

MISSOURI HIGHWAYS and TRANSPORTATION COMMISSION

JEFFERSON CITY, MISSOURI

**SUPPLEMENTAL PLANS TO JULY 2020 MISSOURI STANDARD
PLANS FOR HIGHWAY CONSTRUCTION**

EFFECTIVE January 1, 2021

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION

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203.02F	UNDERGRADING - TYPICAL DETAILS	2	01/01/2004	606.70B	MIDWEST GUARDRAIL SYSTEM (MGS) - THRIE BEAM RAIL ON BRIDGE	5	04/01/2018
203.10D	TABULATED EARTHWORK AND SECTION DATA	1	02/01/2009	606.80C	MIDWEST GUARDRAIL SYSTEM (MGS) - TERMINAL ANCHOR ENDS	7	07/01/2017
203.20G	SUPERELEVATION, SPIRALS AND WIDENING (UNDIVIDED HIGHWAY)	4	07/01/2017	606.81B	MASH - CRASHWORTHY END TERMINALS - TYPE A - GRADING LIMITS	1	10/01/2019
203.21K	SUPERELEVATION, SPIRALS AND WIDENING (DIVIDED HIGHWAY)	3	07/01/2017	607.10V	CHAIN-LINK FENCE	1	02/01/2007
203.22	SUPERELEVATION, SPIRALS AND WIDENING	2	07/01/2017	607.11H	CHAIN-LINK FENCE FOR RETAINING WALLS	1	06/01/2009
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203.41F	TYPICAL DETAILS ON AND OFF RAMPS (ROADWAY WITH 6:1 FORESLOPE)	2	01/01/1995	608.10P	CONCRETE SIDEWALK	1	04/01/2015
203.50N	TYPICAL MEDIAN OPENINGS (DIVIDED HIGHWAYS)	2	04/01/2016	608.20E	CONCRETE STAIRS	2	04/01/2015
203.61A	DRIVEWAY - TYPE I	1	07/01/2004	608.30A	CONCRETE MEDIAN STRIP	*	10/01/2020
203.62D	DRIVEWAY - TYPE II	2	04/01/2017	608.40A	HANDRAILING	*	01/01/2021
203.63B	DRIVEWAY - TYPE III	2	04/01/2017	608.50	CURB RAMPS	4	04/01/2015
203.64D	DRIVEWAY - TYPE IV	2	04/01/2017	609.00P	CONCRETE CURB, CURB AND GUTTER AND GUTTER	2	08/01/2008
203.65A	DRIVEWAY - TYPE V	1	10/01/1998	609.15D	PAVED DITCHES	1	07/01/2016
204.00D	EMBANKMENT CONTROL - MEASURING DEVICES	1	04/01/1983	609.40S	DRAIN BASIN, SHOULDER PAVING AND FILL SLOPES AT BRIDGE ENDS	3	01/01/2017
204.30	PORE PRESSURE MEASUREMENT DEVICES	1	03/01/1996	609.60C	ROCK DITCH LINER	1	03/01/1993
401.00B	TYPE A2 AND A3 SHOULDERS, SAFETY EDGE SM	3	04/01/2018	609.70C	ROCK LINING FOR CULVERT OUTLET	1	10/01/1981
413.20	SCRUB SEAL BROOM CONFIGURATION	1	07/01/2004	611.60R	CONCRETE SLOPE PROTECTION	1	07/01/2015
502.05P	CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15 FT. JOINT SPACING	*	10/01/2020	612.20E	SAND FILLED IMPACT ATTENUATORS	1	10/01/2018
502.10K	DOWEL SUPPORTING UNITS	2	06/01/2010	613.00T	PAVEMENT REPAIR	4	01/01/2020
504.00K	CONCRETE APPROACH PAVEMENT	*	10/01/2020	614.10T	GRATES AND BEARING PLATES	1	12/01/2005
602.00D	RIGHT-OF-WAY AND DRAIN MARKERS	2	01/01/2003	614.11D	CURVED VANE GRATE AND FRAME	*	01/01/2021
604.05D	PIPE CULVERT HEADWALLS - TYPE S	2	08/01/2006	614.30E	MANHOLE FRAMES AND COVERS	2	03/01/1996
604.10E	PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 18" CONCRETE PIPE	1	07/01/2001	616.10AV	TEMPORARY TRAFFIC CONTROL DEVICES	9	07/01/2019
604.11E	PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 24" CONCRETE PIPE	1	07/01/2001	617.10M	PERMANENT CONCRETE TRAFFIC BARRIER	*	10/01/2020
604.12E	PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 30" CONCRETE PIPE	1	07/01/2001	617.20F	TEMPORARY CONCRETE TRAFFIC BARRIER	*	01/01/2021
604.13E	PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 36" CONCRETE PIPE	1	07/01/2001	619.10J	PAVEMENT EDGE TREATMENT	1	10/01/2017
604.14E	PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 42" CONCRETE PIPE	1	07/01/2001	620.00L	PAVEMENT MARKING	5	10/01/2016
604.15E	PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 48" CONCRETE PIPE	1	07/01/2001	620.10G	TEMPORARY PAVEMENT MARKING	5	07/01/2017
604.29C	DROP INLET - TYPE X	2	04/01/2018	625.00	HOLE PATTERN FOR PAVEMENT SLAB STABILIZATION	1	10/01/1998
604.30G	CONCRETE MANHOLES	2	02/01/2009	626.00H	RUMBLE STRIPS	2	04/01/2009
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604.70	SLOTTED DRAIN	2	03/01/1994				
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606.00AY	GUARDRAIL	7	01/01/2020				
606.01F	MEDIAN PIER PROTECTION	9	08/01/2012				
606.22U	BRIDGE ANCHOR SECTION - SAFETY BARRIER CURB ON BRIDGE	6	07/01/2016				
606.23J	BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE)	5	07/01/2016				
606.30K	GUARDRAIL - TERMINAL ANCHOR ENDS	7	04/01/2017				
606.31B	CRASHWORTHY END TERMINALS - TYPE A - GRADING LIMITS	1	10/01/2019				
606.40D	ONE-STRAND ACCESS RESTRAINT CABLE	2	07/01/2004				
606.41L	THREE-STRAND GUARD CABLE	7	04/01/2019				
606.50D	MIDWEST GUARDRAIL SYSTEM (MGS)	8	01/01/2019				
606.51	MIDWEST GUARDRAIL SYSTEM (MGS) - MEDIAN PIER PROTECTION	2	04/01/2018				

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

EFFECTIVE: 01/01/2021

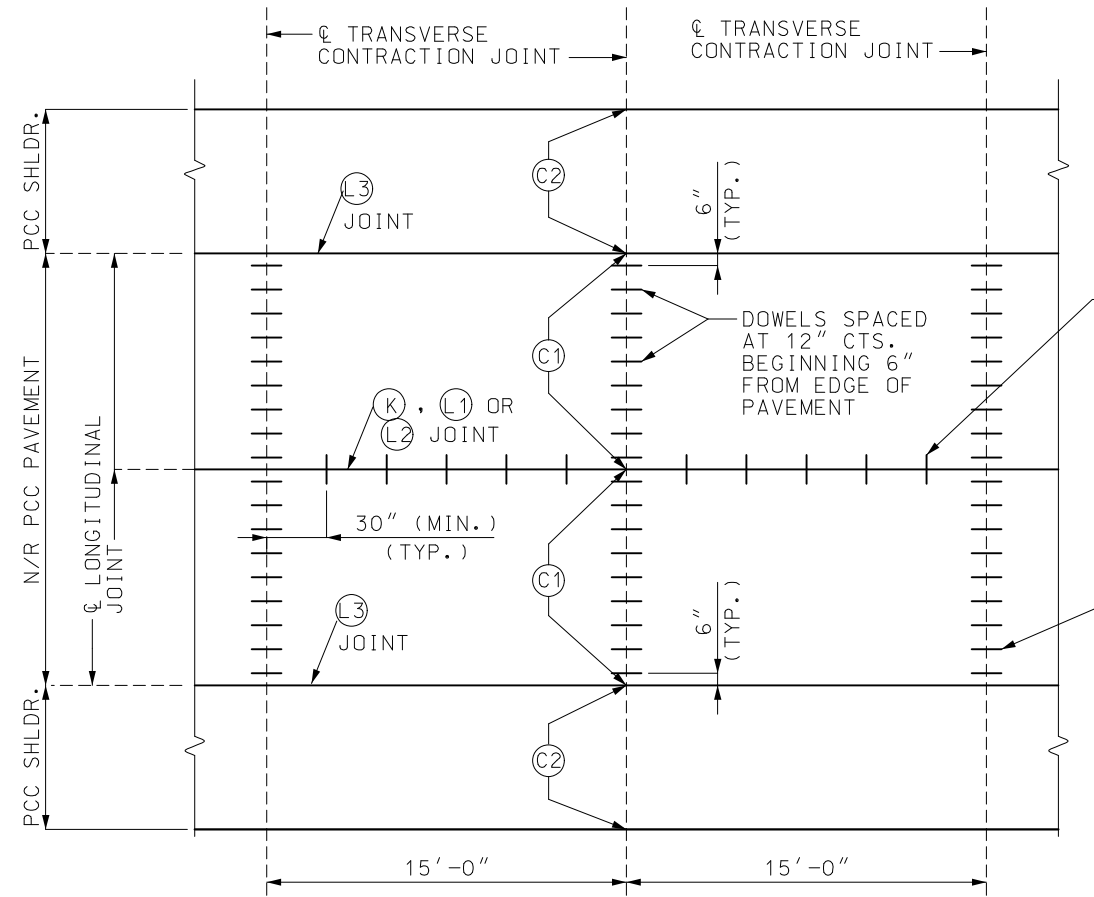
MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION TABLE OF CONTENTS

IF A SEAL IS PRESENT ON THIS SHEET, IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

STANDARD NO.	DRAWING TITLE	NO. OF SHEETS	EFFECTIVE DATE	STANDARD NO.	DRAWING TITLE	NO. OF SHEETS	EFFECTIVE DATE		
703.10J	CONCRETE SINGLE BOX CULVERT - STRAIGHT WINGS (SQUARED)	*	3	01/01/2021	901.30F	HIGHWAY LIGHTING - BASE MOUNTED CONTROL STATION	2	04/01/2005	
703.11J	CONCRETE SINGLE BOX CULVERT - FLARED WINGS (SQUARED)	*	3	01/01/2021	901.80D	HIGHWAY LIGHTING - POWER SUPPLY ASSEMBLY - SECONDARY SERVICE	2	04/01/2002	
703.12J	CONCRETE SINGLE BOX CULVERT - STRAIGHT WINGS (LEFT ADVANCE)	*	3	01/01/2021	901.85B	HIGHWAY LIGHTING SYMBOLS	1	04/01/2018	
703.13J	CONCRETE SINGLE BOX CULVERT - FLARED WINGS (LEFT ADVANCE)	*	3	01/01/2021	902.00P	TRAFFIC SIGNALS	2	04/01/2018	
703.14J	CONCRETE SINGLE BOX CULVERT - STRAIGHT WINGS (RIGHT ADVANCE)	*	3	01/01/2021	902.10Q	TRAFFIC SIGNALS - CONTROLLERS CONDUIT LOCATION	1	04/01/2005	
703.15E	CONCRETE SINGLE BOX CULVERT - FLARED WINGS (RIGHT ADVANCE)	*	3	01/01/2021	902.15K	TRAFFIC SIGNALS - POWER SUPPLY ASSEMBLY	3	07/01/2004	
703.16	CONCRETE SINGLE BOX CULVERT - CUT SECTION	*	1	01/01/2021	902.20G	TRAFFIC SIGNALS - CONCRETE PULL BOXES	3	04/01/2019	
703.17	CONCRETE SINGLE BOX CULVERT - MEMBER SIZES AND REINFORCEMENT		14	04/01/2011	902.21C	TRAFFIC SIGNALS - TELEPHONE INTERCONNECT	1	03/01/1996	
703.37C	CONCRETE BOX CULVERT - EXTERIOR WING REINFORCEMENT		2	04/01/2011	902.30P	TRAFFIC SIGNALS - POST BASES	2	10/01/2018	
703.38A	CONCRETE BOX CULVERT - CUTTING DETAILS		2	10/01/2009	902.40R	TRAFFIC SIGNALS - TUBULAR STEEL POSTS	3	04/01/2018	
703.40H	CONCRETE DOUBLE BOX CULVERT - STRAIGHT WINGS (SQUARED)	*	3	01/01/2021	902.50M	TRAFFIC SIGNALS - INDUCTION LOOP DETECTORS	2	04/01/2020	
703.41H	CONCRETE DOUBLE BOX CULVERT - FLARED WINGS (SQUARED)	*	3	01/01/2021	902.70P	TRAFFIC SIGNALS - RIGID SPAN WIRE DETAILS	*	2	01/01/2021
703.42H	CONCRETE DOUBLE BOX CULVERT - STRAIGHT WINGS (LEFT ADVANCE)	*	3	01/01/2021	902.80L	TRAFFIC SIGNALS - TRAFFIC SIGNAL SYMBOLS	1	04/01/2020	
703.43H	CONCRETE DOUBLE BOX CULVERT - FLARED WINGS (LEFT ADVANCE)	*	3	01/01/2021	903.01J	STANDARD ARROW DETAILS	2	10/01/2016	
703.44H	CONCRETE DOUBLE BOX CULVERT - STRAIGHT WINGS (RIGHT ADVANCE)	*	3	01/01/2021	903.02AP	HIGHWAY SIGNING	8	10/01/2019	
703.45C	CONCRETE DOUBLE BOX CULVERT - FLARED WINGS (RIGHT ADVANCE)	*	3	01/01/2021	903.03BN	POST INSTALLATIONS AND SIGN MOUNTING DETAILS	*	16	01/01/2021
703.46	CONCRETE BOX CULVERT - CUT SECTION	*	1	01/01/2021	903.04F	HIGHWAY SIGNING - WEIGH STATION	1	02/01/2012	
703.47	CONCRETE BOX CULVERT - MEMBER SIZES AND REINFORCEMENT		27	10/01/2011	903.05K	HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE S, ONE TUBE	*	2	01/01/2021
703.60E	CONCRETE BOX STRUCTURE - PIPE INLET		1	07/01/2001	903.06K	HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE S, TWO TUBE	*	2	01/01/2021
703.80H	CONCRETE TRIPLE BOX CULVERT - STRAIGHT WINGS (SQUARED)	*	3	01/01/2021	903.07K	HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE C	*	2	01/01/2021
703.81H	CONCRETE TRIPLE BOX CULVERT - FLARED WINGS (SQUARED)	*	3	01/01/2021	903.08J	HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE B	*	2	01/01/2021
703.82H	CONCRETE TRIPLE BOX CULVERT - STRAIGHT WINGS (LEFT ADVANCE)	*	3	01/01/2021	903.10BD	OVERHEAD SIGN TRUSSES - ALUMINUM	*	6	01/01/2021
703.83H	CONCRETE TRIPLE BOX CULVERT - FLARED WINGS (LEFT ADVANCE)	*	3	01/01/2021	903.12AA	OVERHEAD SIGN TRUSSES - BUTTERFLY AND CANTILEVER STRUCTURAL STEEL	*	7	01/01/2021
703.84H	CONCRETE TRIPLE BOX CULVERT - STRAIGHT WINGS (RIGHT ADVANCE)	*	3	01/01/2021	903.60AC	OVERHEAD SIGN TRUSSES - STRUCTURAL STEEL	*	5	01/01/2021
703.85C	CONCRETE TRIPLE BOX CULVERT - FLARED WINGS (RIGHT ADVANCE)	*	3	01/01/2021					
703.86	CONCRETE TRIPLE BOX CULVERT - CUT SECTION	*	1	01/01/2021					
703.87	CONCRETE TRIPLE BOX CULVERT - MEMBER SIZES AND REINFORCEMENT		27	12/01/2011					
706.35H	BAR SUPPORTS FOR CONCRETE REINFORCEMENT		1	07/01/2004					
712.40L	STEEL DAMS AT EXPANSION DEVICES		1	10/01/2019					
725.00C	CORRUGATED METAL PIPE INSTALLATION METHODS		5	04/01/2011					
725.31C	METAL CURTAIN WALL AND METAL INLETS		1	07/01/2004					
726.30J	RIGID CULVERT INSTALLATION METHODS		2	04/01/2015					
730.00E	THERMOPLASTIC PIPE INSTALLATION METHODS		1	04/01/2015					
731.00U	PRECAST MANHOLES		2	07/01/2016					
731.10S	PRECAST DROP INLET		8	07/01/2016					
732.00S	FLARED END SECTION		3	01/01/2021					
732.05D	BEVELED PIPE END TREATMENT	*	2	07/01/2004					
732.10H	SAFETY SLOPE END SECTION	*	3	01/01/2021					
733.00	PRECAST CONCRETE BOX CULVERT TIES		1	04/01/2018					
806.10J	TEMPORARY EROSION CONTROL MEASURES		6	04/01/2019					
808.00	TYPICAL PLANTING ILLUSTRATIONS		3	07/01/2004					
901.00AB	HIGHWAY LIGHTING - POLES, FOUNDATIONS & APPURTENANCES FOR 30' M.H.	*	4	01/01/2021					
901.01AJ	HIGHWAY LIGHTING - POLES, FOUNDATIONS & APPURTENANCES FOR 45' M.H.	*	6	01/01/2021					
901.02B	HIGHWAY LIGHTING - CABLE, CONDUIT AND TRENCHING		1	04/01/2002					

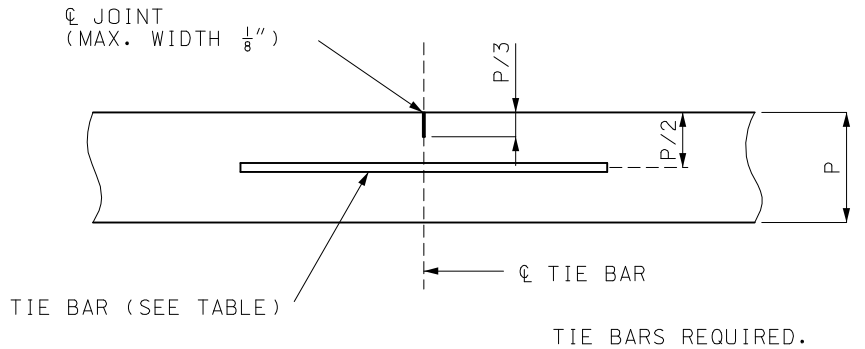
* REVISED OR ADDED SINCE OCTOBER 2020

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



JOINT PLAN AND SPACING FOR CONTRACTION JOINTS (1)

(1) LONGITUDINAL JOINT NOT REQUIRED AT INSIDE SHOULDER ON DIVIDED HIGHWAYS OR AT INSIDE SHOULDER OF RAMPS. FOR 4' OR LESS INSIDE SHOULDERS, DOWELS ARE REQUIRED FOR THE FIRST TWO FEET ADJACENT TO THE TRAVEL LANE.

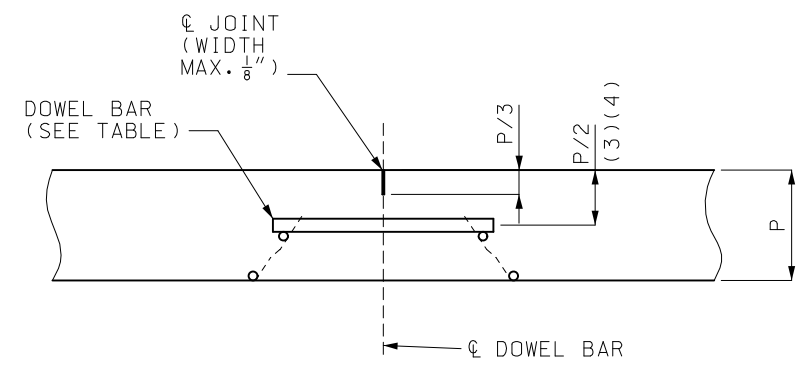


LONGITUDINAL JOINT (L1)

TIE BAR AND DOWEL TABLE				
PCCP THICKNESS (P)	DOWEL SIZE	TIE BAR SIZE	DOWEL SPACING	TIE BAR SPACING
LESS THAN 7"	NONE	#5X30"	NONE	30" CTR.-CTR.
7" TO 10"	1 1/4"X18"	#5X30"	12" CTR.-CTR.	30" CTR.-CTR.
GREATER THAN 10"	1 1/2"X18"	#6X40"	12" CTR.-CTR.	30" CTR.-CTR.

TIE BARS SPACED AT 30" CTS. BEGINNING 30" FROM ϕ TRANSVERSE CONSTRUCTION JOINT

DOWEL BAR (TYP.)

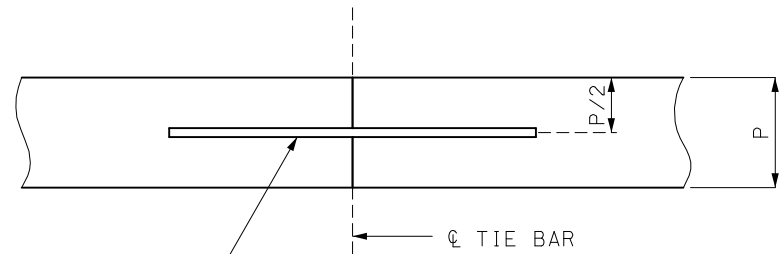


DOWELS REQUIRED. FOR PERMISSIBLE TYPES OF DOWELS SUPPORTING UNITS, SEE OTHER DRAWINGS.

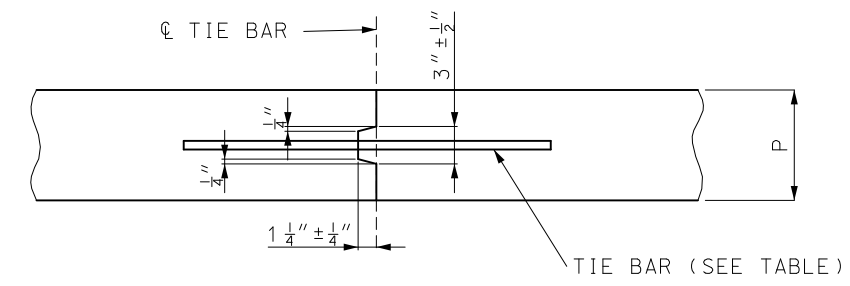
TRANSVERSE CONTRACTION JOINTS FOR CONCRETE PAVEMENT OR BASE WIDENING SHALL MATCH EXISTING JOINTS.

TRANSVERSE CONTRACTION JOINT (C1) (2)

- (2) DOWEL BARS ARE REQUIRED FOR ALL PAVEMENTS HAVING THE SAME THICKNESS AS THE TRAVELED WAY.
- (3) FOR PAVEMENTS HAVING THICKNESS IN 1/2" INCREMENTS, DOWEL BASKETS SHALL BE P/2 - 1/2".
- (4) DOWEL BARS MAY BE PLACED BY MECHANICAL MEANS AT THE OPTION OF THE CONTRACTOR.



LONGITUDINAL CONSTRUCTION JOINT (L2)



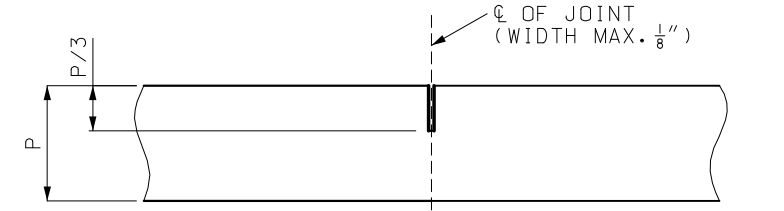
IF METAL IS USED TO FORM KEY DISCONTINUE STRIP FOR DISTANCE OF APPROXIMATELY 3" EACH SIDE OF TRANSVERSE JOINT.

TYPE (K) REQUIRES TIE BAR.

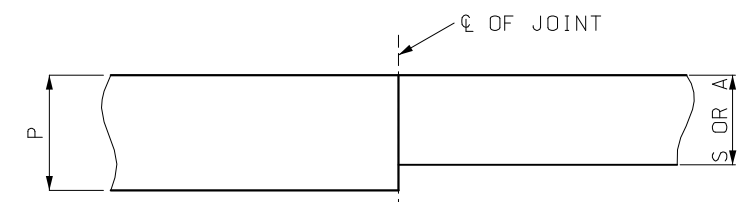
TYPE (M) CONSTRUCTED WITHOUT TIE BARS.

(K) AND (M) JOINTS SHALL NOT BE SAWED.

TONGUE AND GROOVE JOINTS (K) AND (M)



TRANSVERSE CONTRACTION JOINT (C2)



LONGITUDINAL CONSTRUCTION JOINT FOR SHOULDER AND APPROACHES (L3)

S = SHOULDER THICKNESS
A = APPROACH THICKNESS

GENERAL NOTES:

THE FINAL POSITION OF ALL DOWELS AND TIE BARS SHALL BE PERPENDICULAR TO THE PLANE OF THE JOINT AND PARALLEL TO THE SURFACE OF THE PAVEMENT AND PARALLEL TO EACH OTHER.

(L3) JOINT FOR FULL DEPTH OR PARTIAL DEPTH SHOULDERS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

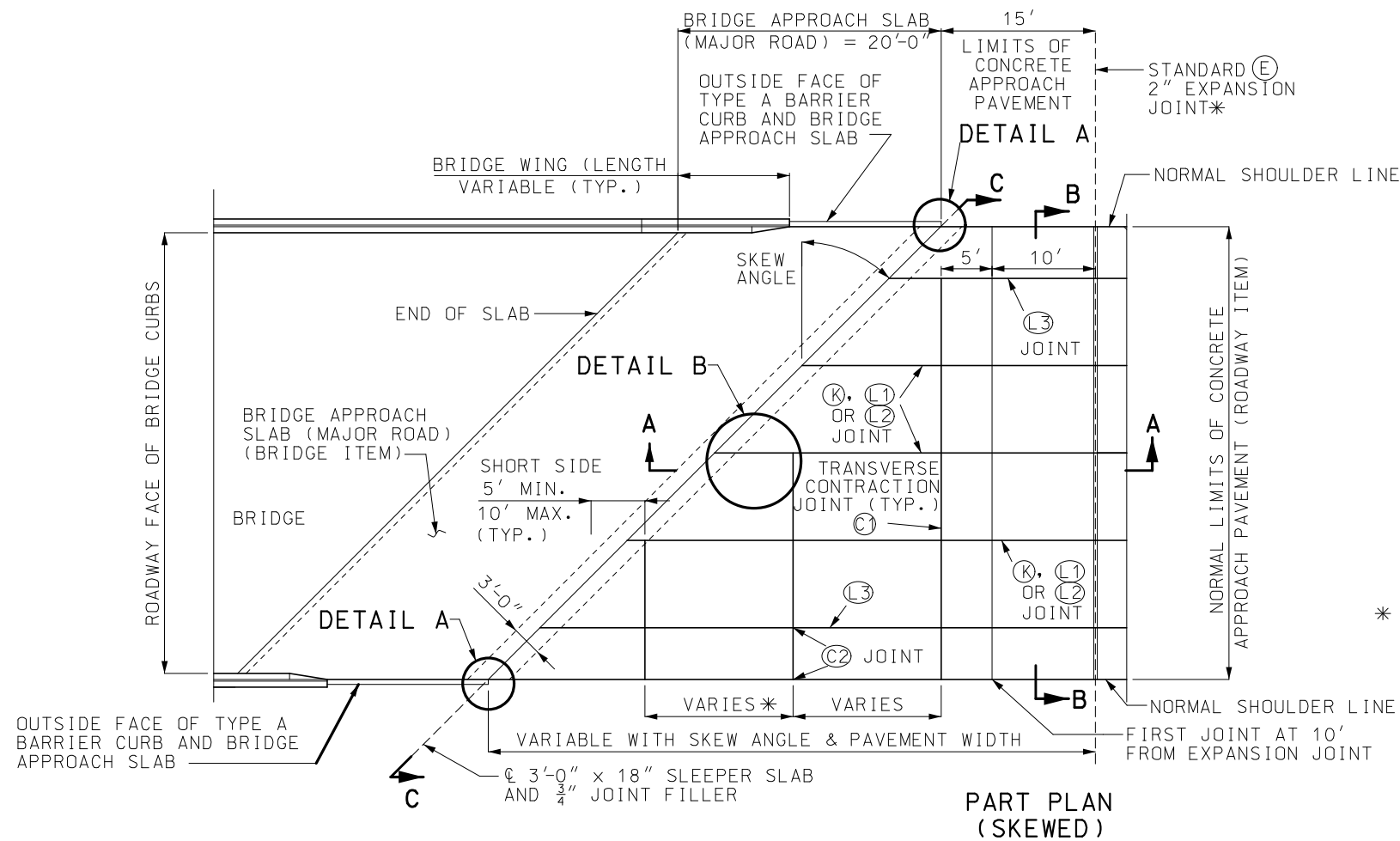
 105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
 TRAVIS D. KOESTNER
 NUMBER PE-30042
 PROFESSIONAL ENGINEER
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

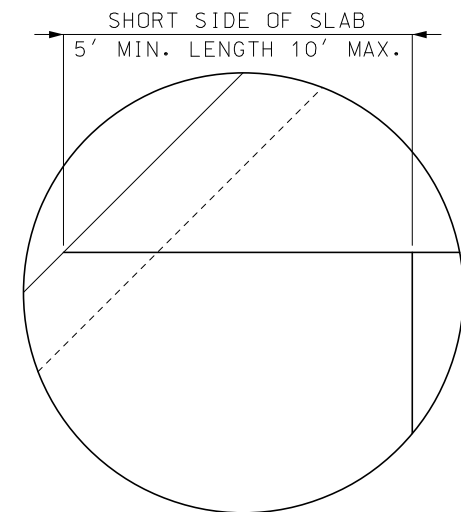
CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING

DATE EFFECTIVE: 10/01/2020	502.05P	SHEET NO. 3 OF 4
DATE PREPARED: 7/21/2020		

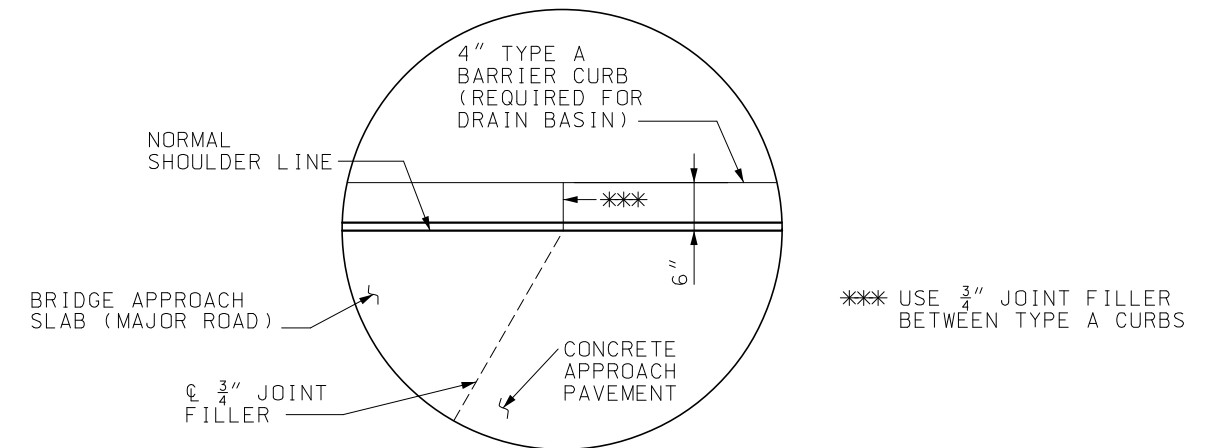
NOTE:
SHORT SIDE OF SKEWED SLAB FOR ALL LANES NEXT TO BRIDGE APPROACH SLAB SHALL BE 5' TO 10'.



* LENGTH OF RECTANGULAR SLABS BETWEEN SKEWED SLAB AND FIRST 10' SLAB SHALL BE 10' TO 15'.

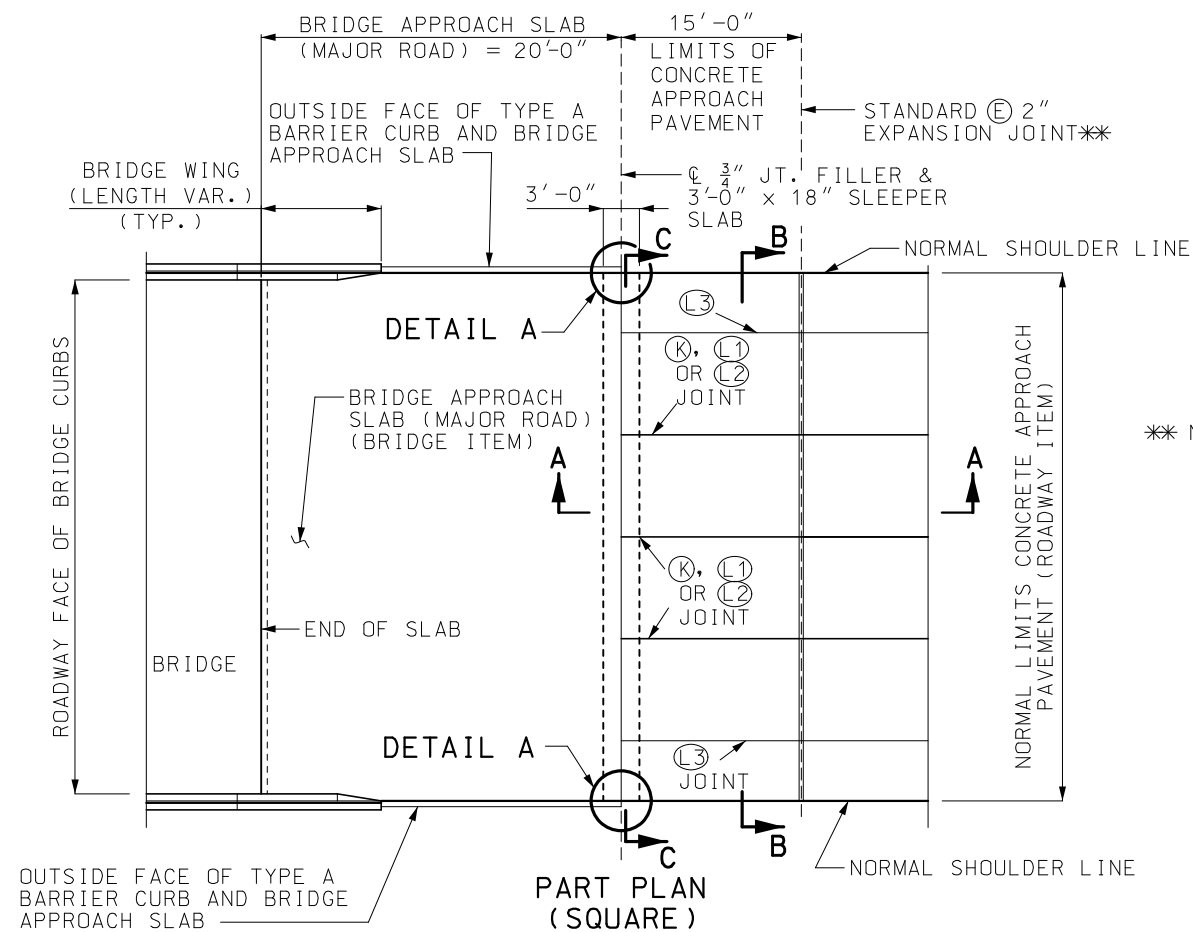


DETAIL B



DETAIL A

** NOT REQUIRED WHEN ADJACENT PAVEMENT IS ASPHALT.

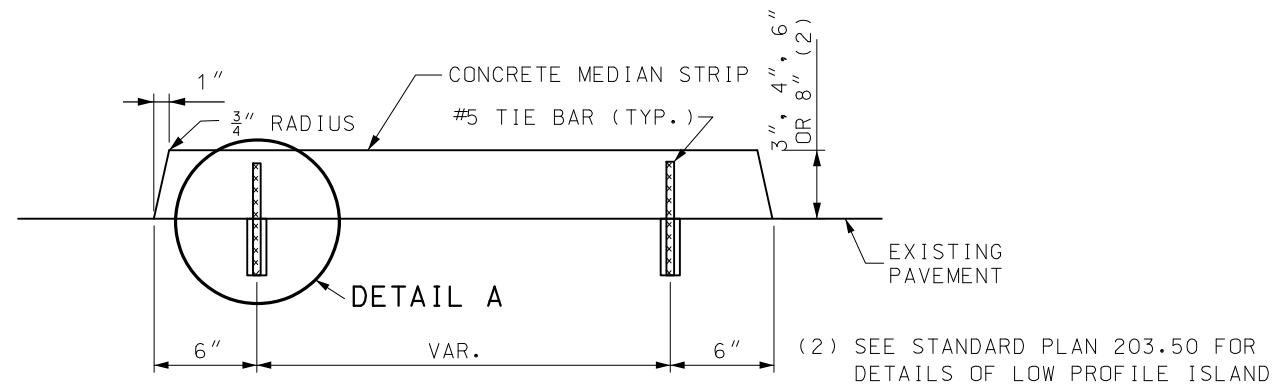


PART PLAN (SQUARE)

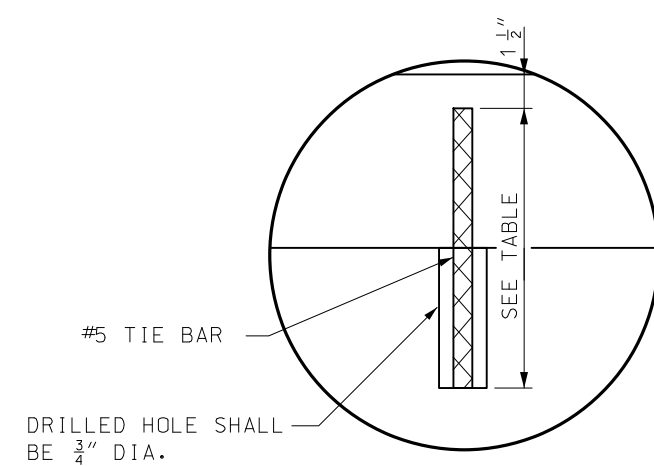
NOTE:
FOR SECTIONS A-A, B-B AND C-C,
SEE SHEET 3 OF 3.

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE APPROACH PAVEMENT	
	FOR MULTI-LANE PAVEMENTS (MAJOR ROAD)	
DATE EFFECTIVE: 10/01/2020	504.00K	SHEET NO. 2 OF 3
DATE PREPARED: 7/21/2020		

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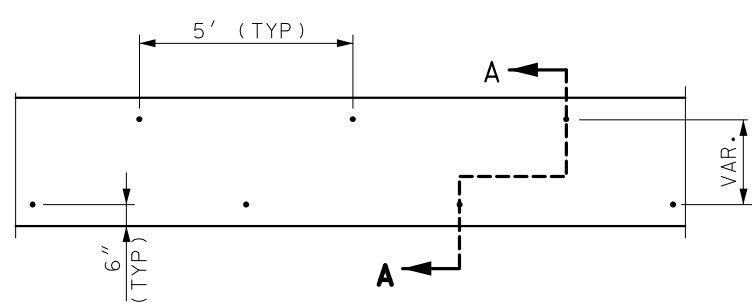


SECTION A-A
CONCRETE MEDIAN STRIP

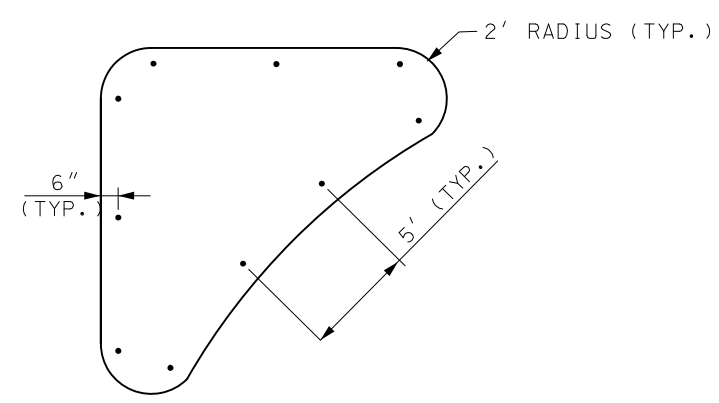


DETAIL A

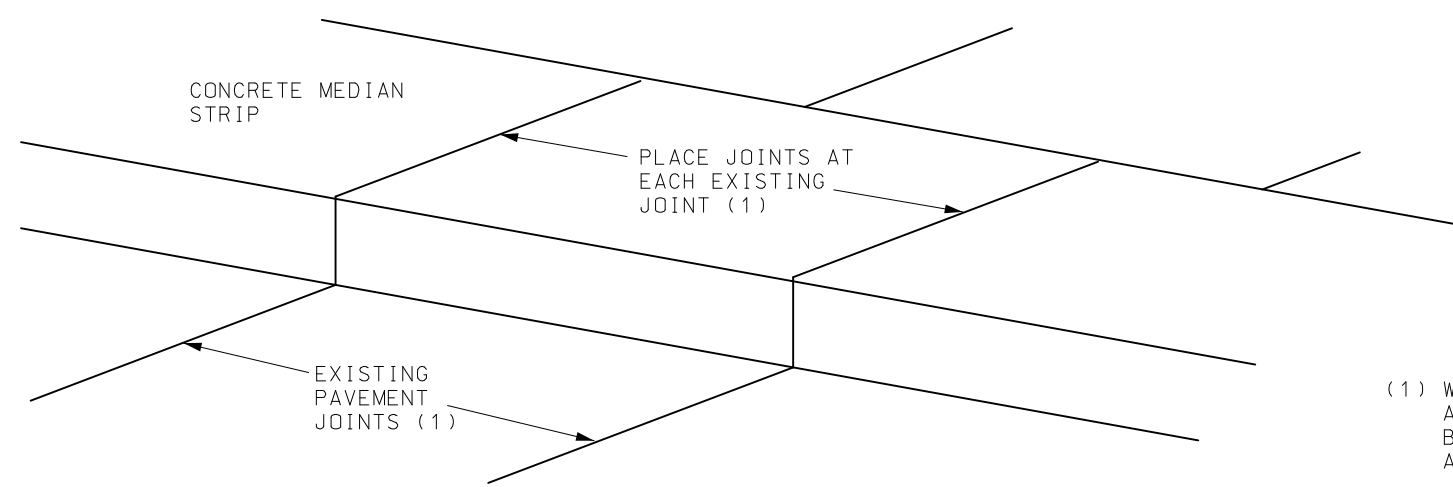
MEDIAN HEIGHT	BAR LENGTH
3"	8"
4"	9"
6"	11"
8"	13"



TIE BAR LOCATIONS FOR
CONCRETE MEDIAN STRIP



TIE BAR LOCATIONS FOR
CONCRETE MEDIAN STRIP (ISLAND)



CONCRETE MEDIAN STRIP JOINT LOCATION

(1) WHEN THERE ARE NO VISIBLE JOINTS IN THE ADJACENT PAVEMENT, THE JOINT SPACING WILL BE EQUAL TO THE MEDIAN STRIP WIDTH, WITH A MINIMUM SPACING OF 10'.

GENERAL NOTES:

TIE BARS SHALL BE EPOXY COATED, DEFORMED REINFORCING BARS MEETING THE REQUIREMENTS OF SECTION 710 AND 1057.

BONDING FOR TIE BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

THE FACE OF THE MEDIAN MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6' OR LESS.

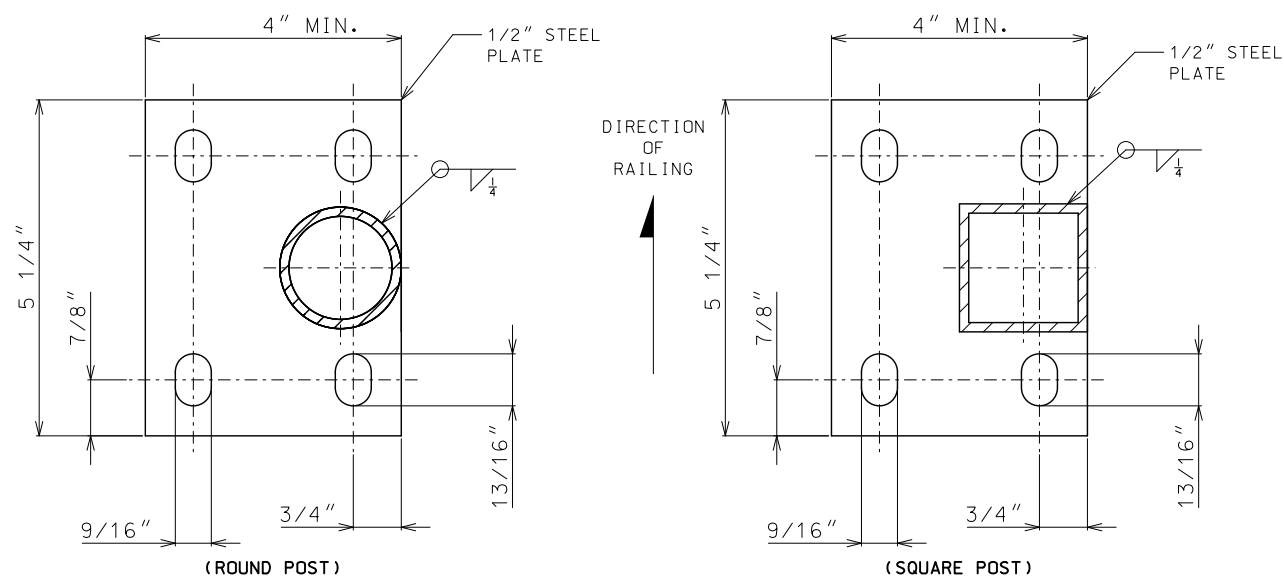
WHEN CONCRETE MEDIANS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, THE MEDIAN HEIGHT WILL BE 4".

MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
 105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

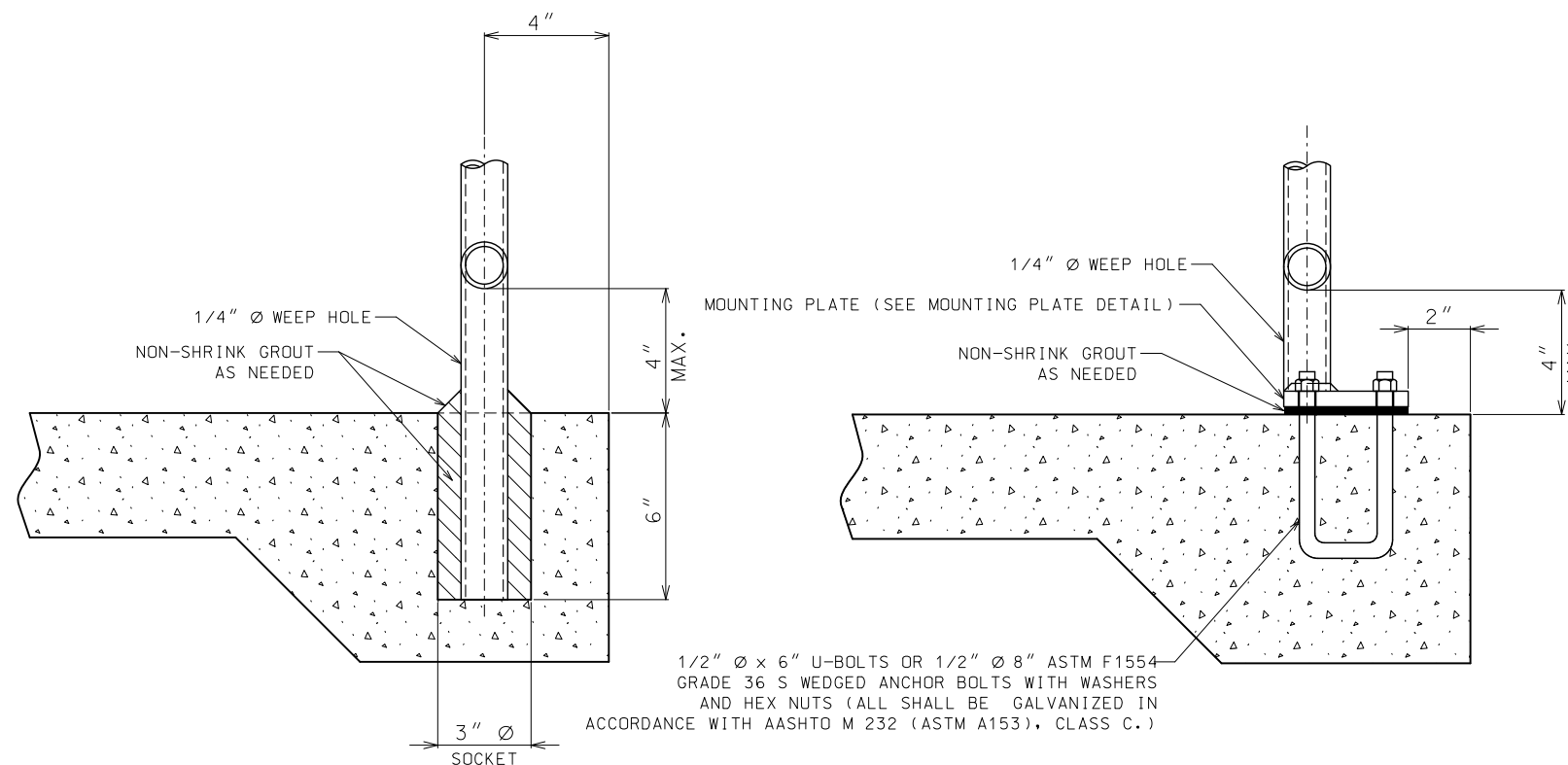
STATE OF MISSOURI
 TRAVIS D. KOESTNER
 NUMBER PE-30042
 PROFESSIONAL ENGINEER
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE MEDIAN STRIP

DATE EFFECTIVE: 10/01/2020	608.30A	SHEET NO. 1 OF 1
DATE PREPARED: 7/21/2020		



**MOUNTING PLATE DETAIL
(PLAN VIEW)**



SOCKET MOUNTING DETAIL

PLATE MOUNTING DETAIL

GENERAL NOTES:

RAILINGS AND POSTS MAY BE EITHER ROUND OR SQUARE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

STEEL RAILINGS AND POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

ALL JOINTS SHALL BE CONTINUOUS WELDED AND GROUND SMOOTH.

METAL SAFETY RAIL MUST BE COMPLIANT WITH THE "AMERICAN'S WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG)". EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

ALL POSTS SHALL HAVE A 1/4" WEEP HOLE IMMEDIATELY ABOVE THE MOUNTING PLATE.

WHEN INSTALLED THE POSTS SHALL BE PLUMB AND RAILINGS SHALL MATCH THE SLOPE OF THE SIDEWALK.

HANDRAIL REQUIREMENTS		
FILL SLOPE	FILL HEIGHT	HANDRAIL
(1V:3H) OR FLATTER	—	NOT REQUIRED
(1V:3H) OR STEEPER	≥ 6 FT.	REQUIRED
(1V:2H) OR STEEPER	≥ 4 FT.	REQUIRED
(1V:1H) OR STEEPER	≥ 1 FT.	REQUIRED

RAILING AND POST SPECIFICATION				
DESCRIPTION	TYPE	SIZE (DIA.)	WEIGHT (LBS. / FT.)	
			ALUM.	STEEL
RAILING & POST	ROUND	1 1/2"	0.940	2.720
	SQUARE	2" X 2"	1.3094	4.310
BALUSTER	ROUND	1/2"	0.2312	0.668
	RECT.	3/8" X 1/2" STL.	—	0.6375
	SQUARE	1/2" X 1/2" ALUM.	0.2944	—

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
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HANDRAILING

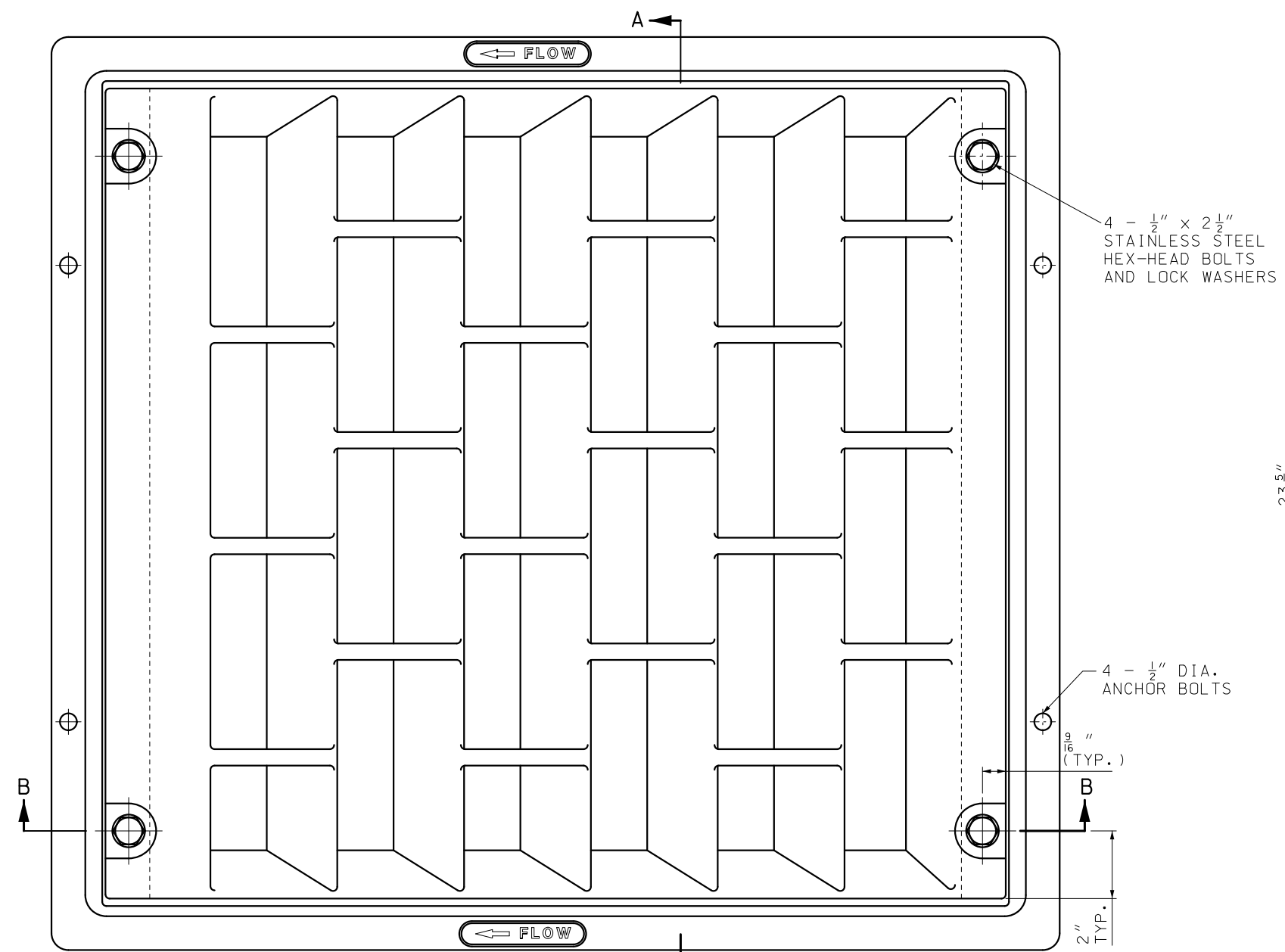
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

SHEET NO.
608.40A
3 OF 4

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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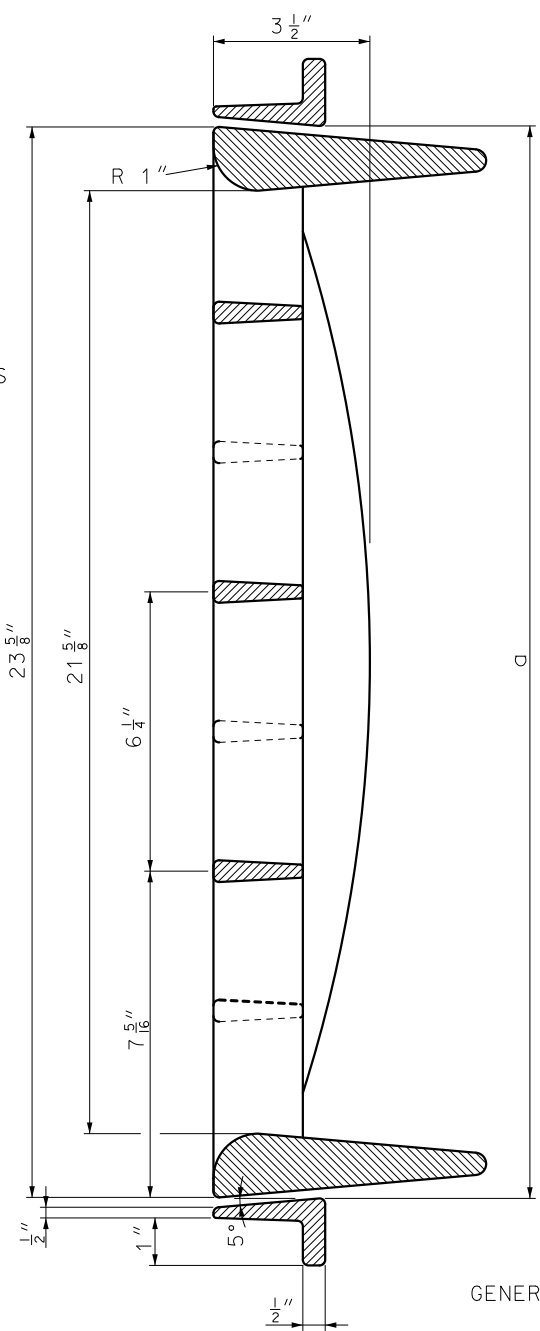
PLAN

4 - 1/2" x 2 1/2" STAINLESS STEEL HEX-HEAD BOLTS AND LOCK WASHERS

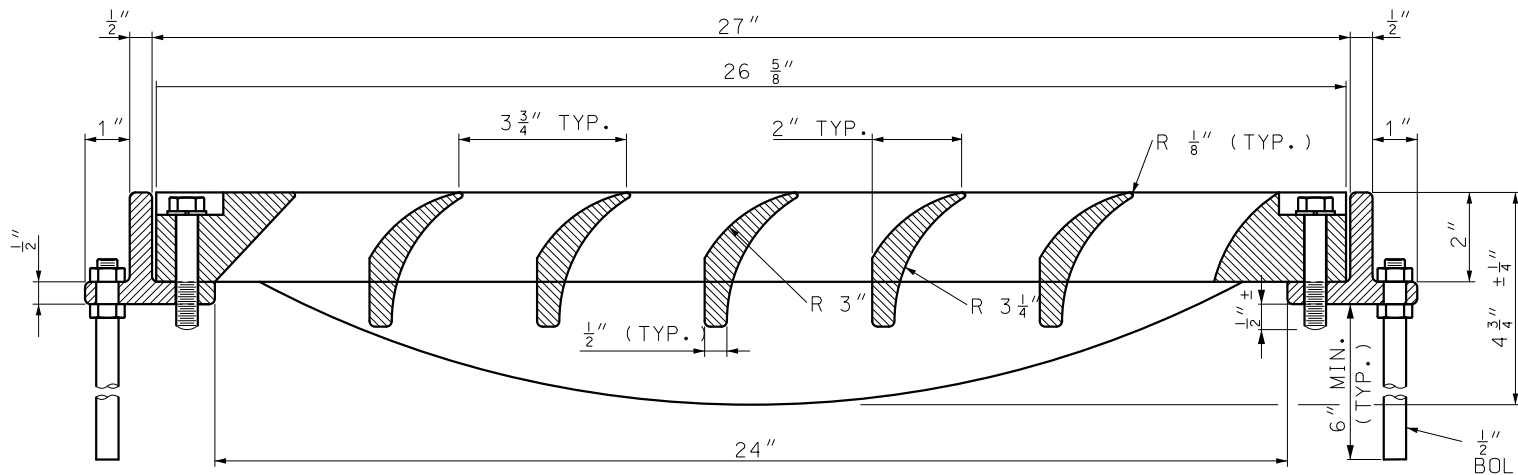
4 - 1/2" DIA. ANCHOR BOLTS

9/16" (TYP.)

2" TYP.



SECTION A-A



SECTION B-B

(*) 1/2" DIA. ASTM F1554, GRADE 36 ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 232 (ASTM A153), CLASS C OR SHALL BE MECHANICALLY GALVANIZED. IF MECHANICALLY GALVANIZED, THE COATING THICKNESS, ADHERENCE AND QUALITY REQUIREMENTS SHALL BE IN ACCORDANCE WITH AASHTO M 232 (ASTM A153), CLASS C. DAMAGED SPALTER COATING SHALL BE REPAIRED IN ACCORDANCE WITH SEC 1081.

