

# **MISSOURI HIGHWAYS and TRANSPORTATION COMMISSION**

**JEFFERSON CITY, MISSOURI**

**SUPPLEMENTAL PLANS TO JULY 2018 MISSOURI STANDARD  
PLANS FOR HIGHWAY CONSTRUCTION**

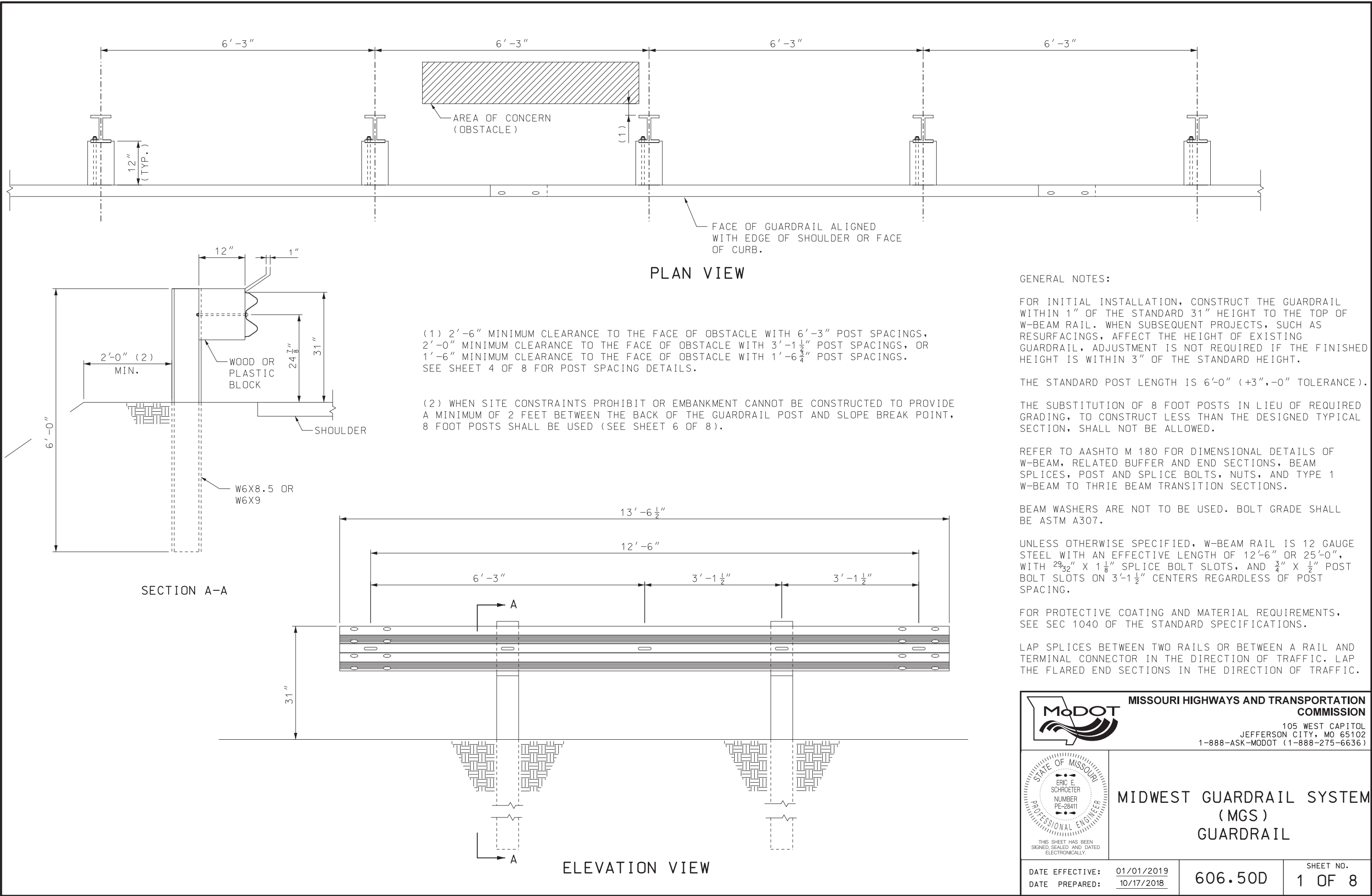
**EFFECTIVE January 1, 2019**


EFFECTIVE: 01/01/2019							
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION							
MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION							
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STANDARD NO.	DRAWING TITLE	NO. OF SHEETS	EFFECTIVE DATE	STANDARD NO.	DRAWING TITLE	NO. OF SHEETS	EFFECTIVE DATE
203.00E	EXCAVATION AND EMBANKMENT – TYPICAL DETAILS	1	08/01/1998	606.60B	MIDWEST GUARDRAIL SYSTEM (MGS) – VERTICAL BARRIER TRNSITIONS	6	04/01/2018
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	606.81	MASH – CRASHWORTHY END TERMINALS – TYPE A – GRADING LIMITS	1	01/01/2017
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
203.35A	MAILBOX TURNOUTS	1	08/01/1981	607.20G	WOVEN WIRE FENCE	2	07/01/2016
203.40G	TYPICAL DETAILS ON AND OFF RAMPS	2	10/01/2007	608.00H	PAVED APPROACHES	2	10/01/2009
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	1	02/01/2011
203.62D	DRIVEWAY – TYPE II	2	04/01/2017	608.40	HANDRAILING	4	04/01/2015
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 <sup>SM</sup>	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
502.05N	CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15 FT. JOINT SPACING	4	07/01/2015	612.20E	SAND FILLED IMPACT ATTENUATORS *	1	10/01/2018
502.10K	DOWEL SUPPORTING UNITS	2	06/01/2010	613.00S	PAVEMENT REPAIR	4	04/01/2017
504.00J	CONCRETE APPROACH PAVEMENT	3	07/01/2015	614.10T	GRATES AND BEARING PLATES	1	12/01/2005
602.00D	RIGHT–OF–WAY AND DRAIN MARKERS	2	01/01/2003	614.11C	CURVED VANE GRATE AND FRAME	1	06/01/2010
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	616.10AU	TEMPORARY TRAFFIC CONTROL DEVICES *	9	01/01/2019
604.11E	PIPE CULVERT HEADWALL – ENERGY DISSIPATOR FOR 24” CONCRETE PIPE	1	07/01/2001	617.10L	PERMANENT CONCRETE TRAFFIC BARRIER *	11	01/01/2019
604.12E	PIPE CULVERT HEADWALL – ENERGY DISSIPATOR FOR 30” CONCRETE PIPE	1	07/01/2001	617.20D	TEMPORARY CONCRETE TRAFFIC BARRIER	8	10/01/2018
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
604.40F	PIPE COLLARS	2	10/01/2000				
604.70	SLOTTED DRAIN	2	03/01/1994				
605.10I	PAVEMENT UNDERDRAINAGE	4	06/01/2013				
606.00AY	GUARDRAIL	7	04/01/2018				
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				
606.31	CRASHWORTHY END TERMINALS – TYPE A – GRADING LIMITS	1	01/01/2017				
606.40D	ONE–STRAND ACCESS RESTRAINT CABLE	2	07/01/2004				
606.41L	THREE–STRAND GUARD CABLE	7	10/01/2017				
606.50D	MIDWEST GUARDRAIL SYSTEM (MGS) *	8	01/01/2019				
606.51	MIDWEST GUARDRAIL SYSTEM (MGS) – MEDIAN PIER PROTECTION	2	04/01/2018				
				* REVISED OR ADDED SINCE JULY 2018			
				SHEET 1 OF 2			

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

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION							
EFFECTIVE: 01/01/2019							
MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION							
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703.10J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (SQUARED)	3	07/01/2015	901.30F	HIGHWAY LIGHTING – BASE MOUNTED CONTROL STATION	2	04/01/2005
703.11J	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (SQUARED)	3	07/01/2015	901.80D	HIGHWAY LIGHTING – POWER SUPPLY ASSEMBLY – SECONDARY SERVICE	2	04/01/2002
703.12J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE)	3	07/01/2015	901.85B	HIGHWAY LIGHTING SYMBOLS	1	04/01/2018
703.13J	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)	3	07/01/2015	902.00P	TRAFFIC SIGNALS	2	04/01/2018
703.14J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE)	3	07/01/2015	902.10Q	TRAFFIC SIGNALS – CONTROLLERS CONDUIT LOCATION	1	04/01/2005
703.15E	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE)	3	07/01/2015	902.15K	TRAFFIC SIGNALS – POWER SUPPLY ASSEMBLY	3	07/01/2004
703.16	CONCRETE SINGLE BOX CULVERT – CUT SECTION	1	04/01/2011	902.20G	TRAFFIC SIGNALS – CONCRETE PULL BOXES	3	11/01/2010
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	10/01/2011	902.50L	TRAFFIC SIGNALS – INDUCTION LOOP DETECTORS	2	06/01/2009
703.41H	CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (SQUARED)	3	10/01/2011	902.70P	TRAFFIC SIGNALS – RIGID SPAN WIRE DETAILS	2	04/01/2018
703.42H	CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE)	3	10/01/2011	902.80L	TRAFFIC SIGNALS – TRAFFIC SIGNAL SYMBOLS	1	07/01/2017
703.43H	CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)	3	10/01/2011	903.01J	STANDARD ARROW DETAILS	2	10/01/2016
703.44H	CONCRETE DOUBLE BOX CULVERT –STRAIGHT WINGS (RIGHT ADVANCE)	3	10/01/2011	903.02AN	HIGHWAY SIGNING	8	01/01/2017
703.45C	CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE)	3	10/01/2011	903.03BL	POST INSTALLATIONS AND SIGN MOUNTING DETAILS	16	01/01/2018
703.46	CONCRETE BOX CULVERT – CUT SECTION	1	10/01/2011	903.04F	HIGHWAY SIGNING – WEIGH STATION	1	02/01/2012
703.47	CONCRETE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT	27	10/01/2011	903.05J	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE S, ONE TUBE	2	10/01/2016
703.60E	CONCRETE BOX STRUCTURE – PIPE INLET	1	07/01/2001	903.06J	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE S, TWO TUBE	2	10/01/2016
703.80H	CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (SQUARED)	3	12/01/2011	903.07J	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE C	2	10/01/2016
703.81H	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (SQUARED)	3	12/01/2011	903.08H	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE B	2	10/01/2016
703.82H	CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE)	3	12/01/2011	903.10BC	OVERHEAD SIGN TRUSSES – ALUMINUM	6	10/01/2016
703.83H	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)	3	12/01/2011	903.12Z	OVERHEAD SIGN TRUSSES – BUTTERFLY AND CANTILEVER STRUCTURAL STEEL	7	10/01/2016
703.84H	CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE)	3	12/01/2011	903.60AB	OVERHEAD SIGN TRUSSES – STRUCTURAL STEEL	5	10/01/2016
703.85C	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE)	3	12/01/2011				
703.86	CONCRETE TRIPLE BOX CULVERT – CUT SECTION	1	12/01/2011				
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				
712.40K	STEEL DAMS AT EXPANSION DEVICES	1	04/01/2016				
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	04/01/2016				
732.05C	BEVELED PIPE END TREATMENT	2	07/01/2004				
732.10H	SAFETY SLOPE END SECTION	3	06/01/2013				
733.00	PRECAST CONCRETE BOX CULVERT TIES	1	04/01/2018				
806.10J	TEMPORARY EROSION CONTROL MEASURES	6	04/01/2015				
808.00	TYPICAL PLANTING ILLUSTRATIONS	3	07/01/2004				
901.00AB	HIGHWAY LIGHTING – POLES, FOUNDATIONS & APPURTENANCES FOR 30’ M.H.	4	04/01/2018				
901.01AJ	HIGHWAY LIGHTING – POLES, FOUNDATIONS & APPURTENANCES FOR 45’ M.H.	6	04/01/2018				
901.02B	HIGHWAY LIGHTING – CABLE, CONDUIT AND TRENCHING	1	04/01/2002				
				* REVISED OR ADDED SINCE JULY 2018			
				SHEET 2 OF 2			

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





MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

STATE OF MISSOURI

ERIC E. SCHROETER

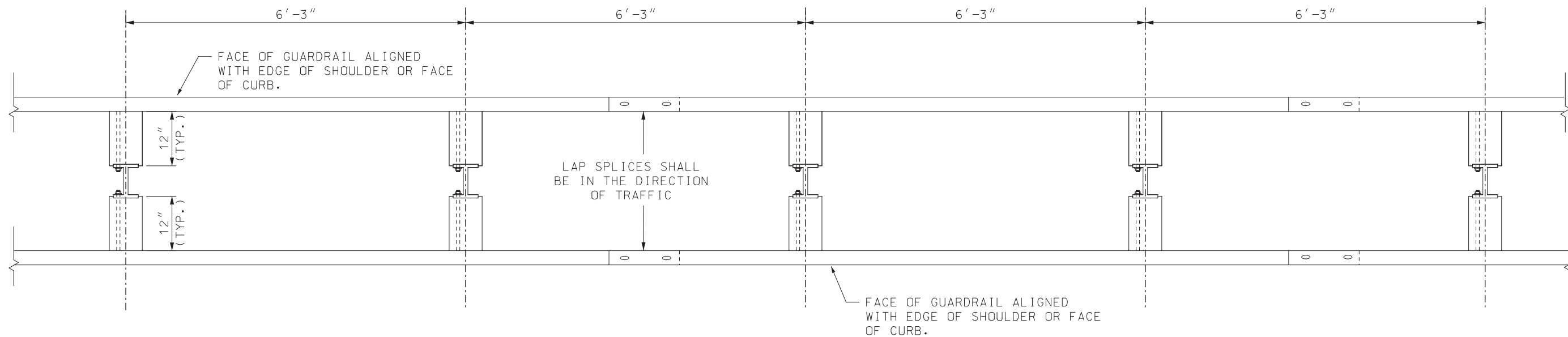
NUMBER PE-28411

PROFESSIONAL ENGINEER

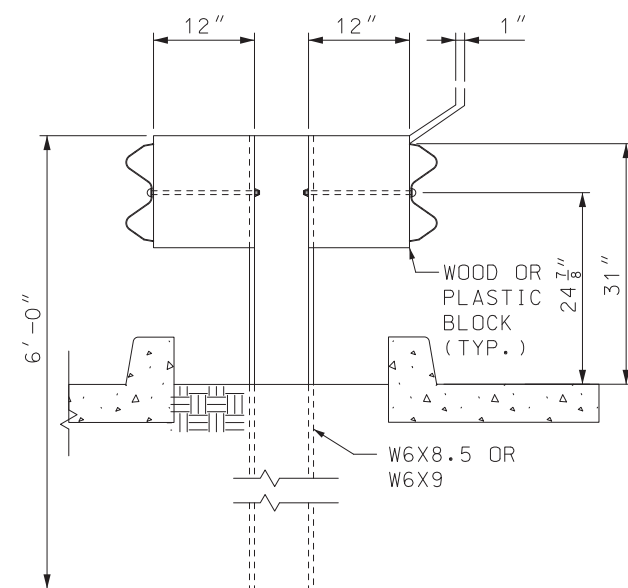
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL

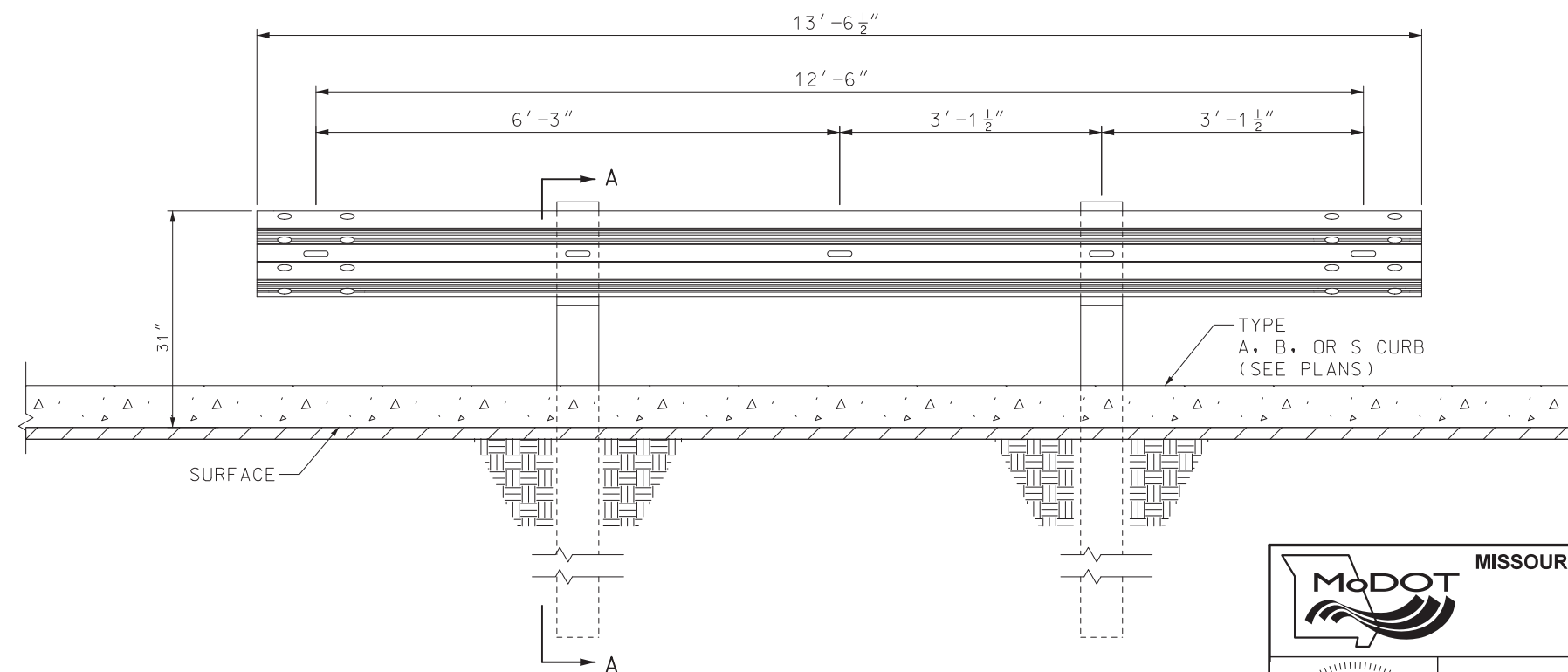
DATE EFFECTIVE:	01/01/2019	606.50D	SHEET NO. 1 OF 8
DATE PREPARED:	10/17/2018		




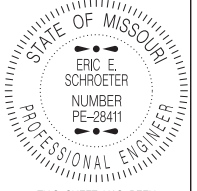
PLAN VIEW

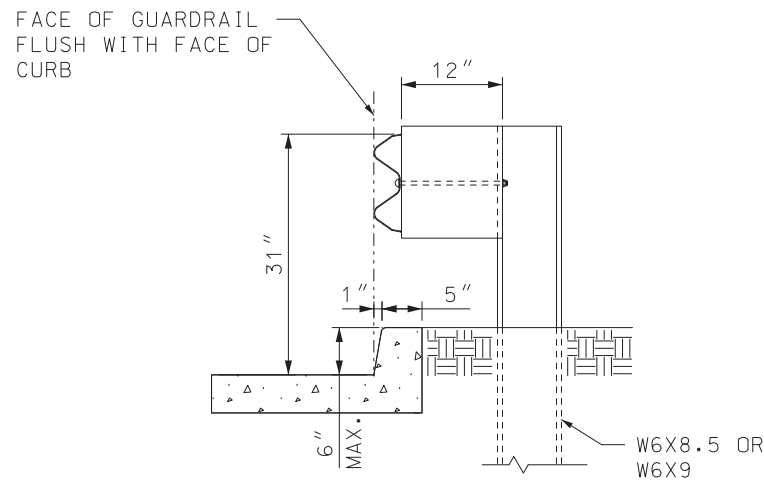


SECTION A-A

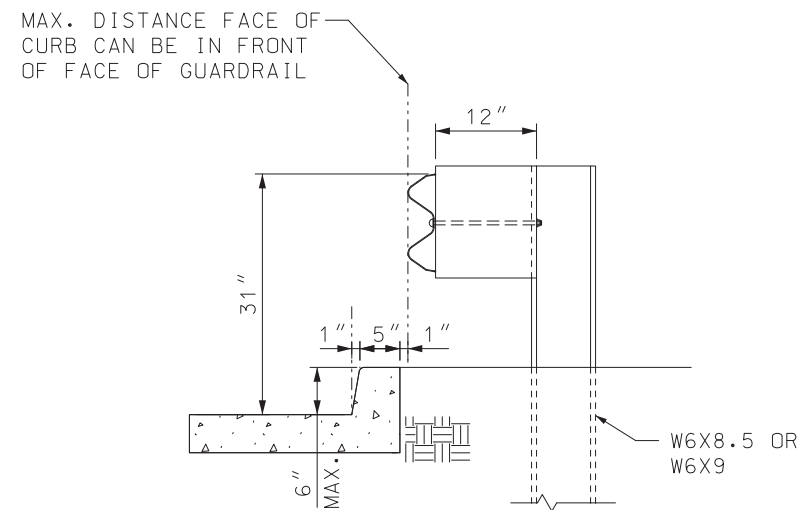


ELEVATION VIEW

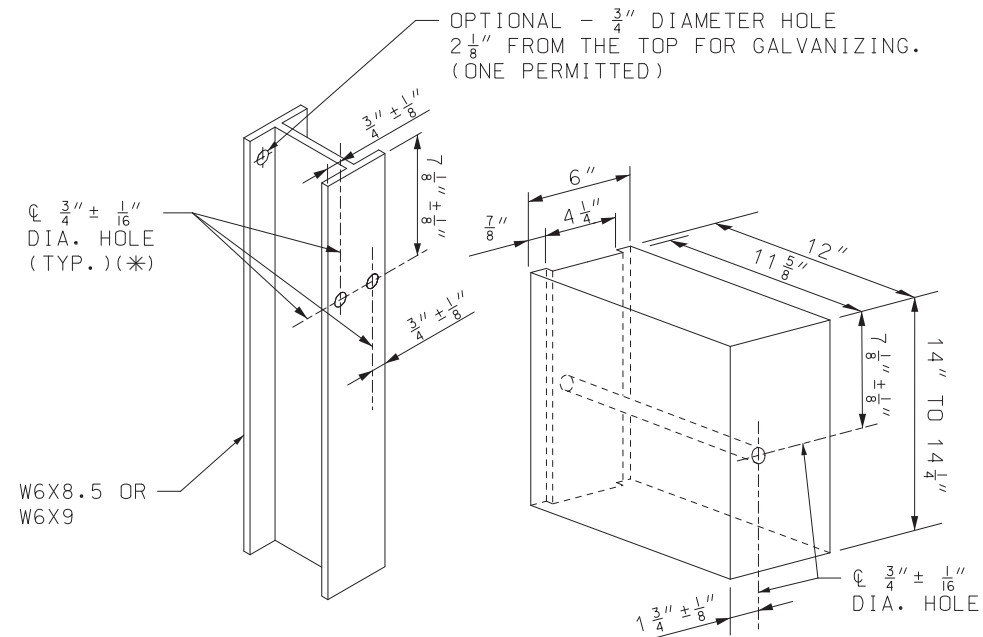
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>DOUBLE FACED GUARDRAIL</b>
DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	606.50D
SHEET NO. <b>2 OF 8</b>	



