2022 Missouri Standard Plans for Highway Construction

Missouri Department of Transportation

This set of standard plans has been approved by the Missouri Highways and Transportation Commission for highway construction projects and constitutes a contract document in accordance with Section 101.2 of the Standard Specifications for Highway Construction.

This set of Standard Plans is effective beginning with the April 2023 bid opening.

www.modot.org/business/standards_and_specs/standardplans.htm

EFFECTIVE: 04/01/2023

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION

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606.01F	MEDIAN PIER PROTECTION	9	04/01/2021
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STANDARD NO.	DRAWING TITLE	NO. OF SHEETS	EFFECTIVE DATE
606.40D	ONE-STRAND ACCESS RESTRAINT CABLE	2	07/01/2004
606.41M	THREE-STRAND GUARD CABLE	7	04/01/2021
606.50E	MIDWEST GUARDRAIL SYSTEM (MGS) *	8	01/01/2023
606.51	MIDWEST GUARDRAIL SYSTEM (MGS) - MEDIAN PIER PROTECTION	2	04/01/2021
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606.70B	MIDWEST GUARDRAIL SYSTEM (MGS) - THRIE BEAM RAIL ON BRIDGE	5	04/01/2018
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607.10V	CHAIN-LINK FENCE	1	02/01/2007
607.11H	CHAIN-LINK FENCE FOR RETAINING WALLS	1	06/01/2009
607.20G	WOVEN WIRE FENCE	2	07/01/2016
608.00K	PAVED APPROACHES	2	07/01/2020
608.10P	CONCRETE SIDEWALK	1	04/01/2015
608.20E	CONCRETE STAIRS	2	04/01/2015
608.30A	CONCRETE MEDIAN STRIP	1	10/01/2020
608.40A	HANDRAILING	4	01/01/2021
608.50A	CURB RAMPS *	4	01/01/2023
609.00Q	CONCRETE CURB, CURB AND GUTTER AND GUTTER *	2	10/01/2022
609.15D	PAVED DITCHES	1	07/01/2016
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609.60C	ROCK DITCH LINER	1	03/01/1993
609.70C	ROCK LINING FOR CULVERT OUTLET	1	10/01/1981
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614.30E	MANHOLE AND FRAME COVERS	2	07/01/1996
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617.20F	TEMPORARY CONCRETE TRAFFIC BARRIER	8	01/01/2021
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620.10G	TEMPORARY PAVEMENT MARKING	5	07/01/2017
625.00	HOLE PATTERN FOR PAVEMENT SLAB STABILIZATION	1	10/01/1998
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* REVISED OR ADDED SINCE JULY 2022

EFFECTIVE: 04/01/2023

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION
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703.11J	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (SQUARED)		3	01/01/2021
703.12J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE)		3	01/01/2021
703.13J	CONCRETE SINGLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)		3	01/01/2021
703.14J	CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE)		3	01/01/2021
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703.17	CONCRETE SINGLE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT		14	04/01/2011
703.37C	CONCRETE BOX CULVERT – EXTERIOR WING REINFORCEMENT		2	04/01/2011
703.38A	CONCRETE BOX CULVERT – CUTTING DETAILS		2	10/01/2009
703.40H	CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (SQUARE)		3	01/01/2021
703.41H	CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (SQUARE)		3	01/01/2021
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703.81H	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (SQUARE)		3	01/01/2021
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703.83H	CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE)		3	01/01/2021
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706.35H	BAR SUPPORTS FOR CONCRETE REINFORCEMENT		1	07/01/2004
712.40L	STEEL DAMS AT EXPANSION JOINTS		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
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731.10S	PRECAST DROP INLET		8	01/01/2022
732.00S	FLARED END SECTION		3	07/01/2021
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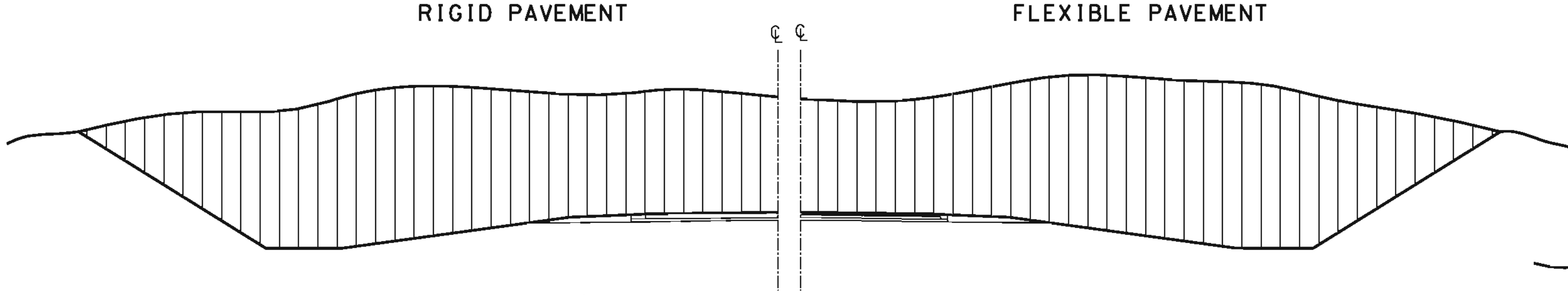
732.10H	SAFETY SLOPE END SECTION		3	01/01/2021
733.00	PRECAST CONCRETE BOX CULVERT TIES		1	07/01/2021
805.00	SEEDING	*	1	07/01/2022
806.10K	TEMPORARY EROSION CONTROL MEASURES	*	6	01/01/2023
808.00	TYPICAL PLANTING ILLUSTRATIONS		3	07/01/2004

STANDARD NO.	DRAWING TITLE		NO. OF SHEETS	EFFECTIVE DATE
901.00AB	HIGHWAY LIGHTING – POLES, FOUNDATION & APPURTENANCES FOR 30' M.H.		4	01/01/2021
901.01AJ	HIGHWAY LIGHTING – POLES, FOUNDATION & APPURTENANCES FOR 45' M.H.		6	01/01/2021
901.02B	HIGHWAY LIGHTING – CABLE, CONDUIT AND TRENCHING		1	04/01/2002
901.30F	HIGHWAY LIGHTING – BASE MOUNTED CONTROL STATION		2	04/01/2005
901.80D	HIGHWAY LIGHTING – POWER SUPPLY ASSEMBLY – SECONDARY SERVICE		2	04/01/2002
901.85B	HIGHWAY LIGHTING SYMBOLS		1	04/01/2018
902.00P	TRAFFIC SIGNALS		2	07/01/2018
902.05	TRAFFIC SIGNALS – ACCESSIBLE PEDESTRIAN SIGNALS		2	04/01/2021
902.10Q	TRAFFIC SIGNALS – CONTROLLERS CONDUIT LOCATION		1	04/01/2005
902.15K	TRAFFIC SIGNALS – POWER SUPPLY ASSEMBLY		3	07/01/2004
902.20G	TRAFFIC SIGNALS – CONCRETE PULL BOXES		3	04/01/2019
902.21C	TRAFFIC SIGNALS – TELEPHONE INTERCONNECT		1	03/01/1996
902.30P	TRAFFIC SIGNALS – POST BASES		2	07/01/2019
902.40R	TRAFFIC SIGNALS – TUBULAR STEEL POSTS		3	04/01/2018
902.50M	TRAFFIC SIGNALS – INDUCTION LOOP DETECTORS		2	04/01/2020
902.70Q	TRAFFIC SIGNALS – RIGID SPAN WIRE DETAILS		3	01/01/2022
902.80L	TRAFFIC SIGNALS – TRAFFIC SIGNAL SYMBOLS		1	04/01/2020
903.01J	STANDARD ARROW DETAILS		2	10/01/2016
903.02AP	HIGHWAY SIGNING		8	10/01/2019
903.03BR	POST INSTALLATION AND SIGN MOUNTING DETAILS	*	16	04/01/2023
903.04F	HIGHWAY SIGNING – WEIGH STATION		1	02/01/2012
903.05L	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE S, ONE TUBE	*	2	10/01/2022
903.06L	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE S, TWO TUBE	*	2	10/01/2022
903.07L	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE C	*	2	10/01/2022
903.08K	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE B	*	2	10/01/2022
903.10BD	OVERHEAD SIGN TRUSSES – ALUMINUM		6	01/01/2021
903.12AA	OVERHEAD SIGN TRUSSES – BUTTERFLY AND CANTILEVER STRUCTURAL STEEL		7	01/01/2021
903.60AC	OVERHEAD SIGN TRUSSES – STRUCTURAL STEEL		5	01/01/2021

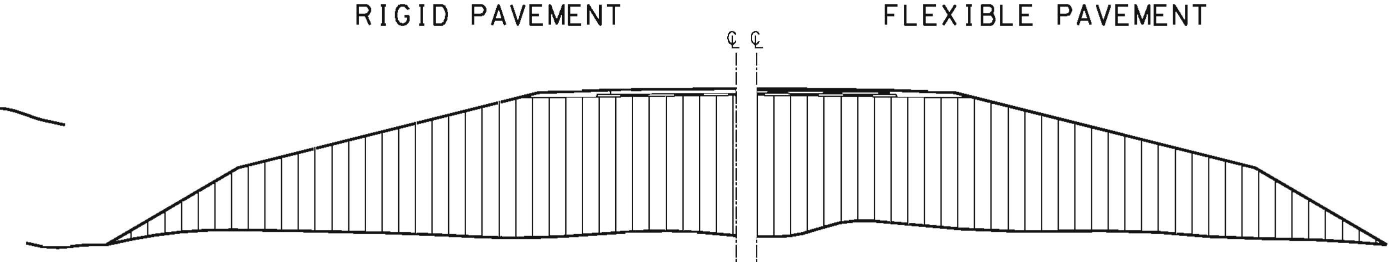
* REVISED OR ADDED SINCE JULY 2022



SOLID AREA INDICATES ADDITIONAL AREA TO BE ADDED TO PAY LIMITS WHERE STABILIZED SHOULDERS ARE USED.

SOLID AREA INDICATES ADDITIONAL AREA TO BE ADDED TO PAY LIMITS WHERE FULL WIDTH BASE IS USED.

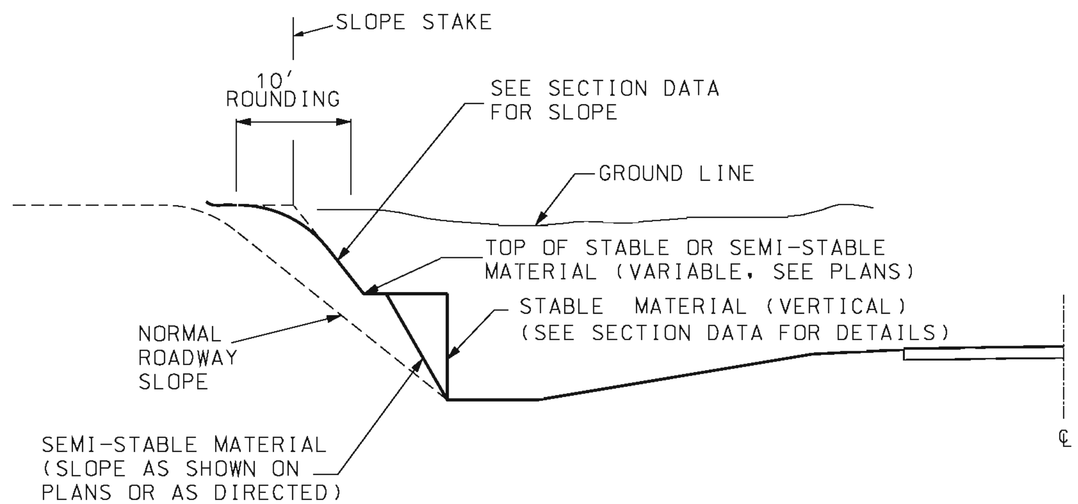
EXCAVATION PAY LIMITS



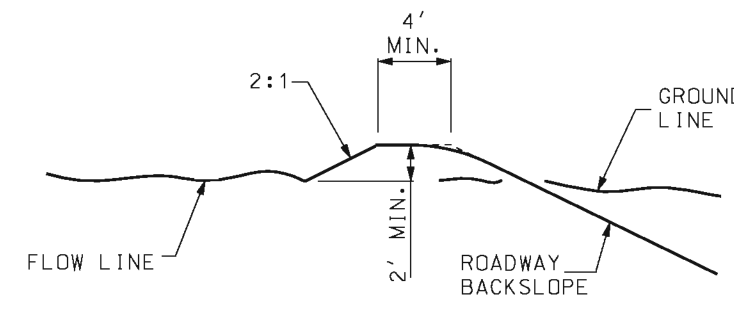
SOLID AREA INDICATES ADDITIONAL EMBANKMENT WHERE STABILIZED SHOULDERS ARE NOT USED.

SOLID AREA INDICATES ADDITIONAL EMBANKMENT WHERE FULL WIDTH BASE IS NOT USED.

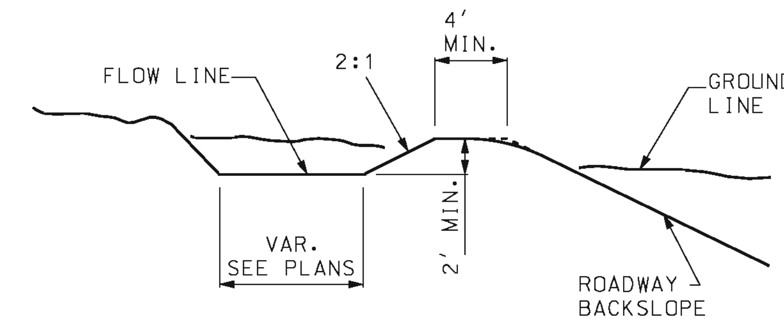
EMBANKMENT LIMITS



BACKSLOPES IN STABLE AND SEMI-STABLE MATERIAL



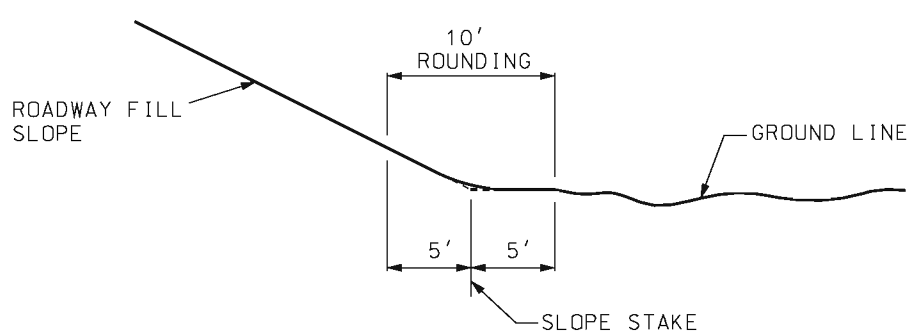
LEVEE



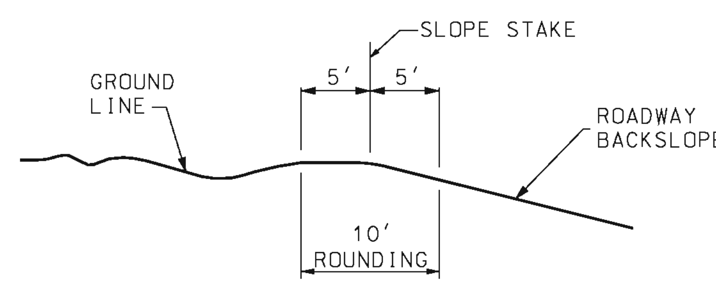
LEVEE AND DITCH

LEVEE AND/OR DITCH MAY BE LOCATED BACK OF BACKSLOPE WHEN CONDITIONS REQUIRE. USE DITCH ONLY WHERE INDICATED OR WHERE REQUIRED FOR DRAINAGE.

INTERCEPTION DITCH AND/OR LEVEE



AT TOE OF ROADWAY FILL SLOPE



AT TOP OF ROADWAY BACKSLOPES

PARABOLIC ROUNDING

GENERAL NOTES:

SUBSURFACE LOGS OF MATERIALS OBTAINED DURING THE SOIL SURVEY FOR THE PURPOSE OF CUT CLASSIFICATION MAY BE ACQUIRED FROM THE DISTRICT OFFICE UPON REQUEST.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

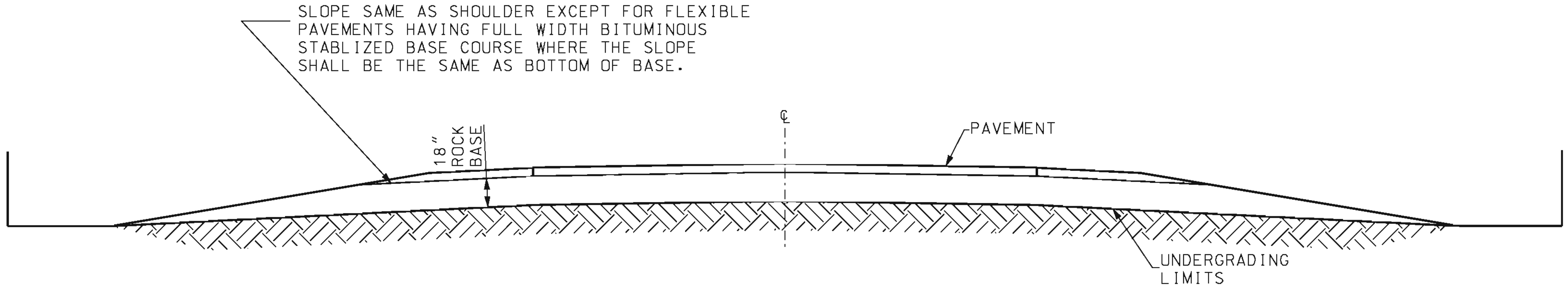
EXCAVATION AND EMBANKMENT

TYPICAL DETAILS

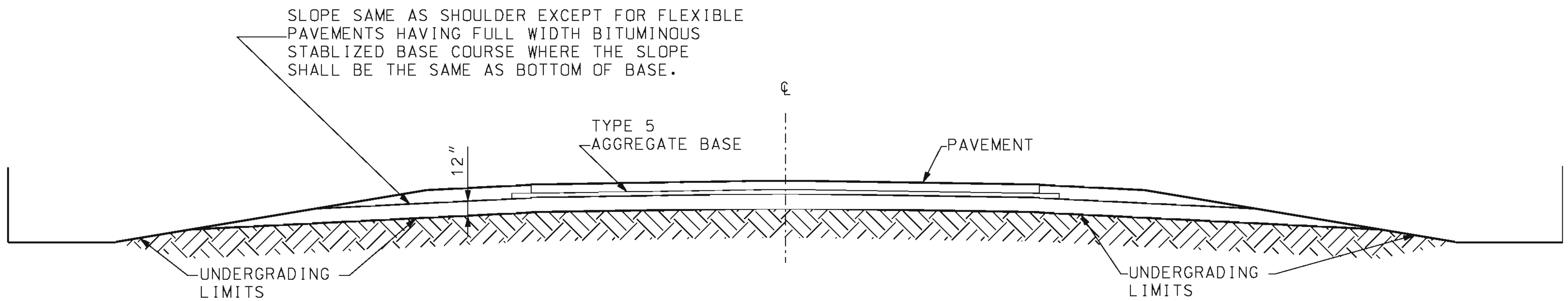
DATE EFFECTIVE: 08/01/1998
DATE PREPARED: 8/21/2009

203.00E

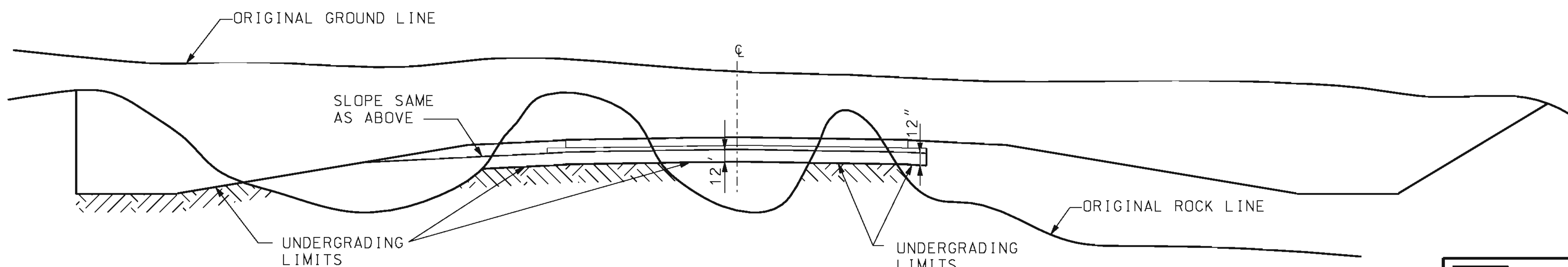
SHEET NO. 1 OF 1



IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH 18" ROCK BASE



IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH TYPE 5 AGGREGATE BASE



IN ROCK OVER PARTIAL WIDTH OF ROADBED

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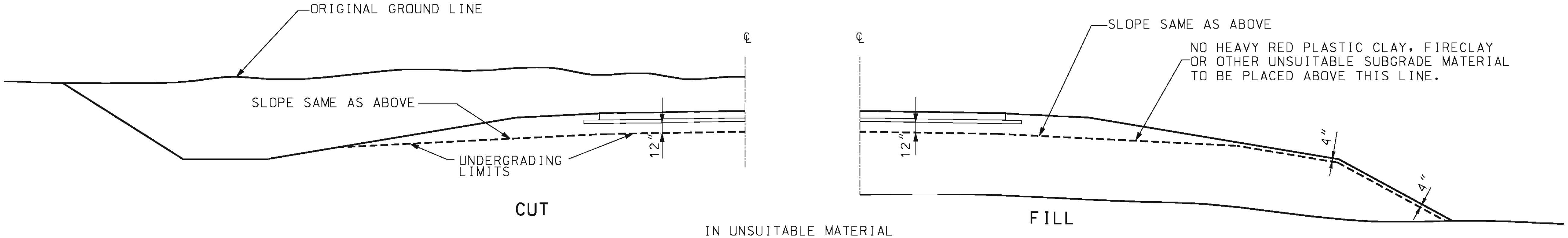
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

UNDERGRADING
TYPICAL DETAILS

DATE EFFECTIVE: 01/01/2004
DATE PREPARED: 8/21/2009

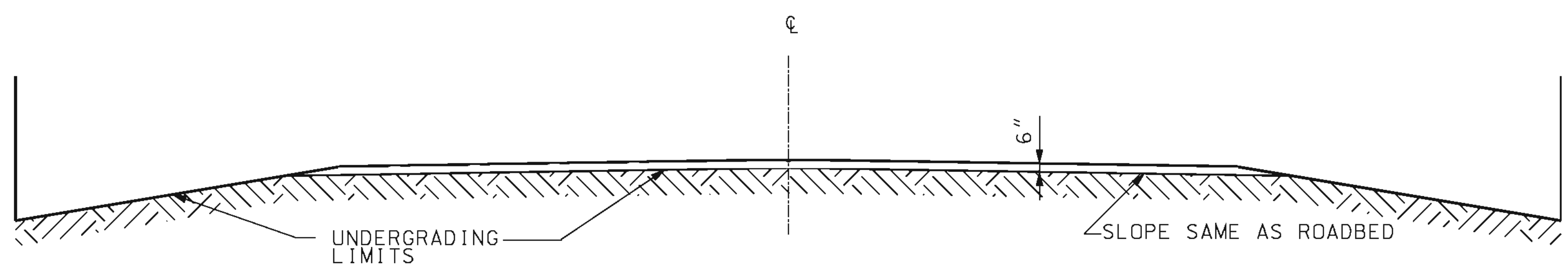
203.02F

SHEET NO. 1 OF 2



IN UNSUITABLE MATERIAL

UNDERGRADING LIMITS
(FLEXIBLE OR RIGID PAVEMENTS)



(IN ROCK OR UNSUITABLE MATERIAL)

UNDERGRADING LIMITS
(EARTH OR AGGREGATE TYPE SURFACE)

GENERAL NOTES:

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
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THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

