

STRUCTURAL DESIGN

ENCLOSED BUILDING

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

30 July 2021 Revision 0 M&A Project No. 21087S

Prepared for:

Metal Carports and Structures, LLC 715 Willow Street Mount Airy, NC 27030

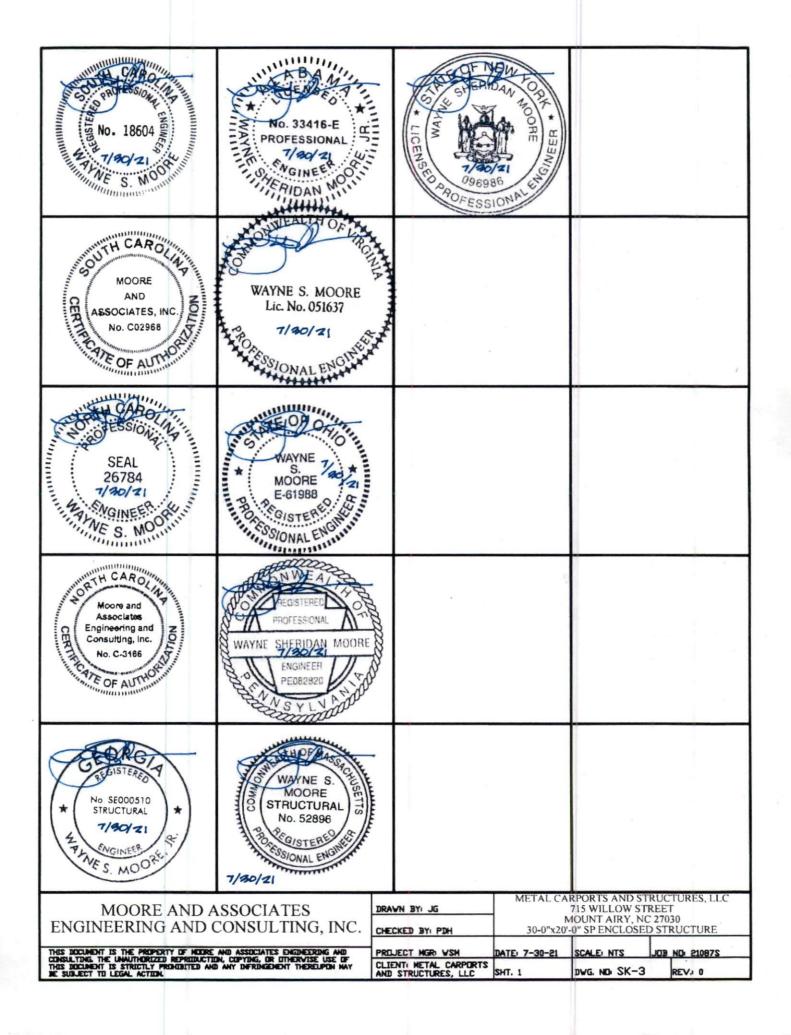
Prepared by:

Moore and Associates Engineering and Consulting, Inc.

1009 East Avenue North Augusta, SC 29841

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





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ENGINEERING AND CONSULTING, I	NC.
THE POSTMENT TO THE GOODERTY OF MOVIES AND ACCOUNTAGE ENGINEERING AN	

ROOF/SIDING OPTION

HEADER OPTIONS

SHEET 18

CLIENTI METAL CARPORTS AND STRUCTURES, LLC	SHT. 2	DVG. ND SK-3		REV. 0		
PROJECT MGR: VSM	DATE: 7-30-21	SCALE: NTS	JOB	ND: 21087S		
CHECKED BY: PDH	30-0"x20'-0" SP ENCLOSED STRUCTURE					
DRAWN BY: JG	715 WILLOW STREET MOUNT AIRY, NC 27030					

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 APPLICABLE BUILDING CODES LISTED ON SHEET 3A
- 3 DESIGN LUADS ARE AS FULLOWS:

A) DEAD LOAD

= 15 PSF

B) LIVE LOAD

- = 12 PSF
- C) GROUND SNOW LOAD
- = 35 PSF
- = 30 PSF WITH U-CHANNEL PEAK BRACE (22'-0")
- NOTE UNBALANCED LOADING DUE TO SNOW DRIFTING FROM AN ADJACENT TALLER STRUCTURE HAS NOT BEEN EVALUATED
- 4 3-SECOND SUST ULTIMATE WIND SPEED (VULT) = (145 MPH (NOMINAL WIND SPEED = (112 MPH)
- 5 MAXIMUM RAFTER/POST AND END POST SPACING = 50 FEET (UNLESS NOTED OTHERWISE)
- 6 END WALL COLUMNS (POSTS) ARE EQUIVALENT TO SIDE WALL POSTS IN SIZE AND SPACING (UNLESS NOTED DTHERWISE)
- 7 RISK CATEGORY I
- 8 WIND EXPOSURE CATEGORY B
- 9 SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2'x2 1/2'-14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS (UNLESS NOTED OTHERWISE) WHERE TS 2 1/2'x2 1/2'-14 GAUGE IS SPECIFIED, TS 2 1/4'x2 1/4'-12 GAUGE MAY BE USED AS OPTION
- 10 AVERAGE PANEL FASTENER SPACING ON-CENTERS = 10' OC (MAX)
- 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 AT DR WITHIN 6' DF EVERY RAFTER COLUMN
- 13 STANDARD GROUND ANCHORS (SDIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 36' LONG IN SUITABLE SDILS OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SDILS AND MUST BE USED IN UNSUITABLE SDILS AS NOTED
- 14 WIND FORCES GOVERN OVER SEISMIC FORCES SEISMIC PARAMETERS ANALYZED ARE