MGS GUARDRAIL AT  
CURB



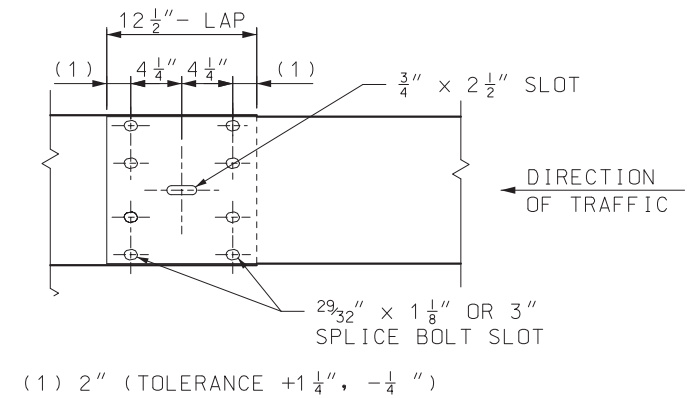
ALTERNATE MGS  
AT CURB



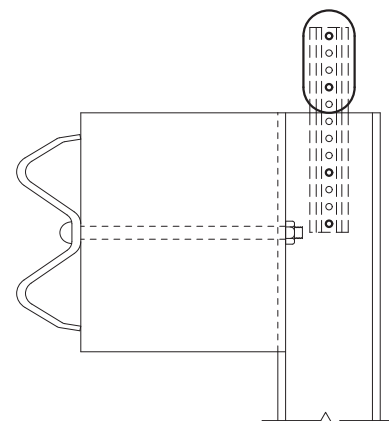
FOR STEEL POST AND NOTCHED WOOD OR PLASTIC BLOCK

### HOLE PUNCHING DETAIL

(\*) TWO HOLES CAN BE PROVIDED ON EACH FLANGE OF POST, ONLY ONE IS REQUIRED  
FOR FLANGE OF POST THAT HAS A BLOCK ATTACHMENT.



RAIL ELEMENT SPLICE  
DETAIL



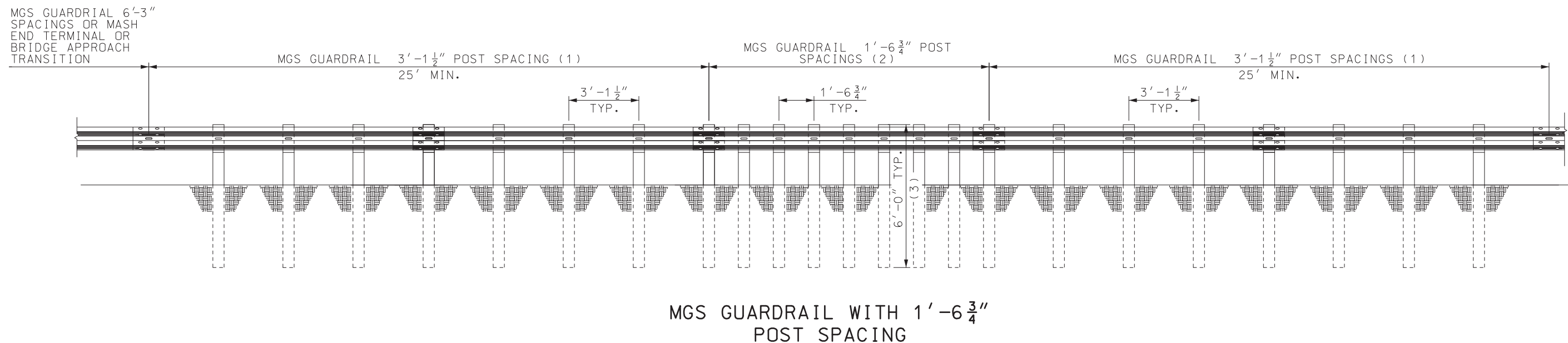
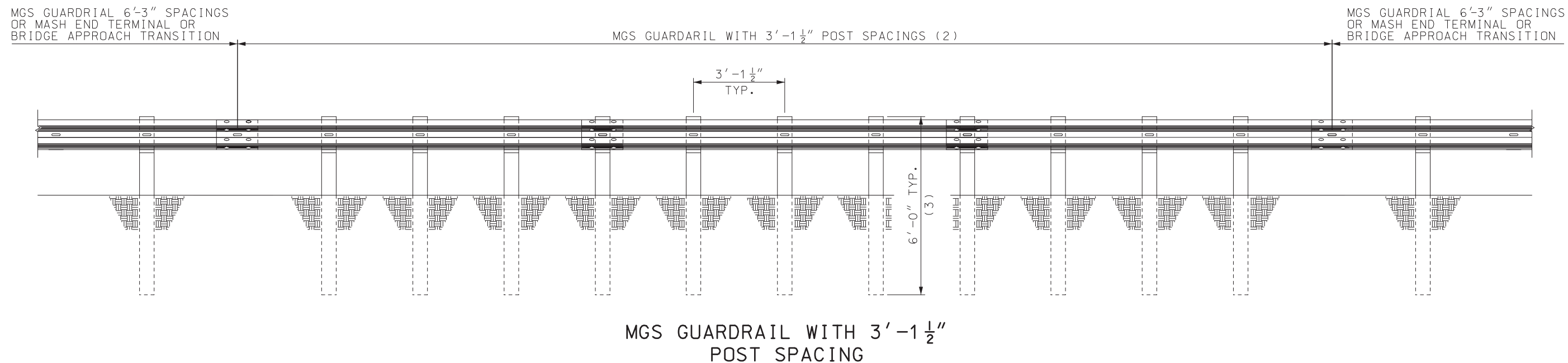
DELINEATORS ON GUARDRAIL

### GENERAL NOTES:

FOR GUARDRAIL DELINEATION DETAILS SEE  
STD PLAN 903.03.

		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>	
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)			
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>POST AND BLOCK</b>		
DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	606.50D	SHEET NO. 3 OF 8	

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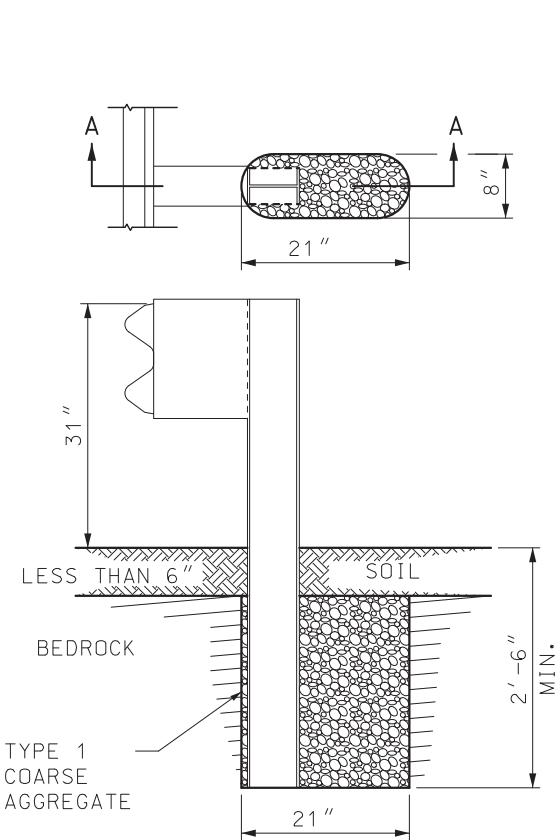


- (1) 25 FEET OF MGS 3'-1 1/2" POST SPACING GUARDRAIL IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF 1'-6 3/4" POST SPACING MGS GUARDRAIL.
- (2) USE AS MANY SEGMENTS AS NECESSARY TO SHIELD THE AREA OF CONCERN.
- (3) REDUCED POST SPACING SHALL USE 6'-0" POSTS MAX. ANY DEVIATION OF 6'-0" POSTS WILL ONLY BE ALLOWED IN ACCORDANCE WITH SPECIAL INSTALLATIONS AS SHOWN ON SHEET 5 OF 8.

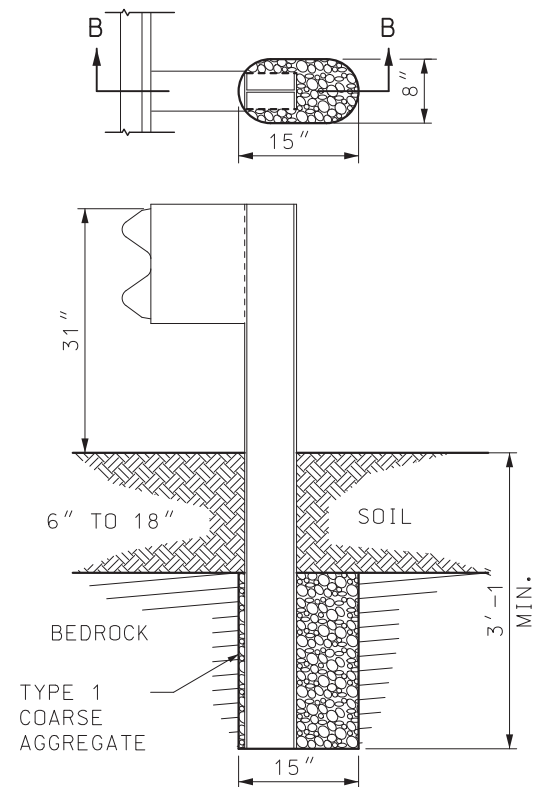
GENERAL NOTES:

- 8' POSTS CANNOT BE USED WHEN:
- POST SPACING IS LESS THAN 6'-3"
  - WITHIN CRASHWORTHY END TERMINALS (SEE MANUFACTURERS DRAWINGS)
  - WITHIN VERTICAL BARRIER TRANSITIONS (606.60)
  - WITHIN BRIDGE APPROACH TRANSITIONS (606.70)

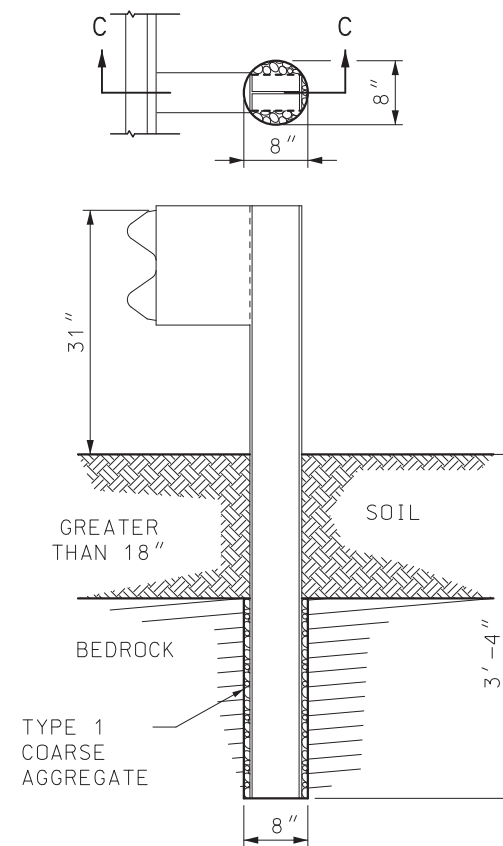
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)		
 <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<b>MIDWEST GUARDRAIL SYSTEM (MGS) REDUCED POST SPACINGS</b>	
	DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	606.50D



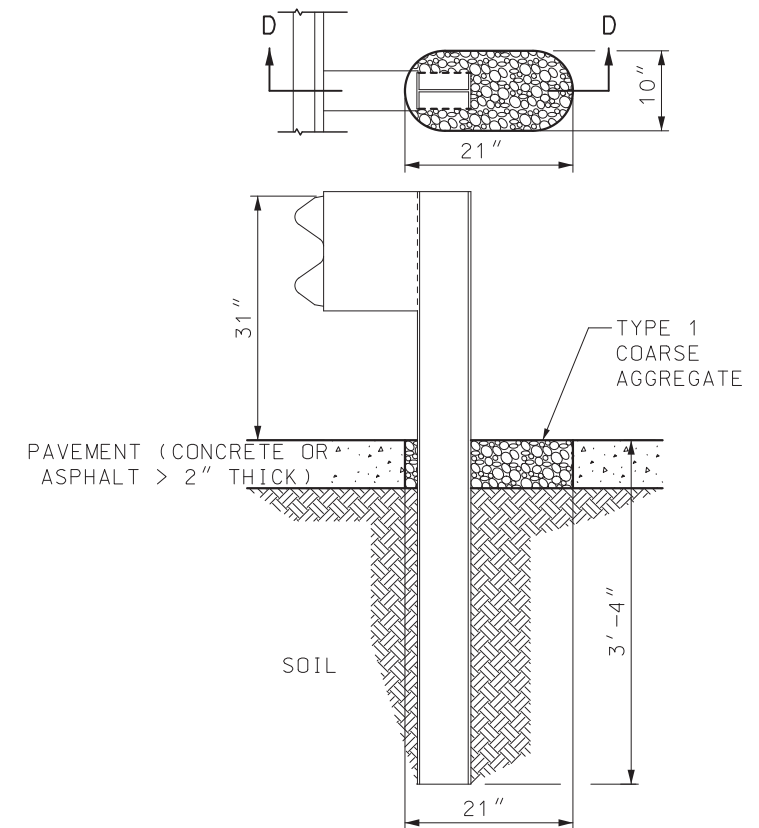
SECTION A-A  
ROCK ENCOUNTERED  
UP TO 6" BENEATH SURFACE



SECTION B-B  
ROCK ENCOUNTERED  
6" TO 18" BENEATH SURFACE

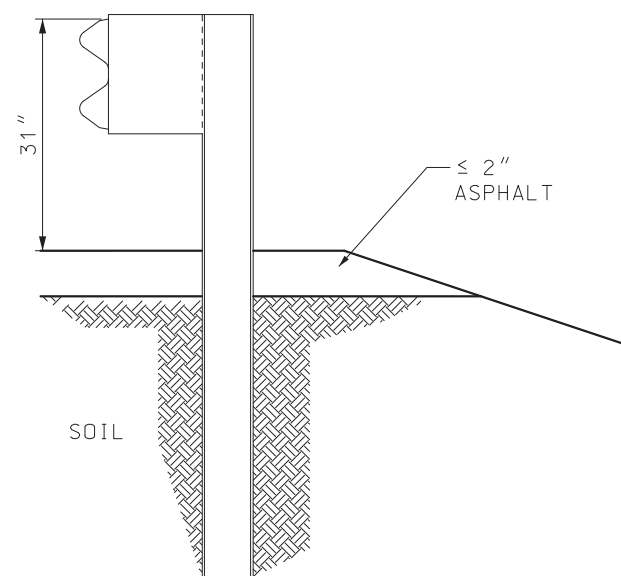


SECTION C-C  
ROCK ENCOUNTERED MORE  
THAN 18" BENEATH SURFACE



SECTION D-D  
SETTING POST THROUGH PAVEMENT  
(CONCRETE OR ASPHALT > 2" THICK)

## SETTING POST IN SOLID ROCK



SETTING POST THROUGH ASPHALT  $\leq 2"$  THICK

### GENERAL NOTES:

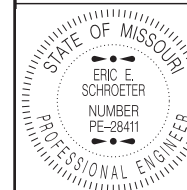
HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 4 INCHES GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN 2 FEET OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SEC 712 OF THE STANDARD SPECIFICATIONS.



MISSOURI HIGHWAYS AND TRANSPORTATION  
COMMISSION

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



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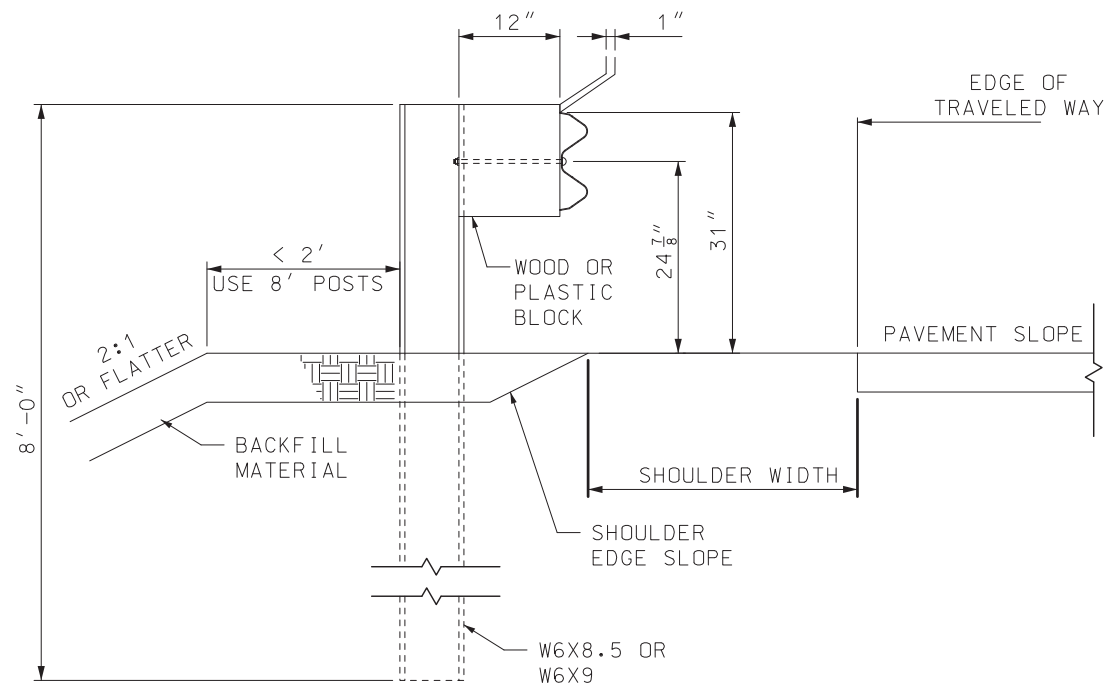
MIDWEST GUARDRAIL SYSTEM  
(MGS)  
SPECIAL INSTALLATIONS