UNDERGRADING
TYPICAL DETAILS

DATE EFFECTIVE: 01/01/2004
DATE PREPARED: 8/21/2009

203.02F

SHEET NO. 2 OF 2

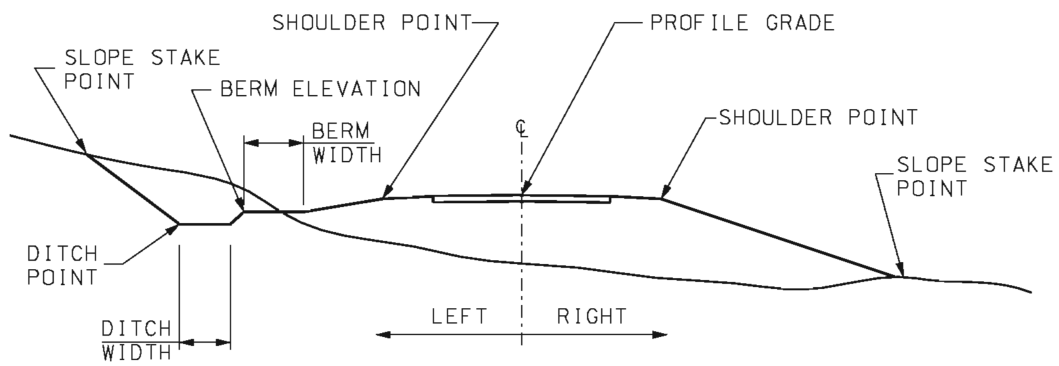


FIGURE A

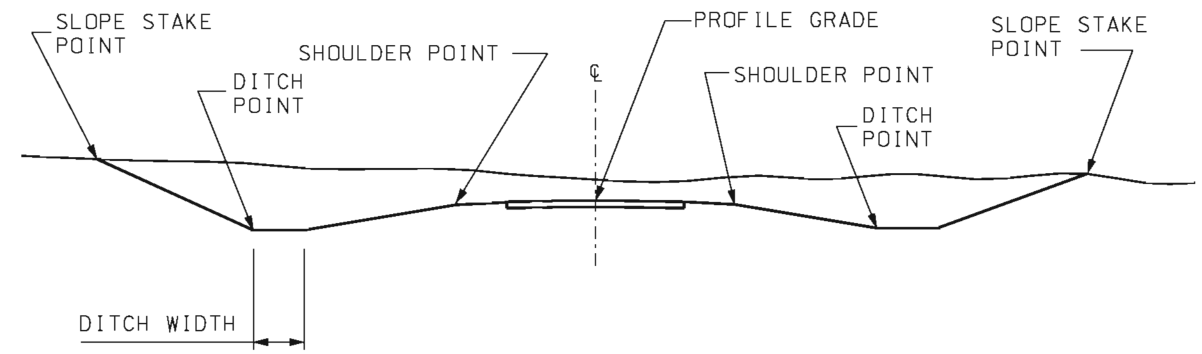


FIGURE B

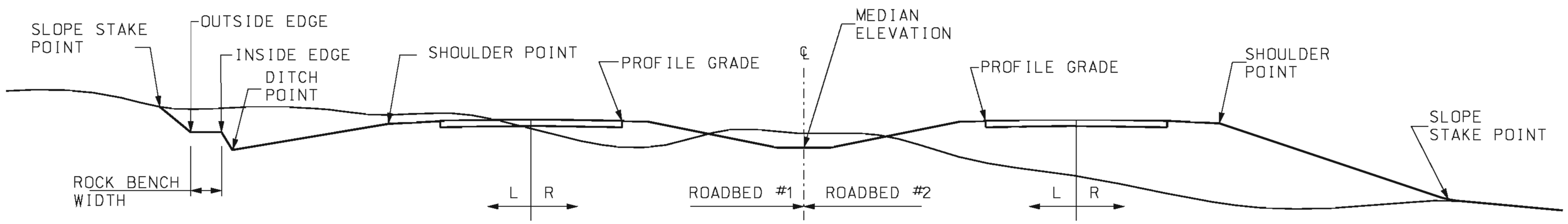


FIGURE C

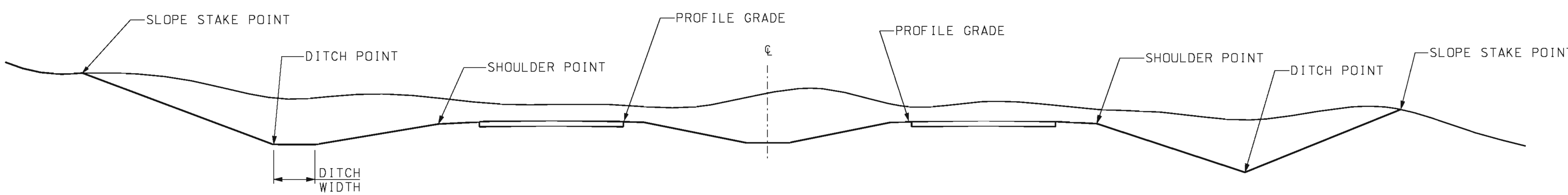
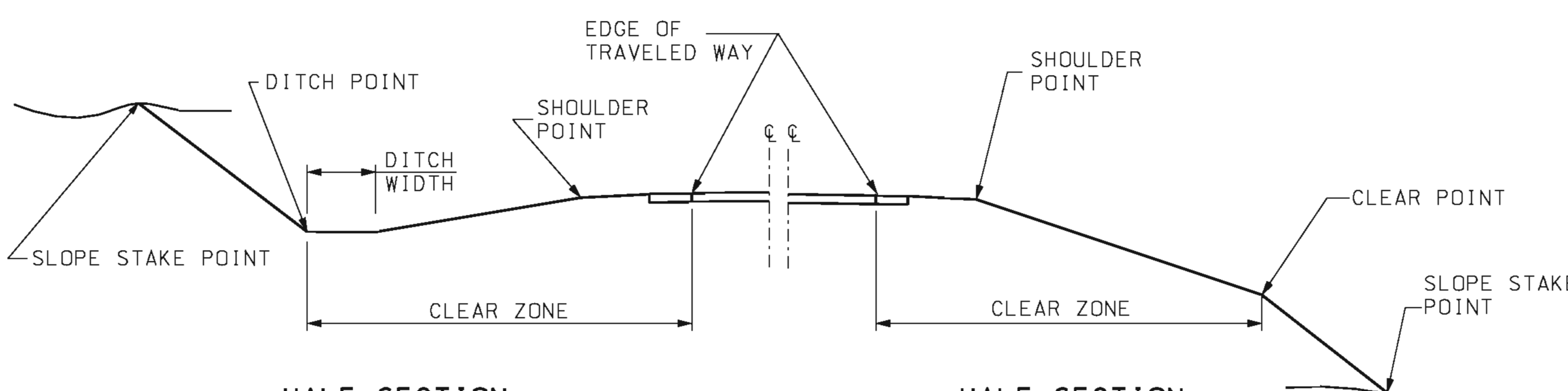


FIGURE D



HALF SECTION CUT

FIGURE E

HALF SECTION CUT

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

MoDOT

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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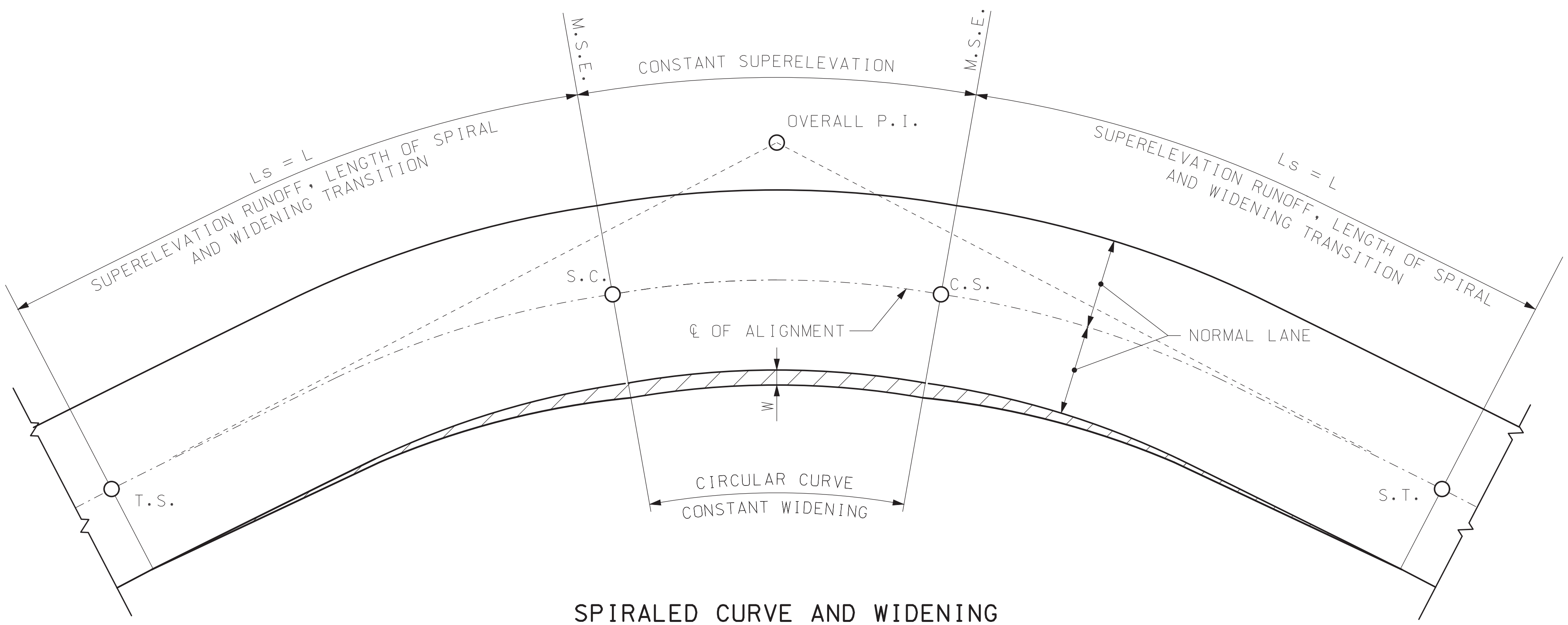
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

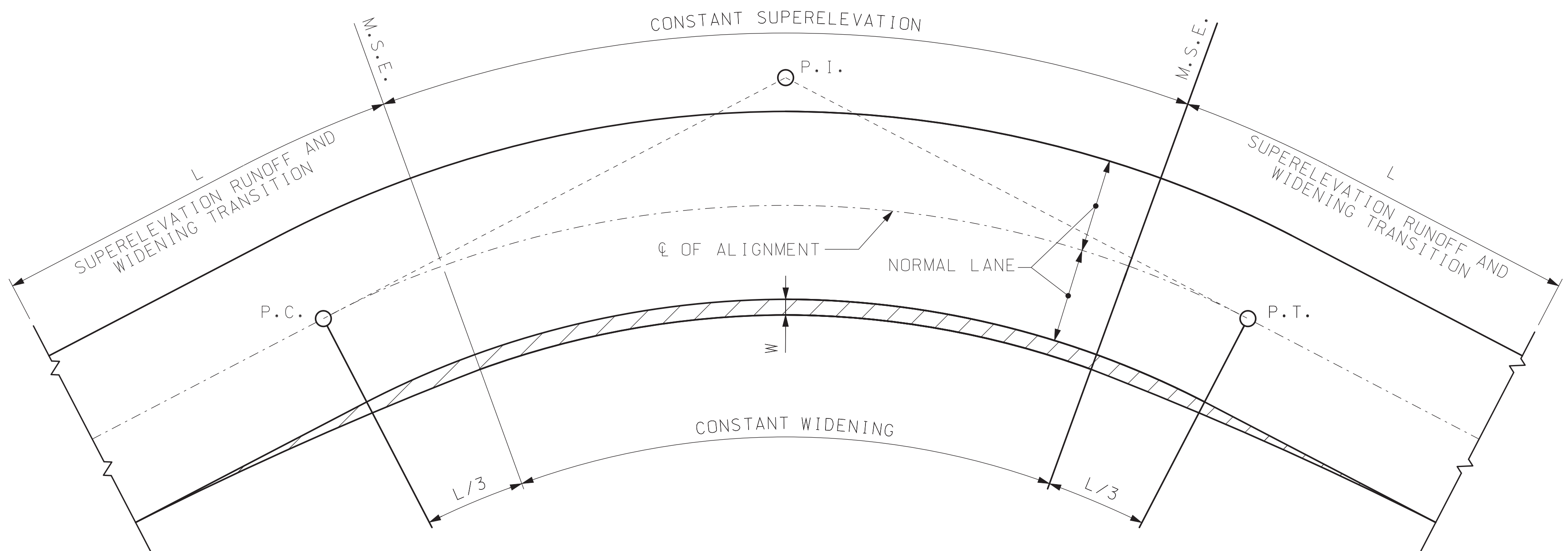
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TABULATED EARTHWORK AND SECTION DATA

DATE EFFECTIVE:	02/01/2009	203.10D	SHEET NO. 1 OF 1
DATE PREPARED:	12/18/2008		



SPIRALED CURVE AND WIDENING
TRANSITIONS



SUPERELEVATION RUNOFF AND
WIDENING TRANSITIONS WITHOUT
SPIRALS

MULTILANE FACTORS FOR "L"
1.0 LANE ROTATED (2 LANE ROADBED) = 1.00
1.5 LANE ROTATED (3 LANE ROADBED) = 1.25
2.0 LANE ROTATED (4 LANE ROADBED) = 1.50
2.5 LANE ROTATED (5 LANE ROADBED) = 1.75
3.0 LANE ROTATED (6 LANE ROADBED) = 2.00
3.5 LANE ROTATED (7 LANE ROADBED) = 2.25

MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION	
DESIGN SPEED	MAXIMUM RADIUS (FT)
30	456
35	620
40	810
45	1025
50	1265
55	1531
60	1822
65	2138
70	2479

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.

GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDERS, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.

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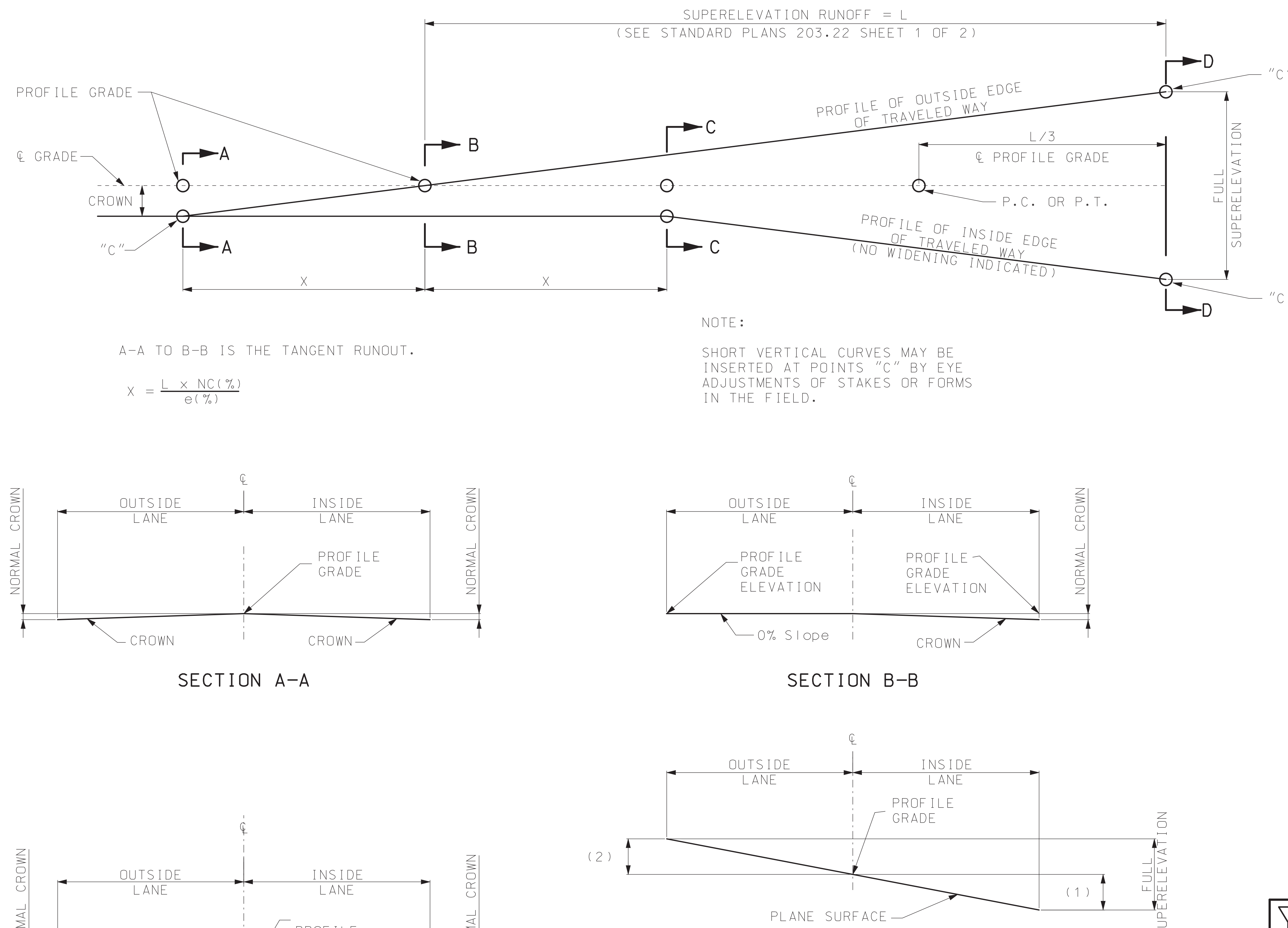
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SUPERELEVATION SPIRALS AND WIDENING
UNDIVIDED HIGHWAYS

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

203.20G



A-A TO B-B IS THE TANGENT RUNOUT.

$$X = \frac{L \times NC(\%)}{e(\%)}$$

NOTE:

SHORT VERTICAL CURVES MAY BE INSERTED AT POINTS "C" BY EYE ADJUSTMENTS OF STAKES OR FORMS IN THE FIELD.

SECTION A-A

SECTION B-B

SECTION C-C

(1) FULL S.E. FOR ½ PAVEMENT WIDTH IF GREATER THAN CROWN SLOPE.

(2) FULL S.E. FOR ½ PAVEMENT WIDTH.

SECTION D-D

CASE NUMBER 1

(WHERE HIGH POINT OF TRAVELED WAY IS AT CENTERLINE ON TANGENT SECTION)
NOTE: USE FOR 2 LANE TRAFFIC ROADS ONLY. PAVEMENT REVOLVED ABOUT ITS ℄.

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SUPERELEVATION SPIRALS AND WIDENING
UNDIVIDED HIGHWAYS

DATE EFFECTIVE: 07/01/2017
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203.20G

NOTE:
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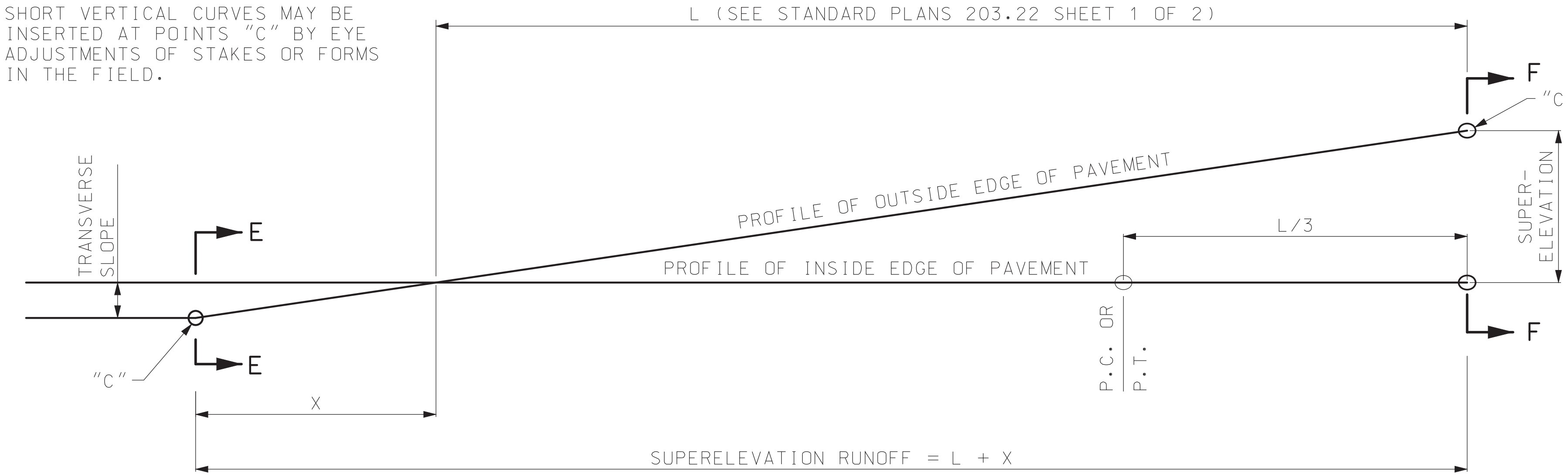
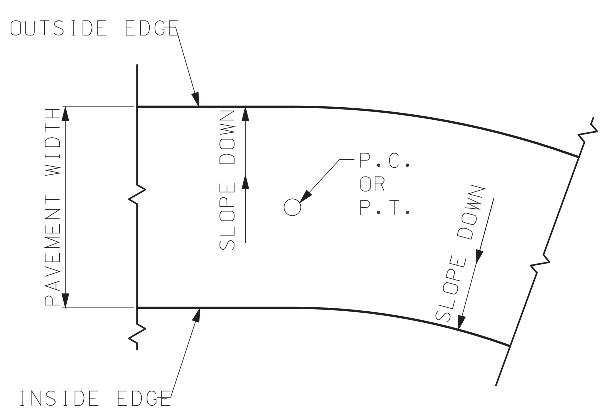
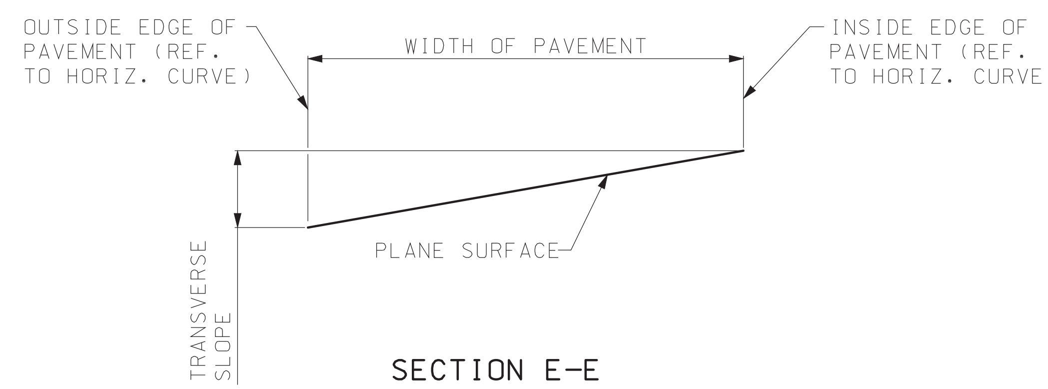
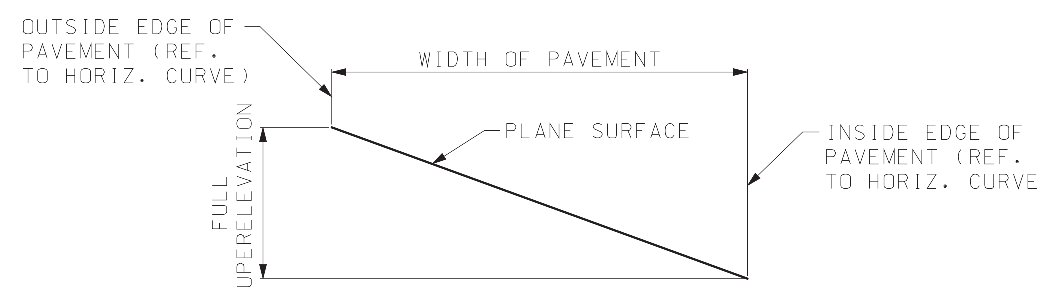




PLAN OF ALIGNMENT
FOR CASE NUMBER 2



SECTION E-E



SECTION F-F

CASE NUMBER 2

(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS OPPOSITE TO SLOPE OF SUPERELEVATION)
NOTE: PAVEMENT REVOLVED ABOUT ITS INSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

STRAIGHT LINE METHODS OF ATTAINING SUPERELEVATION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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STATE OF MISSOURI
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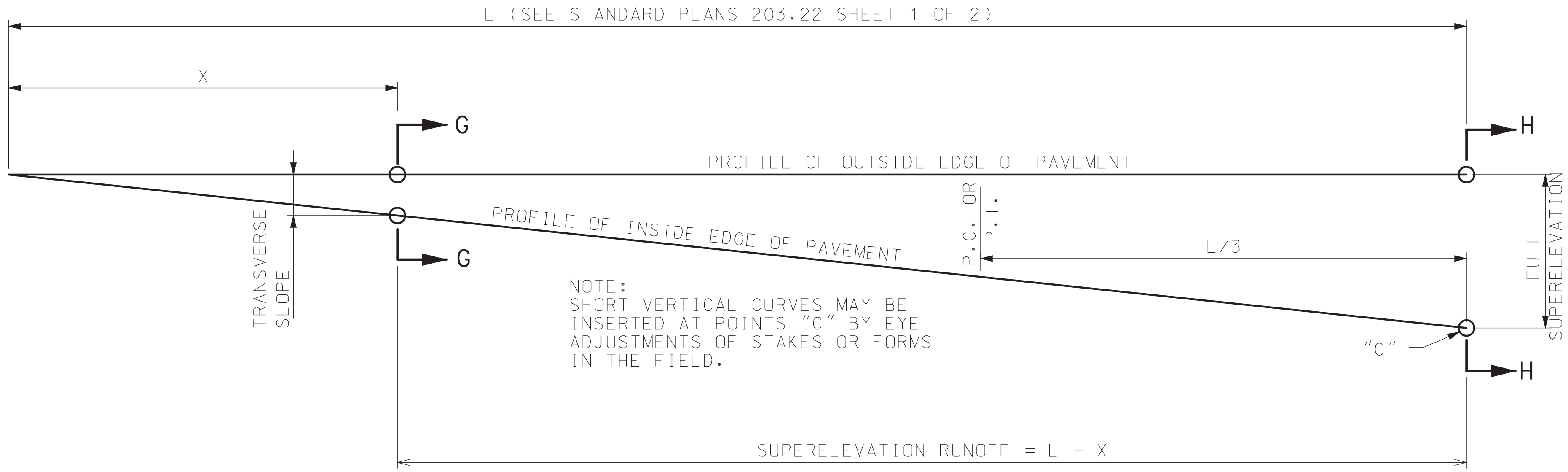
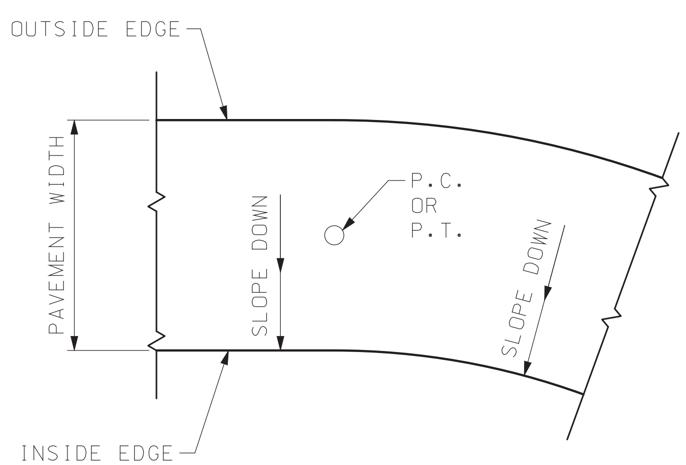
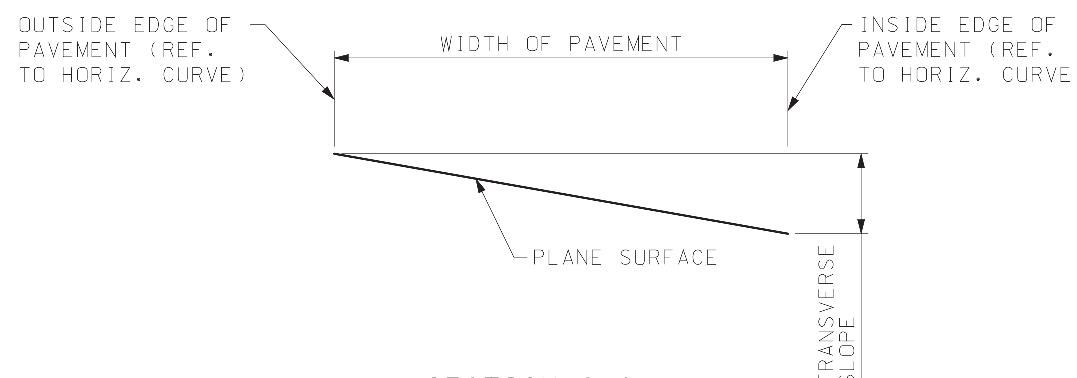
SUPERELEVATION
SPIRALS AND WIDENING
UNDIVIDED HIGHWAYS

DATE EFFECTIVE:	07/01/2017	203.20G	SHEET NO.
DATE PREPARED:	5/1/2017		3 OF 4

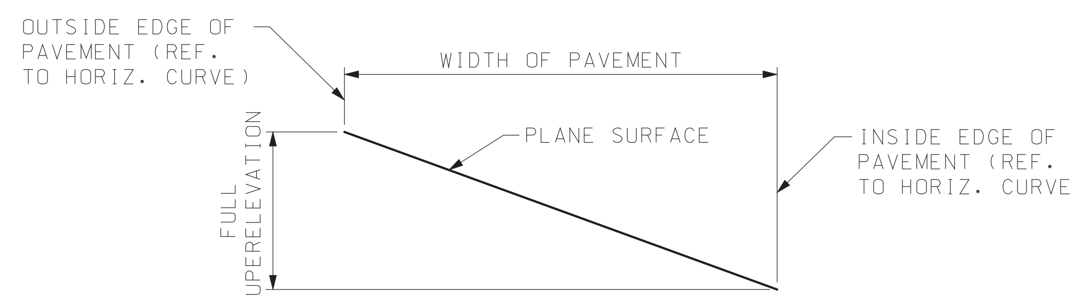




PLAN OF ALIGNMENT
FOR CASE NUMBER 3



SECTION G-G



SECTION H-H

CASE NUMBER 3

(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS SAME DIRECTION AS SLOPE OF SUPERELEVATION)
NOTE: PAVEMENT REVOLVED ABOUT ITS OUTSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