SDIL SITE CLASS = D RISK CATEGORY I

R= 325

I_E= 10 V= CsW

g ecos =202

Spi= 1258 g

15 CONTRACTOR TO PROVIDE ADEQUATE BRACING FOR STRUCTURE SO THAT IT WILL BE STABLE DURING ALL STAGES OF CONSTRUCTION THE STRUCTURE AND FOUNDATIONS ARE DESIGNED FOR A COMPLETED CONDITION ONLY AND, THEREFORE, REQUIRE ADDITIONAL SUPPORT TO MAINTAIN STABILITY BEFORE COMPLETION

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THE PARTY OF THE P	CLIENT: METAL CARPORTS AND STRUCTURES, LLC	SHT. 3	DWG. ND SK-3	REV. 0	

LIST OF APPLICABLE BUILDING CODES

2018 INTERNATIONAL BUILDING CODE (IBC 2018)

2015 INTERNATIONAL BUILDING CODE (IBC 2015)

BUILDING CODE 2015 OF ALABAMA (ADOPTS THE 180 2015 WITH AMENDMENTS)

SEORGIA STATE MINIMUM STANDARD BUILDING CODE (ADOPTS THE IBS 2018 WITH AMENDMENTS)

MASSACHUSETTS STATE BUILDING CODE, 9TH EDITION (ADDPTS THE IBC 2015 WITH AMENDMENTS)

2020 BUILDING CODE OF NEW YORK STATE (ADOPTS THE 18¢ 2018 WITH AMENDMENTS)

2018 NORTH CAROLINA BUILDING CODE (ADOPTS THE 180 2015 WITH AMENDMENTS)

OHIO BUILDING CODE 2017 (ADDPTS THE 180 2015 WITH AMENDMENTS)

BUILDING CODE 2015 OF PENNSYLVANIA (ADOPTS THE 186 2015 WITH AMENDMENTS)

2018 SOUTH CAROLINA BUILDING CODE (ADOPTS THE 180 2018 WITH AMENDMENTS)

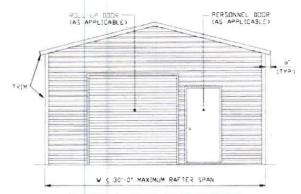
2015 VIRGINIA CONSTRUCTION CODE (ADOPTS THE IBC 2015 WITH AMENDMENTS)

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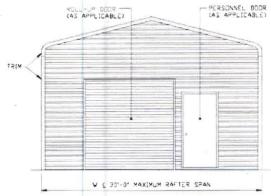
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BOX EAVE FRAME RAFTER STRUCTURE

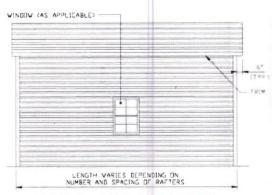


TYPICAL END ELEVATION

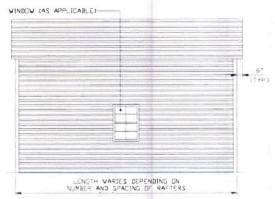
BOW FRAME RAFTER STRUCTURE



TYPICAL END ELEVATION



TYPICAL SIDE ELEVATION



TYPICAL SIDE ELEVATION

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CHECKED BY: PDH PROJECT MGR: WSM

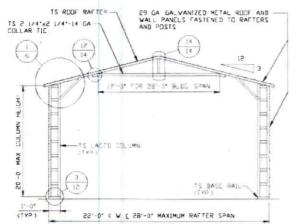
DATE: 7-30-21

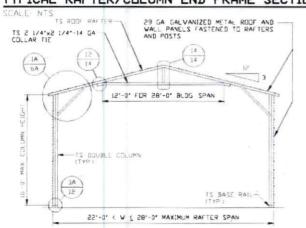
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JOB NO 21087S

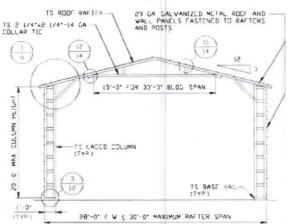
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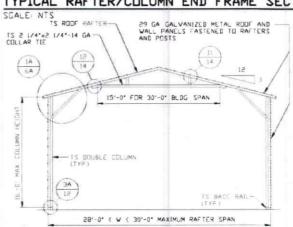




TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION

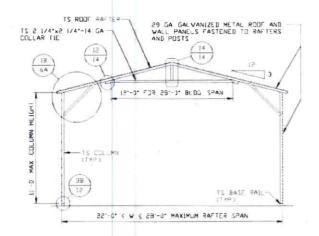


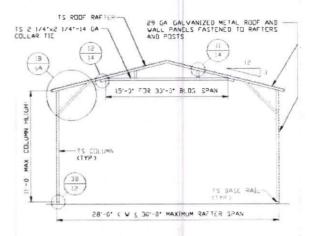
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DRAWN BY: JG	715 WILLOW STREET					