DATE EFFECTIVE: 01/01/2019  
DATE PREPARED: 10/17/2018

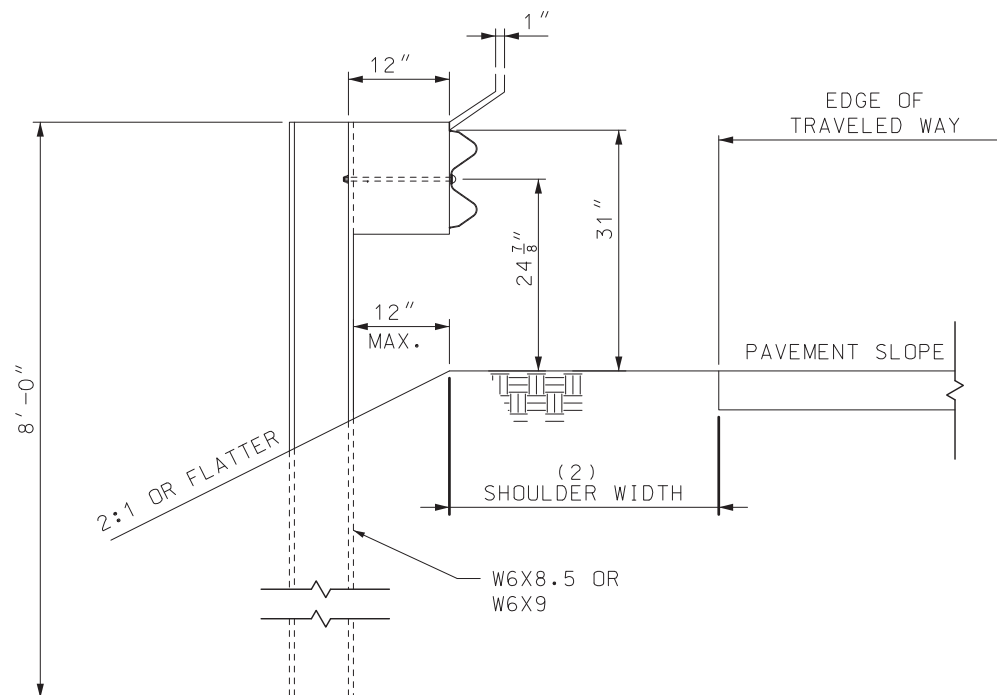
606.50D

SHEET NO.  
5 OF 8

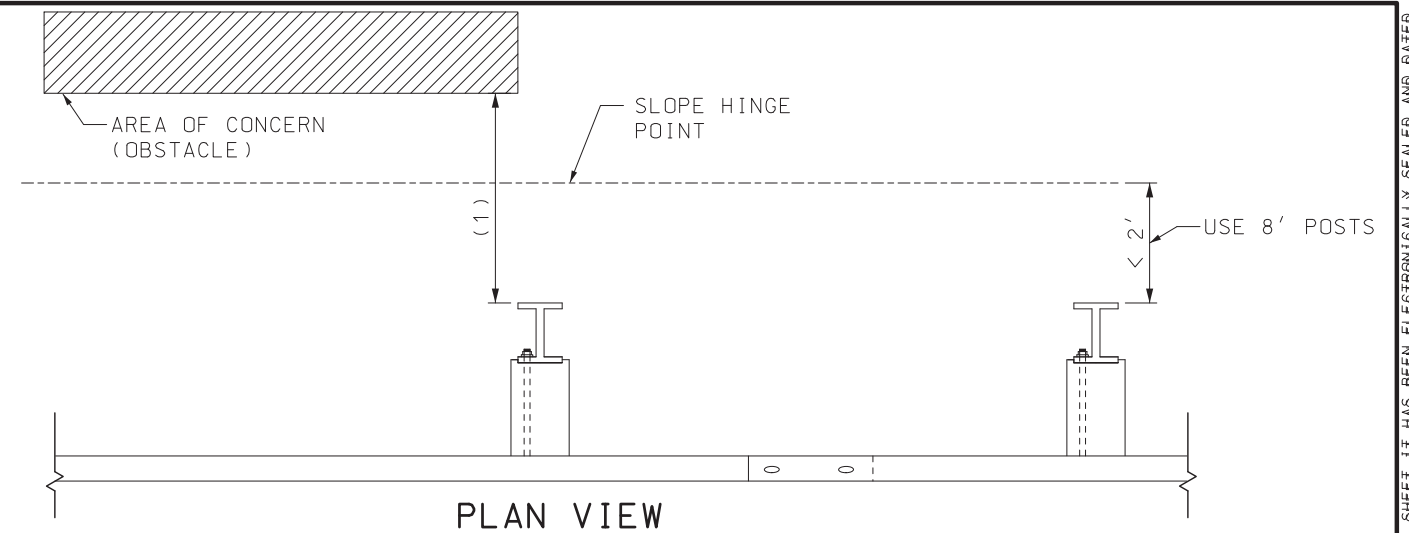




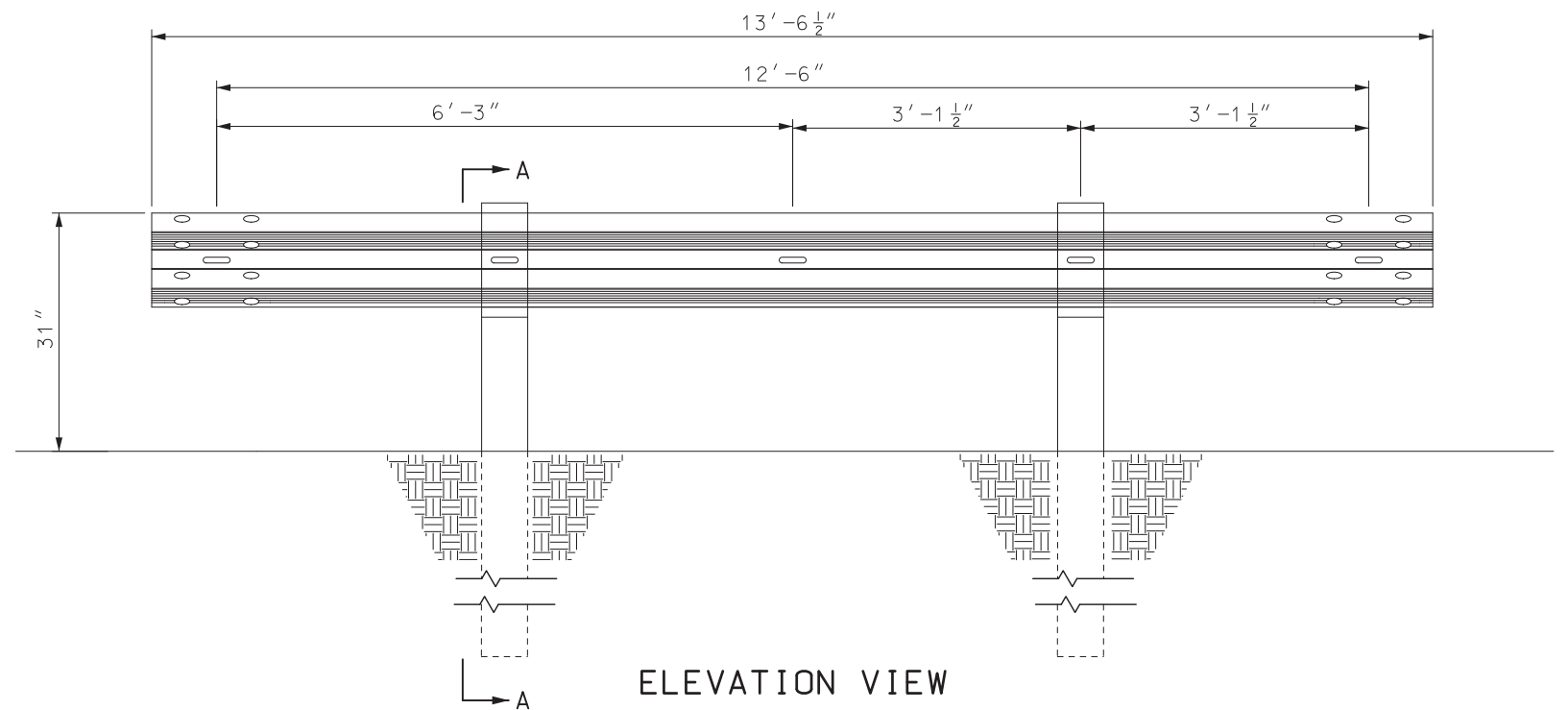
SECTION A-A  
8' STEEL POST



ALTERNATE SECTION A-A  
MAXIMUM LATERAL PLACEMENT OF  
8' STEEL POSTS ADJACENT TO  
SLOPES



PLAN VIEW



ELEVATION VIEW


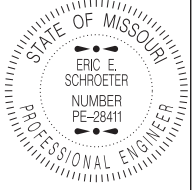
(1) 3'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 8' POSTS ADJACENT TO A 2:1 SLOPE.

(2) WHERE THERE IS NOT SUFFICIENT EMBANKMENT BEYOND THE SHOULDER TO PLACE THE GUARDRAIL POST, THE POSTS MAY BE PLACED A MAXIMUM OF 12" BEYOND THE SLOPE BREAK POINT OF A 2:1 OR FLATTER SLOPE.

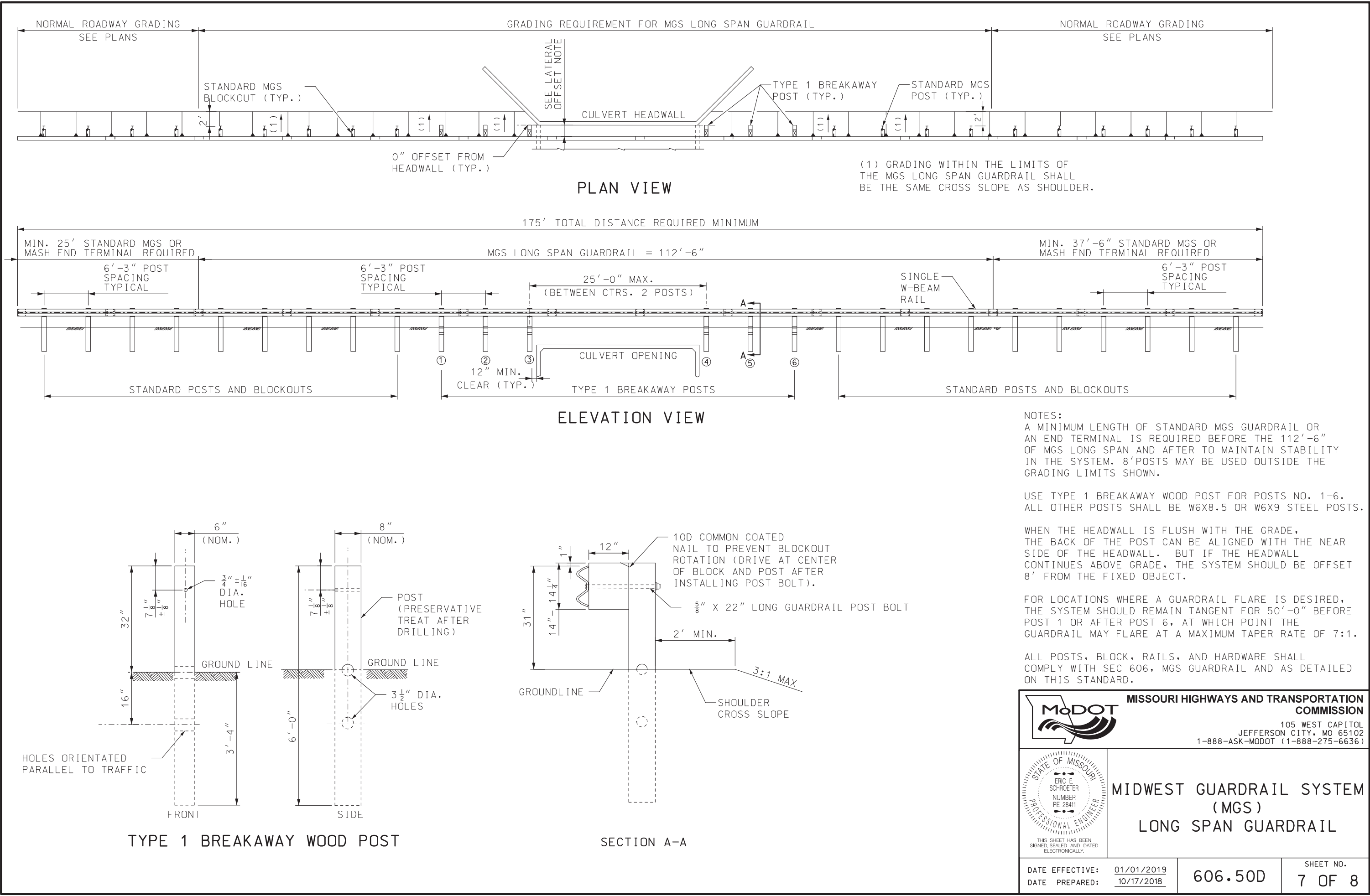
GENERAL NOTES:

SEE STD. PLAN 606.81 FOR SITE GRADING REQUIREMENTS FOR CRASHWORTHY END TERMINALS.

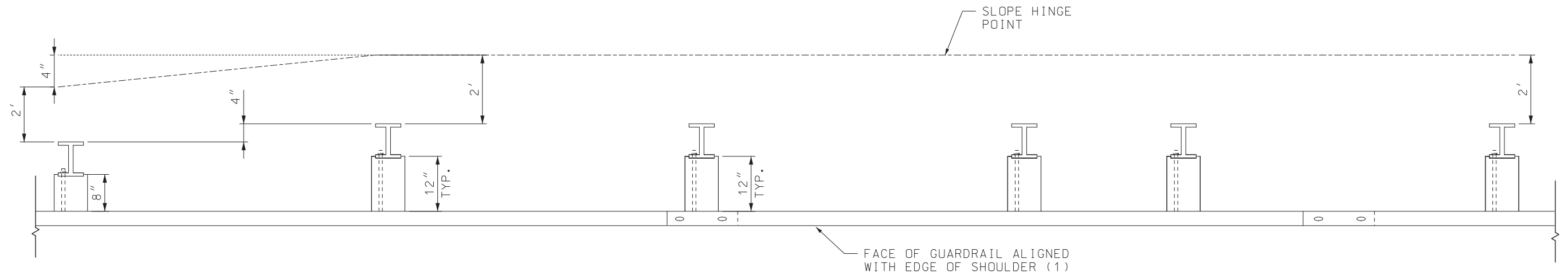
8 FOOT POSTS SHALL BE USED WHEN LESS THAN 2 FEET OF EMBANKMENT IS PRESENT BETWEEN THE BACK OF THE GUARDRAIL POST AND THE SLOPE BREAK POINT. THE SUBSTITUTION OF 8 FOOT POSTS IN LIEU OF REQUIRED GRADING, TO CONSTRUCT LESS THAN THE DESIGNED TYPICAL SECTION, SHALL NOT BE ALLOWED.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>8 FT. POST</b>
DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	SHEET NO. <b>6 OF 8</b>

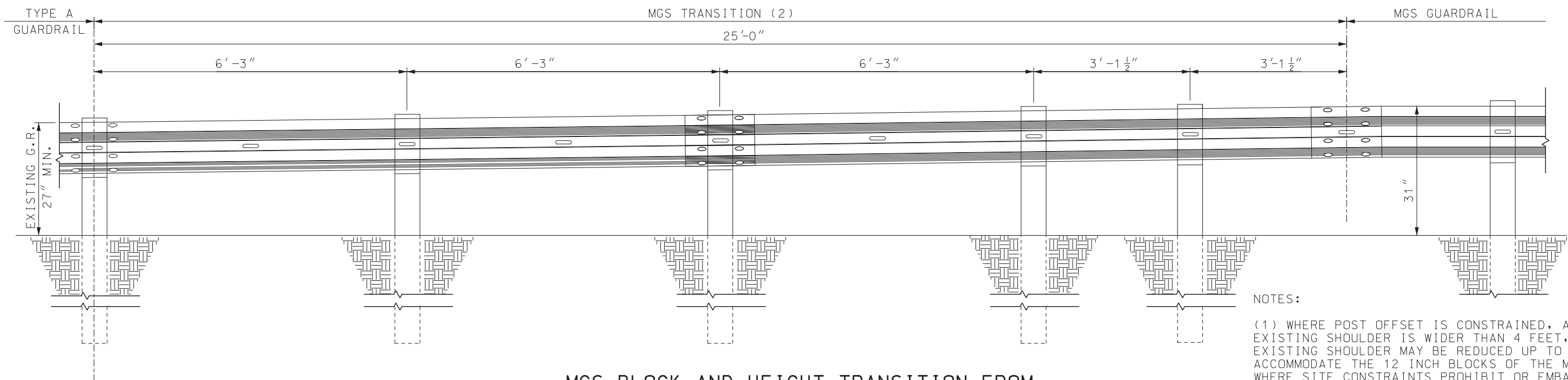
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



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



PLAN VIEW

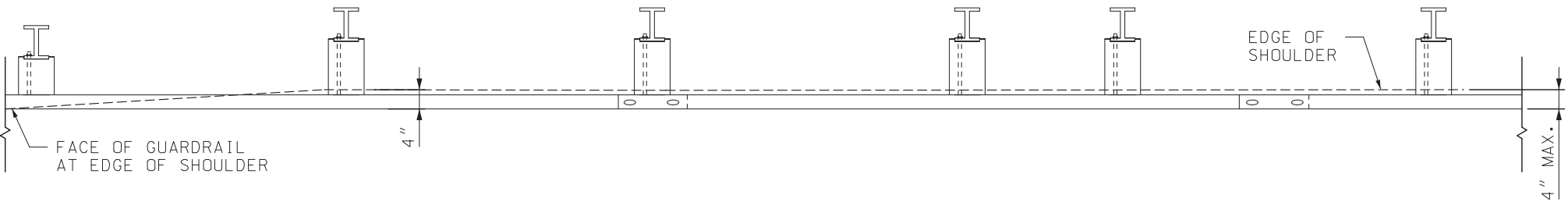


MGS BLOCK AND HEIGHT TRANSITION FROM  
TYPE A GUARDRAIL TO MGS GUARDRAIL


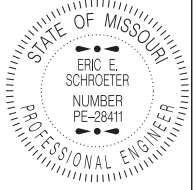
NOTES:

(1) WHERE POST OFFSET IS CONSTRAINED, AND WHEN THE EXISTING SHOULDER IS WIDER THAN 4 FEET, THE EXISTING SHOULDER MAY BE REDUCED UP TO 4 INCHES TO ACCOMMODATE THE 12 INCH BLOCKS OF THE MGS GUARDRAIL. WHERE SITE CONSTRAINTS PROHIBIT OR EMBANKMENT CANNOT BE CONSTRUCTED TO PROVIDE A MINIMUM OF 2 FEET BETWEEN THE BACK OF THE GUARDRAIL POST AND SLOPE BREAK POINT, 8 FOOT POSTS SHALL BE USED (SEE SHEET 6 OF 8). THE SUBSTITUTION OF 8 FOOT POSTS FOR REQUIRED GRADING SHALL NOT BE ALLOWED.

(2) MGS TRANSITION FROM TYPE A GUARDRAIL SHALL BE COMPLETED OUTSIDE THE 50' MGS END TERMINAL LIMITS.

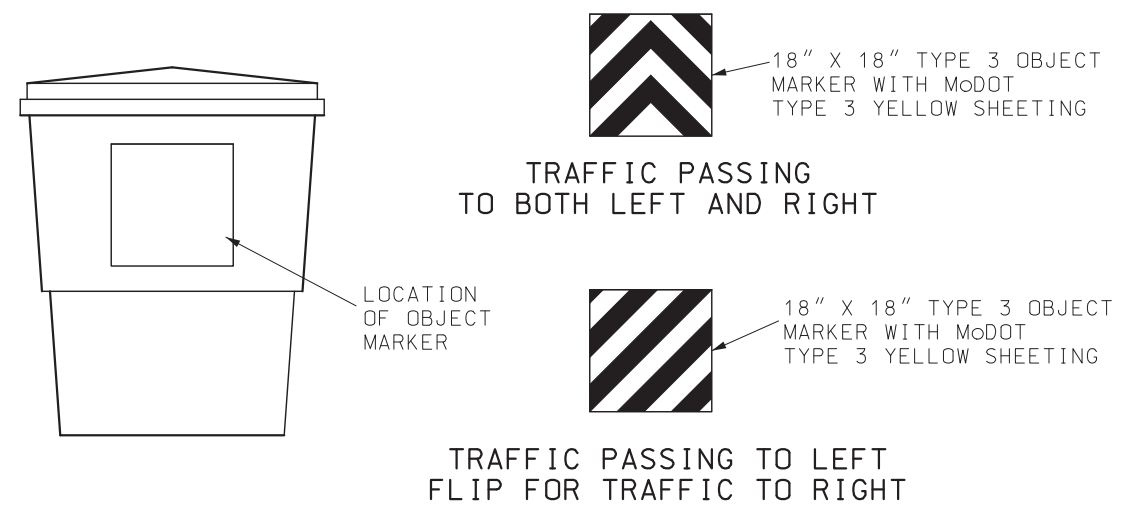


ALTERNATE PLAN VIEW - ALIGNMENT TAPER  
SEE NOTE (1)

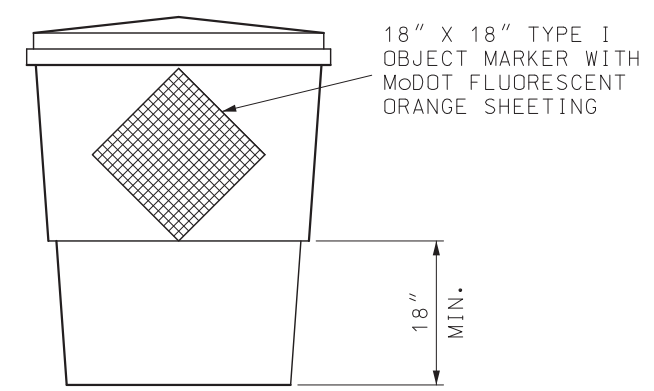
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)		
	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b> <b>BLOCK AND HEIGHT TRANSITION</b>	
DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	<b>606.50D</b>	SHEET NO. <b>8 OF 8</b>

**ATTENUATOR LAYOUT:**

**ALL SAND FILLED ATTENUATORS SHOULD MEET MANUFACTURER'S RECOMMENDATIONS FOR THE ARRAY AND SAND WEIGHT.**




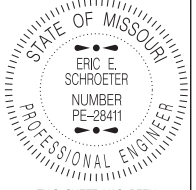
**TYPE 3 OBJECT MARKER PLACEMENT FOR PERMANENT INSTALLATIONS**



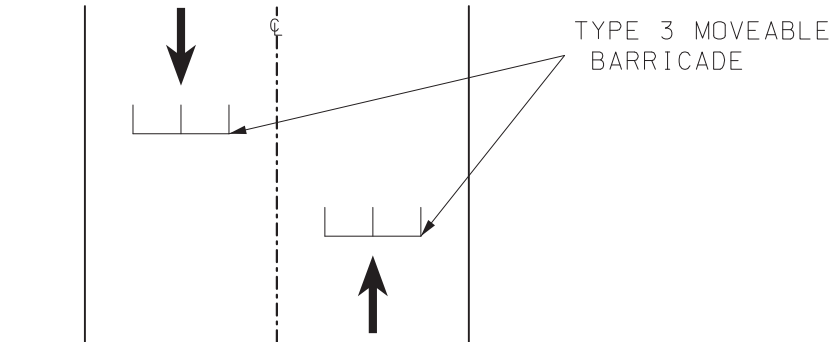
**TYPE I OBJECT MARKER PLACEMENT FOR TEMPORARY INSTALLATIONS**

**GENERAL NOTES:**

OBJECT MARKERS SHALL BE CENTERED VERTICALLY OR PLACED AS DIRECTED BY THE ENGINEER.