STRAIGHT LINE METHOD OF ATTAINING SUPERELEVATION

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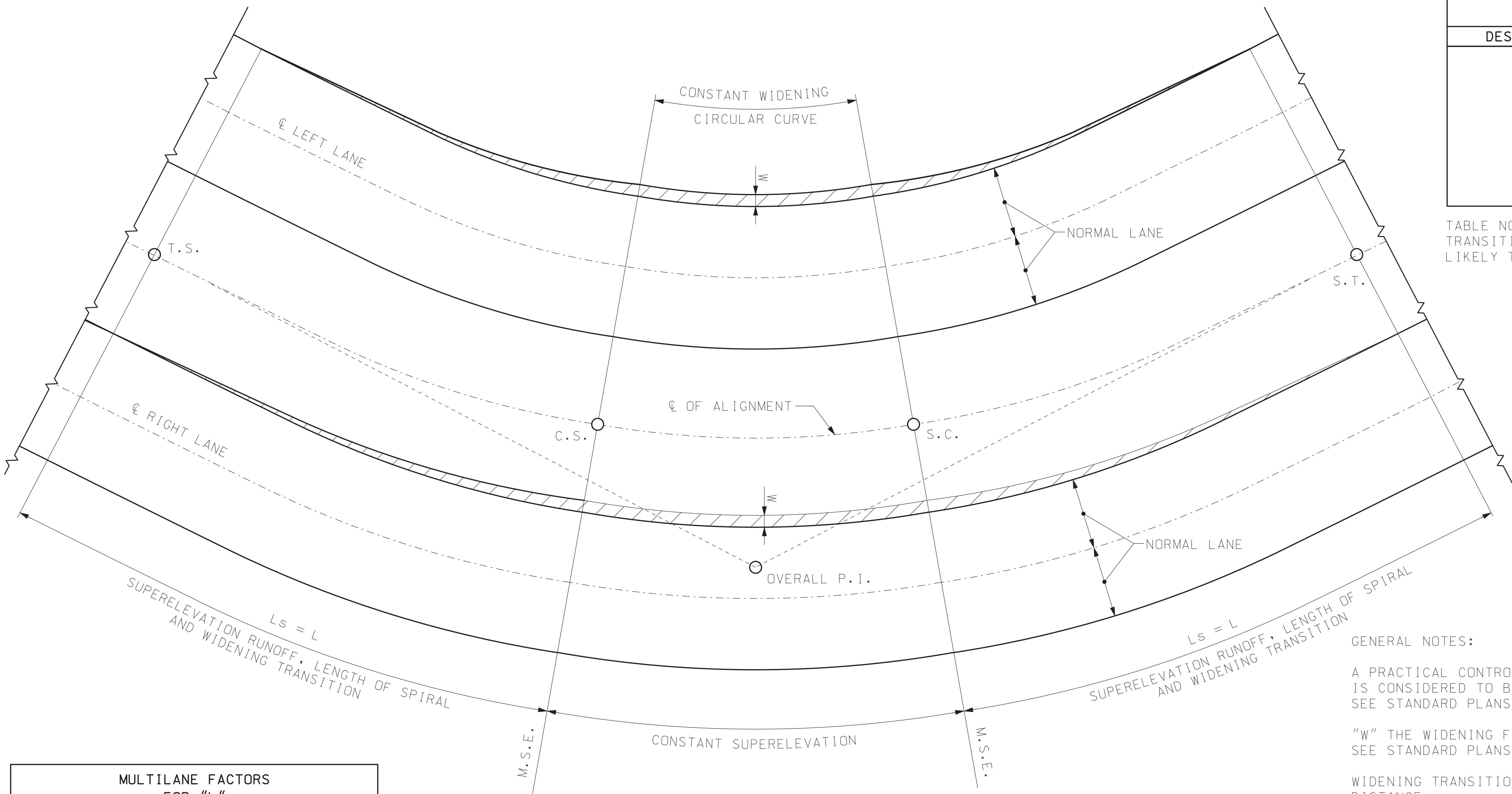
SUPERELEVATION
SPIRALS AND WIDENING
UNDIVIDED HIGHWAYS

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

203.20G

SHEET NO.
4 OF 4



SPIRALED CURVE AND WIDENING TRANSITIONS

MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION	
DESIGN SPEED	MAXIMUM RADIUS (FT)
30	456
35	620
40	810
45	1025
50	1265
55	1531
60	1822
65	2138
70	2479

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.

GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDER, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

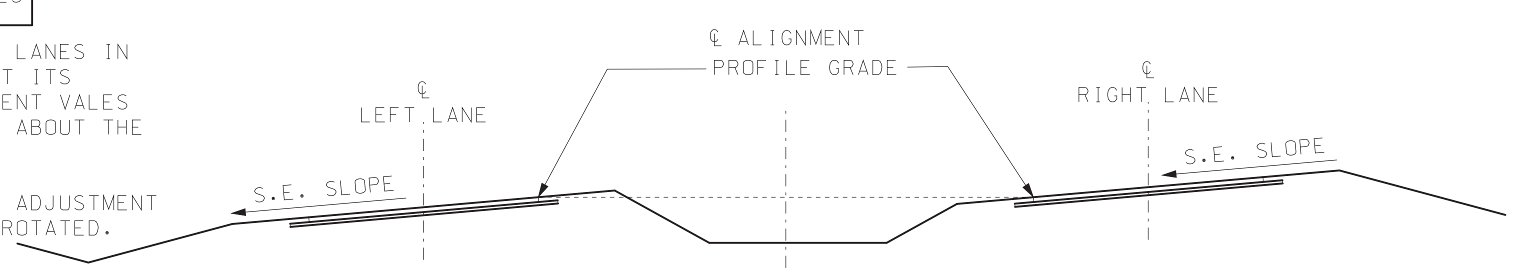
WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.

MULTILANE FACTORS FOR "L"
1.0 LANE ROTATED (2 LANE ROADBED) = 1.00
1.5 LANE ROTATED (3 LANE ROADBED) = 1.25
2.0 LANE ROTATED (4 LANE ROADBED) = 1.50
2.5 LANE ROTATED (5 LANE ROADBED) = 1.75
3.0 LANE ROTATED (6 LANE ROADBED) = 2.00
3.5 LANE ROTATED (7 LANE ROADBED) = 2.25

EXAMPLE: A SIX LANE DIVIDED HIGHWAY (3 LANES IN EACH DIRECTION) ROTATED SEPARATELY ABOUT ITS MEDIAN EDGES WOULD USE THE SAME ADJUSTMENT VALES AS A SIX LANE UNDIVIDED HIGHWAY ROTATED ABOUT THE CENTERLINE.

BOTH CASES WOULD USE THE 3 LANE ROTATED ADJUSTMENT VALUE OF 2 TIMES THE VALUE OF ONE LANE ROTATED.



SECTION ON SUPERELEVATED CURVE

CURVE TO LEFT (ILLUSTRATED)

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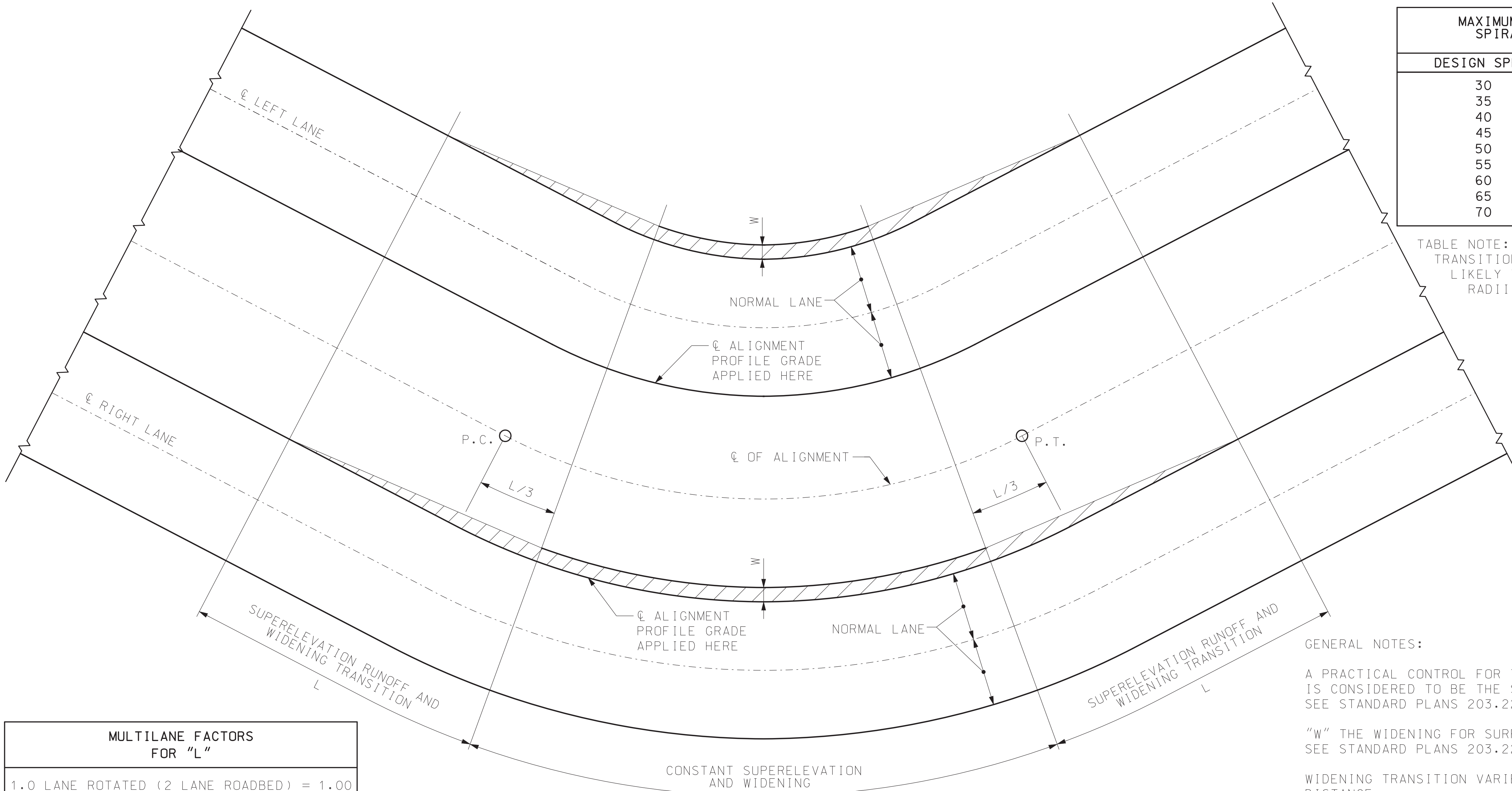
SUPERELEVATION, SPIRALS AND WIDENING
DIVIDED HIGHWAYS

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017
203.21K

MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION	
DESIGN SPEED	MAXIMUM RADIUS (FT)
30	456
35	620
40	810
45	1025
50	1265
55	1531
60	1822
65	2138
70	2479

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.



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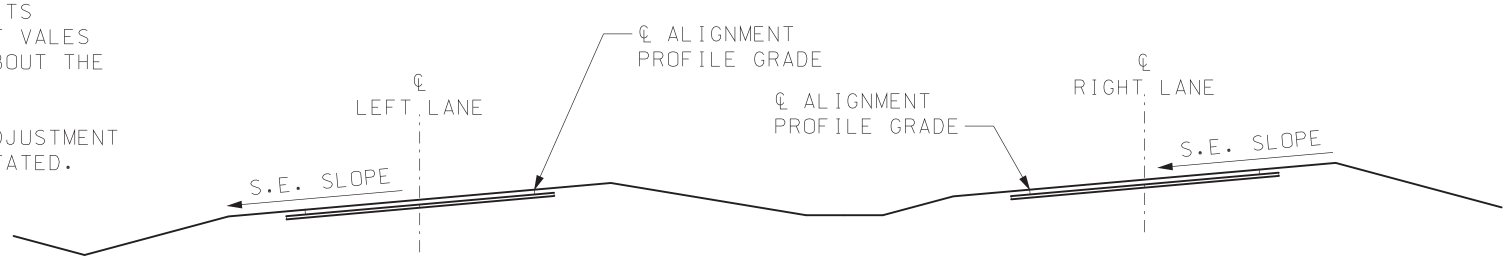
EXAMPLE: A SIX LANE DIVIDED HIGHWAY (3 LANES IN EACH DIRECTION) ROTATED SEPARATELY ABOUT ITS MEDIAN EDGES WOULD USE THE SAME ADJUSTMENT VALES AS A SIX LANE UNDIVIDED HIGHWAY ROTATED ABOUT THE CENTERLINE.

BOTH CASES WOULD USE THE 3 LANE ROTATED ADJUSTMENT VALUE OF 2 TIMES THE VALUE OF ONE LANE ROTATED.

SUPERELEVATION RUNOUT WITHOUT SPIRALS



SECTION ON SUPERELEVATED CURVE

CURVE TO LEFT (ILLUSTRATED)

GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDER, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

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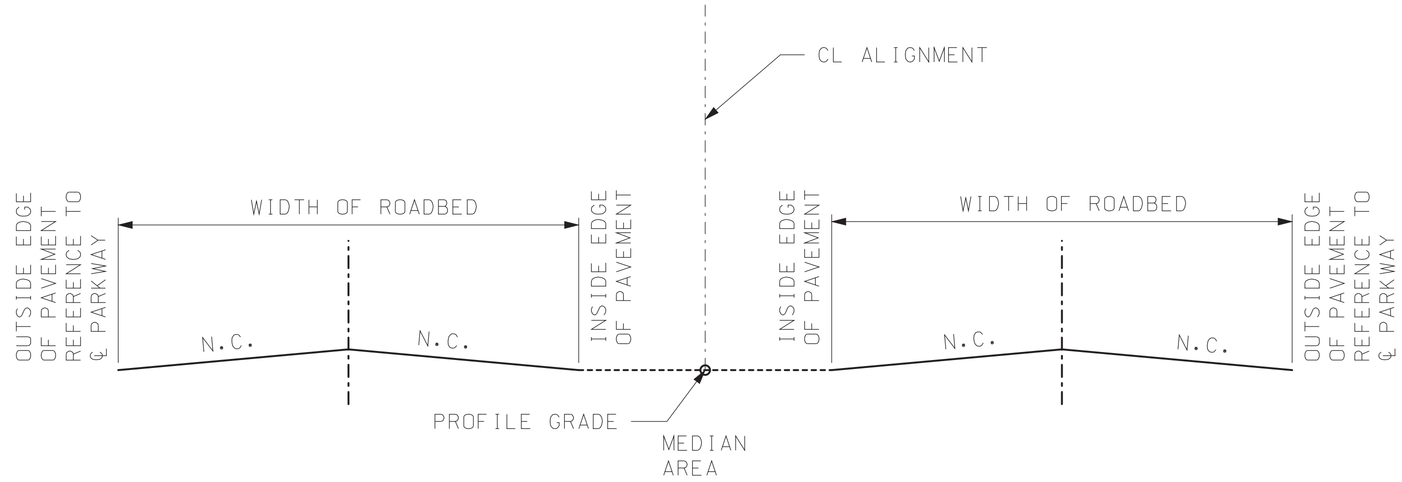
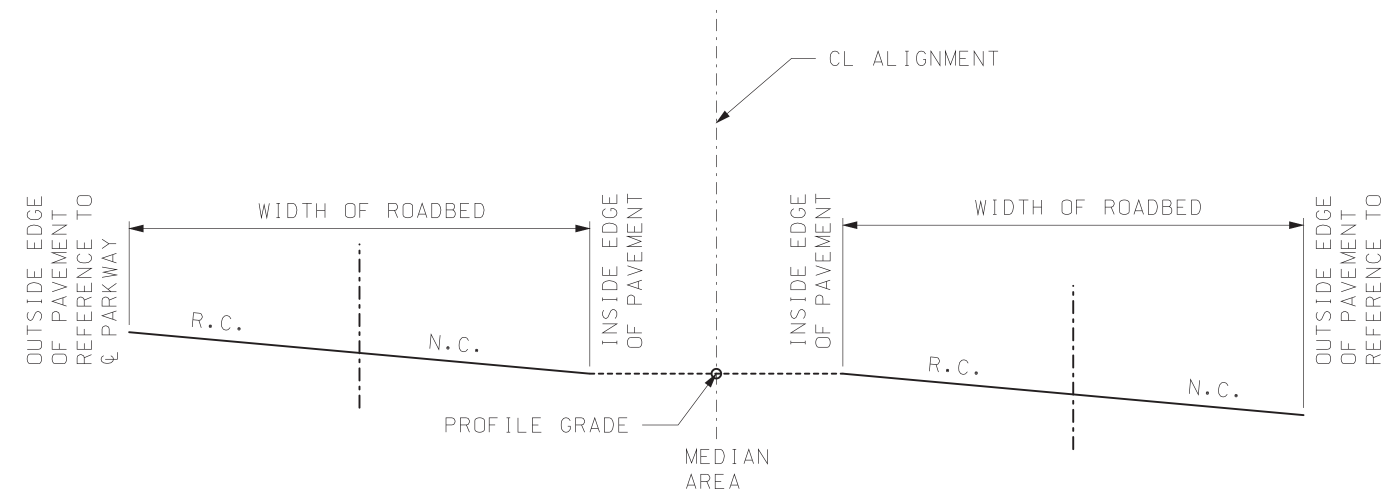
SUPERELEVATION, SPIRALS AND WIDENING
DIVIDED HIGHWAYS

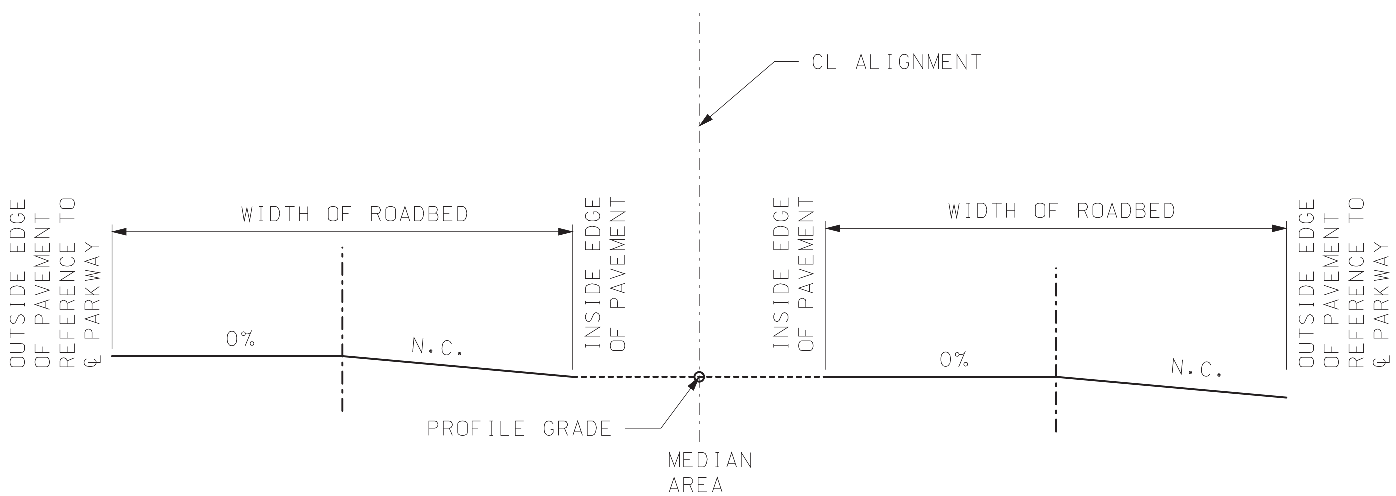
DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017
203.21K



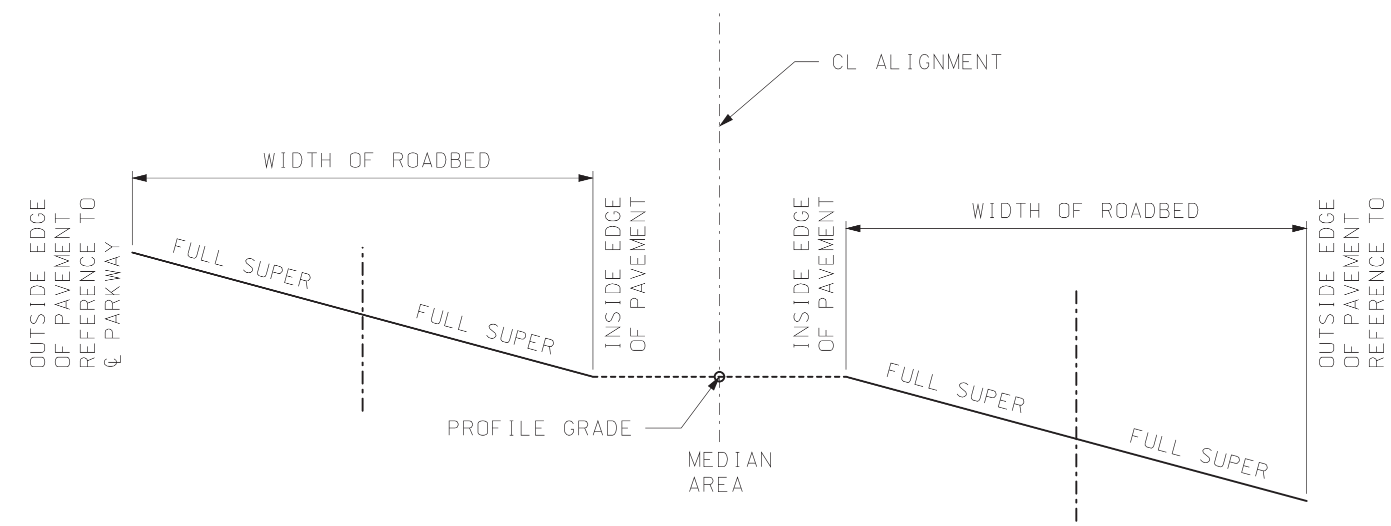
SECTION A-A



SECTION C-C
(CURVE TO RIGHT)



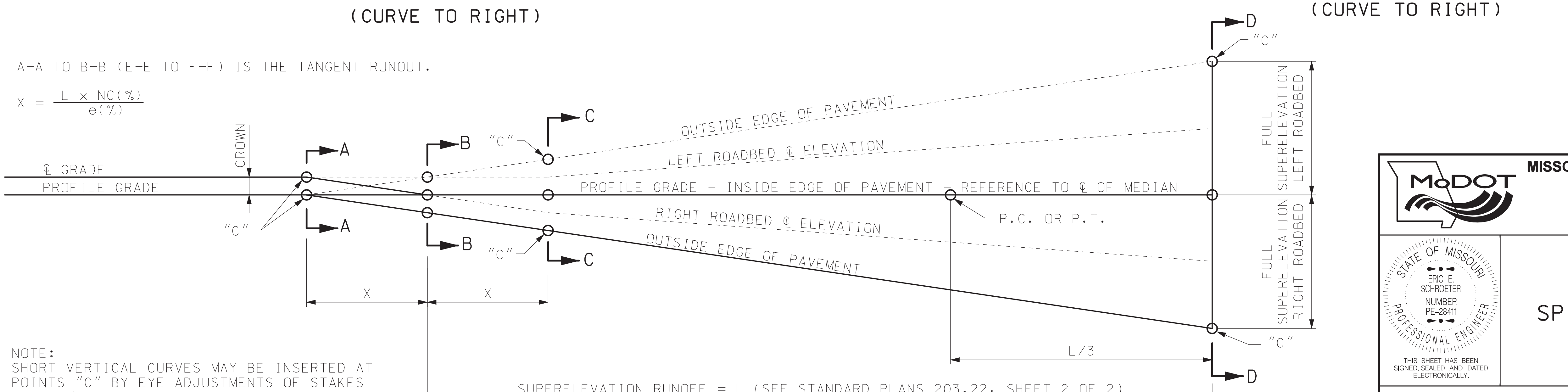
SECTION B-B
(CURVE TO RIGHT)



SECTION D-D
(CURVE TO RIGHT)

A-A TO B-B (E-E TO F-F) IS THE TANGENT RUNOUT.

$$X = \frac{L \times NC(\%)}{e(\%)}$$



NOTE:
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SUPERELEVATION, SPIRALS AND WIDENING
DIVIDED HIGHWAYS

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

203.21K

SHEET NO. 3 OF 3

MINIMUM RADII FOR DESIGN SUPERELEVATION RATES, DESIGN SPEEDS, AND e_{max} = 4%

e%	DESIGN SPEED (MPH) 30			35			40			45			50			55			60		
	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2
NC	2,830	0	0	3,730	0	0	4,770	0	0	5,930	0	0	7,220	0	0	8,650	0	0	10,300	0	0
RC	1,880	36	55	2,490	39	58	3,220	41	62	4,040	44	67	4'940	48	72	5,950	51	77	7,080	53	80
2.2	1,580	40	60	2,120	43	64	2,760	46	58	3,480	49	73	4,280	53	79	5,180	56	84	6,190	59	88
2.4	1,270	44	65	1,760	46	70	2,340	50	74	2,980	53	80	3,690	58	86	4,500	61	92	5,410	64	96
2.6	1,000	47	71	1,420	50	75	1,930	54	81	2,490	58	87	3,130	62	94	3,870	66	100	4,700	69	104
2.8	817	51	76	1,170	54	81	1,620	58	87	2,100	62	93	2,660	67	101	3,310	71	107	4,060	75	112
3.0	681	55	82	982	58	87	1,370	62	93	1,800	67	100	2,290	72	108	2,860	77	115	3,530	80	120
3.2	576	58	87	835	62	93	1,180	66	99	1,550	71	107	1,980	77	115	2,490	82	123	3,090	85	128
3.4	490	62	93	714	66	99	1,010	70	106	1,340	76	113	1,720	82	122	2,170	87	130	2,700	91	136
3.6	416	65	98	610	70	105	865	74	112	1,150	80	120	1,480	86	130	1,880	92	138	2,350	96	144
3.8	348	69	104	512	74	110	730	79	118	970	84	127	1,260	91	137	1,600	97	146	2,010	101	152
4.0	250	73	109	371	77	116	533	83	124	711	89	133	926	96	144	1,190	102	153	1,500	107	160