NOMINAL DIMENSIONS AND WEIGHTS					
OPENING		a	WEIGHT (LB.)	NUMBER OF	
WIDTH	LENGTH			ANCHOR BOLTS	STAINLESS STEEL BOLTS
2'-0"	2'-0"	24"	200	4	4
4'-0"	2'-0"	48"	348	8	8

NOTE: TWO 2' X 2' GRATES MAY BE USED IN LIEU OF SINGLE 4' X 2' GRATES.

INSTALLATION INSTRUCTIONS:

DRILL AND TAP FRAME.

INSTALL 1/2" DIA. BOLTS WITHOUT WASHERS BEFORE CONCRETE POUR TO FORM 1/2" ± BOLT EXTENSION INTO CONCRETE BELOW FRAME. LUBRICATE EXPOSED THREADS.

AFTER CONCRETE HARDENS SUFFICIENTLY, FINAL INSTALLATION SHALL REMOVE AND REINSTALL 1/2" DIA. BOLTS AND LOCK WASHERS THROUGH GRATE AND FRAME. TORQUE 1/2" DIA. BOLTS TO 35-40 FT. LB. APPLY THREAD ADHESIVE TO ALL 1/2" DIA. STAINLESS STEEL BOLTS.

GENERAL NOTES:

GRATES TO BE CONSTRUCTED OF CAST GRAY IRON AND MEET REQUIREMENTS OF AASHTO M 306. MINOR VARIATIONS IN VANE SHAPE TO MEET MANUFACTURER'S STANDARD PRACTICE ARE PERMITTED.

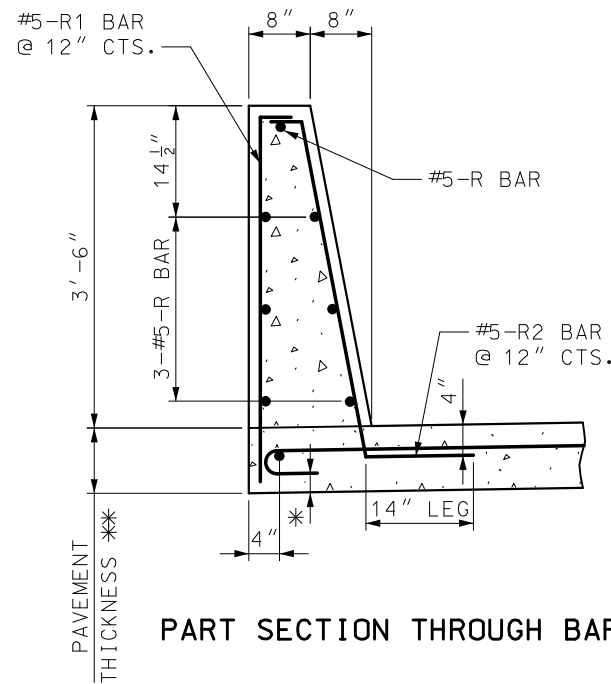
MINIMUM CLEAR OPEN AREA: 2.10 SQUARE FEET.

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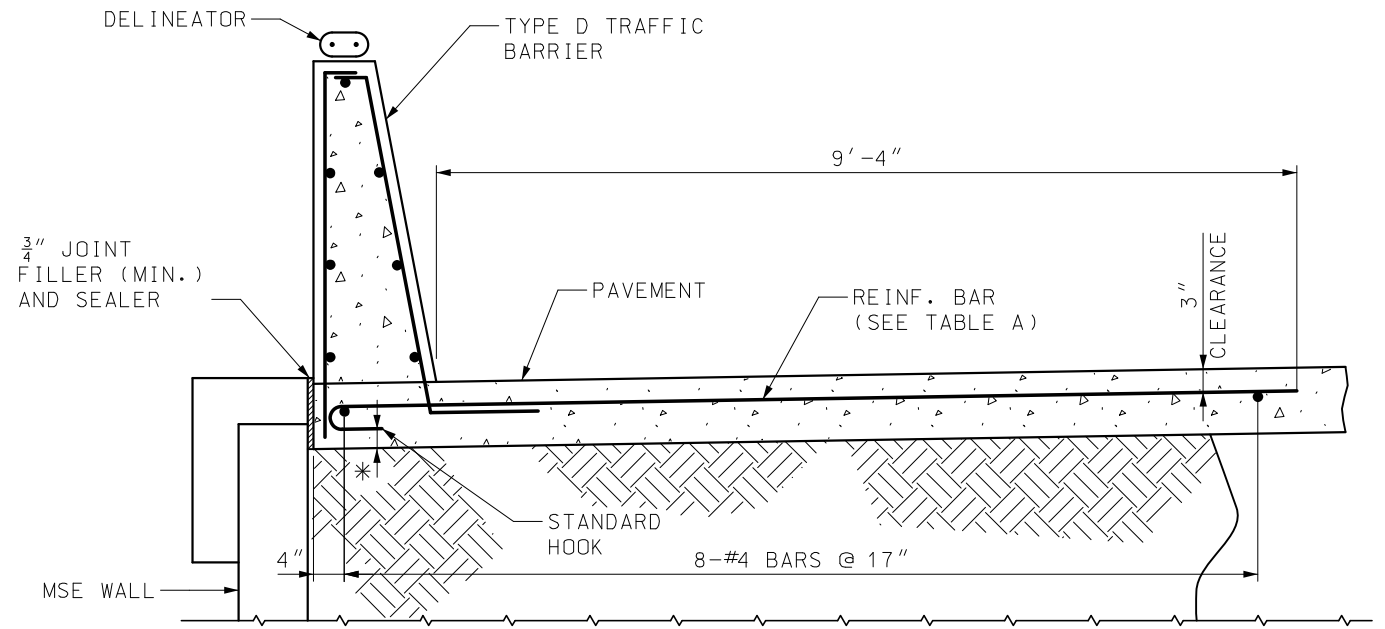
STATE OF MISSOURI
 TRAVIS D. KOESTNER
 NUMBER PE-30042
 PROFESSIONAL ENGINEER
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CURVED VANE GRATE AND FRAME

DATE EFFECTIVE: 01/01/2021	614.11D	SHEET NO. 1 OF 1
DATE PREPARED: 10/14/2020		

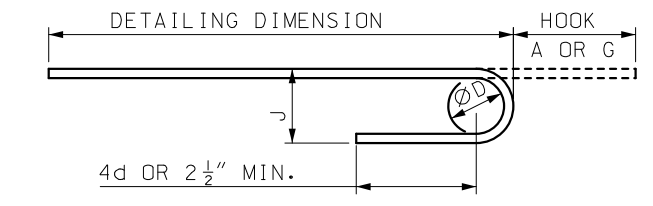
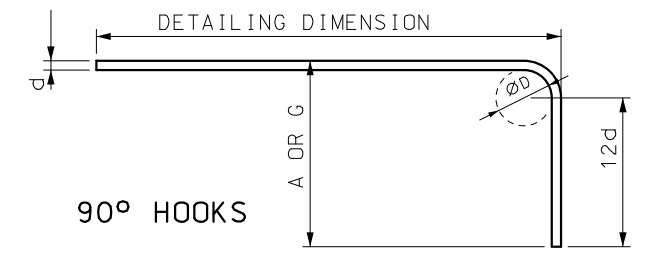


PART SECTION THROUGH BARRIER

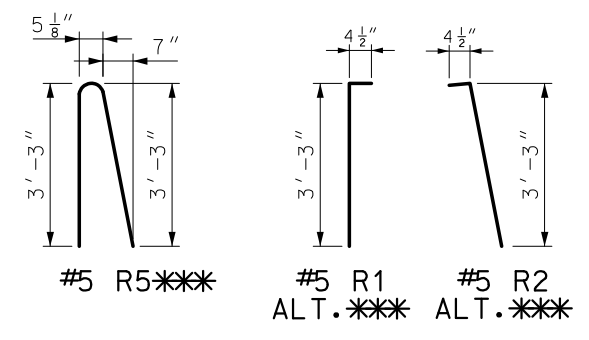
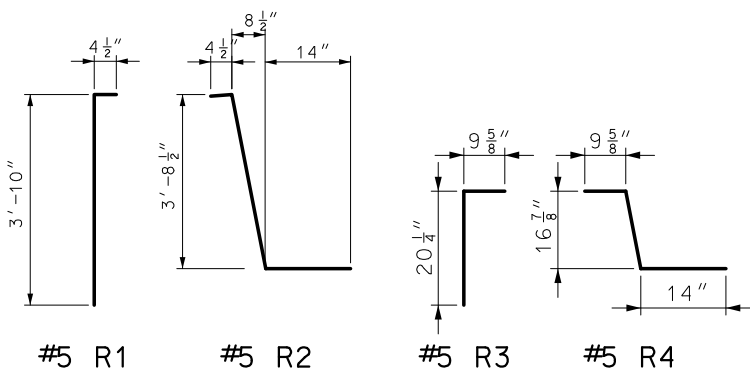


TYPE D (MSE WALL) TRAFFIC BARRIER ON TOP OF MSE WALL

END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS		90° HOOKS
		A OR G	J	A OR G
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"

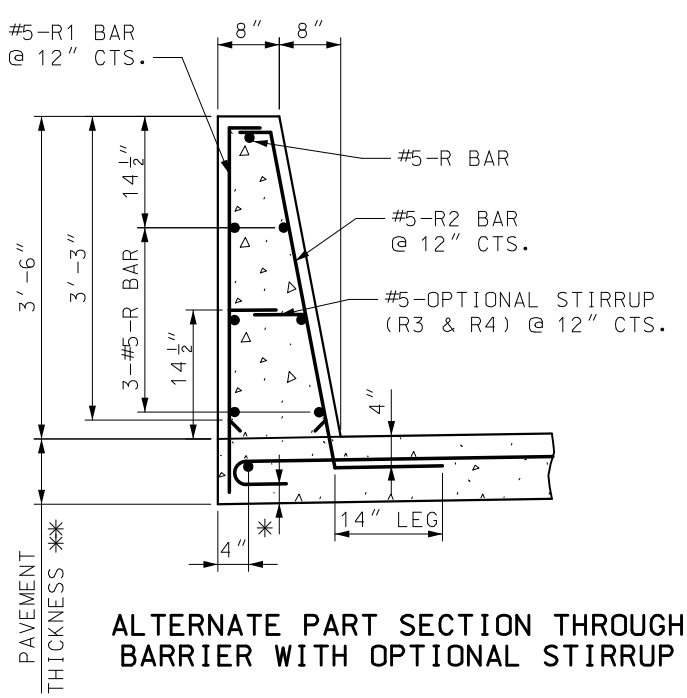


ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.

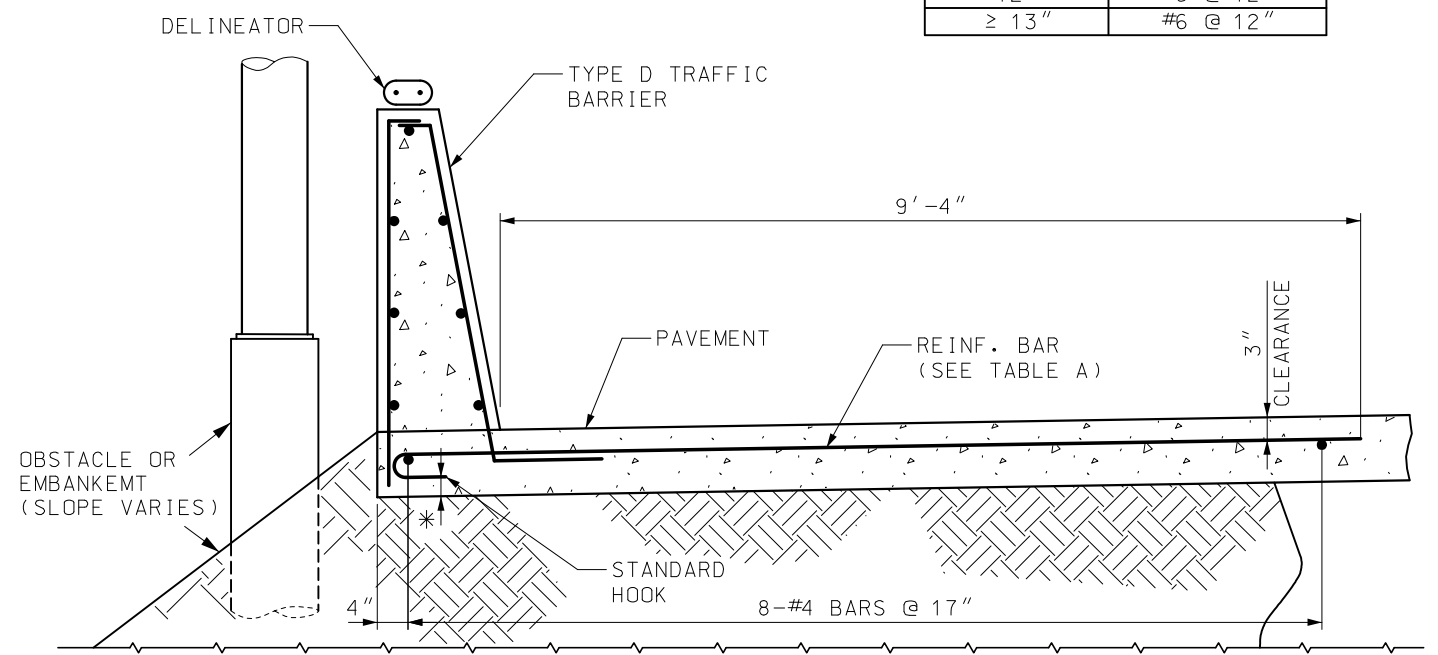


PAVEMENT THICKNESS **	BAR SIZE & SPACING
8"	#5 @ 4"*
9"	#5 @ 5"*
10"	#5 @ 6"
11"	#5 @ 7"
12"	#6 @ 12"
≥ 13"	#6 @ 12"

- NOTES:
- TYPE D SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.
 - FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
 - ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
 - NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.
 - MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2" UNLESS OTHERWISE SHOWN.
 - * TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1 1/2" MINIMUM CLEARANCE.
 - ** SEE ROADWAY PAVEMENT DESIGN.
 - *** R1 AND R2 MAY BE REPLACED WITH ALTERNATE (3'-3") R1 AND R2 OR R5 ONLY FOR USE WITH OPTIONAL STIRRUP.



ALTERNATE PART SECTION THROUGH BARRIER WITH OPTIONAL STIRRUP



TYPE D TRAFFIC BARRIER - MOMENT SLAB**

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PERMANENT CONCRETE TRAFFIC BARRIER

TYPE D ATOP MSE WALL AND MOMENT SLAB

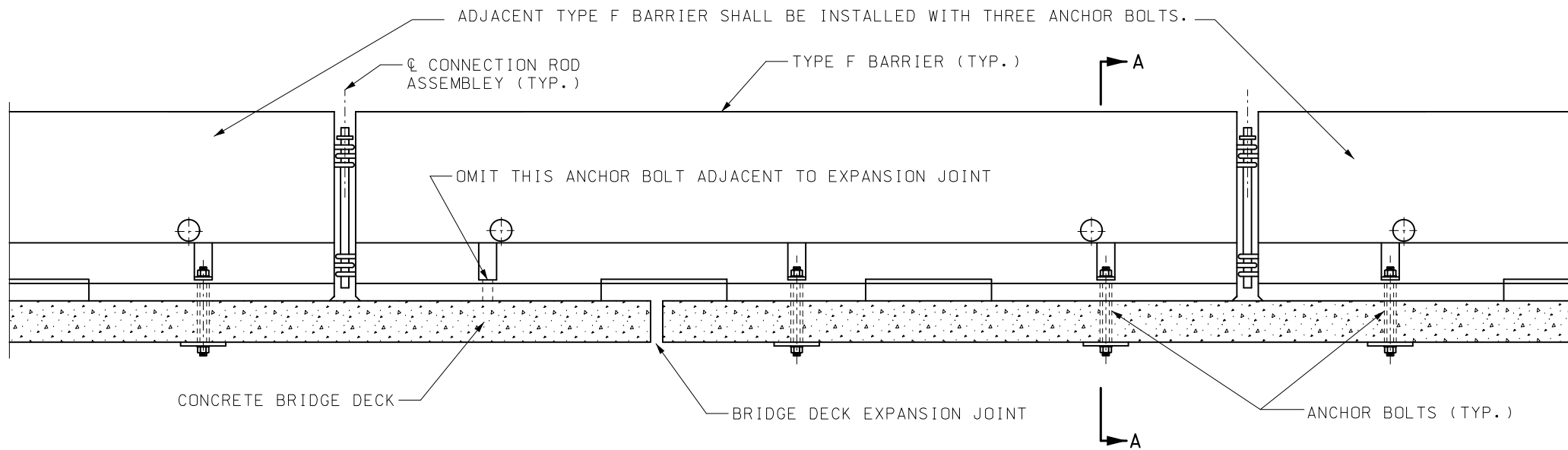
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10/01/2020
DATE PREPARED: 7/21/2020

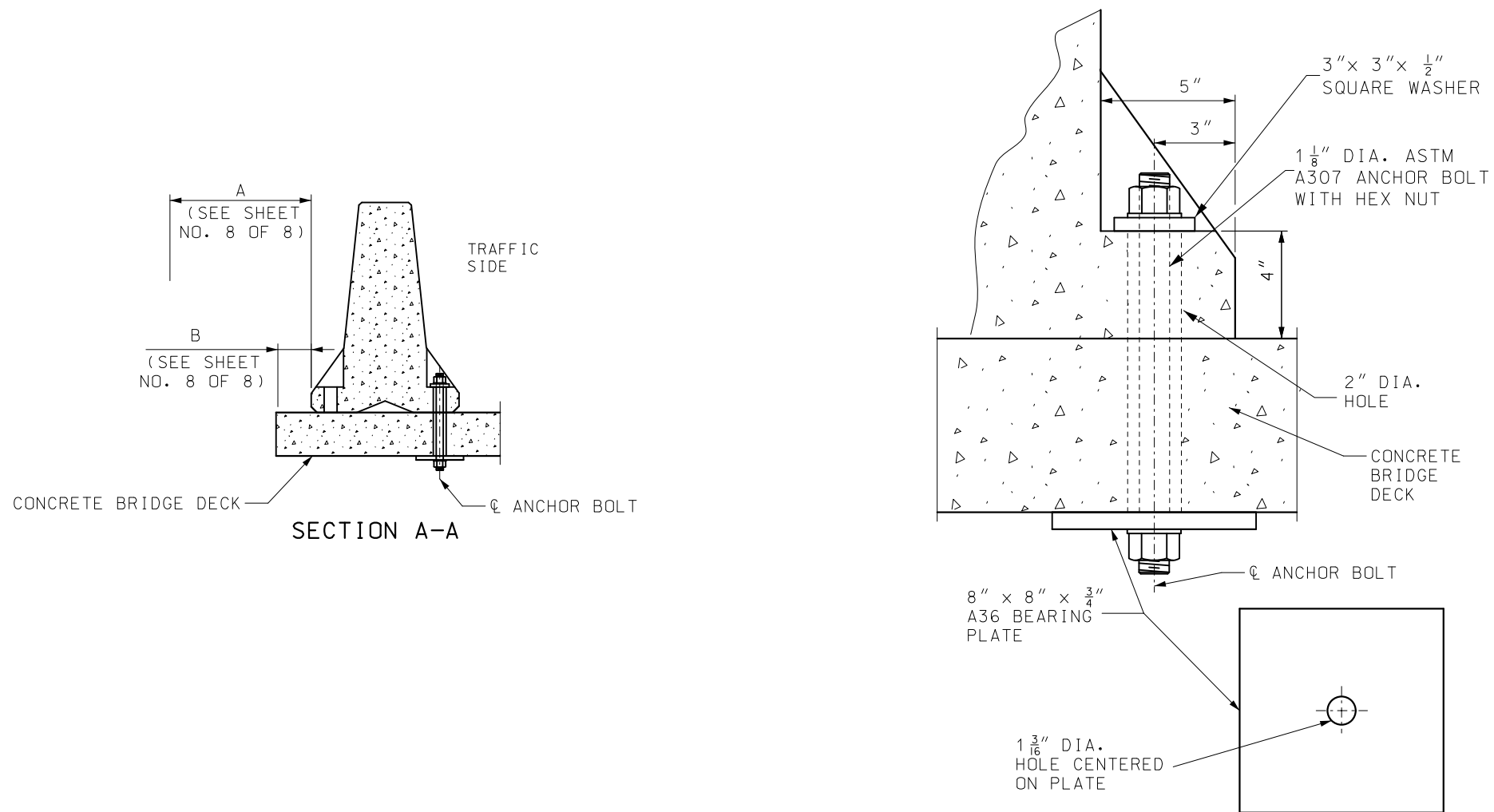
617.10M

SHEET NO. 8 OF 11

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



BOLT THROUGH DECK AT THERMAL EXPANSION JOINTS



BOLT THROUGH DECK DETAIL


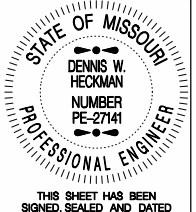
GENERAL NOTES:

ANCHOR BOLT SYSTEMS ARE ONLY APPLICABLE ON BRIDGE DECKS AND RIGID PAVEMENTS.

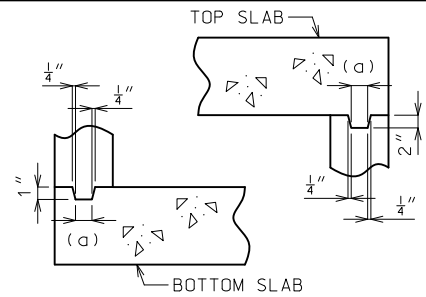
CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

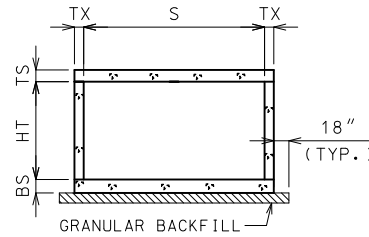
AFTER REMOVAL OF ANCHOR BOLTS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704 OR AN EPOXY BONDING AGENT IN ACCORDANCE WITH SEC 1039.

 <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI DENNIS W. HECKMAN NUMBER PE-27141 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p>TEMPORARY CONCRETE TRAFFIC BARRIER ANCHORED (BOLT SYSTEM)</p>
<p>DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020</p>	<p>617.20F</p>
<p>SHEET NO. 6 OF 8</p>	

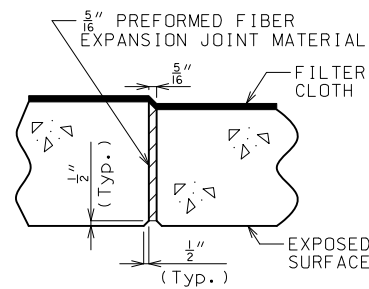
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



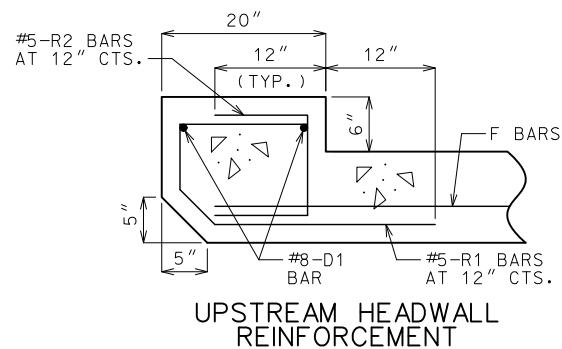
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



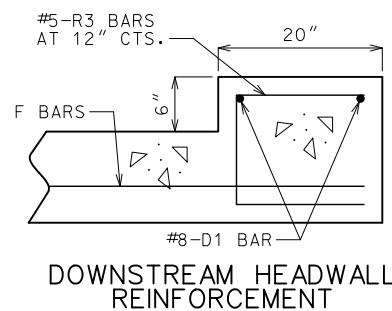
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

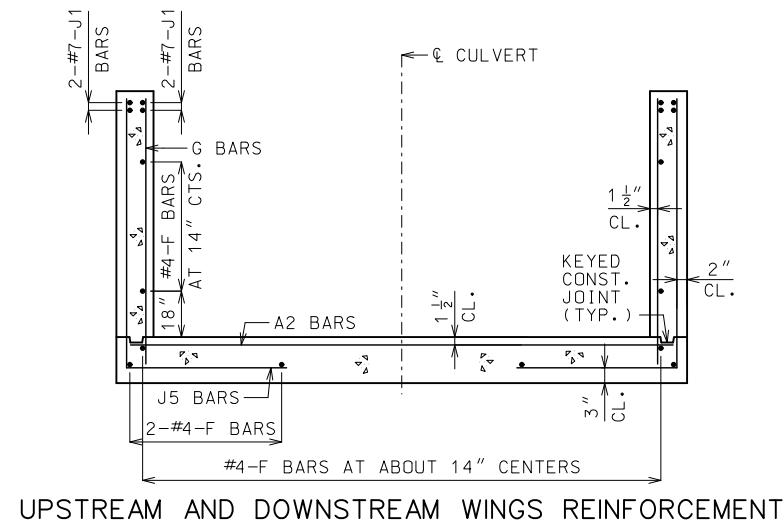
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



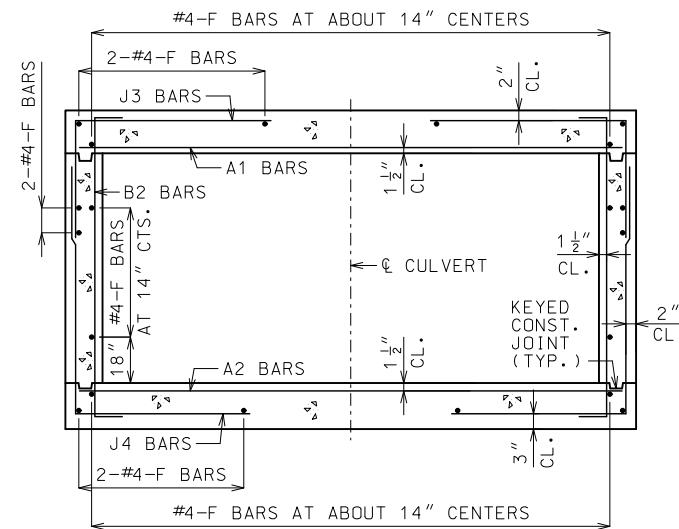
UPSTREAM HEADWALL REINFORCEMENT



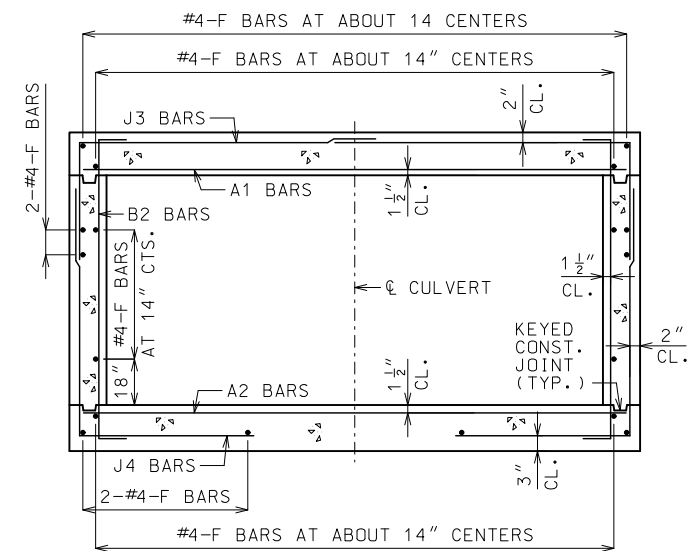
DOWNSTREAM HEADWALL REINFORCEMENT



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

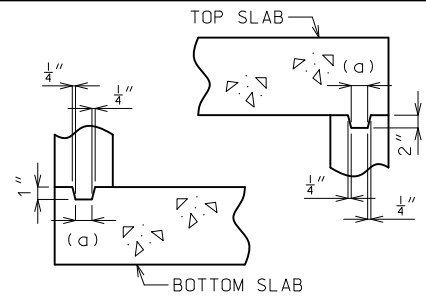
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

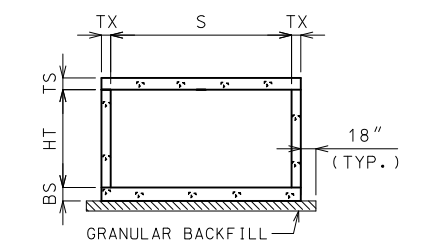
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
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	CONCRETE SINGLE BOX CULVERT	
	SKEW: SQUARED WINGS: STRAIGHT	
SECTIONS		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.10J	SHEET NO. 3 OF 3

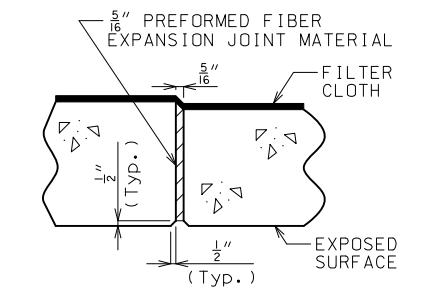
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



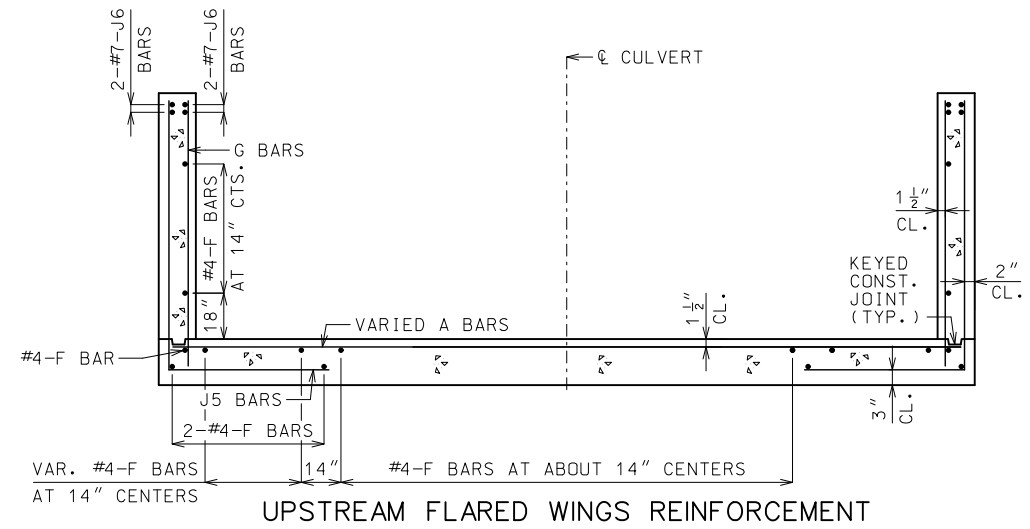
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



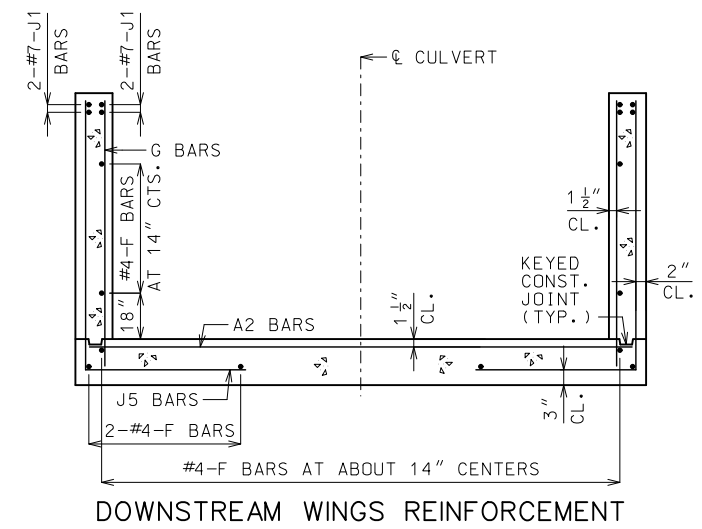
TRANSVERSE JOINT THRU BARREL

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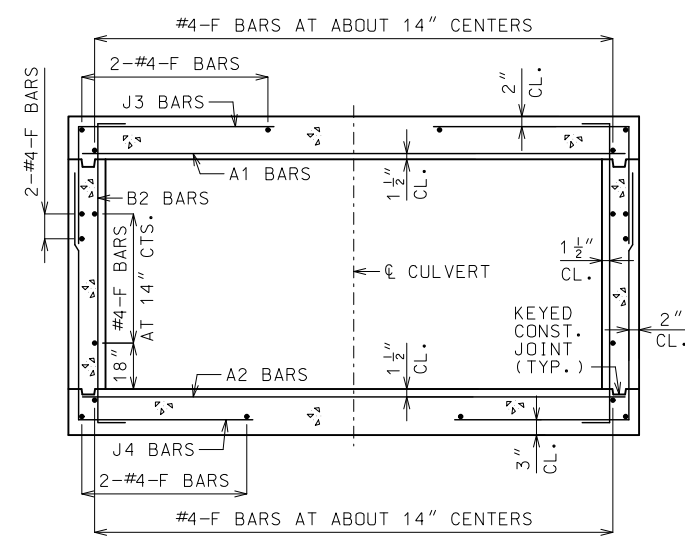
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



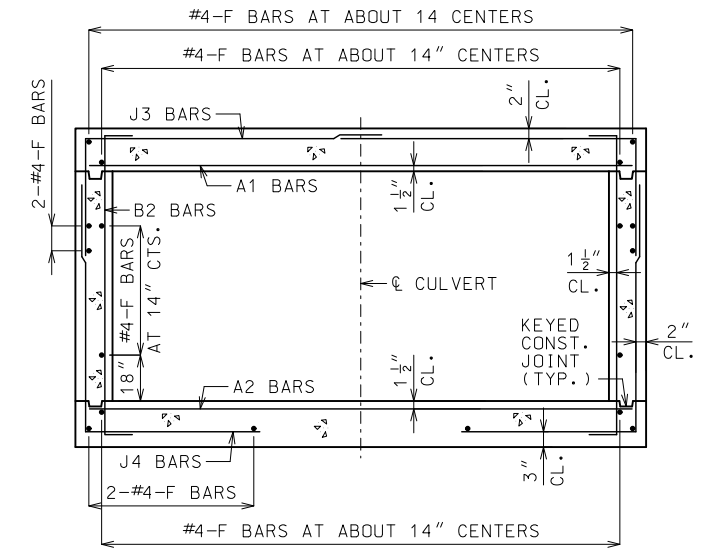
UPSTREAM FLARED WINGS REINFORCEMENT



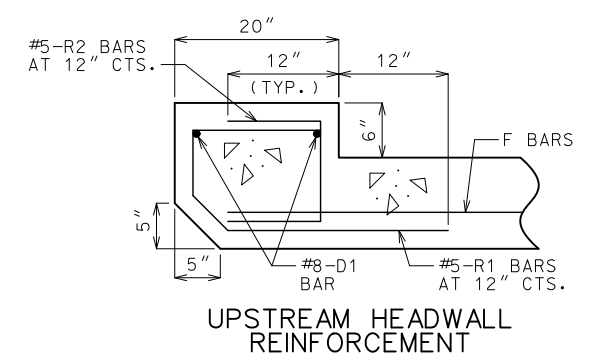
DOWNSTREAM WINGS REINFORCEMENT



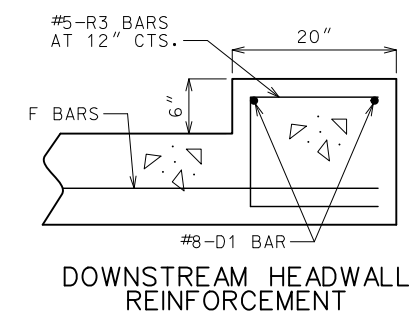
BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT



DOWNSTREAM HEADWALL REINFORCEMENT

GENERAL NOTES:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

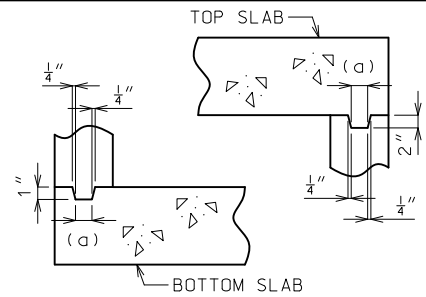
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

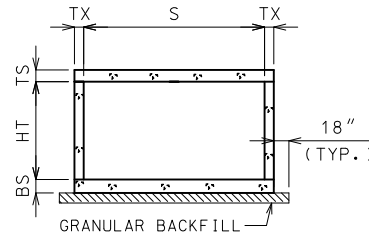
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 inch.

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE SINGLE BOX CULVERT	
	SKEW: SQUARED WINGS: FLARED	
SECTIONS		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.11J	SHEET NO. 3 OF 3

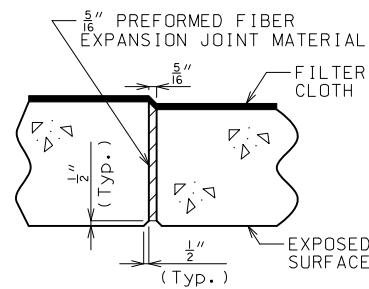
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



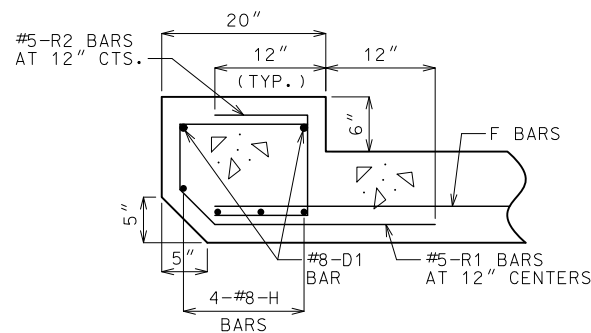
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



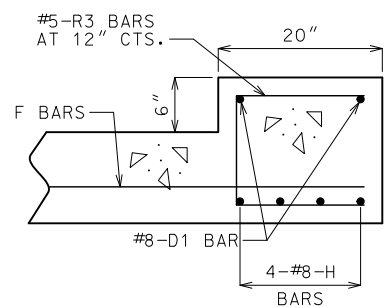
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

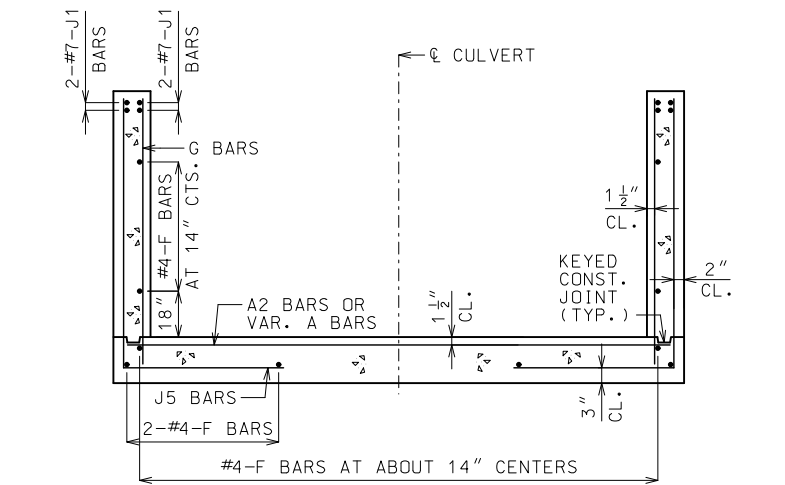
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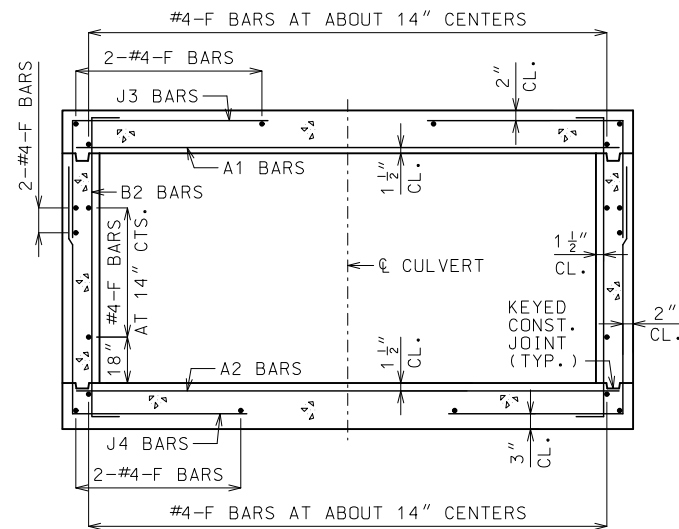
UPSTREAM HEADWALL REINFORCEMENT



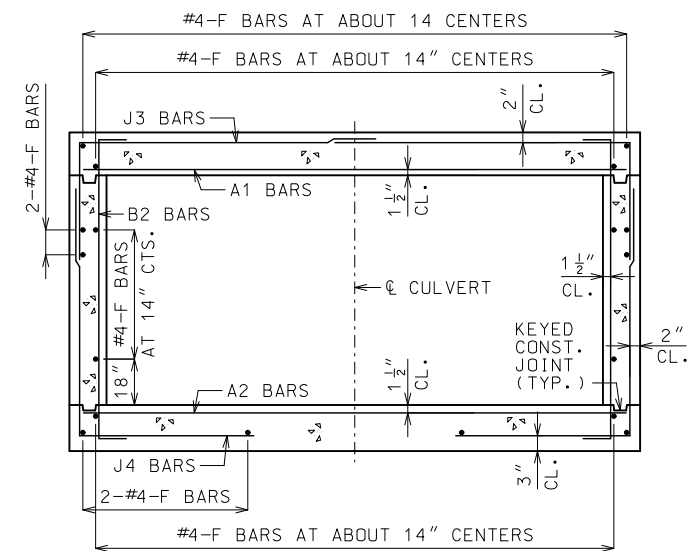
DOWNSTREAM HEADWALL REINFORCEMENT



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

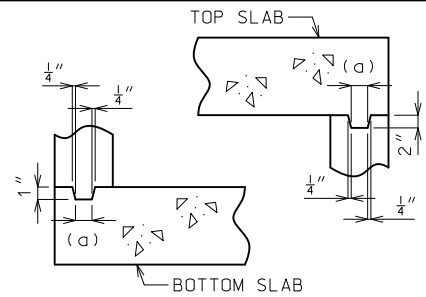
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

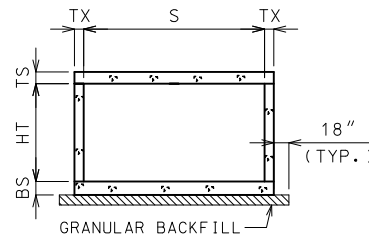
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE SINGLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: STRAIGHT	
	SECTIONS	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.12J	SHEET NO. 3 OF 3

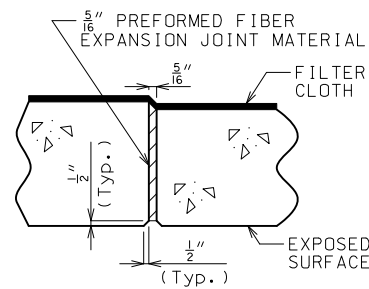
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



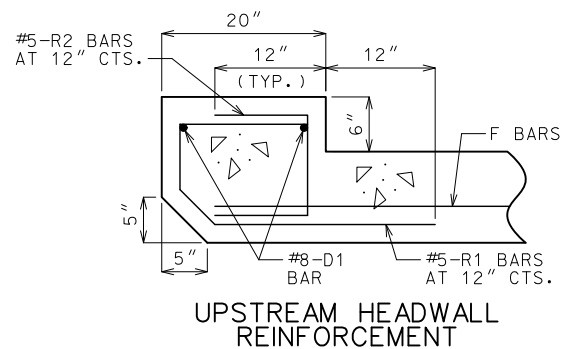
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



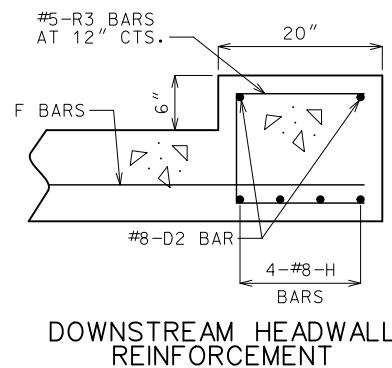
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

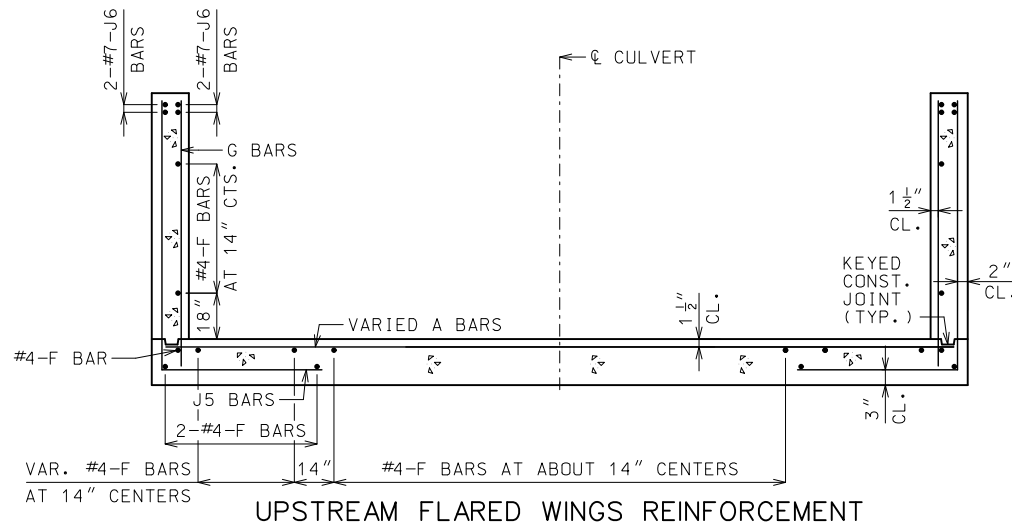
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



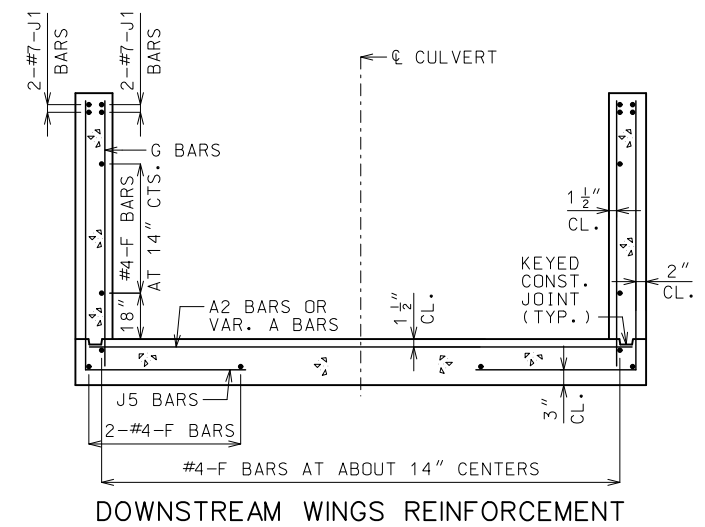
UPSTREAM HEADWALL REINFORCEMENT



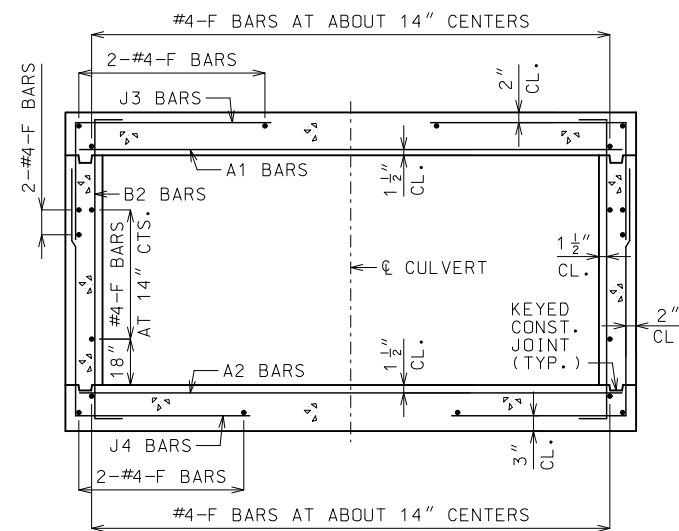
DOWNSTREAM HEADWALL REINFORCEMENT



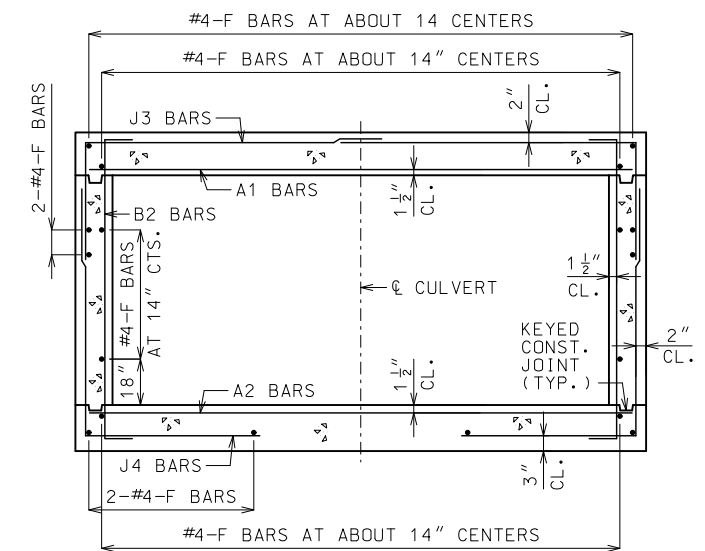
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

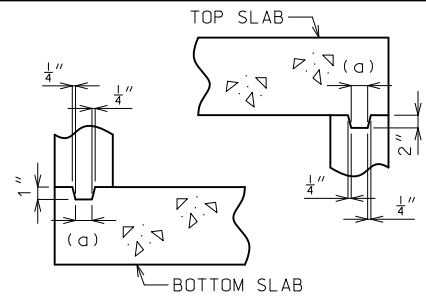
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

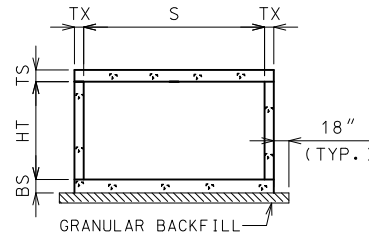
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE SINGLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: FLARED	
	SECTIONS	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.13J	SHEET NO. 3 OF 3

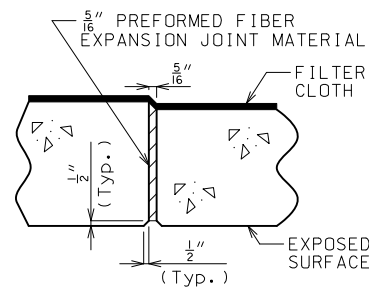
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



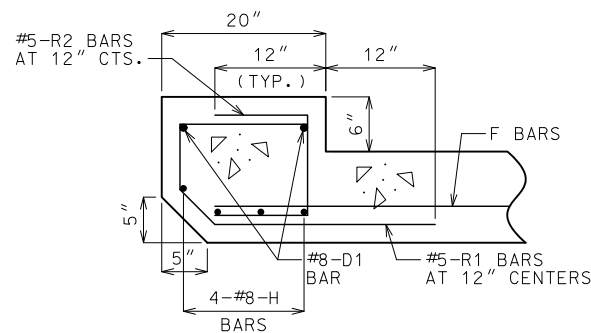
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



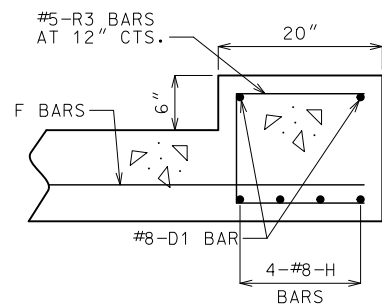
TRANSVERSE JOINT THRU BARREL

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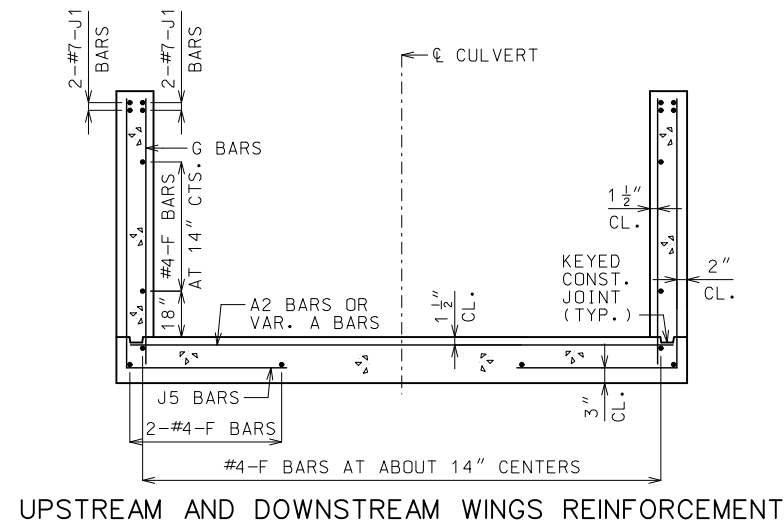
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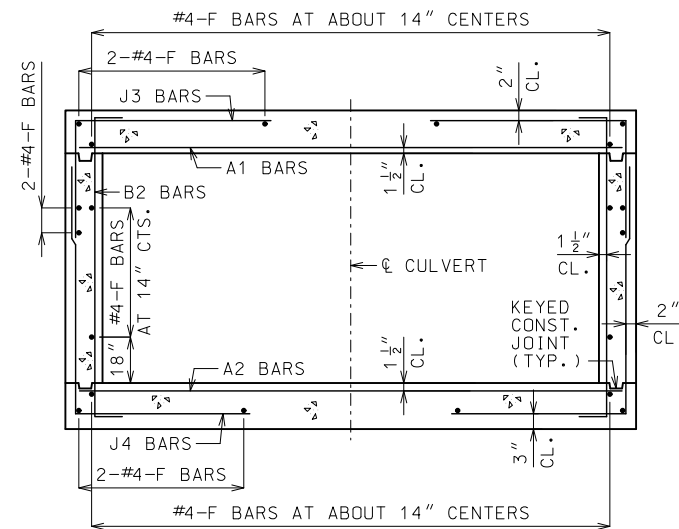
UPSTREAM HEADWALL REINFORCEMENT



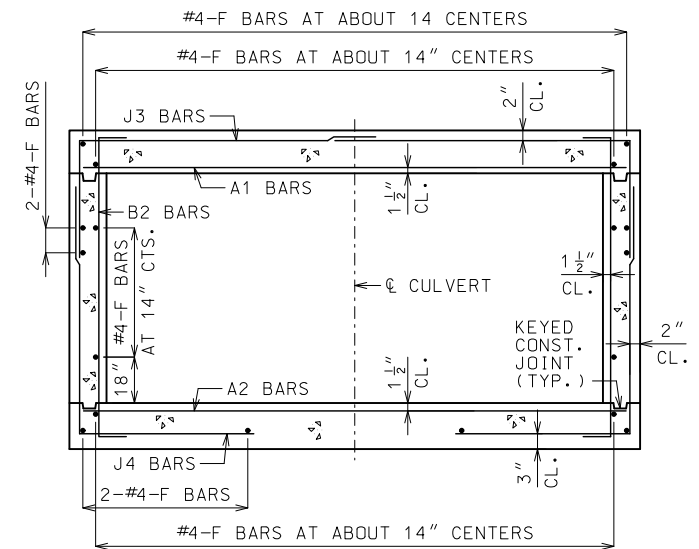
DOWNSTREAM HEADWALL REINFORCEMENT



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS


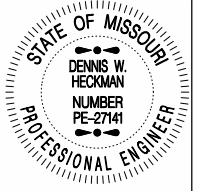
GENERAL NOTES:

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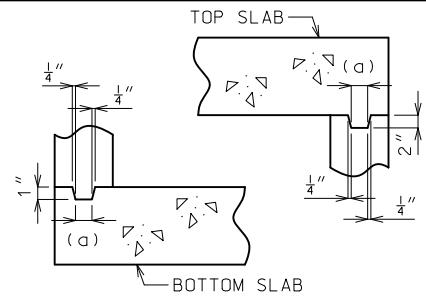
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

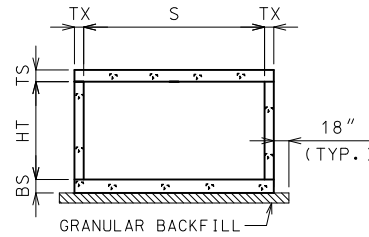
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

 MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE SINGLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: STRAIGHT SECTIONS
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.14J SHEET NO. 3 OF 3

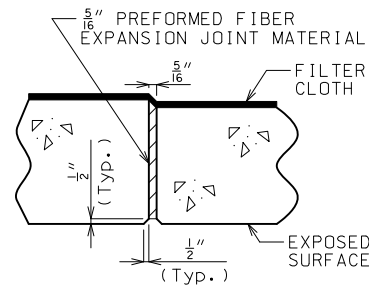
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



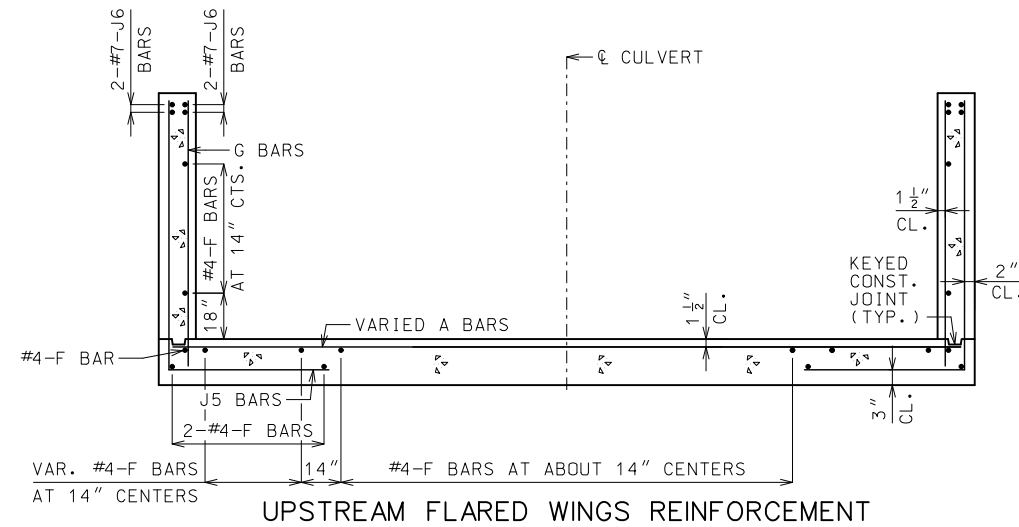
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



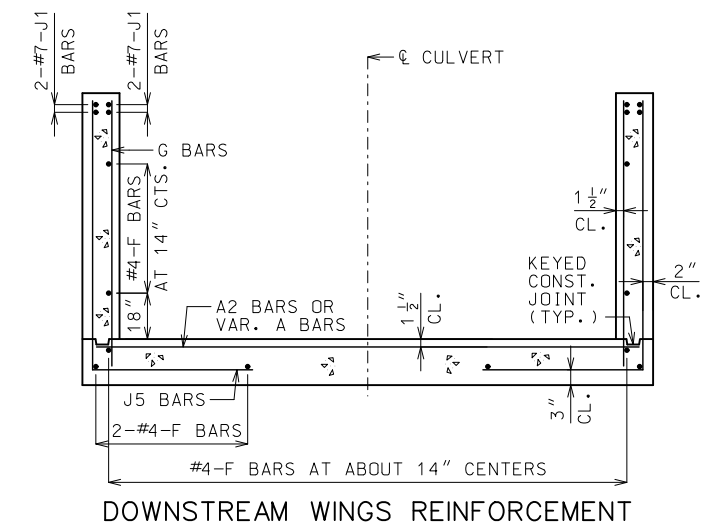
TRANSVERSE JOINT THRU BARREL

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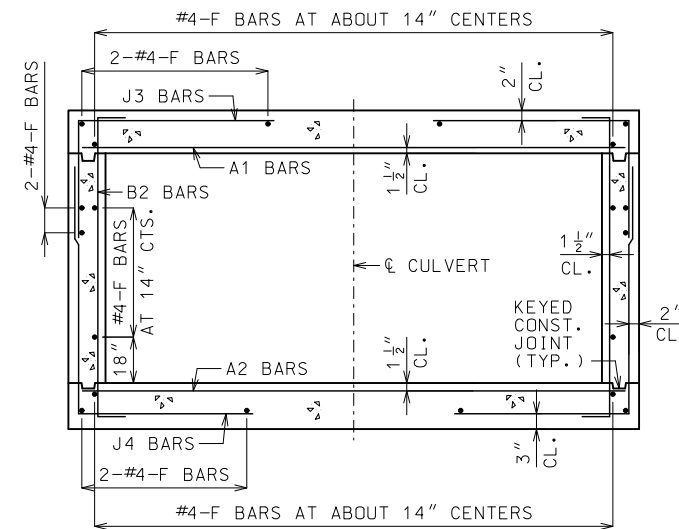
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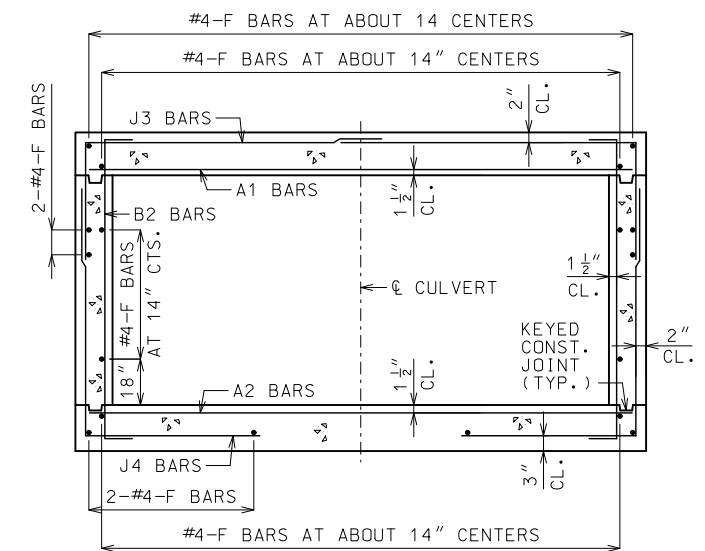
UPSTREAM FLARED WINGS REINFORCEMENT