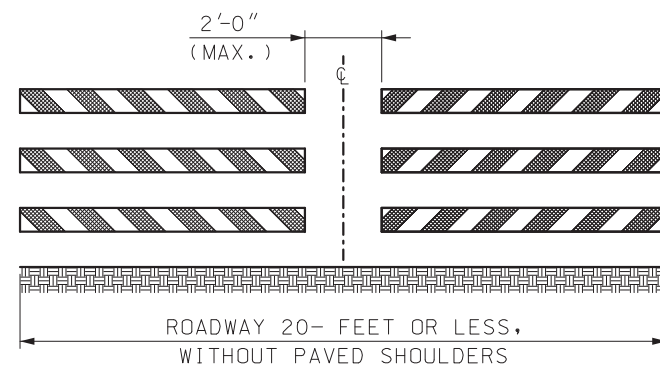
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
 <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<b>SAND FILLED IMPACT ATTENUATORS</b>
DATE EFFECTIVE: 10/01/2018 DATE PREPARED: 7/31/2018	<b>612.20E</b>
SHEET NO. 1 OF 1	

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

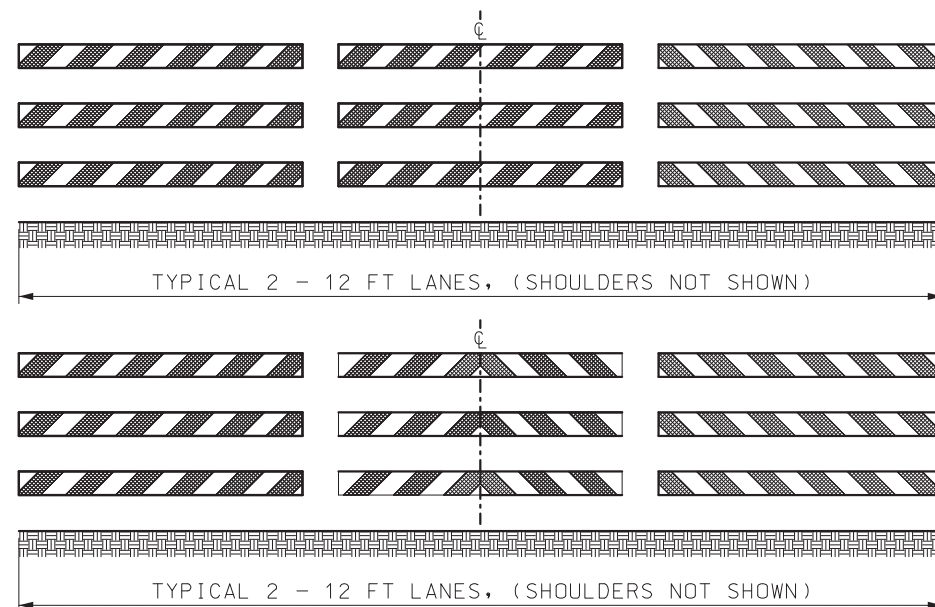


RETROREFLECTIVE MARKING ON TYPE 3 BARRICADES SHALL BE ON BOTH SIDES OF EACH RAIL AND DIRECT TRAFFIC MOVEMENT APPROPRIATELY TO ALLOW VEHICLES TO PASS THROUGH

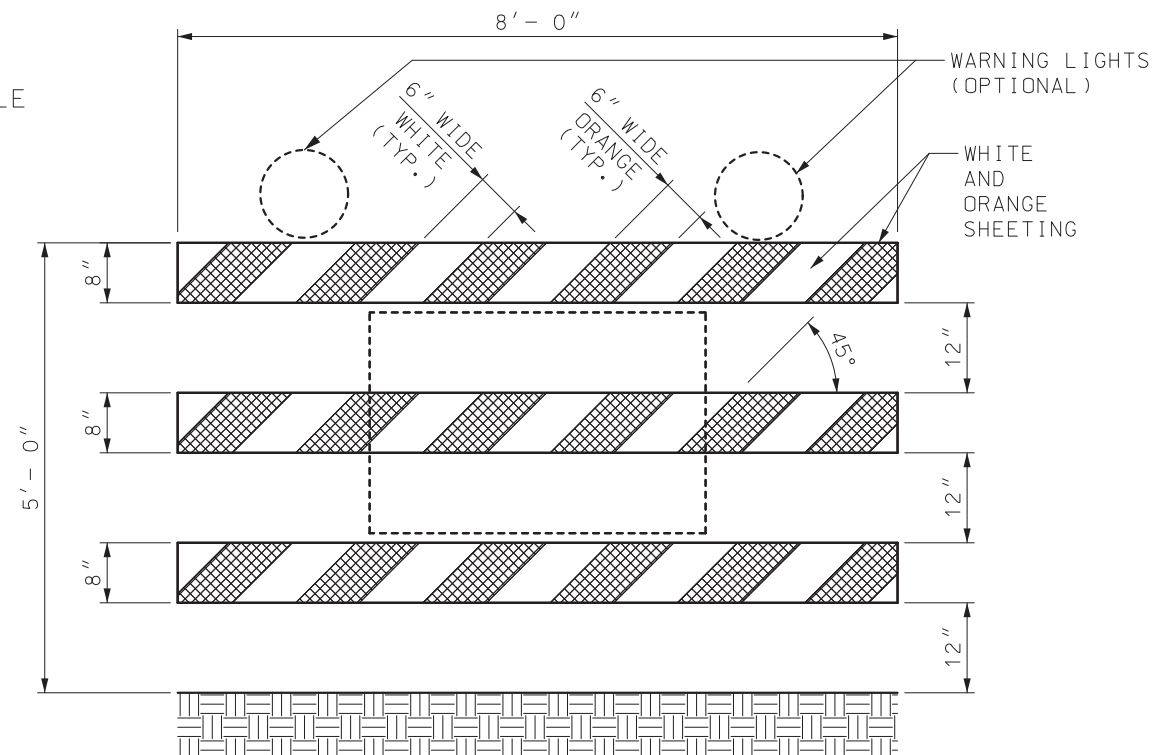
SOFT CLOSURE  
PLAN VIEW



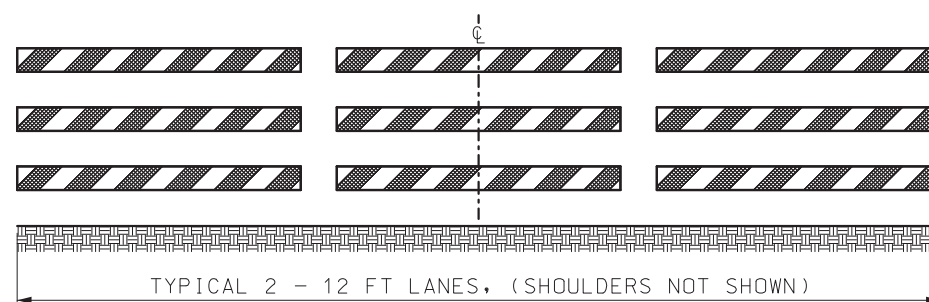
EXAMPLE 2



EXAMPLE 4

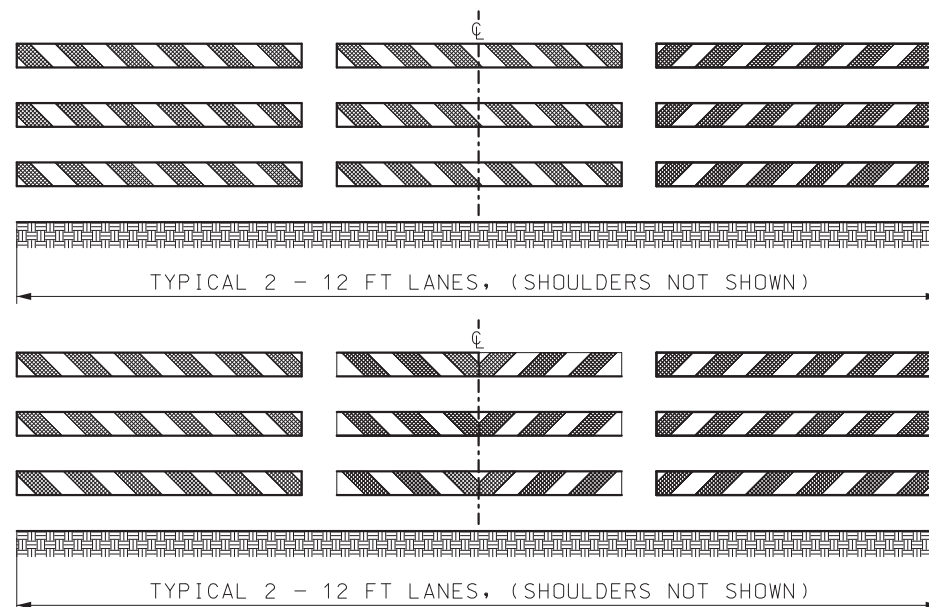


EXAMPLE 1



EXAMPLE SHOWS STRIPES SLOPING TO DIRECT VEHICULAR MOVEMENT TOWARD THE LEFT

EXAMPLE 3



EXAMPLE 5

EXAMPLE 1 – ONE TYPE 3 MOVABLE BARRICADE WILL BE REQUIRED TO COMPLETELY CLOSE EACH 8' OF PAVEMENT. PAVED SHOULDERS SHALL BE INCLUDED IN THE AREA TO BE CLOSED.

SIGNS SHALL BE LIGHT WEIGHT (ROLL-UP OR PLASTIC) AND SHOULD NOT OBSCURE MORE THAN 50 PERCENT OF THE TOP 2 RAILS OR 33 PERCENT OF ALL THREE RAILS.

WARNING LIGHTS SHALL BE LIGHT WEIGHT (3.3 LBS. OR LESS) OR HAVE BATTERY PACK MOUNTED NO HIGHER THAN 18-INCH AND SHALL NOT COVER ANY PORTION OF THE BARRICADE FACE.

IF WARNING LIGHTS ARE USED, THE LIGHTS SHALL BE INSTALLED ON THE BARRICADES IN THE DIRECTION OF TRAFFIC.

IF SIGNS OR LIGHTS CANNOT MEET THE ABOVE REQUIREMENTS, THEY SHALL BE MOUNTED ON SEPARATE CRASHWORTHY DEVICES AT HEIGHTS SPECIFIED FOR POST MOUNTED SIGNS, LOCATED IN TABLE A ON SHEET 1. THE BARRICADE SHALL BE LOCATED IN FRONT OF THE SIGNS OR LIGHTS WITH 7 TO 10 FEET SEPARATING THE DEVICES.

TYPE 3 MOVABLE BARRICADES SHALL BE ENTIRELY FREE STANDING AND PORTABLE. MARKING SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR MAY BE APPLIED TO BOTH THE FRONT AND THE BACK OF EACH RAIL PROVIDED THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.


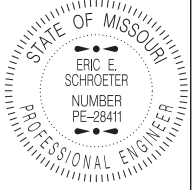
WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 104.2.7.3.

EXAMPLE 2 – FOR PAVED ROADWAYS WITH A WIDTH OF 20- FEET OR LESS AND WITHOUT PAVED SHOULDERS, TWO BARRICADES ARE ACCEPTABLE.

EXAMPLE 3 – WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

EXAMPLE 4 – WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, STRIPES SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES.

EXAMPLE 5 – WHERE NO TURNS ARE INTENDED, STRIPES POSITIONED TO SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

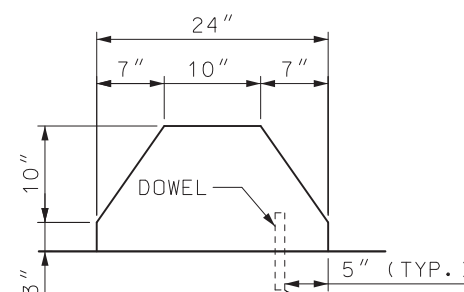
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)		
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.	<b>TEMPORARY TRAFFIC CONTROL DEVICES</b> <b>TYPE 3 MOVABLE BARRICADE</b>	
	DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	616.10AU



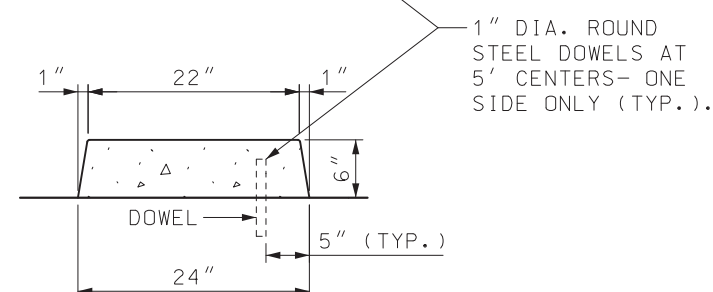
ALL TOP AND END EDGES SHALL BE CHAMFERED  $\frac{3}{4}$  INCH.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE  
STD PLAN 903.03.


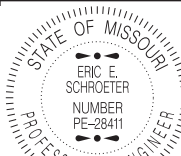
#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.



SECTION A-A

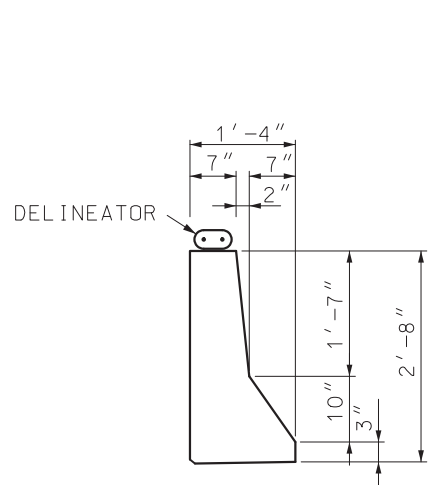


SECTION B-B

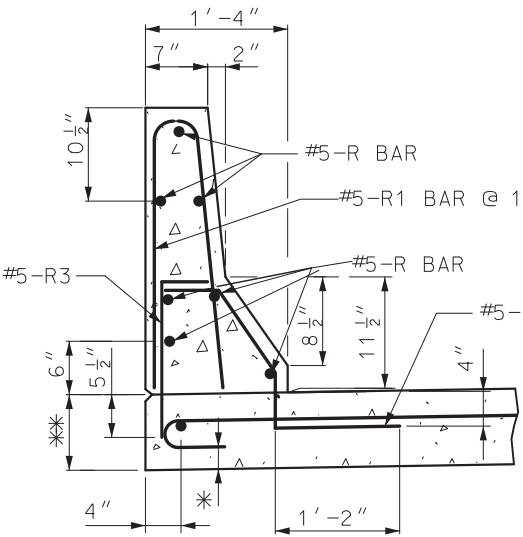
		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<p align="center"> <b>PERMANENT CONCRETE TRAFFIC BARRIER</b>   <b>TYPE A AND B</b> </p>	
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.			
DATE EFFECTIVE:	<u>01/01/2019</u>	617.10L	SHEET NO.
DATE PREPARED:	<u>10/17/2018</u>		1 OF 11



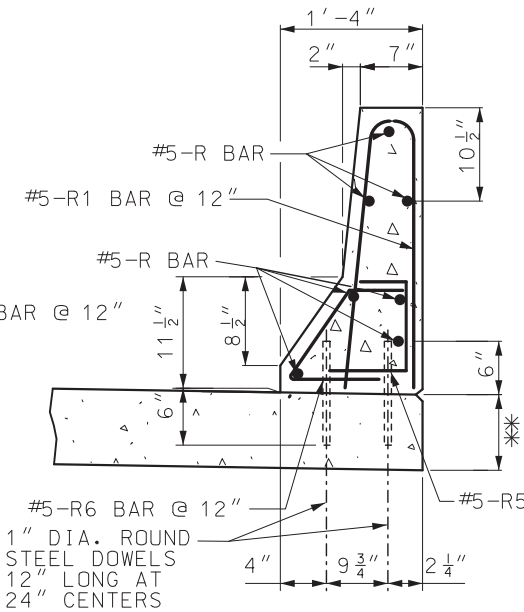




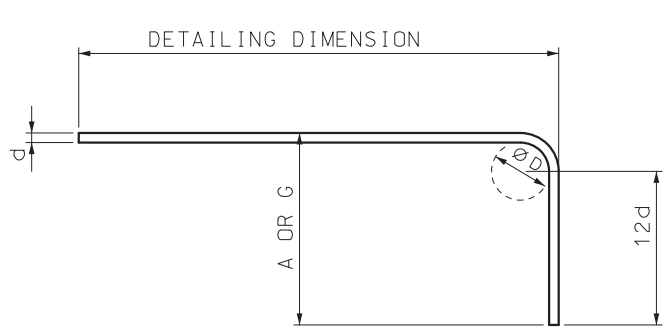
TYPE B (MODIFIED)  
TYPICAL SECTION



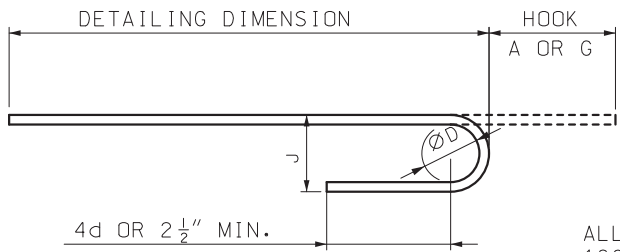
PART SECTION THROUGH  
UPPER BARRIER



PART SECTION THROUGH  
LOWER BARRIER



90° HOOKS

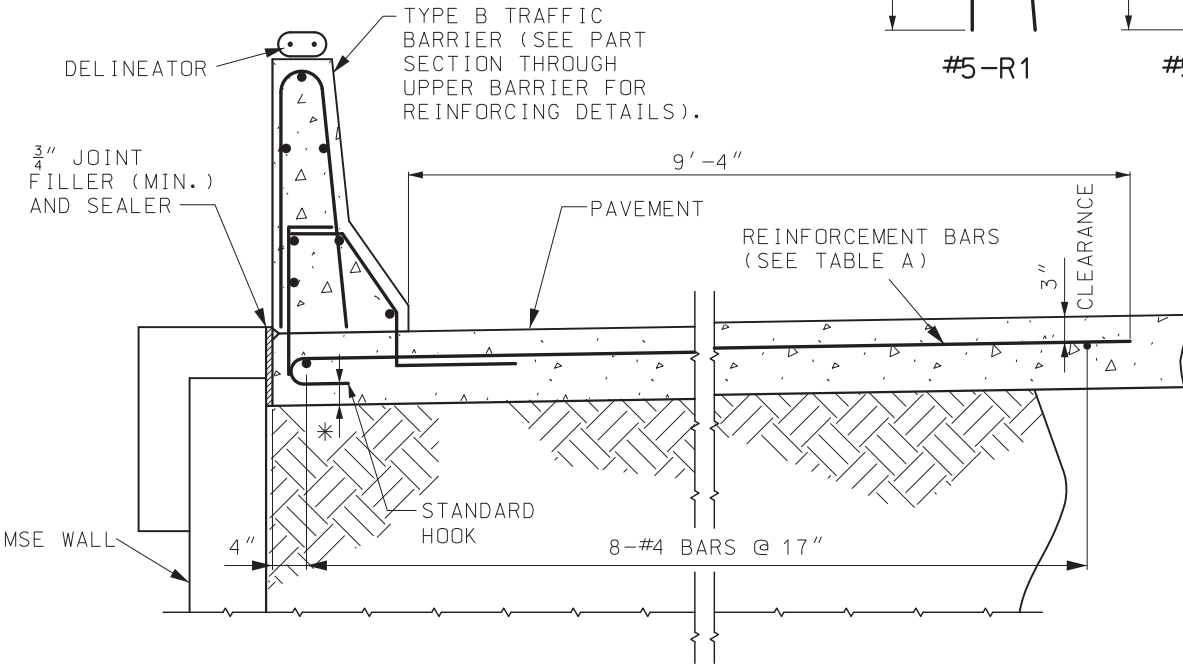
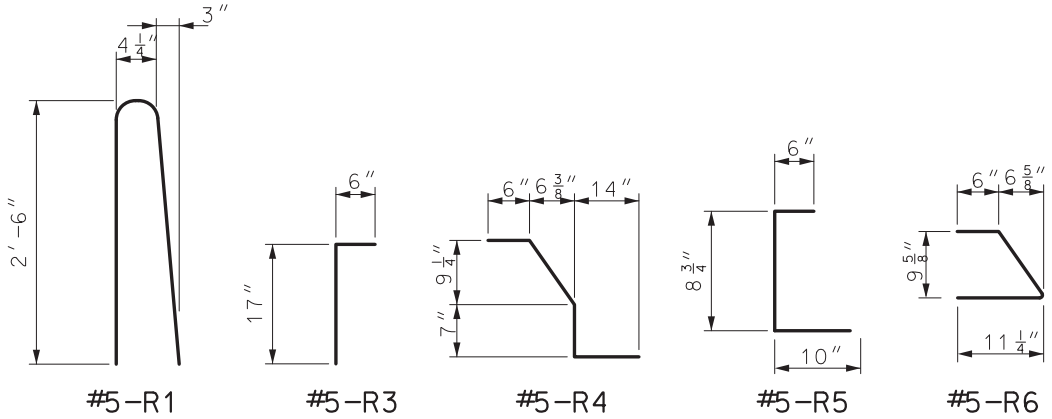


180° HOOKS

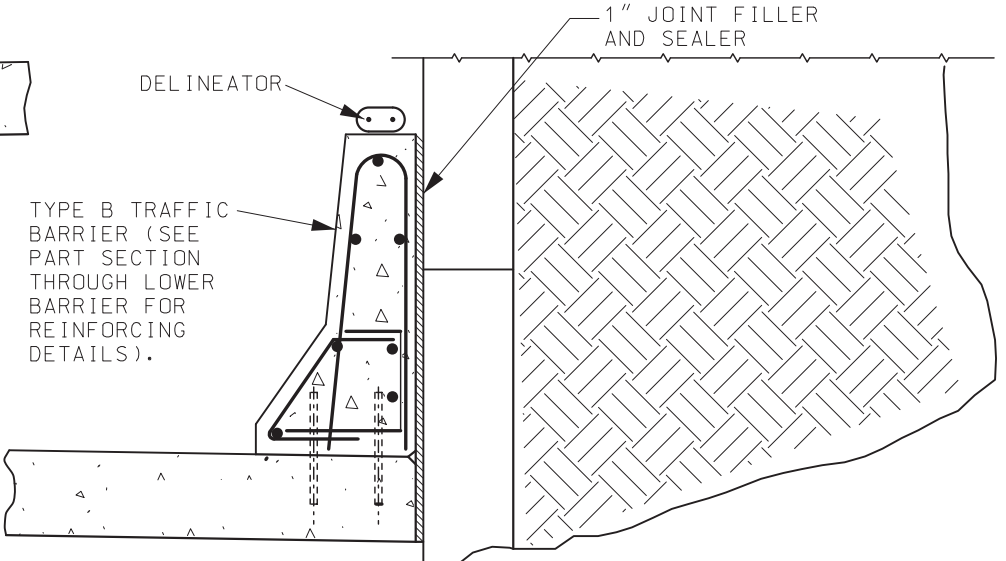
ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.