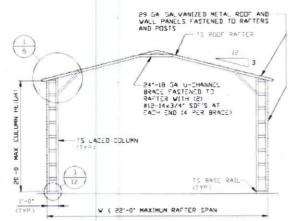


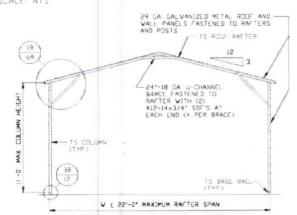


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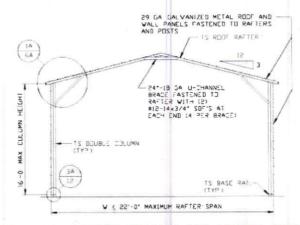
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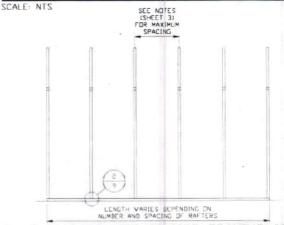




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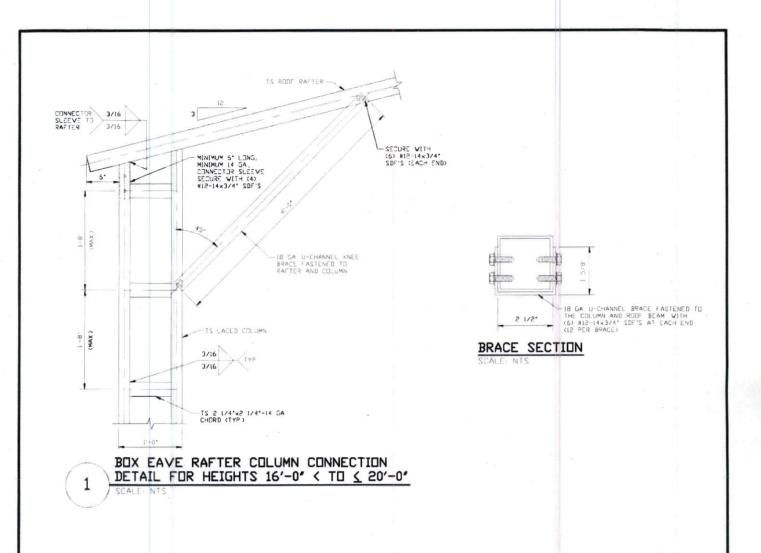


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

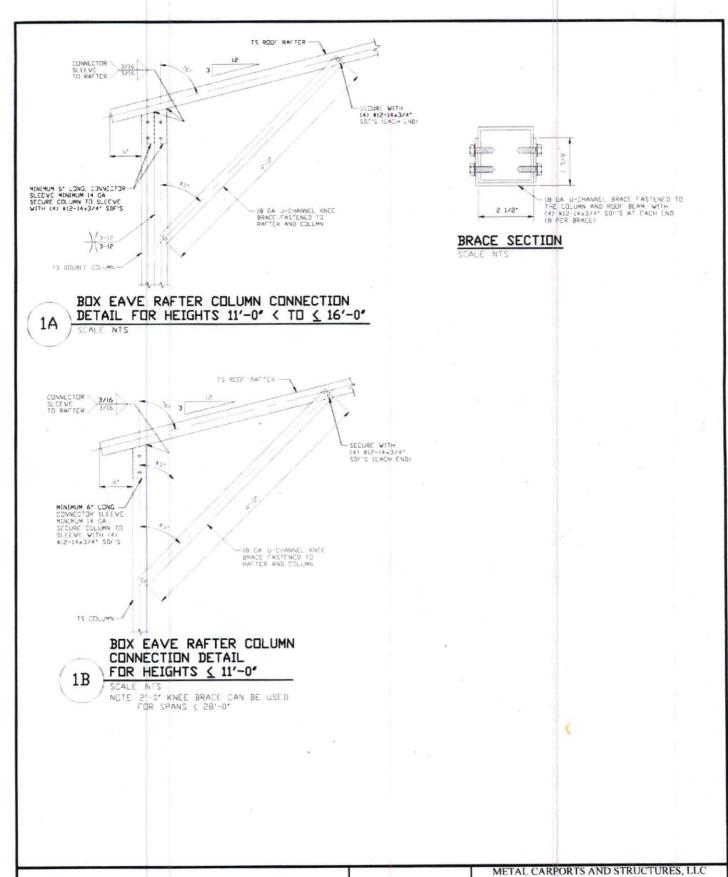
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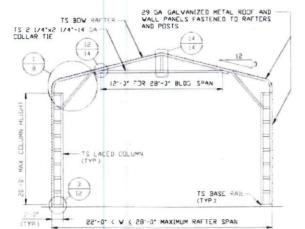
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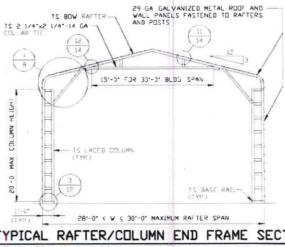


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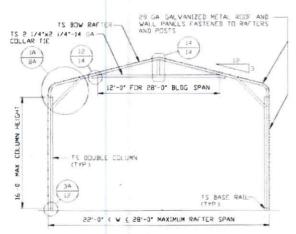


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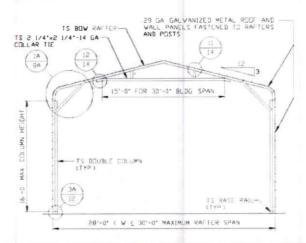




TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION

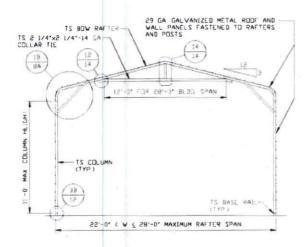


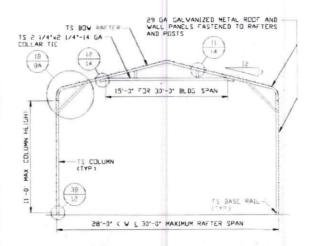
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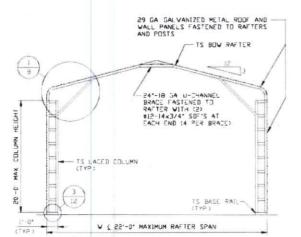




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29 GA GALVANIZED METAL ROUF AND WALL PANELS FASTENED TO RAFTERS AND POSTS

TS BOW RAFTER

14

24'-18 GA U-CHANNEL
BRACE FASTENED TO
RAFTER WITH (2)
H12-14x3/4' SDF'S AT
EACH END (4 PER BRACE)

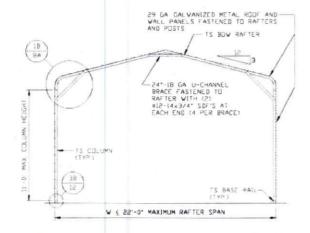
TS DOUBLE COLUMN

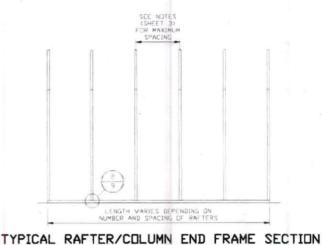
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V & 22'-0' MAXIMUM RAFTER SPAN

TYPICAL RAFTER/COLUMN END FRAME SECTION

TYPICAL RAFTER/COLUMN END FRAME SECTION



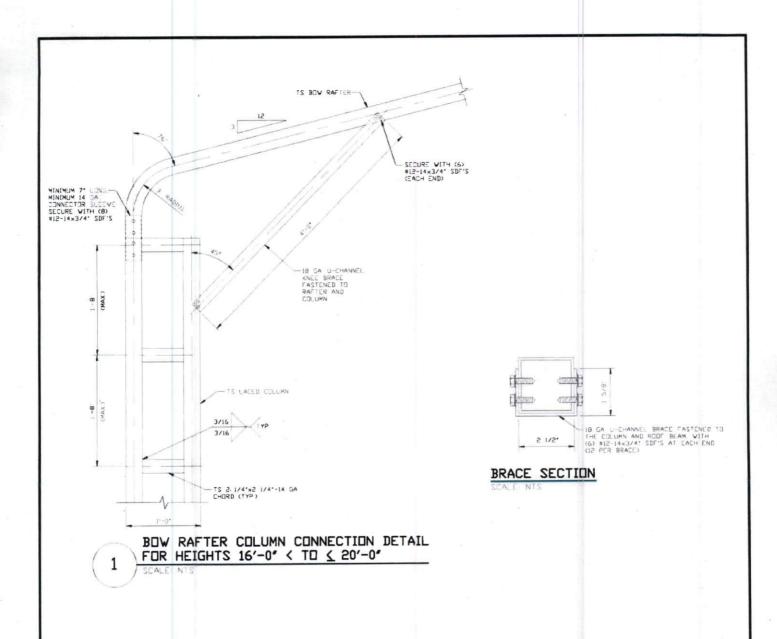


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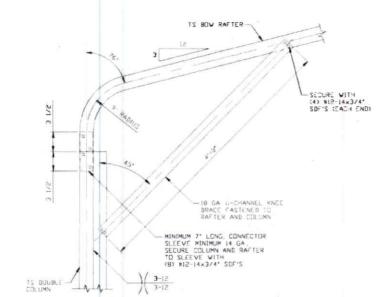
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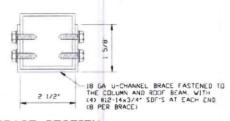
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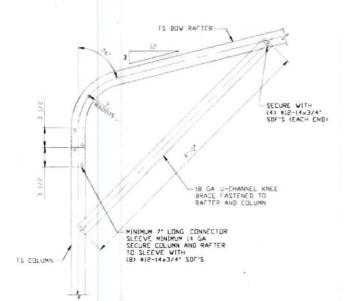
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BRACE SECTION

BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 11'-0' < TO \leq 16'-0' 1A



BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS ≤ 11'-0"

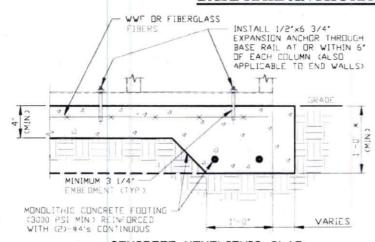
SCALE: NTS

1B

NOTE: 2'-0' KNEE BRACE CAN BE USED FOR SPANS & 28'-0"

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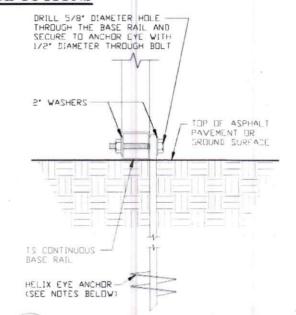
BASE RAIL ANCHORAGE OPTIONS



CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

MINIMUM ANCHOR EDGE DISTANCE IS 4"