MINIMUM RADII FOR DESIGN SUPERELEVATION RATES, DESIGN SPEEDS, AND e_{max} = 8%

e%	DESIGN SPEED (MPH) 30			35			40			45			50			55			60			65			70		
	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2
NC	3,240	0	0	4,260	0	0	5,410	0	0	6,710	0	0	8,150	0	0	9,720	0	0	11,500	0	0	12,900	0	0	14,500	0	0
RC	2,370	36	55	3,120	39	58	3,970	41	62	4,930	44	67	5,990	48	72	7,150	51	77	8,440	53	80	9,510	56	84	10,700	60	90
2.2	2,130	40	60	2,800	43	64	3,570	46	58	4,440	49	73	5,400	53	79	6,450	56	84	7,620	59	88	8,600	61	92	9,660	66	99
2.4	1,930	44	65	2,540	46	70	3,240	50	74	4,030	53	80	4,910	58	86	5,870	61	92	6,930	64	96	7,830	67	100	8,810	72	108
2.6	1,760	47	71	2,320	50	75	2,960	54	81	3,690	58	87	4,490	62	94	5,370	66	100	6,350	69	104	7,180	73	109	8,090	78	117
2.8	1,610	51	76	2,130	54	81	2,720	58	87	3,390	62	93	4,130	67	101	4,950	71	107	5,850	75	112	6,630	78	117	7,470	84	126
3.0	1,480	55	82	1,960	58	87	2,510	62	93	3,130	67	100	3,820	72	108	4,580	77	115	5,420	80	120	6,140	84	126	6,930	90	135
3.2	1,370	58	87	1,820	62	93	2,330	66	99	2,900	71	107	3,550	77	115	4,250	82	123	5,040	85	128	5,720	89	134	6,460	96	144
3.4	1,270	62	93	1,690	66	99	2,170	70	106	2,700	76	113	3,300	82	122	3,970	87	130	4,700	91	136	5,350	95	142	6,050	102	153
3.6	1,180	65	98	1,570	70	105	2,020	74	112	2,520	80	120	3,090	86	130	3,710	92	138	4,400	96	144	5,010	100	151	5,680	108	162
3.8	1,100	69	104	1,470	74	110	1,890	79	118	2,360	84	127	2,890	91	137	3,480	97	146	4,140	101	152	4,700	106	159	5,350	114	171
4.0	1,030	73	109	1,370	77	116	1,770	83	124	2,220	89	133	2,720	96	144	3,270	102	153	3,890	107	160	4,450	112	167	5,050	120	180
4.2	955	76	115	1,280	81	122	1,660	87	130	2,080	93	140	2,560	101	151	3,080	107	161	3,670	112	168	4,200	117	176	4,780	126	189
4.4	893	80	120	1,200	85	128	1,560	91	137	1,960	98	147	2,410	106	158	2,910	112	169	3,470	117	176	3,980	123	184	4,540	132	198
4.6	834	84	125	1,130	89	134	1,470	95	143	1,850	102	153	2,280	110	166	2,750	117	176	3,290	123	184	3,770	128	193	4,310	138	207
4.8	779	87	131	1,060	93	139	1,390	99	149	1,750	107	160	2,160	115	173	2,610	123	184	3,120	128	192	3,590	134	201	4,100	144	216
5.0	727	91	136	991	97	145	1,310	103	155	1,650	111	167	2,040	120	180	2,470	128	191	2,960	133	200	3,410	140	209	3,910	150	225
5.2	676	95	142	929	101	151	1,230	108	161	1,560	116	173	1,930	125	187	2,350	133	199	2,820	138	208	3,250	145	218	3,740	156	234
5.4	627	98	147	870	105	157	1,160	112	168	1,480	120	180	1,830	130	194	2,230	138	207	2,680	144	216	3,110	151	226	3,570	162	243
5.6	582	102	153	813	108	163	1,090	116	174	1,390	124	187	1,740	134	202	2,120	143	214	2,550	149	224	2,970	156	234	3,420	168	252
5.8	542	105	158	761	112	168	1,030	120	180	1,320	129	193	1,650	139	209	2,010	148	222	2,430	155	232	2,840	162	243	3,280	174	261
6.0	506	109	164	713	116	174	965	124	186	1,250	133	200	1,560	144	216	1,920	153	230	2,320	160	240	2,710	167	251	3,150	180	270
6.2	472	113	169	669	120	180	909	128	192	1,180	138	207	1,480	149	223	1,820	158	237	2,210	165	248	2,600	173	260	3,020	186	279
6.4	442	116	175	628	124	186	857	132	199	1,110	142	213	1,400	154	230	1,730	163	245	2,110	171	256	2,490	179	268	2,910	192	288
6.6	413	120	180	590	128	192	808	137	205	1,050	147	220	1,330	158	238	1,650	169	253	2,010	176	264	2,380	184	276	2,790	198	297
6.8	386	124	185	553	132	197	761	141	211	990	151	227	1,260	163	245	1,560	174	260	1,910	181	272	2,280	190	285	2,690	204	306
7.0	360	127	191	518	135	203	716	145	217	933	156	233	1,190	168	252	1,480	179	268	1,820	187	280	2,180	195	293	2,580	210	315
7.2	336	131	196	485	139	209	672	149	223	878	160	240	1,120	173	259	1,400	184	276	1,720	192	288	2,070	201	301	2,470	216	324
7.4	312	135	202	451	143	215	628	153	230	822	164	247	1,060	178	266	1,320	189	283	1,630	197	296	1,970	207	310	2,350	222	333
7.6	287	138	207	417	147	221	583	157	236	765	169	253	980	182	274	1,230	194	291	1,530	203	304	1,850	212	318	2,230	228	342
7.8	261	142	213	380	151	226	533	161	242	701	173	260	901	187	281	1,140	199	299	1,410	208	312	1,720	218	327	2,090	234	351
8.0	214	145	218	314	155	232	444	166	248	587	178	267	758	192	288	960	204	306	1,200	213	320	1,480	223	335	1,810	240	360

TABLE NOTES:

"NC" DENOTES NORMAL CROSS SLOPE.

"RC" DENOTES REMOVE ADVERSE CROSS SLOPE, SUPERELEVATE AT NORMAL CROSS SLOPE.

"e" DENOTES THE SUPERELEVATION IN PERCENT (%).

"L" THE LENGTH OF SUPERELEVATION RUNOFF AND WIDENING TRANSITION IN FEET FOR A 2 LANE ROADWAY.

THE L1 COLUMN IS FOR 1 LANE ROTATED
THE L2 COLUMN IS FOR 2 LANES ROTATED

1 LANE ROTATED IS TYPICALLY FOR A 2-LANE HIGHWAY
2 LANE ROTATED IS TYPICALLY FOR A 4-LANE HIGHWAY

WHEN USING ONE OF THE TABLES FOR A GIVEN RADIUS, INTERPOLATION IS NOT NECESSARY AS THE SUPERELEVATION RATE SHOULD BE DETERMINED FROM A RADIUS EQUAL TO, OR SLIGHTLY SMALLER THAN, THE REDII PROVIDED IN THE TABLE. THE RESULT IS A SUPERELEVATION RATE THAT IS ROUNDED UP TO THE NEAREST 0.2 OF A PERCENT.

EXAMPLE: A 50 MPH CURVE WITH A MAXIMUM SUPERELEVATION RATE OF 8 PERCENT, AND A RADIUS OF 1,910 FT, SHOULD USE THE RADIUS OF 1,830 FT TO OBTAIN A SUPERELEVATION RATE OF 5.4 PERCENT.

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.

SUPERELEVATION, SPIRALS AND WIDENING

DATE EFFECTIVE: 07/01/2018
DATE PREPARED: 5/3/2018

203.22

SHEET NO. 1 OF 2

"W"
CALCULATED AND DESIGN VALUES FOR TRAVELED WAY WIDENING ON OPEN HIGHWAY CURVES
(TWOLANE HIGHWAYS, ONE-WAY OR TWO-WAY)[WB-67 ADJUSTMENT]

CURVE RADIUS (FT)	24' ROADWAY WIDTH							22' ROADWAY WIDTH							20' ROADWAY WIDTH						
	DESIGN SPEED (MPH)							DESIGN SPEED (MPH)							DESIGN SPEED (MPH)						
	30	35	40	45	50	55	60	30	35	40	45	50	55	60	30	35	40	45	50	55	60
7000	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.8	1.8	1.9	1.9	2.0	2.1	2.1
6500	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.8	1.9	1.9	2.0	2.1	2.1	2.2
6000	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.8	0.9	1.0	1.0	1.1	1.2	1.2	1.8	1.9	2.0	2.0	2.1	2.2	2.3
5500	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.9	1.0	1.0	1.1	1.2	1.2	1.3	1.9	2.0	2.0	2.1	2.2	2.2	2.4
5000	0.1	0.1	0.1	0.2	0.2	0.3	0.5	1.0	1.0	1.1	1.2	1.2	1.3	1.4	2.0	2.0	2.1	2.2	2.2	2.3	2.5
4500	0.1	0.1	0.2	0.2	0.3	0.4	0.6	1.0	1.1	1.2	1.2	1.3	1.4	1.5	2.0	2.1	2.2	2.2	2.3	2.4	2.6
4000	0.1	0.2	0.3	0.3	0.4	0.5	0.7	1.1	1.2	1.3	1.3	1.4	1.5	1.6	2.1	2.2	2.3	2.3	2.4	2.5	2.7
3500	0.2	0.3	0.4	0.5	0.6	0.6	0.8	1.2	1.3	1.4	1.5	1.6	1.6	1.7	2.2	2.3	2.4	2.5	2.6	2.6	2.8
3000	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.4	2.5	2.5	2.6	2.7	2.8	2.9
2500	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.7	2.8	2.9	3.0	3.1	3.2	3.3
2000	0.9	1.1	1.2	1.3	1.4	1.5	1.6	1.9	2.1	2.2	2.3	2.4	2.5	2.6	2.9	3.1	3.2	3.3	3.4	3.5	3.6
1800	1.1	1.2	1.3	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.5	3.6	3.7	3.8
1600	1.3	1.4	1.5	1.7	1.8	1.9	2.0	2.3	2.4	2.5	2.7	2.8	2.9	3.0	3.3	3.4	3.5	3.7	3.8	3.9	4.0
1400	1.6	1.8	1.9	2.0	2.2	2.3	2.4	2.6	2.8	2.9	3.0	3.2	3.3	3.4	3.6	3.8	3.9	4.0	4.4	4.3	4.4
1200	2.0	2.1	2.2	2.4	2.5	2.7	2.8	3.0	3.1	3.2	3.4	3.5	3.7	3.8	4.0	4.1	4.2	4.4	4.5	4.7	4.8
1000	2.5	2.7	2.8	3.0	3.1	3.3	3.4	3.5	3.7	3.8	4.0	4.1	4.3	4.4	4.5	4.7	4.8	5.0	5.1	5.3	5.4
900	2.8	3.0	3.1	3.3	3.5	3.6		3.8	4.0	4.1	4.3	4.5	4.6		4.8	5.0	5.1	5.3	5.5	5.6	
800	3.2	3.4	3.6	3.8	4.0	4.1		4.2	4.4	4.6	4.8	5.0	5.1		5.2	5.4	5.6	5.8	6.0	6.1	
700	3.8	4.0	4.2	4.4	4.6			4.8	5.0	5.2	5.4	5.6			5.8	6.0	6.2	6.4	6.6		
600	4.5	4.7	4.9	5.1	5.3			5.5	5.7	5.9	6.1	6.3			6.5	6.7	6.9	7.1	7.3		
500	5.4	5.7	5.9	6.1				6.4	6.7	6.9	7.1				7.4	7.7	7.9	8.1			
450	6.1	6.3	6.6					7.1	7.3	7.6					8.1	8.3	8.6				
400	6.9	7.1	7.4					7.9	8.1	8.4					8.9	9.1	9.4				
350	7.9	8.1	8.4					8.9	9.1	9.4					9.9	10.1	10.4				
300	9.2	9.5						10.2	10.5						11.2	11.5					
250	11.2							12.2							13.2						
200	14.0							15.0							16.0						

TABLE NOTES:

"W" THE WIDENING IN FEET FOR SURFACING AT INSIDE SHOULDERS.

VALUES SHOWN ARE FOR WB-67 DESIGN VEHICLE AND REPRESENT WIDENING IN FEET.

VALUES LESS THAN 2.0 FEET MAY BE DISREGARDED.

FOR 3-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 1.5.

FOR 4-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 2.0.

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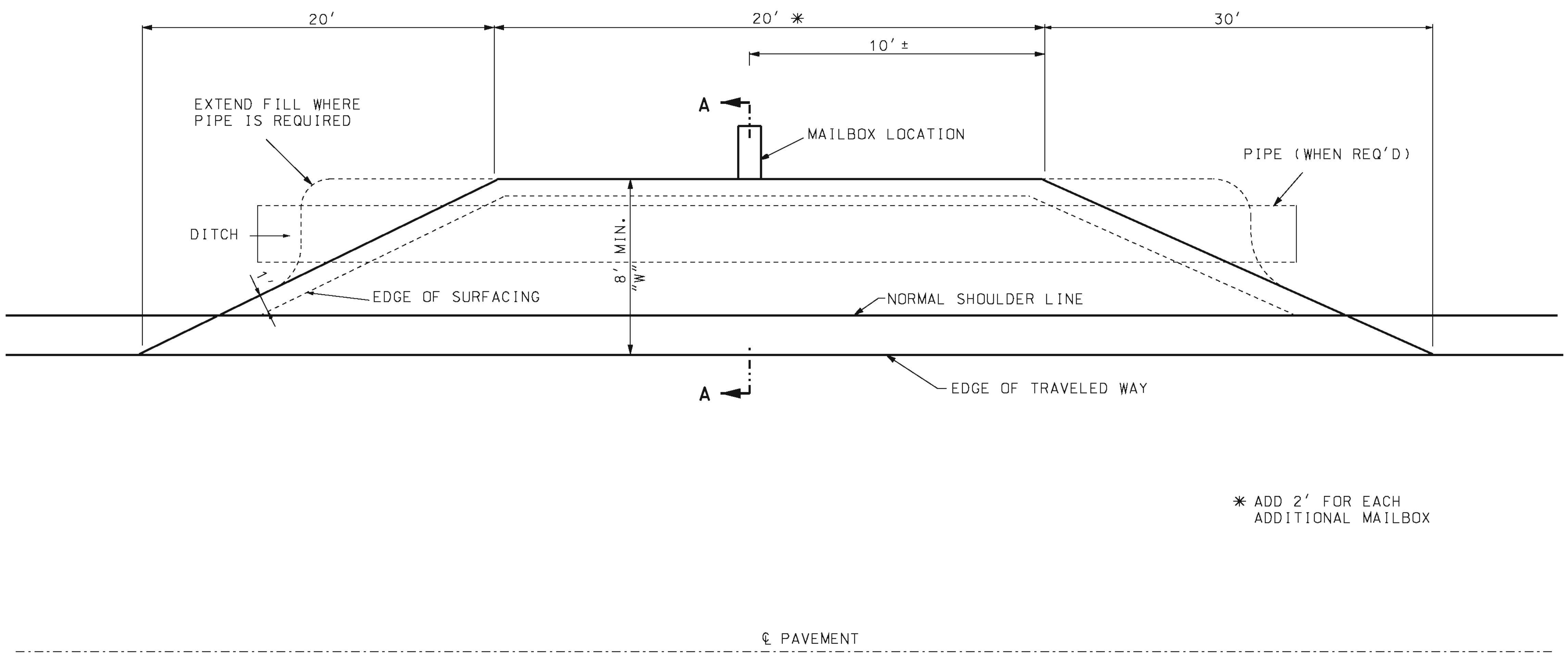
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

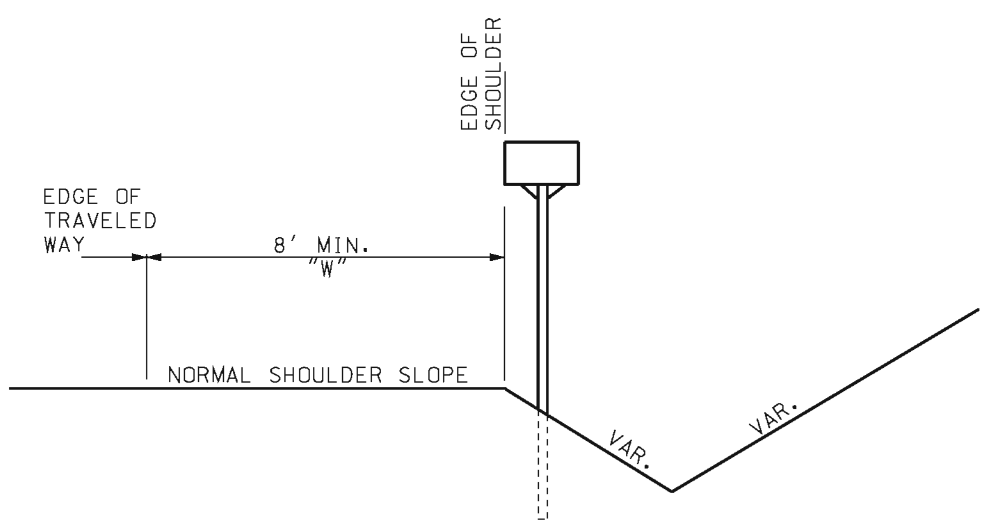
SUPERELEVATION, SPIRALS AND WIDENING

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

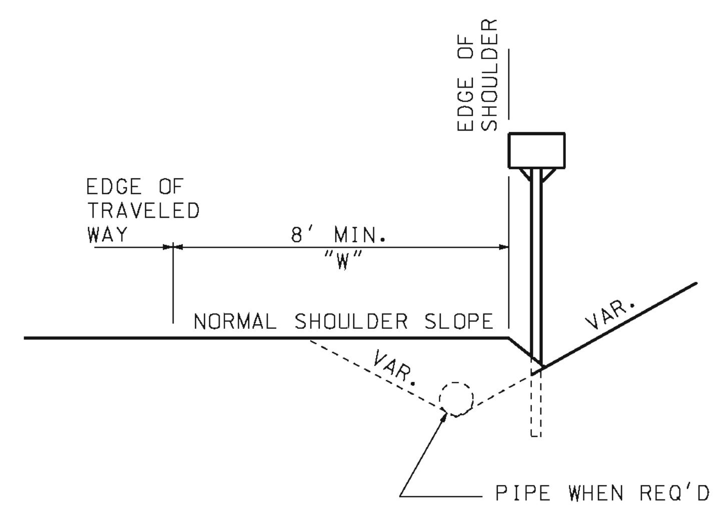
203.22



PLAN



SECTION A-A
(WITHOUT PIPE)



SECTION A-A
(WITH PIPE)

GENERAL NOTES:

IN NO CASE WILL "W" BE LESS THAN SHOULDER WIDTH.
"W" WILL BE 8′ UNLESS OTHERWISE NOTED ON THE PLANS.

WHEN ENTRANCES ARE ADJACENT TO MAILBOX TURNOUTS,
THE AREA AND SURFACING OF THE ENTRANCE MAY BE USED
FOR A PORTION OF THE MAILBOX TURNOUT.

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

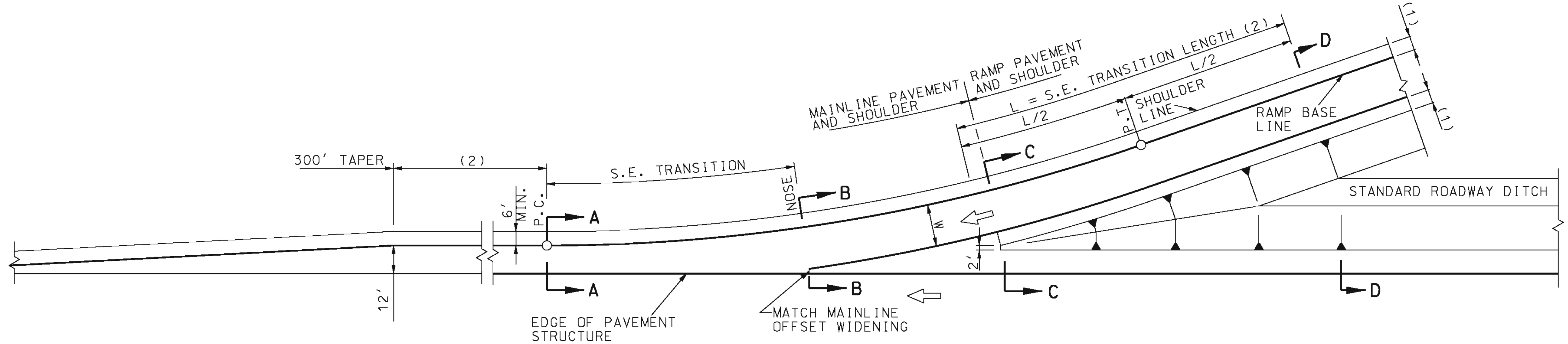
MAILBOX TURNOUTS

DATE EFFECTIVE: 08/01/1981
DATE PREPARED: 8/21/2009

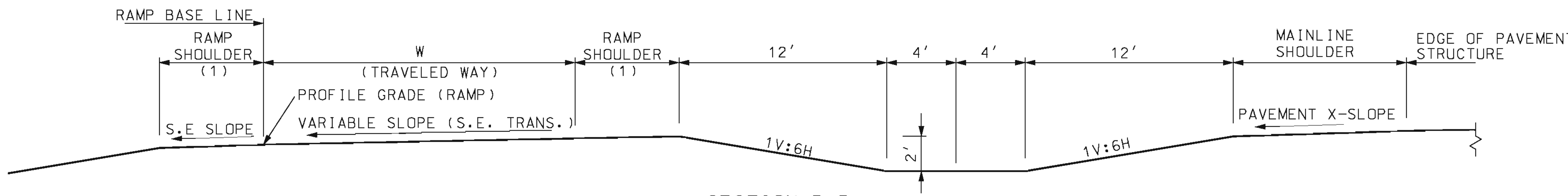
203.35A

SHEET NO.
1 OF 1

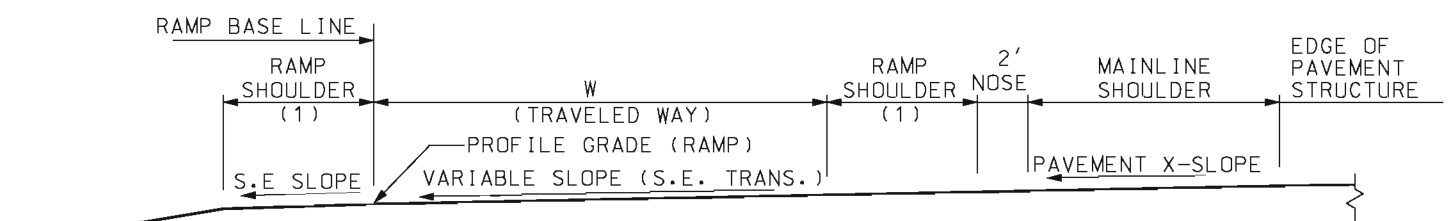
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



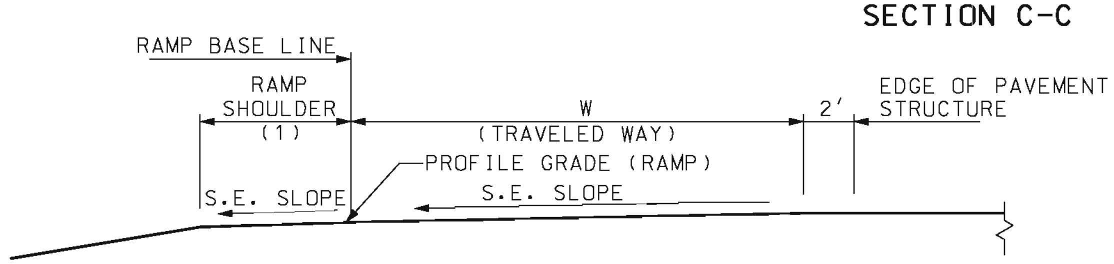
PLAN VIEW "ON" RAMPS



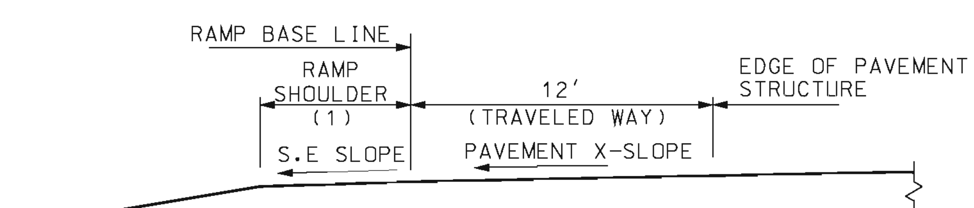
SECTION D-D



SECTION C-C



SECTION B-B



SECTION A-A

W	RAMP WIDTH
14'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES > 5%
12'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES ≤ 5%

NOTES:

(1) FOR RAMP SHOULDER WIDTH, SEE TYPICAL SECTIONS.

(2) SEE ROADWAY PLANS.

GENERAL NOTES:

SEE OTHER DRAWINGS FOR JOINT LAYOUTS AND STRIPING DETAILS.