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"

TABLE A TRANSVERSE PAVEMENT REINFORCEMENT	
PAVEMENT THICKNESS **	BAR SIZE & SPACING
8"	#5 @ 5" *
9"	#5 @ 6" *
10"	#5 @ 8"
11"	#5 @ 9"
≥ 12"	#6 @ 12"



TYPE B TRAFFIC BARRIER ON TOP OF MSE WALL



TYPE B TRAFFIC BARRIER AT THE SIDE OF MSE WALL

- NOTES:
- 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.
  - TYPE B (MODIFIED) SHALL BE USED ONLY AT LOCATIONS SHOWN IN PLANS.
  - FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
  - #8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.
  - \* TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1 1/2" MINIMUM CLEARANCE.
  - \*\* SEE ROADWAY PAVEMENT DESIGN.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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

**PERMANENT CONCRETE TRAFFIC BARRIER AT MSE WALL TYPE B MODIFIED**

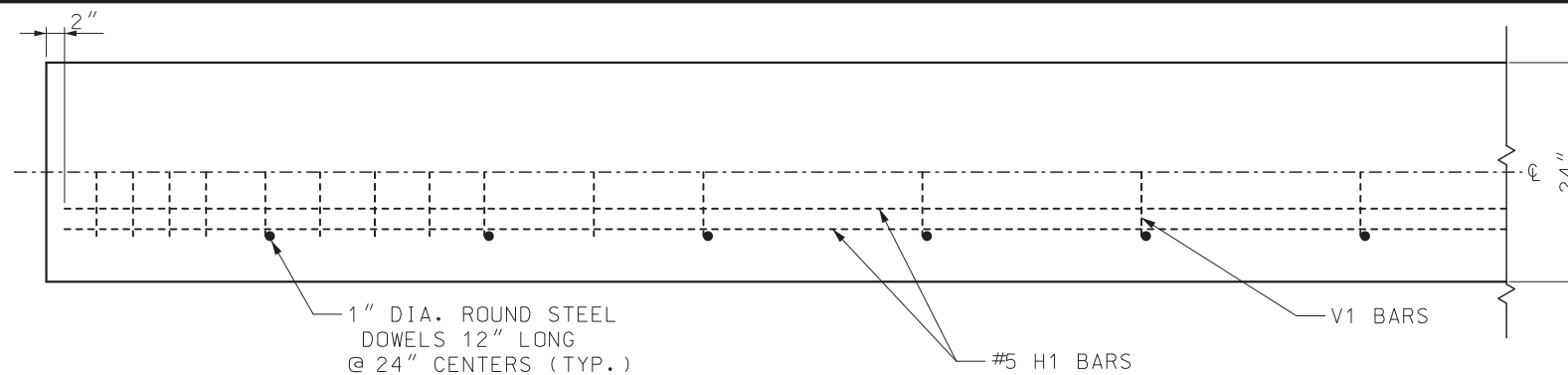
DATE EFFECTIVE: 01/01/2019  
DATE PREPARED: 10/17/2018

617.10L

SHEET NO. 3 OF 11

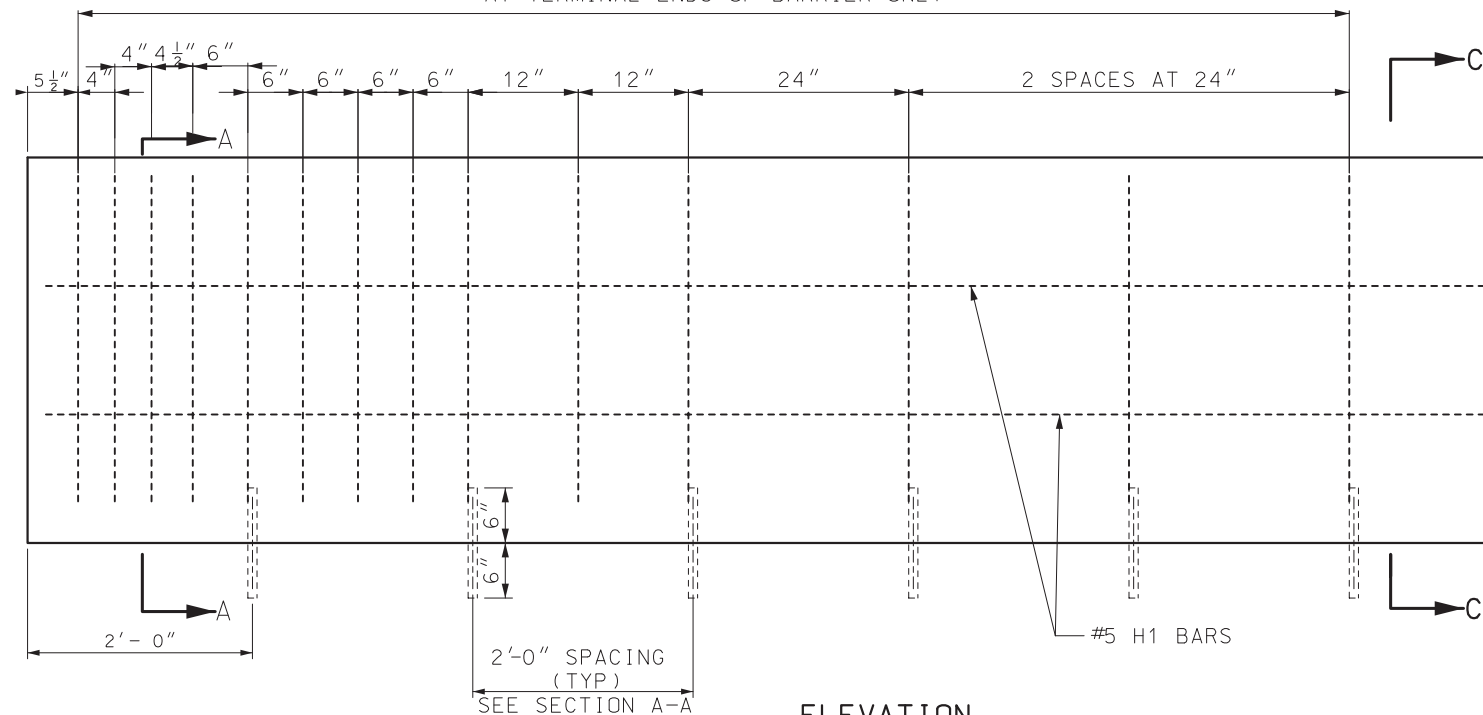
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



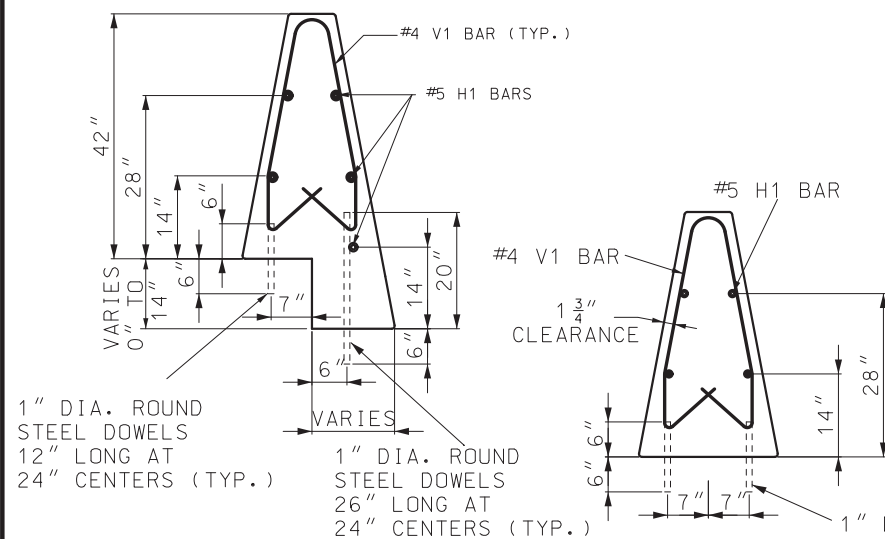


PLAN VIEW  
(SYMMETRICAL ABOUT CENTERLINE)

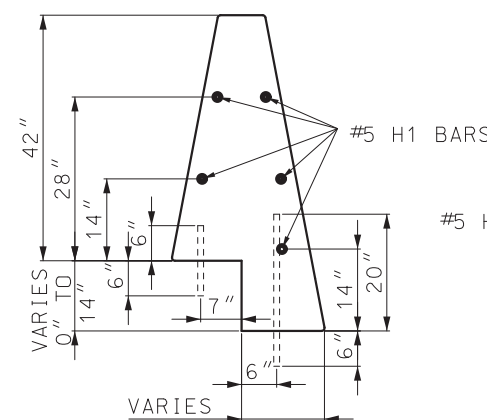
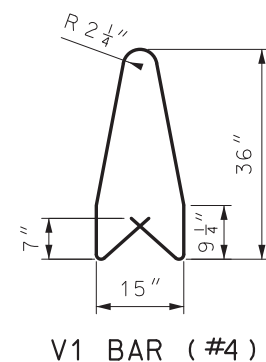
LIMITS OF #4 - V1 SPACED AS SHOWN BELOW  
AT TERMINAL ENDS OF BARRIER ONLY



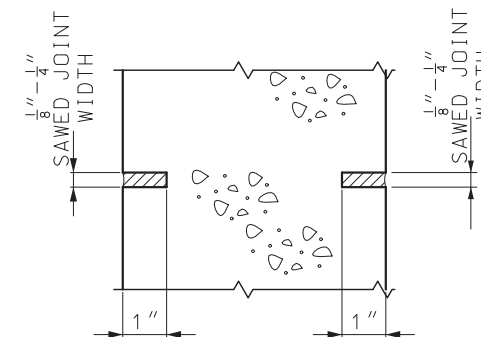
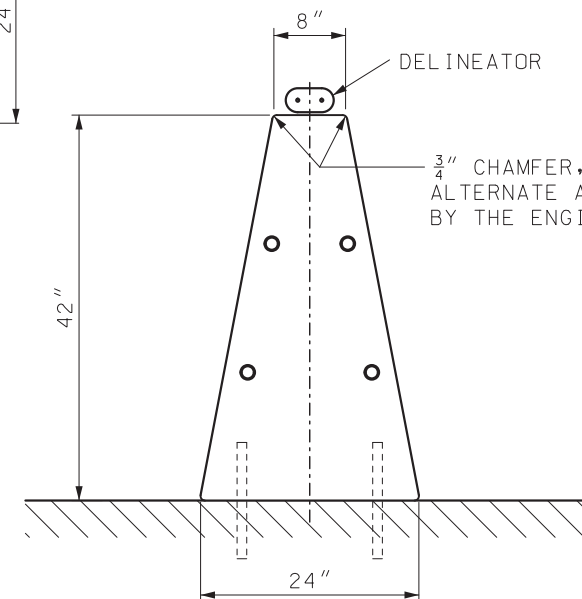
ELEVATION



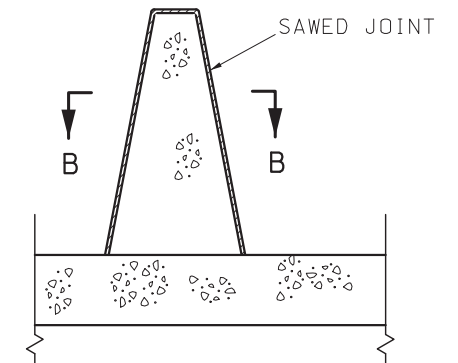
SECTION A-A  
(NORMAL PAVEMENT)



SECTION C-C  
(NORMAL PAVEMENT)



SECTION B-B



SECTION THROUGH SAWED JOINT

NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

ANY REINFORCING BAR INSTALLATION METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm \frac{1}{2}$  INCH AS DIMENSIONED WILL BE SATISFACTORY.


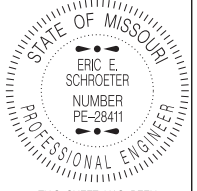
THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

ANCHORING DOWELS MAY BE OMITTED WHEN THE PLANS SPECIFY A MINIMUM 1 3/4" PAVEMENT SURFACE TO BE PLACED ABUTTING BOTH BARRIER FACES.

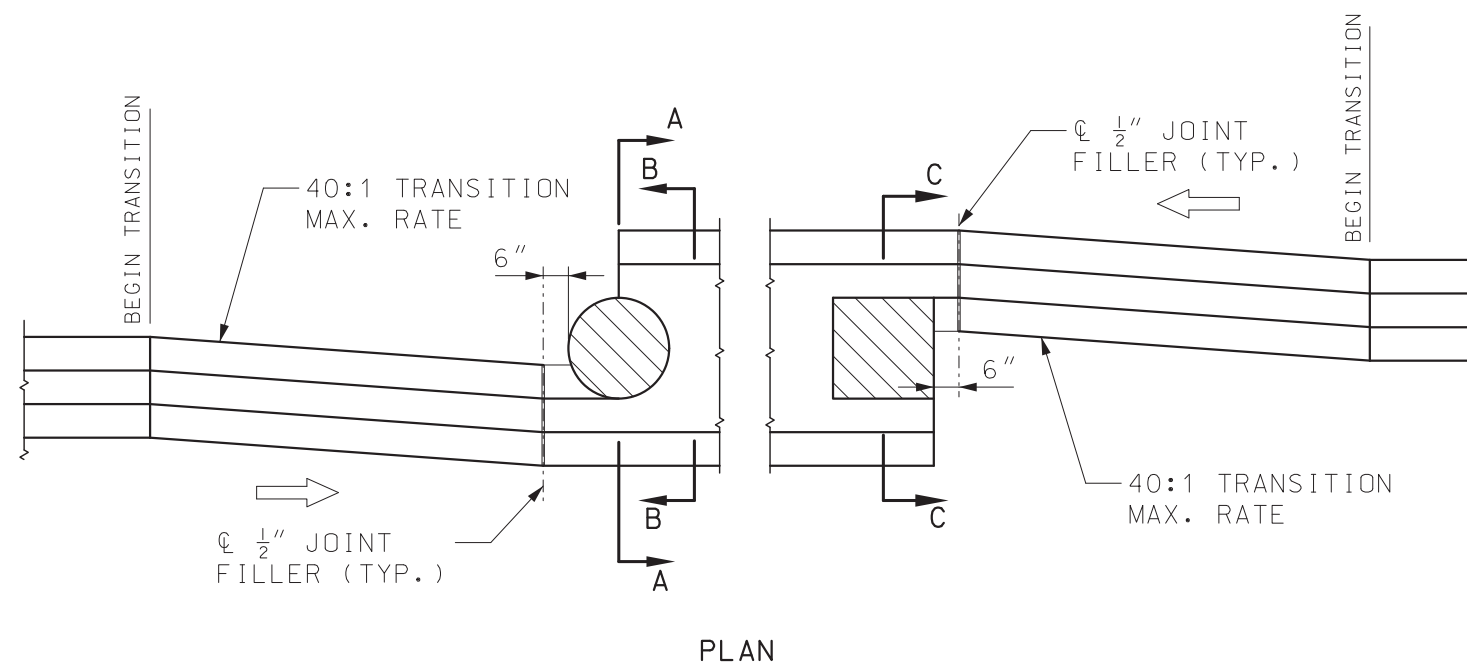
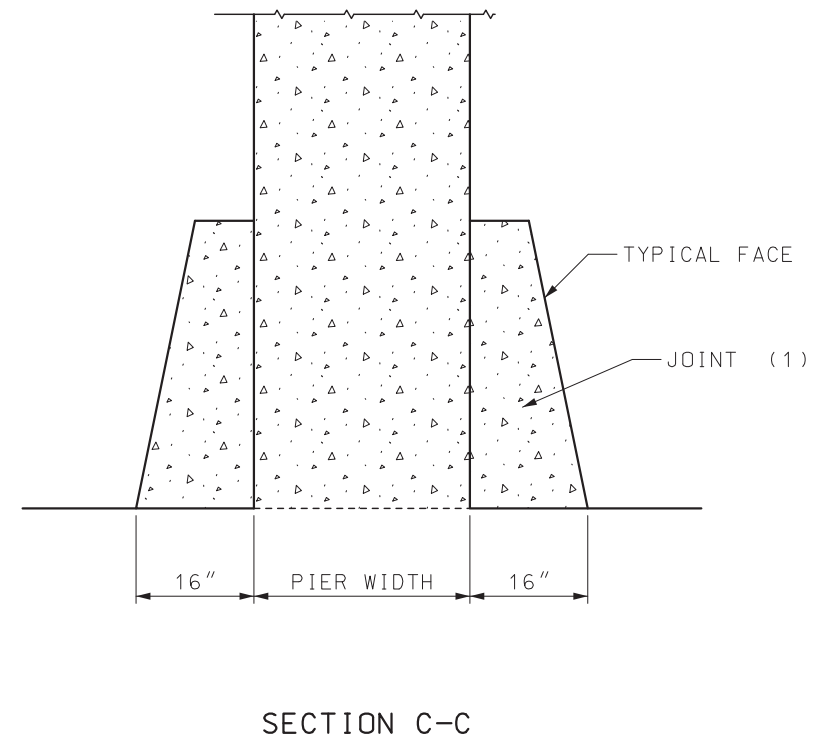
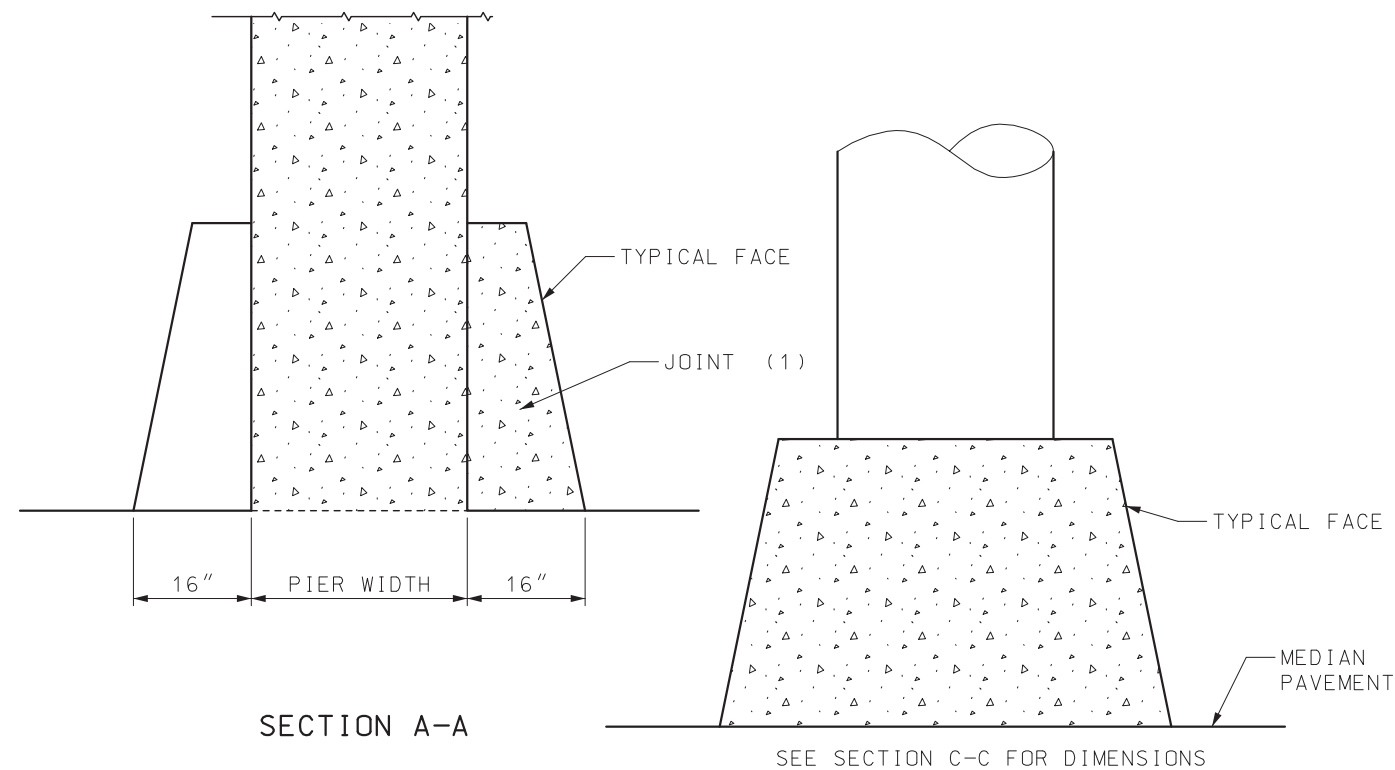
SAWED JOINTS SHALL BE LOCATED AT PAVEMENT TRANSVERSE JOINTS.

#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.