* COORDINATE WITH LOCAL BUILDING CODE/ORD REGARDING REQUIRED FOOTING DEPTH



GROUND BASE HELIX ANCHORAGE

SCALE NTS (CAN BE USED FOR ASPH * COURDINATE WITH LOCAL CODES/ORD REGARDING REPUIRED ANCHOR LENGTH

GENERAL NOTES

NOTE: CONCRETE MONDLITHIC 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 AGIS 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

REINFORCEMENT IS BENT COLD

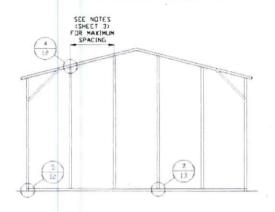
THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS
REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT

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 LODGE 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 50' EMBEDMENT

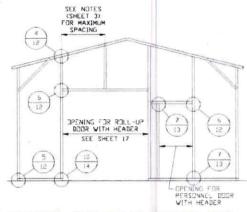
MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG CHECKED BY: PDH		RPORTS AND STRUCTURES, LL 715 WILLOW STREET MOUNT AIRY, NC 27030 -0" SP ENCLOSED STRUCTURE		
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



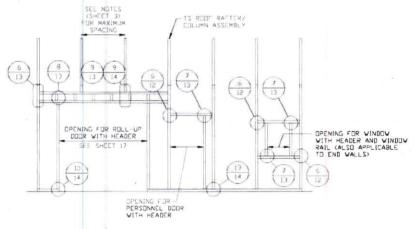
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

CALE 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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	ENGINEERING AND CONSULTING, INC.	CHECKED BY: PDH	
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METAL CARPORTS AND STRUCTURES, LLC 715 WILLOW STREET MOUNT AIRY, NC 27030 30-0"x20-0" SP ENCLOSED STRUCTURE

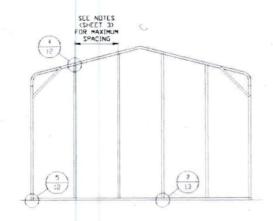
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CLIENT: METAL CARPORTS
AND STRUCTURES, LLC SHT. 10

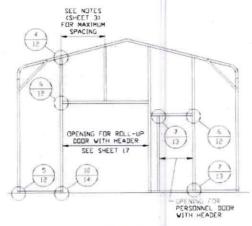
21 SCALE: NTS JUB NO: 21087S

BOW RAFTER END WALL AND SIDE WALL OPENINGS



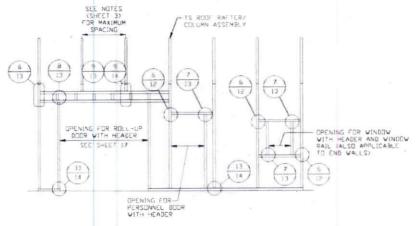
TYPICAL BOW RAFTER END WALL FRAMING SECTION