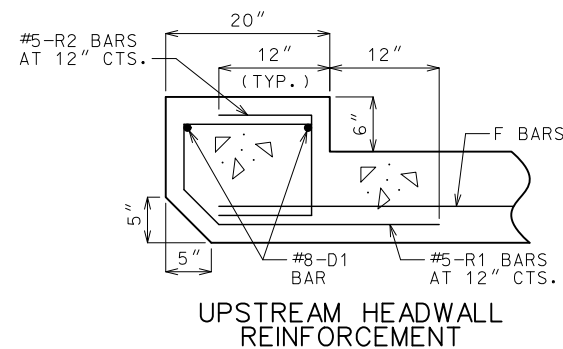
DOWNSTREAM WINGS REINFORCEMENT



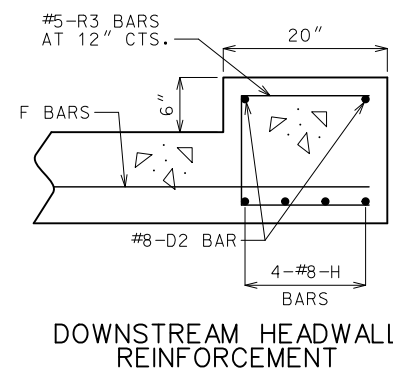
BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT



DOWNSTREAM HEADWALL REINFORCEMENT

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

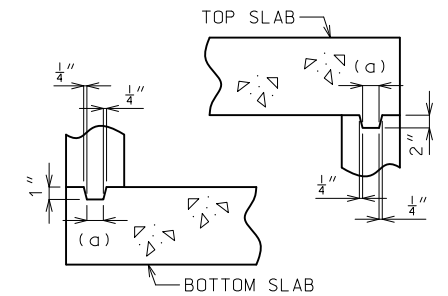
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

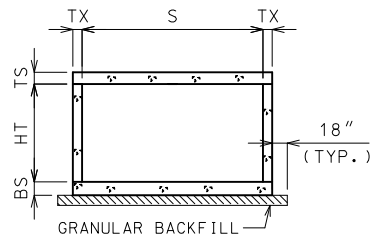
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE SINGLE BOX CULVERT	
	SKEW: RIGHT ADVANCE WINGS: FLARED	
SECTIONS		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.15E	SHEET NO. 3 OF 3

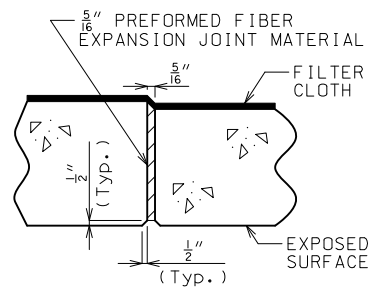
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



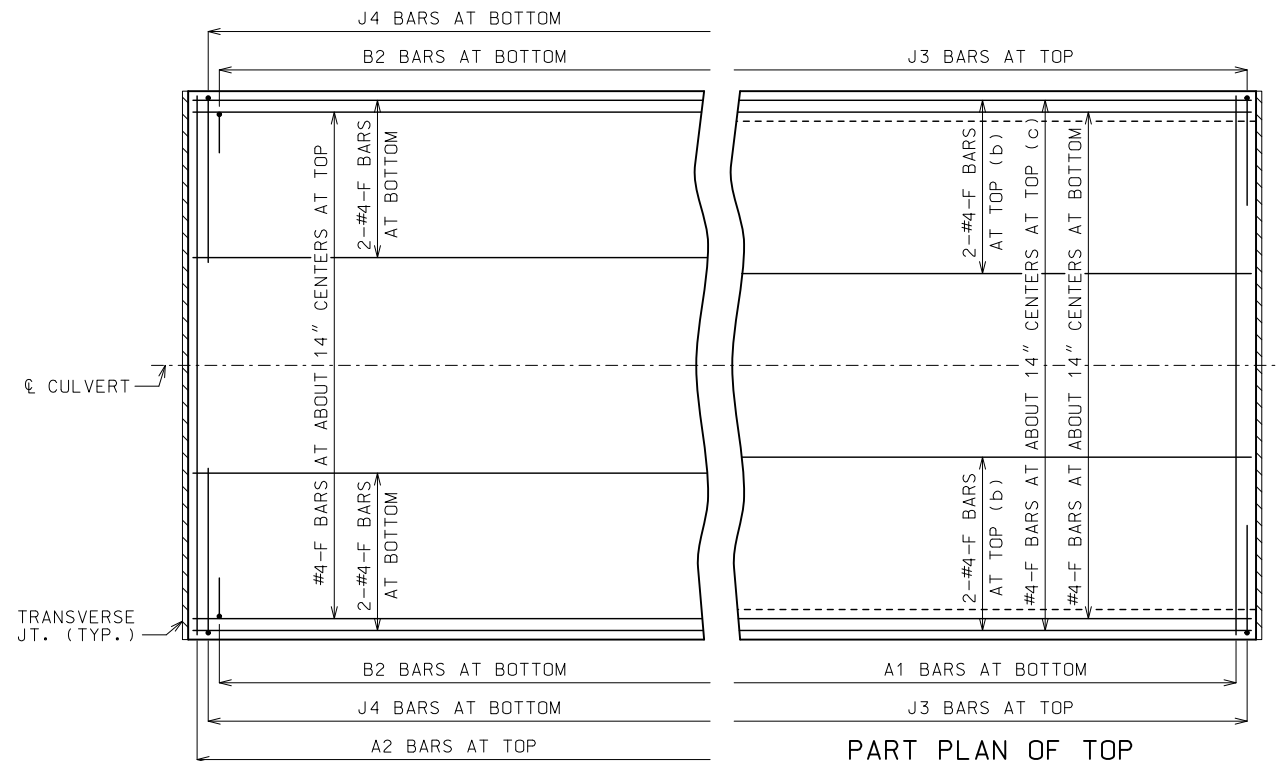
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

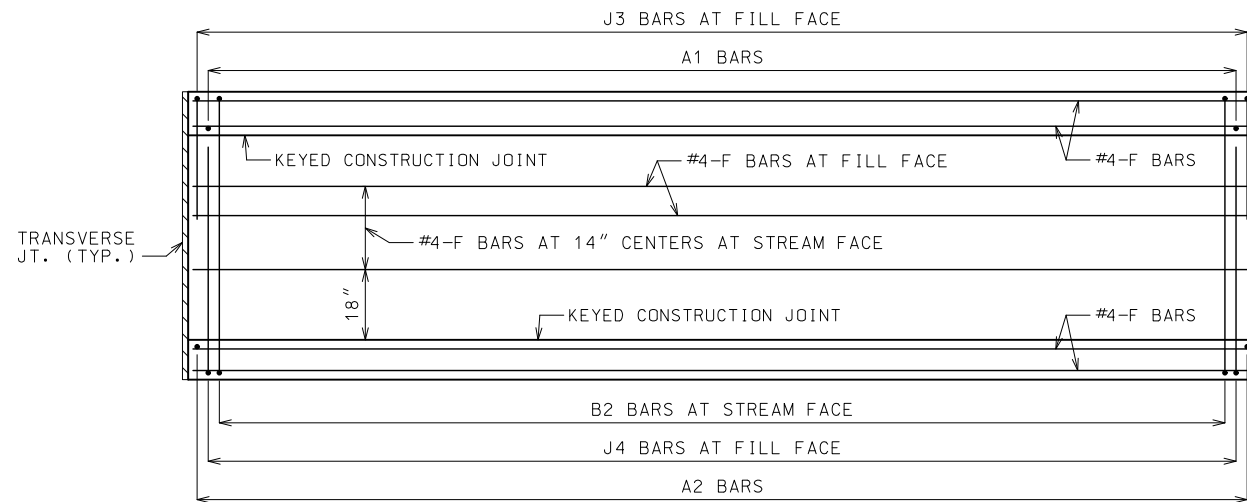


PART PLAN OF TOP SLAB REINFORCEMENT

(b) FOR DESIGN FILLS OVER 2'-0"
(c) FOR DESIGN FILLS 2'-0" OR LESS



PART PLAN OF BOTTOM SLAB REINFORCEMENT



ELEVATION OF WALL REINFORCEMENT

GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

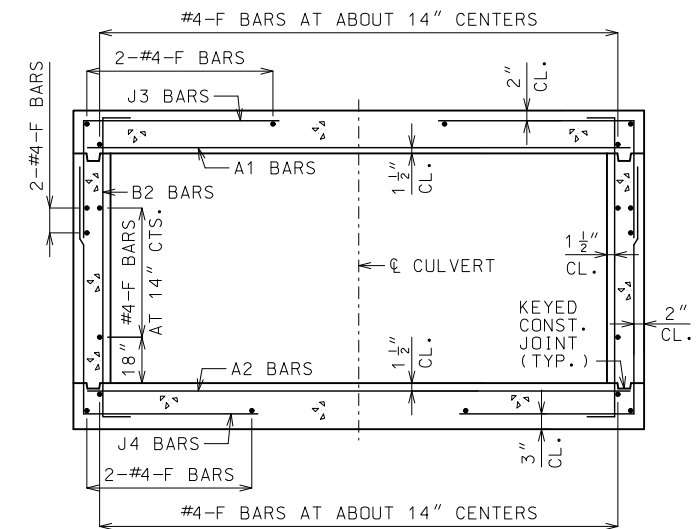
DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

MISCELLANEOUS:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.17.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS AND ELEVATION.

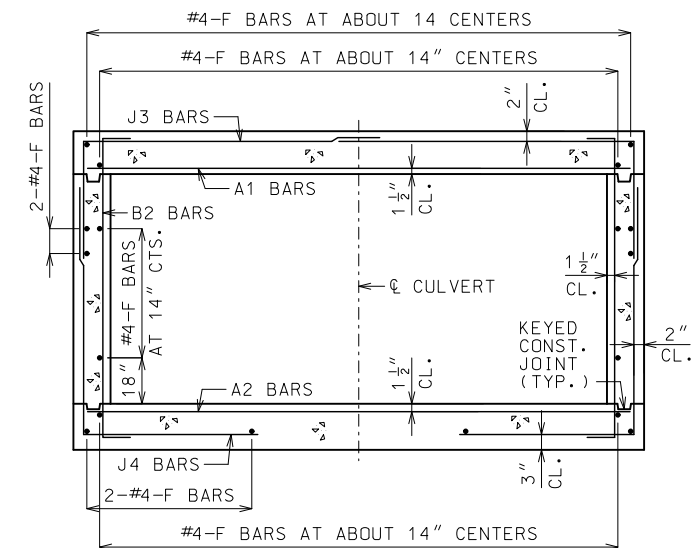
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".



BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"
SYMMETRICAL ABOUT AND NORMAL TO CULVERT CL.

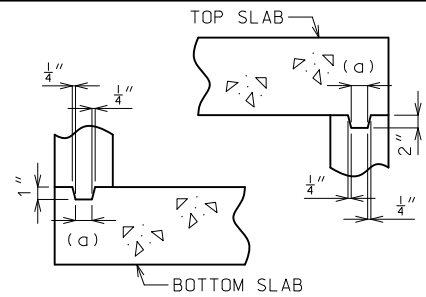


BARREL REINFORCEMENT

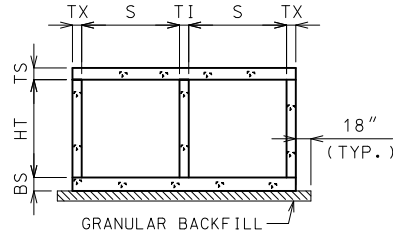
FOR DESIGN FILLS 2'-0" OR LESS
SYMMETRICAL ABOUT AND NORMAL TO CULVERT CL.

		MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		CONCRETE SINGLE BOX CULVERT CUT SECTION	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.16	SHEET NO. 1 OF 1	

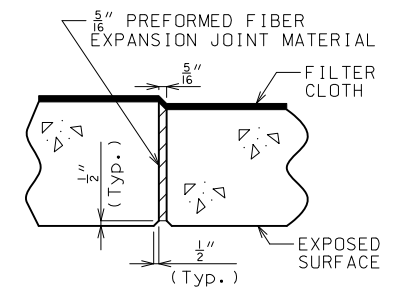
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



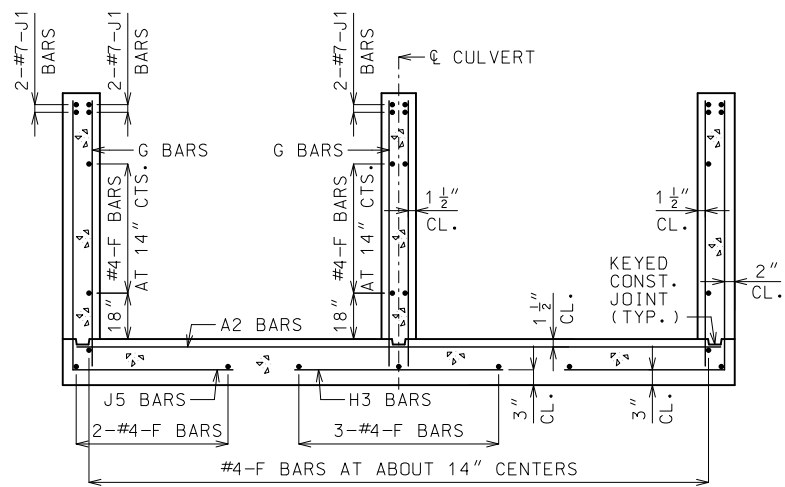
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



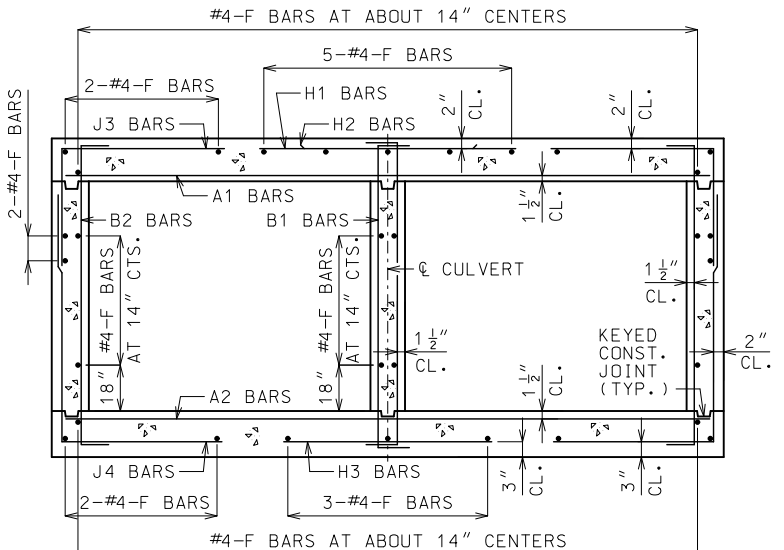
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

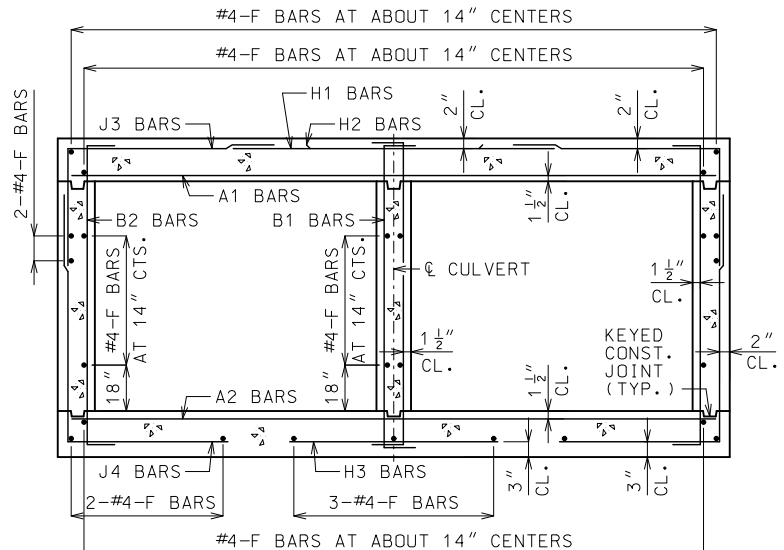
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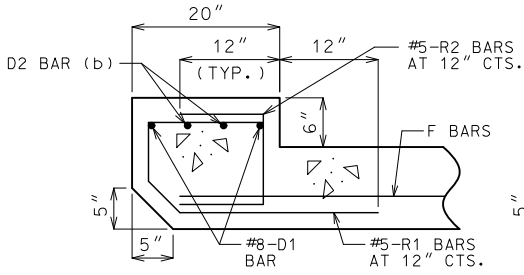
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



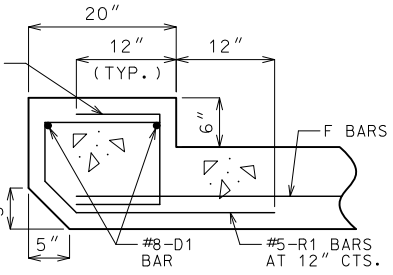
BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



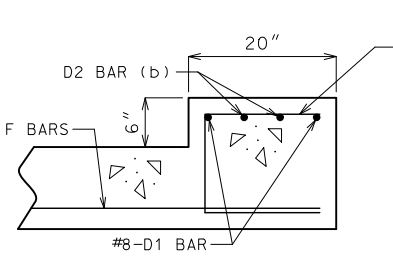
BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



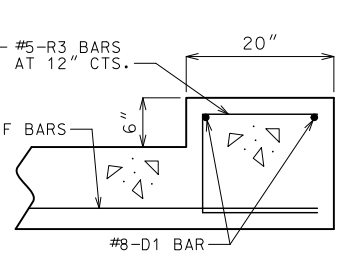
UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

GENERAL NOTES:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

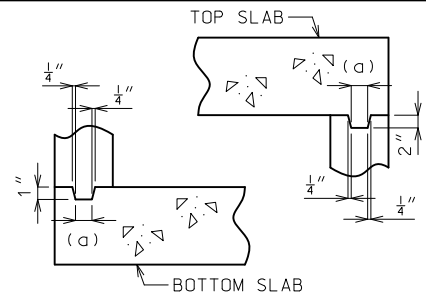
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

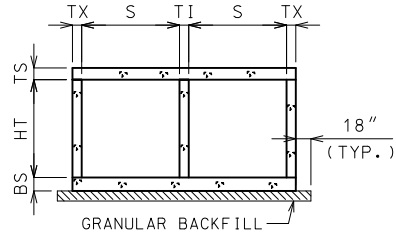
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE DOUBLE BOX CULVERT	
	SKEW: SQUARED WINGS: STRAIGHT	
SECTIONS		SHEET NO. 703.40H 3 OF 3
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020		

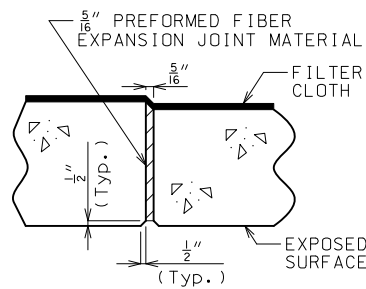
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



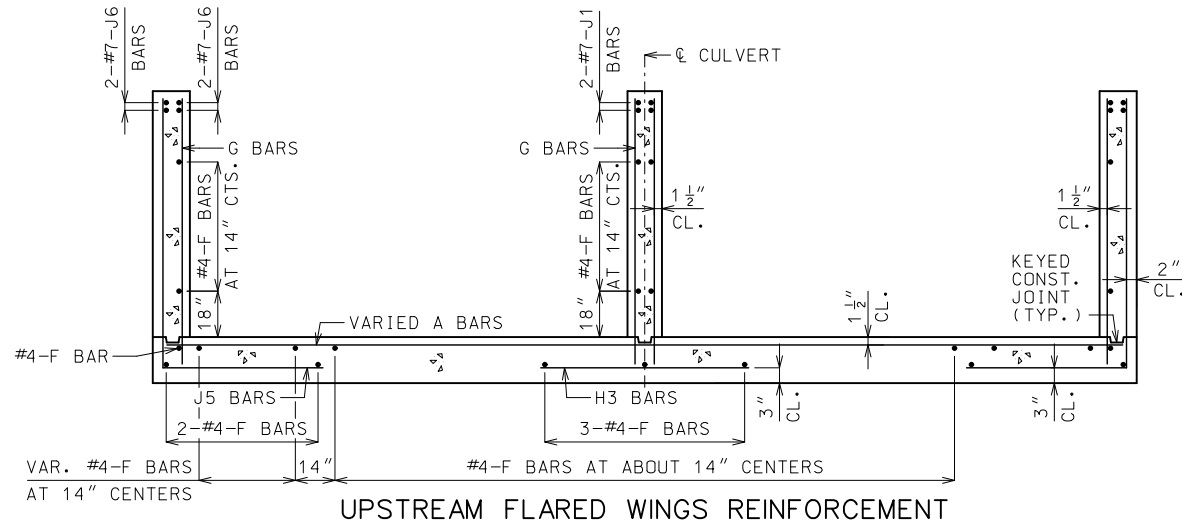
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



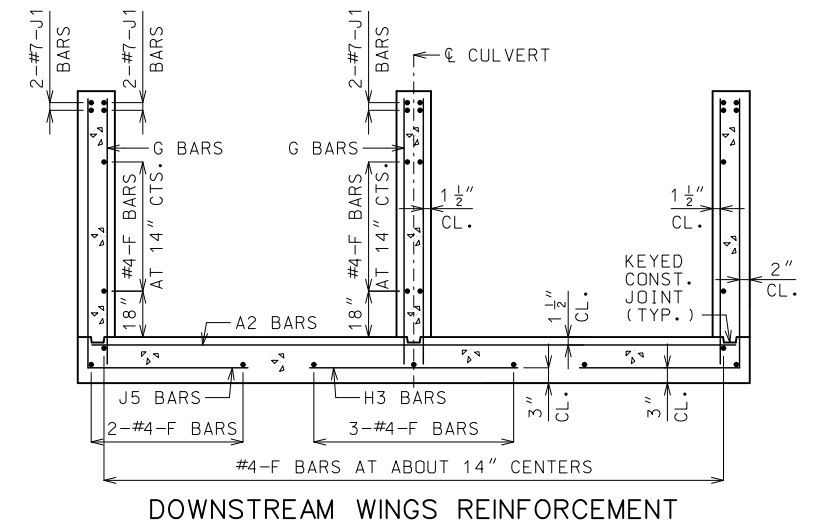
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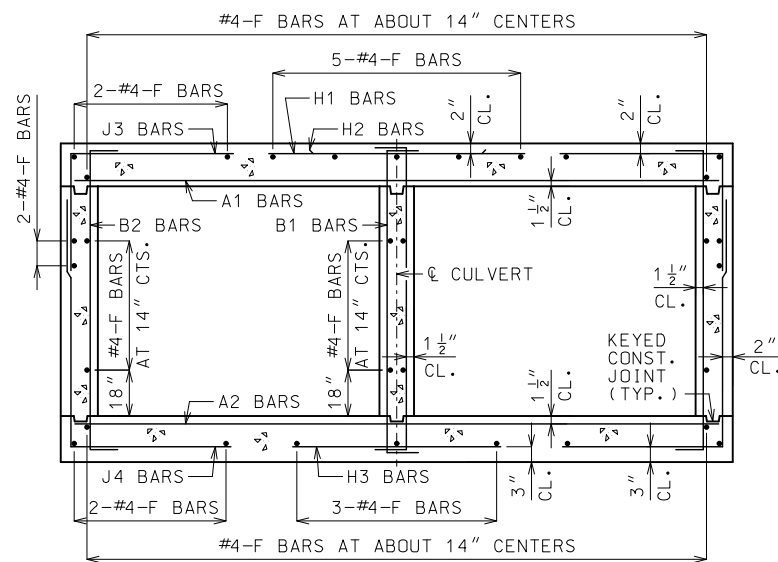
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UPSTREAM FLARED WINGS REINFORCEMENT

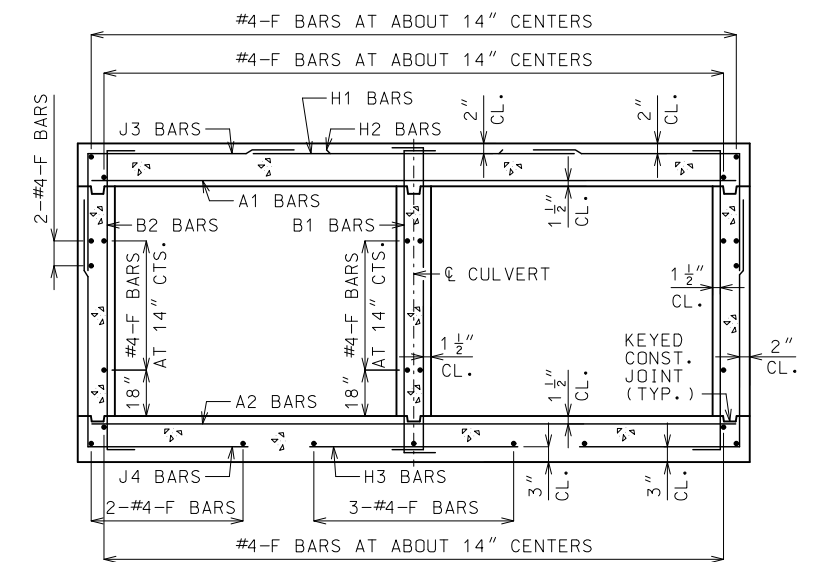


DOWNSTREAM WINGS REINFORCEMENT



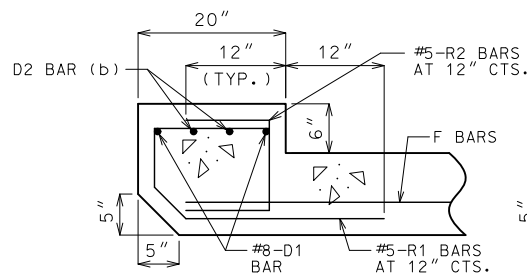
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



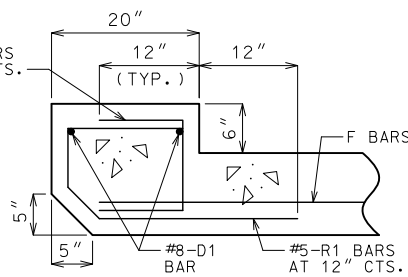
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



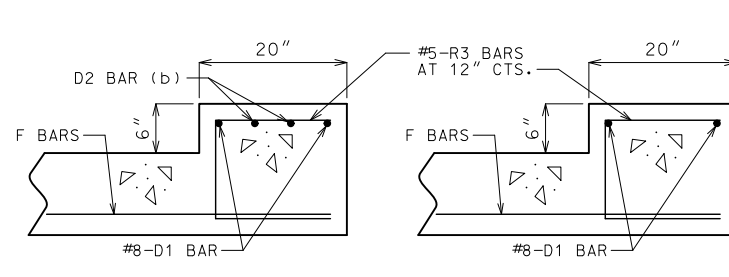
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



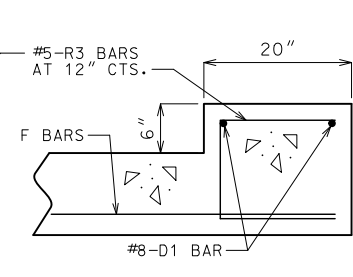
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.


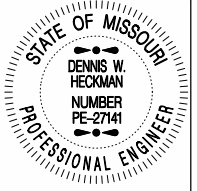
GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

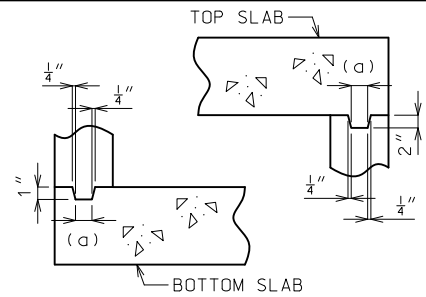
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

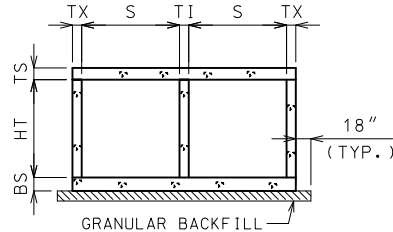
 MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE DOUBLE BOX CULVERT SKEW: SQUARED WINGS: FLARED SECTIONS
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.41H
	SHEET NO. 3 OF 3

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

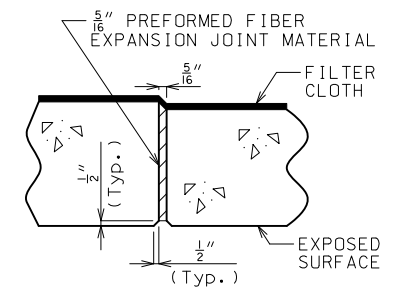
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS

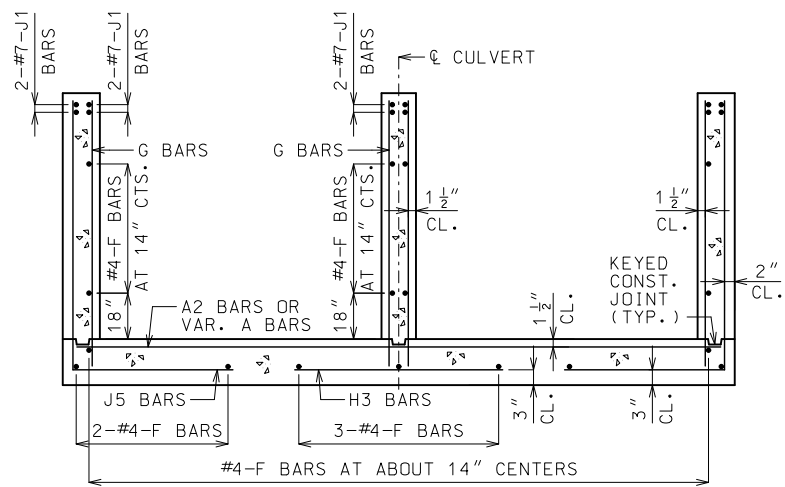


GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

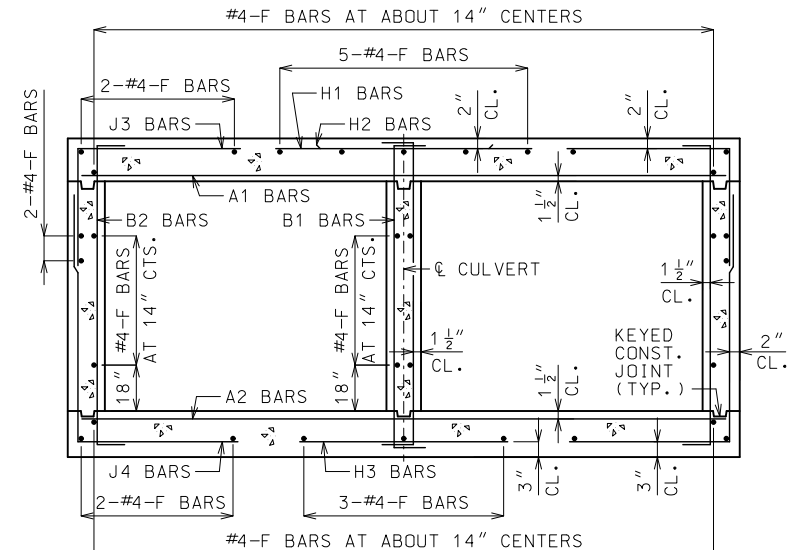


TRANSVERSE JOINT THRU BARREL
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

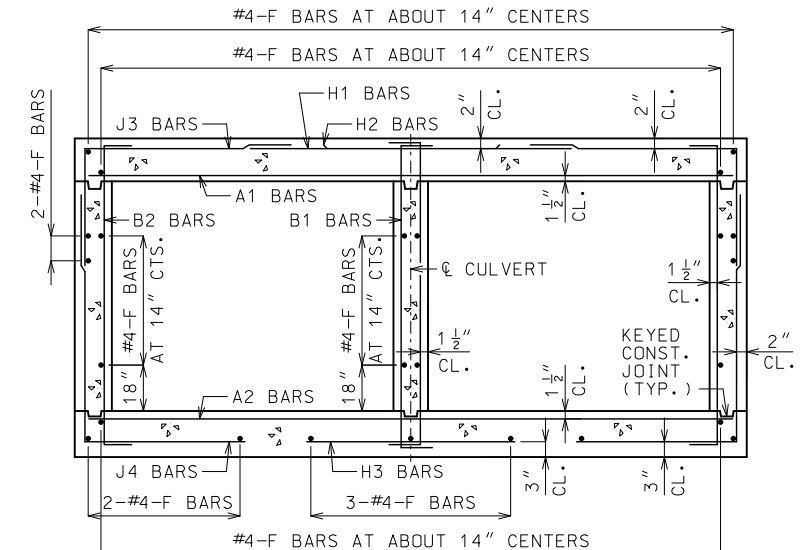
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



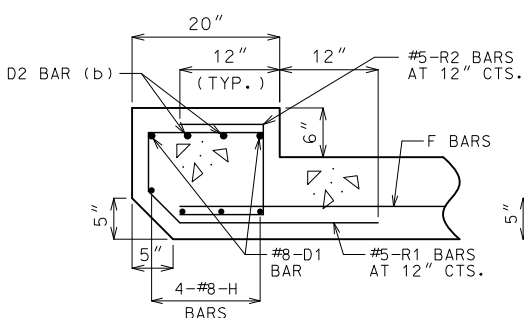
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



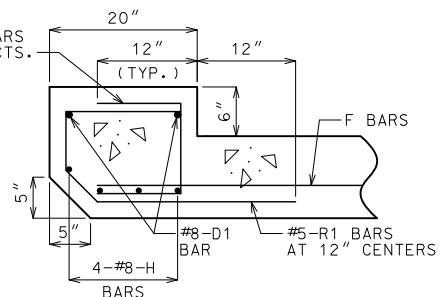
BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



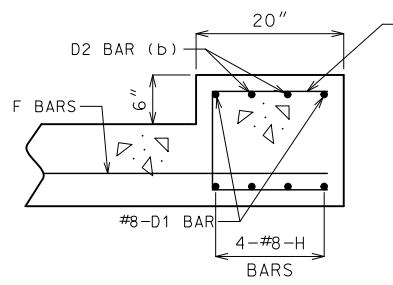
BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



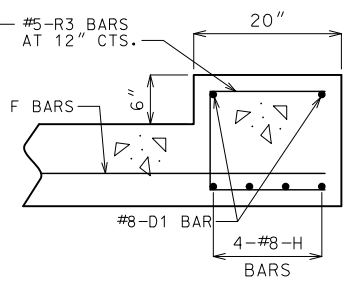
UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL



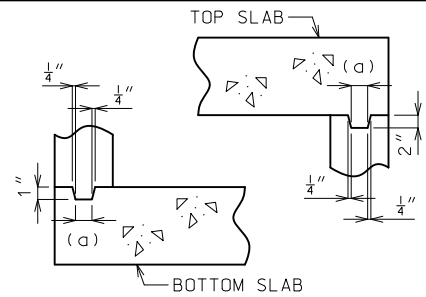
DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

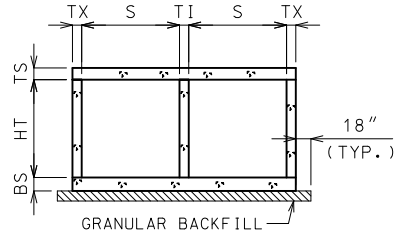
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GENERAL NOTES:
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

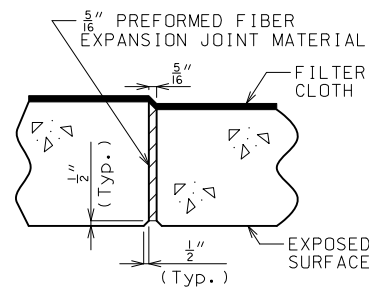
	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE DOUBLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: STRAIGHT	
	SECTIONS	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.42H	SHEET NO. 3 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



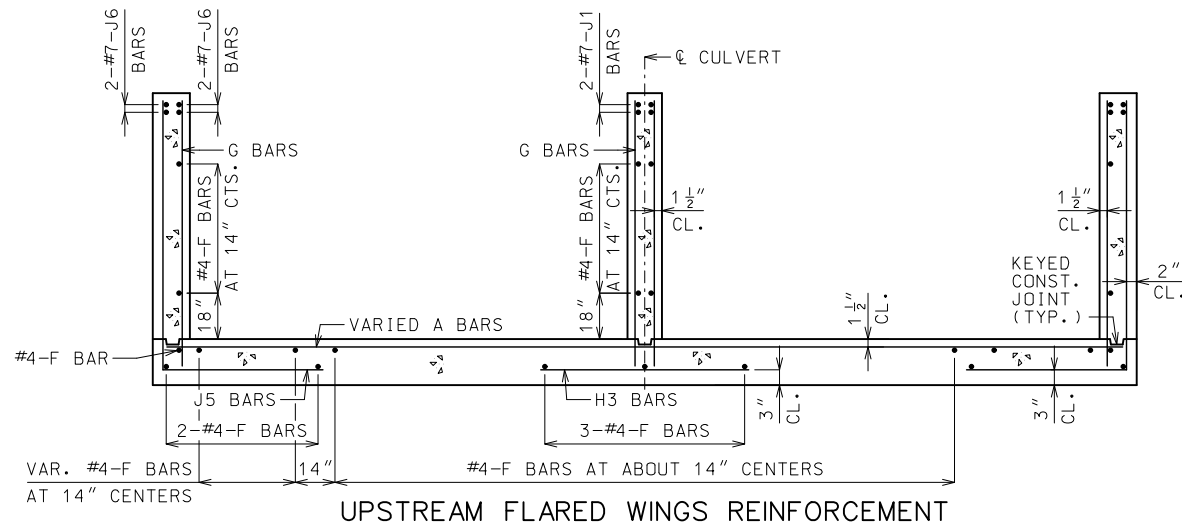
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



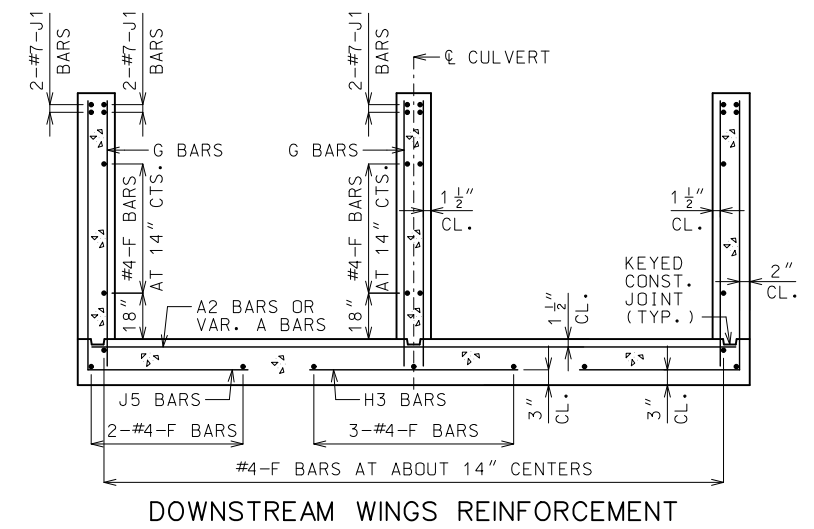
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

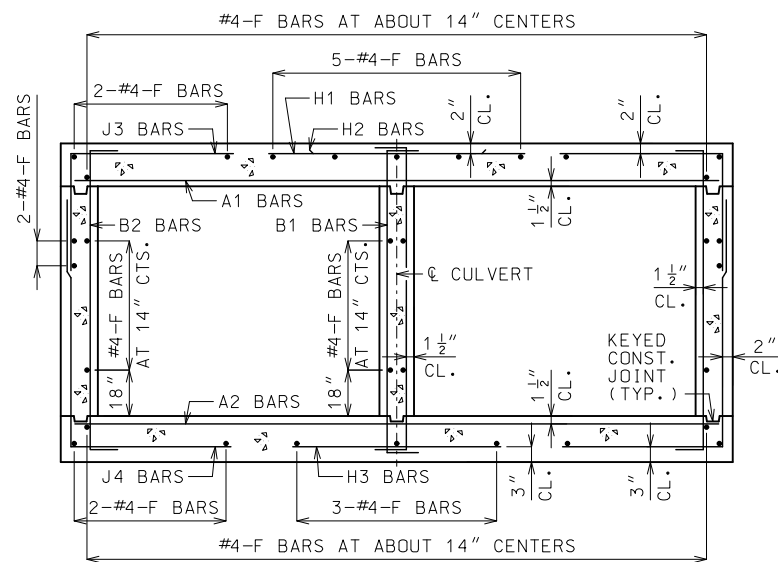
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



UPSTREAM FLARED WINGS REINFORCEMENT

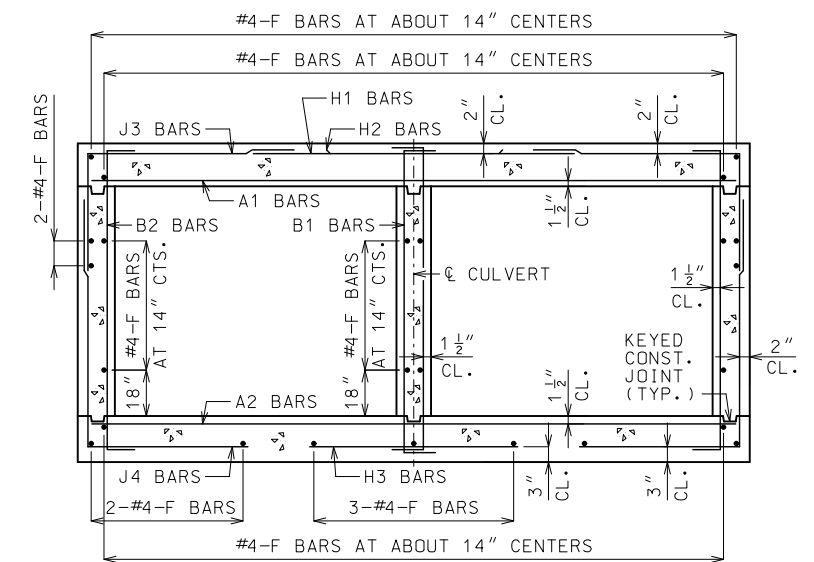


DOWNSTREAM WINGS REINFORCEMENT



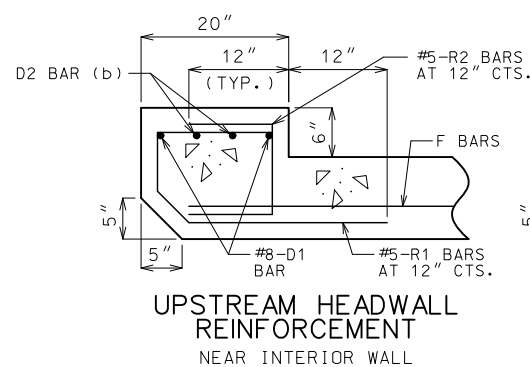
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



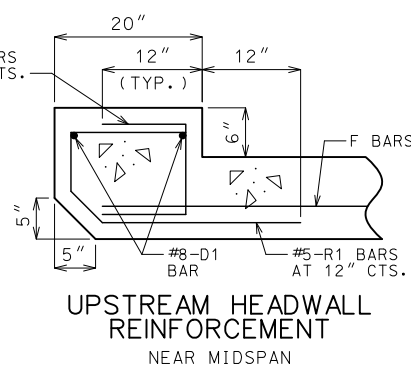
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



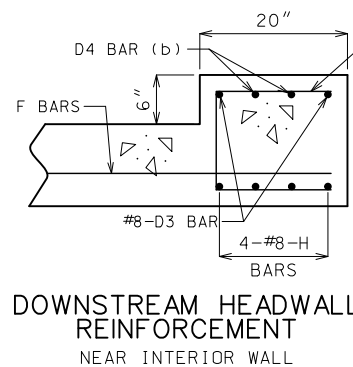
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



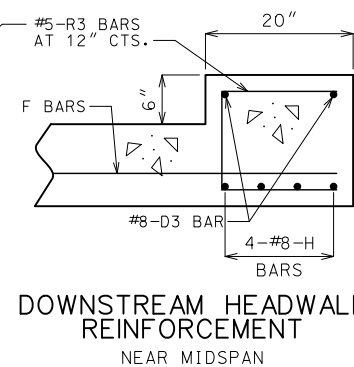
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF \emptyset WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

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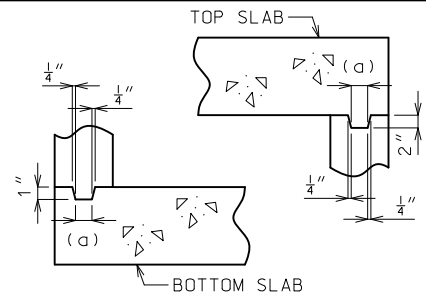
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

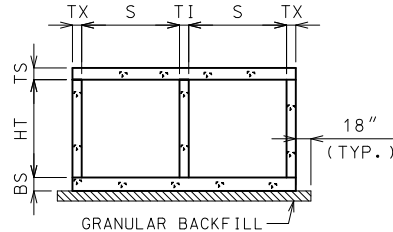
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

		MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
		105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		CONCRETE DOUBLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: FLARED	
		SECTIONS	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.43H		SHEET NO. 3 OF 3

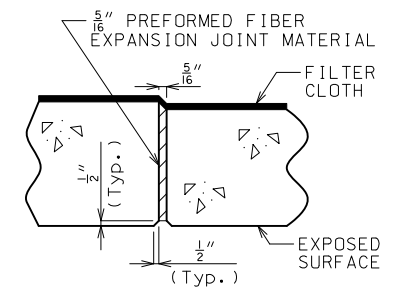
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS

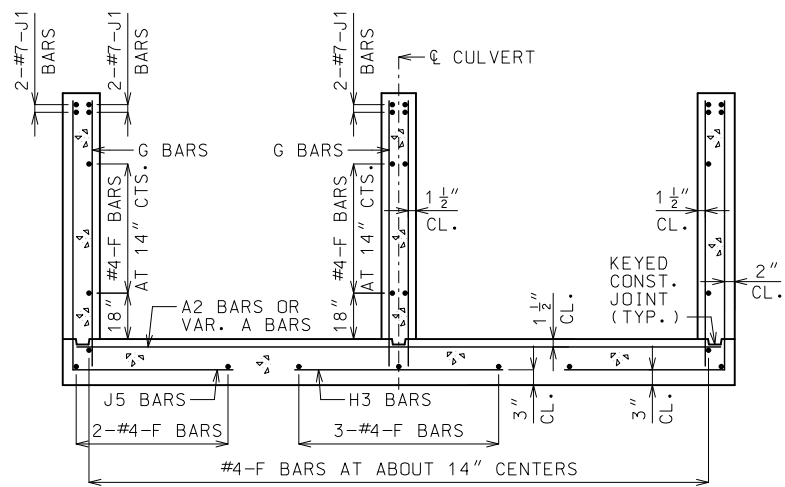


GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

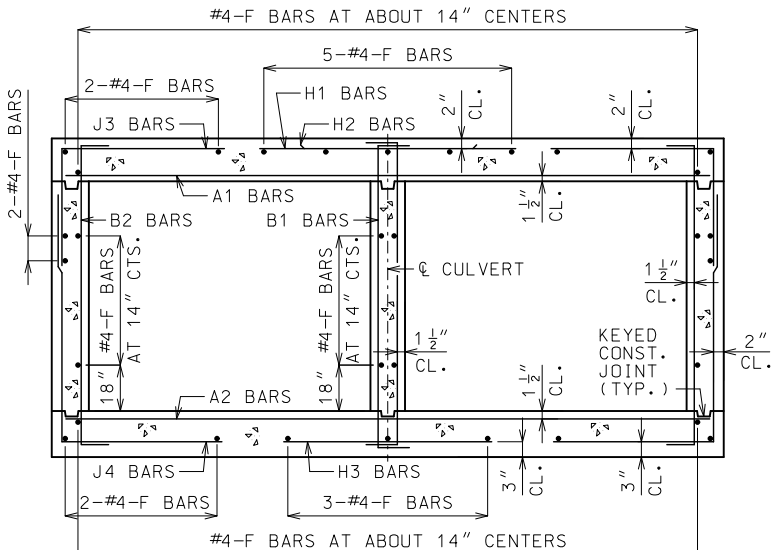


TRANSVERSE JOINT THRU BARREL
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

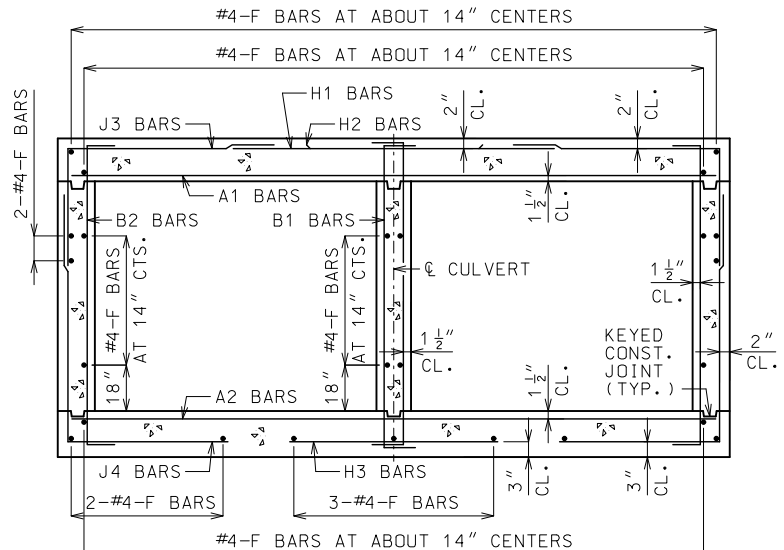
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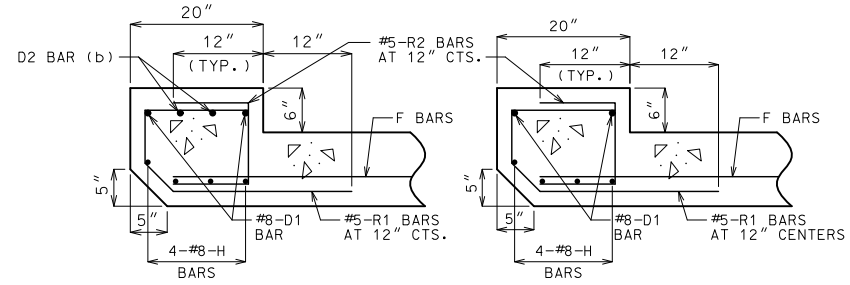
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"

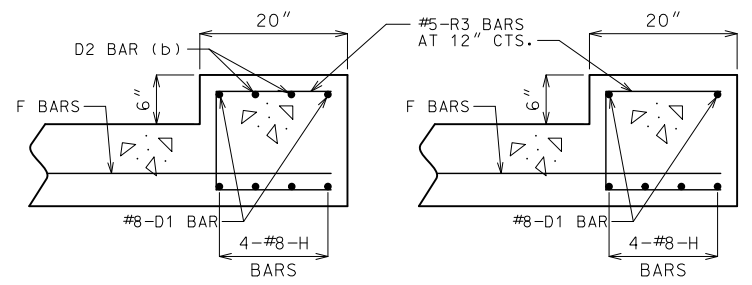


BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"



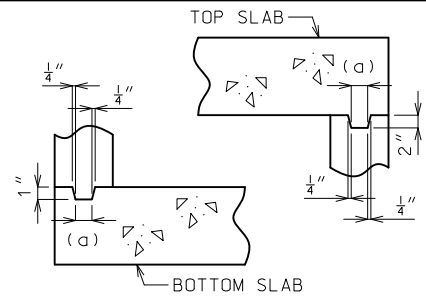
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL NEAR MIDSPAN

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CULVERT WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

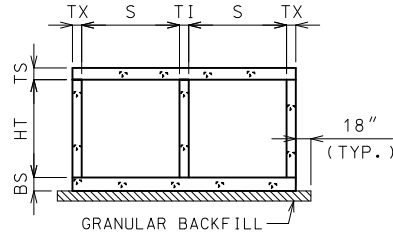
GENERAL NOTES:
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MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE DOUBLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: STRAIGHT SECTIONS	
	DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.44H SHEET NO. 3 OF 3

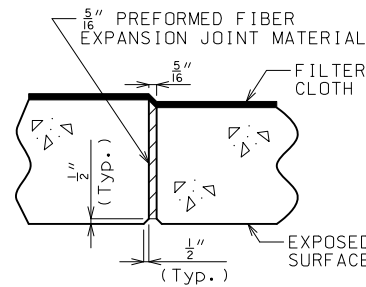
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



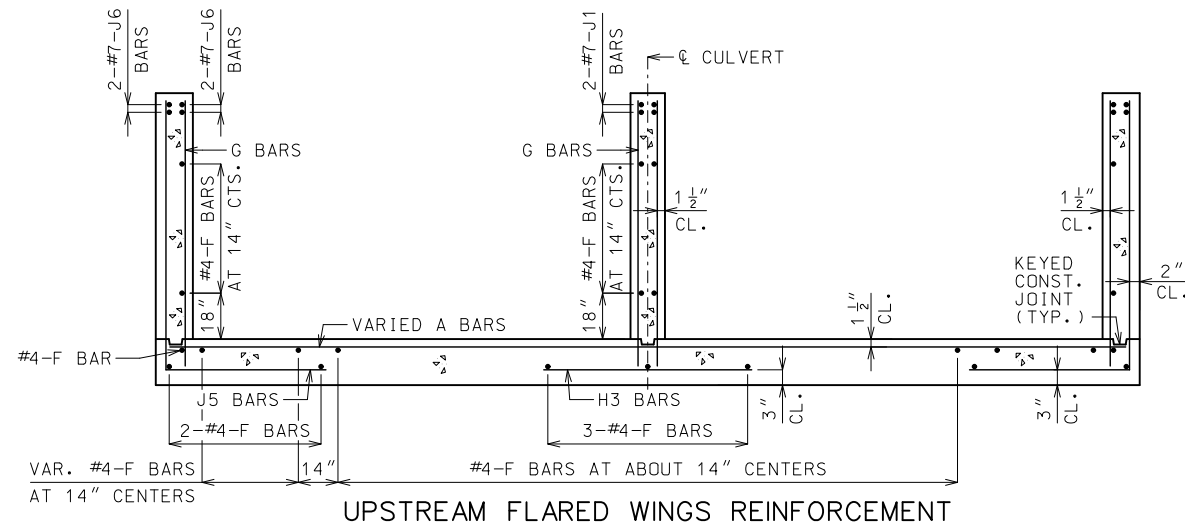
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



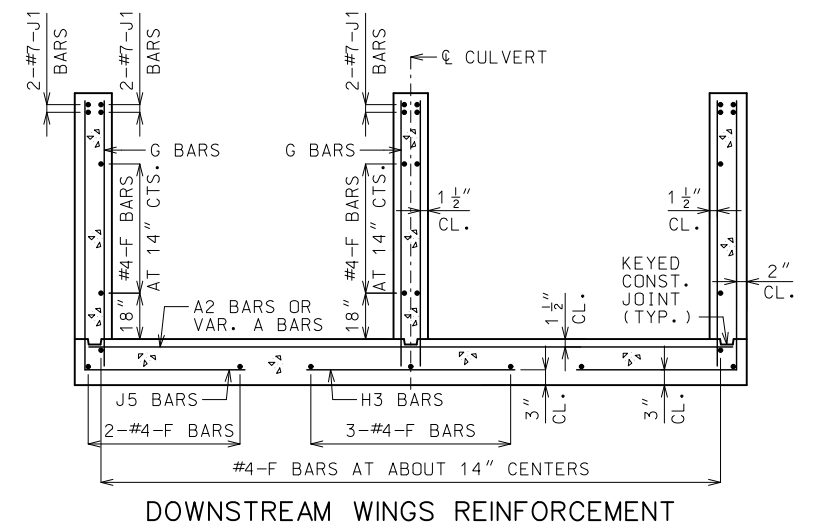
TRANSVERSE JOINT THRU BARREL

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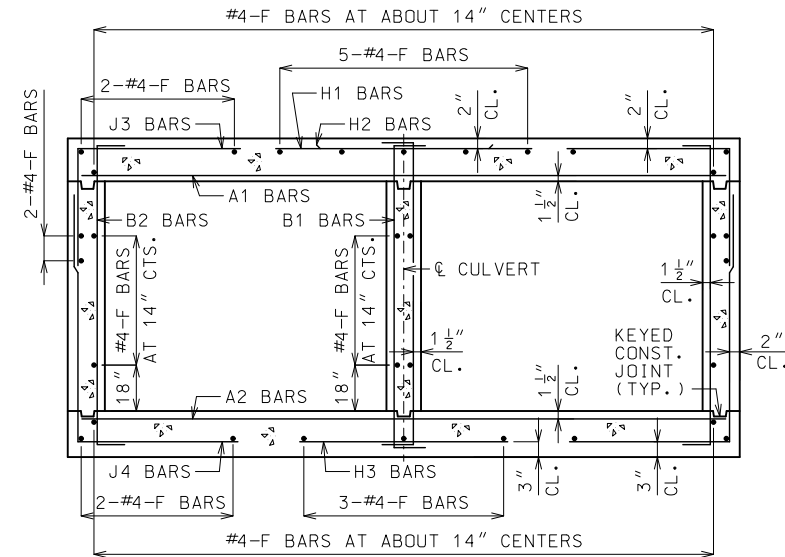
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UPSTREAM FLARED WINGS REINFORCEMENT

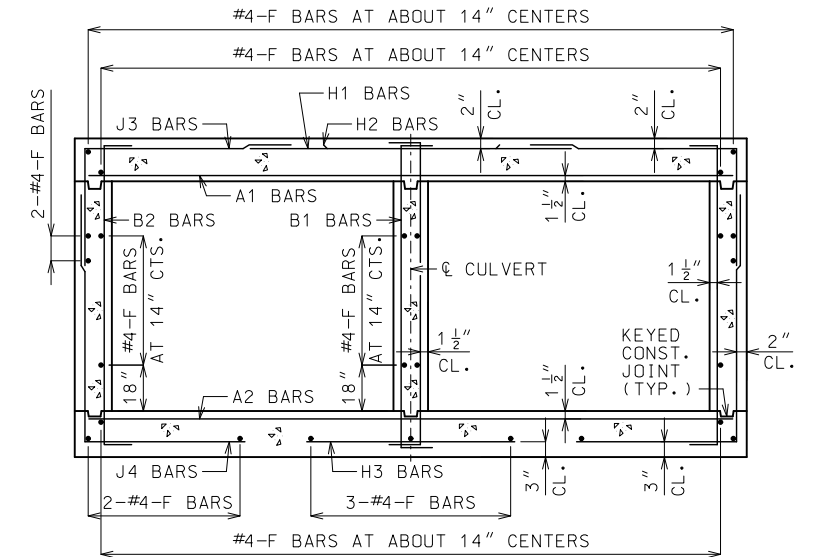


DOWNSTREAM WINGS REINFORCEMENT



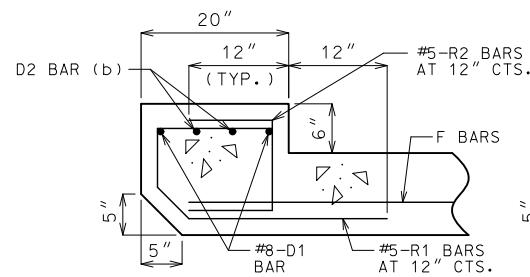
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"