THIS DRAWING IS FOR GENERAL INFORMATION ONLY. FOR ACTUAL CONSTRUCTION DETAILS AND PAVEMENT TYPES, SEE OTHER DRAWINGS.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

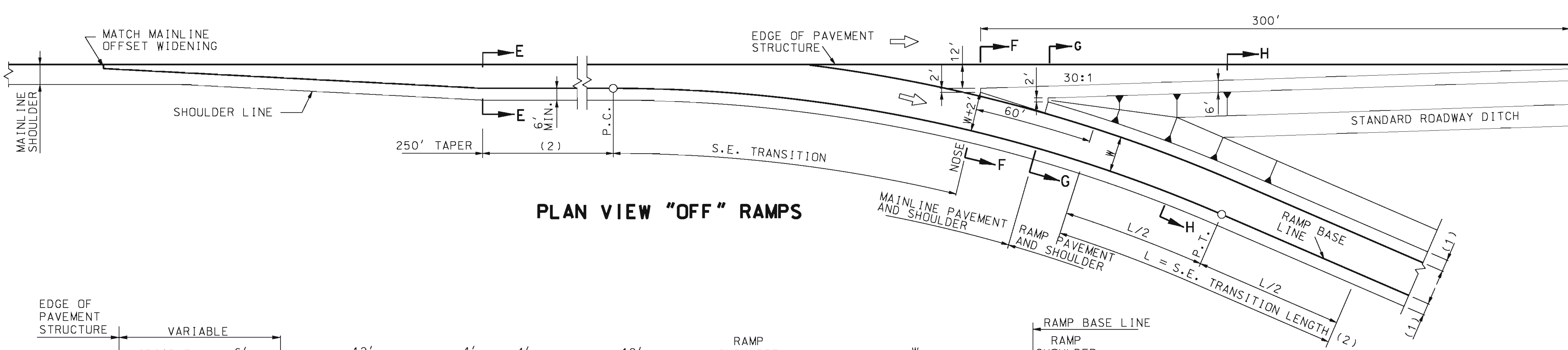
TYPICAL DETAILS ON AND OFF RAMPS

DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES

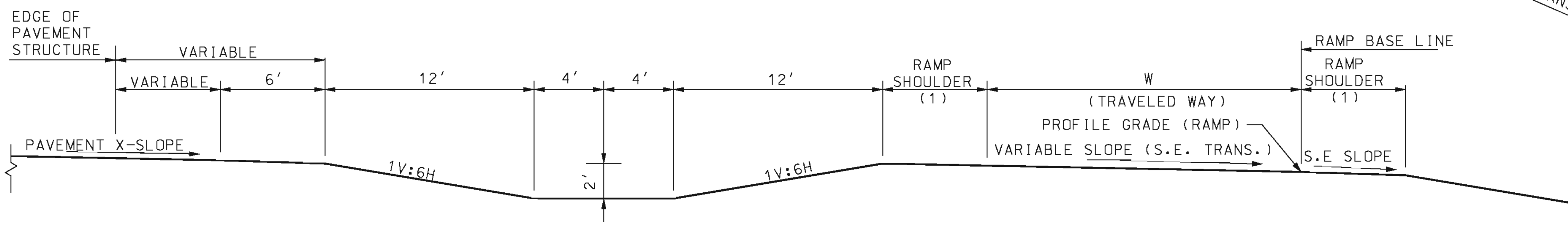
DATE EFFECTIVE: 10/01/2007
DATE PREPARED: 8/21/2009

203.40G

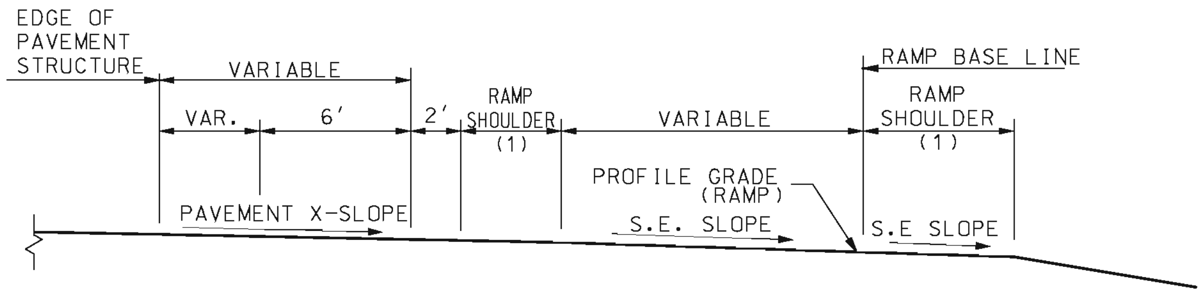
SHEET NO. 1 OF 2



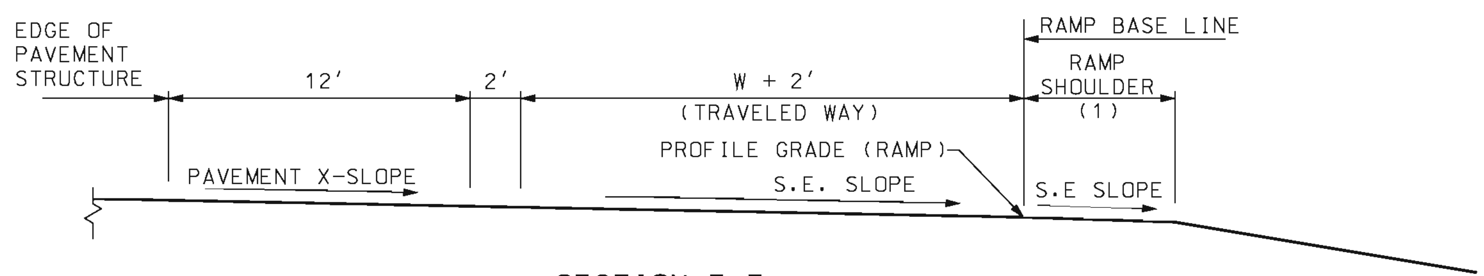
PLAN VIEW "OFF" RAMPS



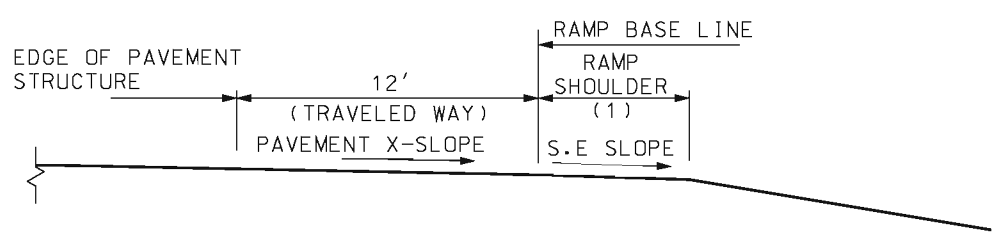
SECTION H-H



SECTION G-G



SECTION F-F



SECTION E-E

W	RAMP WIDTH
14'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES > 5%
12'	ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES ≤ 5%

NOTES:

(1) FOR RAMP SHOULDER WIDTH, SEE TYPICAL SECTIONS.

(2) SEE ROADWAY PLANS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
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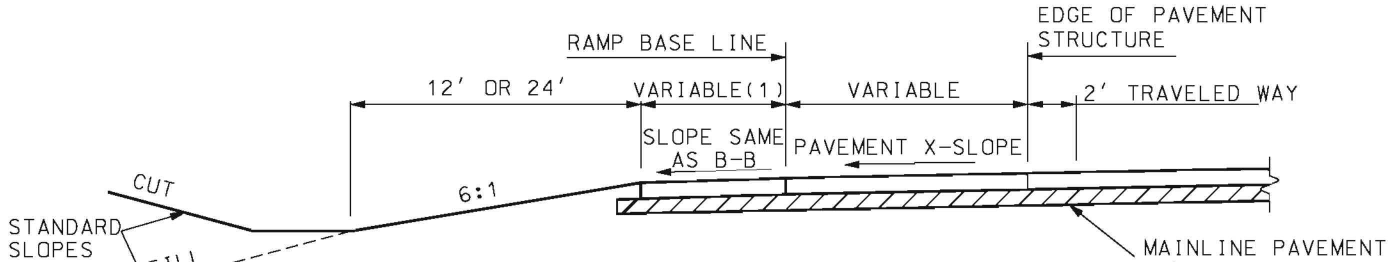
TYPICAL DETAILS ON AND OFF RAMPS

DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES

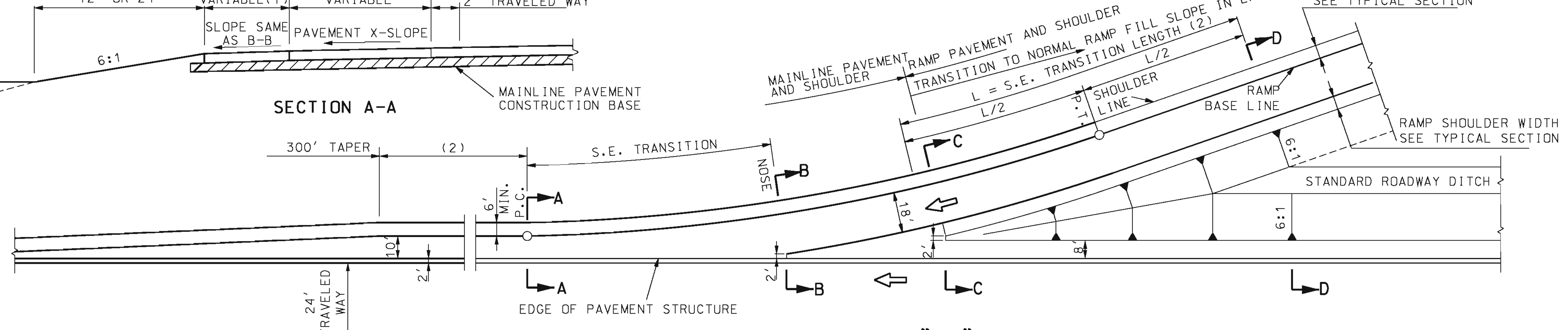
DATE EFFECTIVE: 10/01/2007
DATE PREPARED: 8/21/2009

203.40G

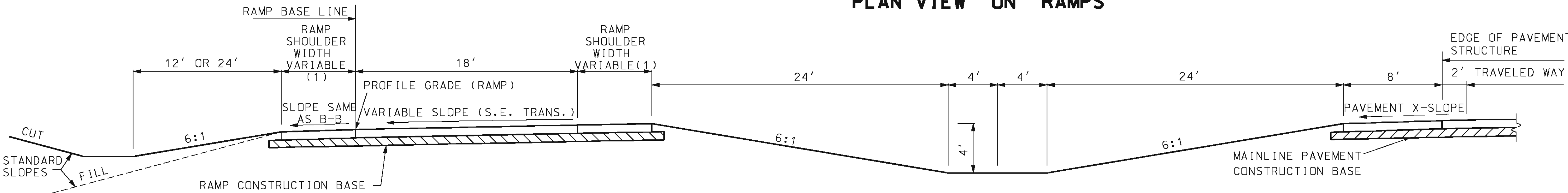
SHEET NO.
2 OF 2



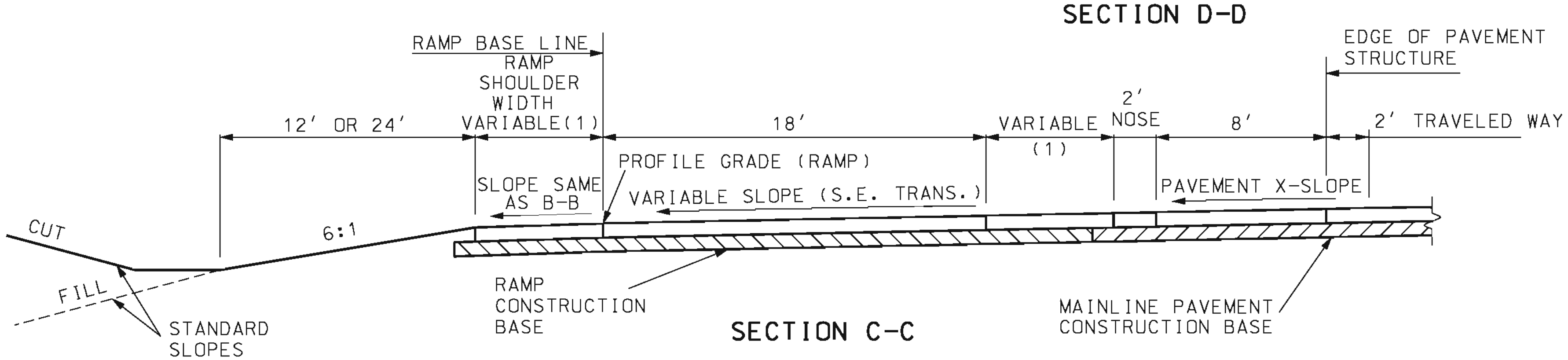
SECTION A-A



PLAN VIEW "ON" RAMPS



SECTION D-D



SECTION C-C

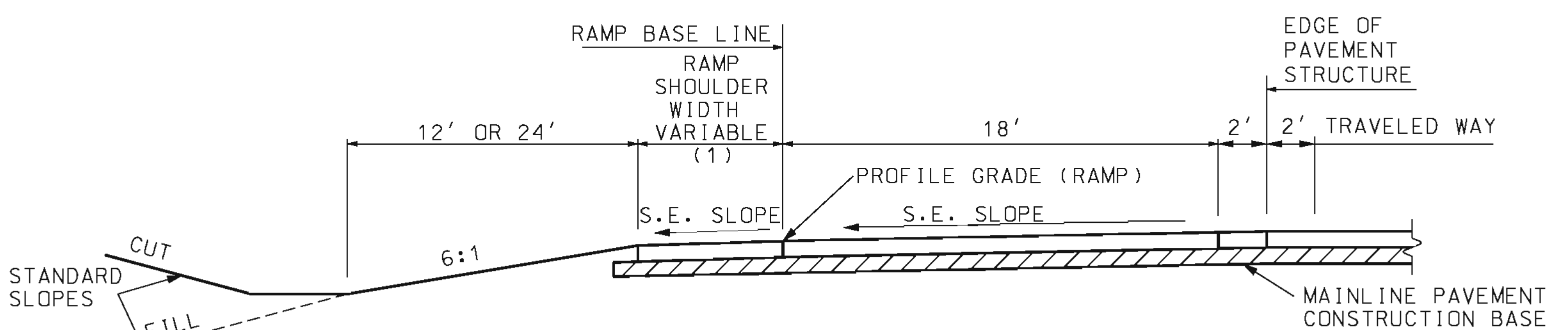
GENERAL NOTES:

SEE OTHER DRAWINGS FOR JOINT LAYOUTS AND STRIPING DETAILS.

THIS DRAWING IS FOR GENERAL INFORMATION ONLY. FOR ACTUAL CONSTRUCTION DETAILS AND PAVEMENT TYPES, SEE OTHER DRAWINGS.

(1) FOR RAMP SHOULDER WIDTH, SEE TYPICAL SECTIONS.

(2) SEE ROADWAY PLANS.



SECTION B-B

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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STATE OF MISSOURI
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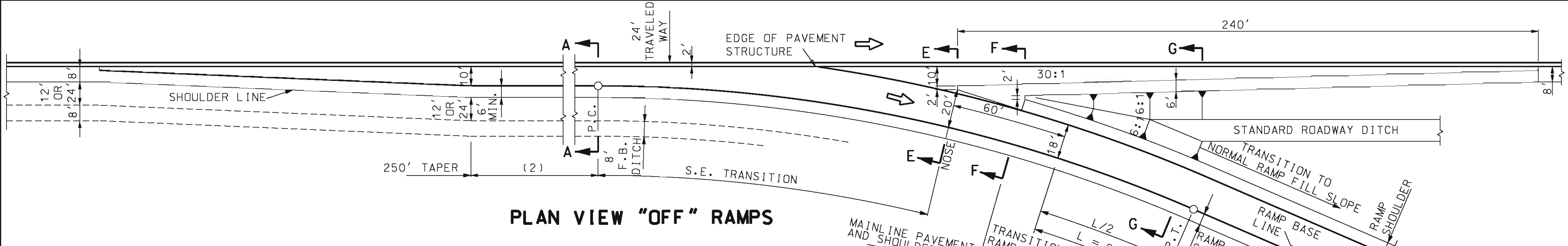
TYPICAL DETAILS ON AND OFF RAMPS

DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES (ROADWAYS WITH 6:1 FORESLOPES) 28 FOOT PAVEMENT STRUCTURE

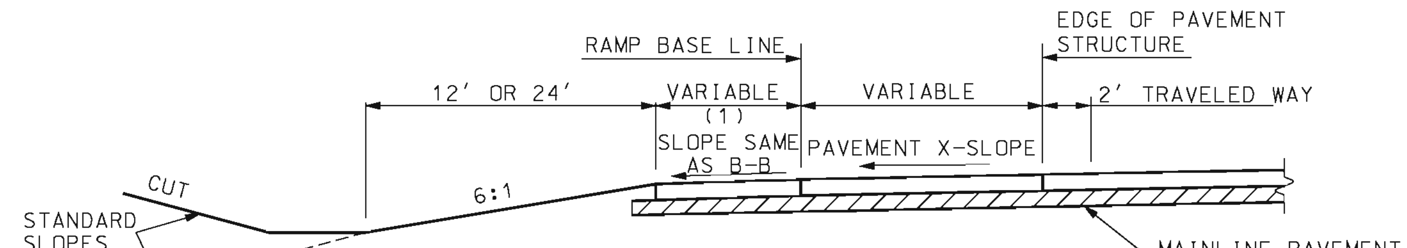
DATE EFFECTIVE: 01/01/1995
DATE PREPARED: 8/21/2009

203.41F

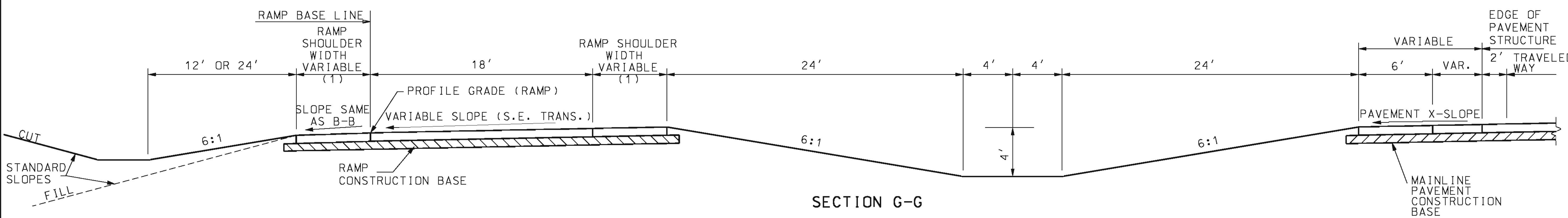
SHEET NO. 1 OF 2



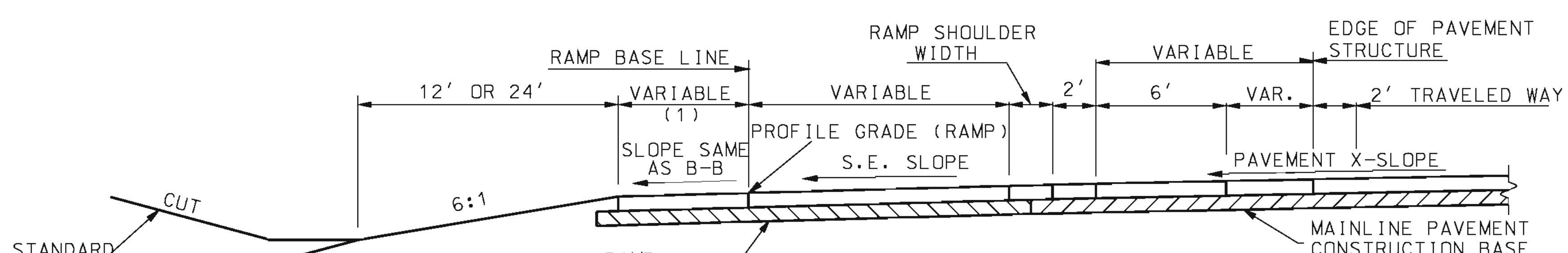
PLAN VIEW "OFF" RAMPS



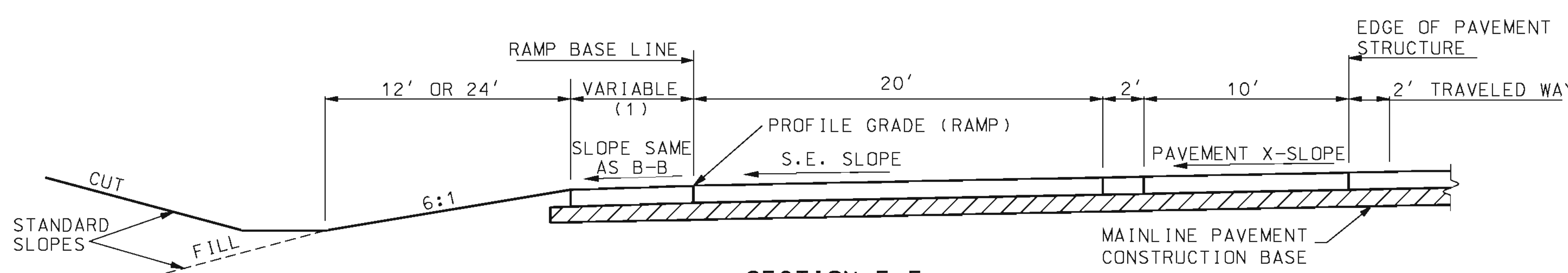
SECTION A-A



SECTION G-G



SECTION F-F



SECTION E-E

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
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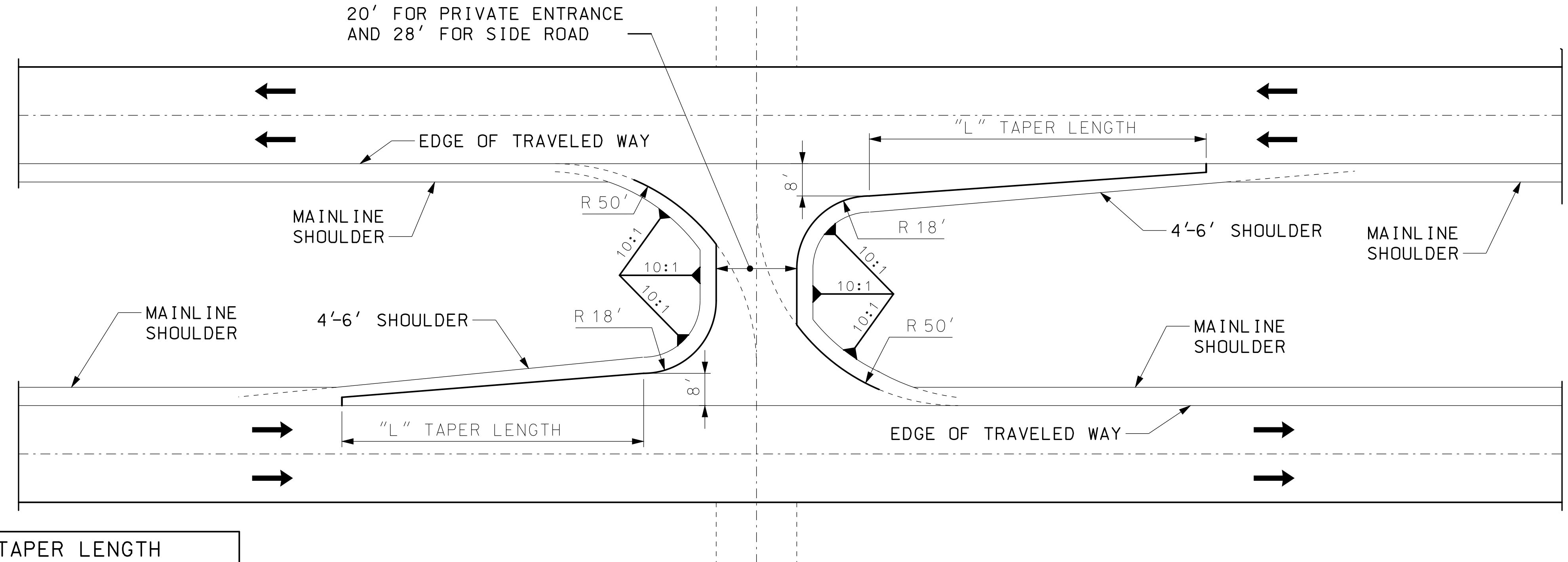
TYPICAL DETAILS ON AND OFF RAMPS

DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES (ROADWAYS WITH 6:1 FORESLOPES) 28 FOOT PAVEMENT STRUCTURE

DATE EFFECTIVE:	01/01/1995	203.41F	SHEET NO. 2 OF 2
DATE PREPARED:	8/21/2009		

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



TAPER LENGTH	
DESIGN SPEED	"L"
≤ 40 MPH	112.5′
> 40 MPH	225′

FOR PRIVATE ENTRANCES, MINOR SIDE ROADS OR FIELD ENTRANCES

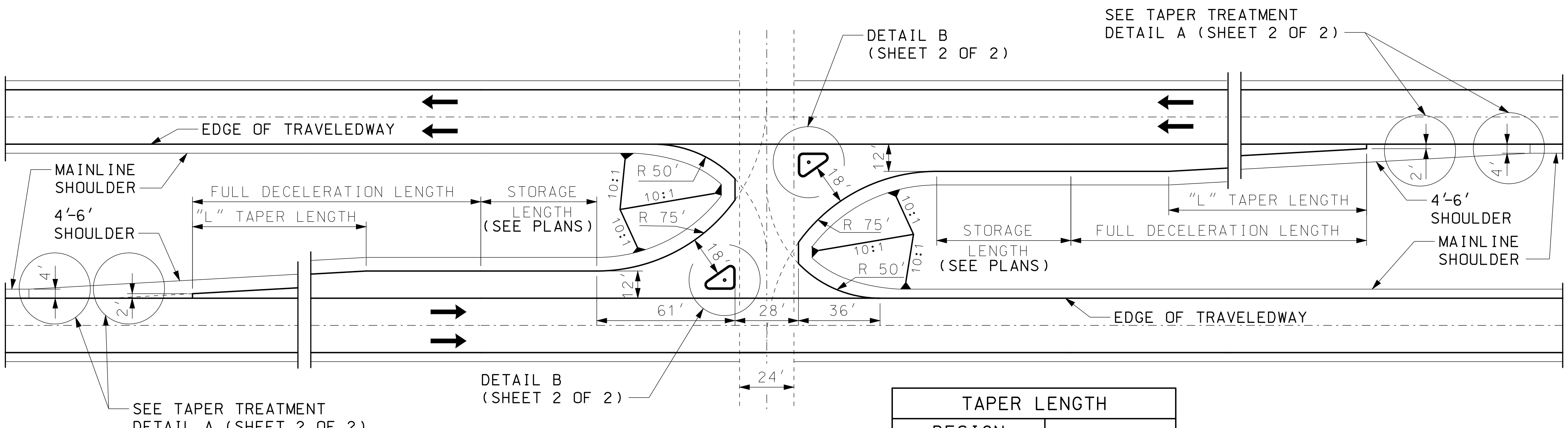
TYPE I MEDIAN OPENING

NOTES FOR TYPE I MEDIAN OPENINGS:

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.

IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.



FULL DECELERATION LENGTH	
DESIGN SPEED	MINIMUM LENGTH
45 MPH	385 FT.
50 MPH	435 FT.
55 MPH	480 FT.
60 MPH	530 FT.
65 MPH	570 FT.
70 MPH	615 FT.

TAPER LENGTH	
DESIGN SPEED	"L"
≤ 40 MPH	125′
> 40 MPH	250′

FOR MAJOR SIDE ROADS, STATE ROUTES
AND MAJOR COMMERCIAL ENTRANCES

TYPE II MEDIAN OPENING

NOTES FOR TYPE II MEDIAN OPENINGS:

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.

IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.

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.