SCALE NTS



TYPICAL BOW RAFTER END WALL OPENINGS FRAMING SECTION

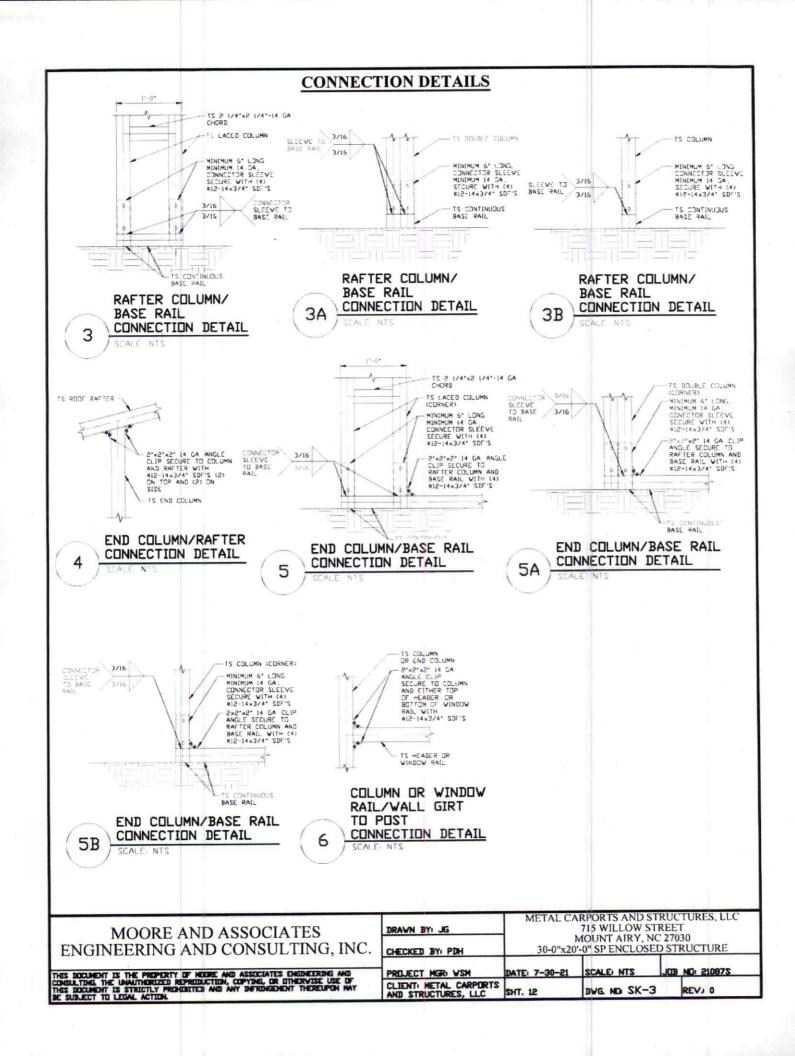
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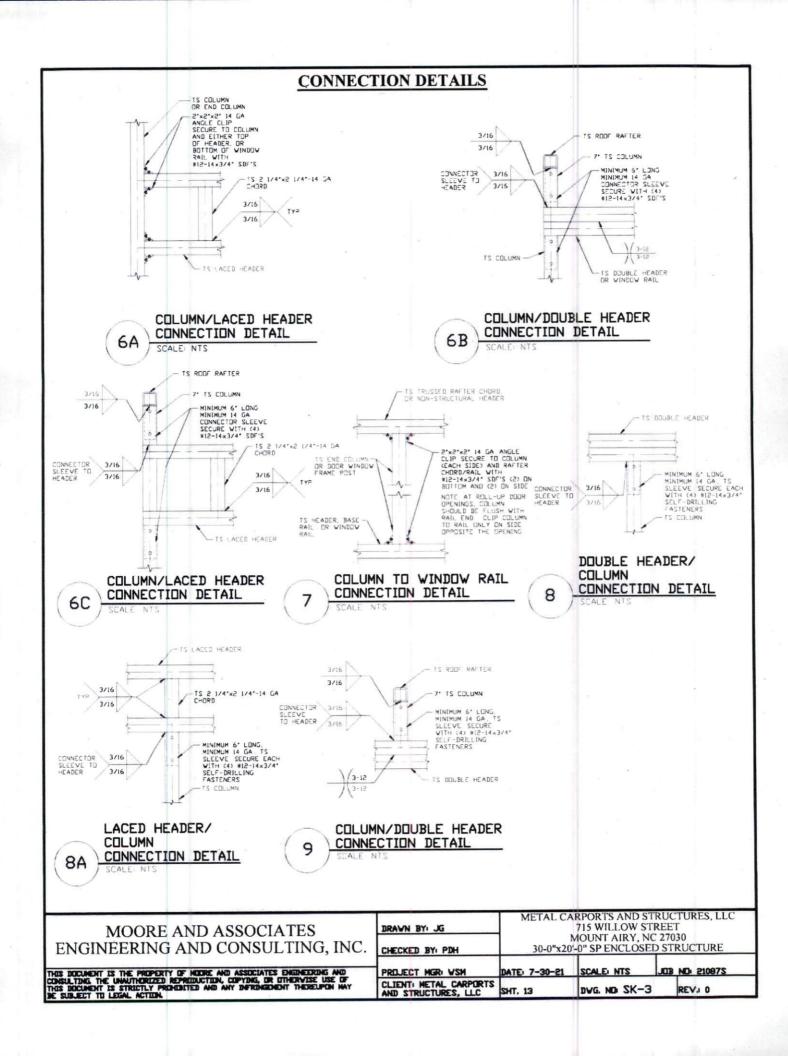


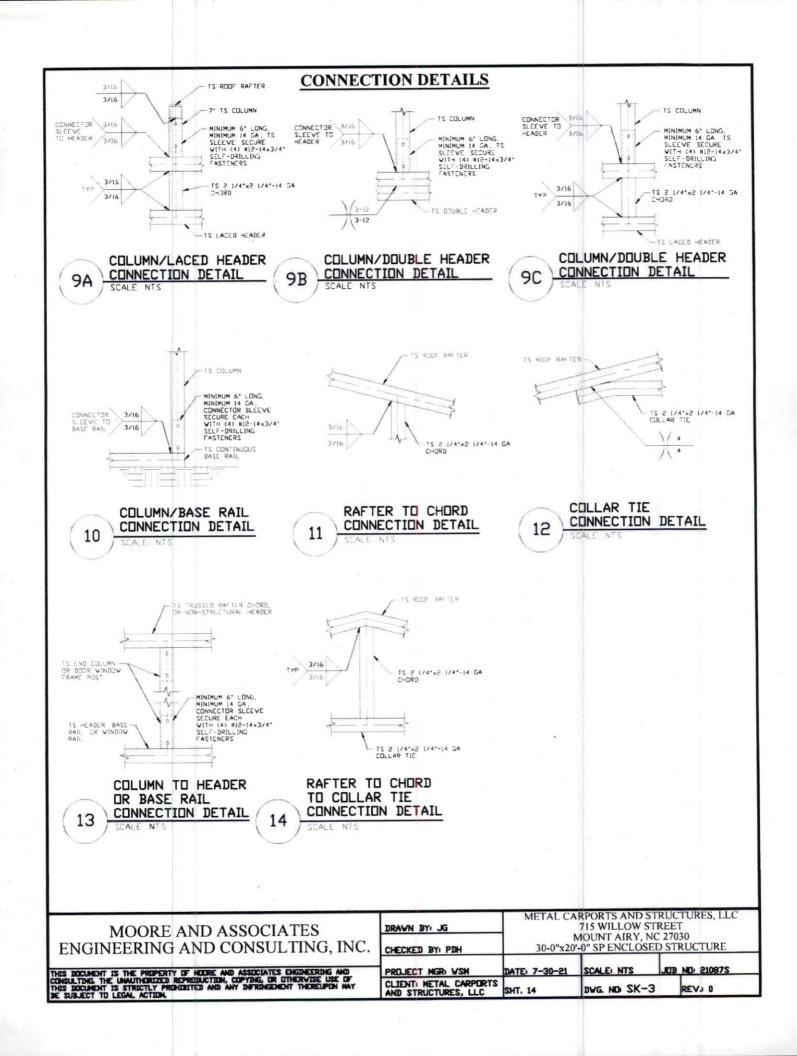
TYPICAL BOW RAFTER SIDE WALL OPENINGS FRAMING SECTION