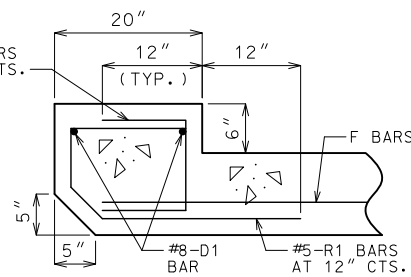


BARREL REINFORCEMENT

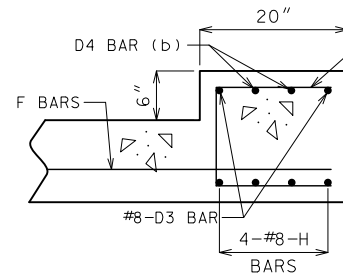
FOR DESIGN FILLS 2'-0" OR LESS



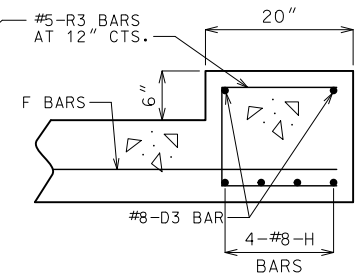
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
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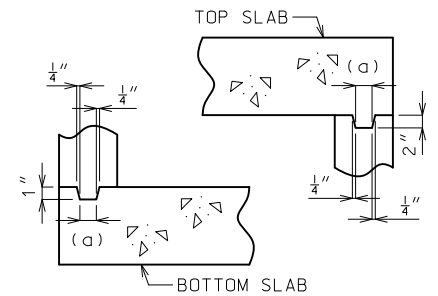
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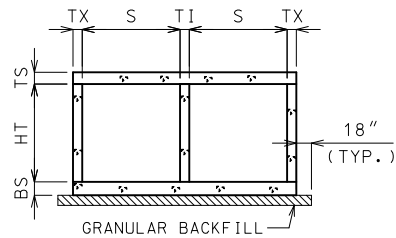
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
	<p>CONCRETE DOUBLE BOX CULVERT</p> <p>SKEW: RIGHT ADVANCE WINGS: FLARED</p> <p>SECTIONS</p>
<p>DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020</p>	<p>703.45C</p>
	<p>SHEET NO. 3 OF 3</p>

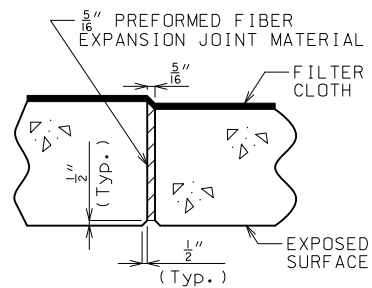
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



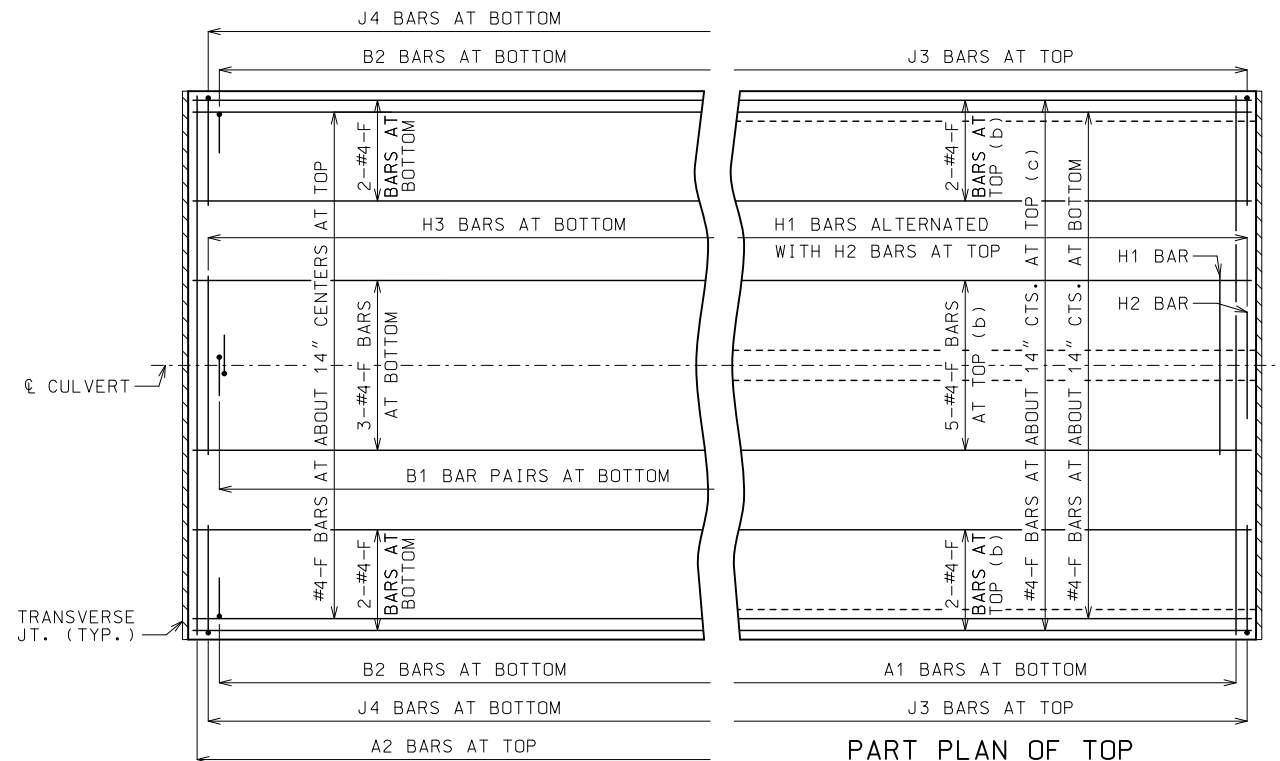
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

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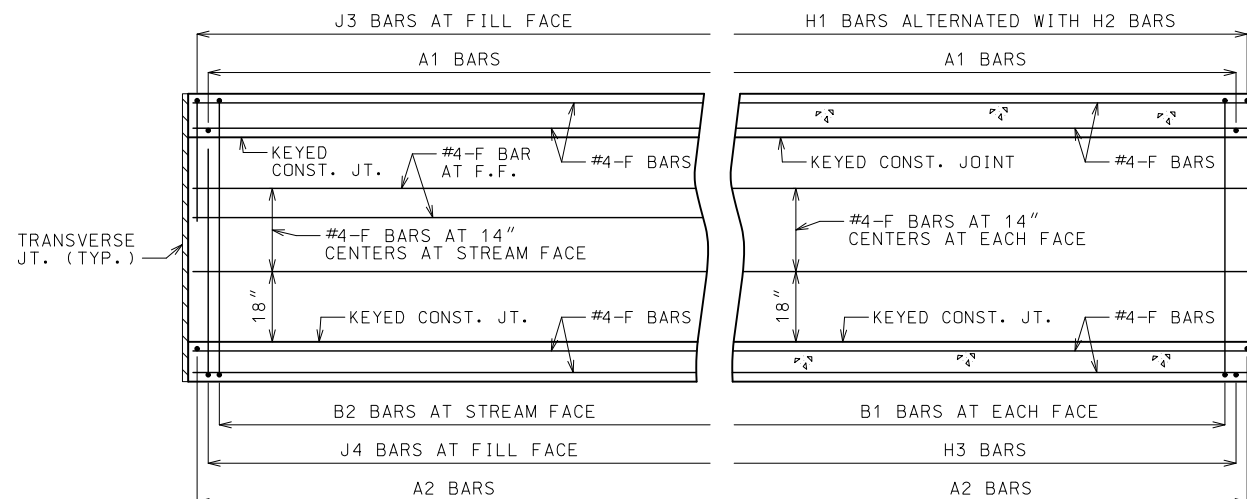
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PART PLAN OF BOTTOM SLAB REINFORCEMENT

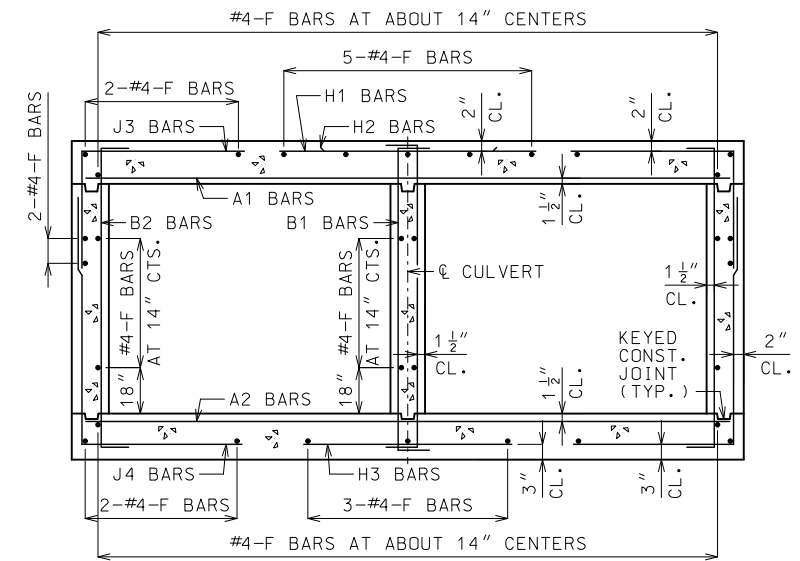
PART PLAN OF TOP SLAB REINFORCEMENT

(b) FOR DESIGN FILLS OVER 2'-0"
(c) FOR DESIGN FILLS 2'-0" OR LESS



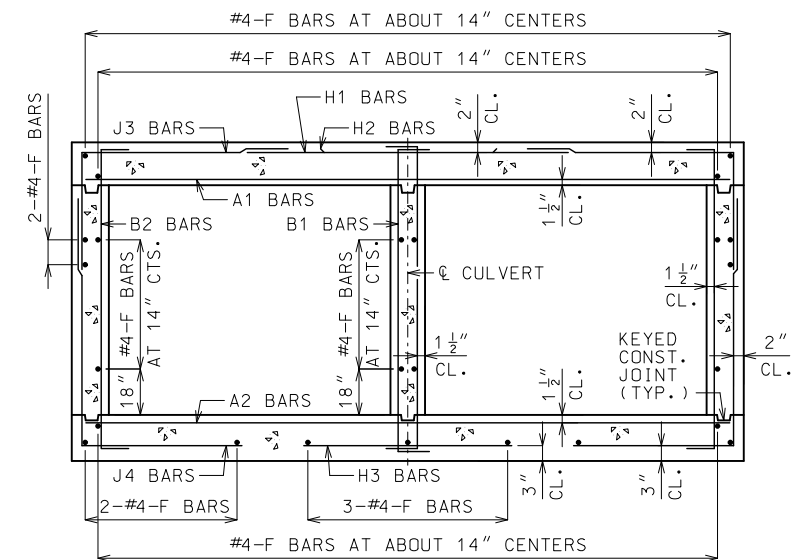
PART ELEVATION OF EXTERIOR WALL REINFORCEMENT

PART SECTION NEAR INTERIOR WALL REINFORCEMENT



BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.



BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.

GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

MISCELLANEOUS:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.47.

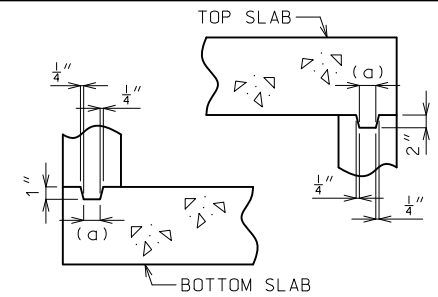
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS, PART ELEVATION AND PART SECTION.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

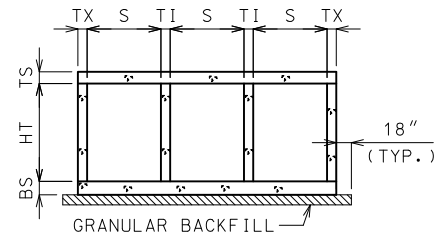
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
<p>STATE OF MISSOURI DENNIS W. HECKMAN NUMBER PE-27141 PROFESSIONAL ENGINEER</p>	<p>CONCRETE DOUBLE BOX CULVERT</p> <p>CUT SECTION</p>
<p>DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020</p>	<p>703.46</p> <p>SHEET NO. 1 OF 1</p>

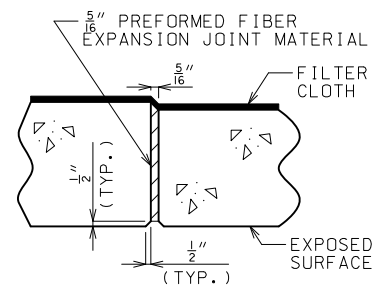
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



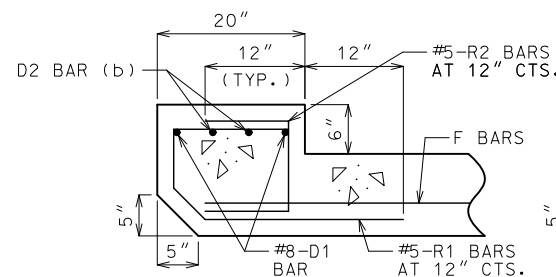
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



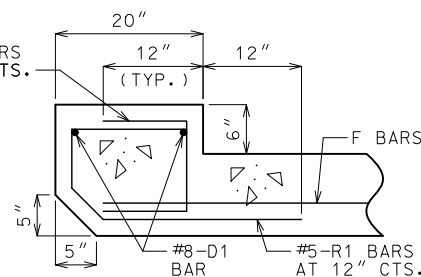
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

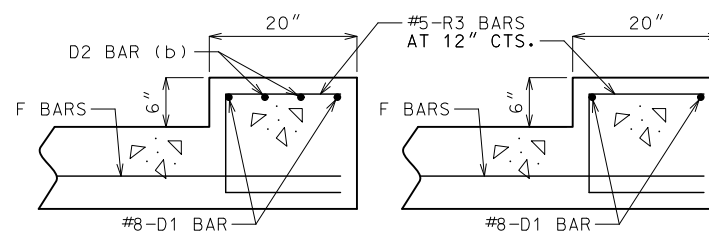
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



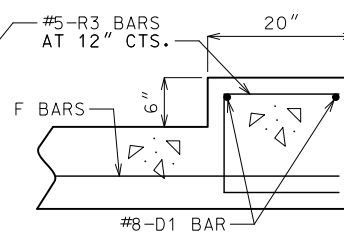
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



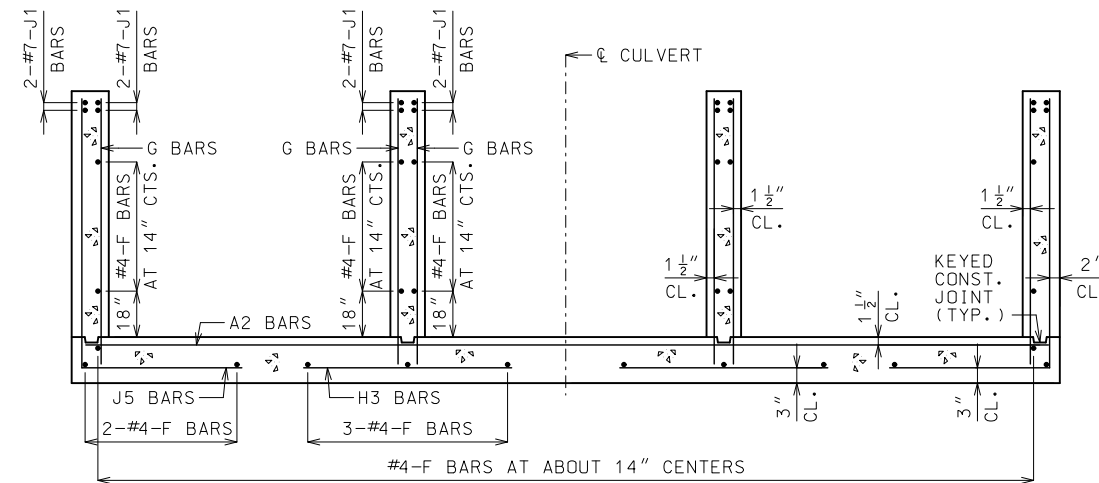
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



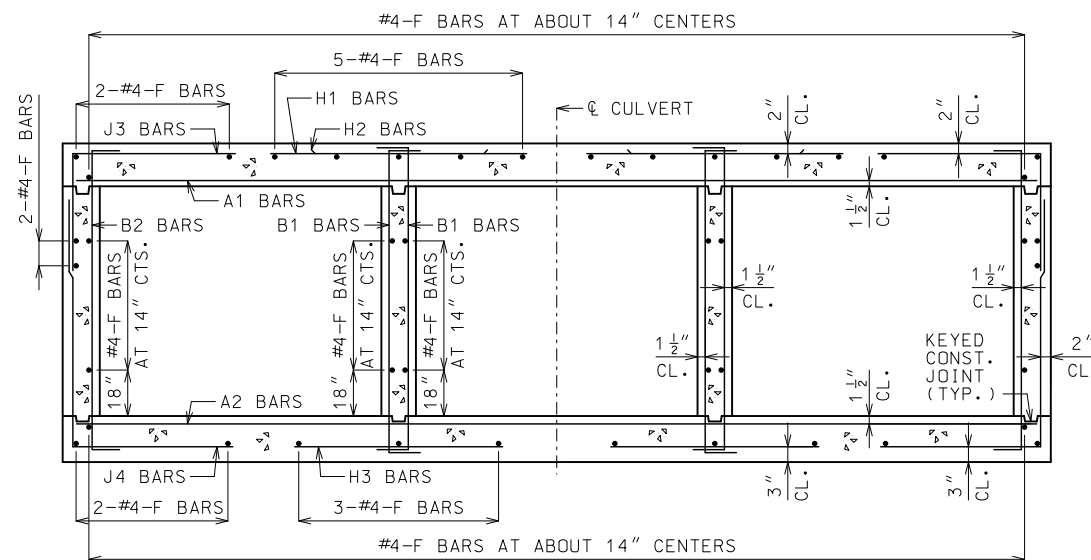
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

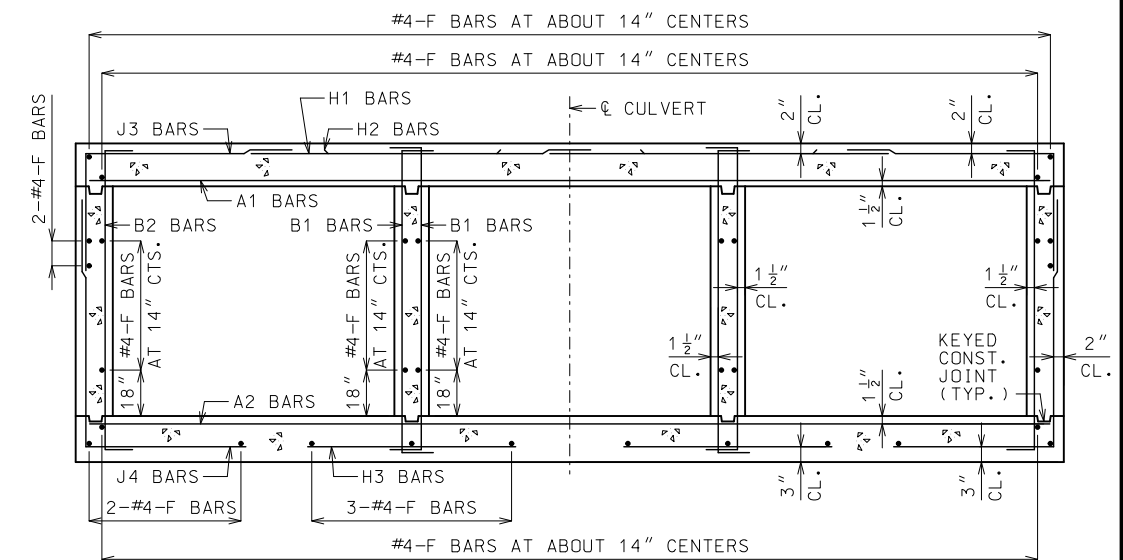
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}"$.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

SKEW: SQUARED
WINGS: STRAIGHT

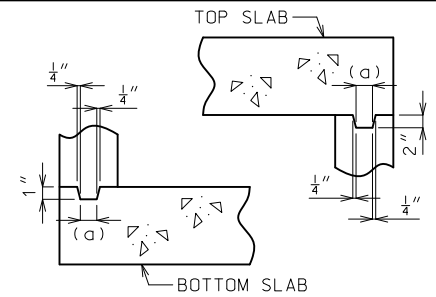
SECTIONS

DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

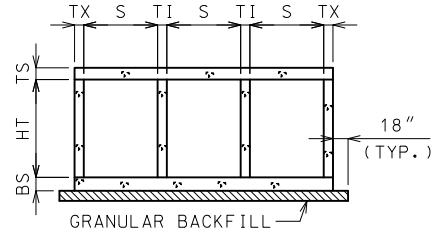
703.80H

SHEET NO.
3 OF 3

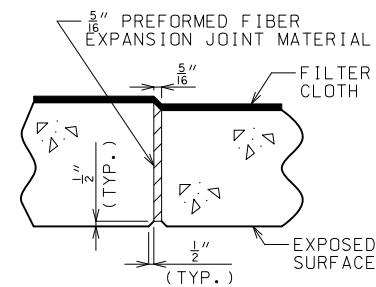
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



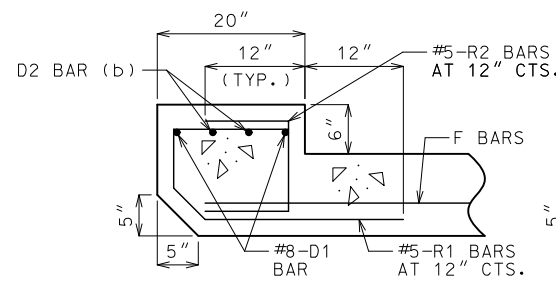
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



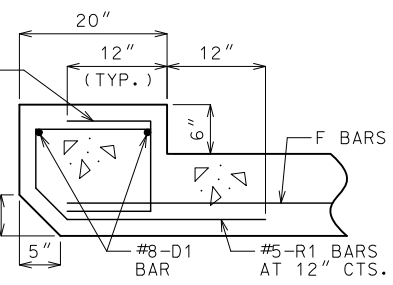
TRANSVERSE JOINT THRU BARREL

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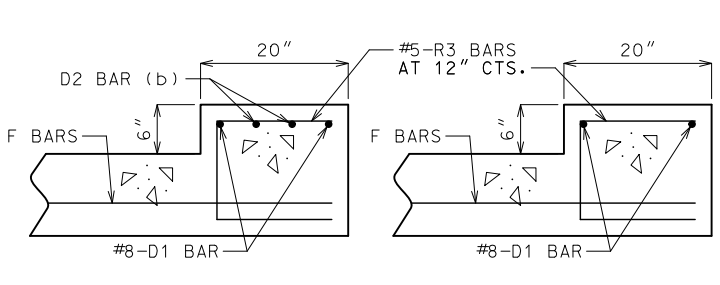
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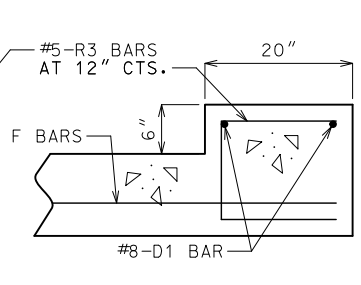
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



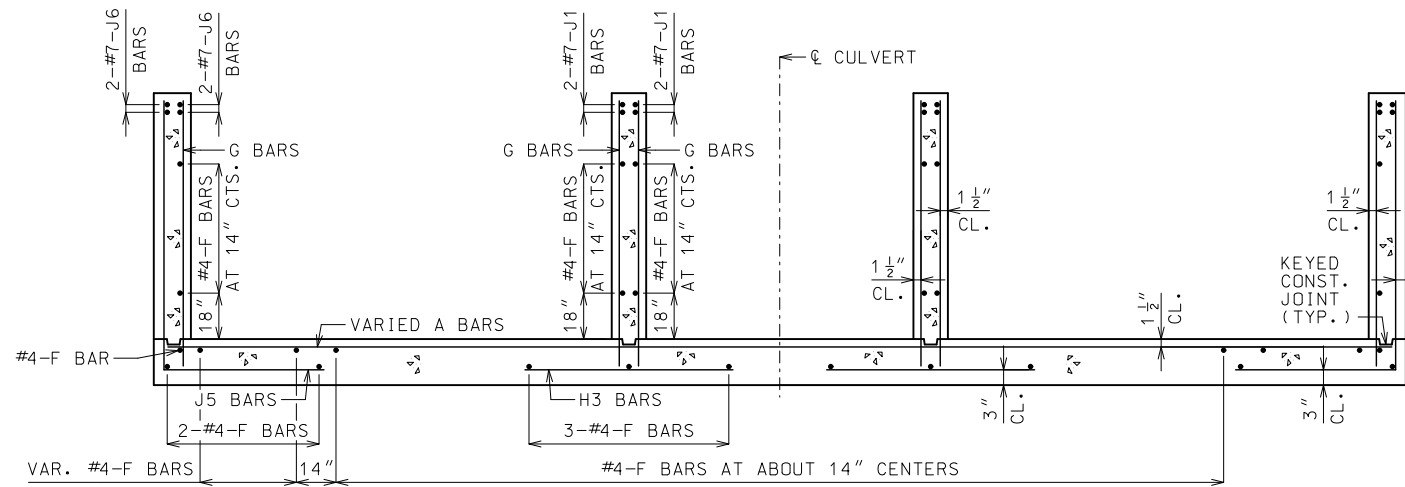
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



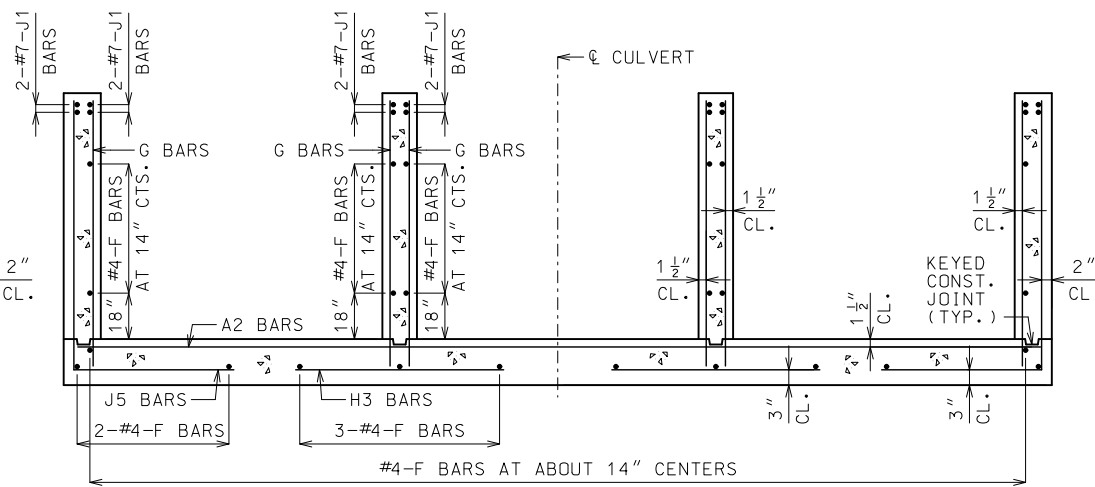
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"
#8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"

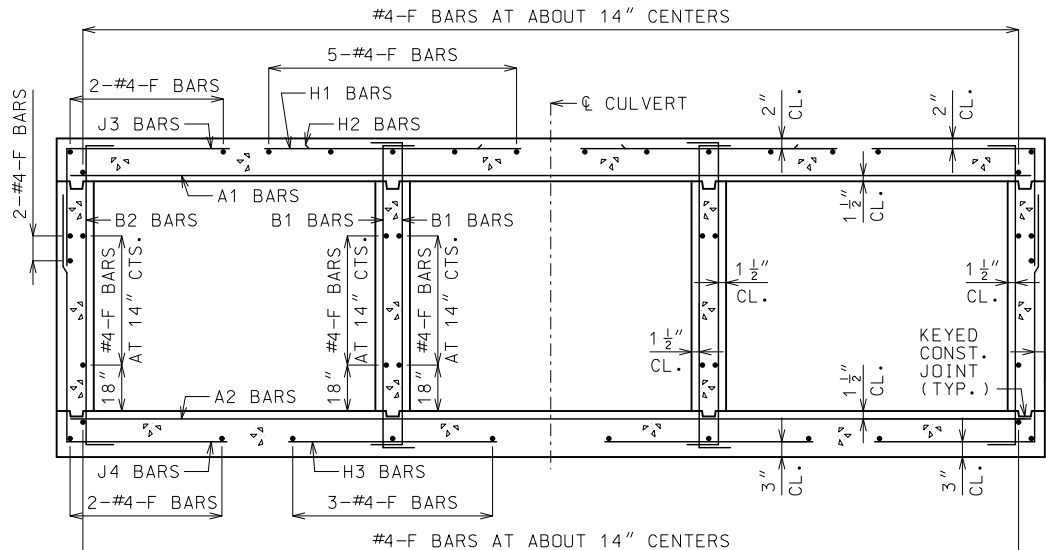
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



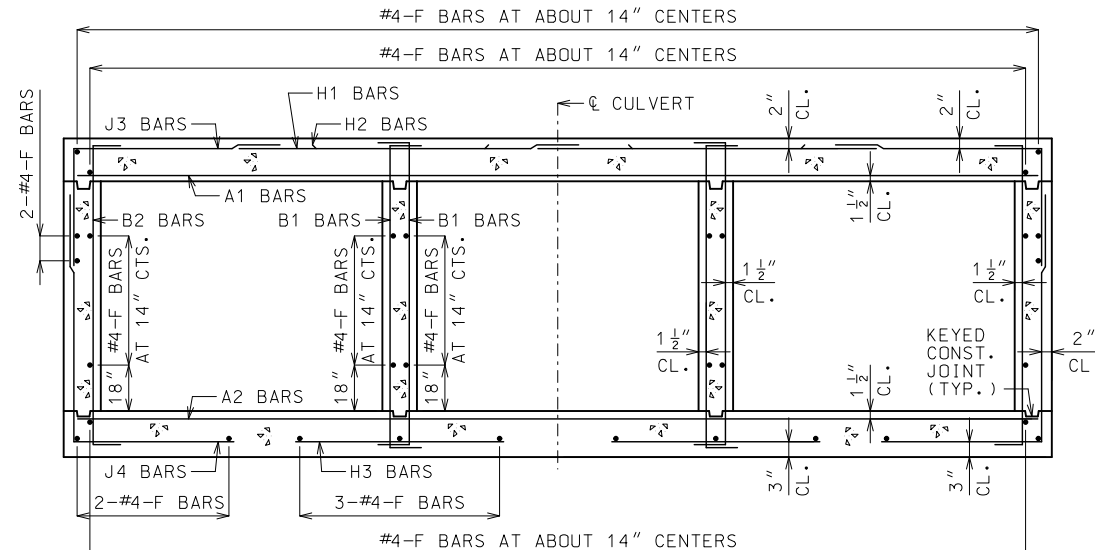
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

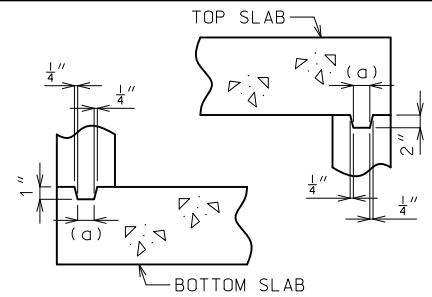
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DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

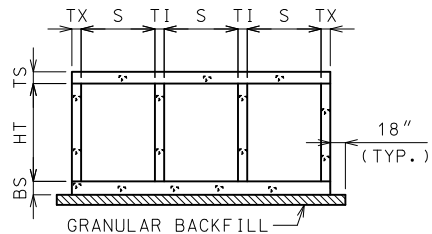
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE TRIPLE BOX CULVERT	
	SKEW: SQUARED WINGS: FLARED	
SECTIONS		SHEET NO. 3 OF 3
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.81H	

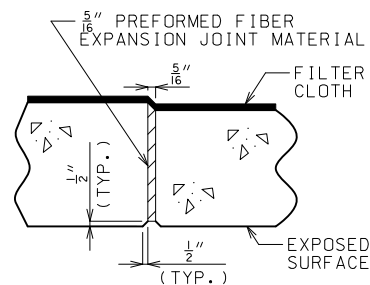
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KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



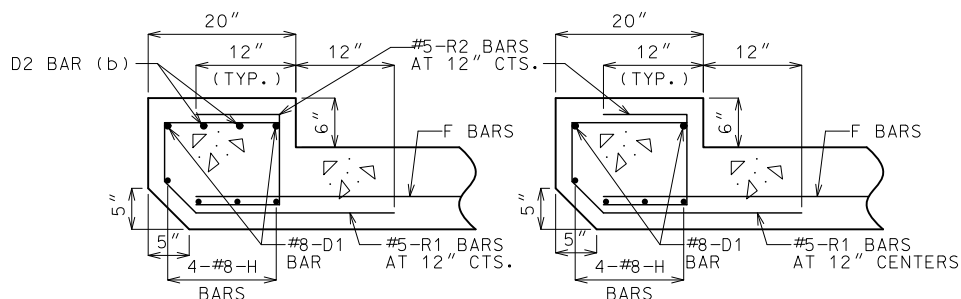
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

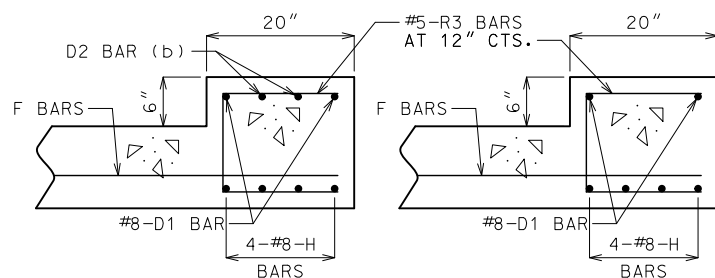
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UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL

UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

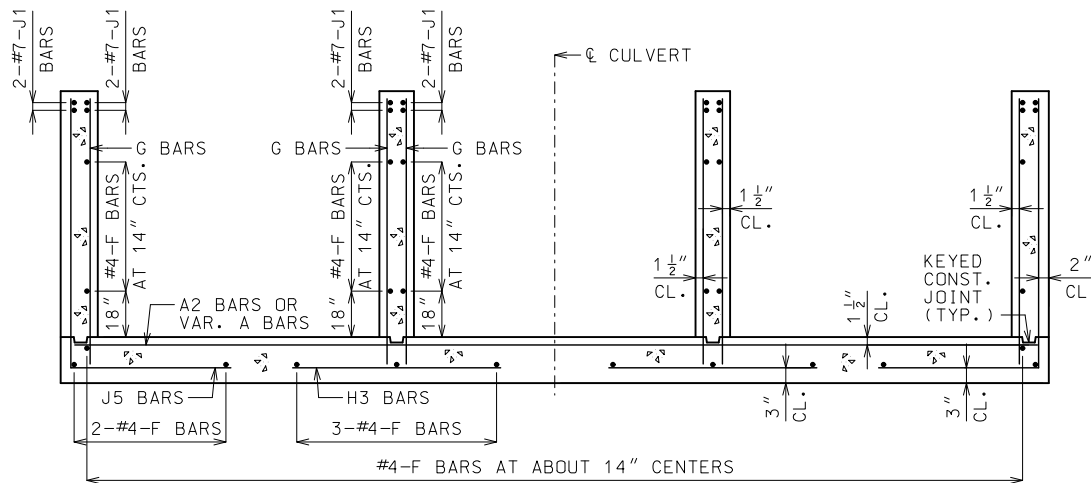


DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL

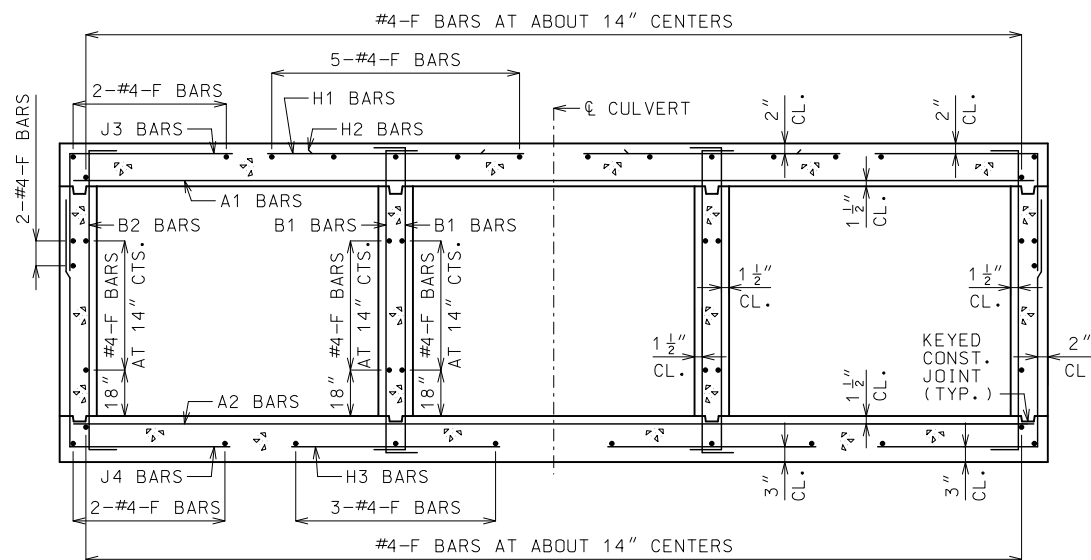
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

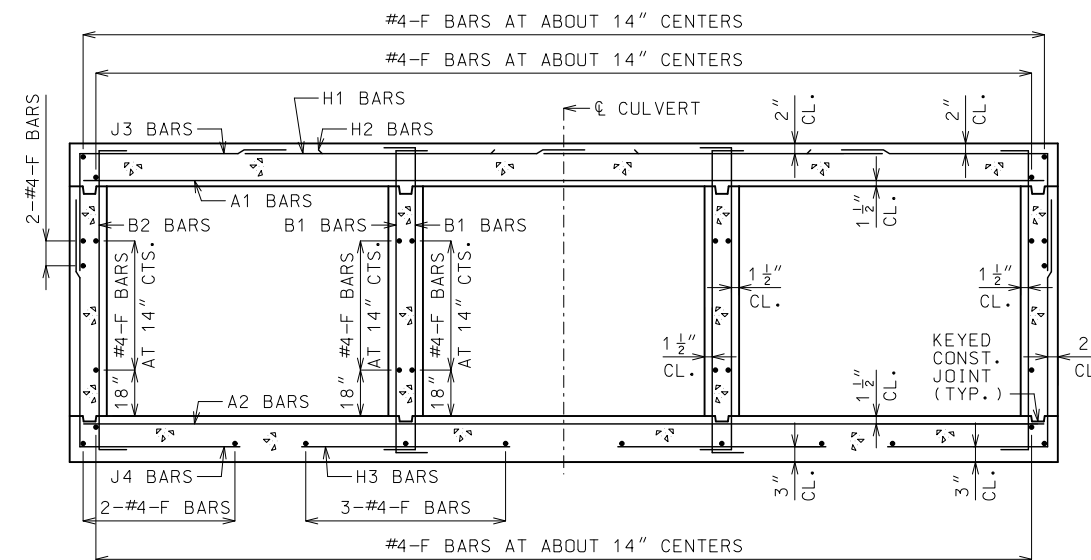
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UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

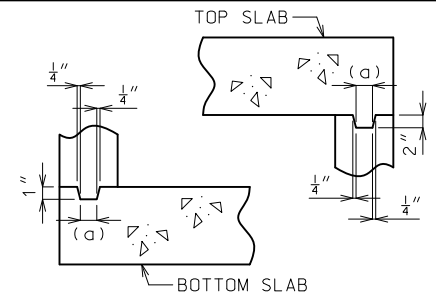
CONCRETE TRIPLE BOX CULVERT
SKEW: LEFT ADVANCE
WINGS: STRAIGHT

SECTIONS

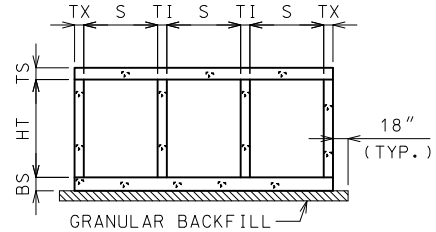
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

703.82H

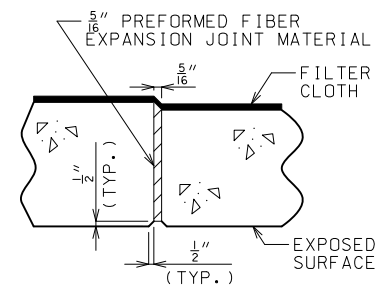
SHEET NO.
3 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



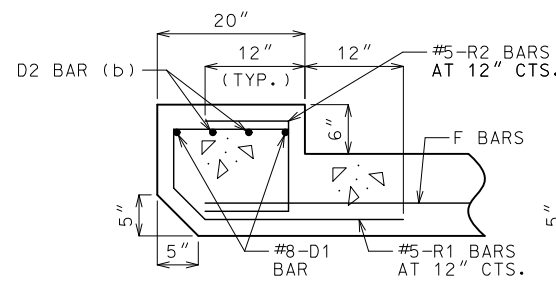
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



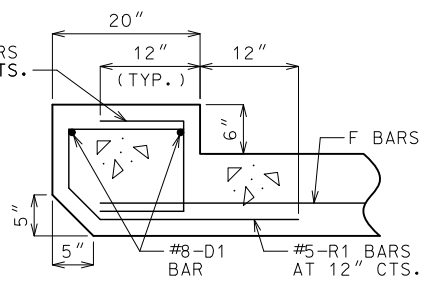
TRANSVERSE JOINT THRU BARREL

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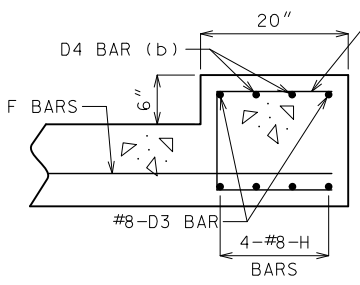
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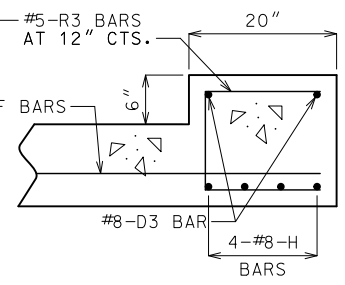
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



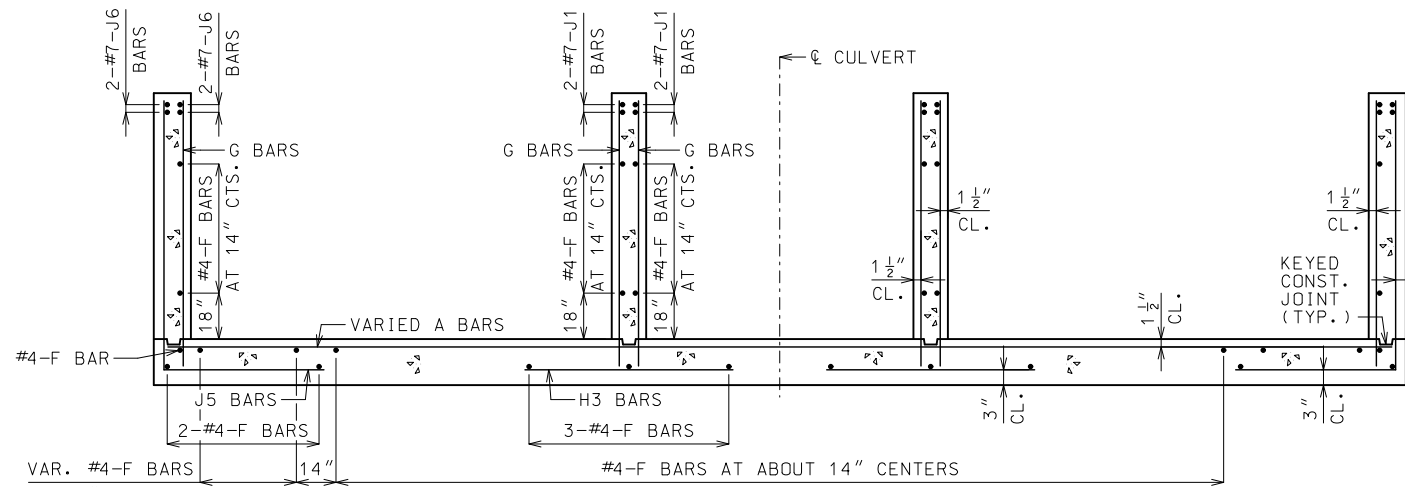
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



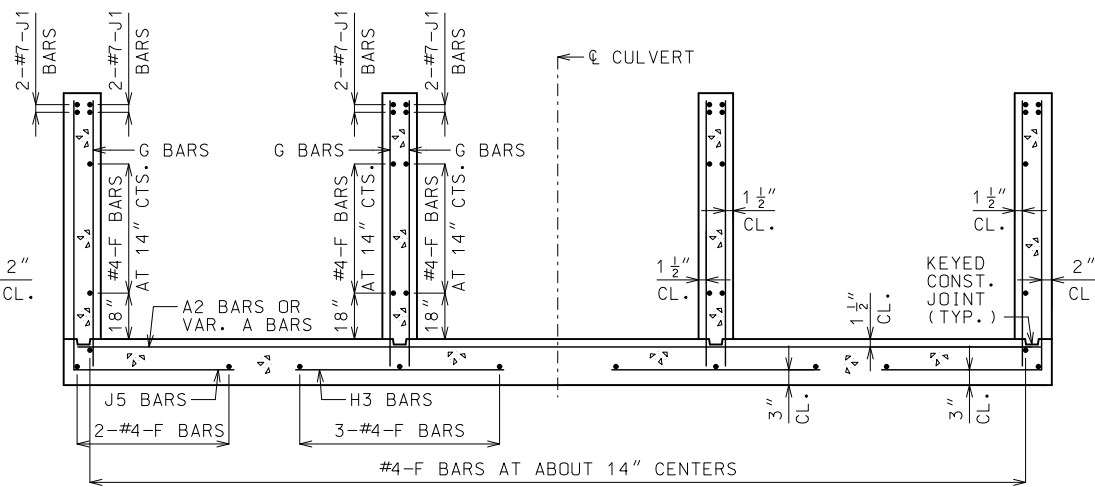
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

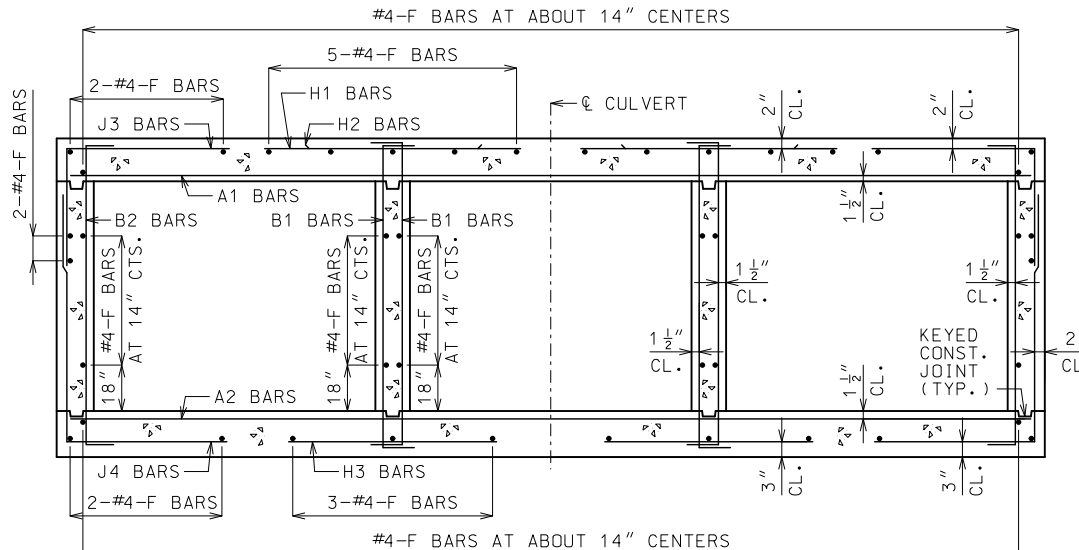
IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



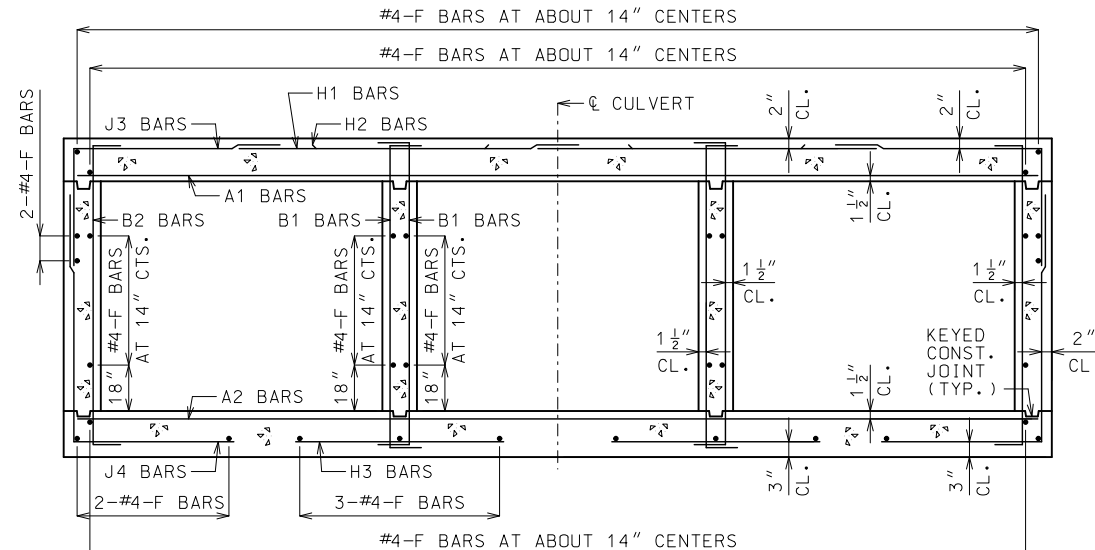
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

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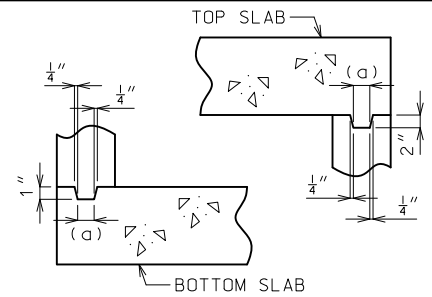
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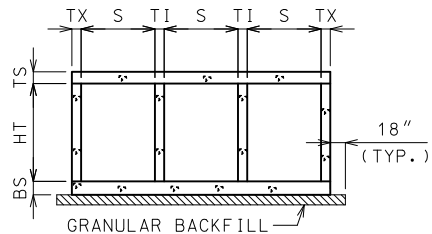
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	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE TRIPLE BOX CULVERT	
	SKEW: LEFT ADVANCE WINGS: FLARED	
SECTIONS		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.83H	SHEET NO. 3 OF 3

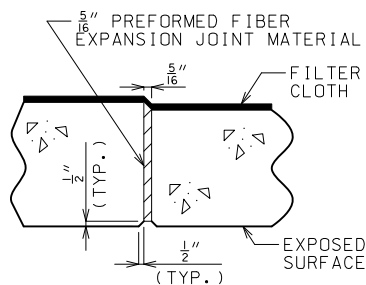
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



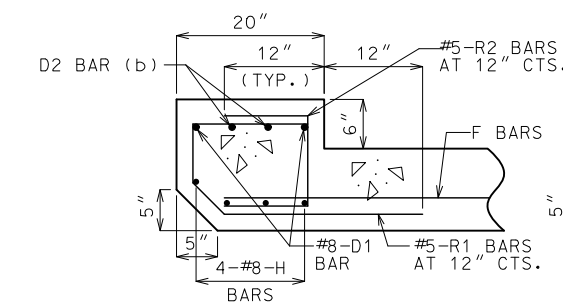
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



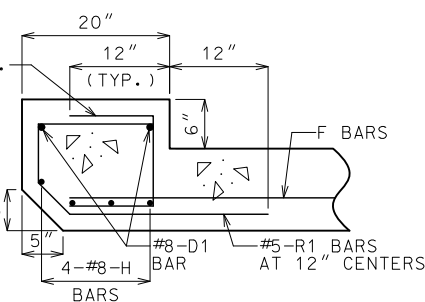
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

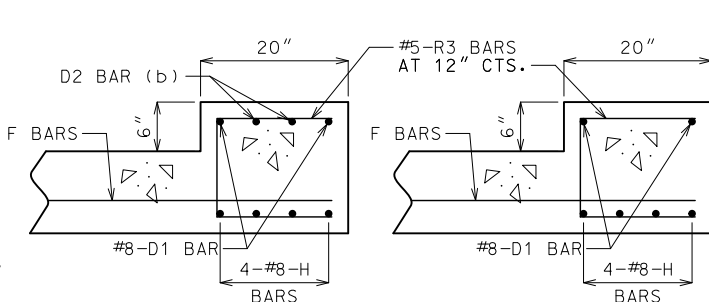
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



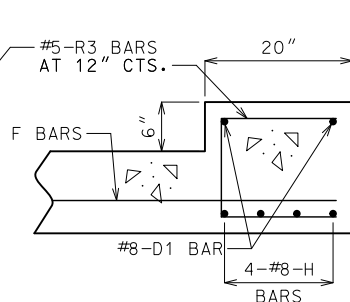
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



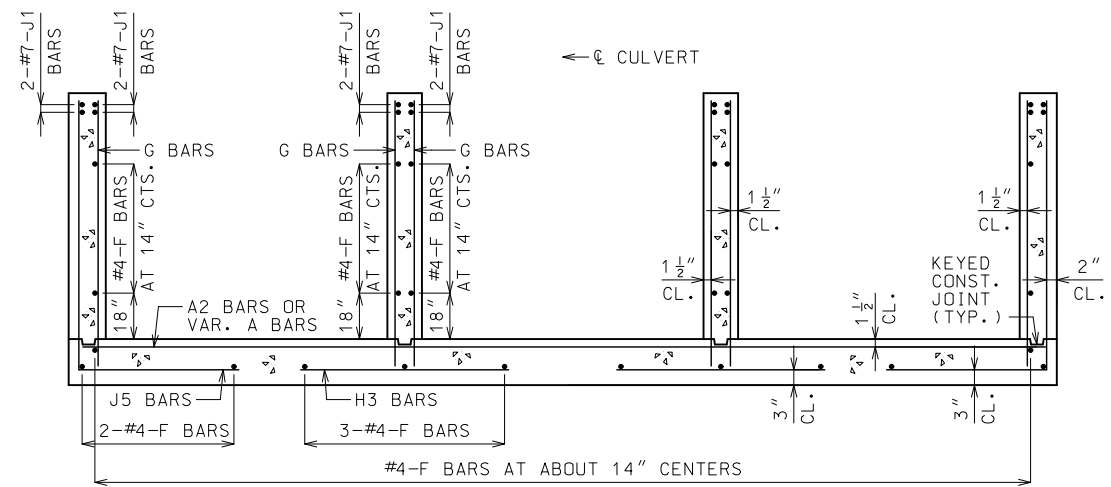
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



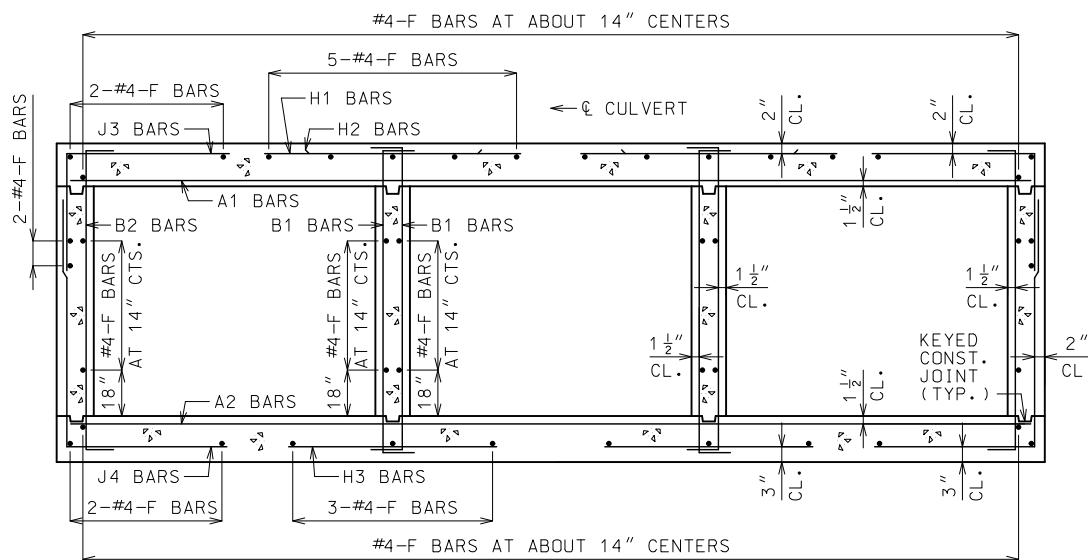
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

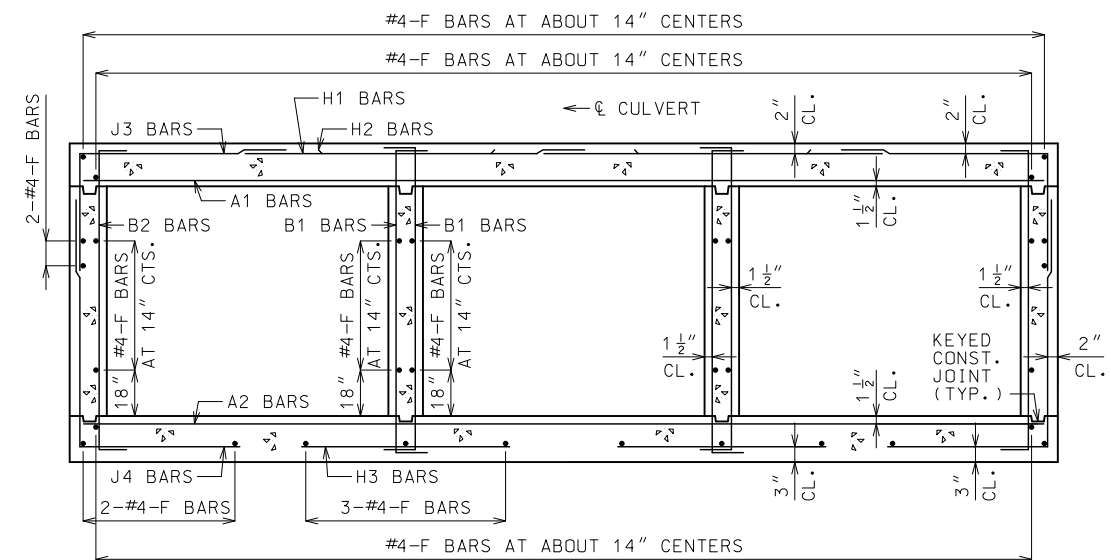
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF \varnothing WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO \varnothing CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}"$.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

CONCRETE TRIPLE BOX CULVERT
SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

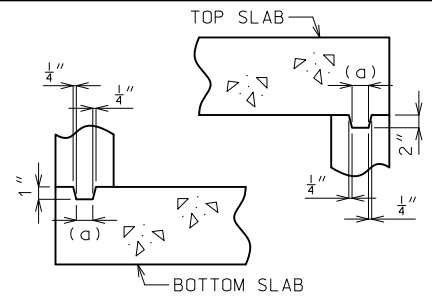
SECTIONS

DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

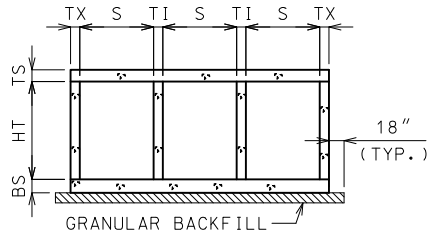
703.84H

SHEET NO.
3 OF 3

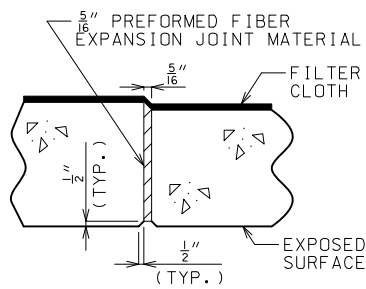
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