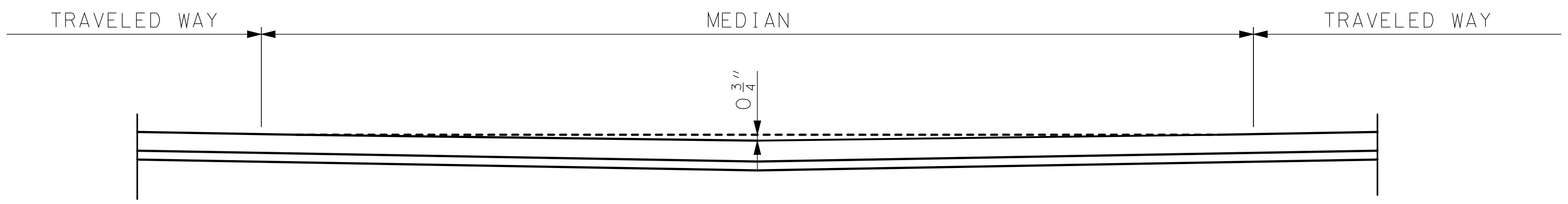
TYPICAL MEDIAN OPENING

DIVIDED HIGHWAYS

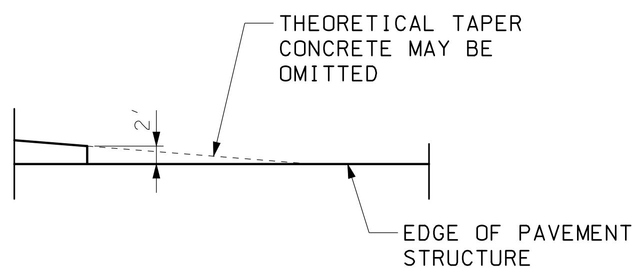
DATE EFFECTIVE: 04/01/2016
DATE PREPARED: 2/11/2016

203.50N

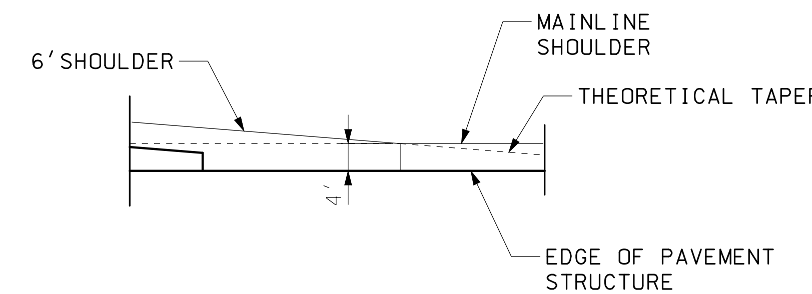
SHEET NO. 1 OF 2



SECTION ALONG MEDIAN OPENING ℄

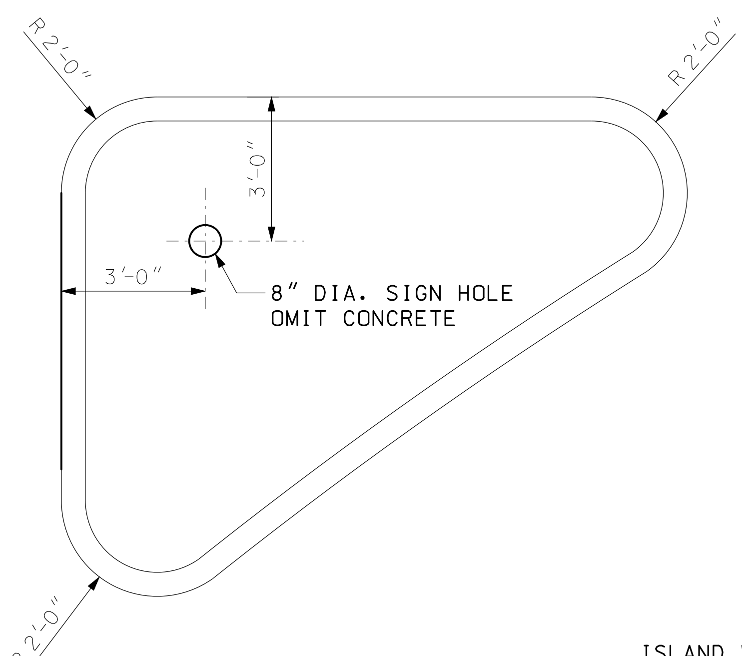


TAPER TREATMENT



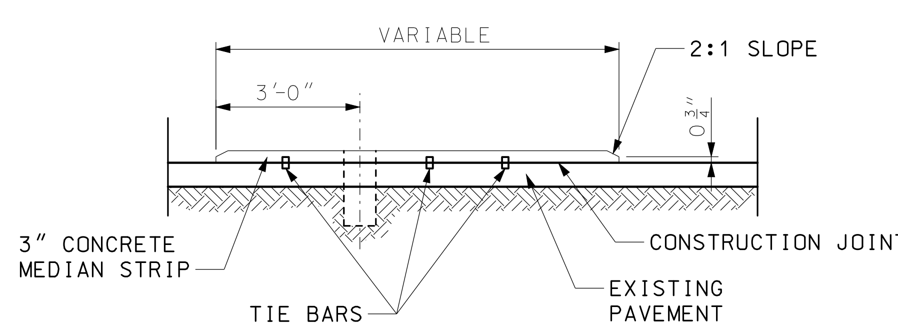
SHOULDER TAPER TREATMENT

DETAIL A



ISLAND DETAIL

ISLAND WILL BE PAID FOR AS CONCRETE MEDIAN STRIP.



LOW PROFILE ISLAND DETAIL

DETAIL B

GENERAL NOTES:
FOR DETAILS ON CONCRETE MEDIAN STRIP CONSTRUCTION, SEE STANDARD PLAN 608.30.

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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
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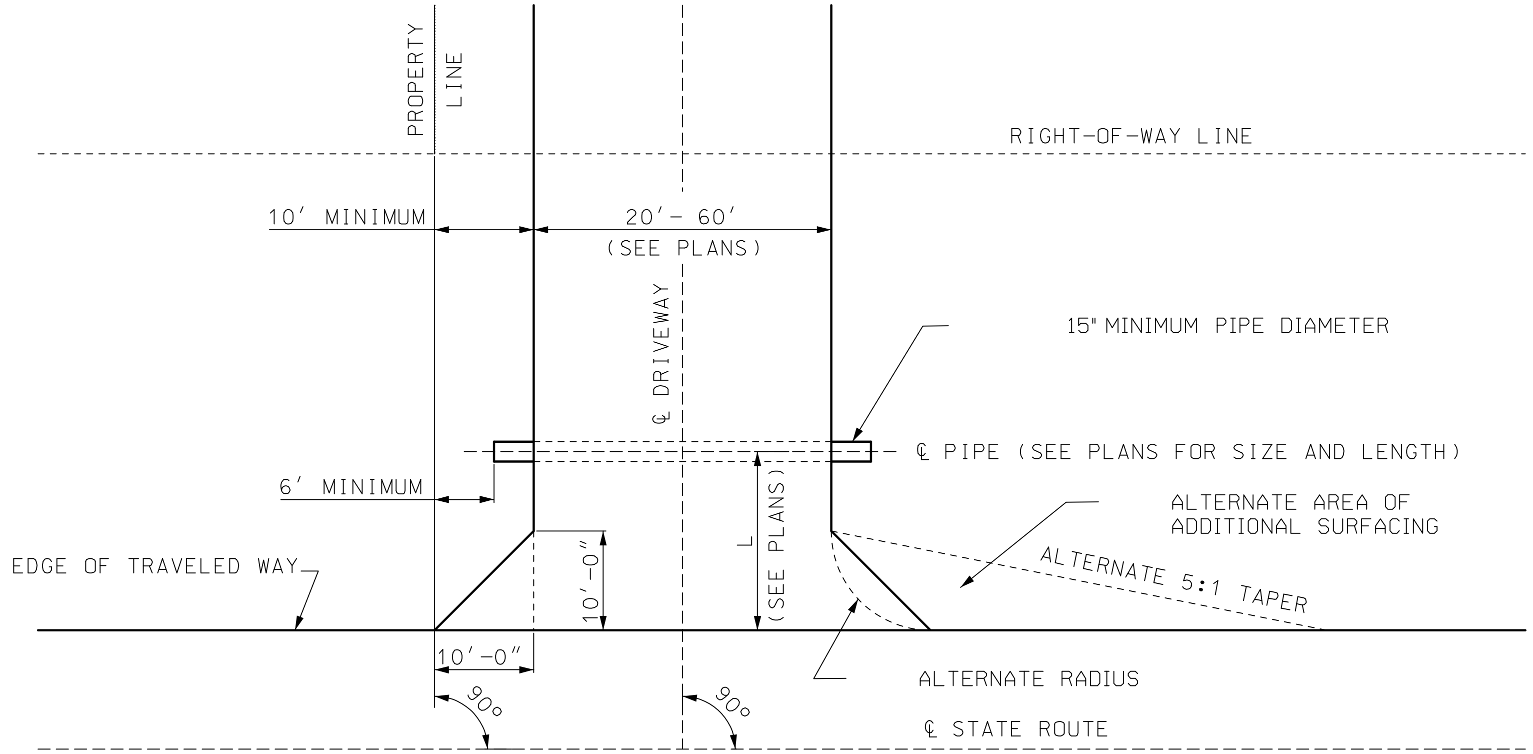
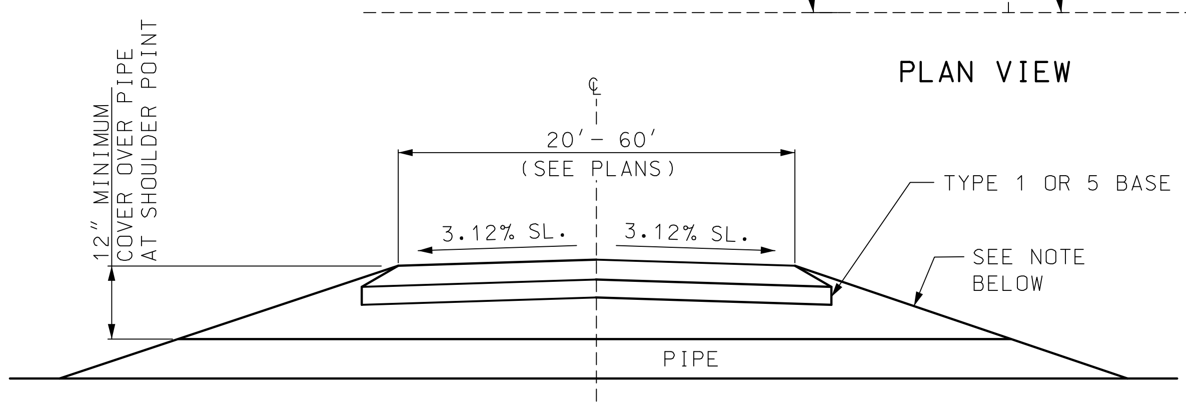
TYPICAL MEDIAN OPENING
DIVIDED HIGHWAYS

DATE EFFECTIVE:	04/01/2016	**203.50N**	SHEET NO. 2 OF 2
DATE PREPARED:	2/11/2016		

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



PLAN VIEW



DRIVEWAY TYPICAL SECTION

DRIVEWAY SIDE SLOPES: ✳

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

NOTE: RECOMMENDED WIDTH OF DRIVEWAY - 20'

✳ IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES. THE LOCATION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE 1988 EDITION OF "ROADSIDE DESIGN GUIDE".

GENERAL NOTES:

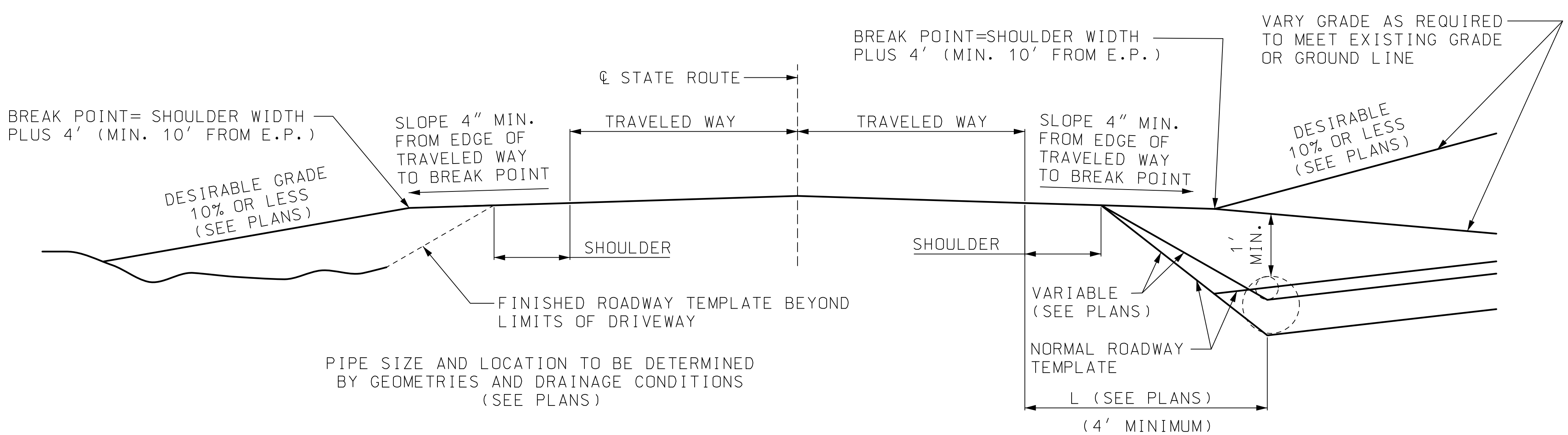
NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED BEYOND THE PROPERTY FRONTAGE.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH. (MINIMUM 32' LENGTH OF MINIMUM 15" DIAMETER PIPE), SEE PLANS.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.



IN FILLS

IN CUTS

PROFILE VIEW

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

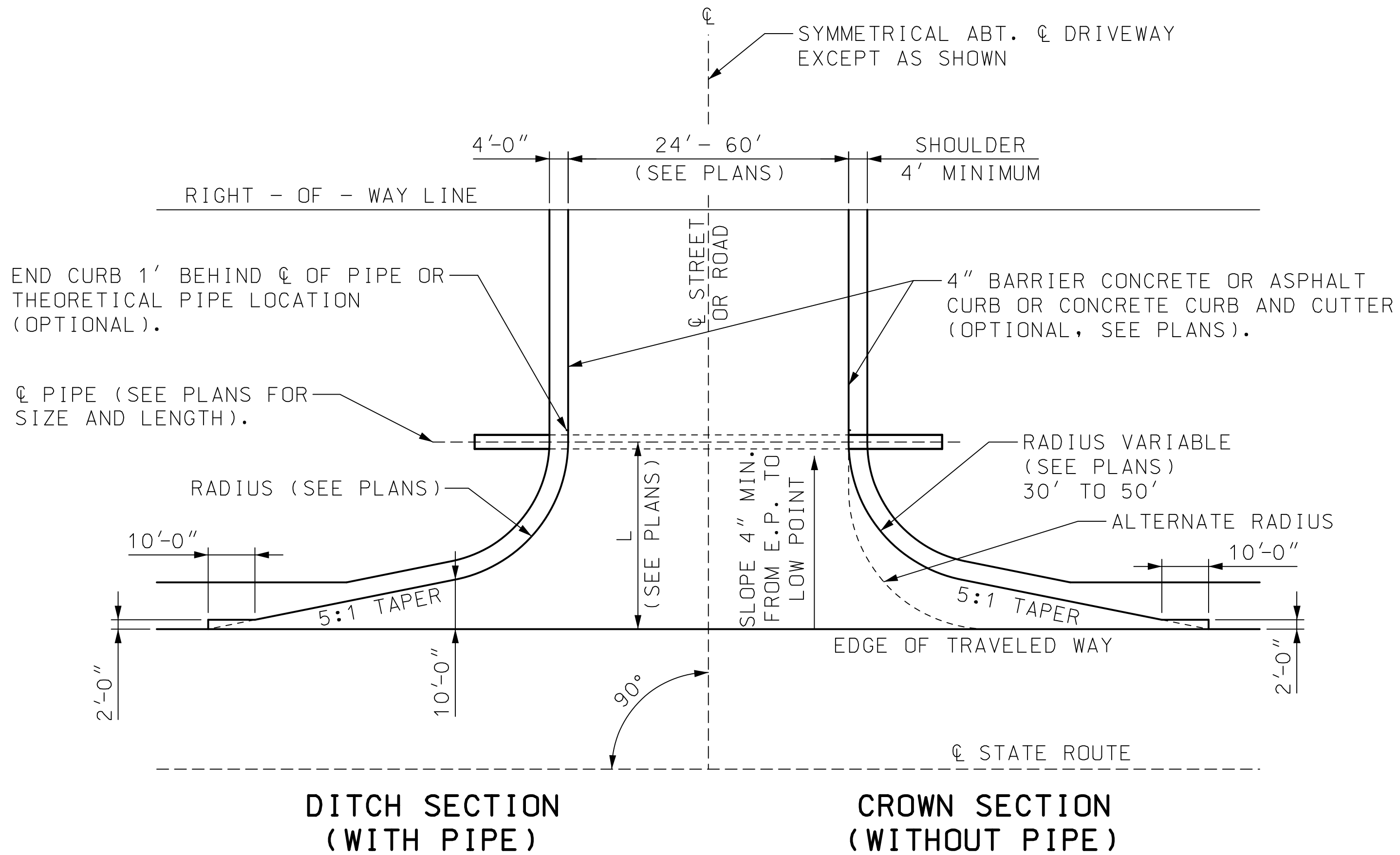
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DRIVEWAY

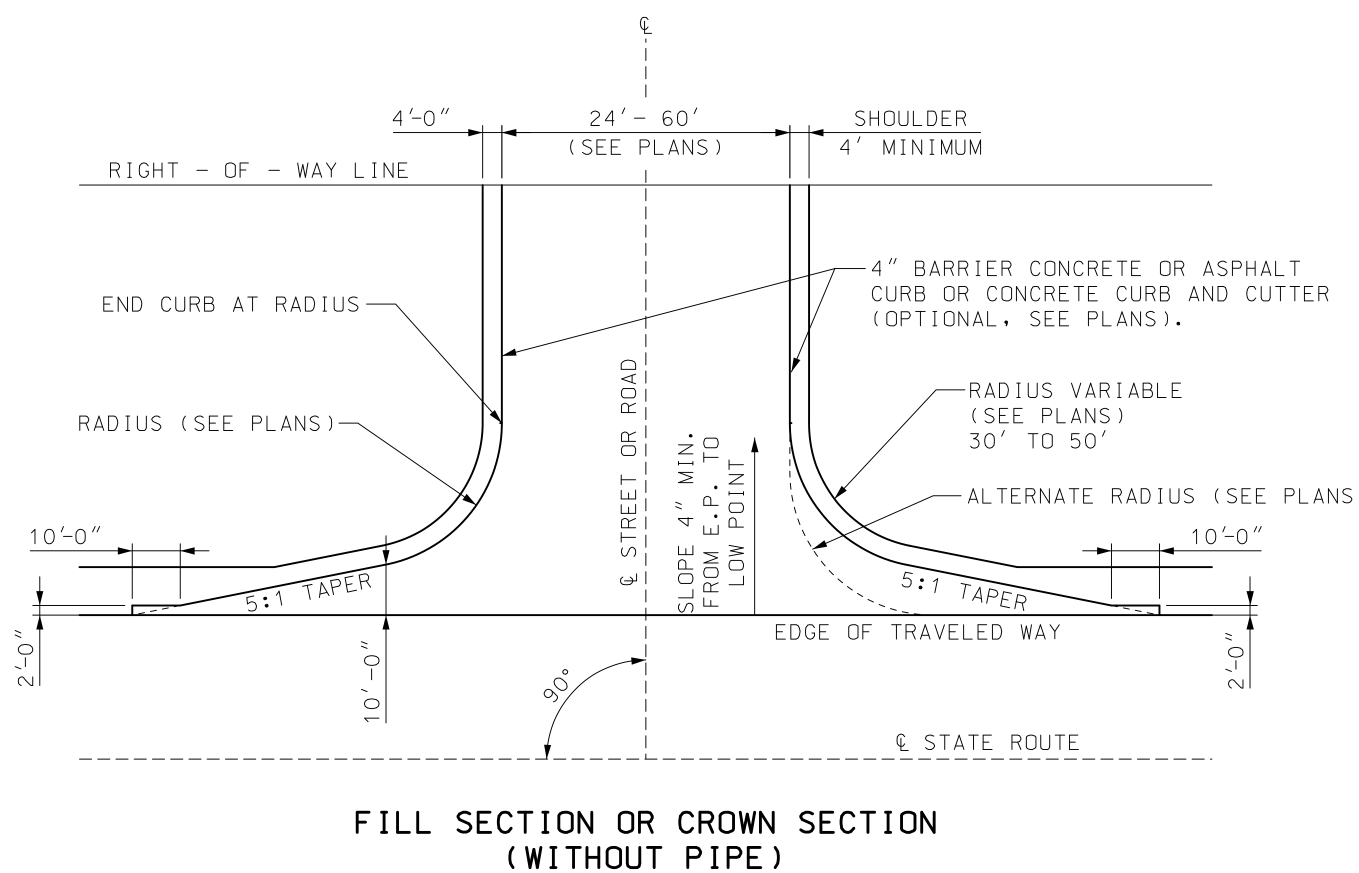
TYPE I

DATE EFFECTIVE:	07/01/2020	203.61B	SHEET NO.
DATE PREPARED:	4/29/2020		1 OF 1

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



PLAN VIEW



PLAN VIEW

GENERAL NOTES:

RECOMMENDED WIDTH OF ROADWAY - 24' WITHOUT PARKING ON ROAD AND 32' WITH PARKING ON ROAD.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OF 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF ASHPALT AND CONCRETE DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).

IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLANS 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH, TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

THIS DRAWING ILLUSTRATES DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

A MINIMUM 100-FOOT SIGHT DISTANCE TRIANGLE, MEASURED ALONG THE CENTERLINE OF THE INTERSECTING ROADWAYS, SHOULD BE PROVIDED.

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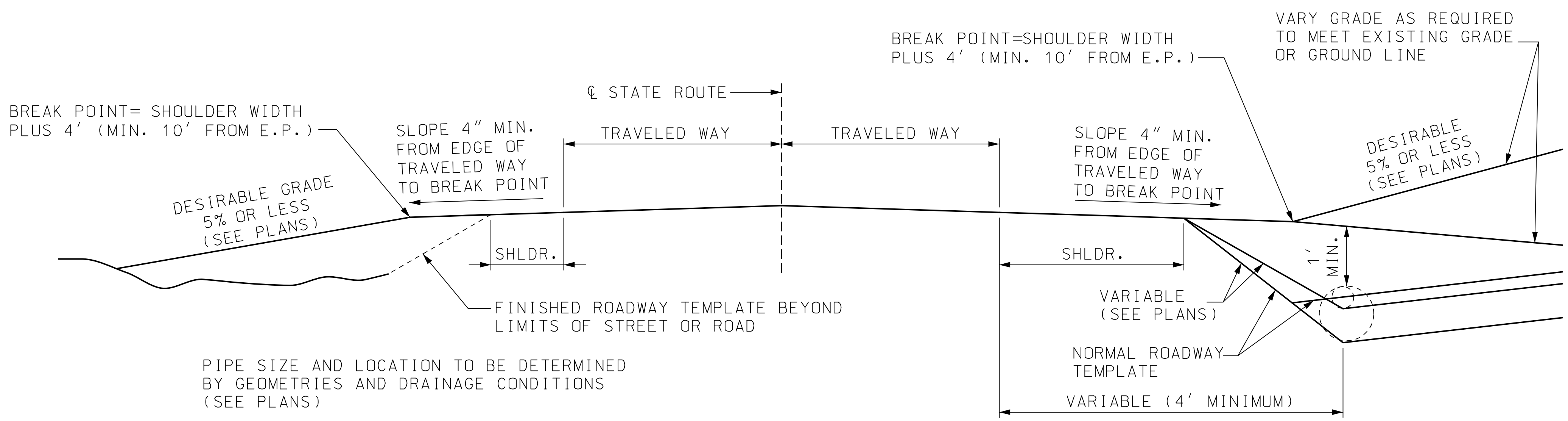
DRIVEWAY
TYPE II

DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020	203.62E	SHEET NO. 1 OF 2

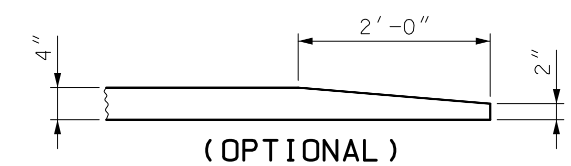
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



IN FILLS

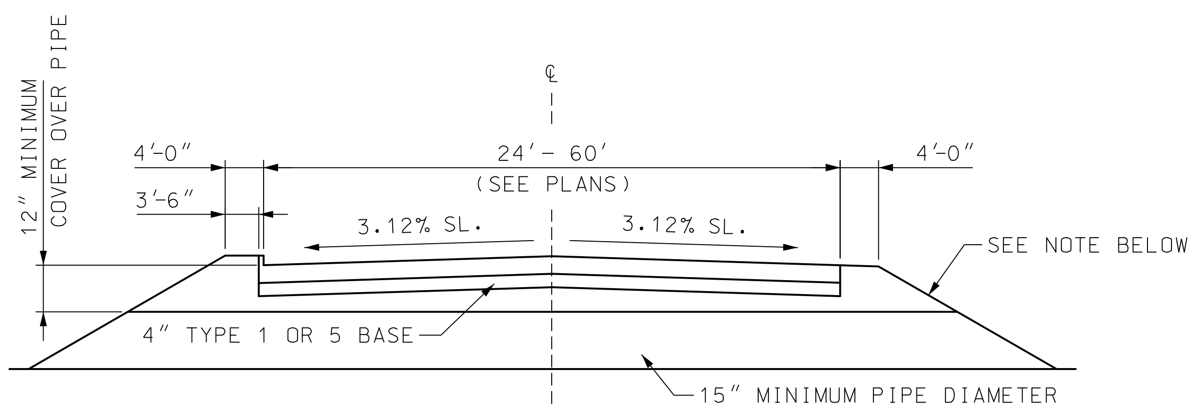
IN CUTS

PROFILE



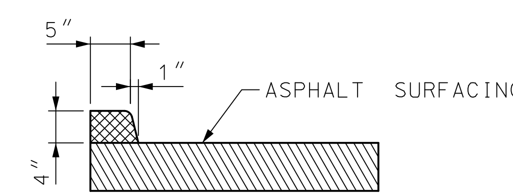
(OPTIONAL)

CURB TERMINUS
DETAIL

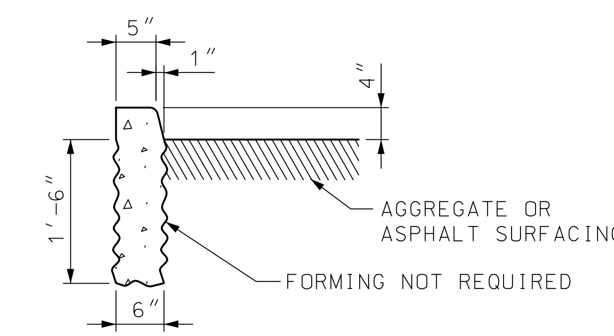


WITH CURB WITHOUT CURB

DRIVEWAY TYPICAL SECTION



SECTION THRU 4" ASPHALT CURB



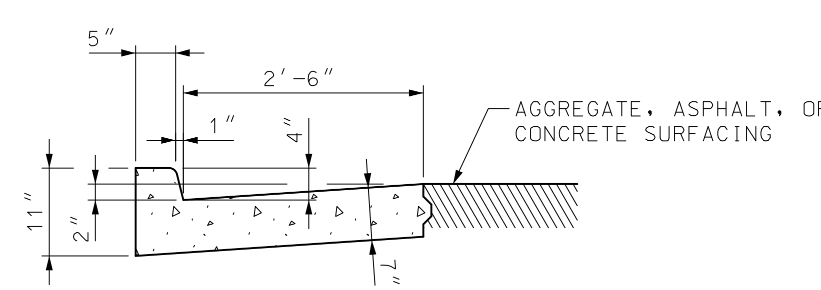
SECTION THRU 4" BARRIER CURB

DRIVEWAY SIDE SLOPES: ✳

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE
(OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE
(OR FLATTER WHERE PRACTICABLE).

✳ IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES. THE LOCATION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".