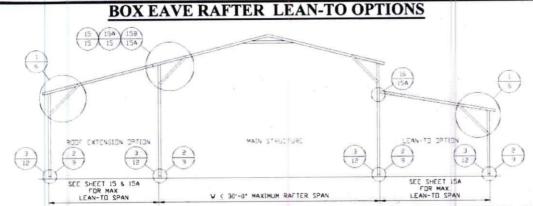
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ENGINEERING AND CONSULTING, INC.	CHECKED BY: PDH		-0" SP ENCLOSI		
MOORE AND ASSOCIATES	DRAWN BY: JG		715 WILLOW S MOUNT AIRY. N	TREE	Т









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

SCALE: NTS

MAXIMUM WIDTH OF SINGLE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 12'-0'

MAXIMUM WIDTH OF DOUBLE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 16'-0'

MAXIMUM WIDTH OF LACED MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 20'-0'

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE LACED COLUMNS FOR EAVE HEIGHTS

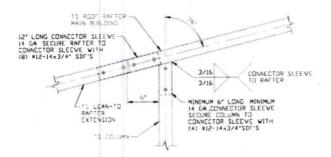
16'-0' < TO < 20'-0'

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS

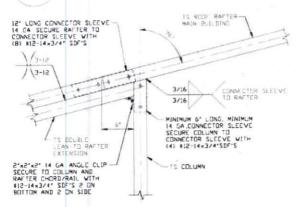
11'-0' < TO < 16'-0'

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS

(11'-0')



SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS & 12'-0'



SIDE EXTENSION RAFTER/
COLUMN DETAIL FOR RAFTER
SPANS 12'-0' < TO \(\leq \) 16'-0'

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.

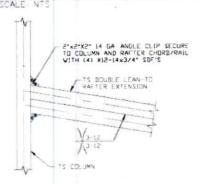
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15A

DRAWN BY: JG	715 WILLOW STREET MOUNT AIRY, NC 27030 30-0"x20'-0" SP ENCLOSED STRUCTURE						
PREJECT MGR VSM	DATE: 7-30-21	SCALE NTS		ND 21087S			
CLIENT: METAL CARPORTS AND STRUCTURES, LLC	SHT. 15	DWG. NO SK-	3	REV. 0			

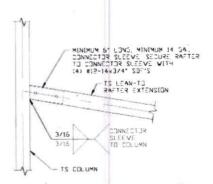
BOX EAVE RAFTER LEAN-TO OPTIONS 12' LONG CONNECTOR SLEEVE 14 GA SECURE RAFTER TO CONNECTOR SLEEVE V(TH (8) #12-14x3/4' SDF'S TS ROOF RAFTER TS 2 1/4"x2 1/4"-14 GA TS LACED -LEAN-TO RAFTER ECTENSION SETTAR ET MINIMUM 6" LONG, MINIMUM 14 GA.COMNECTOR SLEEVE SECURE COLUMN TO CONNECTOR SLEEVE WITH (4) #12-14×3/4"SDF'S 3/16 TYP 2'x2'x2' 14 GA ANGLE CL SECURE TO COLUMN AND RAFTER CHORD/RAIL WITH #12-14x3/4' SDF'S (2) ON BOTTOM AND (2) ON SIDE

SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS 16'-0' < TO \(20'-0'

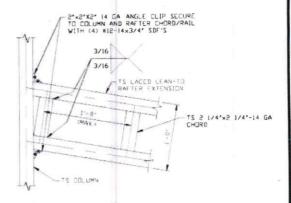


LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL

FOR RAFTER SPANS 12'-0' < TO \(\) 16'-0'



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS & 12'-0' SCALE: NTS



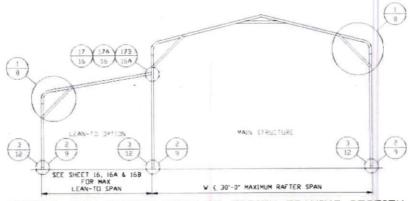
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 16'-0' < TO & 20'-0" 16B

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-	PROJECT MGR: VSM	DATE: 7-30-21	SCALE: NTS	JOB	ND: 21087S	
	CLIENT: METAL CARPORTS AND STRUCTURES, LLC	SHT. 15A	DVG. NO SK-	3	REV. 0	

BOW RAFTER LEAN-TO OPTION



TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION

SCALE NTS

MAXIMUM WIDTH OF SINGLE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 12'-0'
MAXIMUM WIDTH OF DOUBLE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 16'-0'
MAXIMUM WIDTH OF LACED MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 20'-0'
MAIN BUILDING COLUMNS WITH LEAN-TO GR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE LACED
COLUMNS FOR EAVE HEIGHTS 16'-0' < TO < 20'-0'
MAIN BUILDING COLUMNS WITH LEAN-TO GR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE
COLUMNS FOR EAVE HEIGHTS 11'-0' < TO < 16'-0'
MAIN BUILDING COLUMNS WITH LEAN-TO GR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE
COLUMNS FOR EAVE HEIGHTS 11'-0'