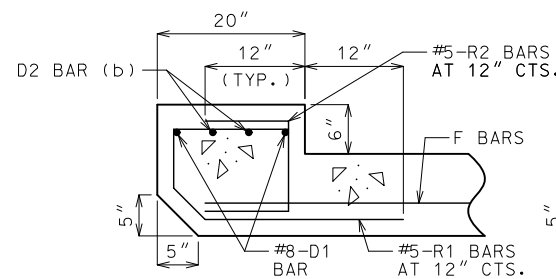
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



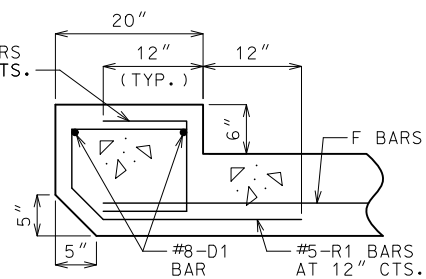
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

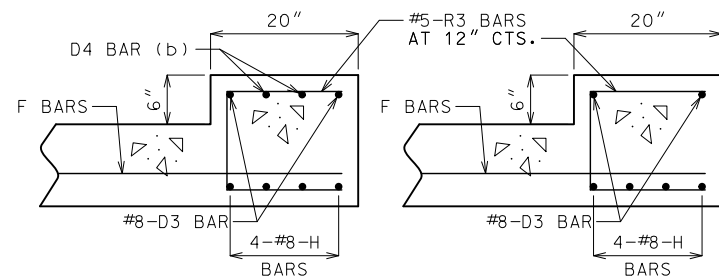
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



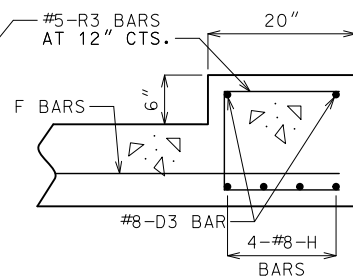
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



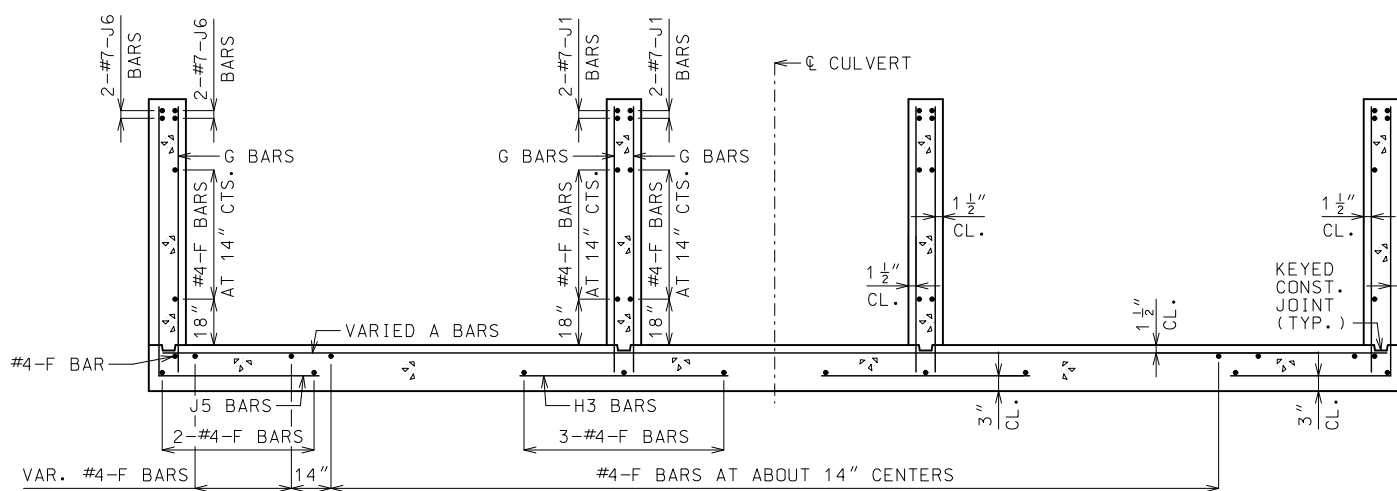
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



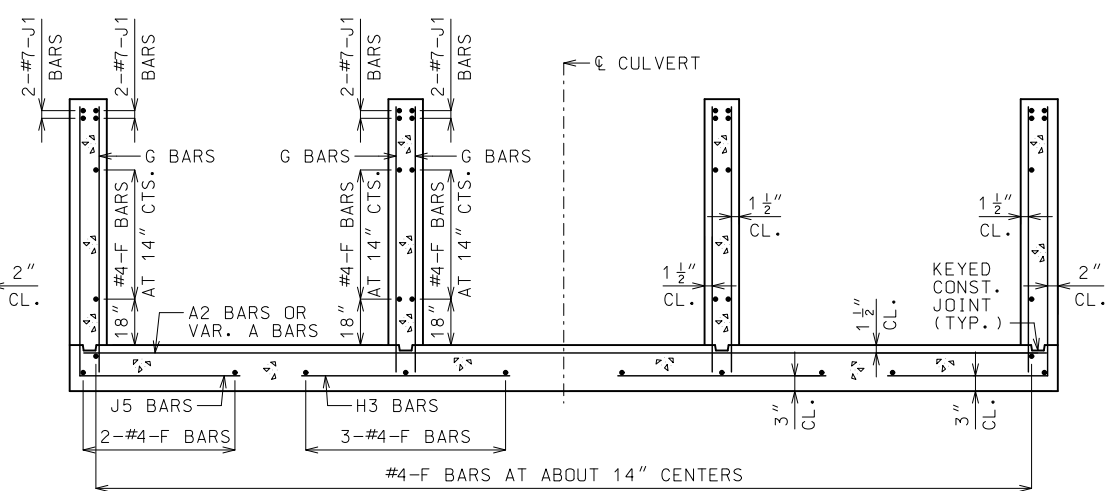
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

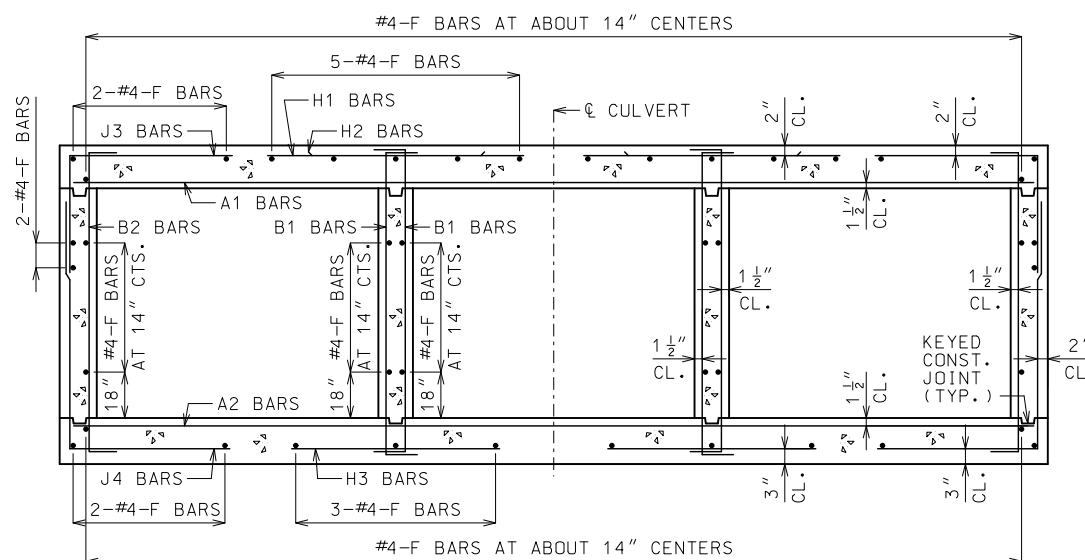
IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



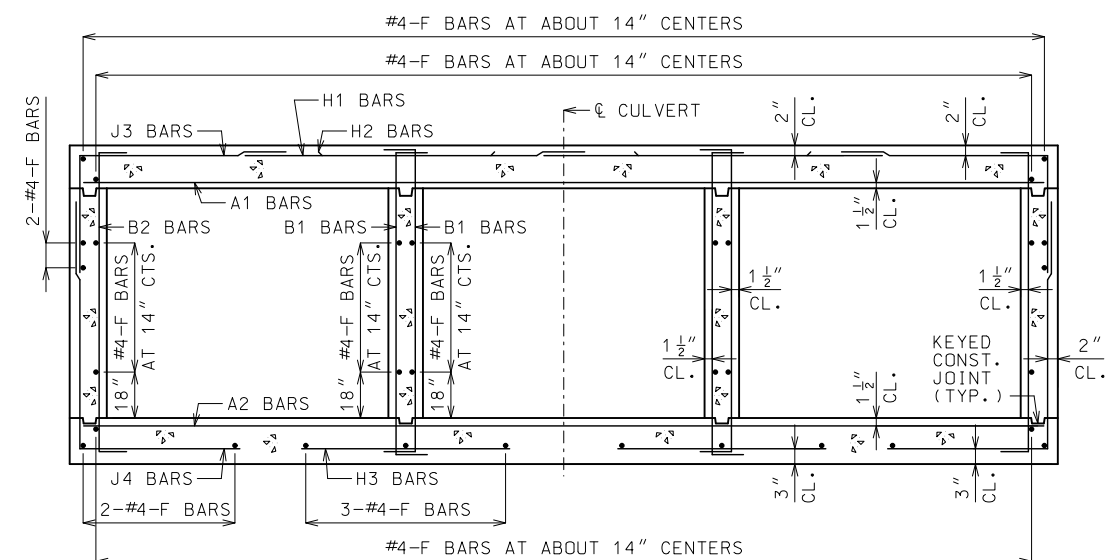
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

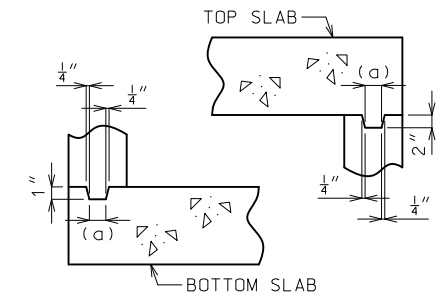
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

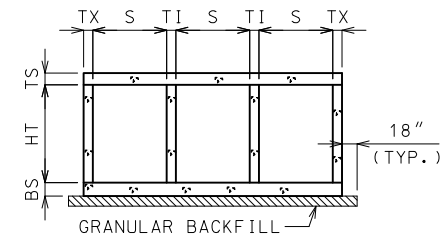
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}"$.

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE TRIPLE BOX CULVERT	
	SKEW: RIGHT ADVANCE WINGS: FLARED	
SECTIONS		
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.85C	SHEET NO. 3 OF 3

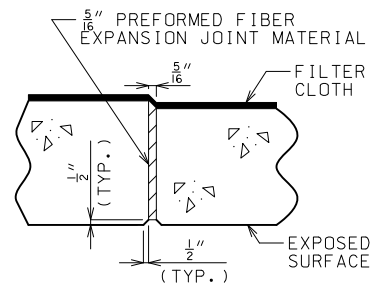
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



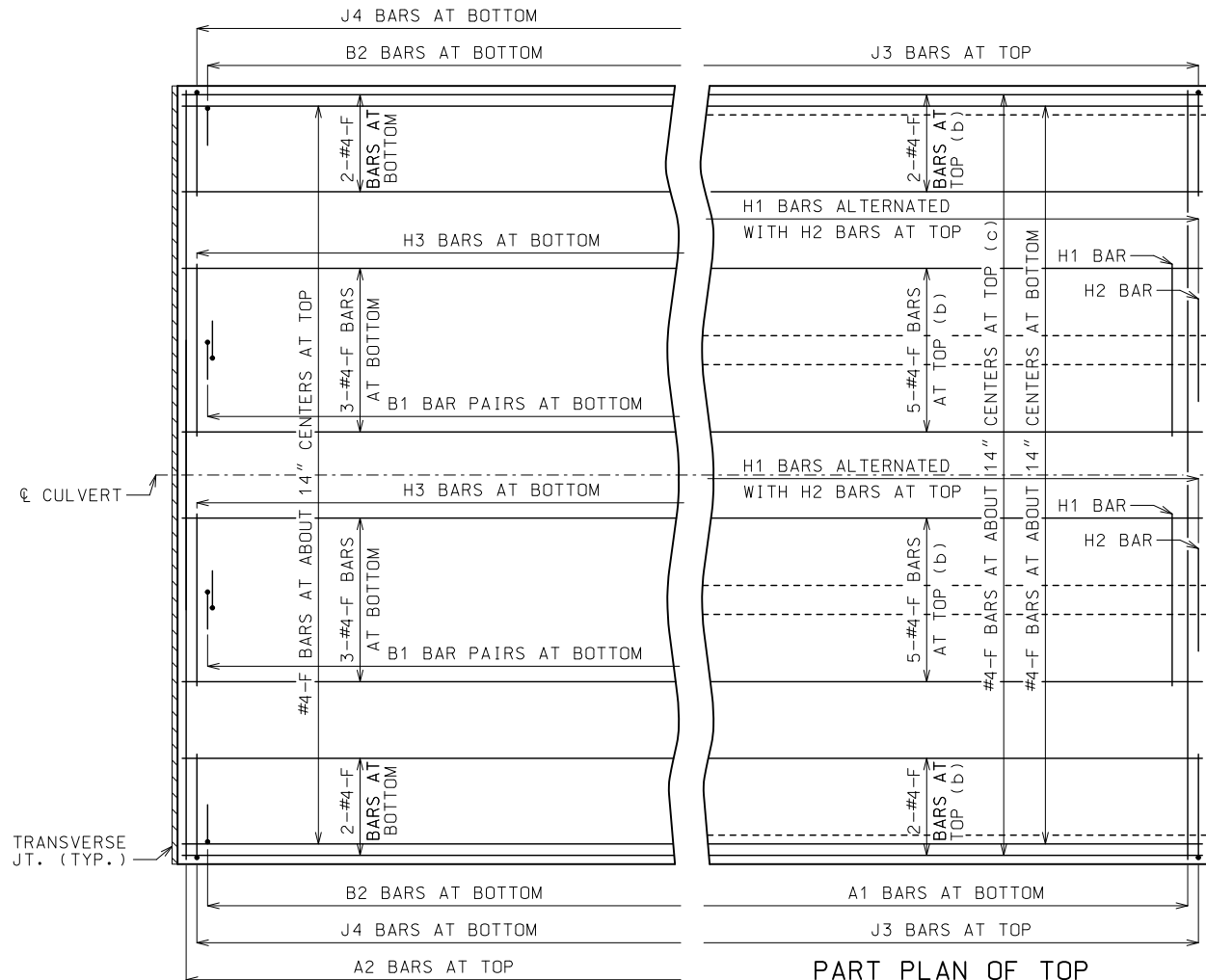
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

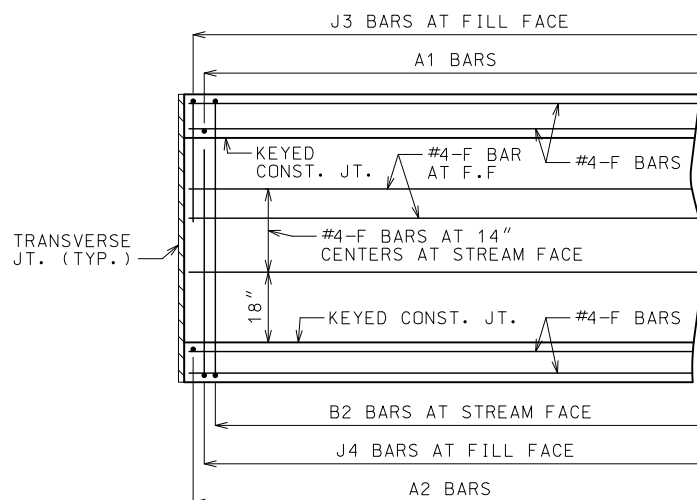
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



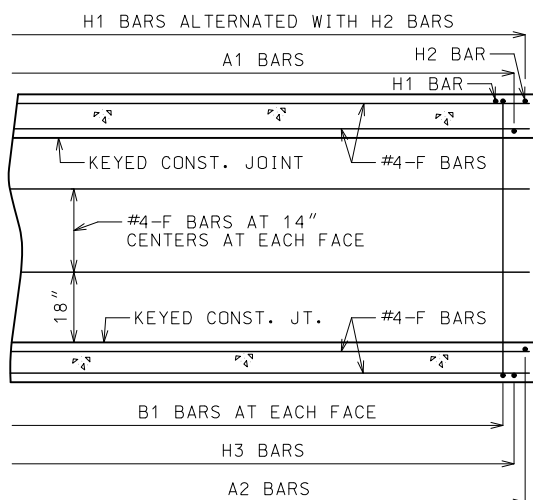
PART PLAN OF BOTTOM SLAB REINFORCEMENT

PART PLAN OF TOP SLAB REINFORCEMENT

(b) FOR DESIGN FILLS OVER 2'-0"
(c) FOR DESIGN FILLS 2'-0" OR LESS



PART ELEVATION OF EXTERIOR WALL REINFORCEMENT



PART SECTION NEAR INTERIOR WALL REINFORCEMENT

GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

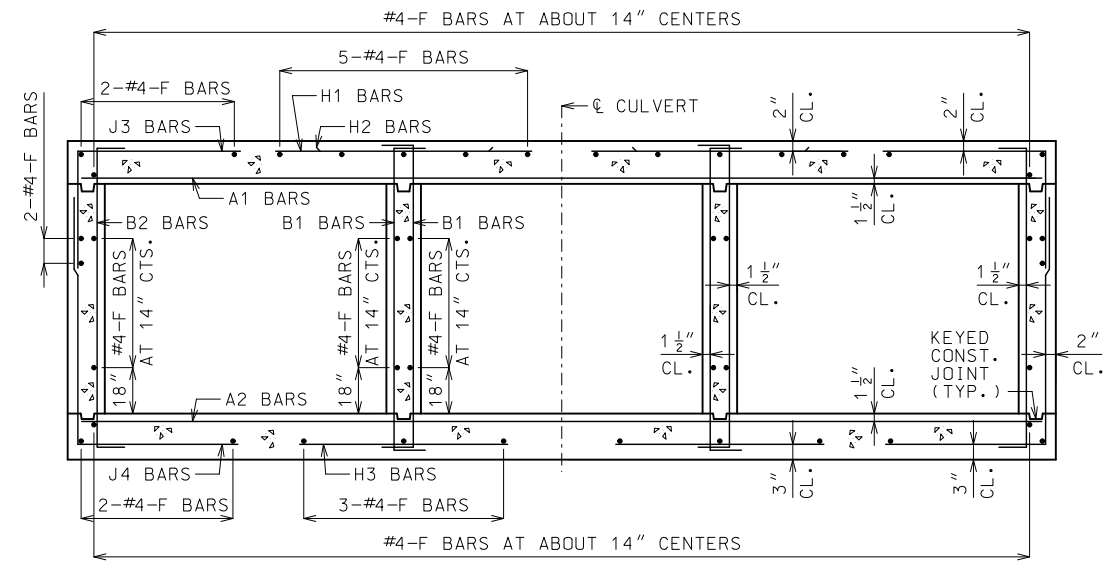
DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

MISCELLANEOUS:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.87.

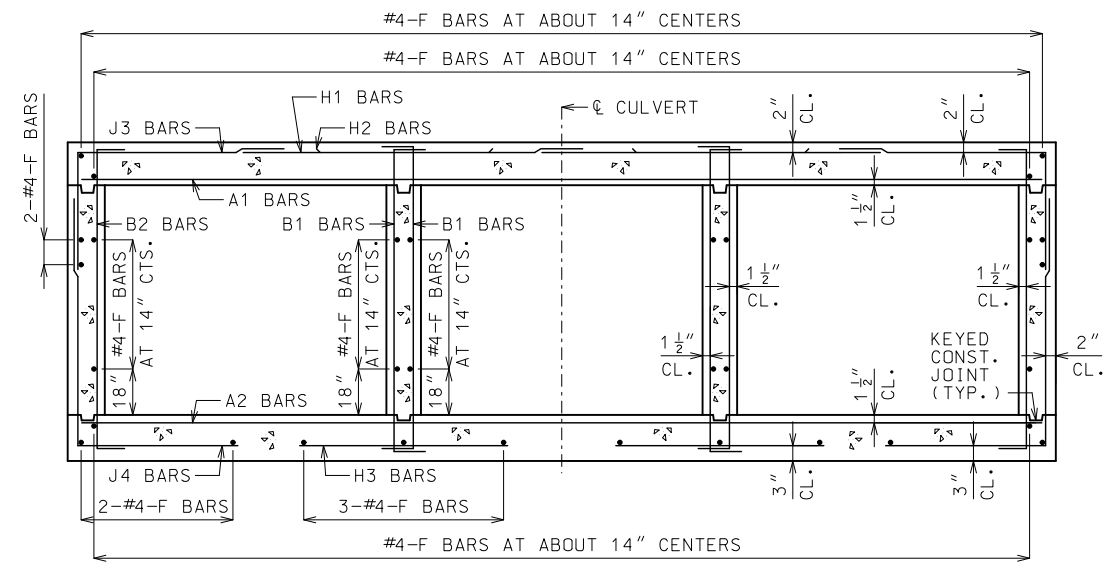
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS, PART ELEVATION AND PART SECTION.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.

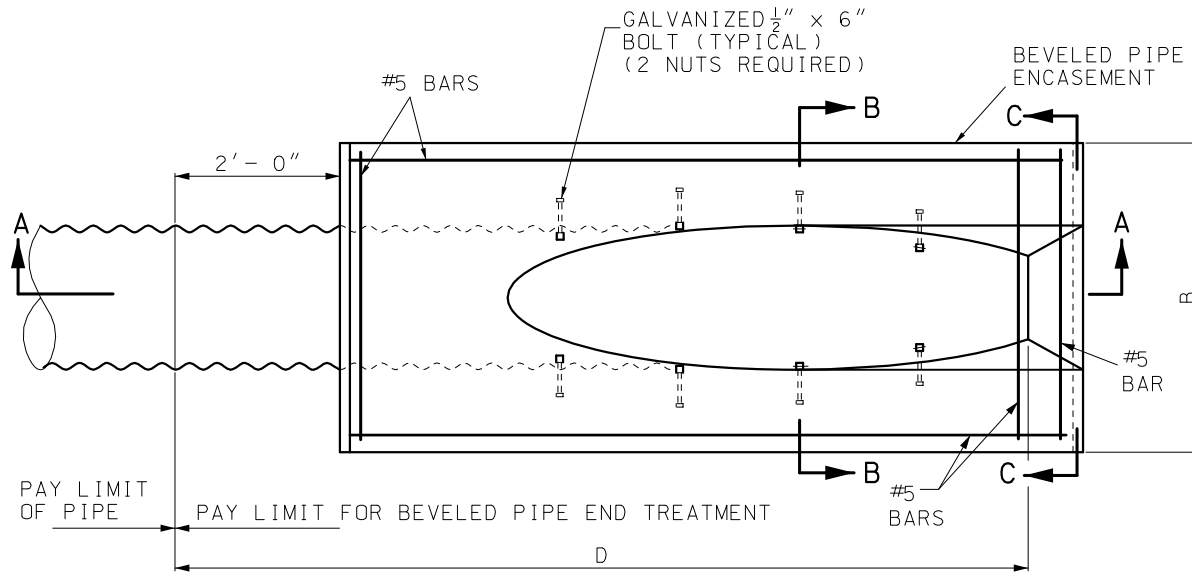


BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.

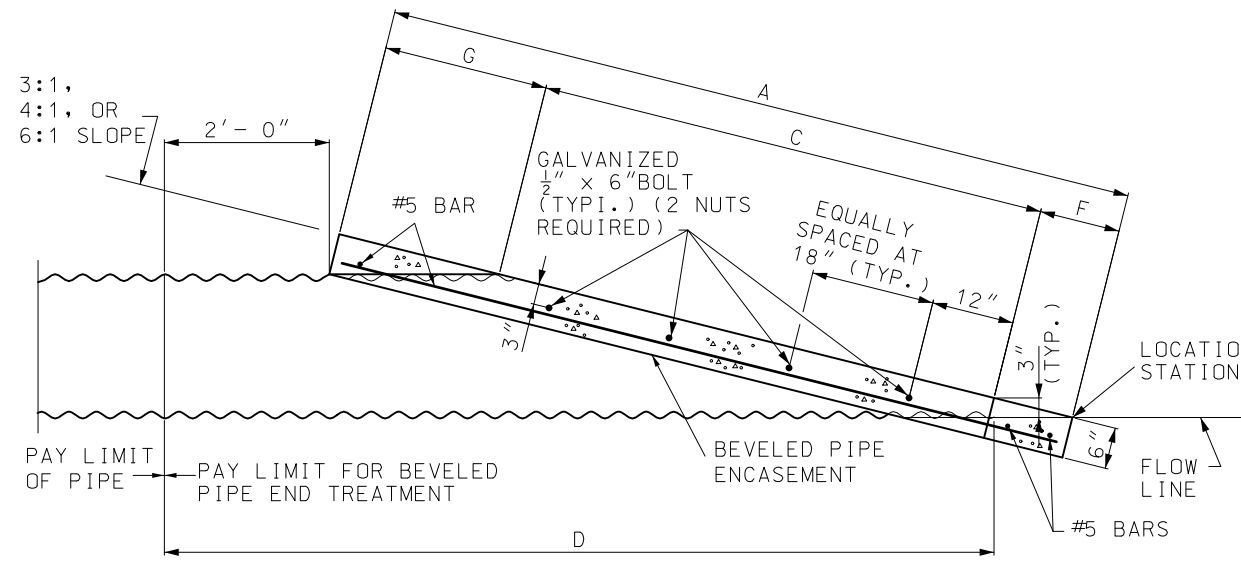
	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	CONCRETE TRIPLE BOX CULVERT	
	CUT SECTION	
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	703.86	SHEET NO. 1 OF 1

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

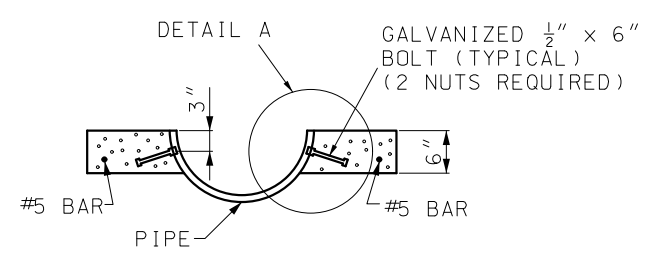
BEVELED PIPE ENCASEMENT DETAILS								
PIPE DIAMETER	SLOPE	A	B	C	D	E	F	G
15"	3:1	5'-5 1/2"	3'-3"	3'-2"	6'-7"	1	9 1/2"	18"
	4:1	7'-2"		4'-1 1/2"	8'-1 1/4"	2	12 1/2"	24"
	6:1	10'-7 1/4"		6'-1"	11'-1 1/2"	3	18 1/4"	36"
18"	3:1	6'-3"	3'-6"	3'-11 1/2"	7'-4"	2	9 1/2"	18"
	4:1	8'-2 1/4"		5'-1 3/4"	9'-1"	3	12 1/2"	24"
	6:1	12'-1 1/2"		7'-7 1/4"	12'-7 1/2"	4	18 1/4"	36"
21"	3:1	7'-1 1/2"	3'-9"	4'-9"	8'-1"	3	9 1/2"	18"
	4:1	9'-2 3/4"		6'-2 1/4"	10'-1 1/4"	3	12 1/2"	24"
	6:1	13'-7 3/4"		9'-1 1/2"	14'-1 1/2"	5	18 1/4"	36"
24"	3:1	7'-10"	4'-0"	5'-6 1/2"	8'-10"	3	9 1/2"	18"
	4:1	10'-3"		7'-2 1/2"	11'-1"	4	12 1/2"	24"
	6:1	15'-2"		10'-7 3/4"	15'-7 1/2"	6	18 1/4"	36"
27"	3:1	8'-7 1/2"	4'-3"	6'-4"	9'-7"	4	9 1/2"	18"
	4:1	11'-3 1/2"		8'-3"	12'-1 1/4"	5	12 1/2"	24"
	6:1	16'-8 1/4"		12'-2"	17'-1 1/2"	7	18 1/4"	36"
30"	3:1	9'-5"	4'-6"	7'-1 1/2"	10'-4"	4	9 1/2"	18"
	4:1	12'-3 3/4"		9'-3 3/4"	13'-1"	6	12 1/2"	24"
	6:1	18'-2 1/2"		13'-8 1/4"	18'-7 1/2"	8	18 1/4"	36"
33"	3:1	10'-2 1/4"	4'-9"	7'-10 3/4"	11'-3 1/4"	5	9 1/2"	18"
	4:1	13'-4 1/4"		10'-3 3/4"	14'-1 1/4"	6	12 1/2"	24"
	6:1	19'-8 3/4"		15'-2 1/2"	20'-1 1/2"	9	18 1/4"	36"
36"	3:1	10'-11 3/4"	5'-0"	8'-8 1/4"	11'-10"	5	9 1/2"	18"
	4:1	14'-4 1/2"		11'-4"	15'-1"	7	12 1/2"	24"
	6:1	21'-3"		16'-8 3/4"	21'-7 1/2"	10	18 1/4"	36"
42"	3:1	12'-6 3/4"	5'-6"	10'-3 1/4"	13'-4"	6	9 1/2"	18"
	4:1	16'-5 1/4"		13'-4 3/4"	17'-1 1/4"	8	12 1/2"	24"
	6:1	24'-3 1/2"		19'-9 1/4"	24'-7 1/2"	13	18 1/4"	36"
48"	3:1	14'-1 3/4"	6'-0"	11'-10 1/4"	14'-10"	7	9 1/2"	18"
	4:1	18'-6"		15'-5 1/2"	19'-1 1/4"	10	12 1/2"	24"
	6:1	27'-4"		22'-9 3/4"	27'-7 1/2"	15	18 1/4"	36"
54"	3:1	15'-8 3/4"	6'-6"	13'-5 1/4"	16'-4"	8	9 1/2"	18"
	4:1	20'-6 3/4"		17'-6 1/4"	21'-1 1/4"	11	12 1/2"	24"
	6:1	30'-4 1/2"		25'-10 1/4"	30'-7 1/2"	17	18 1/4"	36"
60"	3:1	17'-3 3/4"	7'-0"	15'-1 1/4"	17'-10"	9	9 1/2"	18"
	4:1	22'-7 1/2"		19'-7"	23'-1 1/4"	12	12 1/2"	24"
	6:1	33'-5"		28'-10 3/4"	33'-7 1/2"	19	18 1/4"	36"



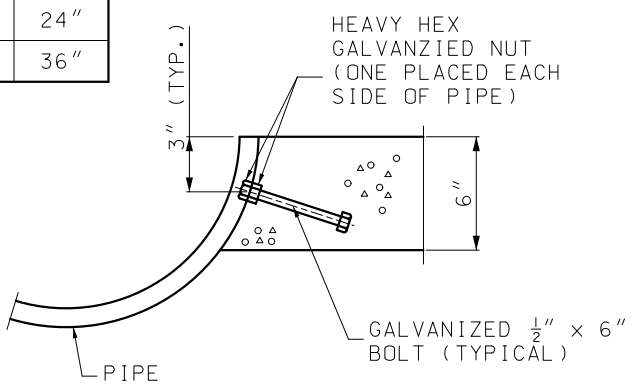
PLAN VIEW FOR HIGHWAYS



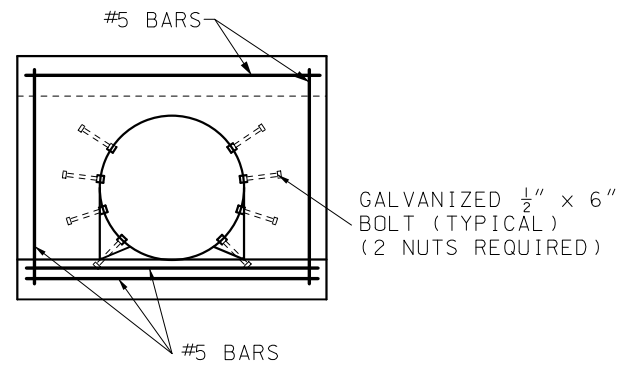
SECTION A-A



SECTION B-B



DETAIL A



SECTION C-C

GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.

REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL PIPE.

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

THE 1/2\"/>

BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF 1/2\"/>

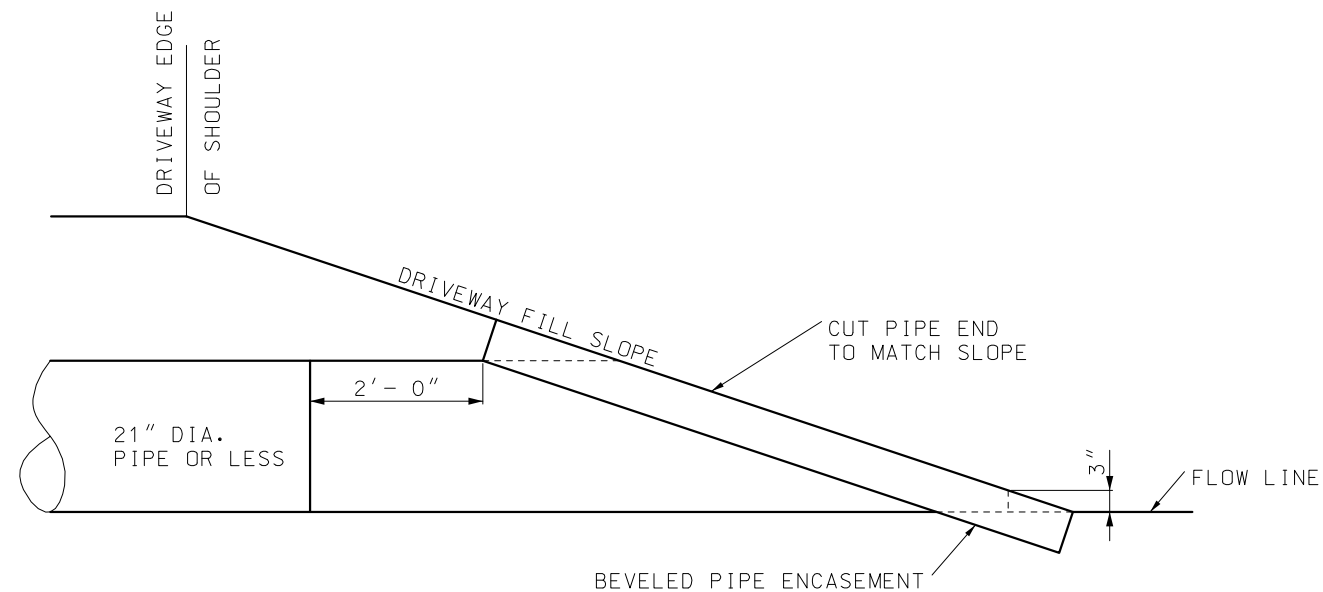
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
 105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
 TRAVIS D. KOESTNER
 NUMBER PE-30042
 PROFESSIONAL ENGINEER
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

BEVELED PIPE END TREATMENT FOR HIGHWAYS

DATE EFFECTIVE: 01/01/2021	732.05D	SHEET NO. 1 OF 2
DATE PREPARED: 10/14/2020		

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PIPE END DETAILS FOR PARALLEL DRAINAGE STRUCTURES FOR DRIVEWAYS

(SINGLE PIPE INSTALLATION)

NOTE:

FOR MULTIPLE PIPE INSTALLATIONS, END SECTIONS WITH SAFETY BARS SYSTEM OR OPTIONAL BAR GATE SYSTEM SHALL BE PROVIDED. SEE STANDARD PLAN 732.10.

SEE DRIVEWAY STANDARD PLANS FOR BEVELED END SECTION REQUIREMENTS.

GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.



REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

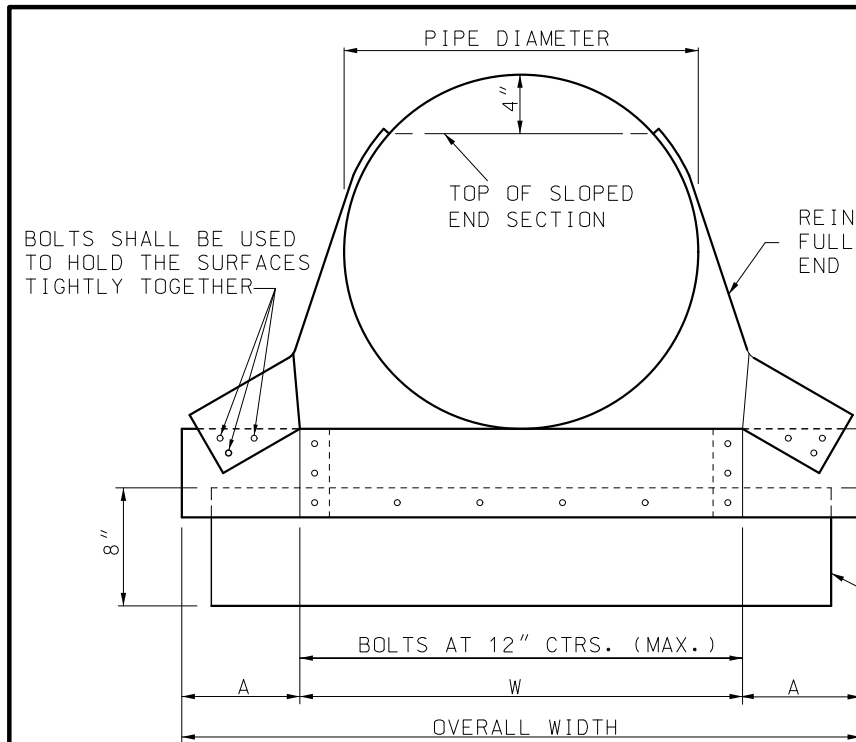
BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL PIPE.

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

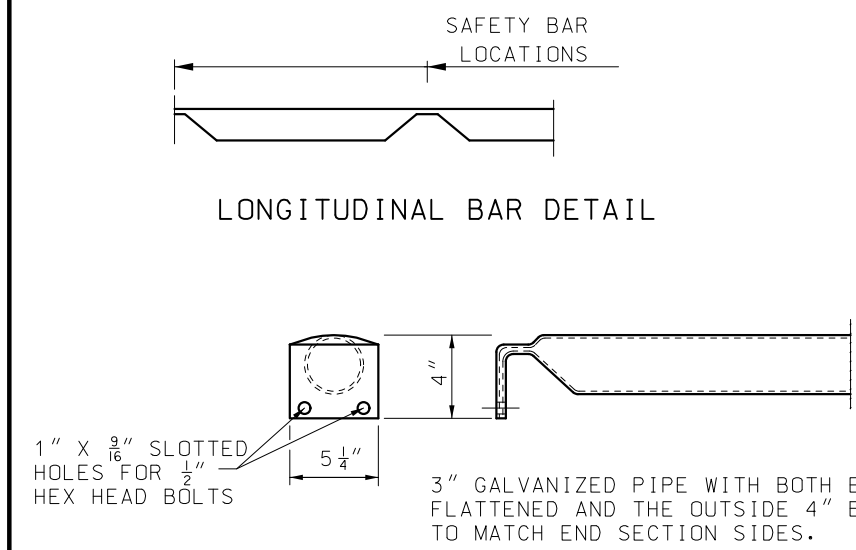
THE $\frac{1}{2}$ " \times 6" BOLT AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 (ASTM A153), CLASS C SPECIFICATIONS. LOW CARBON STEEL ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 36.

BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF $\frac{1}{2}$ " \times 6" GALVANIZED BOLTS. THE $\frac{1}{2}$ " \times 6" GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.

 MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<h3>BEVELED PIPE END TREATMENT FOR DRIVEWAYS</h3>
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	732.05D
SHEET NO. 2 OF 2	

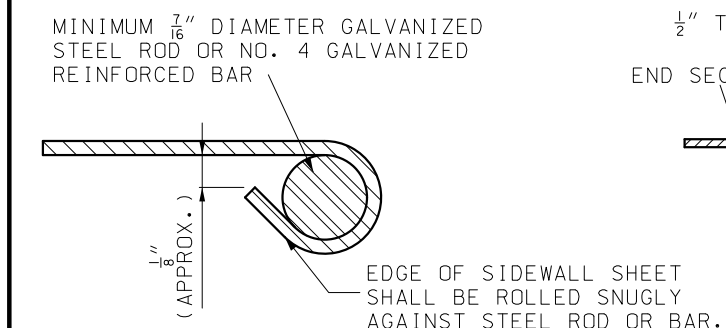


FRONT VIEW CIRCULAR PIPE

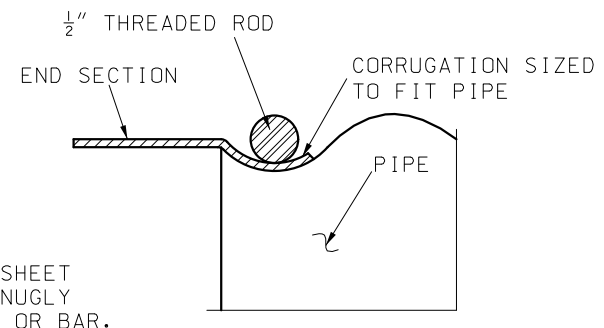


LONGITUDINAL BAR DETAIL

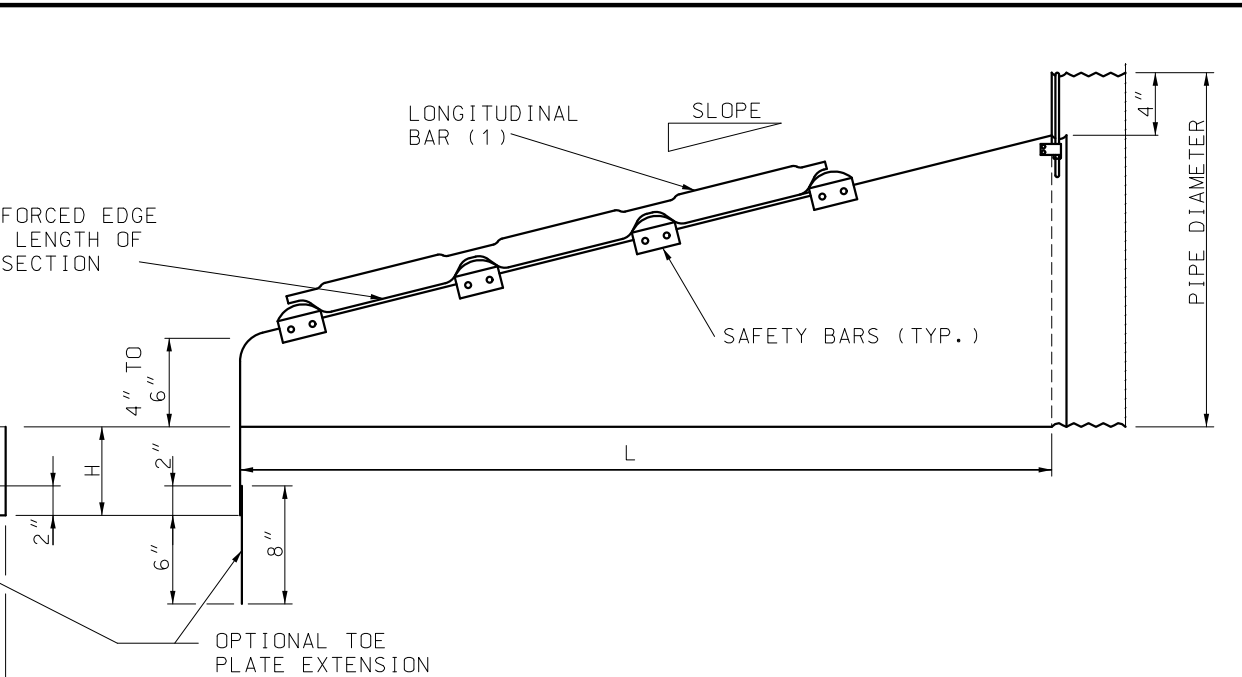
DETAIL OF SAFETY BAR



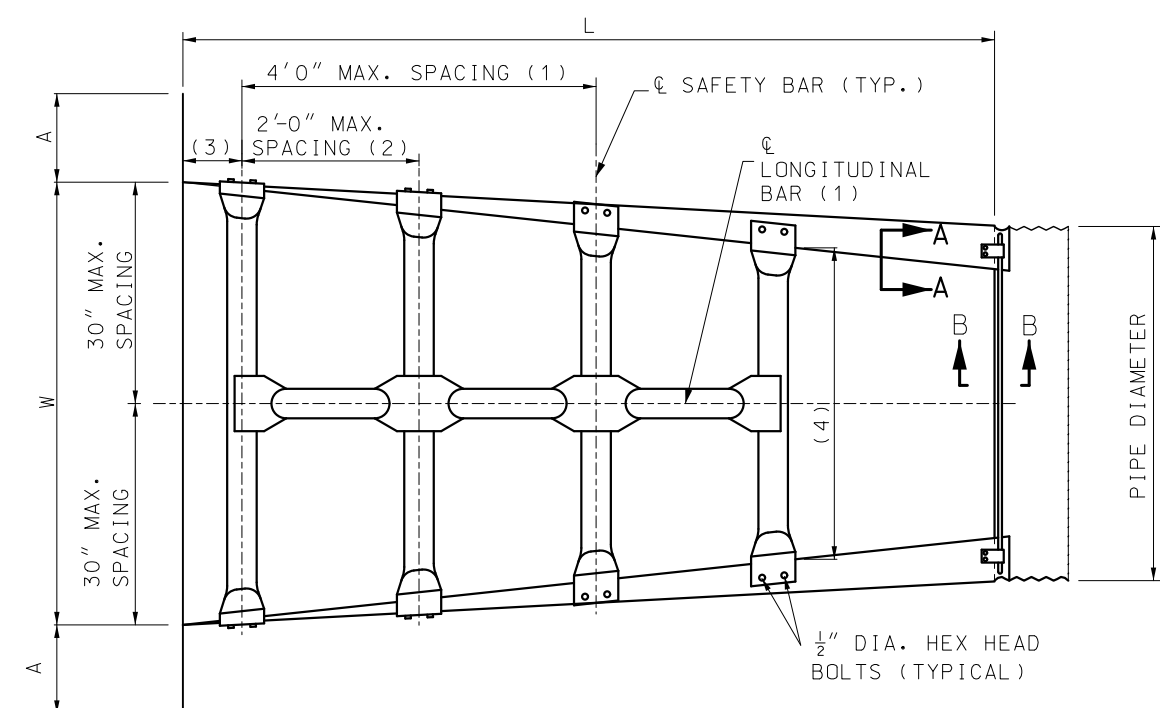
SECTION A-A



SECTION B-B



SIDE ELEVATION CIRCULAR SECTION



TOP VIEW CIRCULAR SECTION

LONGITUDINAL BAR, WHEN REQUIRED, SHALL BE WELDED TO SAFETY BARS TO FORM SINGLE GRATE STRUCTURE. LONGITUDINAL BAR IS NOT TO BE USED FOR PARALLEL DRAINAGE STRUCTURES.

- NOTES:
- (1) FOR CROSSROAD DRAINAGE STRUCTURES ONLY.
 - (2) FOR PARALLEL DRAINAGE STRUCTURES ONLY.
 - (3) 4" TO 6" MINIMUM
 - (4) SAFETY BARS SHALL BE PROVIDED UNTIL THE LATERAL SPAN OF THE OPENING IS LESS THAN OR EQUAL TO 30".

GENERAL NOTES:

END SECTIONS, INCLUDING ALL BOLTS, NUTS, RODS AND STRAPS, SHALL BE FABRICATED FROM GALVANIZED STEEL MEETING THE REQUIREMENTS OF SECTION 1020.

ALL BOLTS UNLESS OTHERWISE SHOWN SHALL BE ASTM A307 BOLTS.

WHEN REQUIRED, OPTIONAL TOE PLATE EXTENSION SHALL BE PUNCHED OR DRILLED AND BOLTED TO END SECTION TOE PLATE. STEEL FOR TOE PLATE EXTENSION SHALL BE SAME GAUGE AS END SECTION. DIMENSIONS SHALL BE OVERALL WIDTH LESS 6" BY 8" HIGH.

ATTACHMENT TO CIRCULAR PIPES 15" THROUGH 24" DIAMETER SHALL BE MADE WITH TYPE #1 STRAPS. ALL OTHER SIZES SHALL BE ATTACHED WITH TYPE #2 CONNECTORS.

SAFETY BARS AND LONGITUDINAL BARS SHALL BE FABRICATED FROM STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A-53 SCHEDULE 40 SPECIFICATIONS. SAFETY BARS AND LONGITUDINAL BARS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1020 OF STANDARD SPECIFICATIONS.

INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 725 AND 732 OF THE STANDARD SPECIFICATIONS.

SLOTTED HOLES FOR SAFETY BAR ATTACHMENT SHALL BE PROVIDED FOR ALL END SECTIONS.

MINOR VARIATIONS OF DETAIL WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

END SECTIONS FABRICATED FROM THICKER METAL THAN INDICATED WILL BE ACCEPTED.

ALL BOLTS SHALL BE 3/8" DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN.

SKIRT SECTION IS DEFINED AS THE FLARED PORTION OF THE END SECTION INCLUDING SIDE AND BOTTOM (CENTER) PANELS AND APRON.

SKIRT SECTION FOR 12" TROUGH 24" PIPES SHALL BE MADE IN ONE PIECE.

SKIRT SECTIONS FOR 30" AND LARGER PIPES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTIONS FROM 48" AND LARGER PIPES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

ALL 3 PIECE SKIRTS FOR 60" PIPES SHALL HAVE 0.109" THICK SIDES AND 0.138" THICK BOTTOM (CENTER) PANELS. WIDTH OF BOTTOM PANELS SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY CONNECTOR SECTION. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.

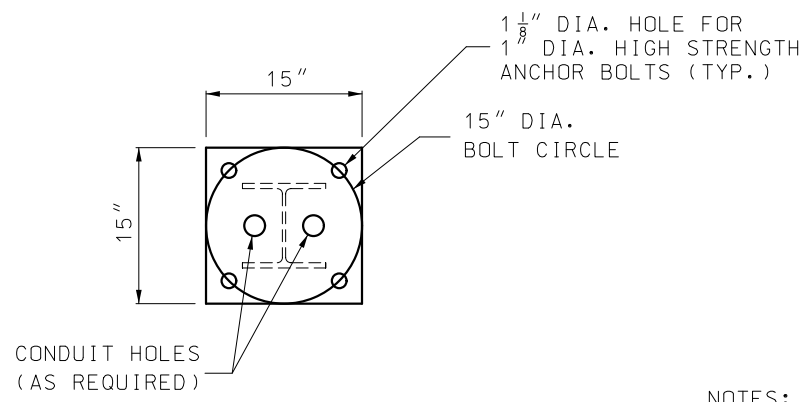
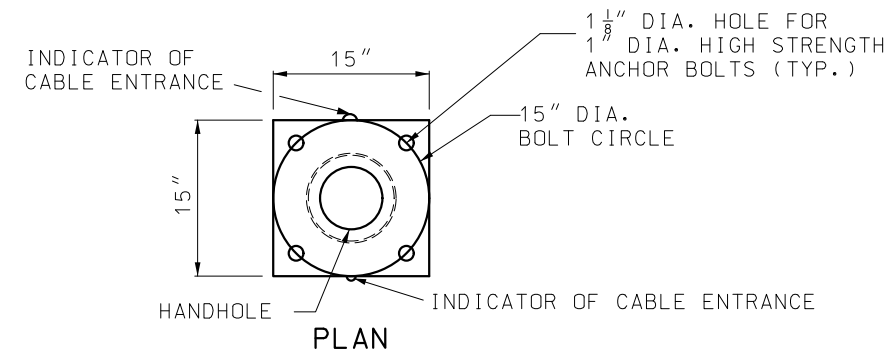
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
 105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
 TRAVIS D. KOESTNER
 NUMBER PE-30042
 PROFESSIONAL ENGINEER
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

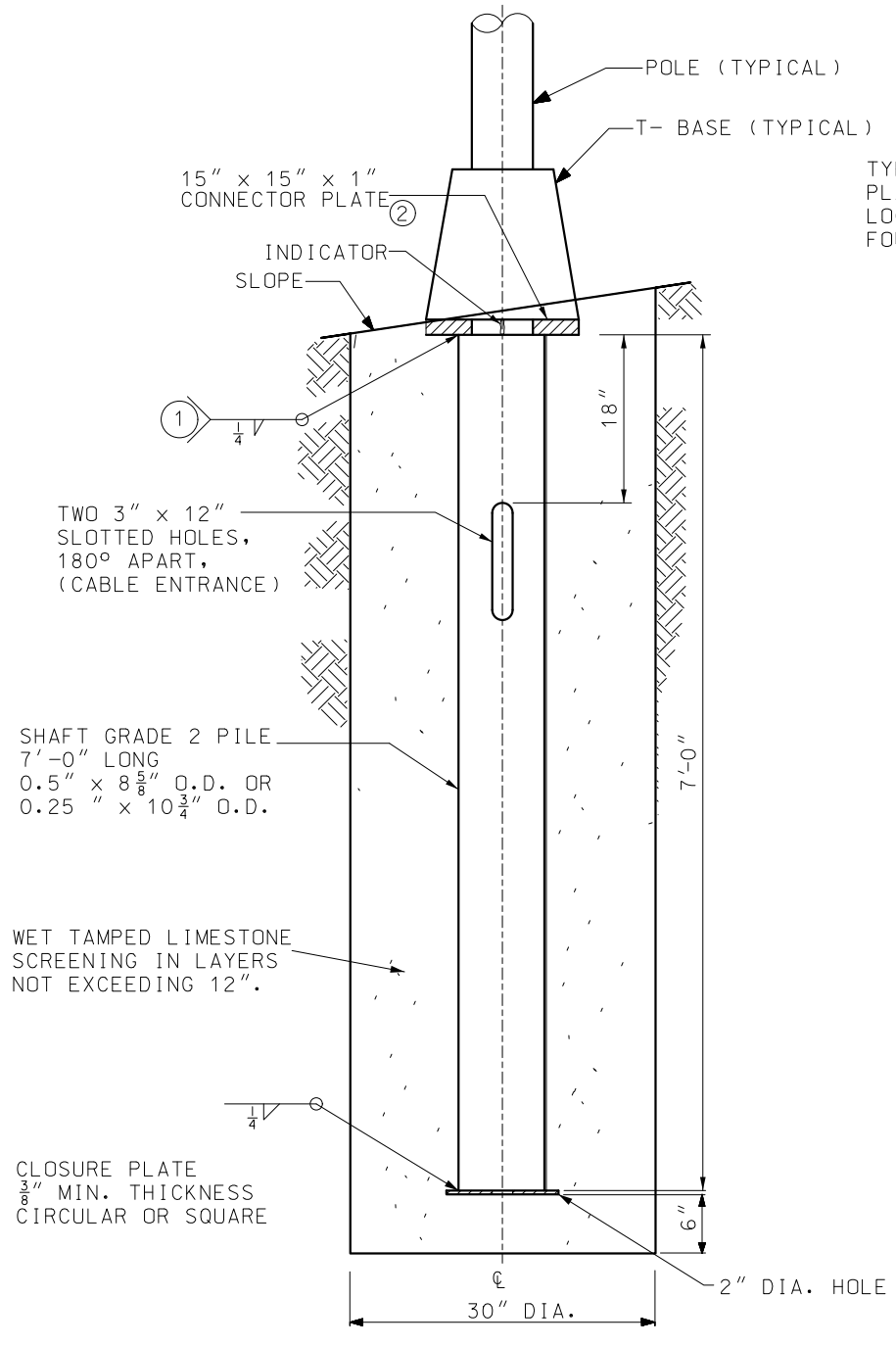
SAFETY SLOPE END SECTION

DATE EFFECTIVE: 01/01/2021	732.10H	SHEET NO.
DATE PREPARED: 10/14/2020		1 OF 3

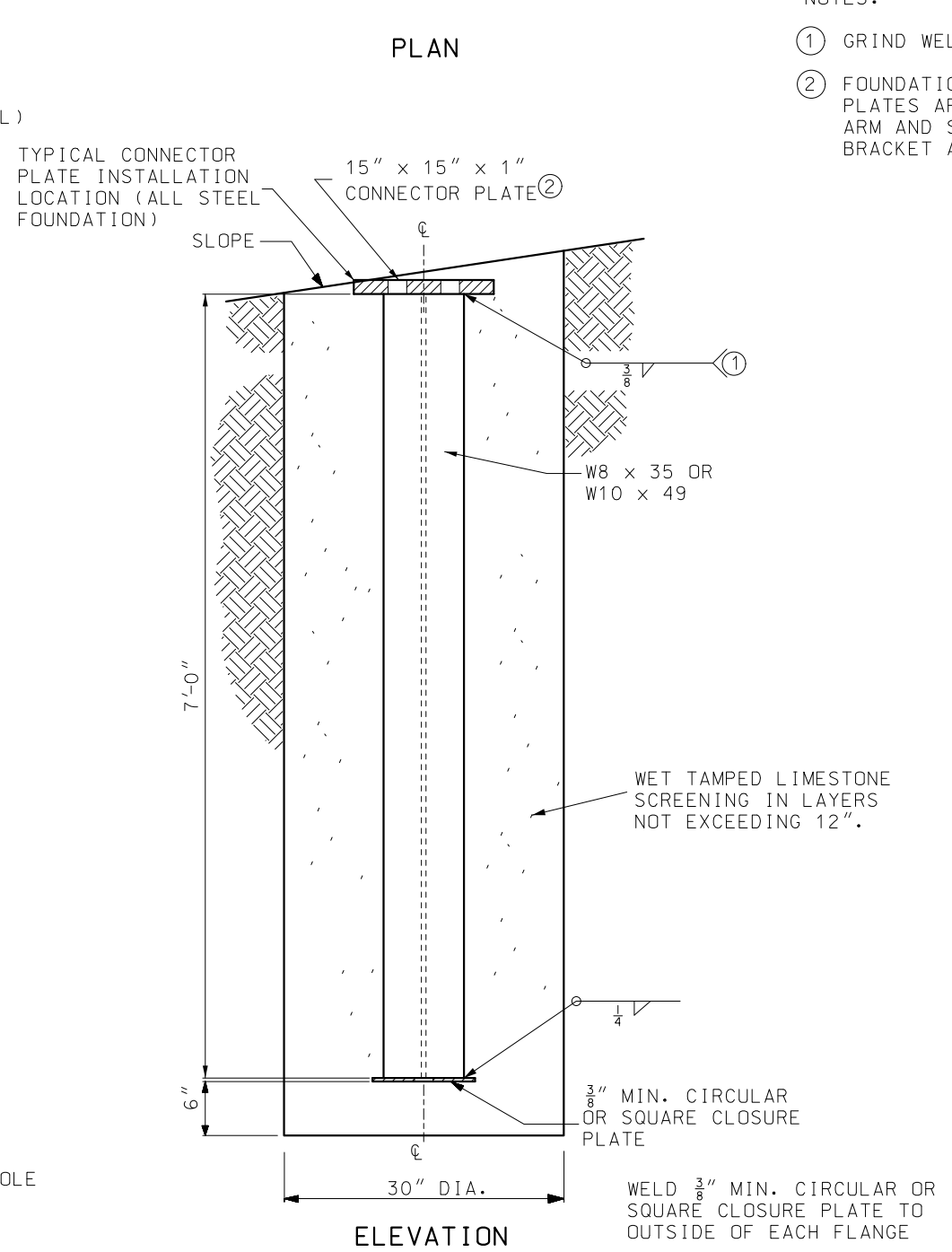
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



- NOTES:
- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
 - ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.



DETAILS OF CIRCULAR STEEL PILE FOUNDATION



DETAILS OF STEEL "H" PILE FOUNDATION

GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.