SECTION THRU CONCRETE
CURB AND GUTTER

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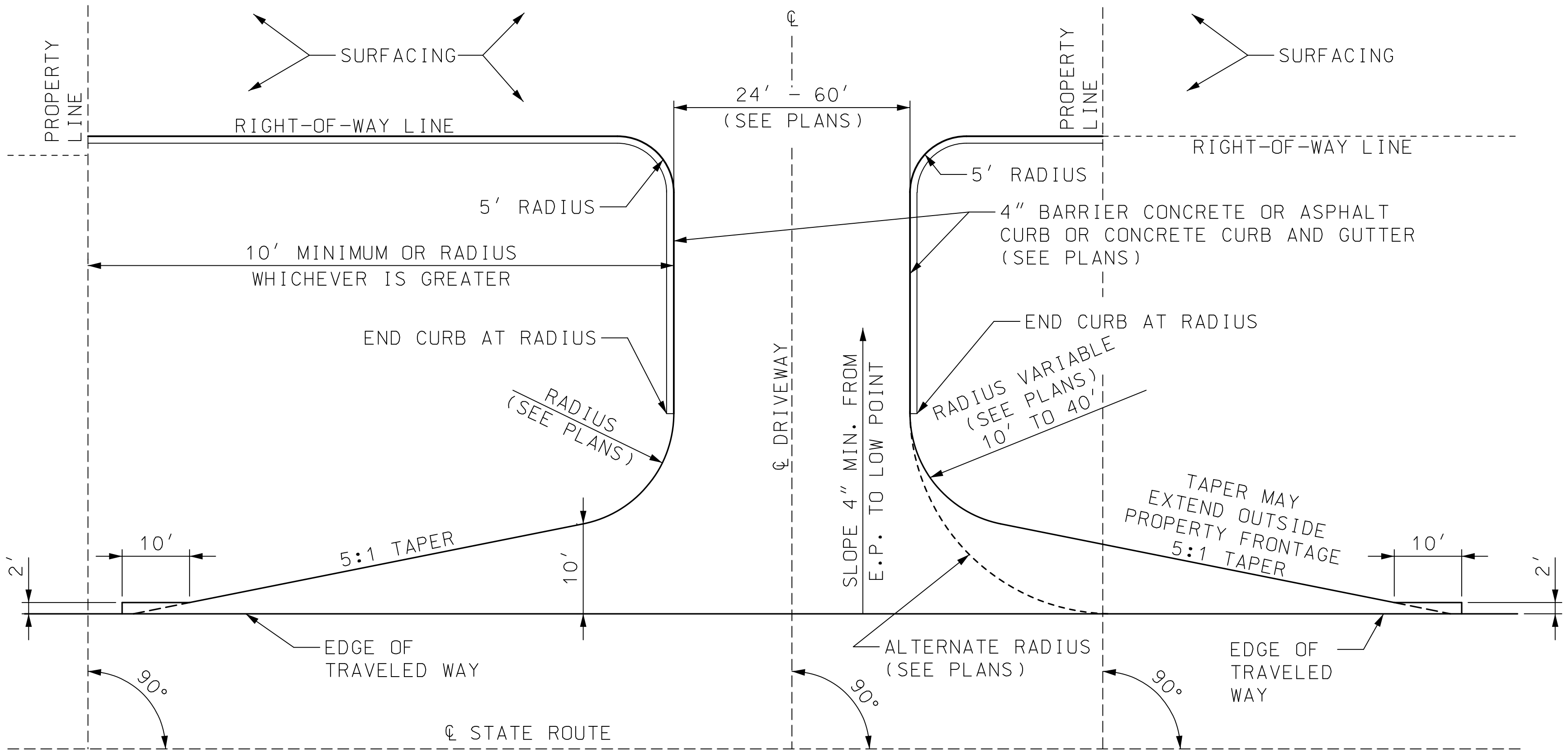
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

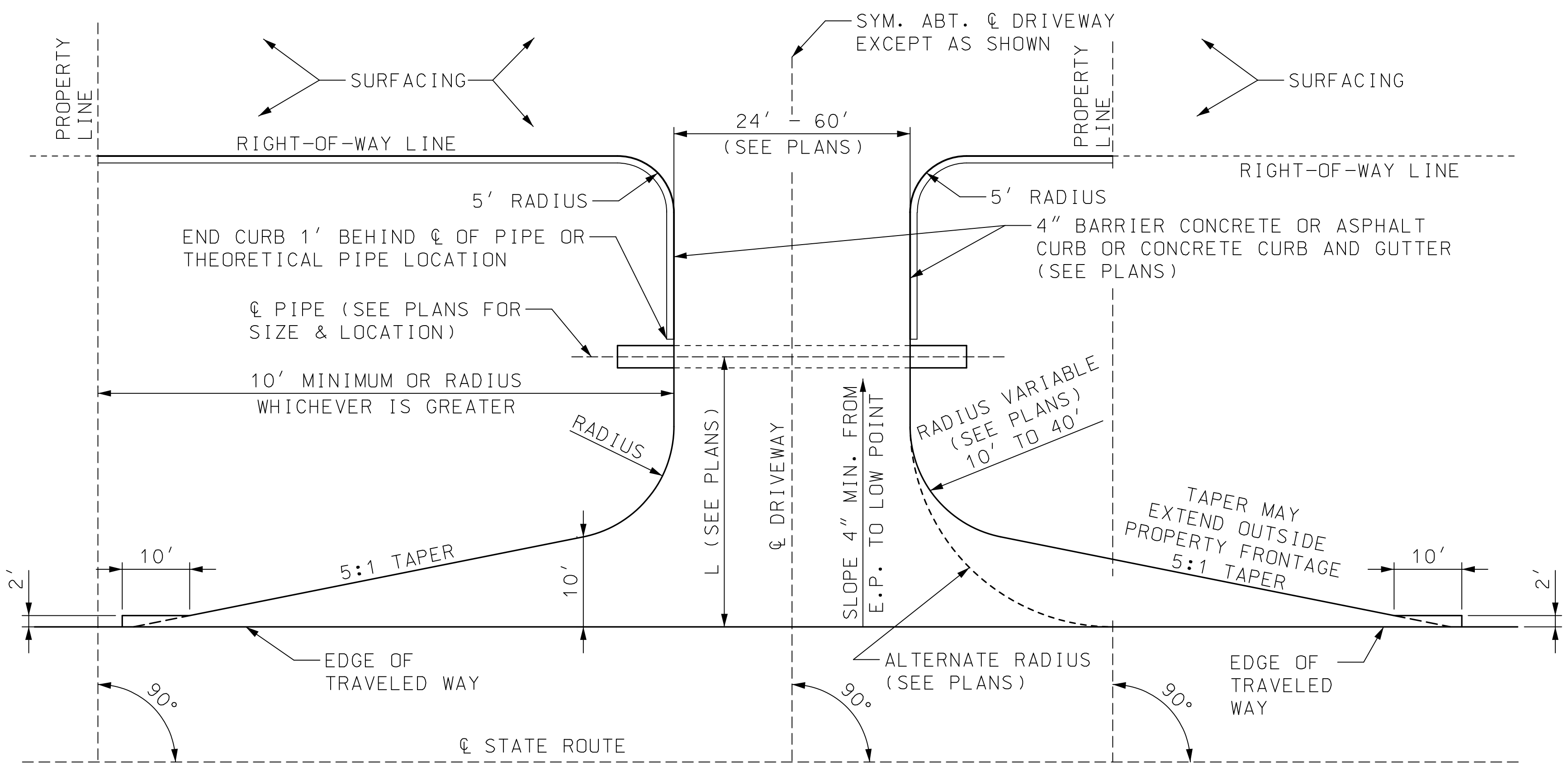
DRIVEWAY
TYPE II

DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020		203.62E	SHEET NO. 2 OF 2

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



FILL SECTION OR CROWN SECTION
(WITHOUT PIPE)
PLAN VIEW



DITCH SECTION
(WITH PIPE)
PLAN VIEW

GENERAL NOTES:

FOR LIGHT DUTY PAVEMENT (<3500 ADT) DRIVEWAY BEGINS AT EDGE OF PAVEMENT.

RECOMMENDED WIDTH OF DRIVEWAY - 40'. SKETCH OR PLAN REQUIRED.

NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED OUTSIDE OF THE PROPERTY FRONTAGE.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).

IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLAN 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH. TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

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.

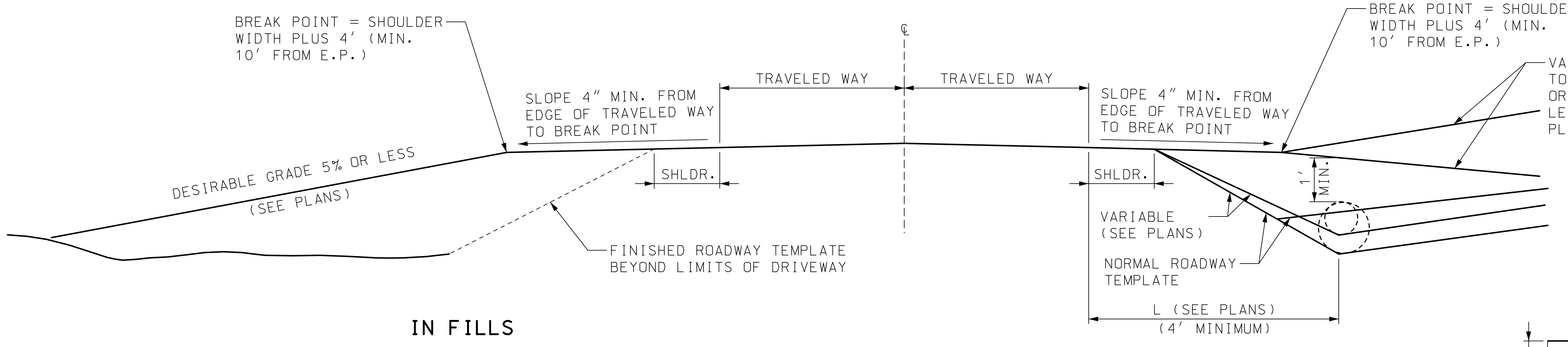
DRIVEWAY
TYPE III

DATE EFFECTIVE: 07/01/2020
DATE PREPARED: 4/29/2020

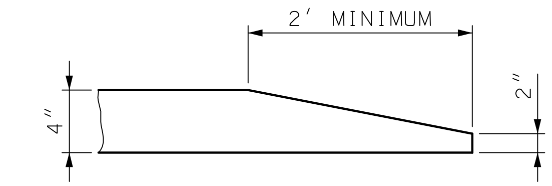
203.63C

SHEET NO.
1 OF 2

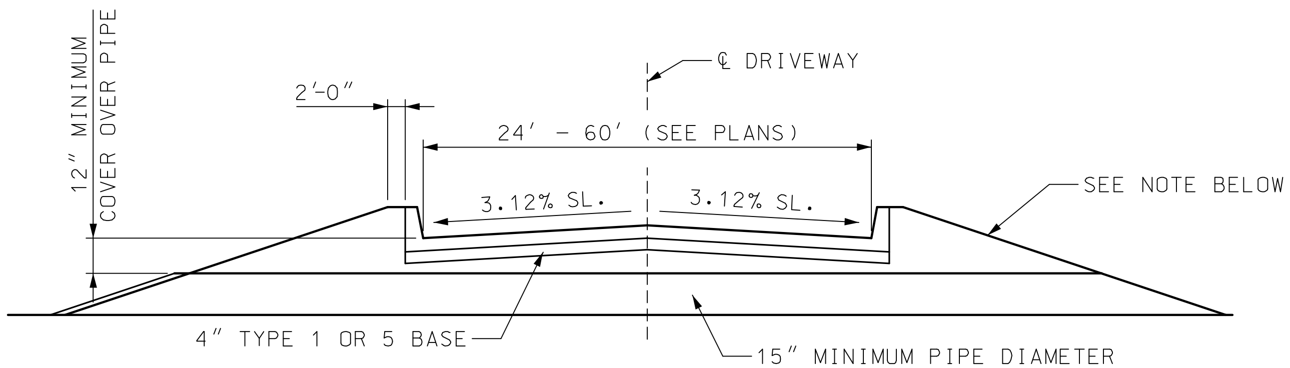
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PROFILE VIEW



CURB TEMINUS DETAIL

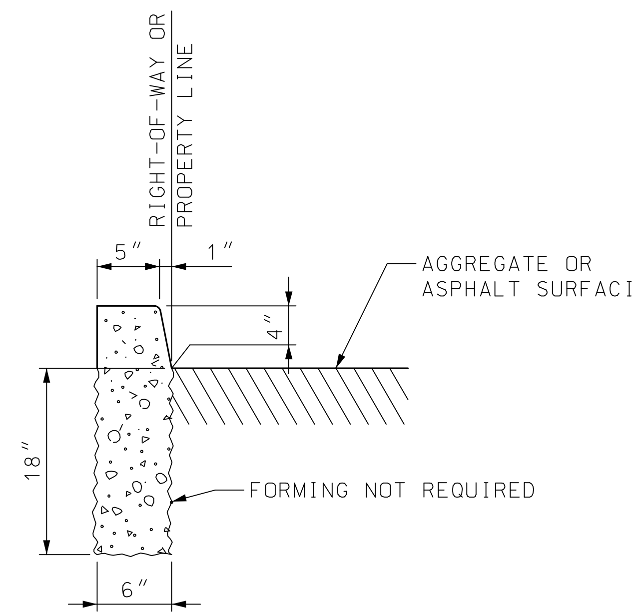


DRIVEWAY TYPICAL SECTION

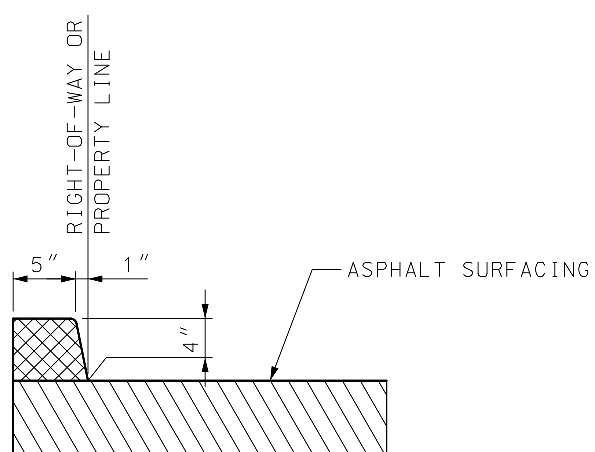
DRIVEWAY SIDE SLOPES: ✳

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 WHERE PRACTICABLE).
OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

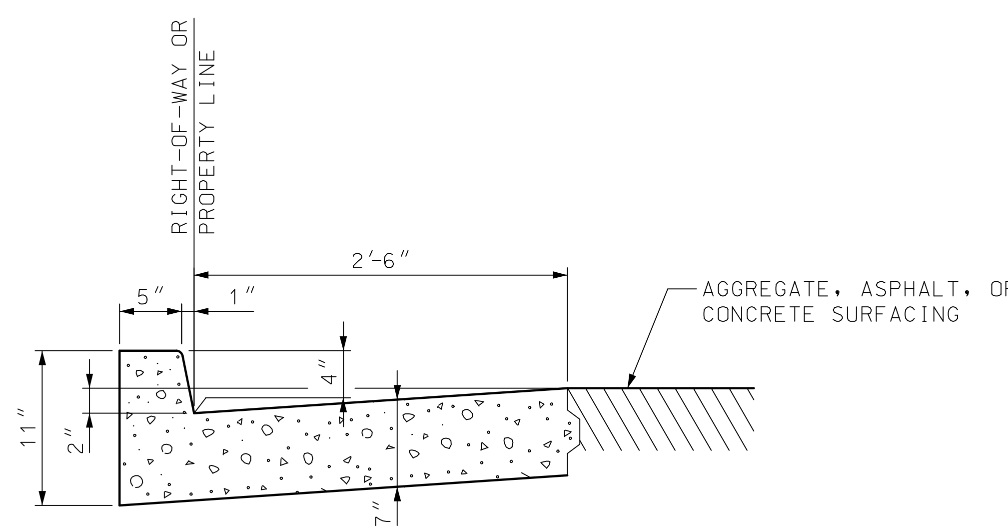
✳ IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES, THE LOCATION OF THE DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".



SECTION THROUGH 4" BARRIER CURB



SECTION THRU 4" ASPHALT CURB



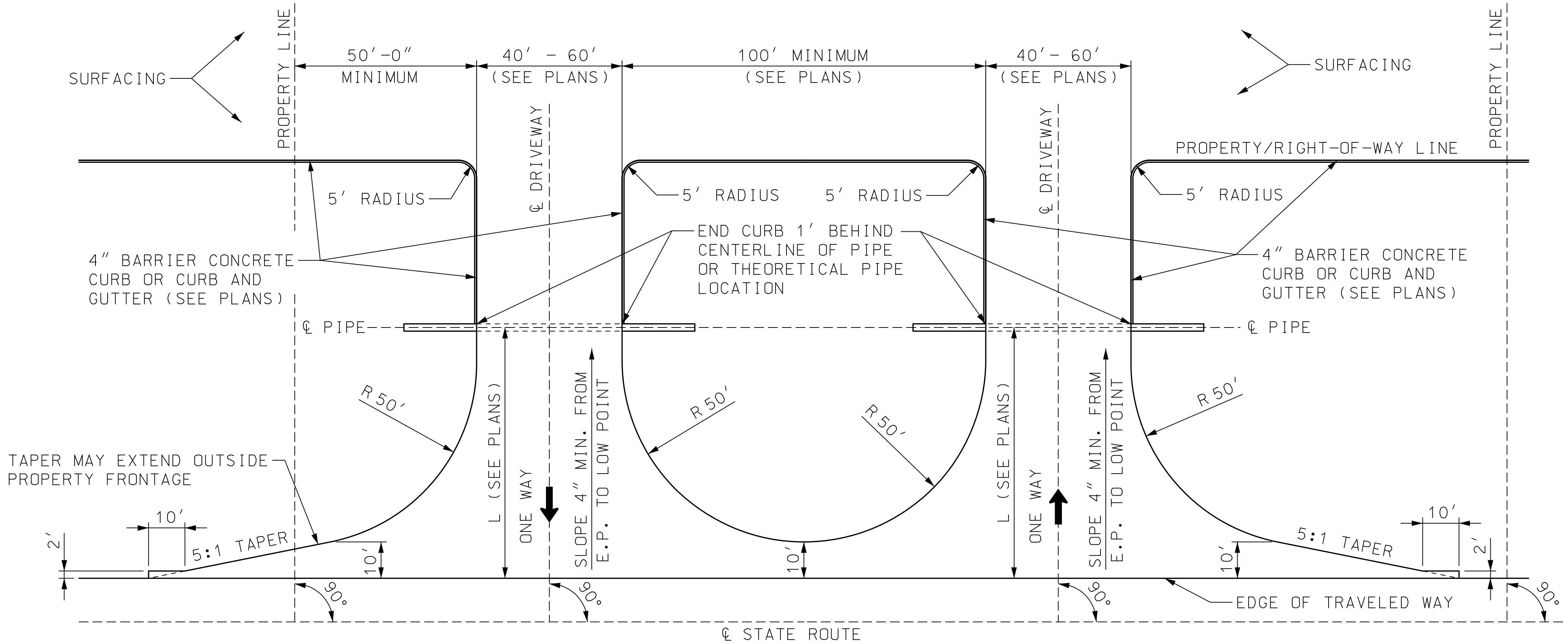
SECTION THROUGHCONCRETE CURB AND GUTTER

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

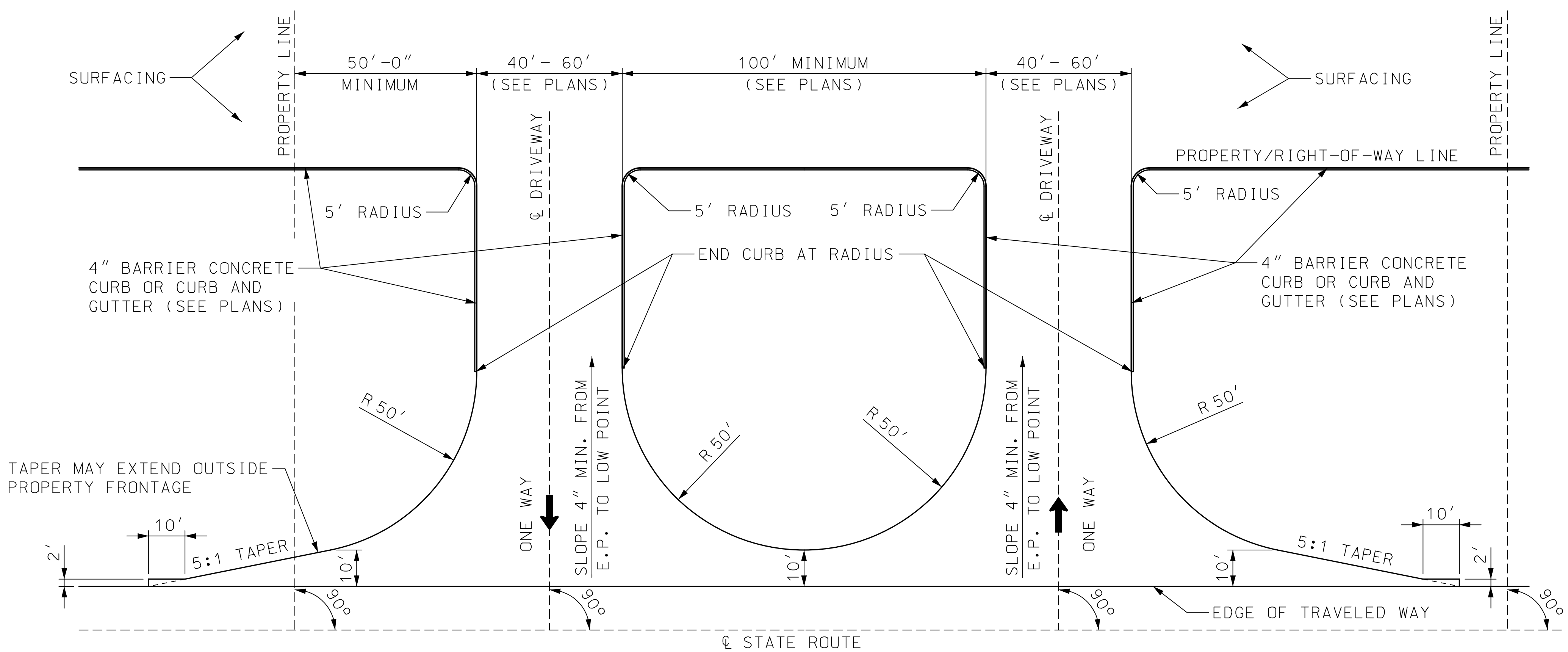
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DRIVEWAY
TYPE III

DATE EFFECTIVE:	07/01/2020	203.63C	SHEET NO.
DATE PREPARED:	4/29/2020		2 OF 2



DITCH SECTION (WITH PIPE)
PLAN VIEW



FILL SECTION OR CROWN SECTION
(WITHOUT PIPE)
PLAN VIEW

GENERAL NOTES:

RECOMMENDED WIDTH OF ROADWAY - 40'.

NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED OUTSIDE OF THE PROPERTY FRONTAGE.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).

IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLAN 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH, TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

THE DRIVEWAY WIDTH SHALL BE DETERMINED AT THE TANGENT POINT OF THE RADIUS AND SIDE OF DRIVEWAY.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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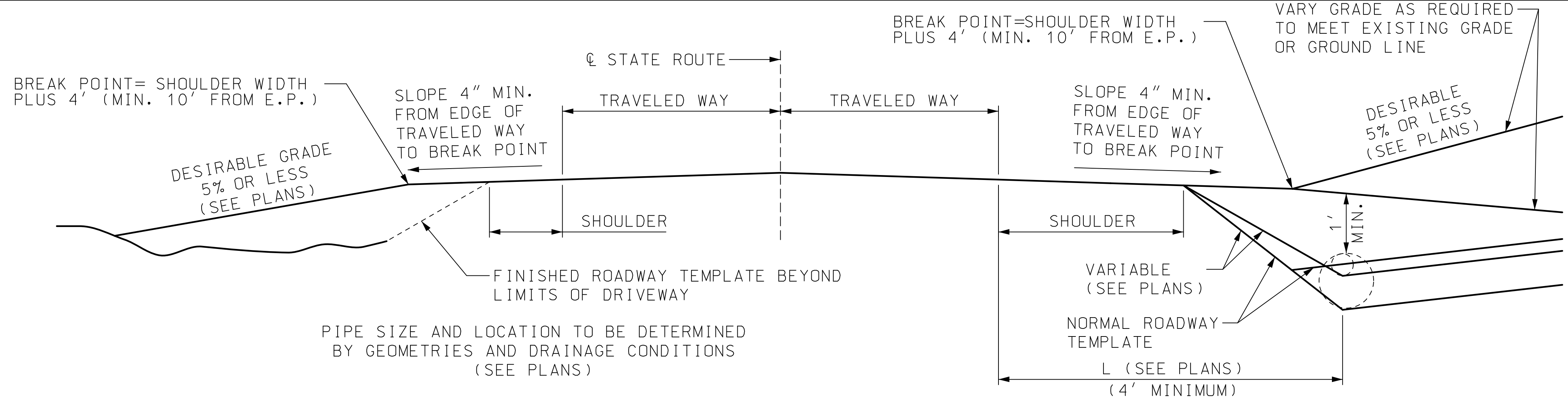
DRIVEWAY
TYPE IV

DATE EFFECTIVE:	07/01/2020	203.64E	SHEET NO.
DATE PREPARED:	4/29/2020		1 OF 2

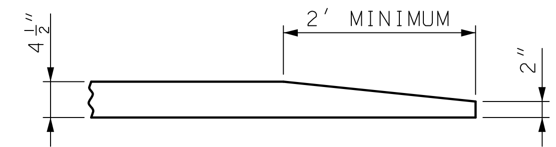
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



IN FILLS

IN CUTS

PROFILE



CURB TERMINUS DETAIL

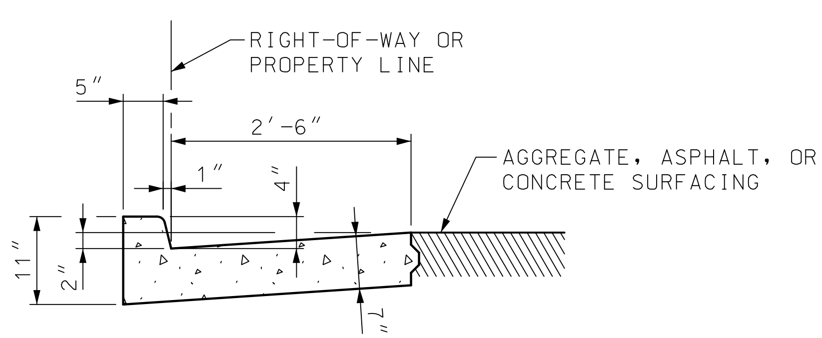
DRIVEWAY TYPICAL SECTION

DRIVEWAY SIDE SLOPES: ✳

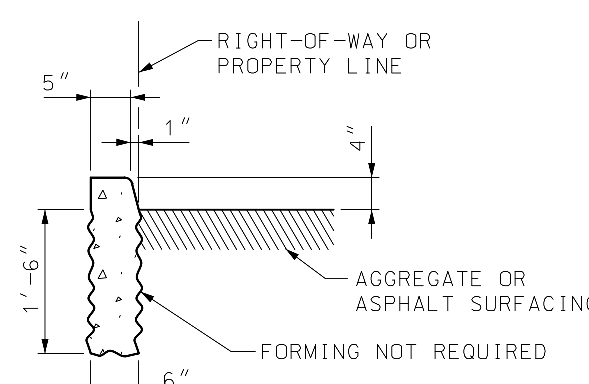
1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

✳ IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPE AND PIPE SECTIONS ON NEW CONSTRUCTION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".