MINIMUM 7' LONG, MINIMUM 14 GACONNECTOR SLEEVE SECURE ROOF
RAFTER AND COLLUMN TO CONNECTOR
VITH (8) 812-14×3/4' SDF'S

CONNECTOR 3/16
SLEEVE
TO COLUMN 1/16

15 LEAN-TO
RAFTER
EXTENSION

MINIMUM 6' LONG, MINIMUM
14 GA CONNECTOR SLEEVE
SECURE RAFTER TO
CONNECTOR SLEEVE WITH
C4) 812-14×3/4' SDF'S

TS COLUMN

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL

FOR RAFTER SPANS & 12'-0'

HINIMUM 7' LONG, MINIMUM
14 GA, CONNECTOR SLEEVE
SECURE RODE RAFTER AND
COLUMN TO CONNECTOR VITH
(B) 812-14×3/4' SDF'S

TS DOUBLE
LEAN-TO
RAFTER
EXTENSION

2'*2'*X2'* 14 GA ANGLE CLIF
SECURE TO COLUMN AND
RAFTER CHORD/PAIL VITH
(4) 812-14×3/4' SDF'S

TS COLUMN

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 12'-0' < TO < 16'-0'

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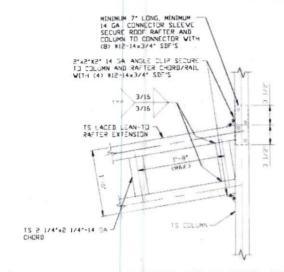
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METAL CARPORTS AND STRUCTURES, LLC 715 WILLOW STREET MOUNT AIRY, NC 27030 30-0"x20'-0" SP ENCLOSED STRUCTURE

PREJECT MGR: VSM DATE: 7-30-21 SCALE: NTS JUB NO: 21087S

CLIENT: METAL CARPORTS
AND STRUCTURES, LLC SHT. 16 DVG. ND: SK-3 REV.; 0

BOW RAFTER LEAN-TO OPTION



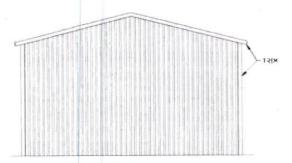
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 16'-0' < TO < 20'-0'

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ENGINEERING AND CONSULTING, INC.
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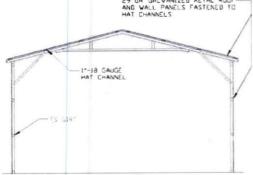
DRAWN BY: JG CHECKED BY: PDH	30-0"x20	715 WILLOW S MOUNT AIRY, 1'-0" SP ENCLOS	NC 270 SED ST	30 RUCTURE	_
	DATE: 7-30-21	SCALE NTS	JUB	NO: 210875	-
CLIENT: METAL CARPORTS AND STRUCTURES, LLC	SHT. 16A	DVG. NO SK-	3	REV. 0	

BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION

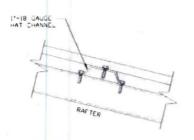


TYPICAL END ELEVATION VERTICAL ROOF/SIDING

29 GA GALVANIZED XETAL ROOF-AND WALL PANELS FASTENED TO HAT CHANNELS

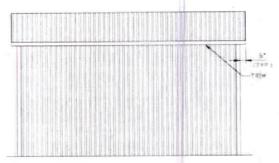


TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

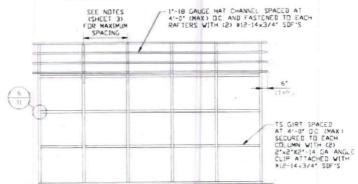


PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE NTS



TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING



TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

E NTS
HAT CHANNELS CAN BE USED AS AN OPTION
IN PLACE OF TS GIRT'S HAT CHANNELS MUST
BE SPACED AT 4'-0' DC (MAX) AND FASTENED
TO EACH COLUMN (LEG) WITH #12-14x3/4' SDF'S

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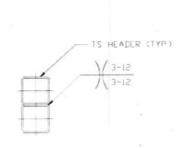
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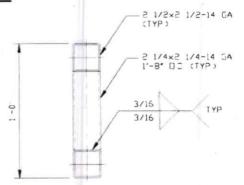
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PROJECT MGR: VSM	DATE: 7-30-21	SCALE: NTS	JOB	ND: 21087S	
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HEADER OPTIONS

SIDE WALL HEADER OPTIONS



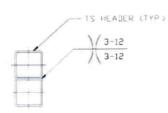


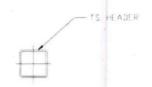


HEADER DETAIL FOR LENGTHS <u>⟨</u> 7'-0"

HEADER DETAIL FOR 7'-0' < LENGTHS & 12'-0' HEADER DETAIL FOR 12'-0' < LENGTHS <u>₹</u> 18'-0'

END WALL HEADER OPTIONS





HEADER DETAIL FOR 13'-0" < LENGTHS & 18'-0"

HEADER DETAIL FOR LENGTHS < 13'-0"

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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	CHECKED BY: PDH	MOUNT AIRY, NC 27030 30-0"x20'-0" SP ENCLOSED STRUCTURE				
A LOCATE LAND LOGGERATEGO	7041 AL TV. 15	METAL CA	715 WILLOW S			