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JEFFERSON CITY, MO 65102
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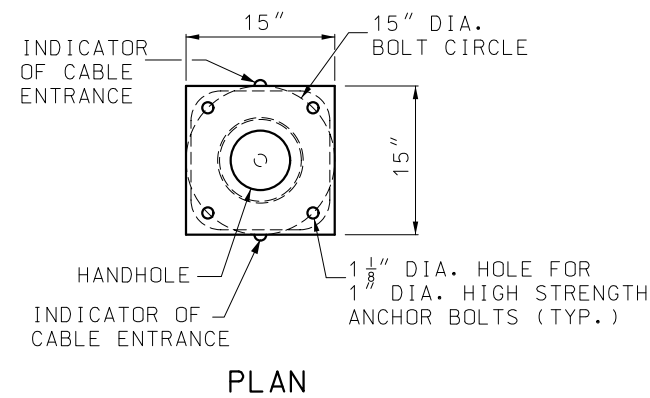
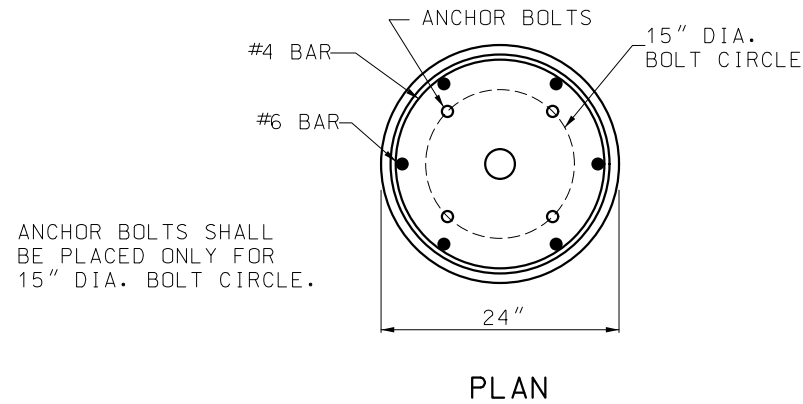
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

DATE EFFECTIVE: 01/01/2021	901.00AB	SHEET NO. 3 OF 4
DATE PREPARED: 10/14/2020		

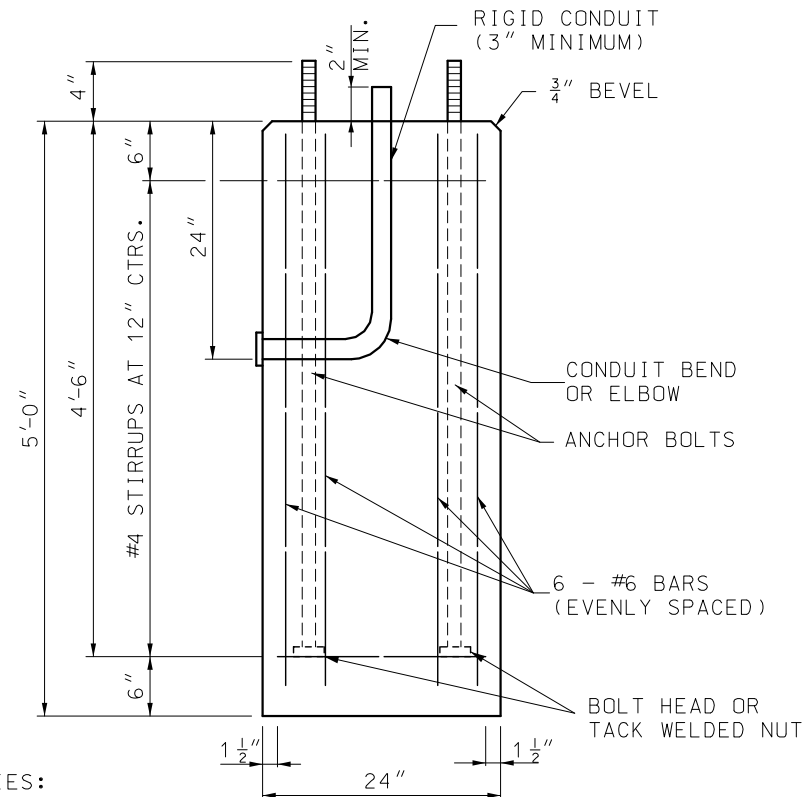
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DRIVE HOLES WILL BE PERMITTED PROVIDED THAT THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE. THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.

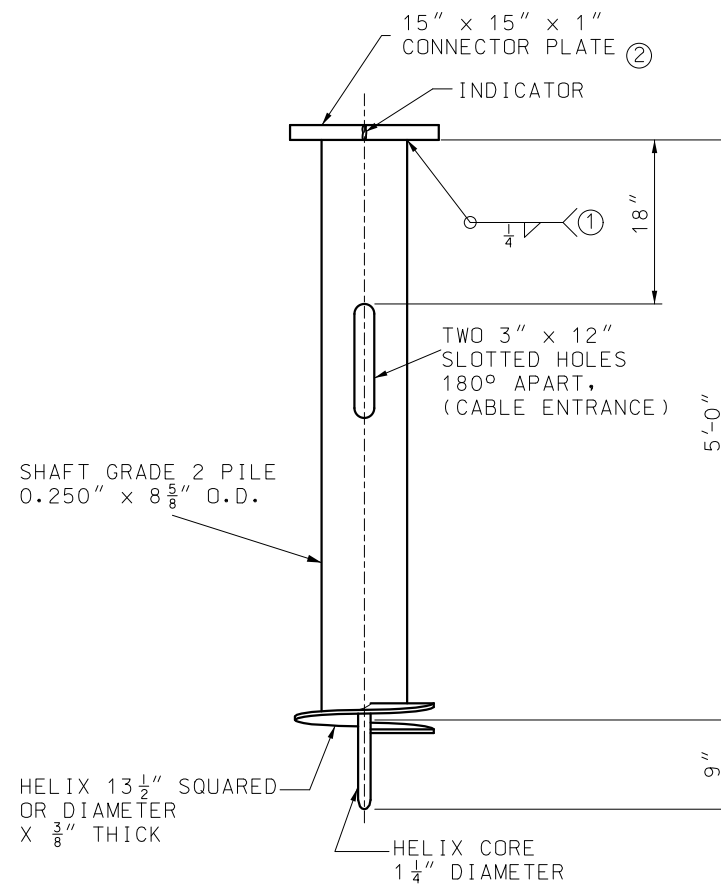
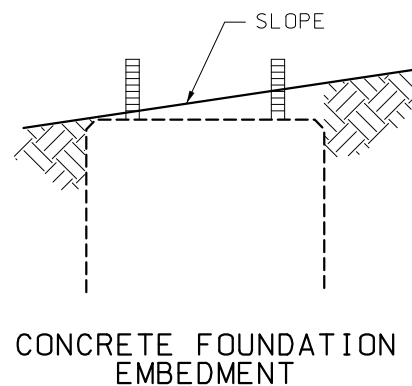
NOTES:

- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.
- ③ AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATION MAY BE PRECAST. IF PRECAST, THEY SHALL BE SET IN DRILLED HOLES 3 FEET IN DIAMETER AND 6 INCHES DEEPER THAN THE BOTTOM OF THE CONCRETE FOUNDATION. THE BOTTOM 6 INCHES OF THE HOLE AND THE REMAINING SPACE AROUND THE FOUNDATION SHALL BE BACKFILLED WITH WET TAMPED LIMESTONE SCREENINGS IN LAYERS NOT EXCEEDING 12 INCHES.

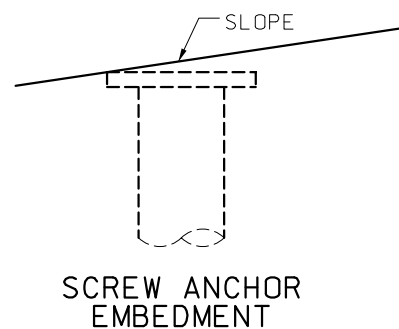


QUANTITIES:
CONC. = 0.58 CU. YD.
REIN. = 64 LBS.

ELEVATION
DETAILS OF CONCRETE FOUNDATION ③



ELEVATION
DETAILS OF SCREW ANCHOR FOUNDATION



GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.

MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

901.00AB

SHEET NO.
4 OF 4

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

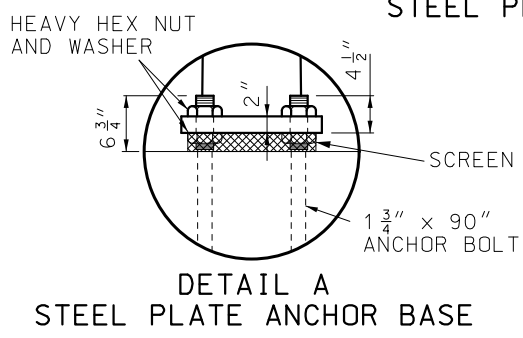
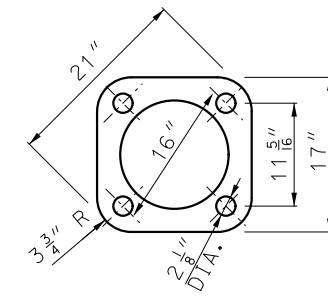
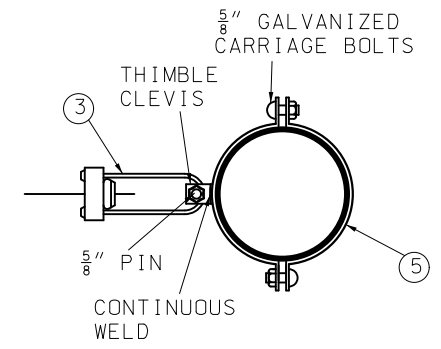
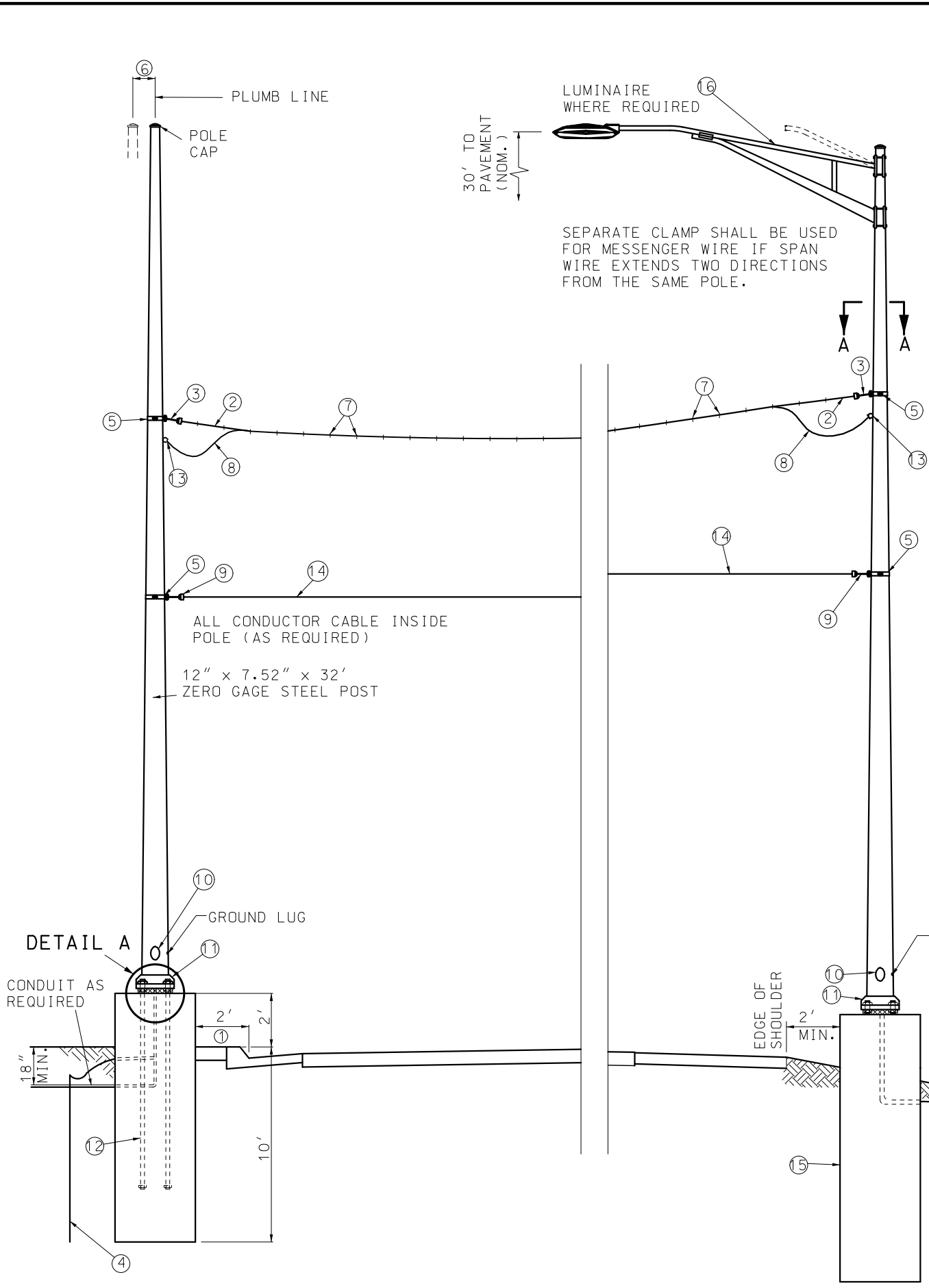
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

- ① 6" IF LOCATED WITHIN 4' OF CONCRETE MEDIAN.
- ② DOUBLE GALVANIZED $\frac{3}{8}$ " (MIN.) STEEL MESSENGER WIRE - 7 STRAND HIGH STRENGTH GRADE.
- ③ $\frac{3}{8}$ " AUTOMATIC JAW TYPE CABLE FITTING WITH SHORT BAIL. 13,860 LBS. MINIMUM HOLDING STRENGTH.
- ④ $\frac{3}{4}$ " x 8' MIN. COPPER GROUND ROD, ONE POLE SHALL BE GROUNDED BY CONNECTING NO. 6 AWG BARE COPPER WIRE FROM GROUNDING LUG INSIDE POLE TO GROUND ROD BY MEANS OF A GALVANIZED WIRE CLAMP LOCATED INSIDE OF POLE. GROUND LUG SHALL BE ORIENTED 90° OR 180° TO HANDHOLE. IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.
- ⑤ GALVANIZED $\frac{1}{4}$ " STEEL CLEVIS CLAMP TO FASTEN TO THE POLE WITH $\frac{5}{8}$ " GALVANIZED CARRIAGE BOLTS.
- ⑥ RAKE AS NECESSARY, 10" MAXIMUM.
- ⑦ NON-CORROSIVE METAL CABLE HANGERS AT 12" CENTERS.
- ⑧ MULTI-CONDUCTOR CABLE (AS REQUIRED).
- ⑨ $\frac{1}{4}$ " AUTOMATIC JAW TYPE CABLE FITTING WITH SHORT BAIL. 5990 LBS. MINIMUM HOLDING STRENGTH.
- ⑩ 4" x 6 $\frac{1}{2}$ " HANDHOLE AND COVER WITH REINFORCED FRAME WELDED TO POLE.
- ⑪ ONE-PIECE OR TWO-PIECE METAL BASE COVER OR INDIVIDUAL NUT COVERS.
- ⑫ FULLY GALVANIZED ANCHOR BOLT WITH BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END.
- ⑬ WIRE ENTRANCE WITH INSULATED WEATHERPROOF BUSHING (AS REQUIRED).
- ⑭ DOUBLE GALVANIZED $\frac{1}{4}$ " STEEL - 7 STRAND HIGH STRENGTH GRADE TETHER WIRE AND CLAMP WITH QUICK RELEASE PROVISIONS. INSTALL HORIZONTAL OR BELOW HORIZONTAL.
- ⑮ TYPE A-10 BASE. SEE STANDARD 902.30 FOR DETAILS.
- ⑯ LUMINAIRE AND BRACKET ARE AS SPECIFIED ON PLANS. SEE STANDARD 901.00 FOR MOUNTING DETAILS.

GENERAL NOTES:
 DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND CURRENT INTERIMS.

MAXIMUM SPAN LENGTH:
 160' FOR ONE ONE OR TWO SPANS OFF POST, WITH GUY WIRE, ONE 5-SECTION HEAD SIGNAL, TWO 3-SECTION HEAD SIGNALS AND TWO SIGNS PER SPAN.
 100' FOR ONE SPAN OFF POST, WITHOUT GUY WIRE, WITH THREE 3-SECTION HEAD SIGNALS AND TWO SIGNS PER SPAN.
 100' FOR TWO SPANS OFF POST, WITHOUT GUY WIRE, WITH TWO 3-SECTION HEAD SIGNALS AND ONE SIGN PER SPAN.

CONCRETE POLE EMBEDMENT SHALL BE CLASS B CONCRETE.
 SEE SHEET 1 FOR DOWN GUY INFORMATION WHEN DOWN GUY IS SPECIFIED ON PLANS.
 EXPANSIVE GROUT SHALL BE USED BETWEEN THE POLE BASE PLATE AND THE CONCRETE BASE WHEN INDIVIDUAL NUT COVERS ARE USED. SEE STANDARD 902.40 FOR SCREEN DETAILS.



STEEL POST DETAILS

DETAIL A
 STEEL PLATE ANCHOR BASE

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)
	<h2 style="margin: 0;">TRAFFIC SIGNALS</h2> <h3 style="margin: 0;">RIGID SPAN WIRE DETAILS</h3>
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	902.70P
	SHEET NO. 2 OF 2

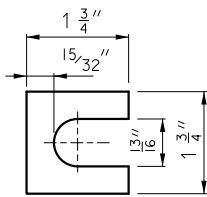
STRUCTURAL STEEL POST FOR GROUND MOUNTED SIGNS																
POST		BOLT			WASHER			BASE CONNECTION DATA TABLE (IN.)								
DES. NO.	NOM SIZE (IN. X LBS)	DIA IN.	LENGTH IN.	TORQUE IN. / LB.	OD IN.	ID IN.	THICK IN.	A	B	C	D	E	F	G	W	R
1	W6x9															
2	W6x15	$\frac{5}{8}$	$2\frac{3}{4}$	345	$1\frac{5}{16}$	$\frac{11}{16}$	$\frac{1}{8}$	5	2	$1\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$1\frac{1}{2}$
3	W8x18															
4	W10x22															
5	W10x26	$\frac{3}{4}$	$3\frac{1}{2}$	555	$1\frac{13}{32}$	$\frac{13}{16}$	$\frac{1}{8}$	6	$2\frac{1}{4}$	$1\frac{3}{8}$	$3\frac{1}{2}$	$1\frac{1}{4}$	1	$\frac{3}{4}$	$\frac{5}{16}$	$1\frac{1}{2}$
6	W12x35															

POST AND FOOTING DATA TABLE													
POST		FOOTING											
POST DES. NO.	NOM. SIZE	WEIGHT		STUB LENGTH	DIA.	LEVEL GROUND		6:1 GRADE		4:1 GRADE		3:1 OR 2:1 GRADE	
		LBS/FT	LBS/IN			DEPTH	C.Y.	DEPTH	C.Y.	DEPTH	C.Y.	DEPTH	C.Y.
1	W6	9.0	0.75	3'-0"	15"	3'-0"	0.14	3'-2"	0.15	3'-3"	0.16	3'-6"	0.17
2	W6	15.0	1.25	4'-0"	24"	4'-0"	0.47	4'-2"	0.50	4'-3"	0.51	4'-6"	0.54
3	W8	18.0	1.50	4'-6"	28"	4'-6"	0.71	4'-8"	0.73	4'-9"	0.74	5'-0"	0.78
4	W10	22.0	1.83	5'-0"	36"	5'-0"	1.31	5'-2"	1.36	5'-3"	1.39	5'-6"	1.45
5	W10	26.0	2.17	5'-0"	36"	5'-0"	1.31	5'-3"	1.37	5'-5"	1.43	5'-9"	1.52
6	W12	35.0	2.92	5'-6"	36"	5'-6"	1.44	5'-9"	1.52	5'-11"	1.56	6'-3"	1.65

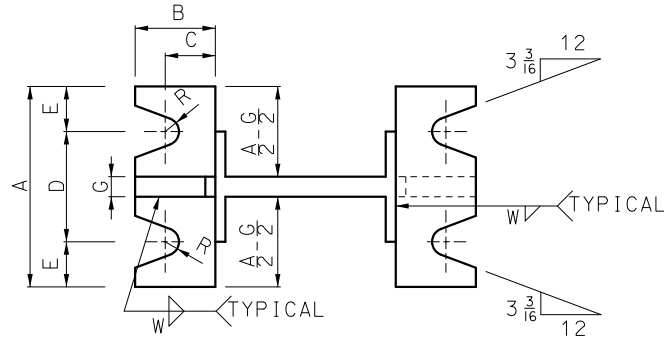
SHEET METAL BOLT RETAINER CUT FROM 30 GAGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES TO BE $\frac{1}{16}$ " LARGER THAN REQUIRED BOLT SIZE.



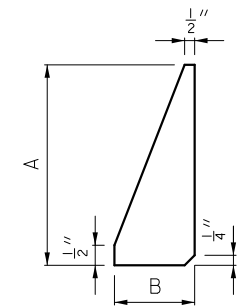
BOLT RETAINER



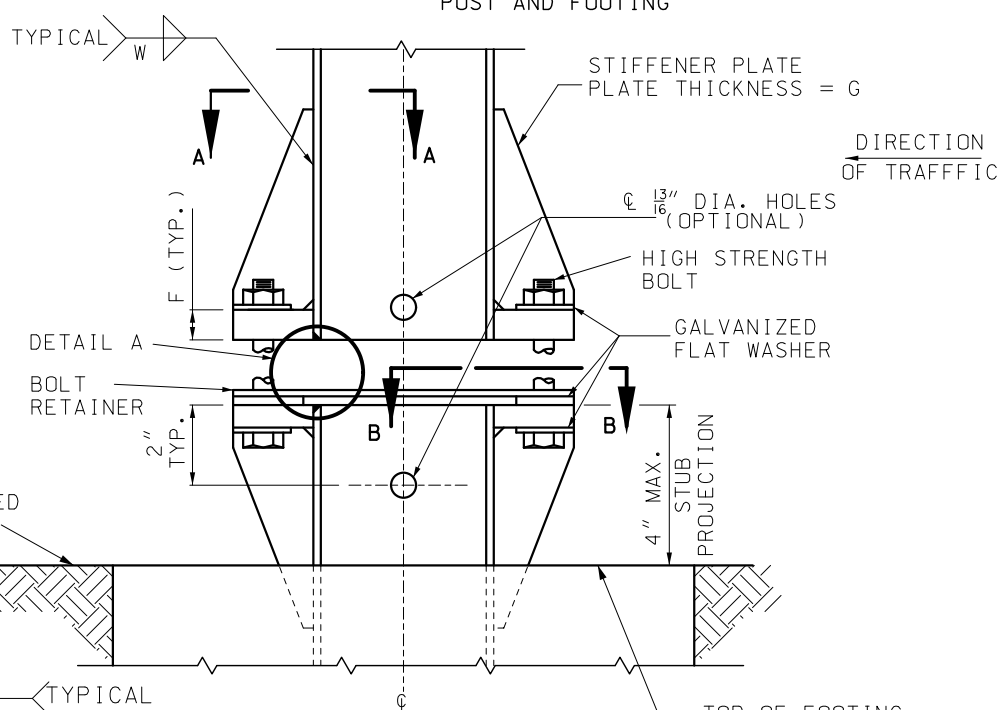
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SECTION A-A SECTION B-B
POST AND FOOTING

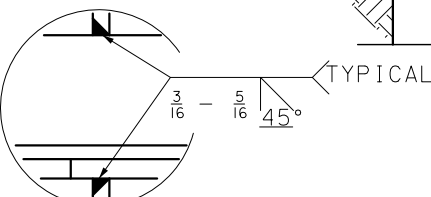


STIFFENER PLATE

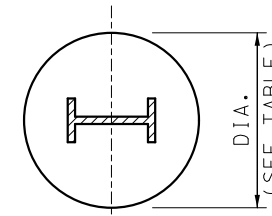


ELEVATION

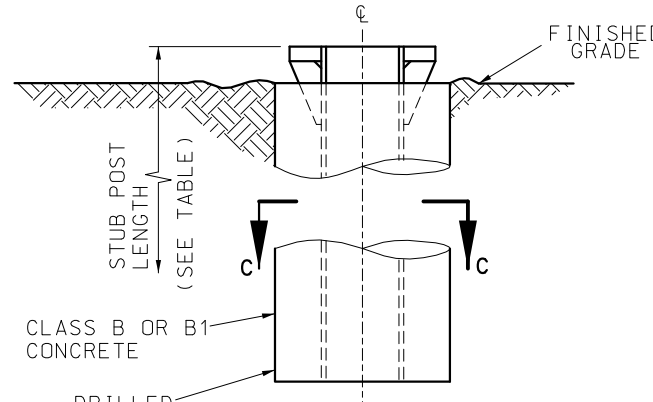
TOP OF FOOTING, FLUSH WITH FINISHED FLAT GRADE. SEE "FOOTING DETAIL" FOR FOOTINGS ON SLOPES.



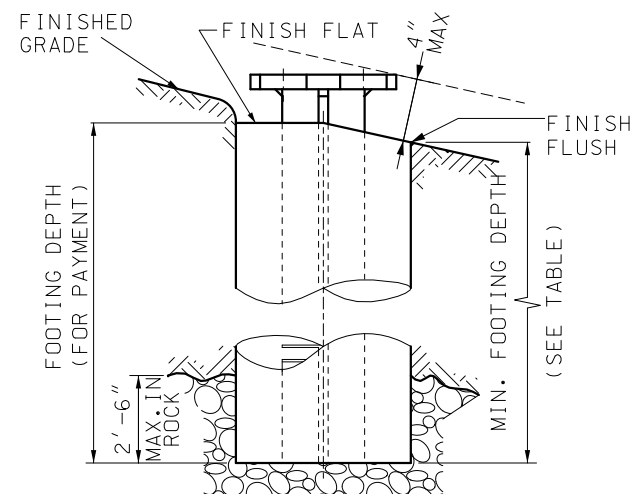
DETAIL A



SECTION C-C



STUB DETAIL



FOOTING DETAIL

GENERAL NOTES:

DESIGN SPECS: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS - 1985 (EXCEPT 2001 AND LATEST INTERIMS FOR STRUCTURAL STEEL POSTS).

POSTS, PERFORATED FUSE PLATE AND SPLICE PLATE TO BE GALVANIZED AFTER FABRICATION.

METAL PROJECTING BEYOND THE PLANE OF THE PLATE FACE WILL NOT BE ALLOWED.

REMOVE ALL GALVANIZING RUNS OR BEADS IN THE WASHER AREA.

ALL STRUCTURAL STEEL STIFFENER PLATES AND BASE PLATES, FOR GROUND MOUNTED SIGNS SHALL MEET THE REQUIREMENTS OF ASTM A 36 OR AASHTO M 270 GRADE 50, MINIMUM YIELD 50,000 PSI.

IN THE EVENT THE DISTANCE BETWEEN THE TOP OF THE FOOTING AND THE BOTTOM OF THE SIGN IS LESS THAN 7'-9", THE SIGN HEIGHT AND POST LENGTH IS TO BE INCREASED SUFFICIENTLY TO ACCOMMODATE THIS MINIMUM SPACING.

HINGE PLATES NOT REQUIRED ON SINGLE POST SIGNS OR ANY SIGNS USING PIPE POSTS.

NUTS ON HINGE PLATE BOLTS SHALL BE TIGHTENED TO THE REQUIRED MINIMUM BOLT TENSION VALUES SHOWN IN TABLE 1 SEC. 1080 OF THE STANDARD SPECIFICATIONS.

THE NUT SHALL BE FREE RUNNING. IF THE NUT WILL NOT SPIN ON THE BOLT BECAUSE OF GALVANIZING IRREGULARITIES, A LUBRICANT SHALL BE APPLIED.

ALL BREAKAWAY ASSEMBLY BOLTS SHALL BE TIGHTENED IN A SYSTEMATIC MANNER TO THE PRESCRIBED TORQUE SHOWN ON THIS DRAWING.

EACH BREAKAWAY ASSEMBLY BOLT SHALL BE LOOSENED AND RE-TIGHTENED TO THE REQUIRED TORQUE IN THE SAME ORDER AS THE INITIAL TIGHTENING.

THE THREADS SHALL BE BURRED AT THE NUT USING A CENTER PUNCH TO PREVENT NUT FROM LOOSENING.

POST LENGTH QUANTITY SHOWN ON PLANS INCLUDES STUB.

1" X 2 1/2" HIGH STRENGTH BOLTS FOR PIPE POSTS SHALL BE OF THE DESIGNATION AASHTO M 164 OR ASTM A 449. ALL OTHER HIGH STRENGTH BOLTS SHALL BE OF THE DESIGNATION ASTM F3125 GRADE A325.

FURNISH TWO .012" ± AND TWO .0032" ± THICK SHIMS PER POST FROM BRASS SHIM STOCK OR STRIP, DESIGNATION ASTM B 36. SHIM AS REQUIRED TO PLUMB POST.

HIGH STRENGTH BOLTS WITH HEX NUT AND THREE WASHERS WITH EACH BOLT ARE TO BE GALVANIZED.

OPTIONAL HOLES (13/16" ROUND FOR "1" SHAPE POSTS AND 3/16" ROUND FOR PIPE POST BASE PLATES) AS SHOWN IN "ELEVATIONS" ARE TO BE USED AS AID FOR GALVANIZING ONLY.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

POST INSTALLATION DETAILS

POST AND FOOTING DETAILS

WIDE FLANGE (WF) POSTS

STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 01/01/2021

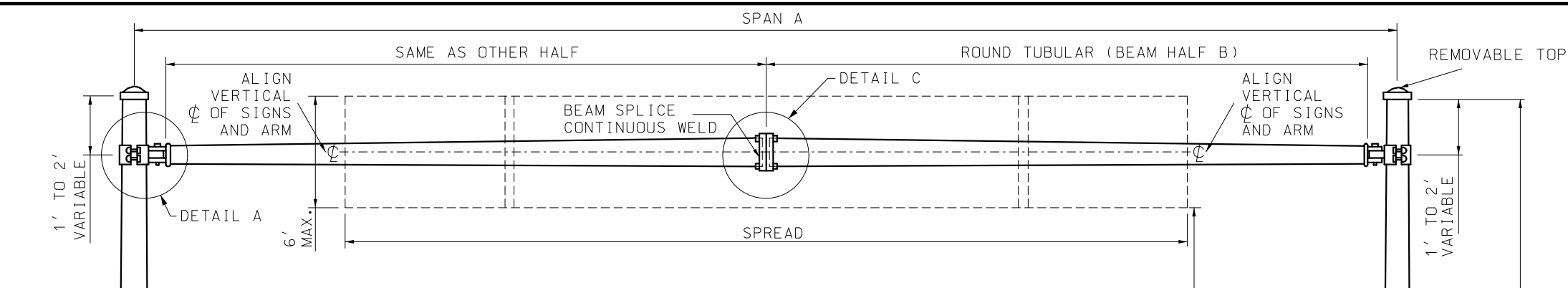
DATE PREPARED: 10/14/2020

903.03BN

SHEET NO.
1 OF 16

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SPAN A	SPREAD FEET											
	15	20	25	30	35	40	45	50	55	60	65	70
31'-6"	143	152										
35'-0"	126	138	153									
41'-3"	106	120	130	144								
41'-6"	124	134	144	155								
45'-0"	102	112	121	132	144							
51'-3"	78	88	98	108	118	129						
51'-6"	109	119	129	141	154	168						
55'-0"	88	98	108	119	131	142	155					
61'-3"	69	80	91	101	110	121	130	142				
61'-6"		115	124	133	144	157	170	182				
65'-0"		98	107	117	128	140	152	164	176			
71'-3"		80	89	98	109	121	132	144	156	164		
71'-6"		110	121	131	142	152	162	173	184	197		
75'-0"		94	104	114	124	139	144	154	165	176	187	
81'-3"		84	94	104	116	126	131	146	157	168	179	190

W=40 POUNDS PER SQUARE FOOT.

TYPE NO.	SPAN A	GA.	DIMENSIONS		END POST	
			GA.	D	GA.	D
S-1310	31'-6" THRU 41'-3"	3	8.8"	6" x 20'	3	10"
S-1310	41'-6" THRU 51'-3"	3	9.5"	6" x 25'	3	10"
S-1310	51'-6" THRU 61'-3"	3	10.5"	6.3" x 30'	3	10"
S-1312	61'-6" THRU 71'-3"	7	14"	9.1" x 35'	3	12"
S-1312	71'-6" THRU 81'-3"	7	16"	10.4" x 40'	3	12"

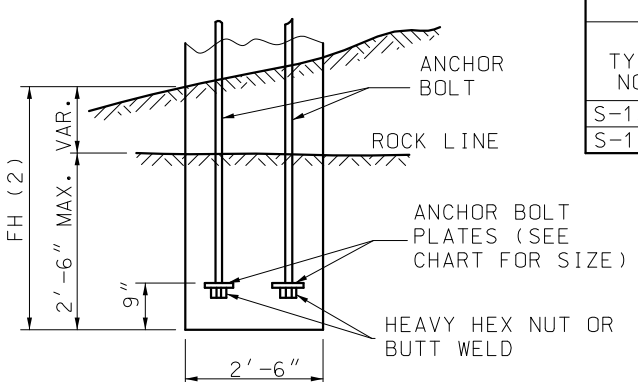
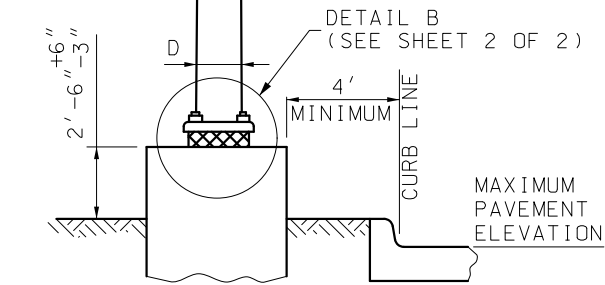
NOTES:
 DESIGN SPANS IN EVEN 3" INCREMENTS. SPECIFY SPAN A REQUIRED. FOR SPAN LENGTHS LESS THAN MAXIMUM FOR A DESIGNATED RANGE, THE LARGER DIAMETER OF THE CROSS BEAM IS HELD AND THE SMALLER DIAMETER WILL INCREASE AS LENGTH IS REDUCED. DESIGN POSTS IN EVEN 1" INCREMENTS.

TYPE NO.	DIA. FD	ESTIMATED QUANTITIES FOOTING						
		CLASS B CONCRETE		REINFORCING STEEL				
		1' DEPTH	1" DEPTH	#5	#4 (3)	TOTAL		
S-1310	2'-6"	0.1818	0.01515	6	8'-9"	10	7'-2"	103
S-1312	2'-6"	0.1818	0.01515	6	10'-3"	12	7'-2"	121

(3) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 1V:2H SLOPE.

MODIFIED FOOTING IN SOLID ROCK		
TYPE NO.	ANCHOR BOLT (1)	ANCHOR BOLT PLATE
S-1310	1 1/2" DIA.	3 1/2" x 3 1/2" x 3/4"
S-1312	1 3/4" DIA.	3 1/2" x 3 1/2" x 3/4"

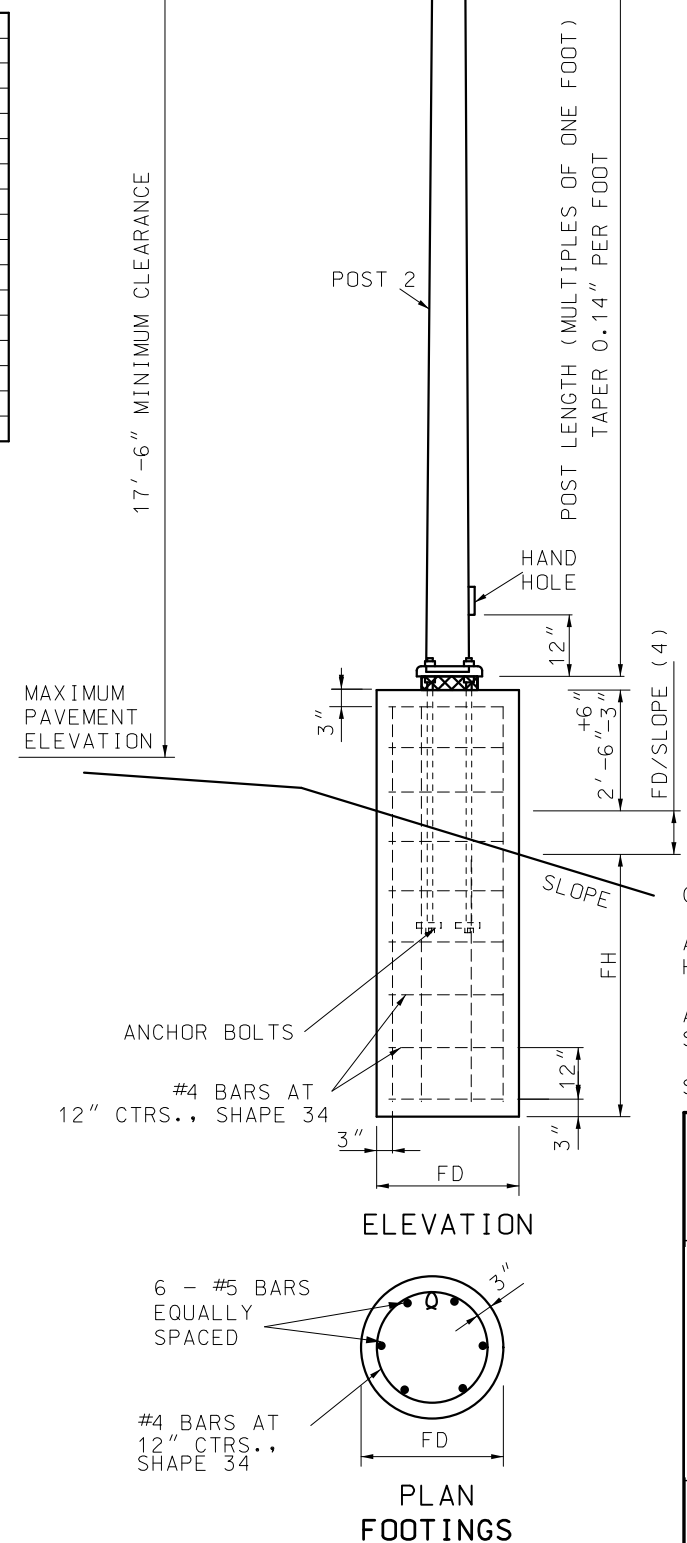
(1) ANCHOR BOLT LENGTH AS REQUIRED



REINFORCEMENT PLACED SAME AS STANDARD FOOTING. CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK.

MODIFIED FOOTING IN SOLID ROCK

(2) NOT TO EXCEED 5' FOR S-1310, NOT TO EXCEED 6'-6" FOR S-1312.



(4) EXAMPLE: IF SLOPE IS 1V:6H, THE DENOMINATOR IS 6

GENERAL NOTES:

- ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE ARM.
- ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.
- SEE SHEET 2 OF 2 FOR DETAILS A, B AND C.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

HIGHWAY SIGNING

TUBULAR SUPPORT STEEL

TYPE S

ONE TUBE

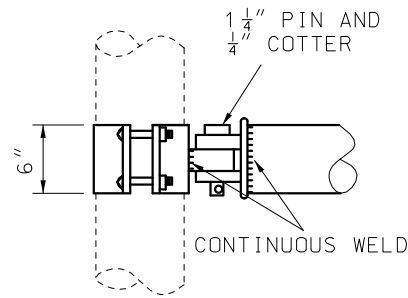
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 01/01/2021

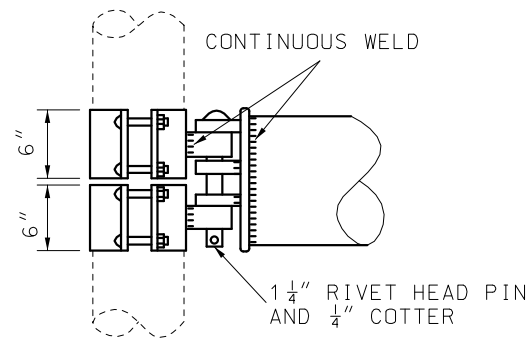
DATE PREPARED: 10/14/2020

903.05K

SHEET NO.
1 OF 2

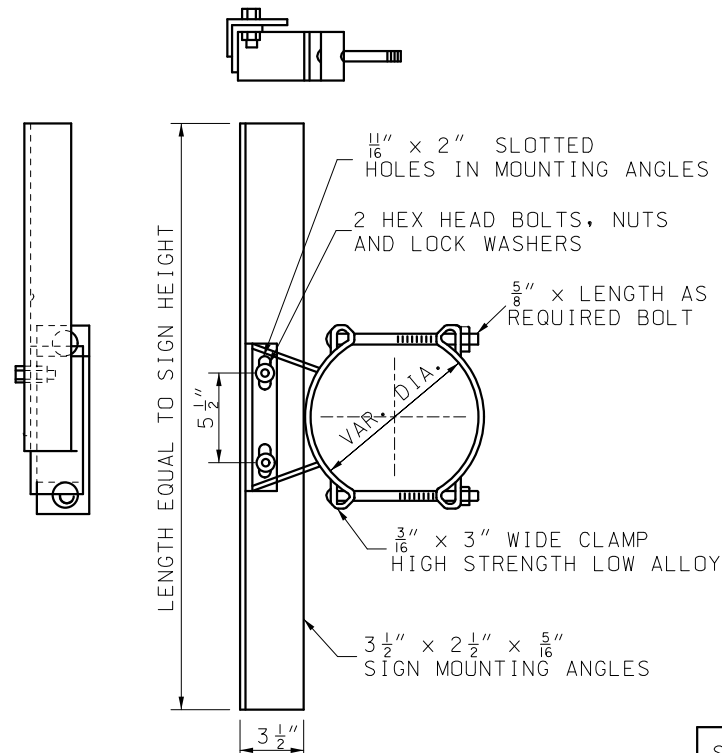


TUBE DIAMETER EQUAL TO OR LESS THAN 10 1/2" AT CENTER OF SPAN



TUBE DIAMETER GREATER THAN 10 1/2" AT CENTER OF SPAN

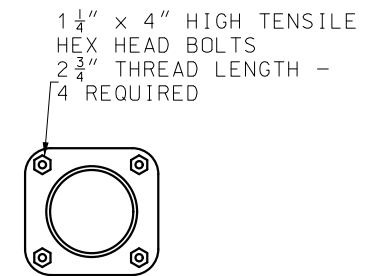
DETAIL A
BEAM CLAMP



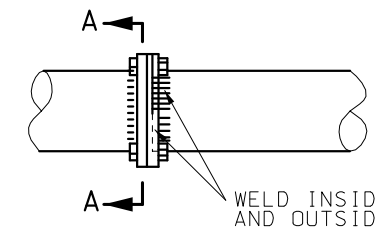
NOTE:
MINIMUM OF TWO BRACKETS ARE REQUIRED FOR SIGNS OVER 42" IN LENGTH.

GALVANIZED SIGN BRACKET ASSEMBLY

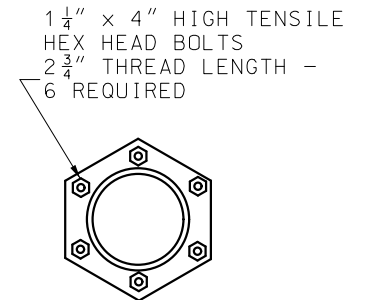
SIGN HEIGHT (INCHES)	MAXIMUM LIN. FT. OF SIGN WIDTH PER BRACKET
48 & UNDER	13
60	8
72	5



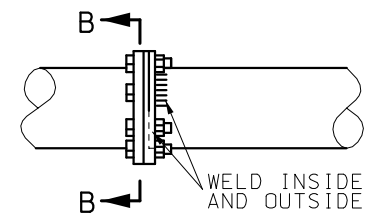
SECTION A-A



TUBE DIAMETER 9 1/2" AND UNDER



SECTION B-B

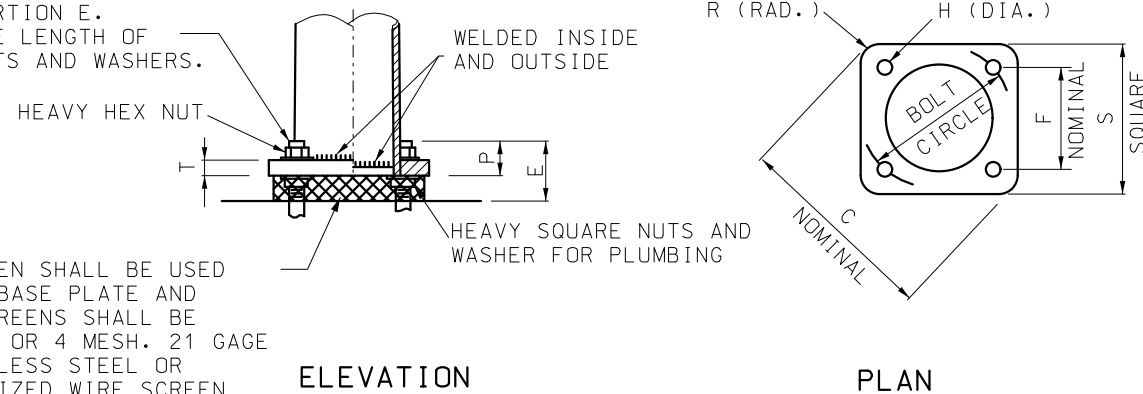


TUBE DIAMETER OVER 9 1/2"

DETAIL C
BEAM SPLICE

POST BASE DIMENSIONS AND DATA												
TYPE NO.	BOLT CIRCLE	C	F	H	S	R	P	T	E	ANCHOR BOLT	FOOTING	
											FH	FD
S-1310	13 1/2"	17 1/2"	9 9/16"	1 3/4"	14 1/8"	3 1/8"	3 3/4"	1 1/2"	7"	1 1/2" x 60"	5'-0"	2'-6"
S-1312	16"	21"	11 5/16"	2 1/8"	17"	3 3/4"	4 1/2"	2"	7 1/2"	1 3/4" x 90"	6'-6"	2'-6"

ANCHOR BOLTS AS SPECIFIED. THREAD UPPER PORTION E. GALVANIZE ENTIRE LENGTH OF BOLT AND ALL NUTS AND WASHERS.



ELEVATION

PLAN

DETAIL B
POST BASE

A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE OR HEAVIER. STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT. THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

HIGHWAY SIGNING

TUBULAR SUPPORT STEEL

TYPE S

ONE TUBE

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

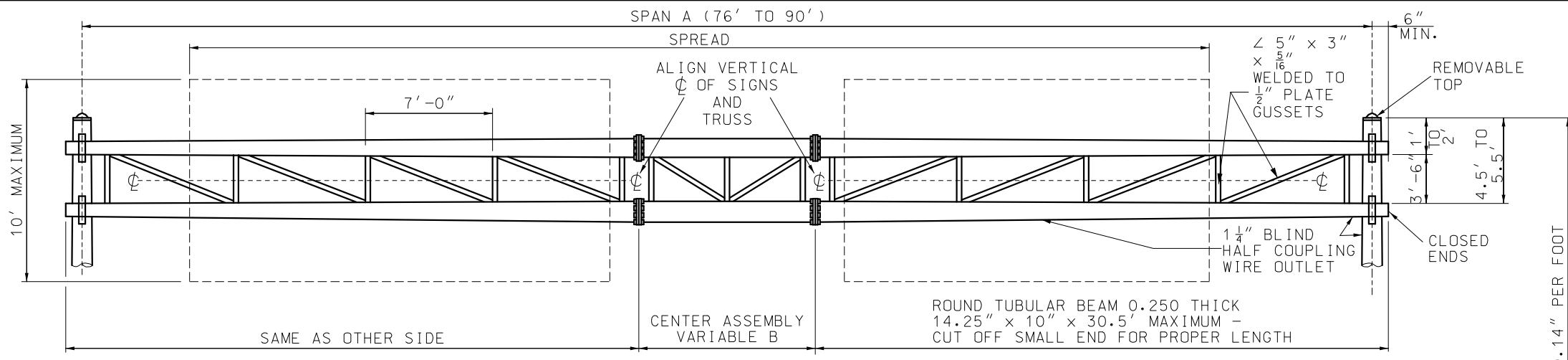
SHEET NO.
2 OF 2

DATE EFFECTIVE: 01/01/2021

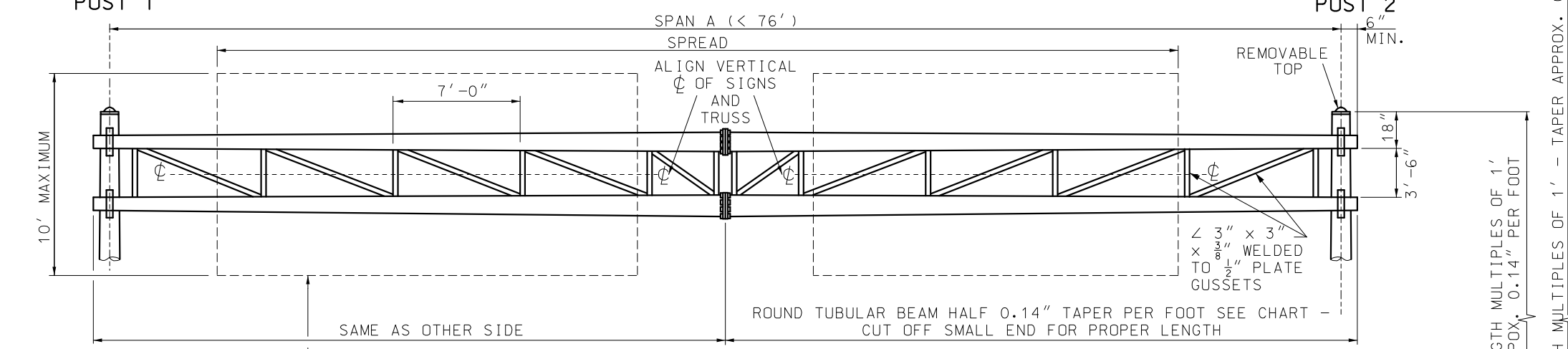
DATE PREPARED: 10/14/2020

903.05K

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TWO END POST			
TYPE	GA	D INCHES	ALLOWABLE MOMENT-FT-LBS.
S-2315	3	15	120 000
S-2316.5	3	16.5	147 000
S-2318	3	18	177 000
S-27716	7+7	16	214 000
S-2018	0	18	222 000
S-27718	7+7	18	255 000
S-23316.5	3+3	16.5	292 000
S-23317	3+3	17	328 000
S-20018	0+0	18	453 000



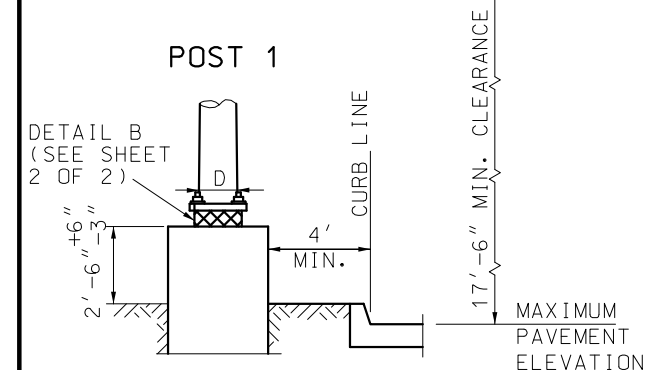
* EXAMPLE: IF SLOPE IS 1V:6H, THE DENOMINATOR IS 6

GENERAL NOTES:

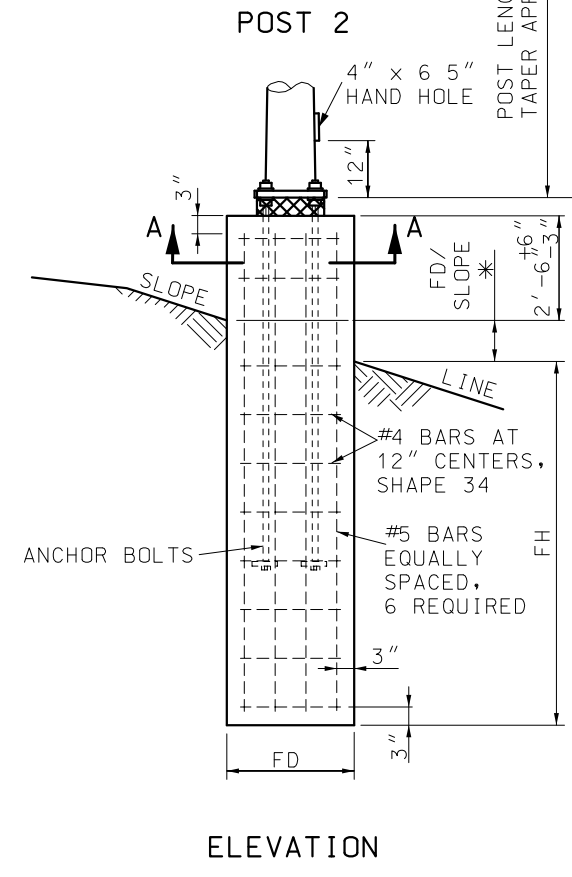
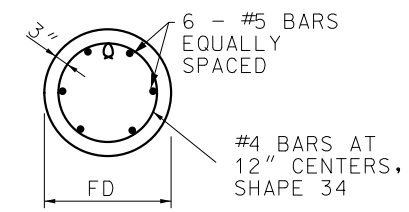
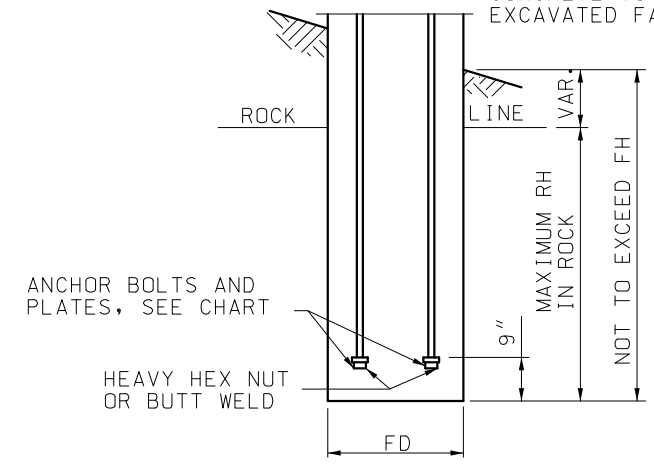
USE LONGEST POST AND SPAN A (NEXT GREATER IF NOT CHARTED) TO DETERMINE END POSTS AND STRUCTURE DESIGNS. MAXIMUM SIGN AREA FOR GIVEN SPREAD (INTERPOLATE FOR UNCHARTED SPREADS) NOT TO BE EXCEEDED. SUPPORTS DESIGNED BY END POST TYPE AND SPAN A (I.E. S-2315-40 ETC.).

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE TRUSS.



REINFORCEMENT PLACED SAME AS STANDARD FOOTING, CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK.



