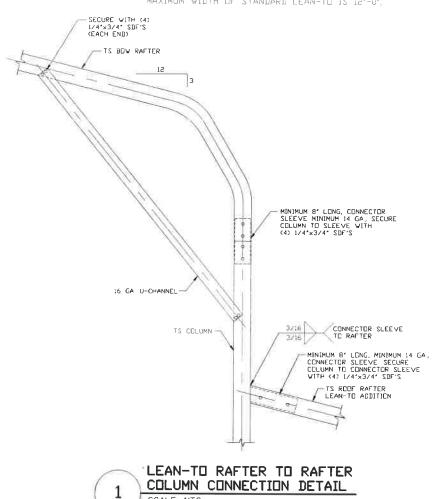
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BOW RAFTER LEAN-TO OPTIONS



TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION

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





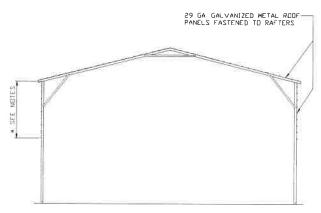


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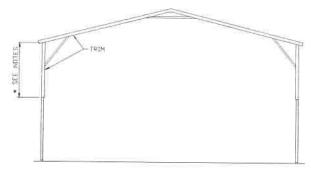
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PREJECT MGR: VSM	DATE: 11-5-18	SCALE: NTS	JUB ND 180335/181135/182465	
		T	JOB NO	
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BOX EAVE RAFTER EXTRA SIDE PANEL OPTION



TYPICAL RAFTER/COLUMN FRAME SECTION - EXTRA SIDE PANELS



TYPICAL END ELEVATION EXTRA SIDE PANELS

SCALE: NTS

TRIM

TYPICAL SIDE ELEVATION EXTRA SIDE PANELS

SCALE: NTS

NOTES

- * 6'-0" MAX (FOR EAVE HEIGHT ₹ 10'-0")
- * 3'-0" MAX (FOR EAVE HEIGHT 10'-0" < TO $\leq 14'$ -0")

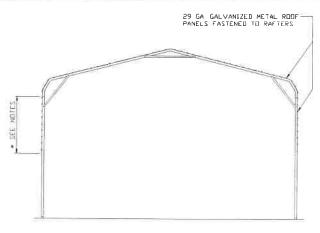


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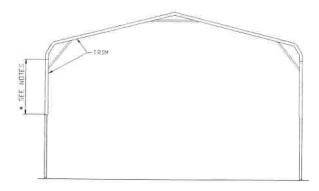
CLIENT: NEVMART	SHT, 14 DVG. ND SK-1		l	REV. 6	
PROJECT MGR: VSM	DATE: 11-5-18	SCALE: NTS	JIIB 18033	ND 35/181135/182465	
CHECKED BY PDH	SOUTH HILL, VA 23970 30'-0"x14'-0" FULLY OPEN STRUCTURE				
DRAWN BY: LT		NEWMART BUILDERS 1000 CYCLE LANE			

BOW RAFTER EXTRA SIDE PANEL OPTION



TYPICAL RAFTER/COLUMN FRAME SECTION - EXTRA SIDE PANELS

SCALEINTS

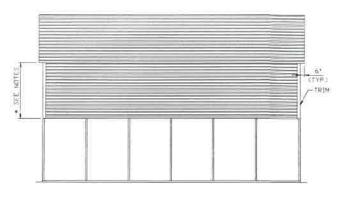


TYPICAL END ELEVATION EXTRA SIDE PANELS

SCALE: NTS

NOTES

- * 6'-0" MAX (FOR EAVE HEIGHT < 10'-0")
- * 3'-0" MAX (FOR EAVE HEIGHT 10'-0" (TO $\leq 14'$ -0")



TYPICAL SIDE ELEVATION EXTRA SIDE PANELS

SCALE: NTS

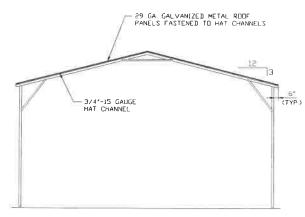


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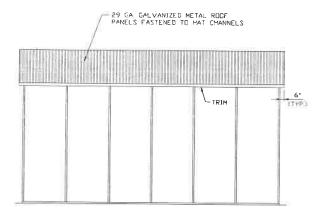
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	CHECKED BY PDH	30'-0"x1	VA 239 PEN ST	70 RUCTURE		
-	PROJECT MGRI WSM	DATE: 11-5-18	SCALE: NTS	JDB 1	NDi IS/18113S/18246S	
	CLIENT: NEVMART BUILDERS	SHT. 15	DVG. ND SK-1		REVJ 6	

BOX EAVE RAFTER VERTICAL ROOF OPTION



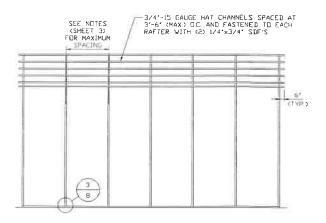
TYPICAL SECTION VERTICAL ROOF OPTION

SCALE NTS



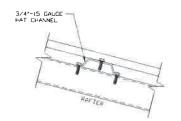
TYPICAL SIDE ELEVATION VERTICAL ROOF

SCALE: NTS



TYPICAL FRAMING SECTION VERTICAL ROOF OPTION

SCALE: NTS



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

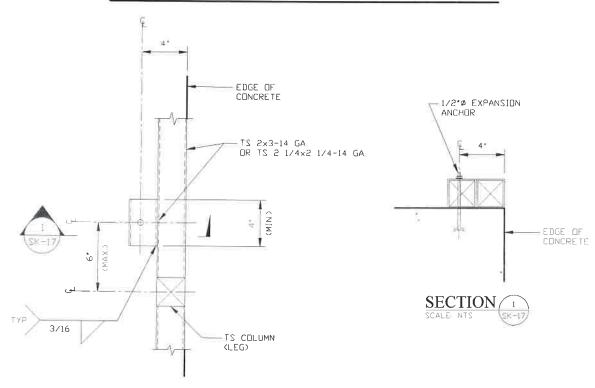


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ADDITIONAL BASE RAIL ANCHORAGE OPTION



TYPICAL ANCHOR DETAIL WHEN BASE RAIL IS NEAR EDGE OF CONCRETE

SCALE: NTS



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