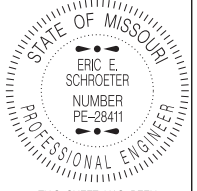
 <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	
 <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>PERMANENT CONCRETE TRAFFIC BARRIER TYPE C</b></p>
<p>DATE EFFECTIVE: 01/01/2019</p> <p>DATE PREPARED: 10/17/2018</p>	<p>617.10L</p>
<p>SHEET NO. 4 OF 11</p>	

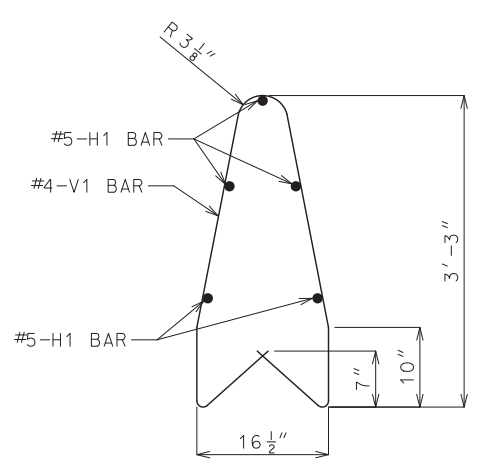
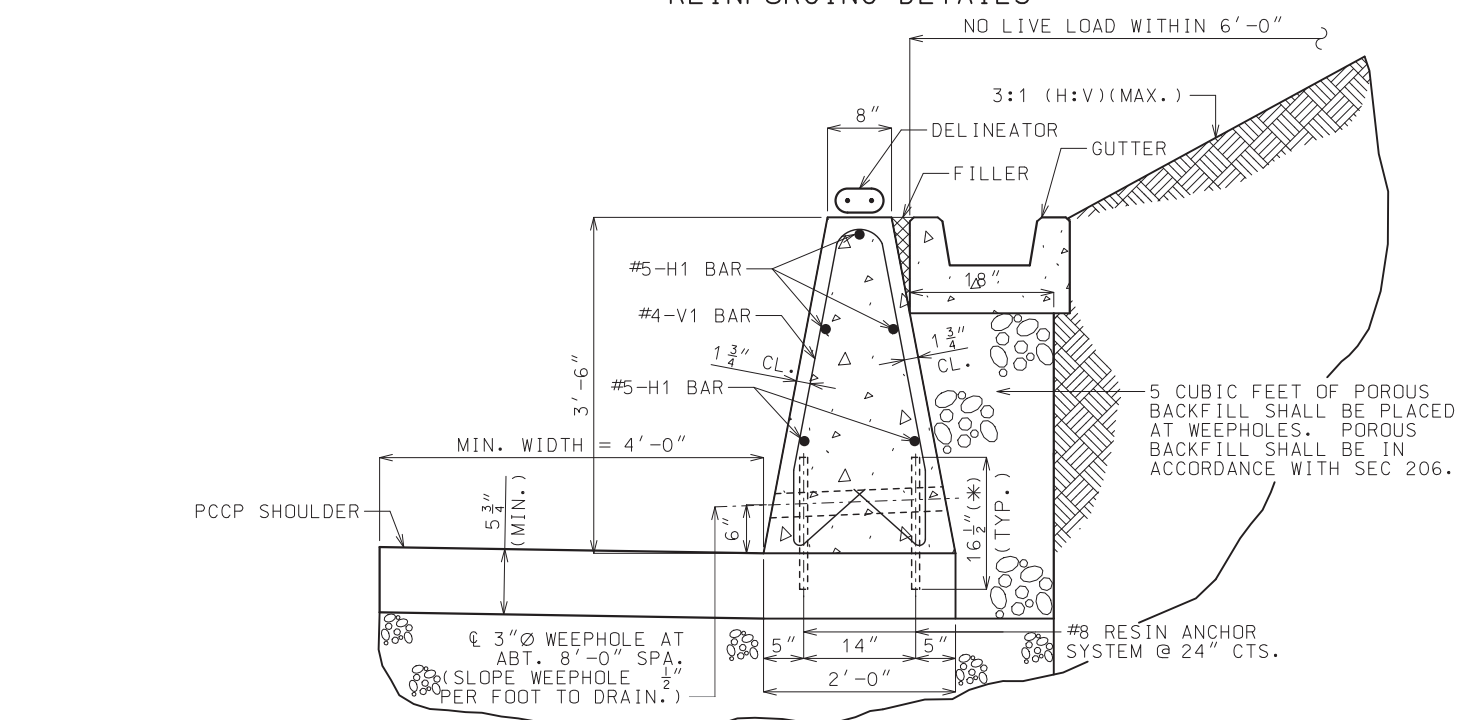
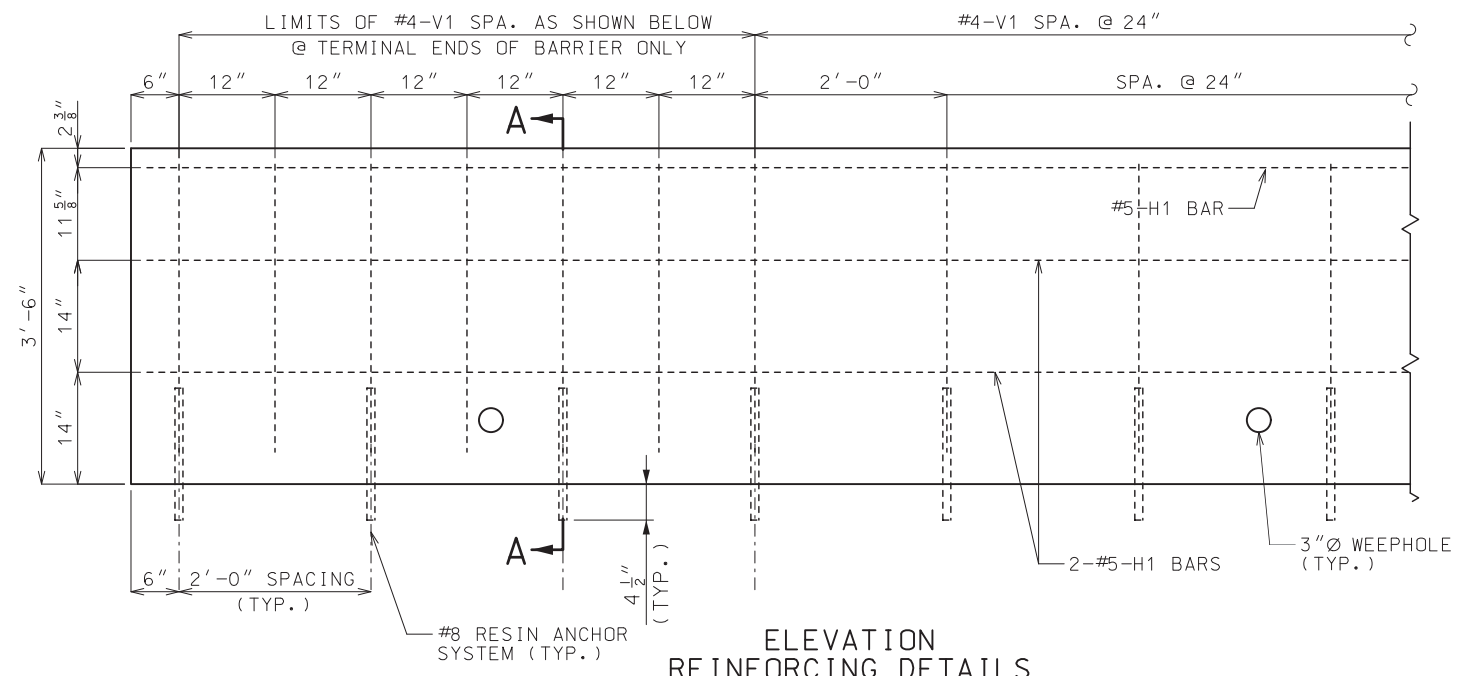
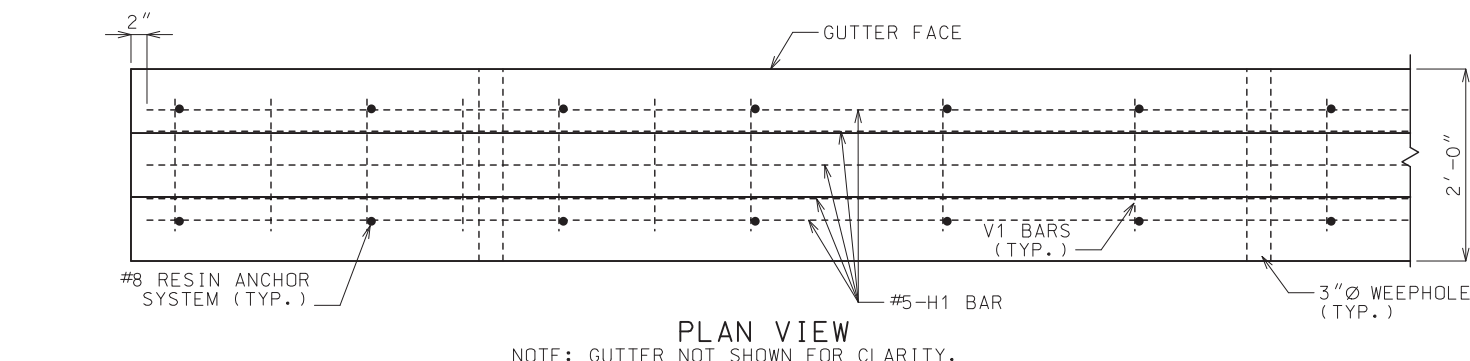
REINFORCING DETAILS



TRANSITION DETAILS FOR PIER PROTECTION

(1) 1 IN. JOINT WITH JOINT FILLER AND SEALER


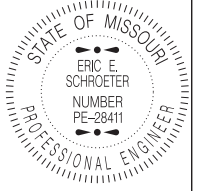
 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER TYPE C</b>
DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	SHEET NO. <b>617.10L</b> <b>5 OF 11</b>



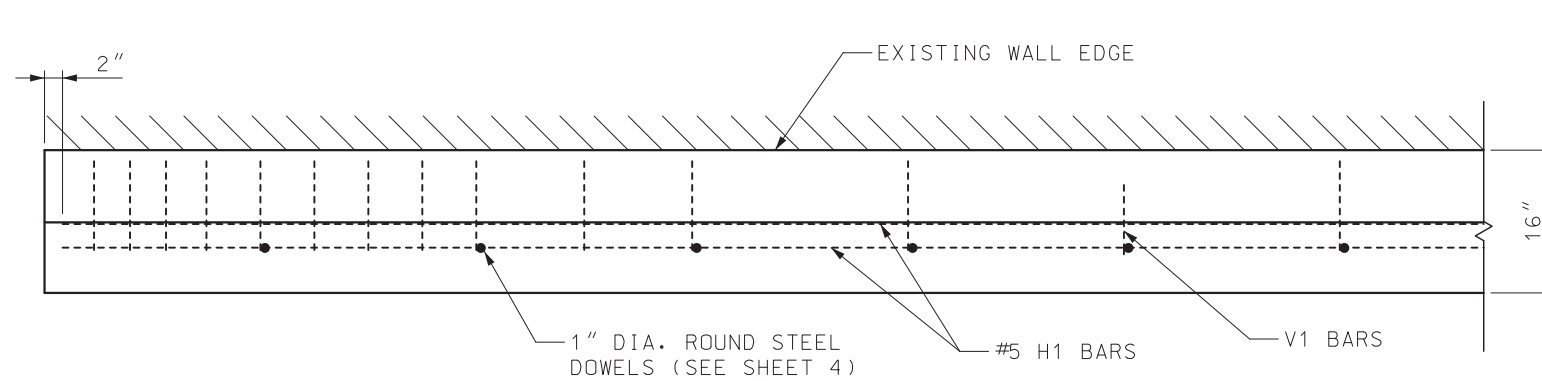
PART SECTION OF  
#4-V1 BAR

GENERAL NOTES:

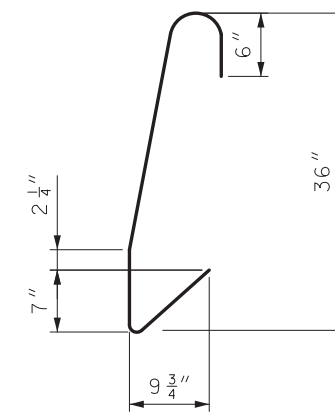
- CONCRETE SHALL BE CLASS B F'C = 4,000 PSI.
- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- ANGLE OF INTERNAL FRICTION,  $\phi F \geq 27^\circ$  FOR BACKFILL MATERIAL.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ", UNLESS OTHERWISE SHOWN.
- BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.
- ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm 1/2$  INCH AS DIMENSIONED WILL BE SATISFACTORY.
- THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.
- THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.
- THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.
- SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.
- TYPE C BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
- RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.
- WHEN BARRIER HEIGHT EXCEEDS 42" OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN 6'-0", CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>		
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)		
 <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p>	<b>PERMANENT CONCRETE TRAFFIC BARRIER</b>	
	TYPE C AS RETAINING WALL	
DATE EFFECTIVE: 01/01/2019	617.10L	SHEET NO. 6 OF 11
DATE PREPARED: 10/17/2018		

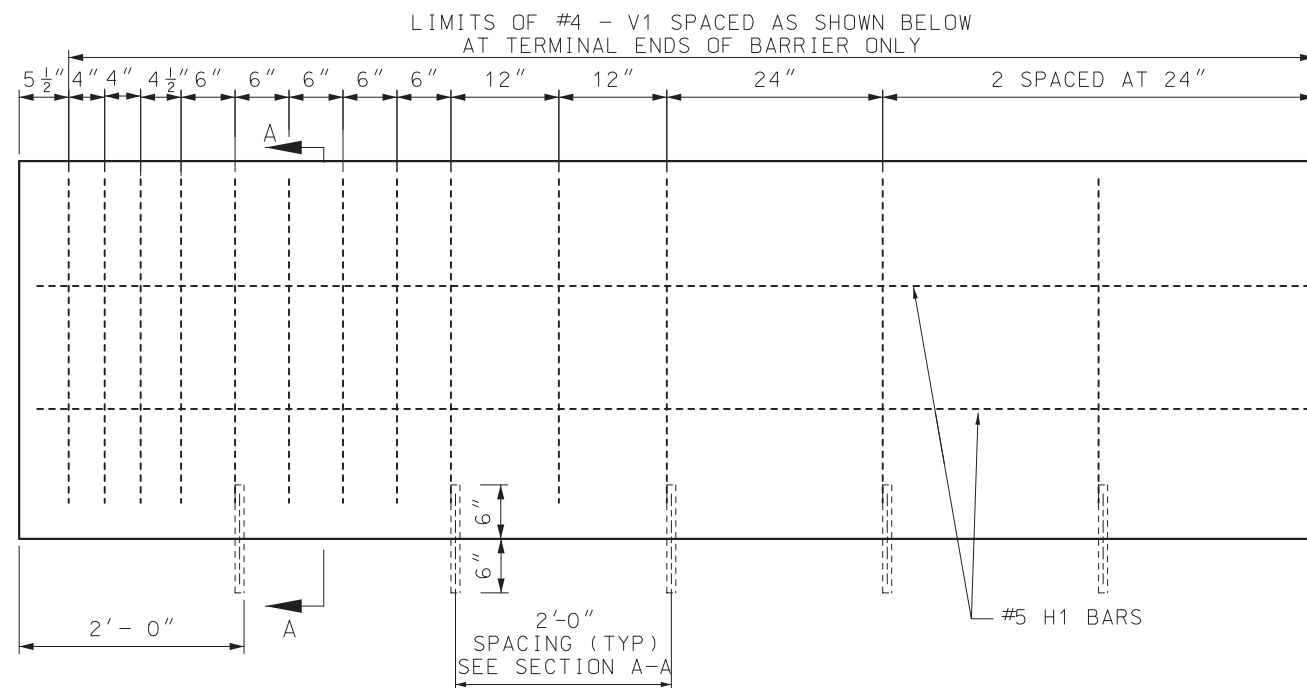
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



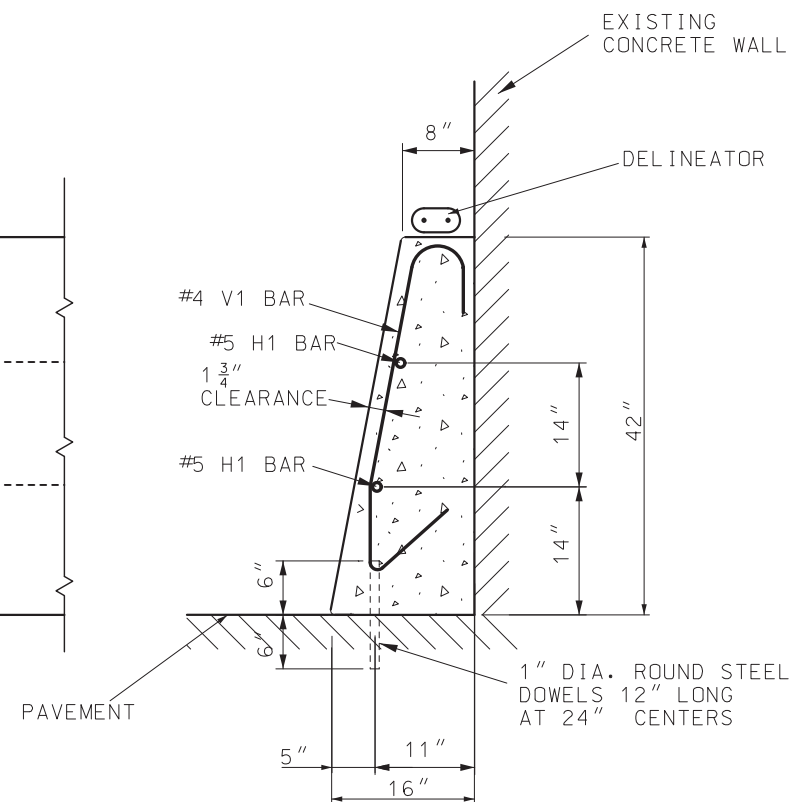
PLAN VIEW



V1 BAR (#4)



ELEVATION  
REINFORCING DETAILS



SECTION A-A

NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.  
BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm \frac{1}{2}$  INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.

THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.

SAWED JOINTS SHALL BE LOCATED AT PAVEMENT TRANSVERSE JOINTS.

TYPE D SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

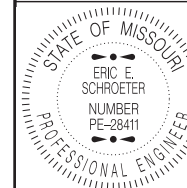
#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.



MISSOURI HIGHWAYS AND TRANSPORTATION  
COMMISSION

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



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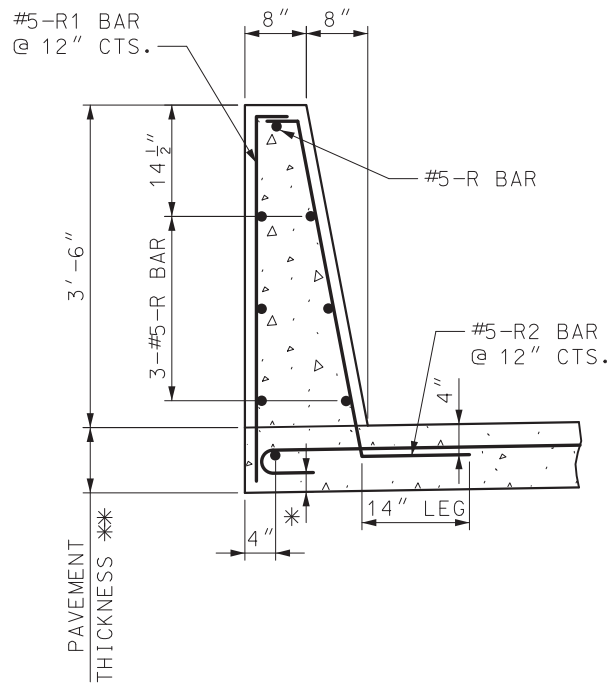
PERMANENT CONCRETE  
TRAFFIC BARRIER  
TYPE D

DATE EFFECTIVE: 01/01/2019  
DATE PREPARED: 10/17/2018

617.10L

SHEET NO.  
7 OF 11

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



PART SECTION THROUGH BARRIER

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

NOTES:

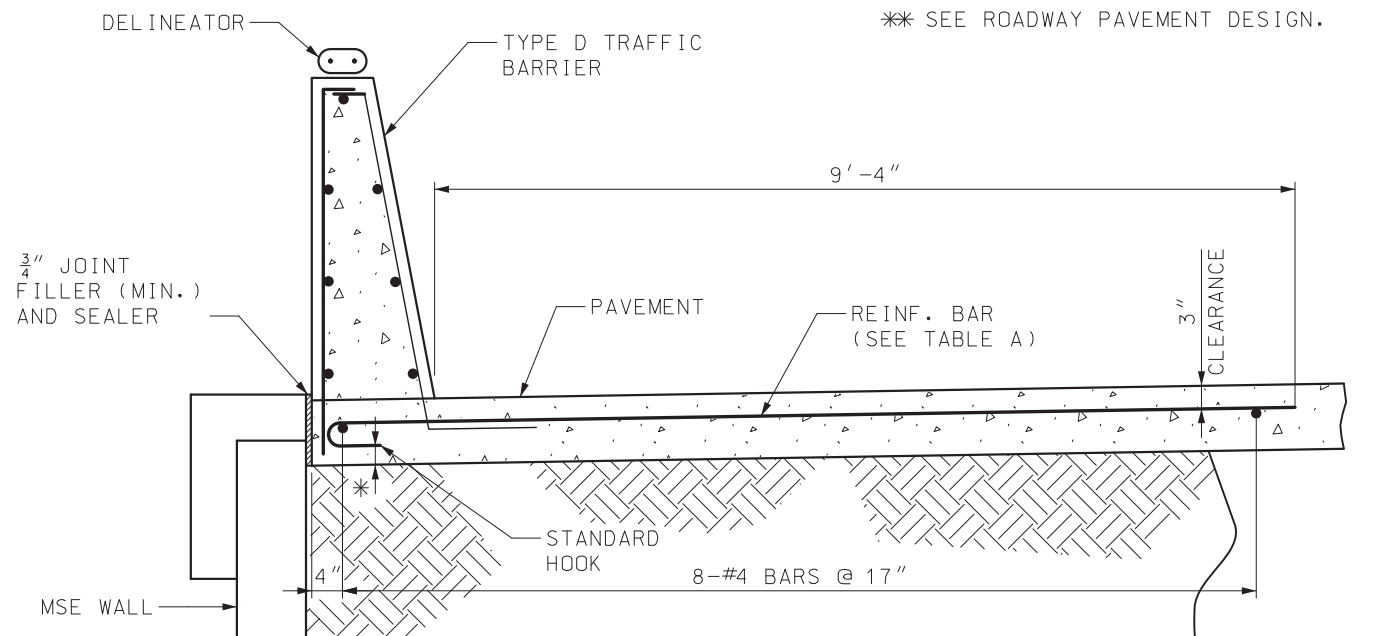
ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.