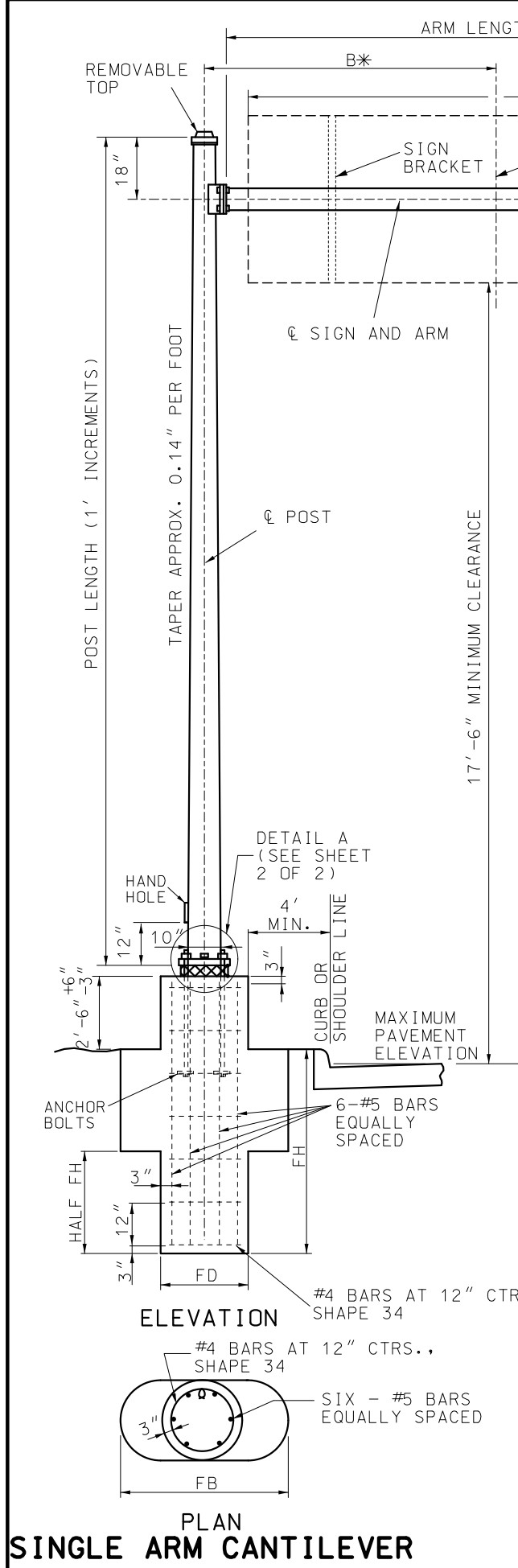
MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
 105 WEST CAPITOL JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
 NICOLE A. KOLB HOOD
 NUMBER PE-2001018754
 PROFESSIONAL ENGINEER
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY SIGNING
 TUBULAR SUPPORT STEEL
 TYPE S
 TWO TUBES

DATE EFFECTIVE: 01/01/2021	903.06K	SHEET NO. 1 OF 2
DATE PREPARED: 10/14/2020		

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SINGLE ARM CANTILEVER

SIGN BRACKETS	
SIGN HT. (IN.)	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET
	1 CLAMP TYPE
42	16
48	13
60	8
72	5
84	3

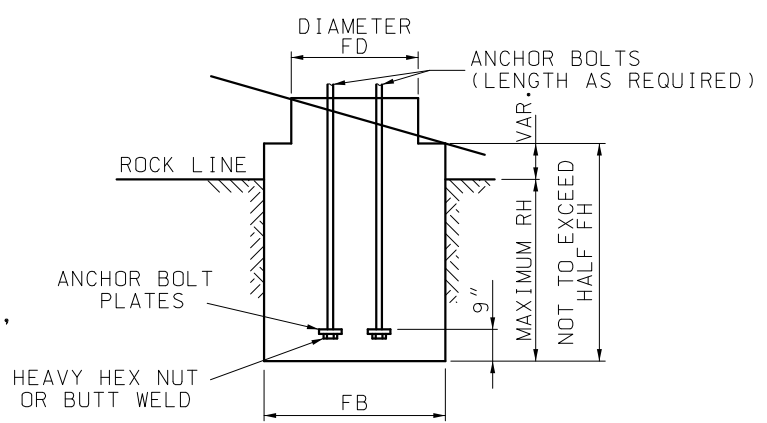
ARM = 35 000 PSI

TYPE NUMBER	ARM DIMENSIONS		POST		MAX SIGN AREA SQ. FT.	MAX. B WITH MAX. SIGN AREA
	LENGTH	DIA. / THK	GA	DIA.		
C-1710-12	12'	6" STD				
C-1710-18	18'	0.280" THK	7	10"	41	8'-0"
C-1310-12	12'	6" EX HVY				
C-1310-18	18'	0.432" THK	3	10"	59	8'-9"

* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left(\frac{\text{MAX. B FOR TRUE SIGN AREA}}{\text{TRUE SIGN AREA}} \right) \leq \left(\frac{\text{MAX SIGN AREA} \times \left(\frac{\text{MAX. B WITH MAX. SIGN AREA}}{\text{TRUE SIGN AREA}} \right)}{\text{TRUE SIGN AREA}} \right)$$

** THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN 1/4 OF THE SIGN WIDTH

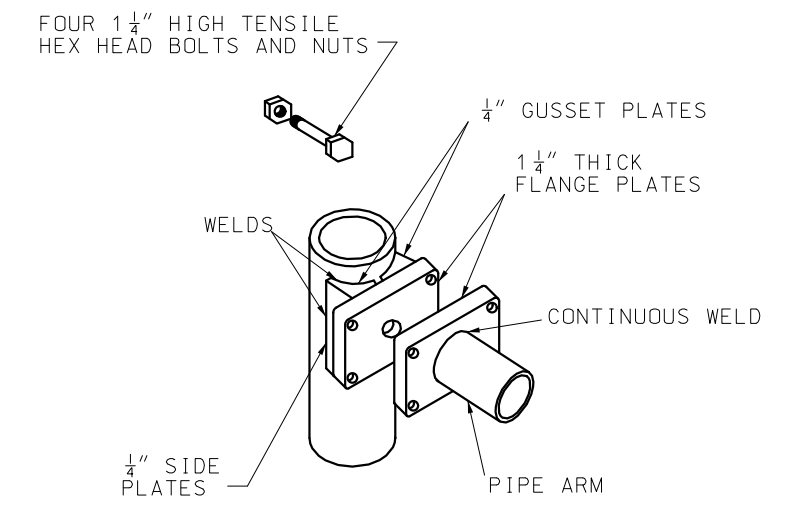


MODIFIED FOOTING IN SOLID ROCK

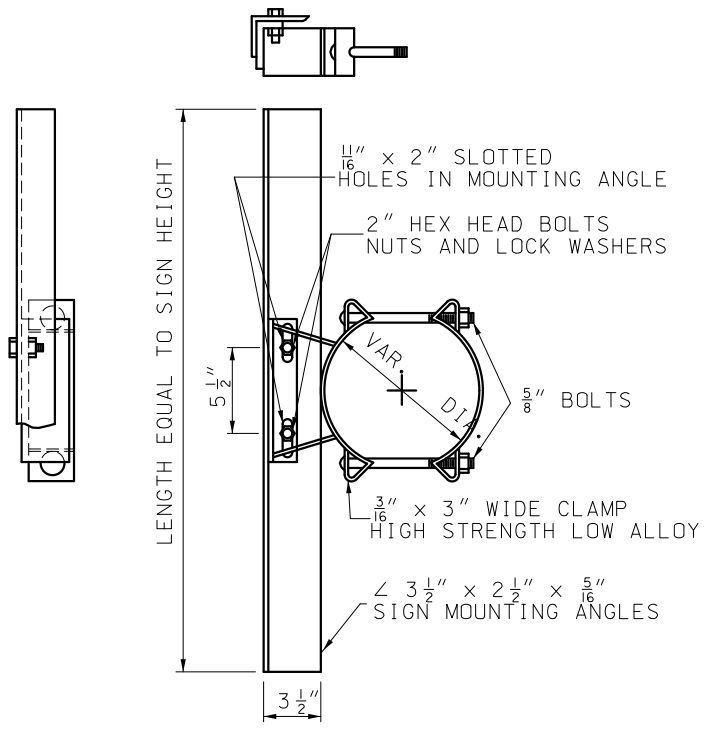
TYPE NUMBER	DIAMETER	ESTIMATED QUANTITIES						REINFORCING STEEL		
		CU YD CLASS B CONCRETE FOOTING								
		FD SECTION		FB SECTION				#5	#4 (1)	TOTAL
		1' DEPTH	1" DEPTH	1' DEPTH	1" DEPTH	1" DEPTH	NO. FT-IN	NO. FT-IN	LBS	
C-1710	2'	4'	0.11635	0.0097	0.2645	0.0220	6 7'-6"	9 5'-7"	81	
C-1310	2'	4'	0.11635	0.0097	0.2645	0.0220	6 7'-6"	9 5'-7"	81	

(1) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

TYPE NUMBER	ANCHOR BOLT DIA.	ANCHOR BOLT PLATE	FOOTING			CLASS B CONCRETE FOOTING FB SECTION CU. YD.	
			RH	FD	FB	1' DEPTH	1" DEPTH
			C-1710 & C-1310	1 1/2"	3 1/2" x 3 1/2" x 3/4"	2'-6"	2'-0"
C-2315	2"	3 1/2" x 3 1/2" x 3/4"	3'-0"	3'-0"	3'-6"	3173	0264
C-2318	2"	3 1/2" x 3 1/2" x 3/4"	3'-6"	3'-6"	3'-6"	3563	0297
C-2018	2 1/4"	4 1/2" x 4 1/2" x 3/4"	3'-6"	3'-6"	3'-6"	3563	0297



FOR POLE DIAMETER UNDER 12" ARM ATTACHMENT



GALVANIZED SIGN BRACKET ASSEMBLY

GENERAL NOTE:

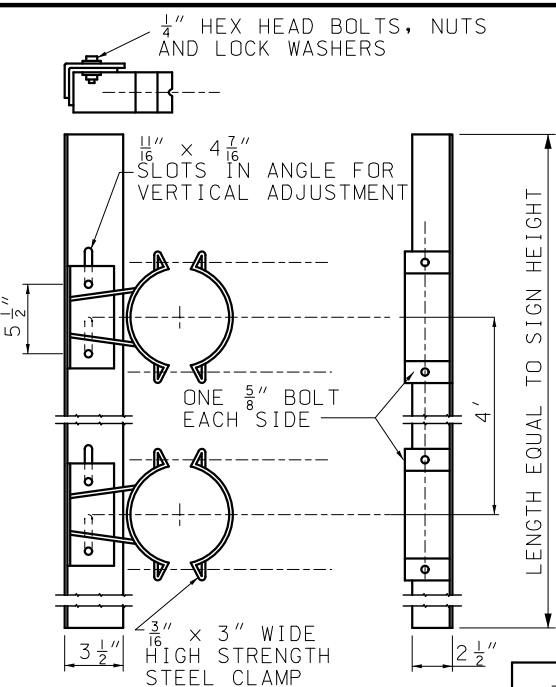
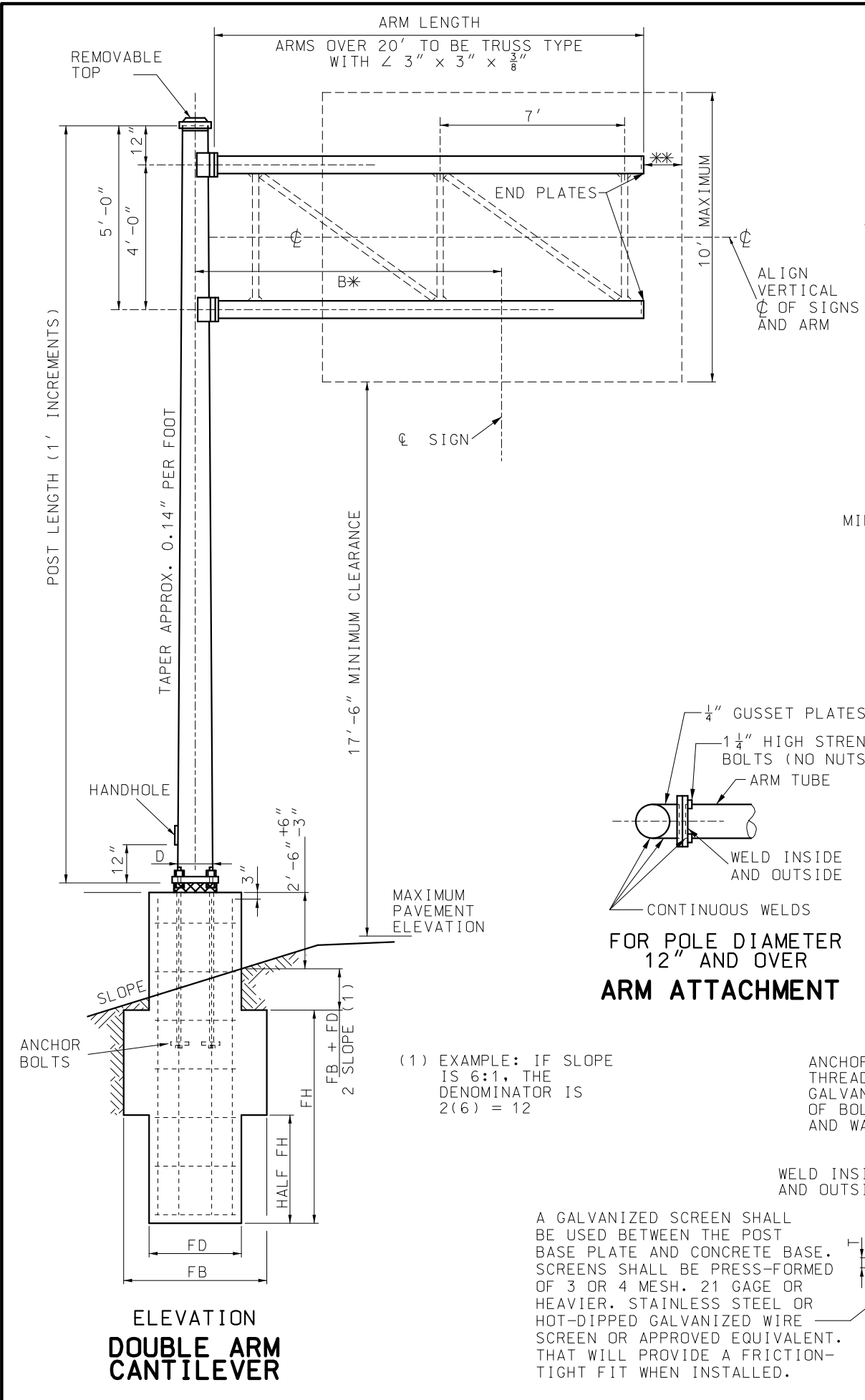
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE ARM.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.

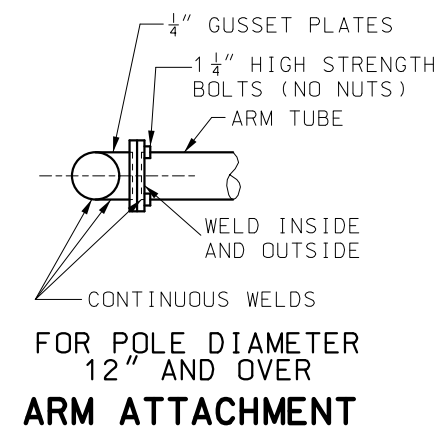
	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	HIGHWAY SIGNING TUBULAR SUPPORT STEEL TYPE C	
	DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020	903.07K

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

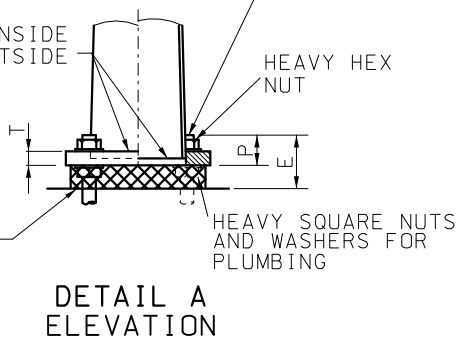


MINIMUM OF TWO BRACKETS REQUIRED ON SIGNS OVER 42" IN LENGTH
GALVANIZED SIGN BRACKET ASSEMBLY



ANCHOR BOLTS AS SPECIFIED THREAD UPPER PORTION E. GALVANIZE ENTIRE LENGTH OF BOLT AND ALL NUTS AND WASHERS.

A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE OR HEAVIER, STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT. THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.



TYPE NUMBER	DIAMETER		CU. YD. CLASS B CONCRETE FOOTING				REINFORCING STEEL				
	FD	FB	FD SECTION		FB SECTION		#5		#4 (2)		TOTAL LBS.
			1' DEPTH	1" DEPTH	1' DEPTH	1" DEPTH	NO.	FT-IN	NO.	FT-IN	
C-2315	3'	4'	0.2618	0.0218	0.3729	0.0311	6	11'-3"	13	8'-9"	146
C-2318	3'-6"	5'	0.3563	0.0297	0.5507	0.0459	6	12'-2"	13	10'-4"	166
C-2018	3'-6"	5'	0.3563	0.0297	0.5507	0.0459	6	12'-8"	14	10'-4"	176

(2) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

TYPE NUMBER	POST		ARM				B *	MAX. AREA SQ FT
	GA	DIA.	GA	DIMENSIONS				
C-2315-12	3	15"	7	7.5" x 5.82" x 12'	8'	130		
C-2315-16	3	15"	7	9.0" x 6.76" x 16'	12'	120		
C-2315-20	3	15"	3	10" x 7.2" x 20'	16'	115		
C-2315-24	3	15"	3	11" x 7.64" x 24'	20'	100		
C-2318-18	3	18"	7	9.0" x 6.48" x 18'	10'	145		
C-2318-22	3	18"	7	11" x 7.92" x 22'	14'	150		
C-2318-26	3	18"	7	12.5" x 8.86" x 26'	18'	150		
C-2018-24	0	18"	7	12.5" x 9.14" x 24'	14'	205		
C-2018-28	0	18"	3	12.5" x 8.58" x 28'	18'	215		
C-2018-34	0	18"	0	13" x 8.24" x 34'	24'	190		

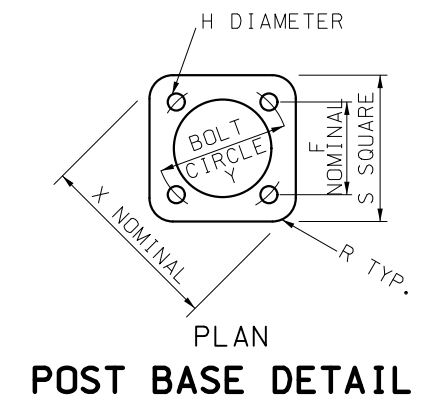
SIGN HT. (IN.)	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET
42	16
48	16
60	16
72	15
84	11
96	6
108	4
120	3

* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left(\frac{\text{MAX. B FOR TRUE SIGN AREA}}{\text{TRUE SIGN AREA}} \right) \leq \left(\frac{\text{MAX. SIGN AREA}}{\text{TRUE SIGN AREA}} \right) \times \left(\frac{\text{MAX. B WITH MAX. SIGN AREA}}{\text{TRUE SIGN AREA}} \right)$$

** THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN 1/4 OF THE SIGN WIDTH

TYPE NUMBER	POST BASE DIMENSIONS										FOOTING		
	Y	X	E	F	H	P	R	S	T	ANCHOR BOLTS	FH	FD	FB
	13 1/2"	17 1/2"	7"	9 9/16"	1"	3 3/4"	3 1/8"	14 1/8"	1 1/2"				
C-1710 & C-1310	13 1/2"	17 1/2"	7"	9 9/16"	1"	3 3/4"	3 1/8"	14 1/8"	1 1/2"	1 1/2" x 60"	5'	2'	4'
C-2315	22"	28 3/8"	8 1/2"	15 1/2"	2"	4 3/4"	4 3/8"	23"	2"	2" x 96"	7'	3'	4'
C-2318	25 1/2"	33"	8 1/2"	18"	2"	4 3/4"	5 1/2"	26 1/2"	2"	2" x 96"	7'-6"	3'-6"	5'
C-2018	25 1/2"	33"	9 1/2"	18"	2"	5 1/2"	5 1/2"	26 1/2"	2 1/2"	2 1/4" x 96"	8'	3'-6"	5'



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

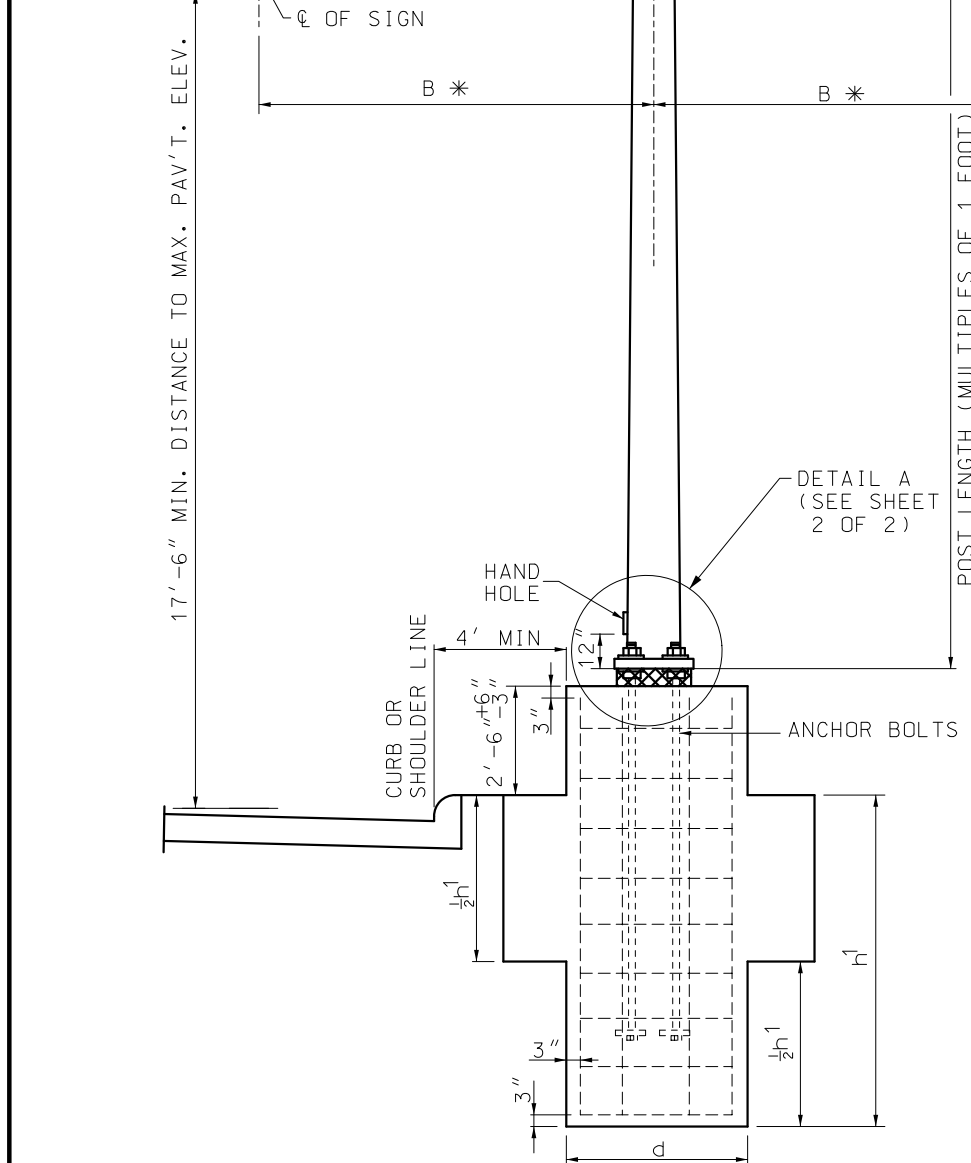
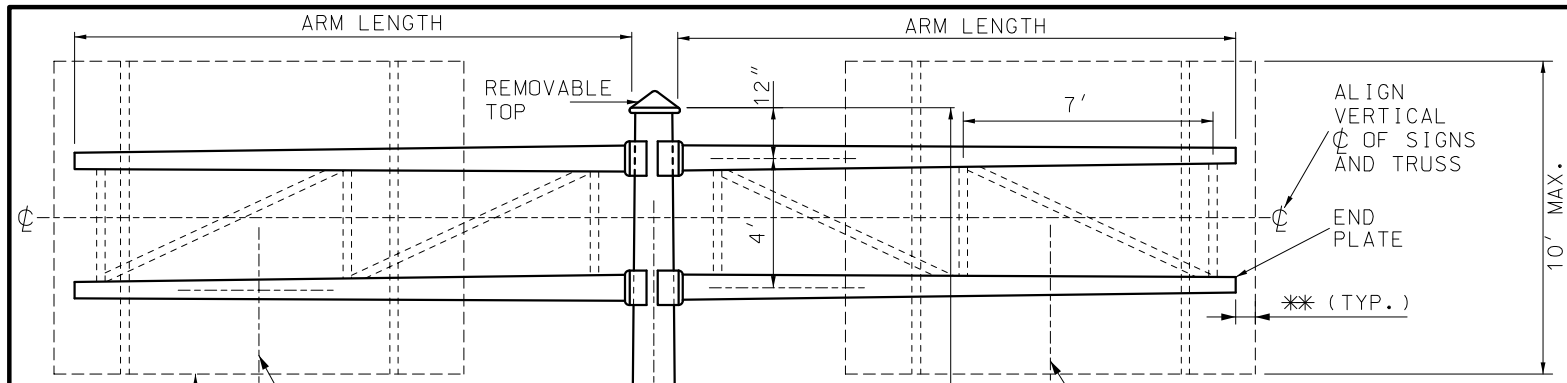
STATE OF MISSOURI

NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY SIGNING TUBULAR SUPPORT STEEL TYPE C

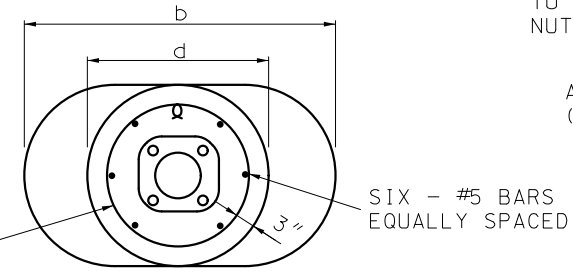
DATE EFFECTIVE: 01/01/2021	903.07K	SHEET NO. 2 OF 2
DATE PREPARED: 10/14/2020		



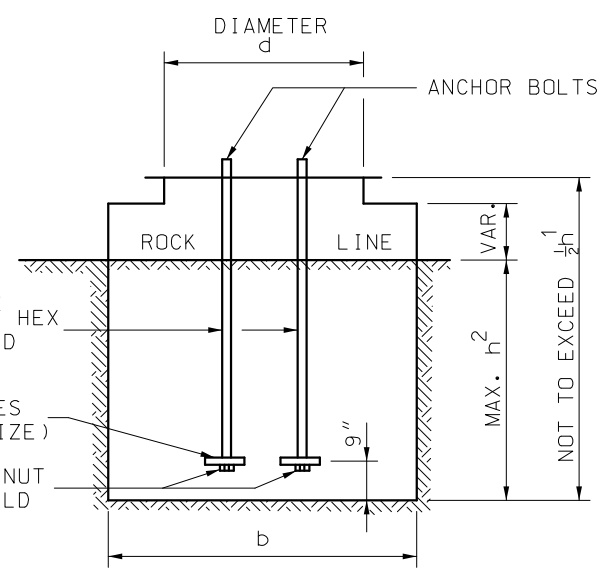
* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left(\text{MAX. B FOR TRUE SIGN AREA} \right) \leq \frac{\frac{1}{2} \left(\text{MAX SIGN AREA} \right) \times \left(\text{MAX. B WITH MAX. SIGN AREA} \right)}{\left(\text{TRUE SIGN AREA} \right)}$$

** THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN 1/4 OF THE SIGN WIDTH



PLAN FOOTING



MODIFIED FOOTINGS IN SOLID ROCK

TYPE NUMBER	POST			ARM		MAX. AREA (2) SQ. FT.
	GA.	"B"*	DIA.	GA.	DIMENSIONS	
B-2018	0	8'	18"	7	7.5" x 5.82" x 12'	260
	0	12'	18"	7	9.0" x 6.76" x 16'	240
	0	16'	18"	3	10.0" x 7.2" x 20'	230
	0	20'	18"	3	11.0" x 7.64" x 24' (1)	200
B-23318	3+3	10'	18"	7	9" x 6.48" x 18'	290
	3+3	14'	18"	7	11" x 7.92" x 22' (1)	300
	3+3	18'	18"	7	12.5" x 8.86" x 26' (1)	300
B-20018	0+0	14'	18"	7	12.5" x 9.14" x 24' (1)	410
	0+0	18'	18"	3	12.5" x 8.58" x 28' (1)	430
	0+0	24'	18"	0	13" x 24" x 34' (1)	430

NOTES:
 (1) ARMS OVER 20' TO BE TRUSS TYPE WITH \angle 3" x 3" x 3/8" ANGLES.
 (2) MAX SIGN AREA ON EACH SIDE EQUALS HALF THE TOTAL IN CHART.
 W = 40# PER SQUARE FOOT

TYPE NUMBER	DIA. "d"	DIA. "b"	ESTIMATED QUANTITIES				REINFORCING STEEL				
			CLASS B CONCRETE FOOTING (C.Y.)		REINFORCING STEEL		TOTAL				
			"d" SECTION	"b" SECTION	#5	#4 (3)					
B-2018	3'-6"	6'-0"	0.3563	0.0297	0.6800	0.0567	6	10'-0"	11	10'-4"	139
B-23318	3'-6"	7'-0"	0.3563	0.0297	0.8100	0.0675	6	10'-6"	12	10'-4"	149
B-20018	3'-6"	7'-0"	0.3563	0.0297	0.8100	0.0675	6	12'-0"	13	10'-4"	165

(3) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

TYPE NUMBER	ANCHOR BOLT (4) (DIA.)	ANCHOR BOLT PLATE	MODIFIED FOOTING IN SOLID ROCK			CLASS B CONCRETE FOOTING CU. YD.	
			FOOTING			"b" SECTION	
			"h ² "	"d"	"b"	1' DEPTH	1' DEPTH
B-2018	2 1/4"	4 1/2" x 4 1/2" x 3/4"	3'-6"	3'-6"	3'-6"	0.3563	0.0297
B-23318	3"	5 1/2" x 5 1/2" x 1"	4'-0"	3'-6"	4'-6"	0.4860	0.0405
B-20018	3"	5 1/2" x 5 1/2" x 1"	5'-0"	3'-6"	4'-6"	0.4860	0.0405

(4) ANCHOR BOLT LENGTH AS REQUIRED

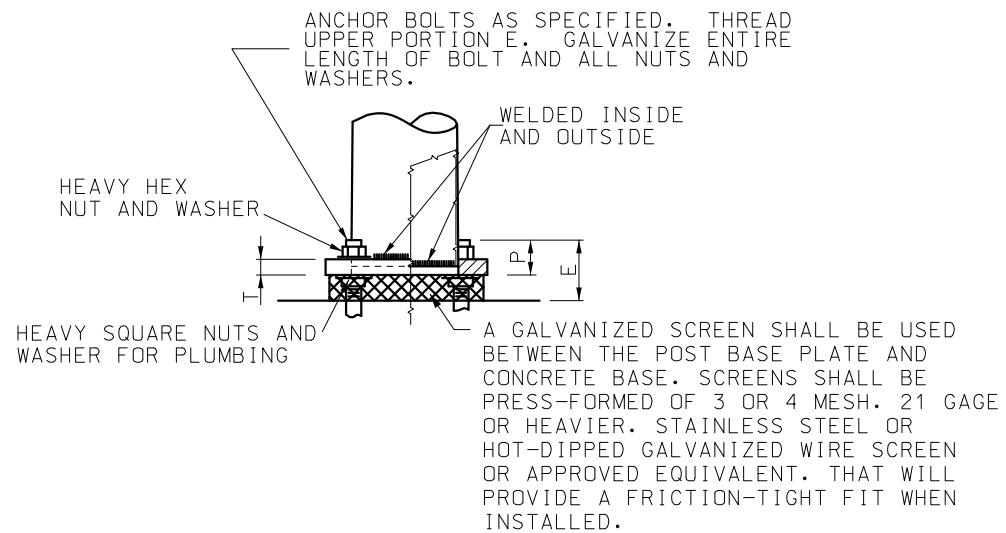
GENERAL NOTE:
 ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL CL OF THE TRUSS.
 ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.

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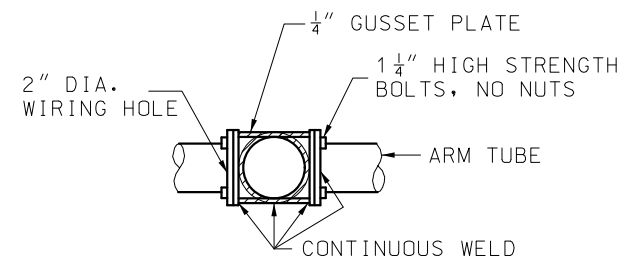
STATE OF MISSOURI
 NICOLE A. KOLB HOOD
 NUMBER PE-2001018754
 PROFESSIONAL ENGINEER
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**HIGHWAY SIGNING
 TUBULAR SUPPORT STEEL
 TYPE B**

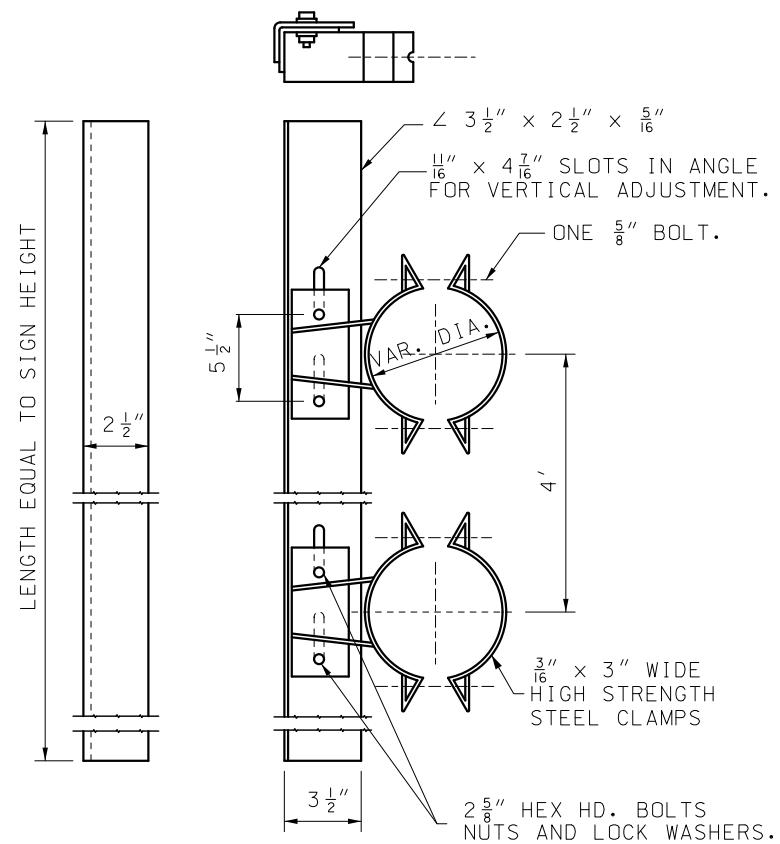
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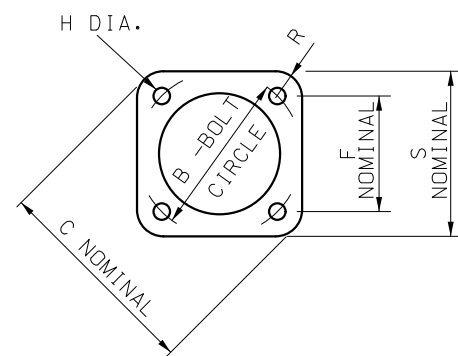
**DETAIL A
ELEVATION BASE DETAIL**



ARM ATTACHMENT DETAIL



GALVANIZED SIGN BRACKET ASSEMBLY *



PLAN POST BASE DETAIL

SIGN HEIGHT INCHES	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET
48 & UNDER	16
60	16
72	15
84	11
96	6
108	4
120	3

* MINIMUM OF TWO BRACKETS REQUIRED ON SIGNS OVER 42" IN LENGTH

TYPE NUMBER	POST BASE DIMENSIONS										FOOTING		
	B	C	F	H	S	R	P	T	E	ANCHOR BOLTS	"h"	"d"	"b"
	B-2018	25 1/2"	33"	18"	2 5/8"	26 1/2"	5 1/2"	5 1/2"	2 1/2"	9 1/2"	2 1/4" x 96"	7'-6"	3'-6"
B-23318	25 1/2"	33"	18"	3 3/8"	26 1/2"	5 1/2"	7"	3"	12"	3" x 120"	8'-0"	3'-6"	7'-0"
B-20018	25 1/2"	33"	18"	3 1/8"	26 1/2"	5 1/2"	7"	3"	12"	3" x 120"	9'-6"	3'-6"	7'-0"

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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI

NICOLE A. KOLB HOOD
NUMBER
PE-2001018754

PROFESSIONAL ENGINEER

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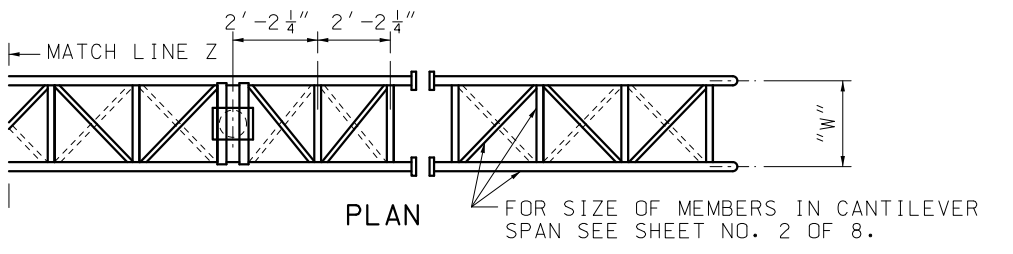
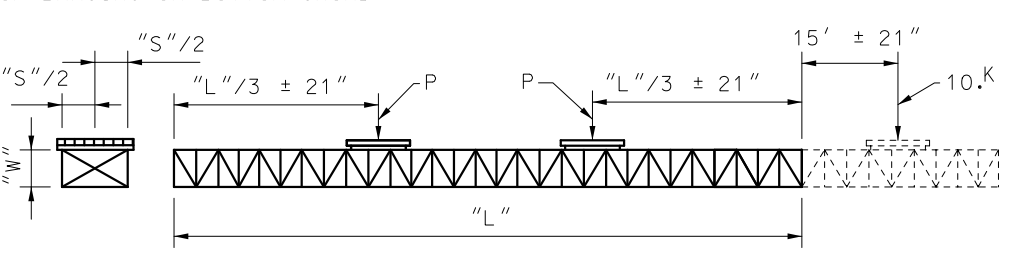
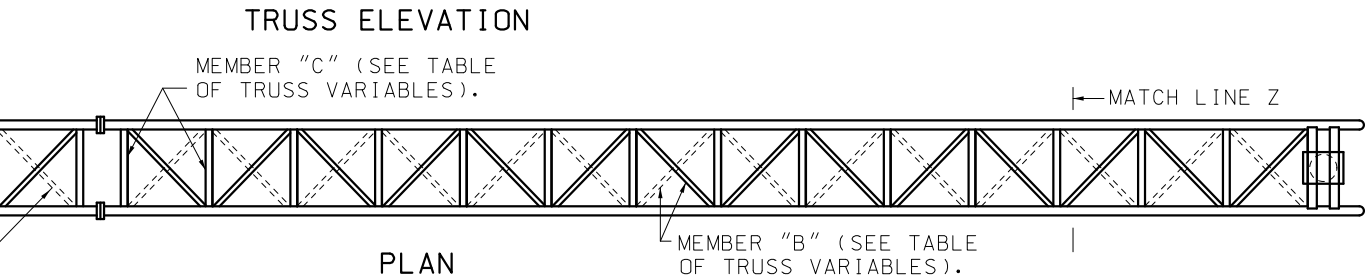
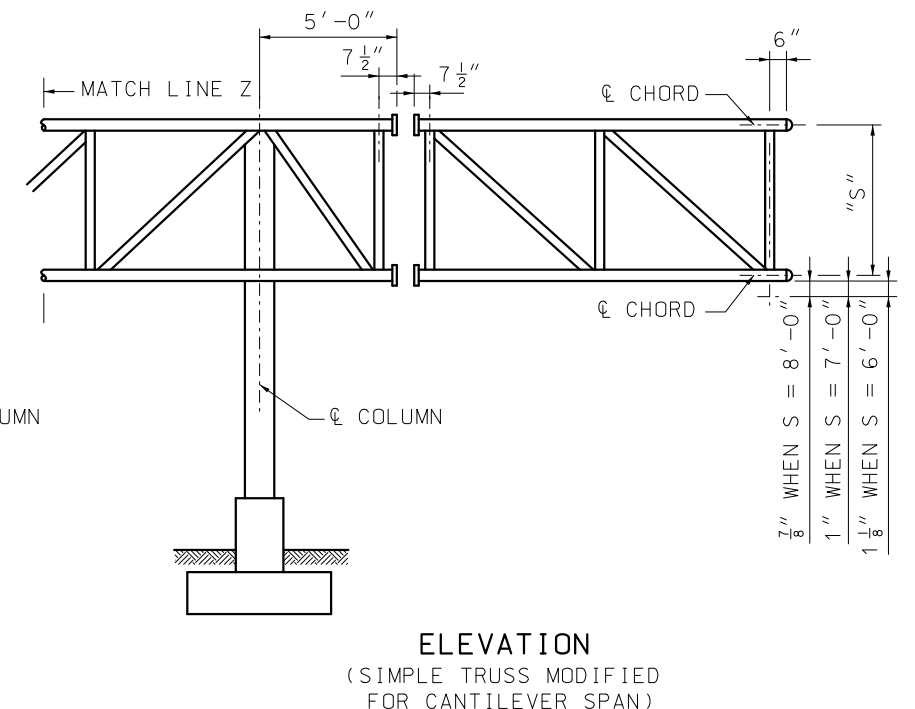
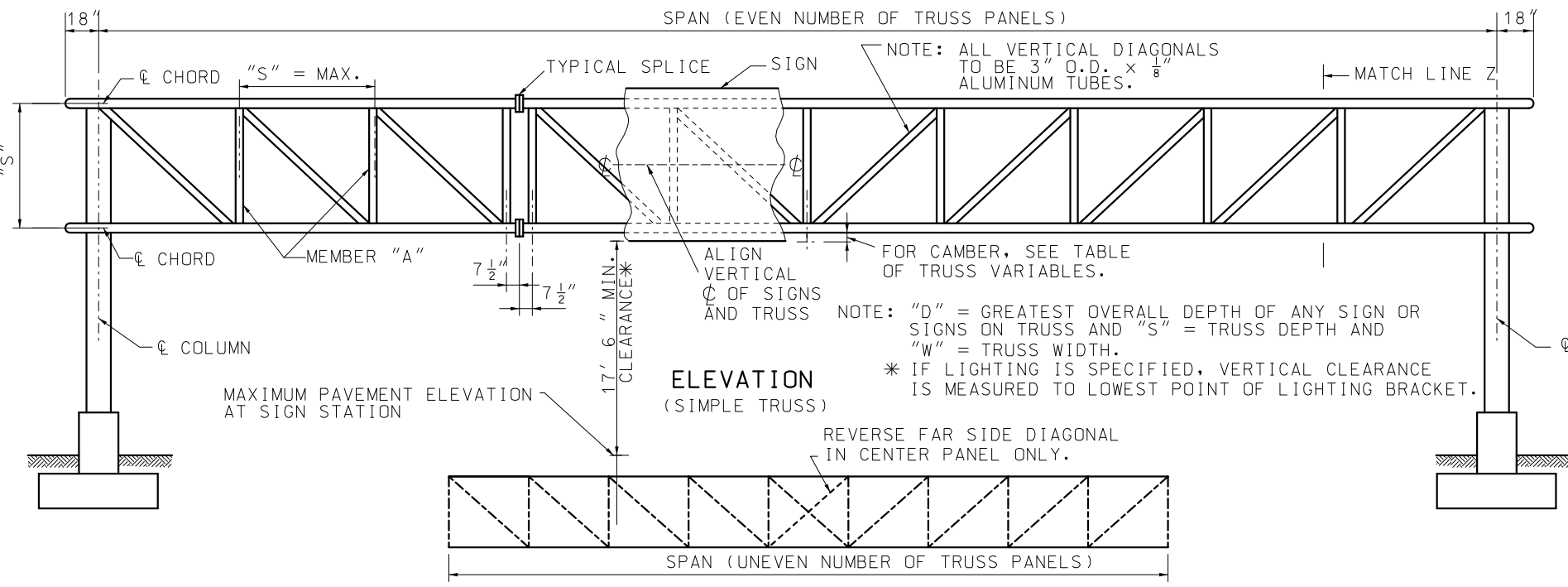
**HIGHWAY SIGNING
TUBULAR SUPPORT STEEL
TYPE B**

DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

903.08J

SHEET NO.
2 OF 2

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



$P = \frac{84\alpha W}{L} - 0.02 L$ WHERE
 α = AREA OF ONE CHORD TUBE IN SQUARE INCHES.
 (USE 0.76 α FOR 4" DIA. x 1/4" AND 4 1/2" DIA. x 1/4" CHORDS)
 W = WIDTH OF TRUSS IN FEET.
 L = SPAN LENGTH IN FEET.

SAMPLE, GIVEN: $\alpha = 4.123$ SQ. IN., $W = 6'-0"$ AND $L = 100'$.
 SOLUTION: $P = \frac{84 \times 4.123 \times 6.0}{100} - 0.02 \times 100 = 20.8 - 2 = 18.8$

NOTE:
 IF CANTILEVERED, REMOVE CONCENTRATED LOAD NEAREST CANTILEVER END AND LOAD CANTILEVER SPAN AS SHOWN ABOVE.
 15' OR LESS CANTILEVER SPANS NEED NOT BE TESTED.
 REPEAT ABOVE TESTS BY ROTATING 180° (TO SIMULATE WIND REVERSAL). NO VERTICAL LOAD (D.L.) TEST WILL BE REQUIRED.
 LOADS P SHALL NOT BE MORE THAN 16° FOR SPANS LESS THAN 55 FEET AND 20°. FOR ALL OTHERS.

SIMULATED WIND-SHOP TEST LOADING

TRUSS VARIABLES						
SPAN	"S"	"W"	MEMBER "A"	MEMBER "B"	MEMBER "C"	SHOP CAMBER
UP TO 70'-6"	6'-0"	5'-0"	2 1/2" DIA. x 1/8"	2 1/2" DIA. x 1/8"	1 3/4" DIA. x 1/8"	3/4"
71' TO 80'-6"	6'-0"	6'-0"	2 1/2" DIA. x 1/8"	2 1/2" DIA. x 1/8"	2" DIA. x 1/8"	1 1/4"
81' TO 90'-6"	6'-0"	6'-0"	2 1/2" DIA. x 1/8"	2 3/4" DIA. x 1/8"	2" DIA. x 1/8"	1 1/2"
91' TO 100'-6"	6'-0"	6'-0"	2 1/2" DIA. x 1/8"	2 3/4" DIA. x 1/8"	2" DIA. x 1/8"	2 1/4"
101' TO 110'-6"	7'-0"	7'-0"	2 1/2" DIA. x 1/8"	3" DIA. x 1/8"	2 1/4" DIA. x 1/8"	2 1/2"
111' TO 120'-6"	7'-0"	7'-0"	2 1/2" DIA. x 1/8"	3 1/2" DIA. x 1/8"	2 1/4" DIA. x 1/8"	2 3/4"
121' TO 130'-6"	7'-0"	7'-0"	3" DIA. x 1/8"	3 1/2" DIA. x 1/8"	2 1/4" DIA. x 1/8"	3 3/4"
131' TO 140'-6"	8'-0"	7'-0"	3" DIA. x 1/8"	3 3/4" DIA. x 1/8"	2 1/2" DIA. x 1/8"	3"
141' TO 150'-6"	8'-0"	7'-0"	3" DIA. x 1/8"	3 3/4" DIA. x 1/8"	2 3/4" DIA. x 1/8"	3 3/4"
151' TO 160'-6"	8'-0"	7'-0"	3" DIA. x 1/8"	3 3/4" DIA. x 1/8"	2 3/4" DIA. x 1/8"	4 1/2"

NOTE:
 FOR SIZE OF CHORD MEMBERS, SEE DATA SHEET. SHOP CAMBER MAY BE PARABOLIC OR STRAIGHT, BUT SHALL BE SYMMETRICAL ABOUT CENTERLINE OF SPAN.

GENERAL NOTES:
 ALL STRUCTURAL STEEL AND COLUMN BASE PLATES ASTM A36.
 ALL ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 36.
 PROPOSED FIELD SPLICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL OF THE ENGINEER.
 TRUSSES SHALL BE FABRICATED WITH A MINIMUM OF SPLICING IN TRUSS CHORDS.
 FIELD SPLICING WILL NOT BE PERMITTED WITHIN THE MIDDLE ONE-THIRD OF SPAN.
 PERMISSIBLE VENT HOLES (MAXIMUM 1/8" DIAMETER) SHALL BE PLACED A MINIMUM OF 3" FROM WELD ON LOW SIDE OF HORIZONTAL, VERTICAL AND DIAGONAL TUBES.
 ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE TRUSS.
 FOR ADDITIONAL INFORMATION SEE DATA SHEET.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
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OVERHEAD SIGN TRUSSES

ALUMINUM

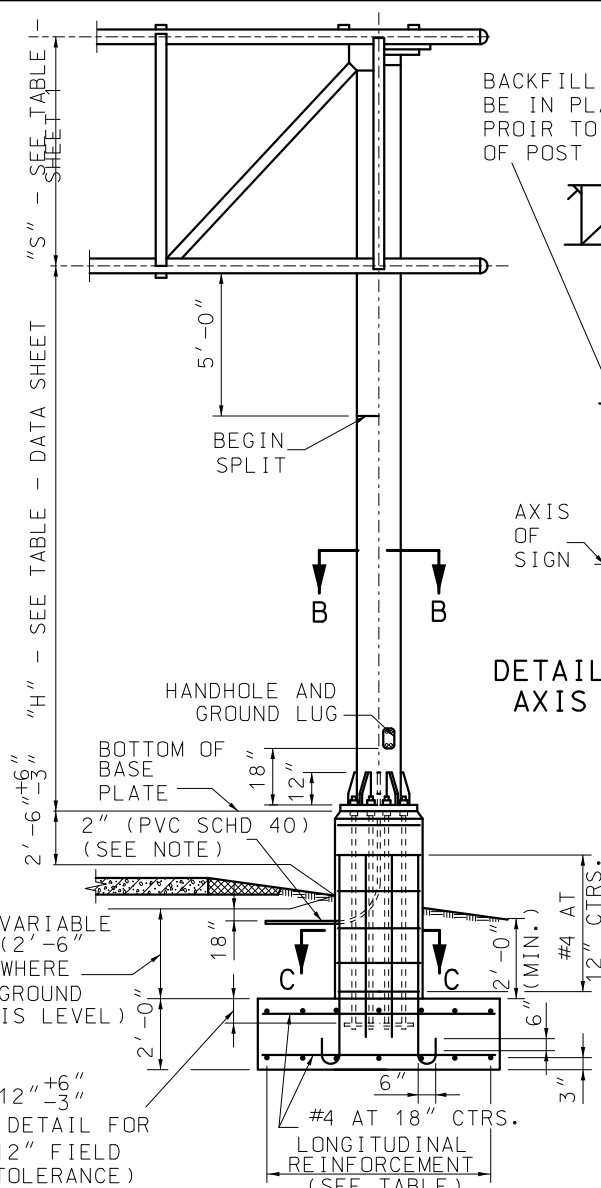
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

903.10BD

SHEET NO.
1 OF 6

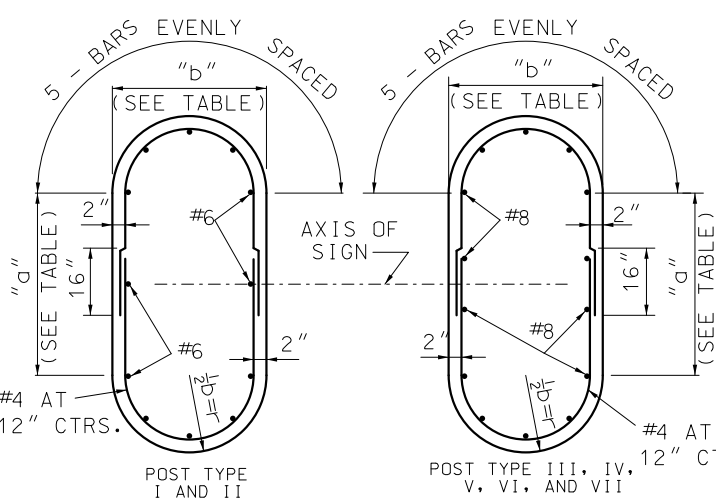
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

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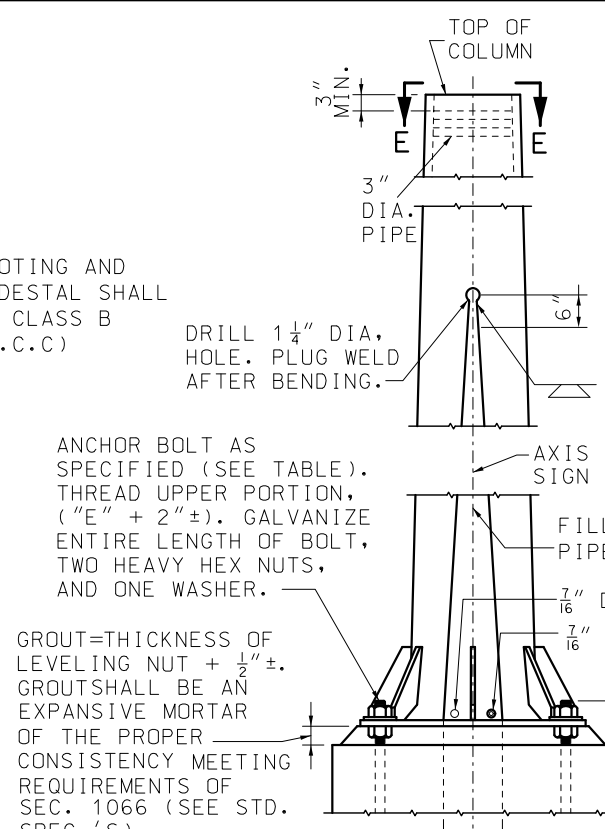
ELEVATION

NOTE: THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM RADIUS BEND OF 9 1/2".

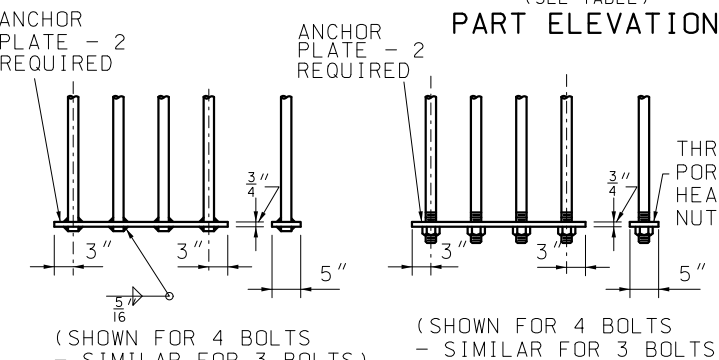


SECTION C-C

(TYPICAL SECTION SHOWING REINFORCING STEEL)
NOTE: FOR DETAILS OF ALTERNATE PEDESTAL, SEE SHEET NO. 5 OF 6.

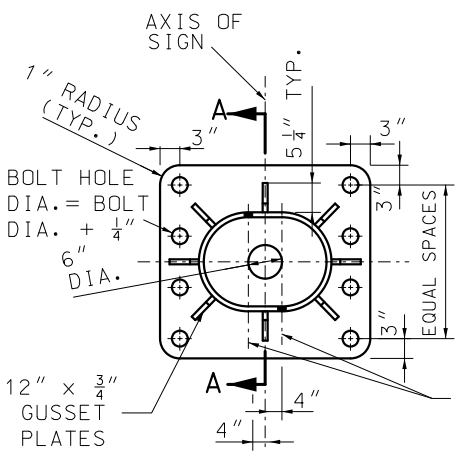
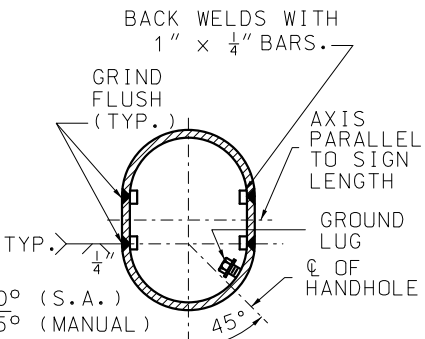


PART ELEVATION

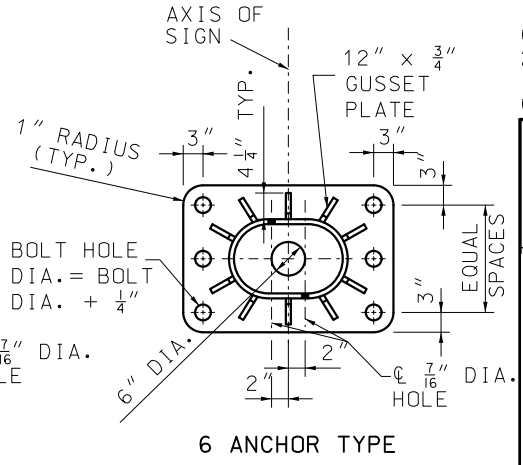


ANCHORAGE DETAIL A

ANCHORAGE DETAIL B (OPTIONAL)

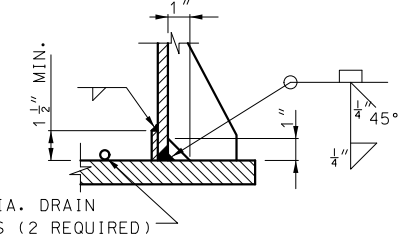
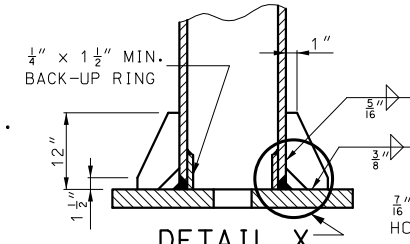
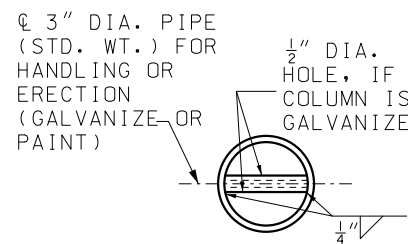


TYPICAL BASE PLATES



POST TYPE	PIPE COLUMN	DIMENSION "E"	SPLIT	BASE PLATE SIZE*	ANCHOR BOLTS DIA.	PEDESTAL SIZE*		FOOTING SIZE*	LONGITUDINAL FOOTING REINFORCEMENT		CONCRETE C.Y.
						a	b		TOP	BOTTOM	
I	12" STD. AT 65.42	8 1/2"	6"	2'-6" x 23" x 1 1/2"	6 AT 2 1/4"	4'-0"	2'-11"	7'-0" x 14'-6"	7-#5 BARS	7-#6 BARS	10.9
II	14" O.D. AT 72.09	8 1/2"	9 1/2"	3'-0" x 2'-0" x 1 1/2"	6 AT 2 1/4"	4'-4"	3'-0"	8'-0" x 16'-0"	8-#5 BARS	9-#6 BARS	13.2
III	16" O.D. AT 82.77	8 3/4"	11 1/2"	3'-4" x 2'-2" x 1 3/4"	6 AT 2 1/4"	4'-8"	3'-2"	8'-6" x 17'-6"	9-#5 BARS	9-#7 BARS	15.2
IV	18" O.D. AT 93.45	9 1/2"	12 1/2"	3'-7" x 2'-4" x 2"	6 AT 2 1/2"	5'-1"	3'-4"	9'-6" x 19'-0"	10-#5 BARS	10-#8 BARS	18.1
V	20" O.D. AT 104.13	9 1/2"	13"	3'-10" x 2'-9" x 2"	8 AT 2 1/2"	5'-4"	3'-9"	10'-0" x 20'-0"	10-#5 BARS	10-#8 BARS	20.6
VI	24" O.D. AT 125.49	9 1/2"	10 1/2"	4'-0" x 3'-3" x 2"	8 AT 2 1/2"	5'-6"	4'-3"	10'-6" x 21'-0"	11-#5 BARS	11-#8 BARS	23.3
VII	24" O.D. AT 125.49	9 1/2"	13 1/2"	4'-3" x 3'-3" x 2"	8 AT 2 1/2"	5'-9"	4'-3"	11'-0" x 22'-0"	11-#5 BARS	11-#9 BARS	25.1

* BASE PLATES, PEDESTAL, AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



DETAIL X

GENERAL NOTES:

A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53. NO OBJECTIONABLE SEAMS WILL BE PERMITTED.

ALL STRUCTURES SHALL BE GROUNDED.

BURR THREADS ON ALL ANCHOR BOLTS.

A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5'-0".

QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF 2'-0".

QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

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JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER

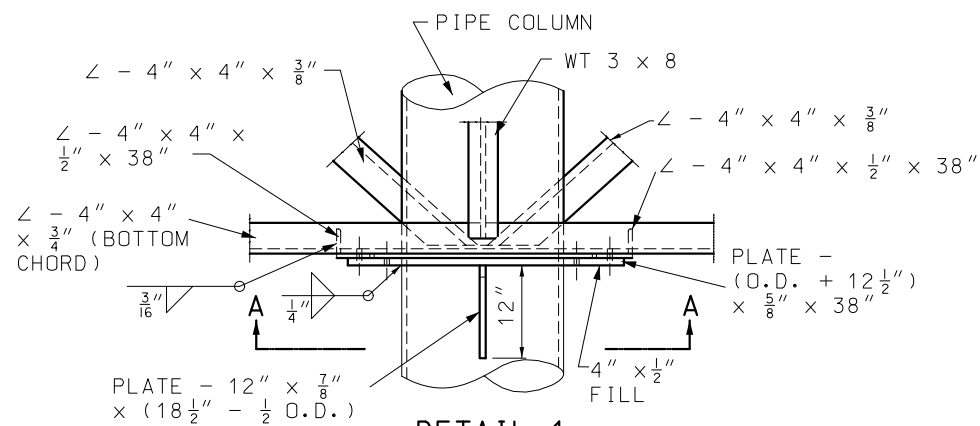
OVERHEAD SIGN TRUSSES
ALUMINUM

DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

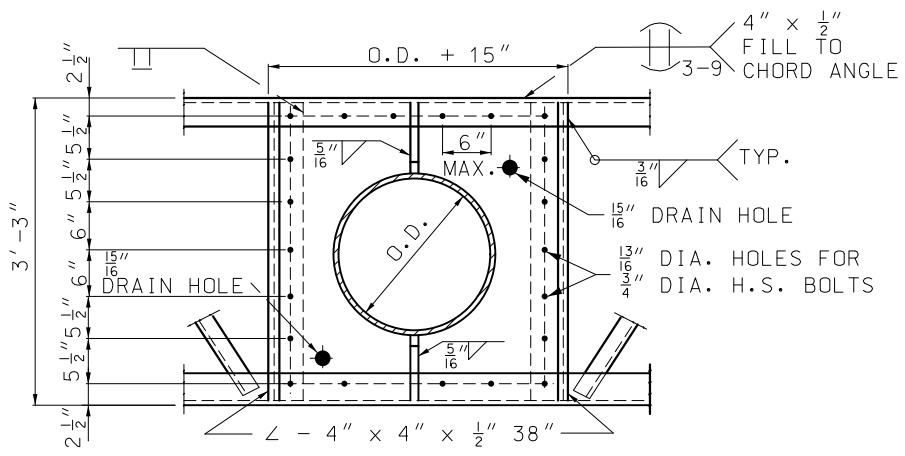
903.10BD

SHEET NO. 4 OF 6

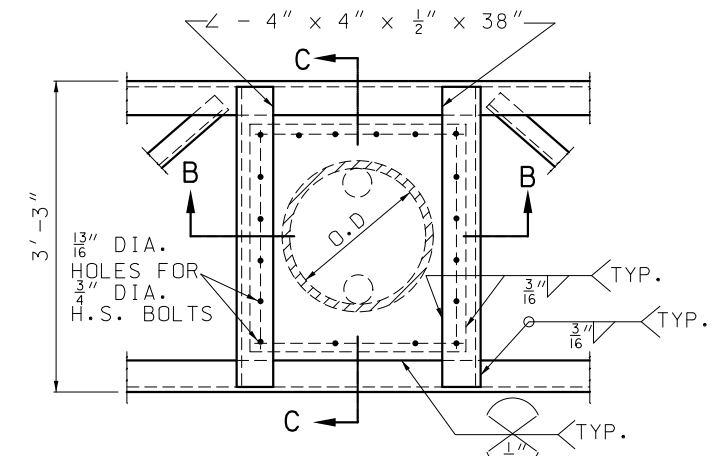
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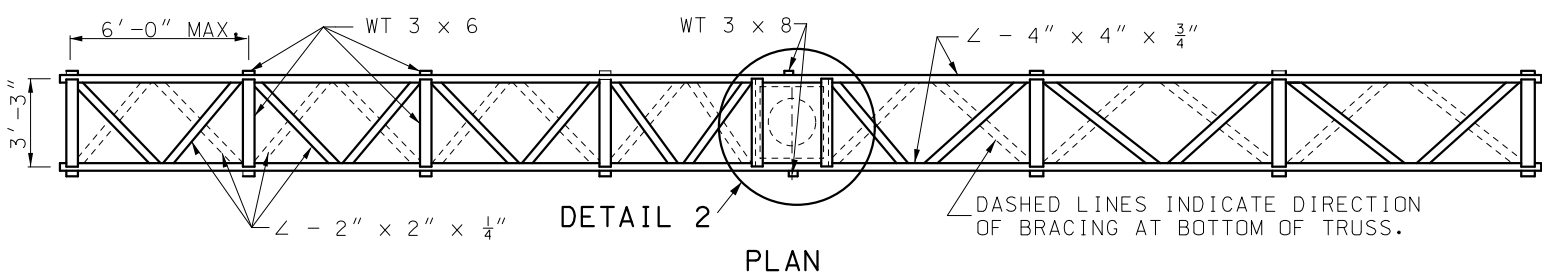
DETAIL 1
TRUSS BOTTOM CONNECTION TO COLUMN



SECTION A-A

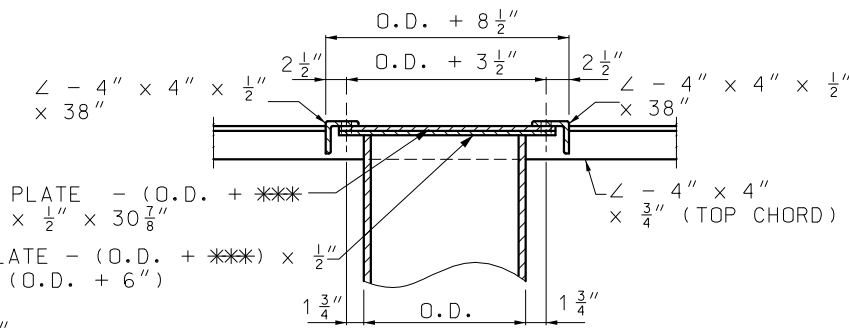


DETAIL 2
TRUSS TOP CONNECTION TO COLUMN

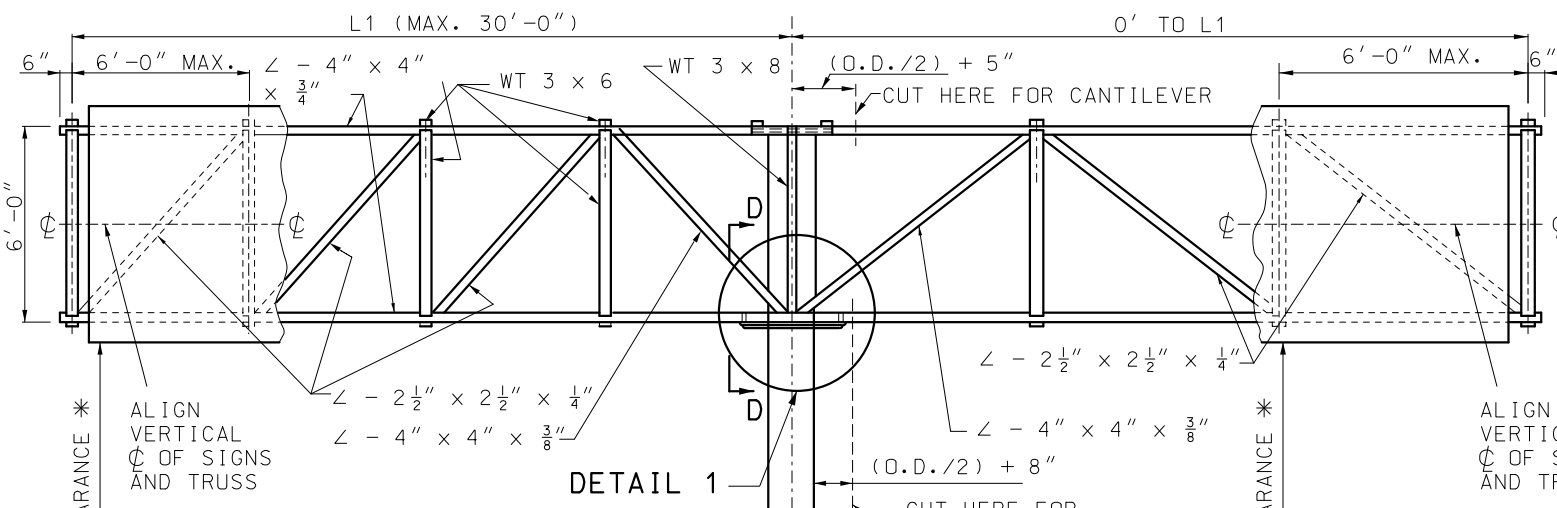


DETAIL 2
PLAN

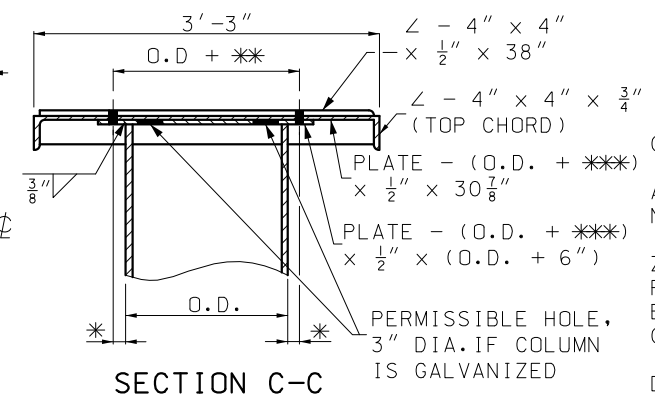
- * 1 1/2" FOR POST TYPE VII
1 3/4" FOR ALL OTHER POST TYPES
- ** 3" FOR POST TYPE VII
3 1/2" FOR ALL OTHER POST TYPES
- *** 5 1/2" FOR POST TYPE VII
6" FOR ALL OTHER POST TYPES



SECTION B-B



DETAIL 1



SECTION C-C

GENERAL NOTES:
ALL FASTENERS SHALL HAVE A HARDENED WASHER UNDER THE NUT OR BOLT HEAD, WHICHEVER IS TURNED IN TIGHTENING.
ZINC CHROMATE PRIMER SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATION TT-P-645 OR TT-P-1757 AND SHALL BE ACCEPTED ON THE BASIS OF THE LABEL SHOWING CONFORMANCE OR A MANUFACTURER'S CERTIFICATION.

DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND CURRENT INTERIMS.

DESIGN OF SPREAD FOOTINGS SHALL COMPLY WITH 1994 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE TRUSS.

* IF LIGHTING IS SPECIFIED, VERTICAL CLEARANCE IS MEASURED TO THE LOWEST POINT OF LIGHTING BRACKET.

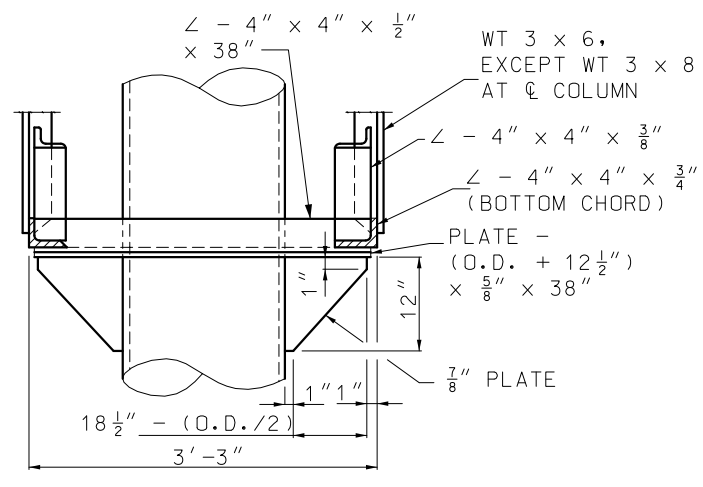


ELEVATION
DRILLED SHAFT OPTION



ELEVATION
SPREAD FOOTING OPTION

NOTE:
TRUSSES AND COLUMN BASE PLATES: ASTM A36, ANCHOR BOLTS: ASTM F1554, GRADE 36. FOR ADDITIONAL INFORMATION, SEE DATA SHEET.



SECTION D-D

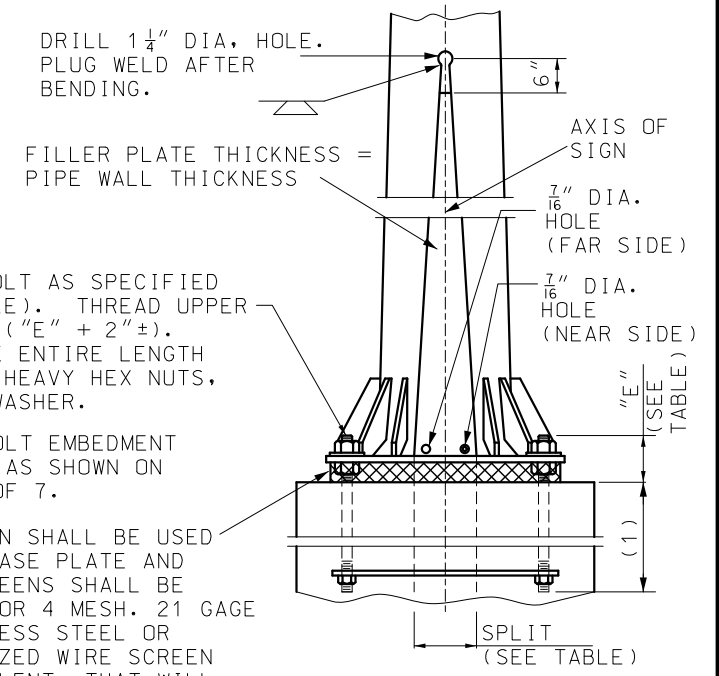
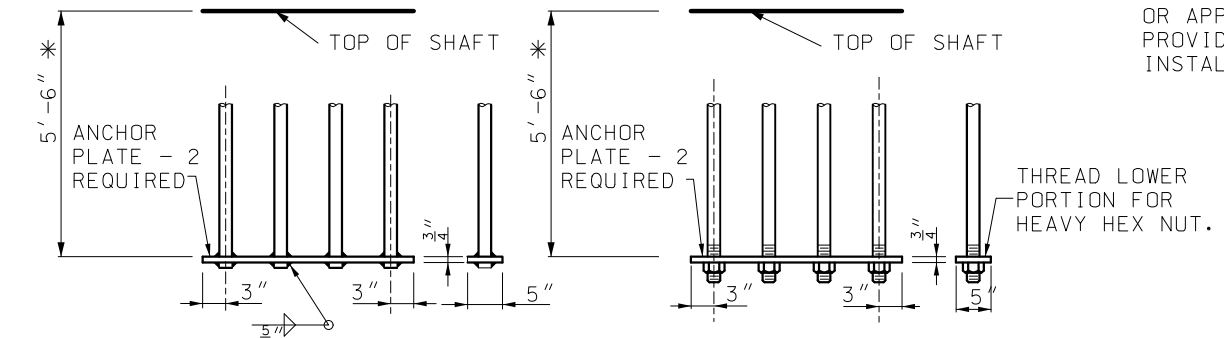
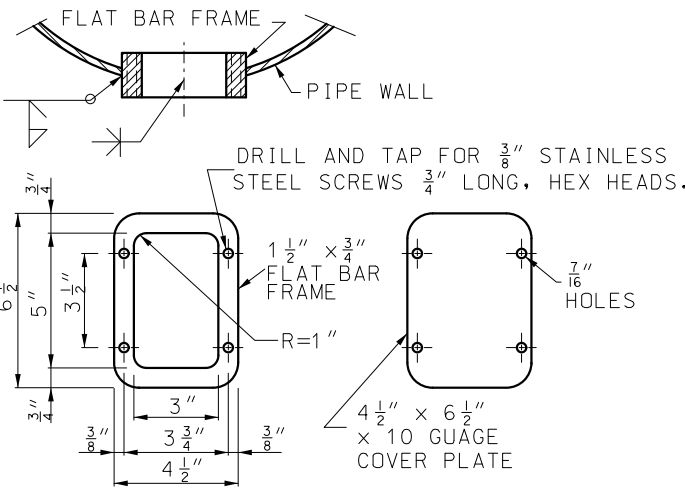
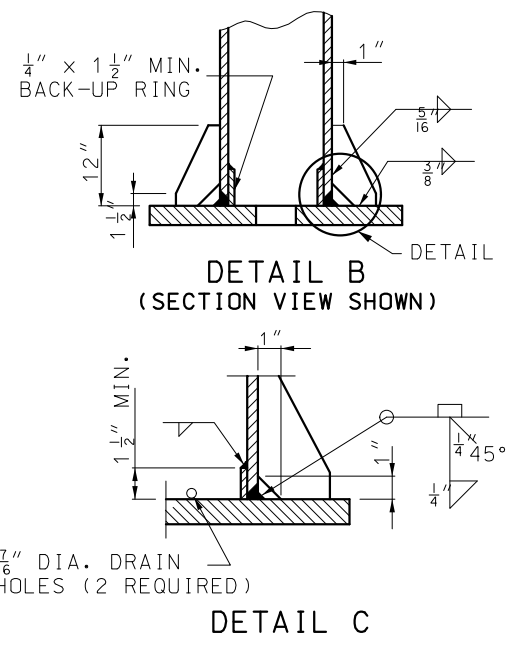
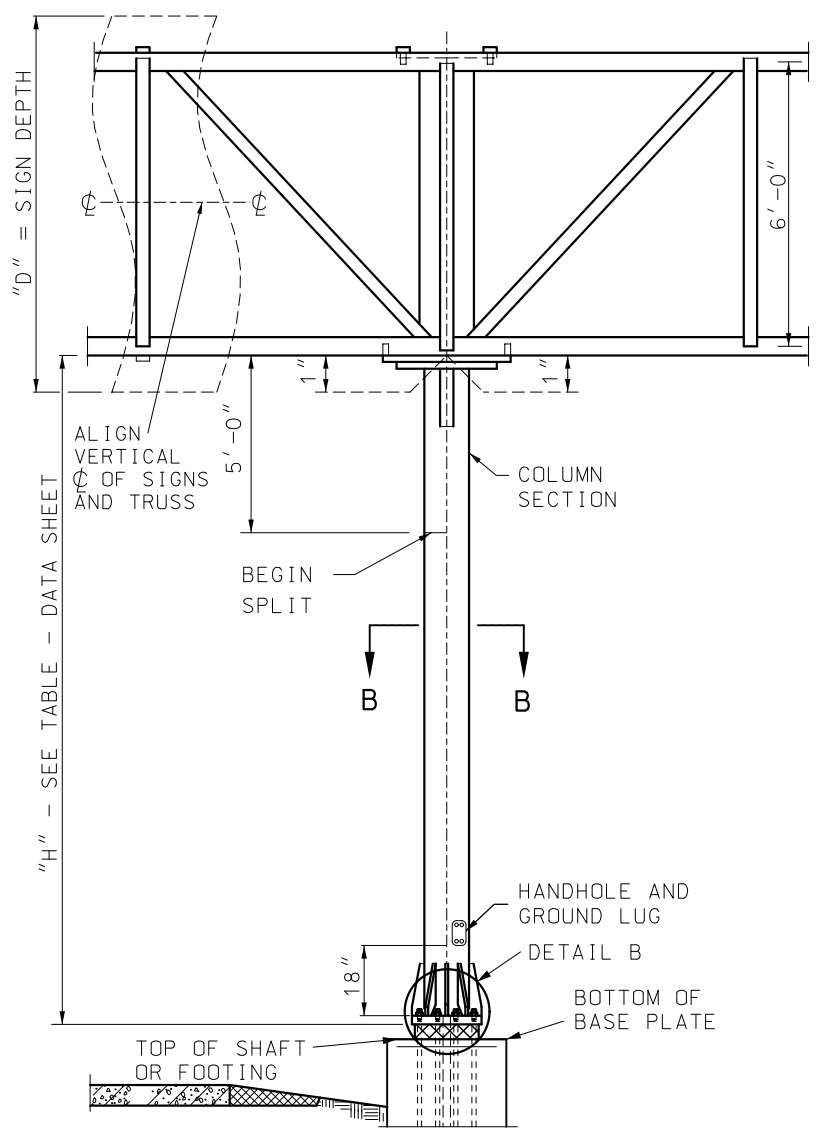
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105 WEST CAPITOL JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES
BUTTERFLY AND CANTILEVER
STRUCTURAL STEEL

DATE EFFECTIVE: 01-01-2021	903.12AA	SHEET NO. 1 OF 7
DATE PREPARED: 10/14/2020		

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



ANCHOR BOLT AS SPECIFIED (SEE TABLE). THREAD UPPER PORTION, ("E" + 2"±). GALVANIZE ENTIRE LENGTH OF BOLT, HEAVY HEX NUTS, AND ONE WASHER.

(1) ANCHOR BOLT EMBEDMENT SHALL BE AS SHOWN ON SHEET 6 OF 7.

A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE OR HEAVIER, STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT. THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.

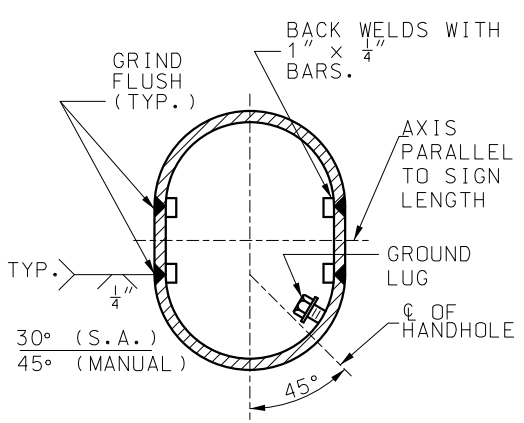
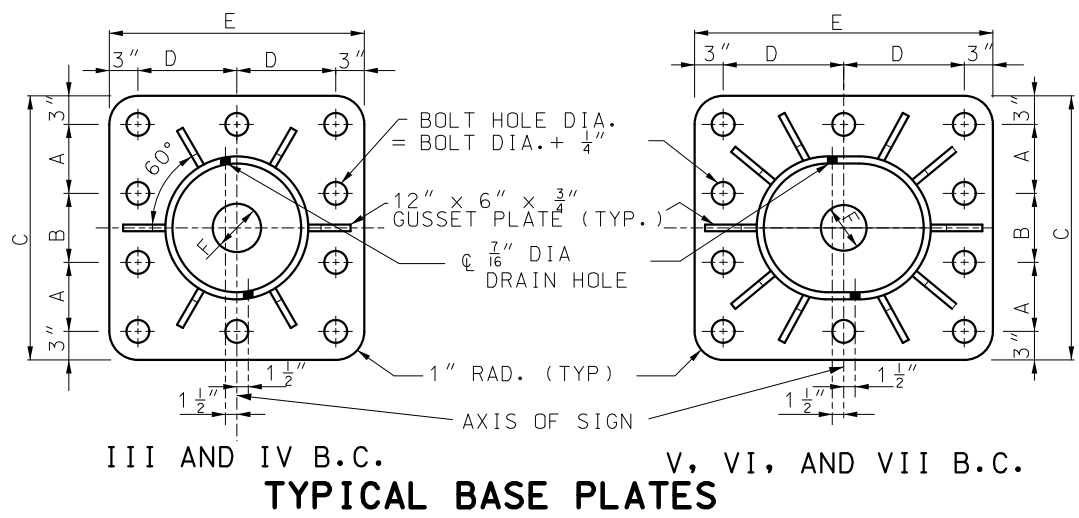
GENERAL NOTES:

- SUBSTRUCTURE SHALL BE BACKFILLED PRIOR TO ERECTION OF POST.
- ASTM A 106 GRADE B STEEL PIPE OR A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.
- ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53.
- ALL STRUCTURES SHALL BE GROUNDED.
- BURR THREADS ON ALL ANCHOR BOLTS.
- A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.
- GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.
- ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL C OF THE TRUSS.

NOTE:
HANDHOLE REQUIRED ONLY IN POWER COLUMN.

DETAIL A ANCHORAGE
(BOTH DETAILS ARE SHOWN FOR 4 BOLTS - SIMILAR FOR 3 BOLTS)
* DIMENSION SHOWN FOR DRILLED SHAFT OPTION. FOR SPREAD FOOTING OPTION REFER TO SHEET 6 OF 7.

TYPICAL BASE PLATE (10 ANCHOR TYPE) BUTTERFLY AND CANTILEVER (B.C.)					
	III	IV	V	VI	VII
A	8"	9"	8"	9"	10 1/2"
B	10"	10"	10"	10"	11"
C	32"	34"	32"	34"	38"
D	13"	14"	16 1/2"	18"	20"
E	32"	34"	39"	42"	46"
F	6"	6"	6"	6"	6"



NOTE:
FOR DETAILS OF OPTIONAL SUBSTRUCTURES, SEE OTHER SHEETS.
ANCHOR BOLTS AND PLATE NOT SHOWN.

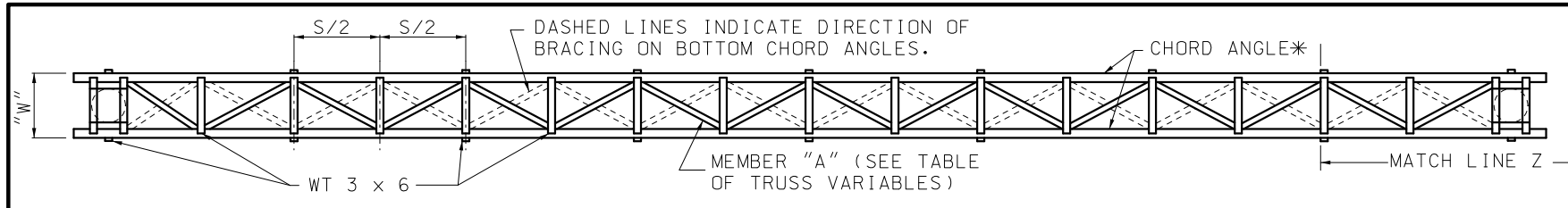
MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

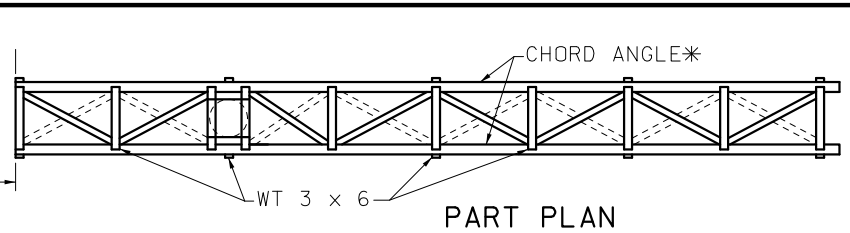
OVERHEAD SIGN TRUSS COLUMN AND BASE PLATES

DATE EFFECTIVE: 01-01-2021	903.12AA	SHEET NO. 3 OF 7
DATE PREPARED: 10/14/2020		

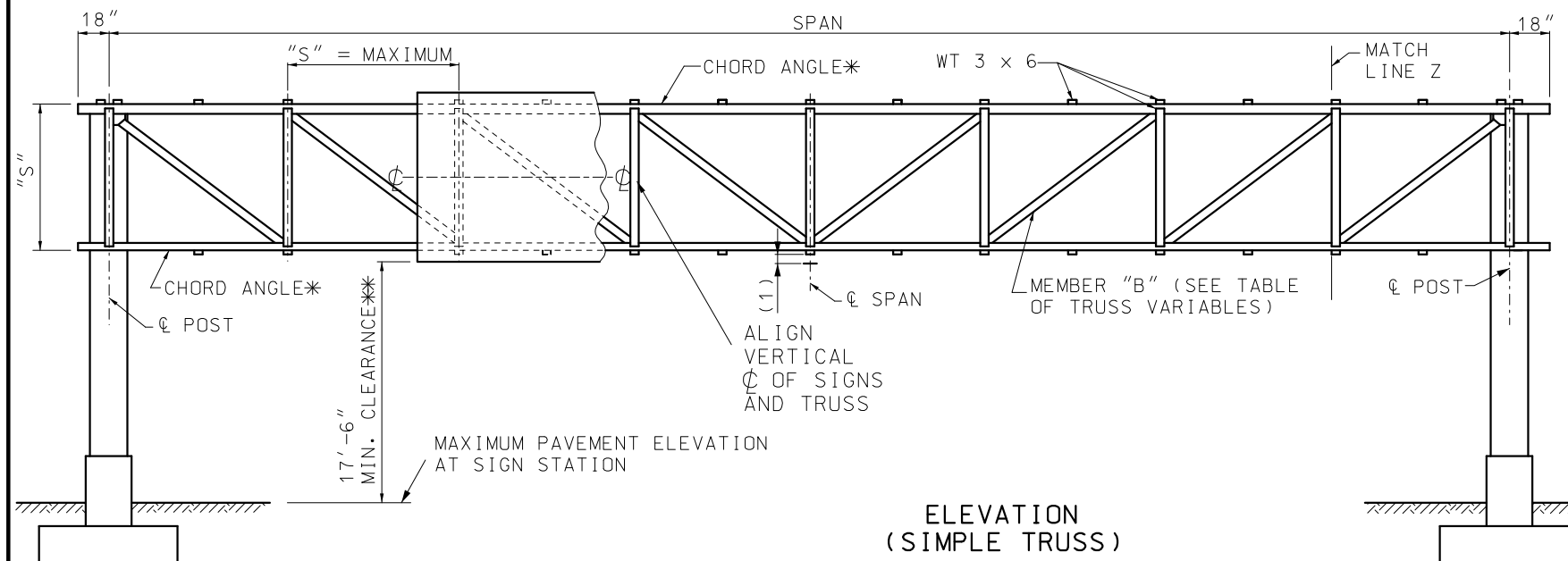
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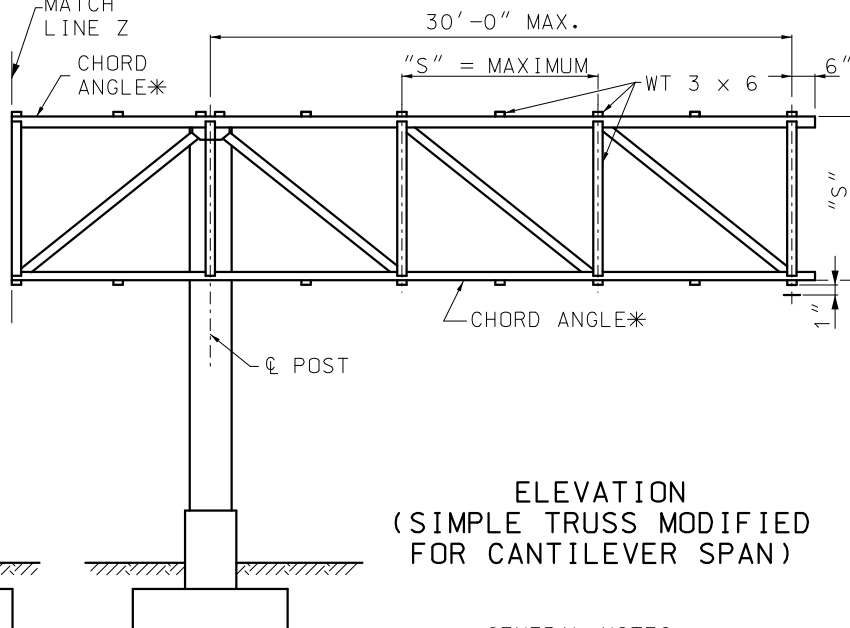
PART PLAN



PART PLAN



ELEVATION (SIMPLE TRUSS)



ELEVATION (SIMPLE TRUSS MODIFIED FOR CANTILEVER SPAN)

NOTES:

SHOP SPLICES ON CHORD ANGLES WILL BE ALLOWED ONLY BY SPECIAL PERMISSION. IF PERMISSION IS GRANTED, SUCH SPLICES MUST BE LOCATED AT THE CENTERLINE OF MAIN PANEL POINTS.

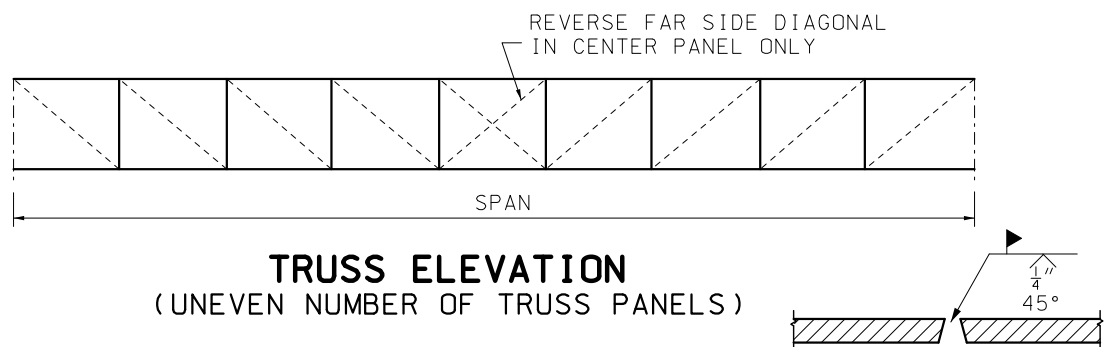
"D" = GREATEST OVERALL DEPTH OF ANY SIGN OR SIGNS ON TRUSS AND "S" = TRUSS DEPTH, AND "W" = TRUSS WIDTH.

3/4" DIA. BOLTS SHALL BE REMOVED AFTER WELDING IS COMPLETE. BOLT HOLES SHALL BE PLUGGED AND THE OUTSIDE FACE GROUND SMOOTH.

* SEE GENERAL NOTES THIS SHEET FOR CHARPY V-NOTCH REQUIREMENTS.

** IF LIGHTING IS SPECIFIED, VERTICAL CLEARANCE IS MEASURED TO LOWEST POINT OF LIGHTING BRACKET.

(1) FOR PARABOLIC CAMBER SEE TABLE OF TRUSS VARIABLES



TRUSS ELEVATION (UNEVEN NUMBER OF TRUSS PANELS)

TRUSS VARIABLES					
SPAN	"S"	"W"	MEMBER "A"	MEMBER "B"	SHOP CAMBER
UP TO 80'-6"	6'-0"	4'-0"	L 2 1/2" x 2 1/2" x 1/4"	L 2 1/2" x 2 1/2" x 1/4"	2"
81' TO 100'-6"	6'-0"	5'-0"	L 3" x 3" x 1/4"	L 2 1/2" x 2 1/2" x 1/4"	2 1/2"
101' TO 130'-6"	7'-0"	6'-0"	L 3" x 3" x 1/4"	L 3" x 3" x 1/4"	3 1/2"
131' TO 150'-6"	8'-0"	6'-0"	L 3 1/2" x 3 1/2" x 5/16"	L 3 1/2" x 3 1/2" x 5/16"	4 1/2"
151' TO 160'-6"	8'-0"	7'-0"	L 3 1/2" x 3 1/2" x 5/16"	L 3 1/2" x 3 1/2" x 5/16"	5 1/2"

NOTE: FOR SIZE OF CHORD MEMBERS SEE DATA SHEET.

GENERAL NOTES:

ALL STRUCTURAL STEEL AND COLUMN BASE PLATES ASTM A36, EXCEPT THAT CHORD ANGLES GREATER THAN 1/2" IN THICKNESS SHALL BE AASHTO M183 WITH SUPPLEMENTAL REQUIREMENTS: S5, CHARPY V-NOTCH IMPACT TEST FOR TEMPERATURE ZONE 2.

ALL ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 36.

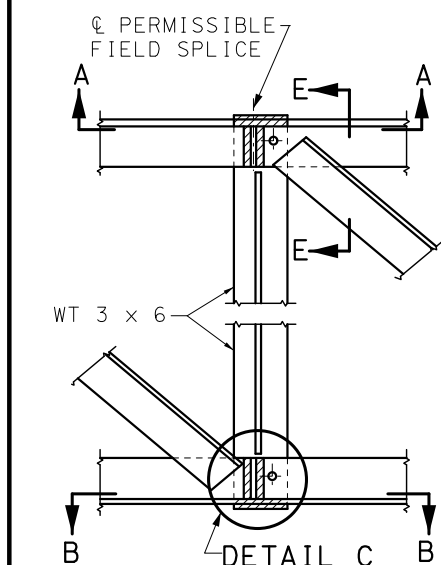
PROPOSED FIELD SPLICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL OF THE ENGINEER.

TRUSSES SHALL BE FABRICATED WITH A MINIMUM OF SPLICING IN TRUSS CHORDS. FIELD SPLICING WILL NOT BE PERMITTED WITHIN THE MIDDLE ONE-THIRD OF SPAN.

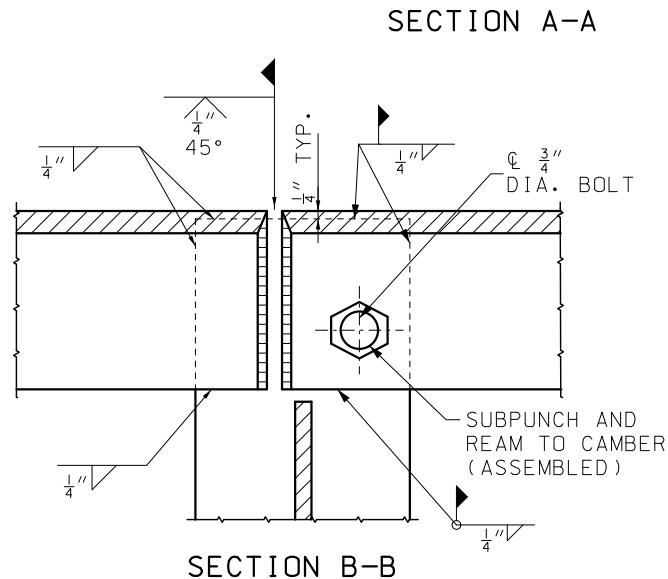
FOR ADDITIONAL INFORMATION SEE DATA SHEET.

ZINC CHROMATE PRIMER SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATIONS TT-P-645 OR TT-P-1757 AND SHALL BE ACCEPTED ON THE BASIS OF THE LABEL SHOWING CONFORMANCE OR A MANUFACTURER'S CERTIFICATION.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL CL OF THE TRUSS.

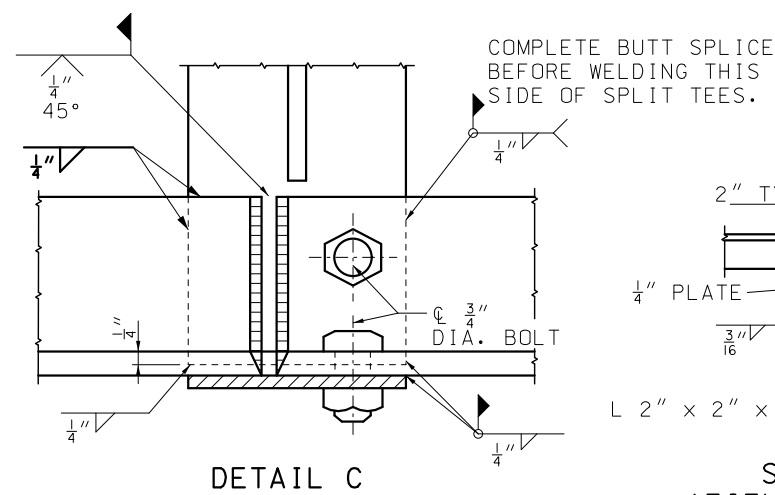


SECTION THROUGH TRUSS LOCATING SPLICES

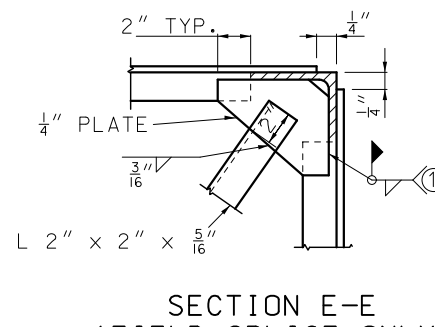


SECTION B-B

DETAIL OF FIELD SPLICES (IF ANY)



DETAIL C



SECTION E-E (FIELD SPLICE ONLY)

1 SEE SHEET 2

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
PROFESSIONAL ENGINEER

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OVERHEAD SIGN TRUSSES

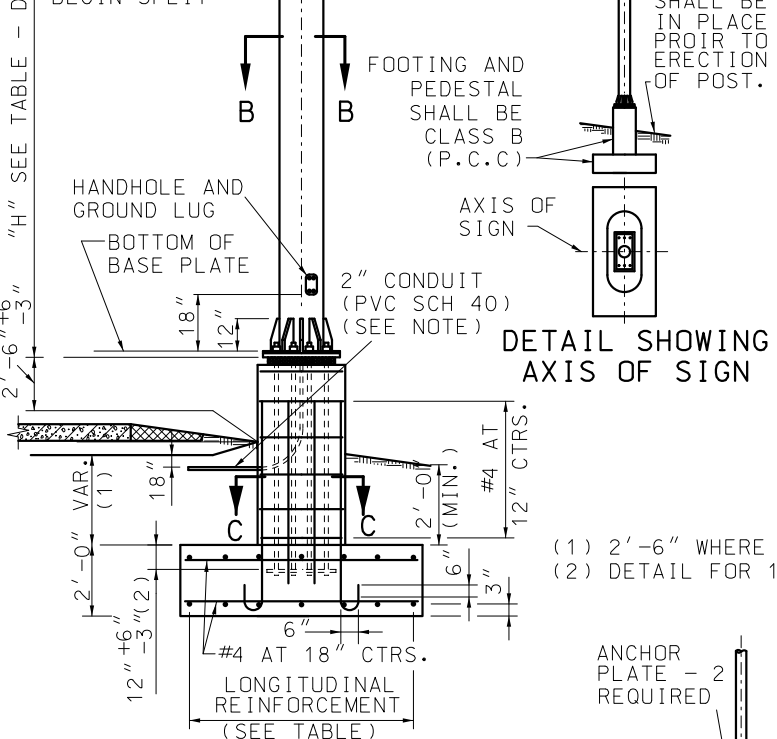
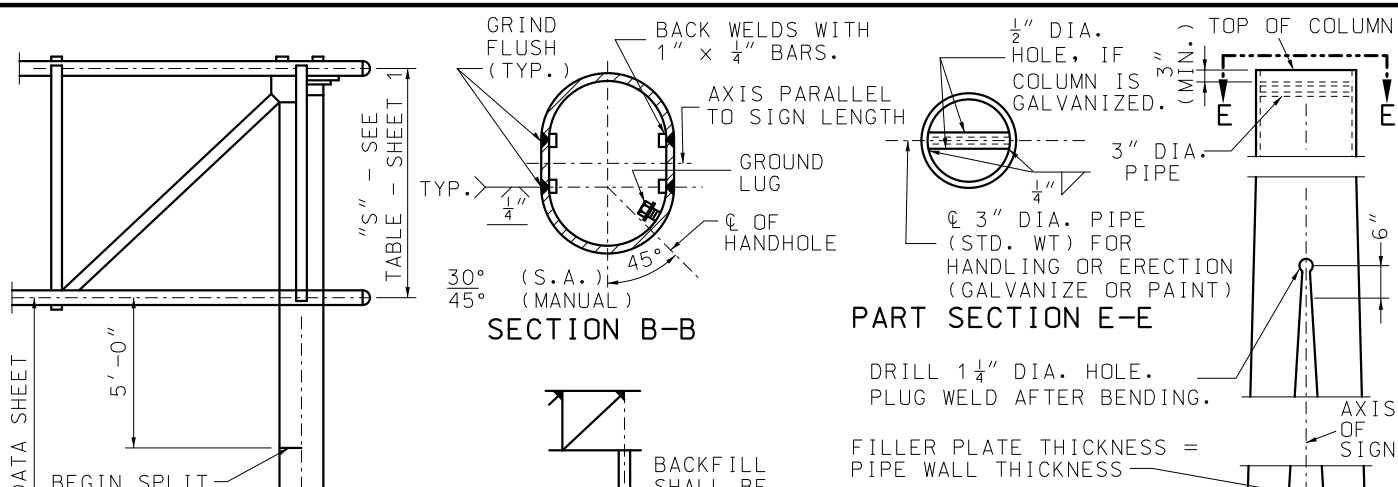
STRUCTURAL STEEL

SHEET NO.
1 OF 5

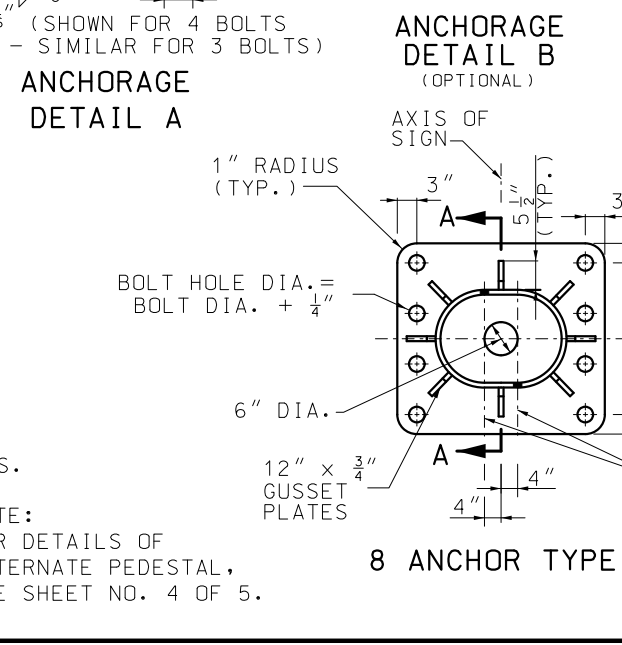
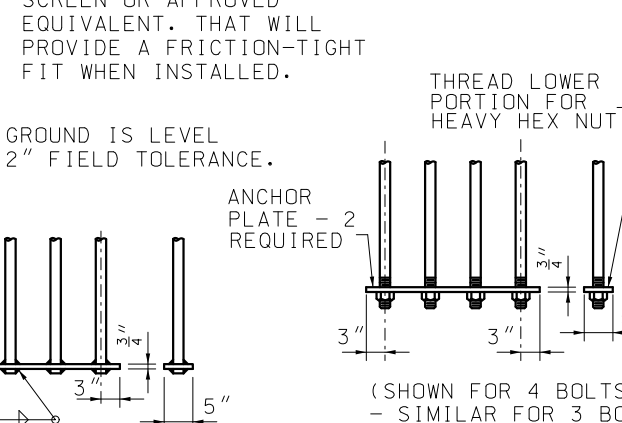
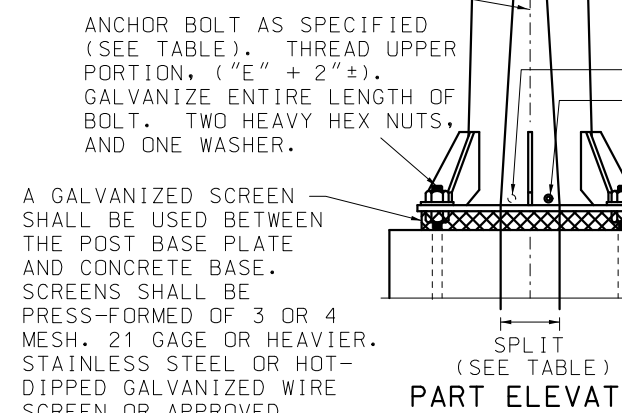
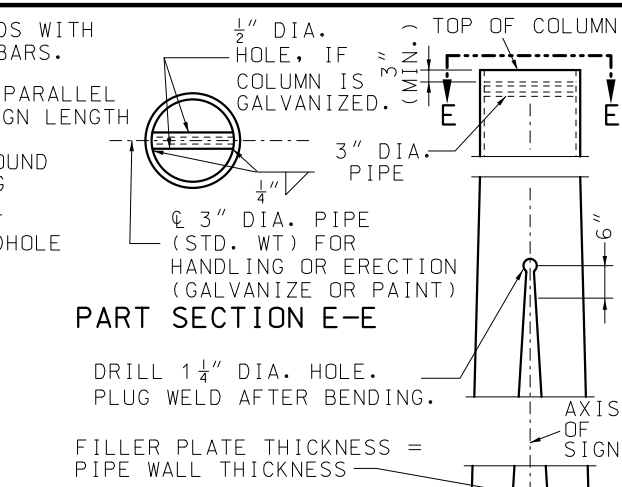
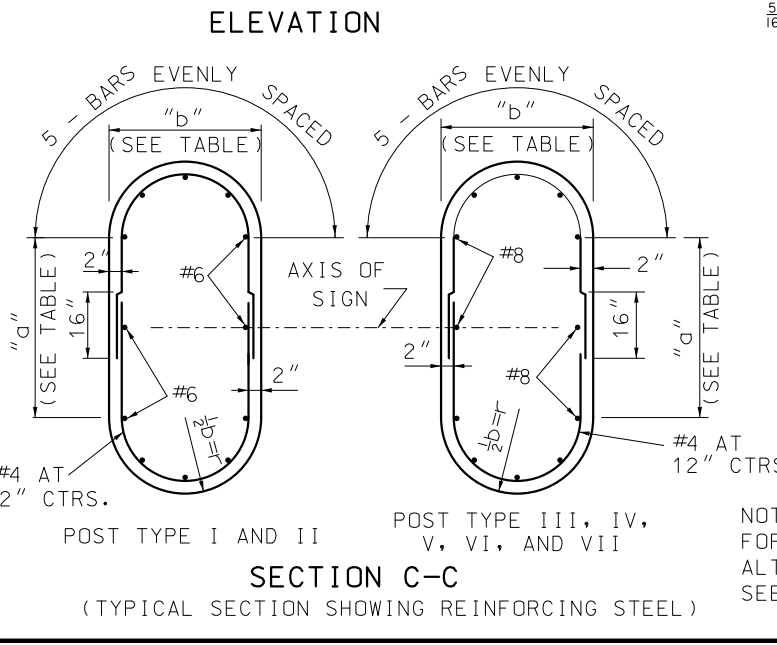
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

903.60AC

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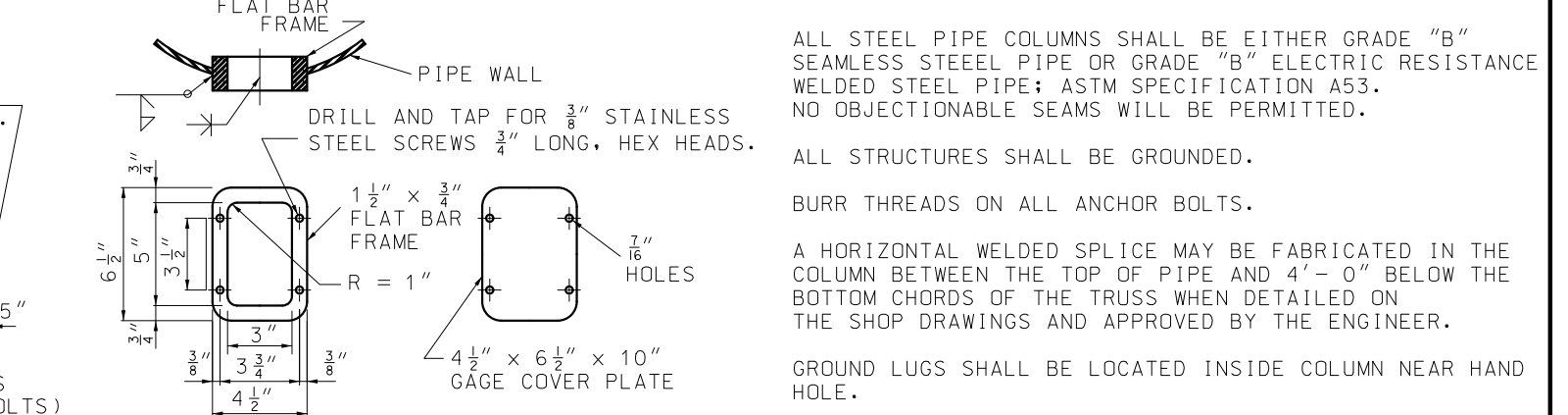
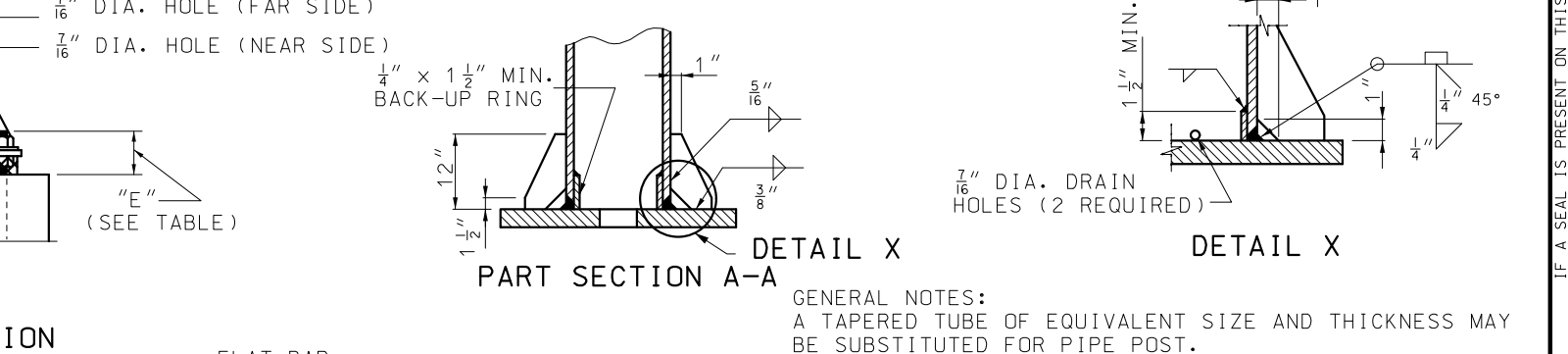


NOTE: THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM RADIUS BEND OF 9 1/2".



POST TYPE	PIPE COLUMN	DIMENSION "E"	SPLIT	BASE PLATE SIZE*	ANCHOR BOLTS DIA.	PEDESTAL SIZE*		FOOTING SIZE*	LONGITUDINAL FOOTING REINFORCEMENT		CONCRETE C.Y.
						a	b		TOP	BOTTOM	
I	12" STD. AT 65.42	8 1/2"	6"	2'-6" x 23" x 1 1/2"	6 AT 2 1/4"	4'-0"	2'-11"	7'-0" x 14'-6"	7-#5 BARS	7-#6 BARS	10.9
II	14" O.D. AT 72.09	8 1/2"	9 1/2"	3'-0" x 2'-0" x 1 1/2"	6 AT 2 1/4"	4'-4"	3'-0"	8'-0" x 16'-0"	8-#5 BARS	9-#6 BARS	13.2
III	16" O.D. AT 82.77	8 3/4"	11 1/2"	3'-4" x 2'-2" x 1 3/4"	6 AT 2 1/4"	4'-8"	3'-2"	8'-6" x 17'-6"	9-#5 BARS	9-#7 BARS	15.2
IV	18" O.D. AT 93.45	9 1/2"	12 1/2"	3'-7" x 2'-4" x 2"	6 AT 2 1/2"	5'-1"	3'-4"	9'-6" x 19'-0"	10-#5 BARS	10-#8 BARS	18.1
V	20" O.D. AT 104.13	9 1/2"	13"	3'-10" x 2'-9" x 2"	8 AT 2 1/2"	5'-4"	3'-9"	10'-0" x 20'-0"	10-#5 BARS	10-#8 BARS	20.6
VI	24" O.D. AT 125.49	9 1/2"	10 1/2"	4'-0" x 3'-3" x 2"	8 AT 2 1/2"	5'-6"	4'-3"	10'-6" x 21'-0"	11-#5 BARS	11-#8 BARS	23.3
VII	24" O.D. AT 125.49	9 1/2"	13 1/2"	4'-3" x 3'-3" x 2"	8 AT 2 1/2"	5'-9"	4'-3"	11'-0" x 22'-0"	11-#5 BARS	11-#9 BARS	25.1

* BASE PLATES, PEDESTAL, AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



GENERAL NOTES:
 A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.
 ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53. NO OBJECTIONABLE SEAMS WILL BE PERMITTED.
 ALL STRUCTURES SHALL BE GROUNDED.
 BURR THREADS ON ALL ANCHOR BOLTS.
 A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.
 GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.
 QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5'-0".
 QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF 2'-0".
 QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
 105 WEST CAPITOL JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
 NICOLE A. KOLB HOOD
 NUMBER PE-2001018754
 PROFESSIONAL ENGINEER

OVERHEAD SIGN TRUSSES
 STRUCTURAL STEEL

DATE EFFECTIVE: 01/01/2021
 DATE PREPARED: 10/14/2020

903.60AC

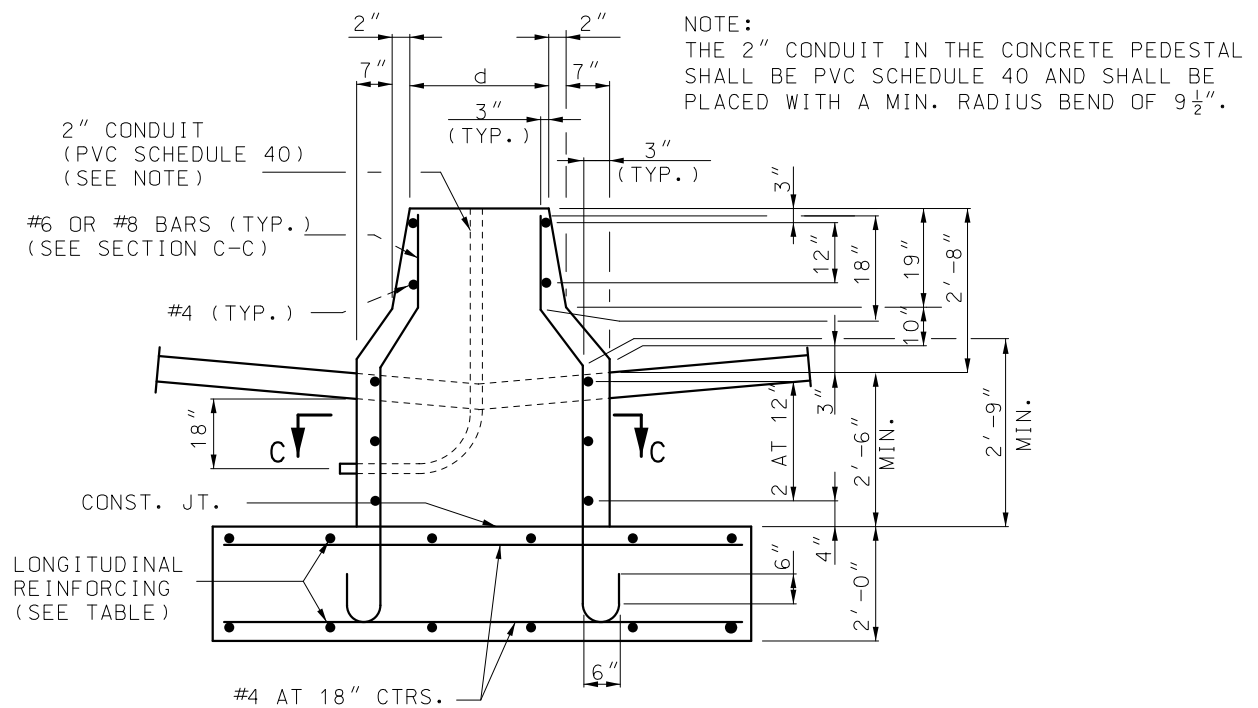
SHEET NO. 3 OF 5

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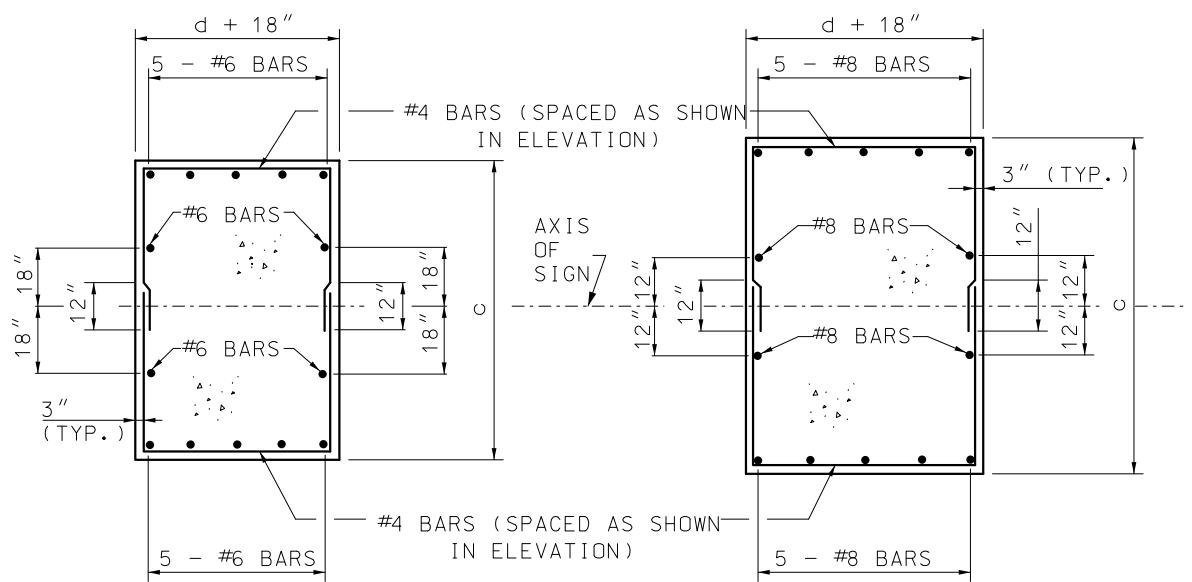
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POST TYPE	PIPE COLUMN	PEDESTAL SIZE*		FOOTING SIZE*	LONGITUDINAL FOOTING REINFORCEMENT		CONCRETE C.Y.	
		c	d		TOP	BOTTOM	TYPE A MEDIAN BARRIER	TYPE C MEDIAN BARRIER
I	12" STD. AT 65.42	5'-9"	2'-1"	7'-0" x 14'-6"	7-#5 BARS	7-#6 BARS	10.9	11.6
II	14" O.D. AT 72.09	6'-2"	2'-2"	8'-0" x 16'-0"	8-#5 BARS	9-#6 BARS	13.2	14.0
III	16" O.D. AT 82.77	6'-7"	2'-4"	8'-6" x 17'-6"	9-#5 BARS	9-#7 BARS	15.2	16.1
IV	18" O.D. AT 93.45	7'-1"	2'-6"	9'-6" x 19'-0"	10-#5 BARS	10-#8 BARS	18.1	19.1
V	20" O.D. AT 104.13	7'-8"	2'-11"	10'-0" x 20'-0"	10-#5 BARS	10-#8 BARS	20.6	21.7
VI	24" O.D. AT 125.49	8'-3"	3'-5"	10'-6" x 21'-0"	11-#5 BARS	11-#8 BARS	23.3	24.6
VII	24" O.D. AT 125.49	8'-6"	3'-5"	11'-0" x 22'-0"	11-#5 BARS	11-#9 BARS	25.1	26.5

* BASE PLATES, PEDESTAL, AND FOOTINGS LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



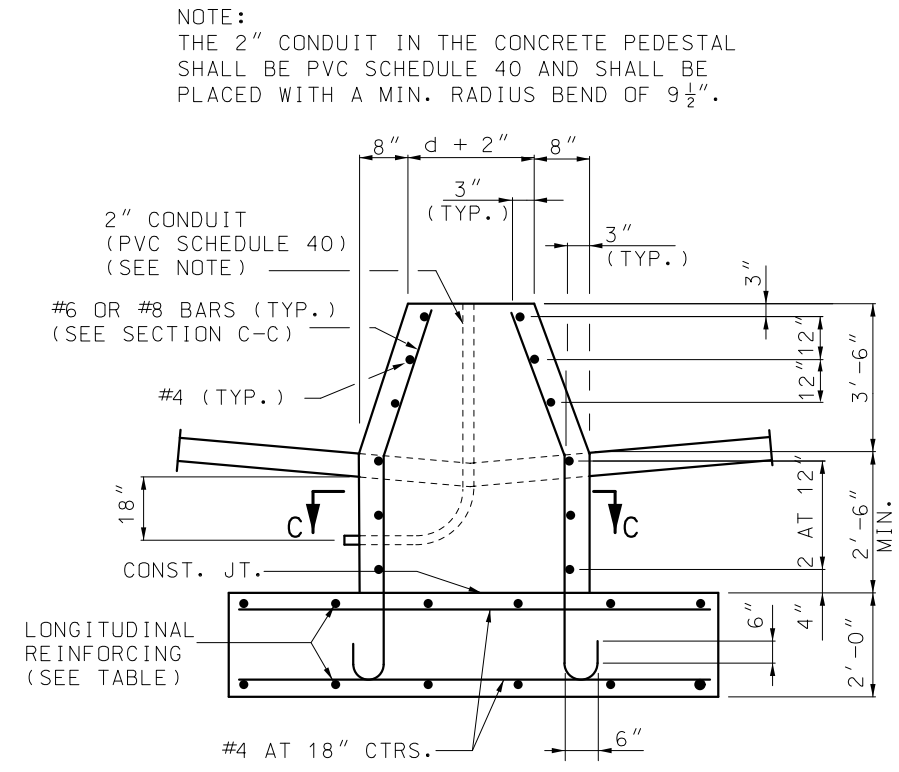
PART ELEVATION
(TYPE A CONCRETE TRAFFIC BARRIER)



SECTION C-C
TYPICAL SECTION SHOWING
REINFORCING STEEL

DETAILS OF ALTERNATE PEDESTAL

(TO BE USED ADJACENT TO TYPE "A" OR "C" MEDIAN BARRIER)



PART ELEVATION
(TYPE C CONCRETE TRAFFIC BARRIER)

GENERAL NOTES:

- A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.
- ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53.
- NO OBJECTIONABLE SEAMS WILL BE PERMITTED.
- ALL STRUCTURES SHALL BE GROUNDED.
- BURR THREADS ON ALL ANCHOR BOLTS.
- PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 5 FOR DETAILS OF THESE ITEMS.
- GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.
- QUANTITIES FOR PEDESTAL ARE BASED ON NOMINAL HEIGHT OF 5'-2" (TYPE A MEDIAN BARRIER) OR 6'-0" (TYPE C MEDIAN BARRIER).
- QUANTITIES FOR FOOTING ARE BASED ON NOMINAL DEPTH OF 2'-0".
- QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

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OVERHEAD SIGN TRUSSES
STRUCTURAL STEEL

DATE EFFECTIVE: 01/01/2021	903.60AC	SHEET NO. 4 OF 5
DATE PREPARED: 10/14/2020		