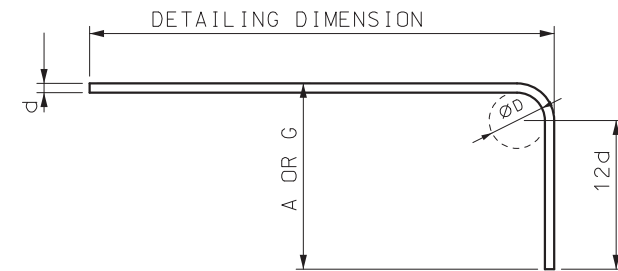
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½", UNLESS OTHERWISE SHOWN.

\* TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1½" MINIMUM CLEARANCE.

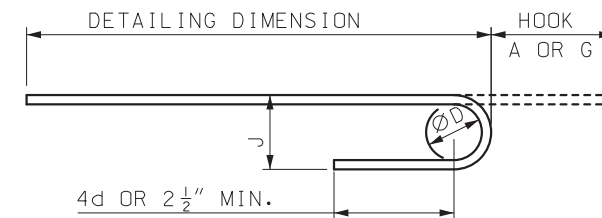
\*\* SEE ROADWAY PAVEMENT DESIGN.



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



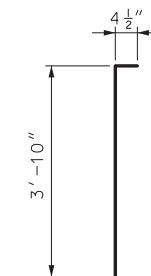
90° HOOKS



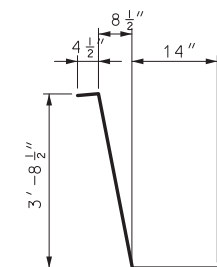
180° HOOKS

END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS A OR G	90° HOOKS J	90° HOOKS 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.



#5 R1



#5 R2

NOTES:

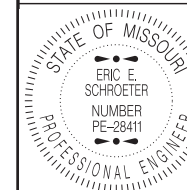
TYPE D SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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



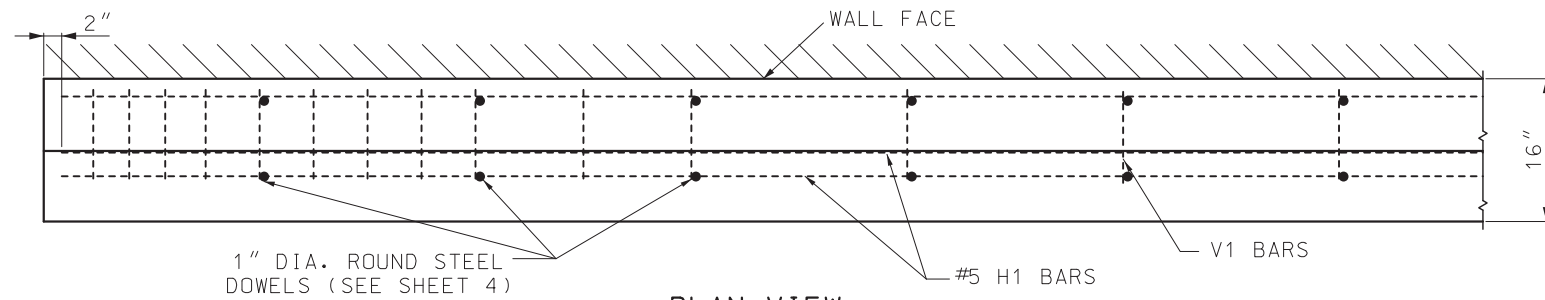
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PERMANENT CONCRETE  
TRAFFIC BARRIER  
TYPE D ATOP MSE WALL

DATE EFFECTIVE: 01/01/2019  
DATE PREPARED: 10/17/2018

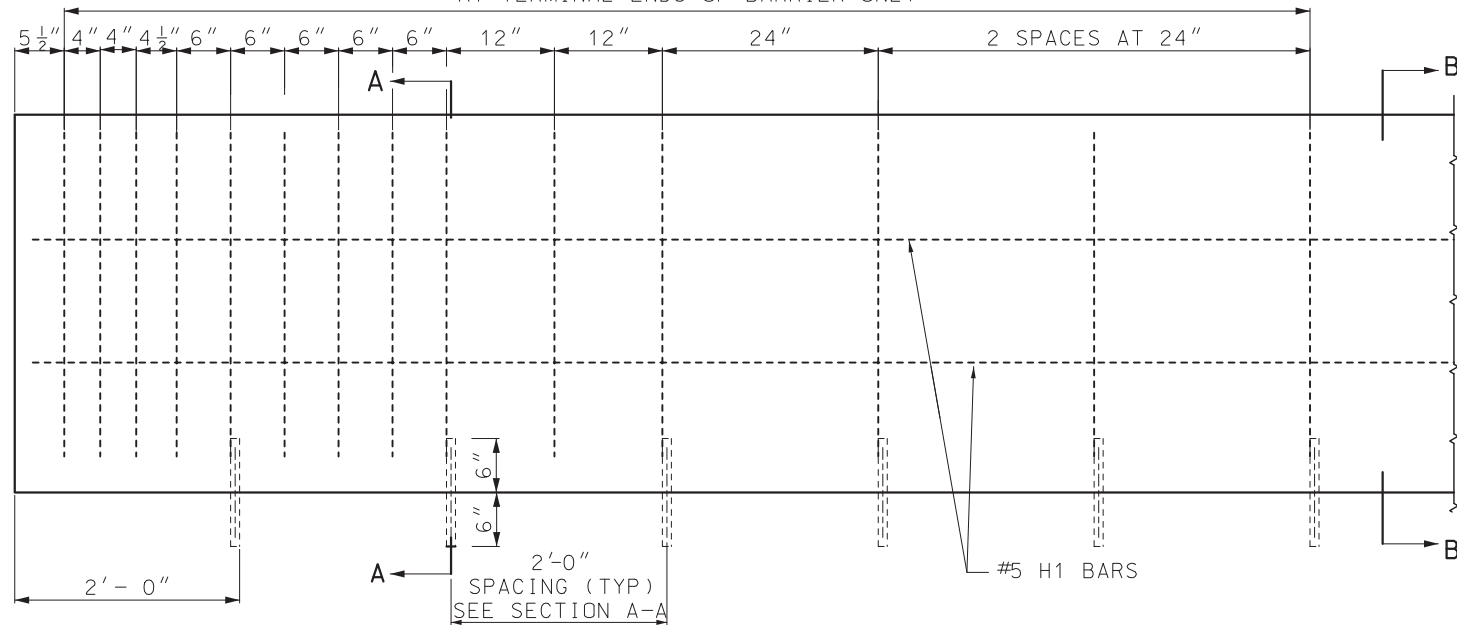
617.10L

SHEET NO.  
8 OF 11

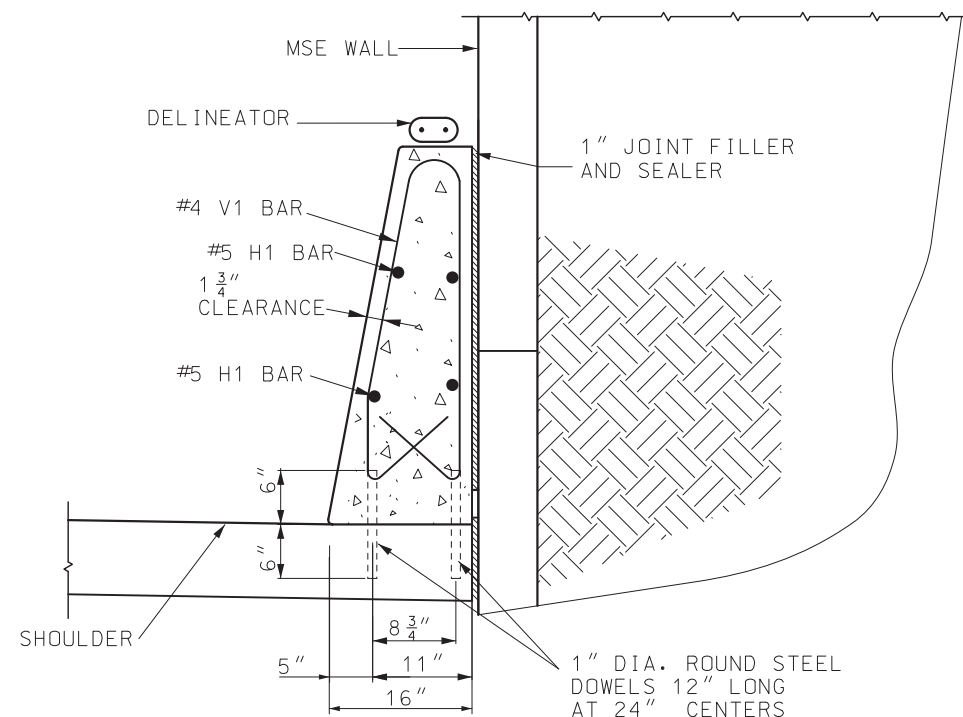


PLAN VIEW

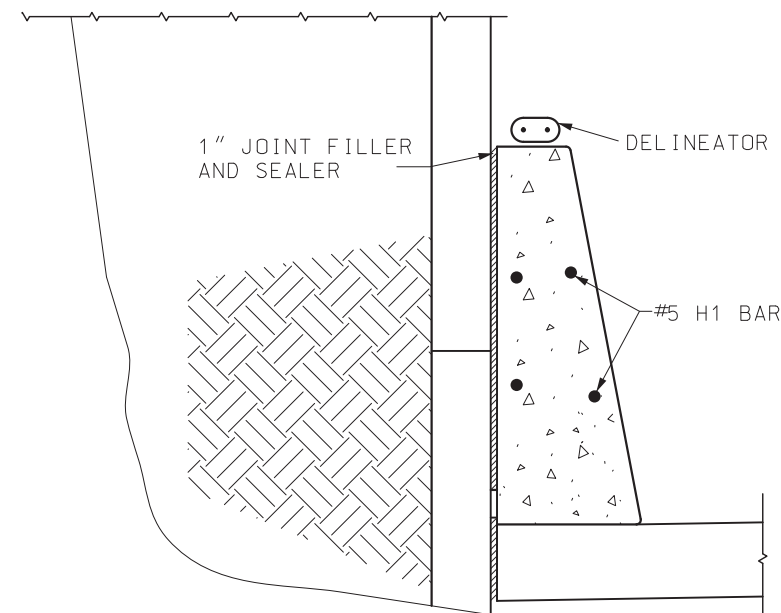
LIMITS OF #4 - V1 SPACED AS SHOWN BELOW  
AT TERMINAL ENDS OF BARRIER ONLY



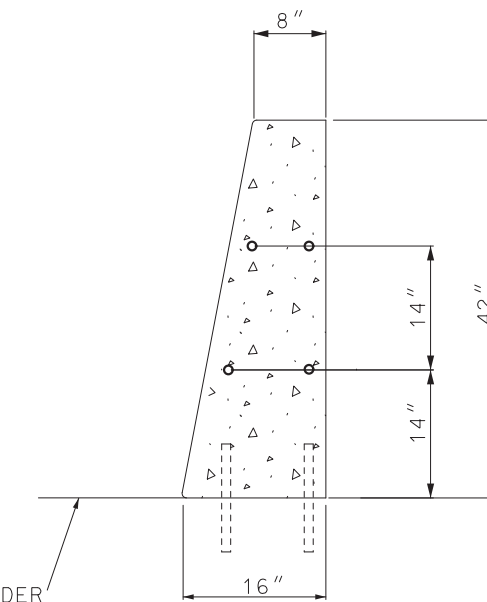
ELEVATION  
REINFORCING DETAILS



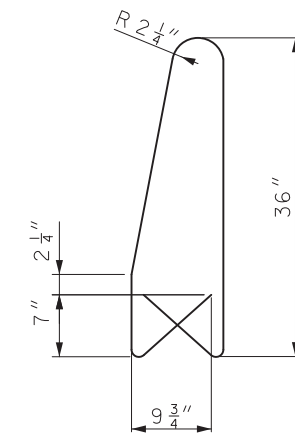
SECTION A-A



SECTION B-B



TYPE D TYPICAL SECTION



V1 BAR (#4)

NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED  $\pm \frac{1}{2}$  INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.


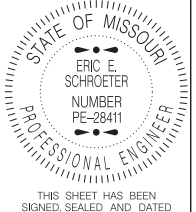
THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.

SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE STANDARD PLANS FOR SAWED JOINT DETAIL

TYPE D BARRIER SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

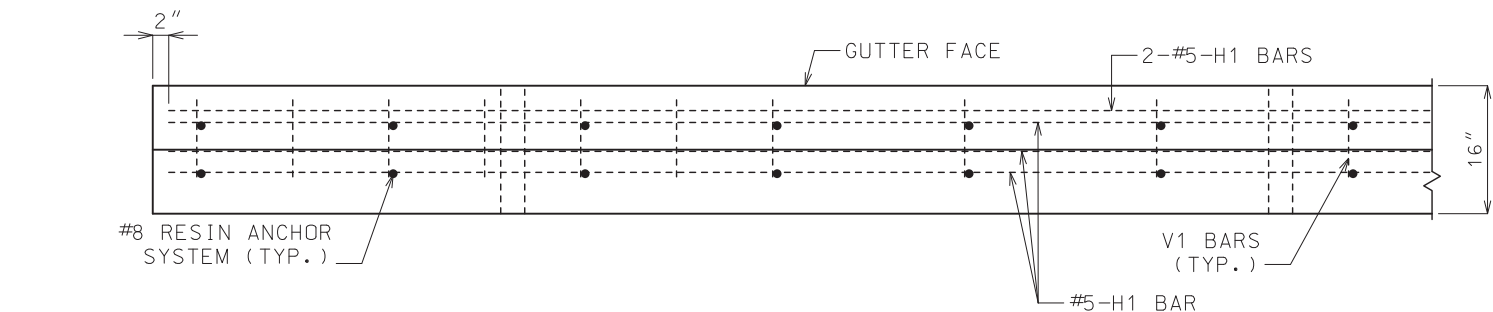
#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER</b> <b>TYPE D BESIDE MSE WALL</b>
DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	617.10L
SHEET NO. 9 OF 11	

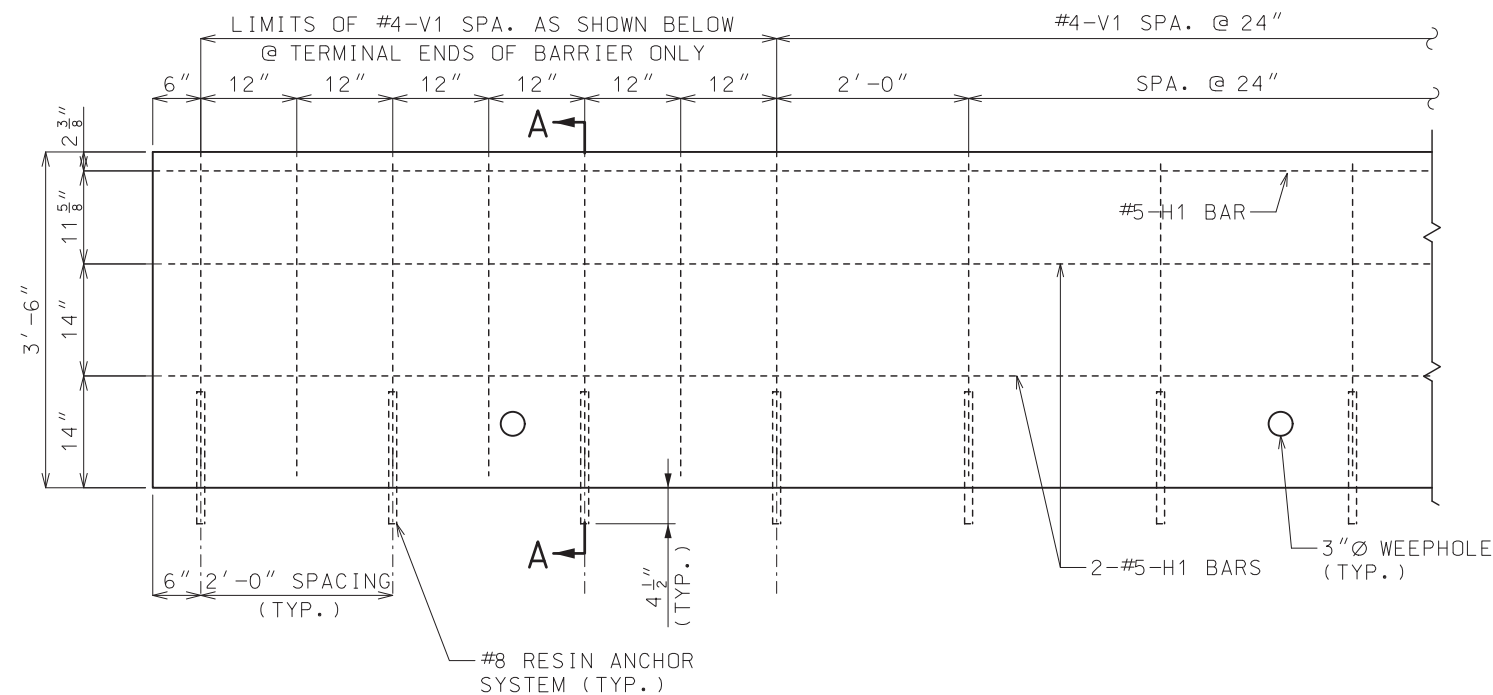
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



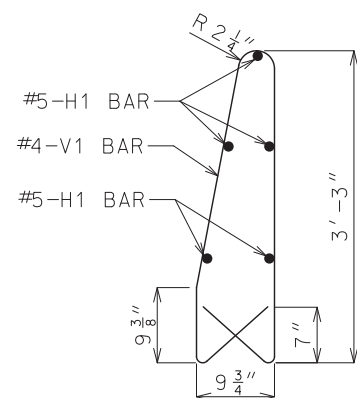


PLAN VIEW

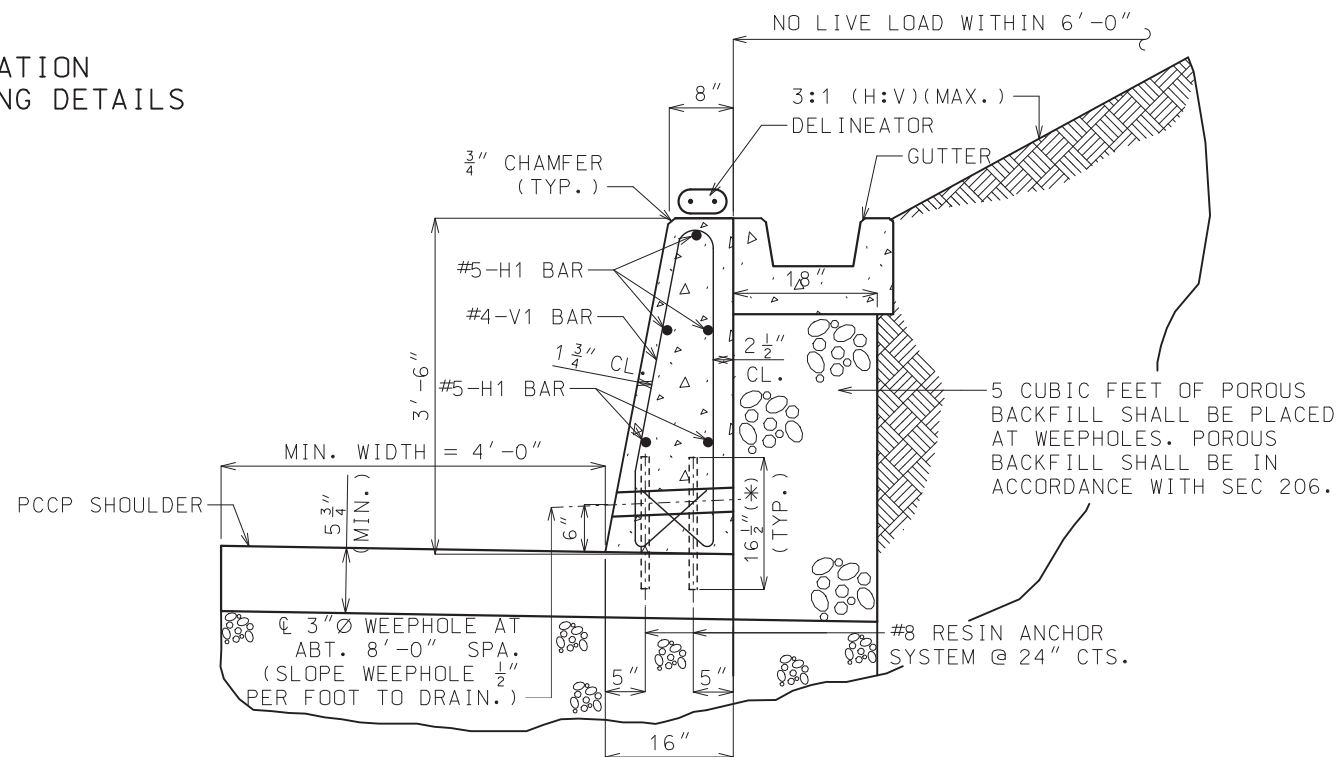
NOTE: GUTTER NOT SHOWN FOR CLARITY.



ELEVATION  
REINFORCING DETAILS



PART SECTION OF  
#4-V1 BAR



SECTION A-A  
(FOR SLOPING AND NONSLOPING BACKSLOPE)

(\*) EMBED ANCHOR 4 1/2" INTO PCCP SHOULDER.

#### GENERAL NOTES:

CONCRETE SHALL BE CLASS B  $f'_c = 4,000$  PSI.

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

ANGLE OF INTERNAL FRICTION,  $\phi_f \geq 30^\circ$  FOR BACKFILL MATERIAL.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1-1/2", UNLESS OTHERWISE SHOWN.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REFORCING STEEL WILL BE POSITIONED  $\pm 1/2$  INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.

THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATION.


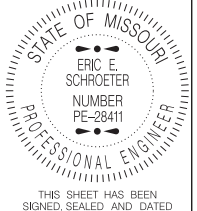
SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.

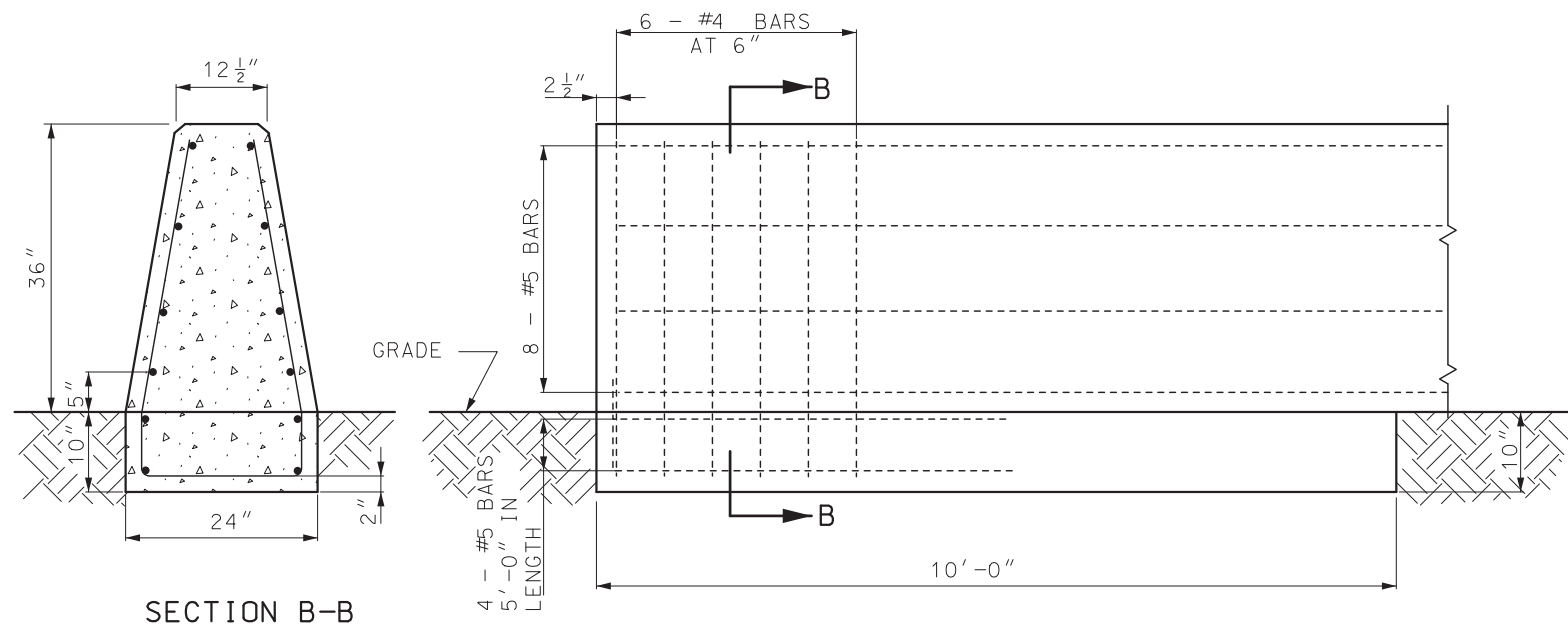
TYPE D BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.

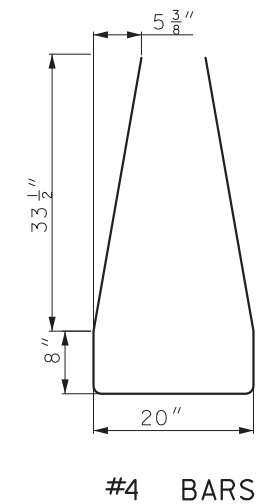
WHEN BARRIER HEIGHT EXCEEDS 42" OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN 6'-0", CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>PERMANENT CONCRETE TRAFFIC BARRIER</b> <b>TYPE D AS RETAINING WALL</b>
DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018	SHEET NO. <b>617.10L 10 OF 11</b>

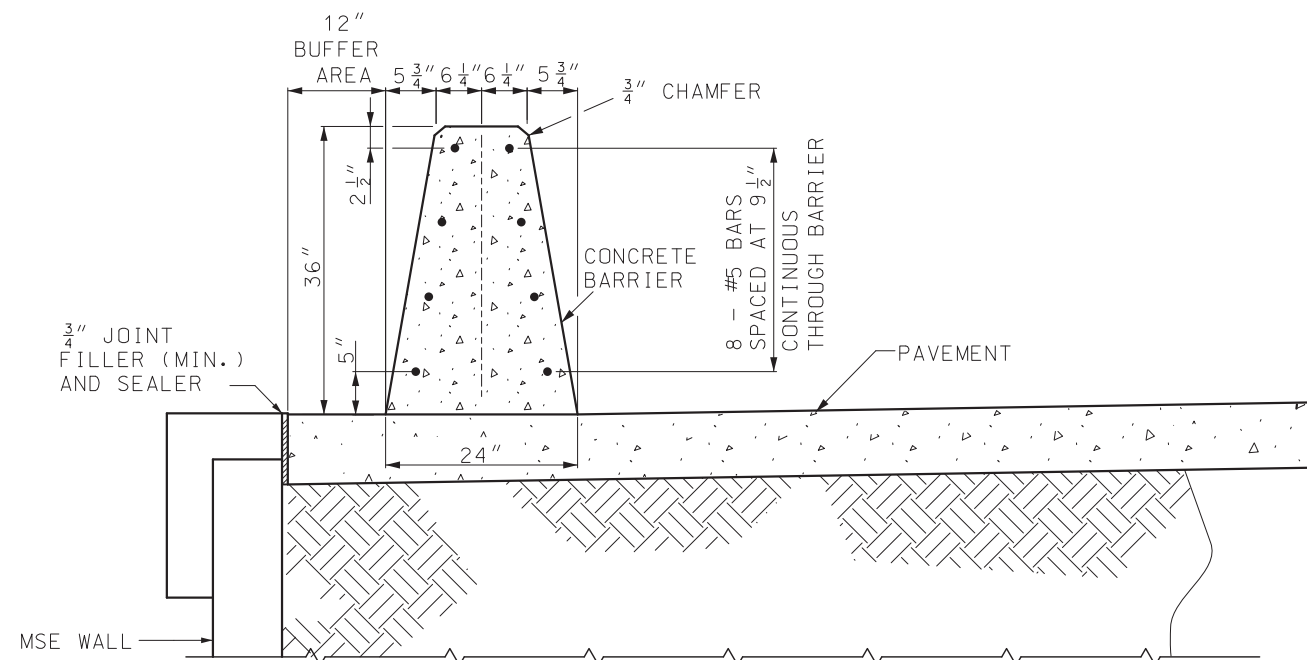


SECTION B-B

CONCRETE BARRIER END ANCHORAGE ON GRADE



#4 BARS



TRAFFIC BARRIER ON TOP OF MSE WALL

GENERAL NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.

A 12" BUFFER REQUIRED WITHIN THE LIMITS OF THE TRAFFIC BARRIER EXCLUDING THE END ANCHORAGE SECTIONS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

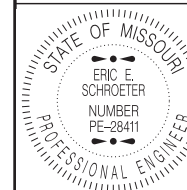
PAVEMENT SURFACE DIFFERENTIAL SHALL NOT EXCEED 1 1/2".

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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



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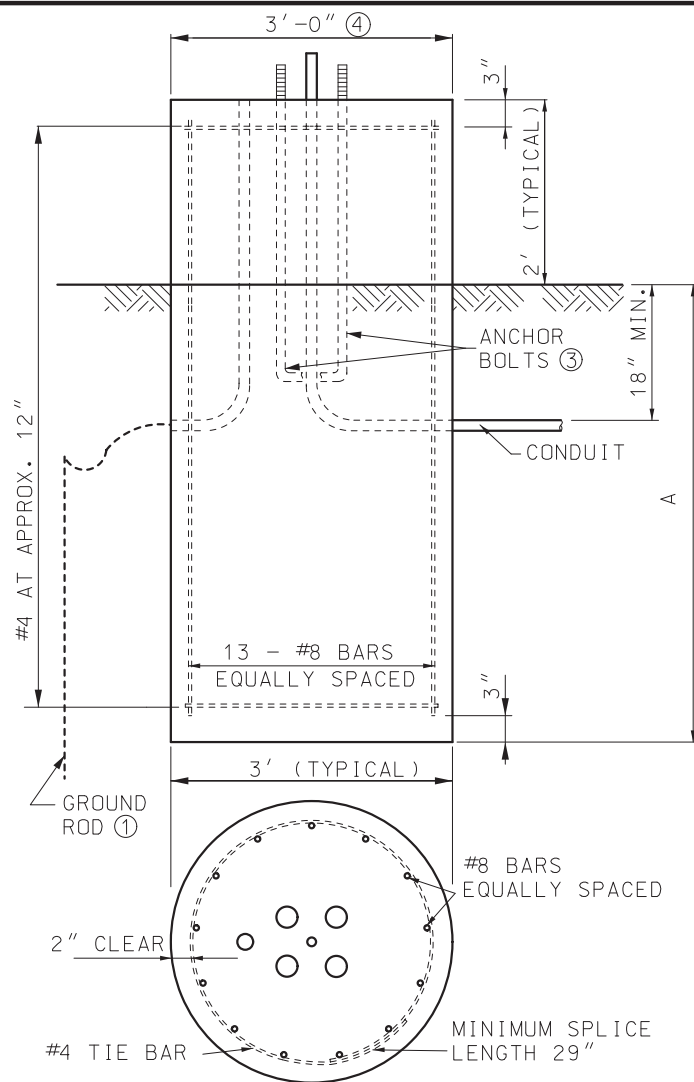
PERMANENT CONCRETE  
TRAFFIC BARRIER  
TYPE E ATOP MSE WALL

DATE EFFECTIVE: 01/01/2019  
DATE PREPARED: 10/17/2018

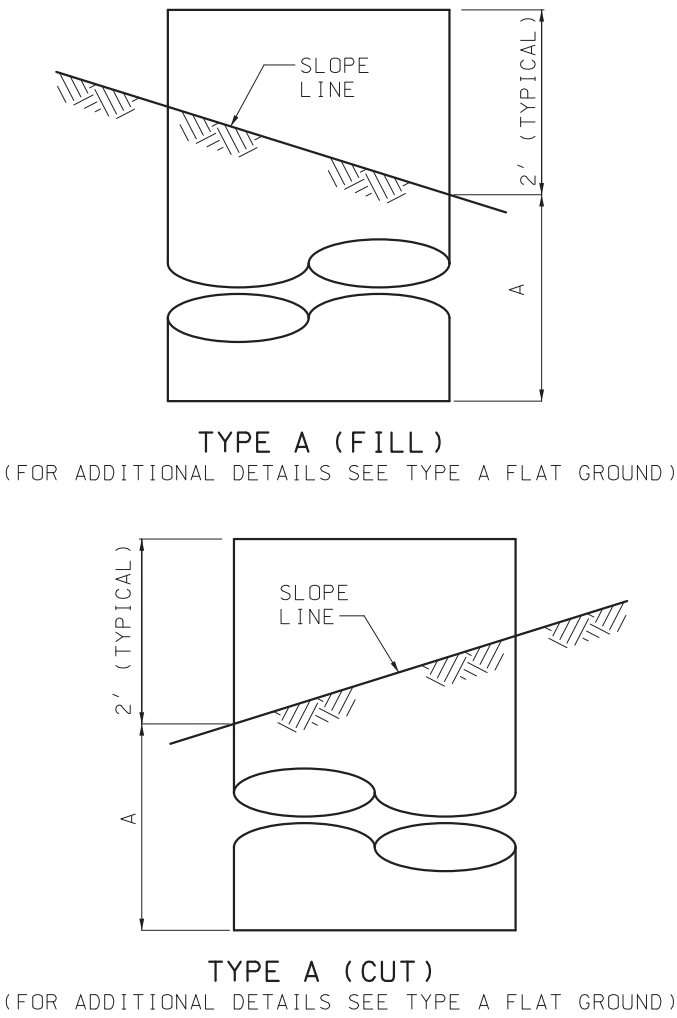
617.10L

SHEET NO.  
11 OF 11





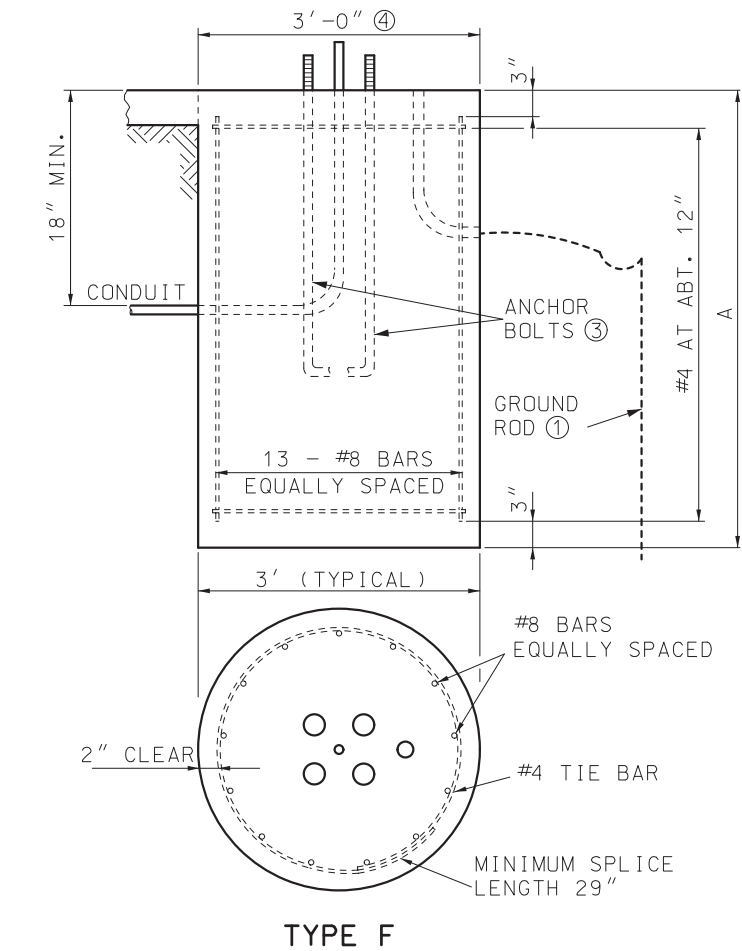
TYPE A (FLAT GROUND)



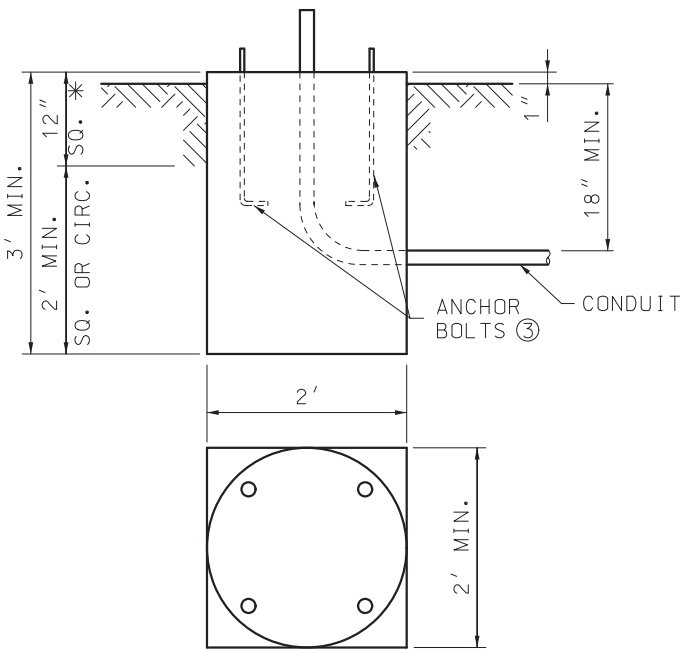
POST BASES

STEEL AND CONCRETE REQUIREMENTS FOR POST BASES⑨				
BASES		#6 STEEL BAR		CONC. C.Y.
TYPE	A ⑦	LENGTH	WEIGHT LBS. ⑧	
A-9	9'-0"	10'-6"	300	2.88
A-9.5	9'-6"	11'-0"	310	3.01
A-10	10'-0"	11'-6"	320	3.14
A-10.5	10'-6"	12'-0"	330	3.27
A-11	11'-0"	12'-6"	350	3.40
A-12	12'-0"	13'-6"	380	3.67
F-9	9'-0"	8'-6"	240	2.36
F-9.5	9'-6"	9'-0"	250	2.49
F-10	10'-0"	9'-6"	270	2.62
F-10.5	10'-6"	10'-0"	280	2.75
F-11	11'-0"	10'-6"	300	2.88
F-12	12'-0"	11'-6"	320	3.14
C*				0.44

\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".



TYPE F




TYPE C

\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".

- ① APPLICABLE ONLY WHERE CONTROLLER IS MOUNTED TO A SIGNAL POLE.
- ② BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ③ ANCHOR BOLT DIMENSIONS ARE SHOWN ON THE MANUFACTURER'S APPROVED DRAWINGS.
- ④ MAXIMUM BOLT CIRCLE DIAMETER IS 26". BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ⑤ ARM LENGTH DETERMINED BY LENGTH OF LONGEST ARM FOR TYPE B & BL SIGNAL POSTS.
- ⑥ BASE TYPE A OR F DETERMINED BY LOCATION OF POST BASE.
- ⑦ SOIL DEPTH, NO ROCK.
- ⑧ WEIGHT INCLUDES #4 TIE BARS.
- ⑨ WHEN CONCRETE BASE IS LOCATED WITHIN 8" CONCRETE DIVISIONAL ISLAND, EMBEDMENT LENGTH MAY BE REDUCED BY 1/2 DIAMETER OF THE DRILLED SHAFT.


POST BASES		
POST TYPE	ARM LENGTH (FEET) ⑤	BASE TYPE ⑥
C OR CL	15 - 25	A-9 OR F-9
C OR CL	30 - 35	A-9.5 OR F-9.5
C OR CL	40 - 55	A-10.5 OR F-10.5
B OR BL	15 - 25	A-10 OR F-10
B OR BL	30 - 35	A-11 OR F-11
B OR BL	40 - 55	A-12 OR F-12

BASE EMBEDMENT IN SOLID ROCK	
SOLID ROCK ENCOUNTER POINT	REQUIRED EMBEDMENT FOR BASE TYPE
	A-10 F-10
AT SURFACE	4'-9"
AT ONE-FOURTH NORMAL DEPTH	4'-0"
AT ONE-HALF NORMAL DEPTH	3'-3"
AT THREE-FOURTHS NORMAL DEPTH	1'-3"
1. REQUIRED EMBEDMENT DEPTHS CAN BE INTERPOLATED BETWEEN ENCOUNTER POINTS FOR OTHER SOLID ROCK ENCOUNTER DEPTHS.	
2. NORMAL LENGTHS FOR ANCHOR BOLTS AND REINFORCING STEEL WILL BE REQUIRED.	
3. CORE DRILL HOLES FOR ANCHOR BOLTS AND REINFORCING STEEL IN SOLID ROCK SHALL BE PROVIDED. CORE DRILL HOLES SHALL BE TWICE THE DIAMETER OF THE ANCHOR BOLT AND REINFORCING STEEL DIAMETER AND TO WITHIN 3 INCHES OF THE NORMAL BASE DEPTH.	
4. IF SOIL, SHALE, GRAVEL, FRACTURED ROCK, OR VOIDS ARE ENCOUNTERED DURING CORE DRILLING, THE ROCK SHALL BE REMOVED TO THE POINT OF ENCOUNTER.	
5. ANCHOR BOLTS AND REINFORCING STEEL SHALL BE GROUTED IN THE CORE DRILL HOLES WITH NON-SHRINK GROUT HAVING A MINIMUM STRENGTH OF 9,000 POUNDS IN 24 HOURS.	
6. STRAIGHT ANCHOR BOLTS OF THE LENGTH SHOWN IN THE ANCHOR BOLT TABLE UNDER THE COLUMN "BOLT LENGTH" ARE ADEQUATE FOR USE IN GROUTED CORE DRILLED HOLES.	



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.

TRAFFIC SIGNALS  
POST BASES

DATE EFFECTIVE: 10/01/2018  
DATE PREPARED: 7/31/2018

902.30P

SHEET NO.  
1 OF 2