SECTION THRU CONCRETE CURB AND GUTTER



SECTION THRU 4" BARRIER CURB

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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STATE OF MISSOURI
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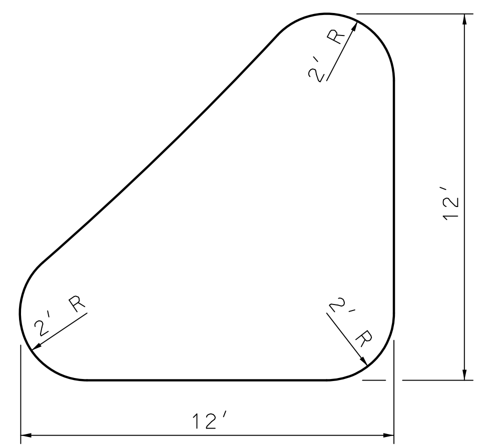
DRIVEWAY
TYPE IV

DATE EFFECTIVE:	07/01/2020	203.64E	SHEET NO. 2 OF 2
DATE PREPARED:	4/29/2020		

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



NOTE:

SEE STANDARD PLAN 203.50 FOR DETAILS OF LOW PROFILE ISLAND.

WHERE MINIMUM ISLAND CANNOT BE OBTAINED, OMIT ISLAND.

MINIMUM ISLAND DETAILS

	W	R	MIN. TURN LANE	TAPER
VOLUME PRODUCT	24'	90'	22'	5:1
TRUCK-SINGLE APPROACH	30'	95'	24'	5:1

NOTES:

THIS DRAWING SHALL BE USED IN CONJUNCTION WITH TYPES II AND III DRIVEWAYS WHEN TRAFFIC VOLUMES REQUIRE A VOLUME PRODUCT INTERSECTION AND TYPE IV WHEN A SINGLE APPROACH TRUCK DRIVEWAY IS DESIRED.

ALL CONTROLS PERTAINING TO GRADES, DRAINAGE, BASE, CURBING, ETC. SHALL BE AS SHOWN ON OTHER RESPECTIVE TYPE DRIVEWAY STANDARD PLANS.

THE "W" DIMENSIONS ARE RECOMMENDED WIDTH. OTHER ALLOWED WIDTHS MAY BE USED WITHIN TOLERANCES OF THE RESPECTIVE TYPE DRIVEWAY STANDARD PLANS.

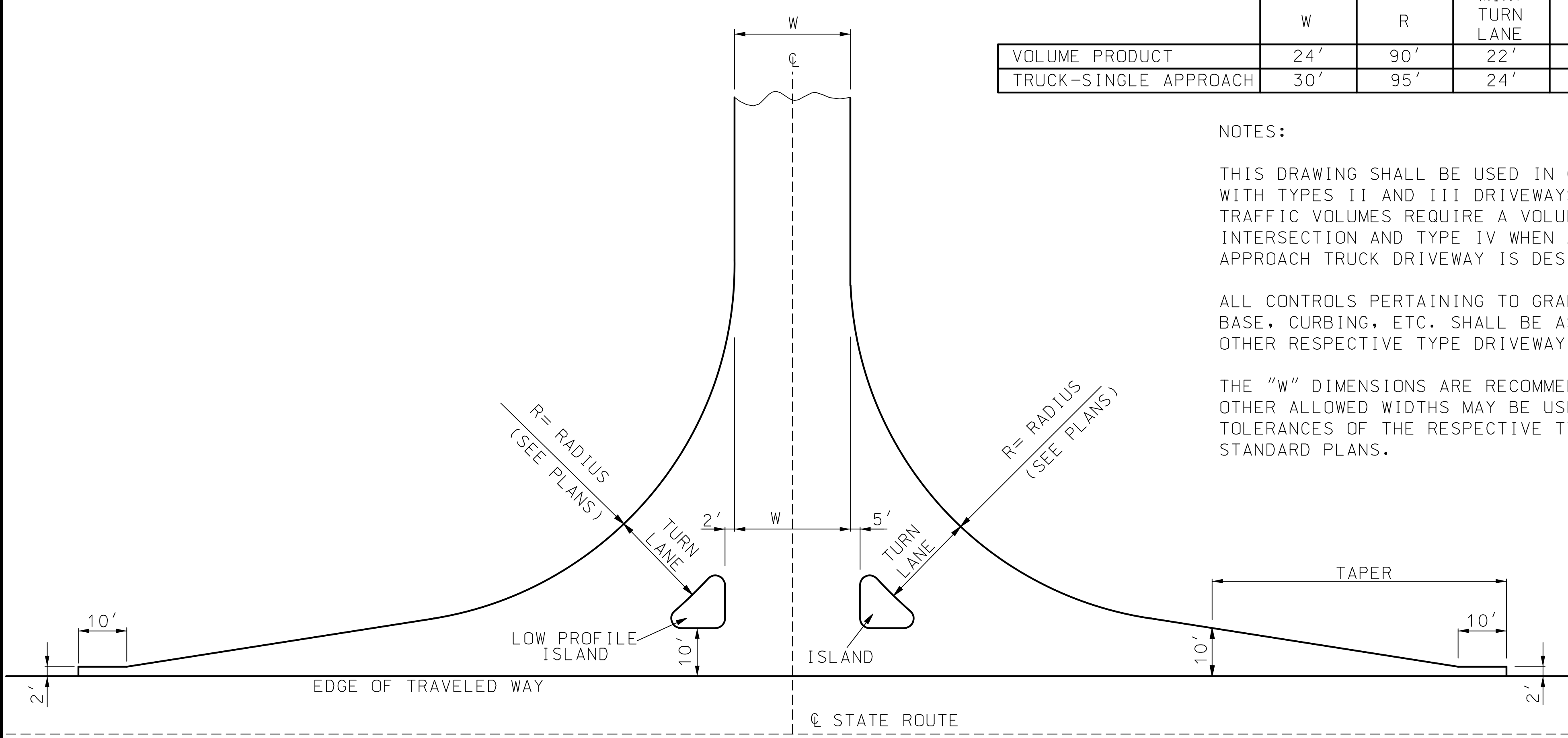
GENERAL NOTES:

DETAILS SHOWN ON THIS SHEET ARE FOR RIGHT ANGLE APPROACHES.

TAPER LENGTHS ARE NOT APPLICABLE WHEN DECELERATION LANES ARE PROVIDED.

SIGNALIZED INTERSECTIONS AND INTERSECTIONS IN DEVELOPED AREAS MAY BE MODIFIED TO MEET EXISTING CONDITIONS.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.



PLAN VIEW

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

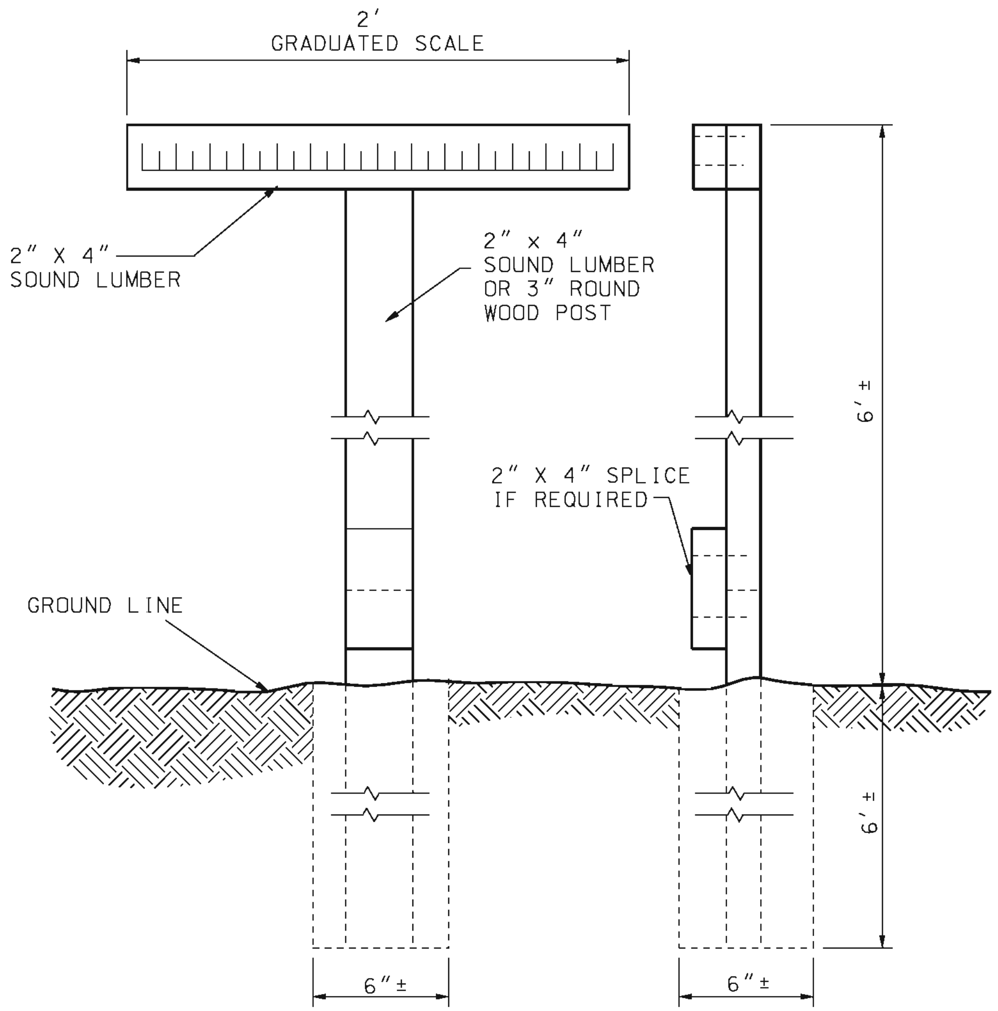
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DRIVEWAY
TYPE V

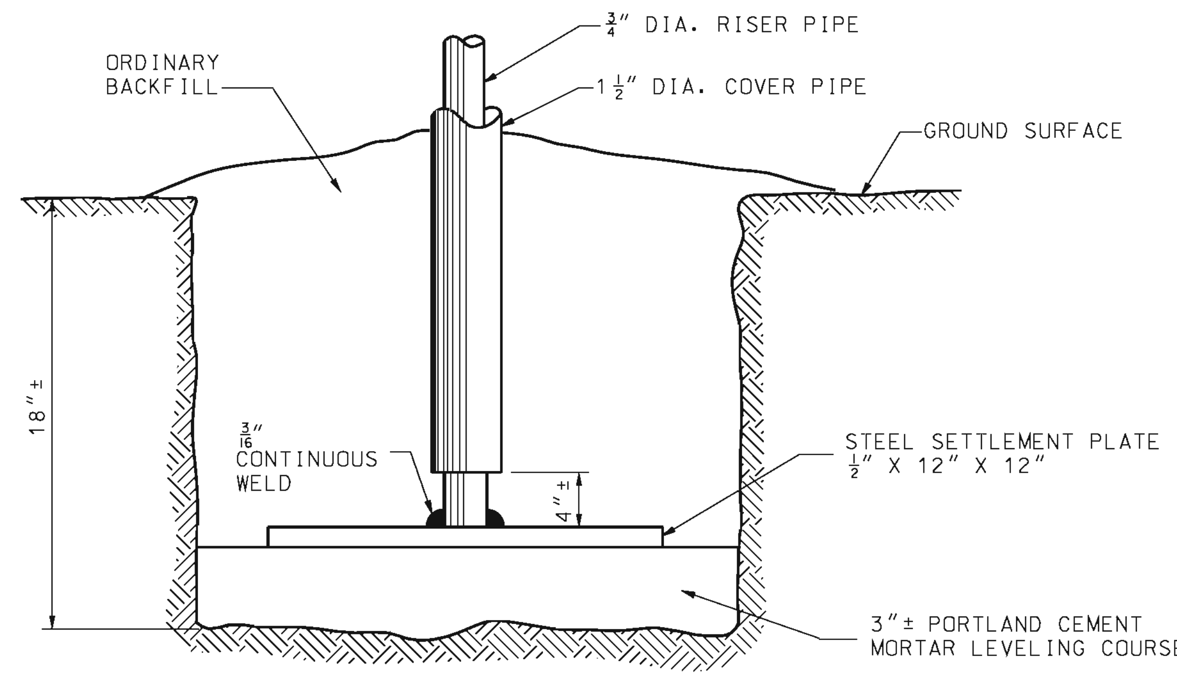
DATE EFFECTIVE: 07/01/2020
DATE PREPARED: 4/29/2020

203.65B

SHEET NO.
1 OF 1



EMBANKMENT CONTROL STAKE



SETTLEMENT GAUGE

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

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

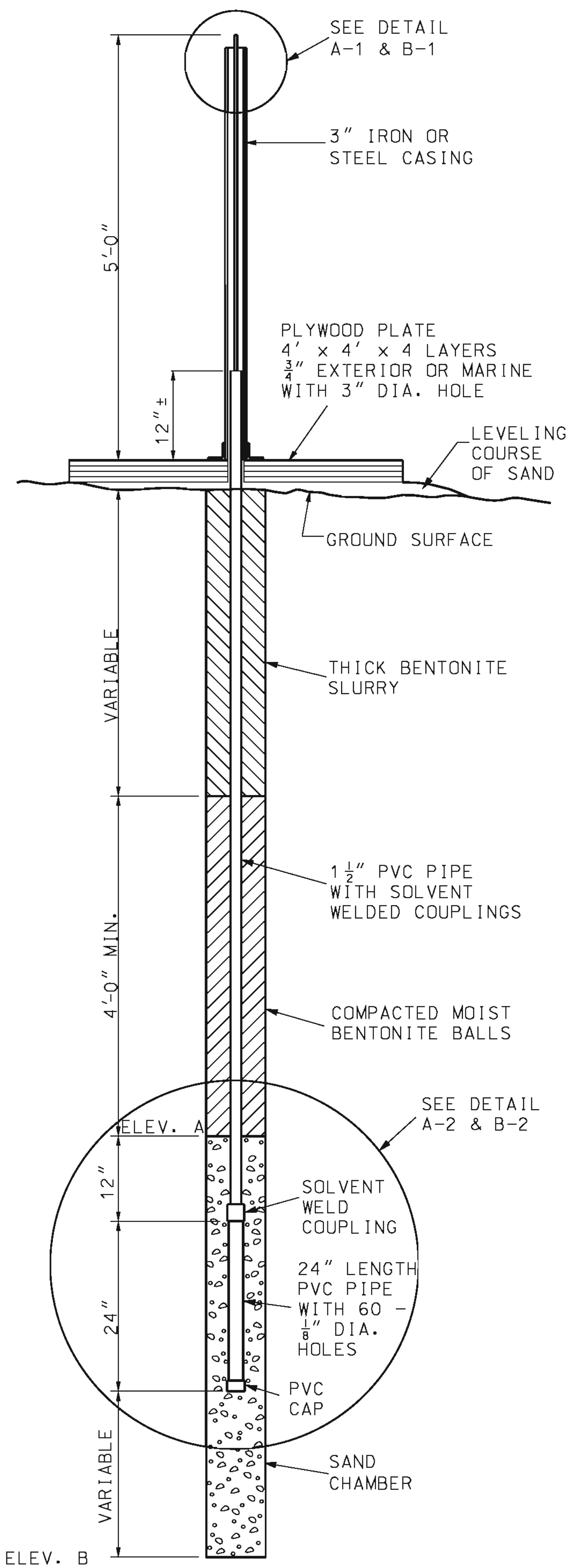
EMBANKMENT CONTROL

MEASURING DEVICES

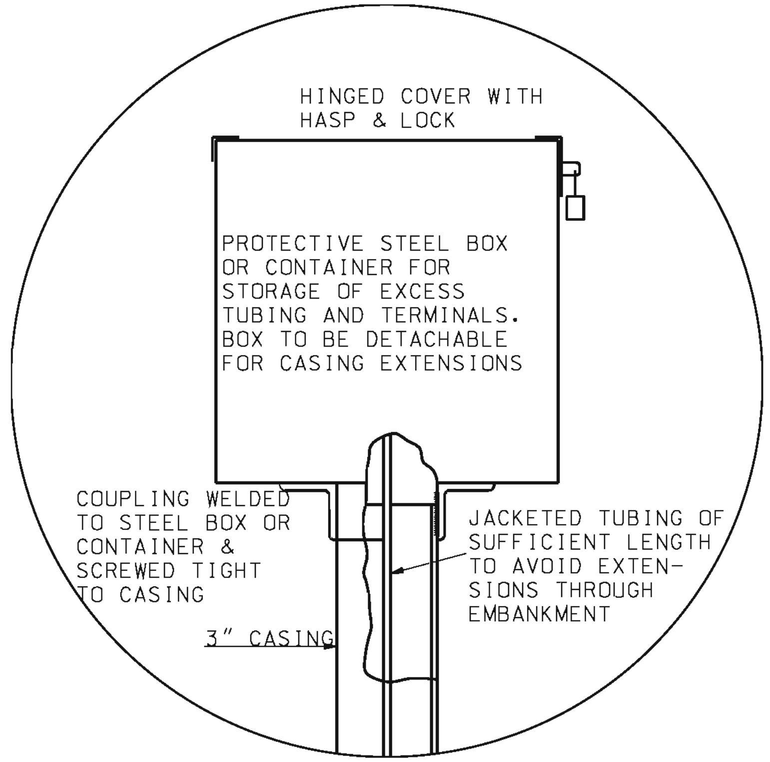
DATE EFFECTIVE: 04/01/1983
DATE PREPARED: 8/21/2009

204.00D

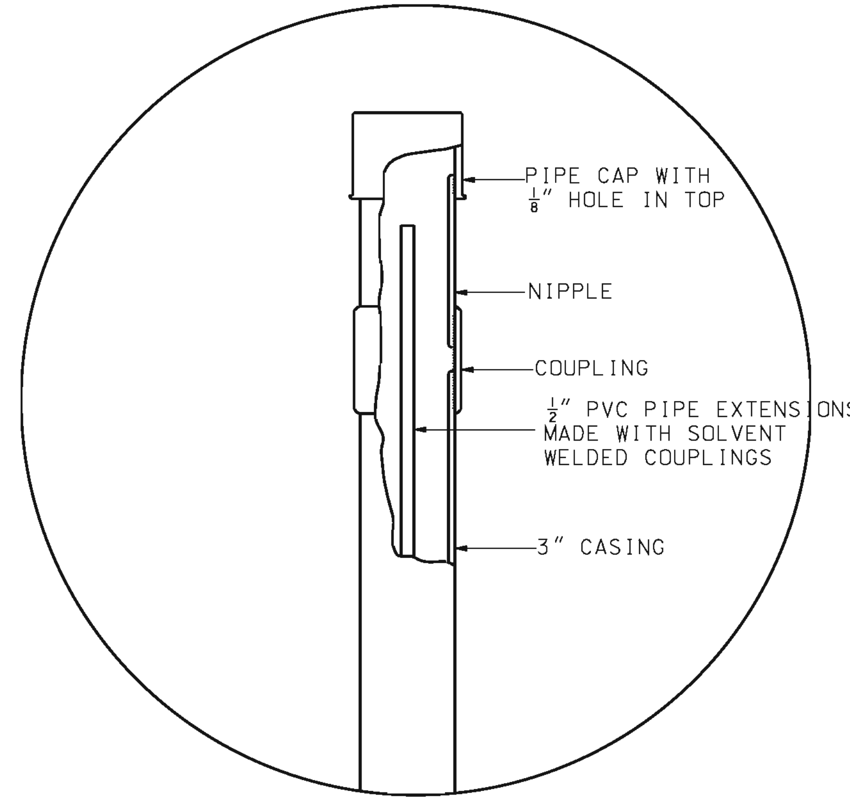
SHEET NO. 1 OF 1



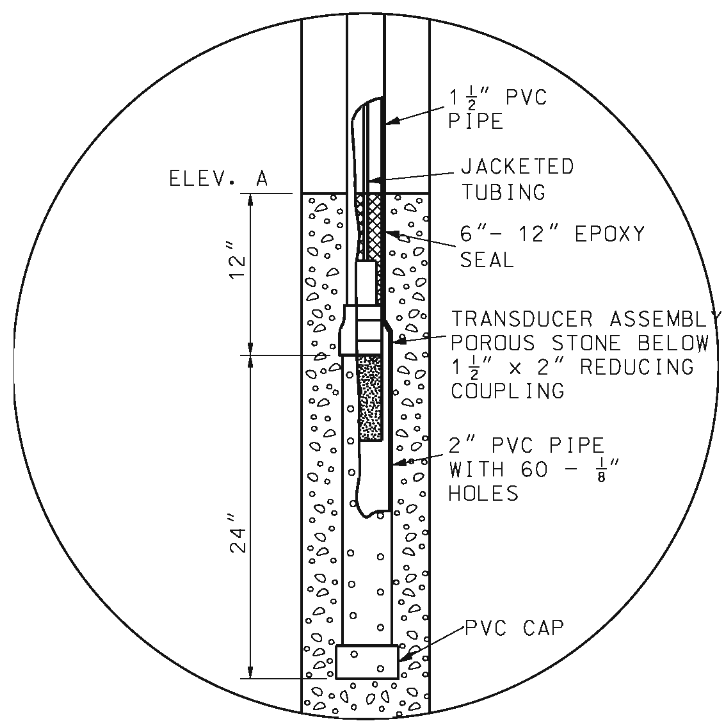
GENERAL



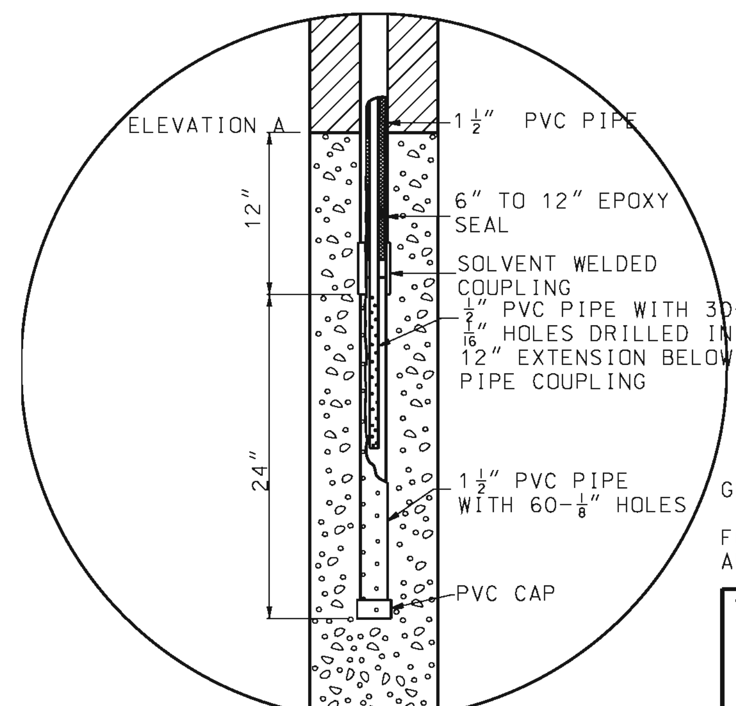
DETAIL A-1



DETAIL B-1



DETAIL A-2
TYPE A



DETAIL B-2
TYPE B

GENERAL NOTES:

FOR ELEVATION A AND ELEVATION B STATION, LOCATIONS AND EMBANKMENT CONTROL LIMITS, SEE ROADWAY PLANS.

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KATHRYN PHILLIPS HARVEY
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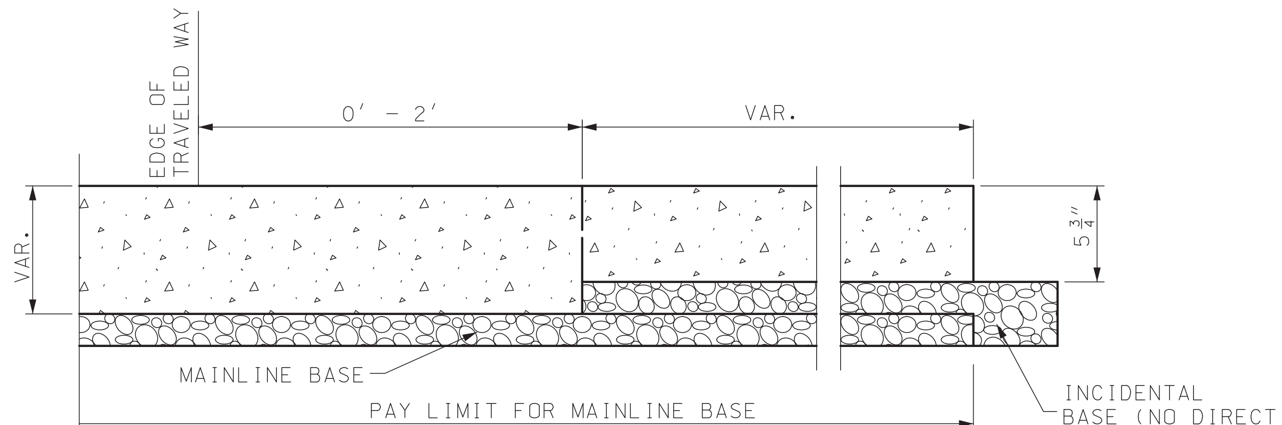
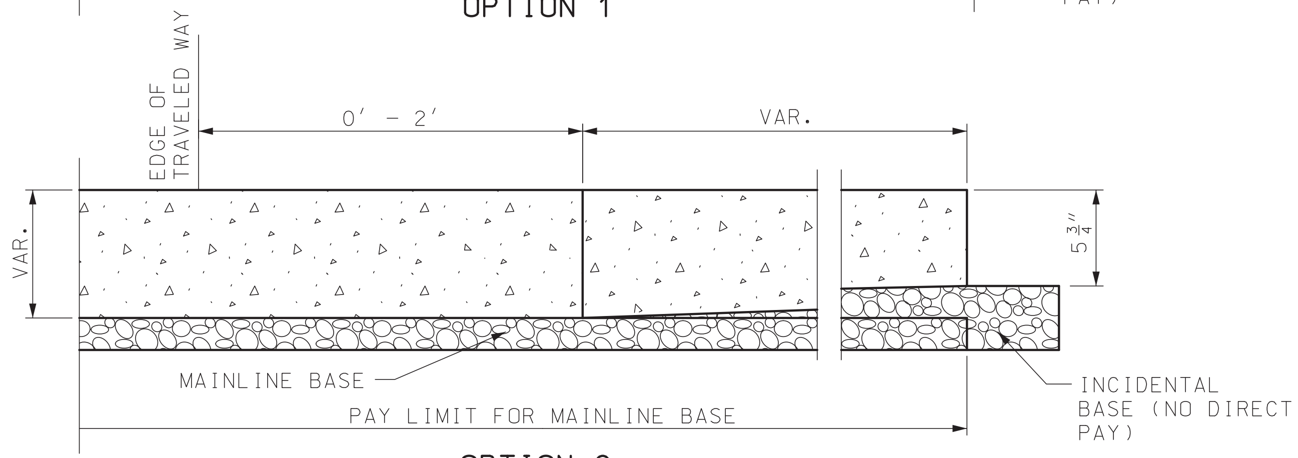
PORE PRESSURE MEASUREMENT DEVICES

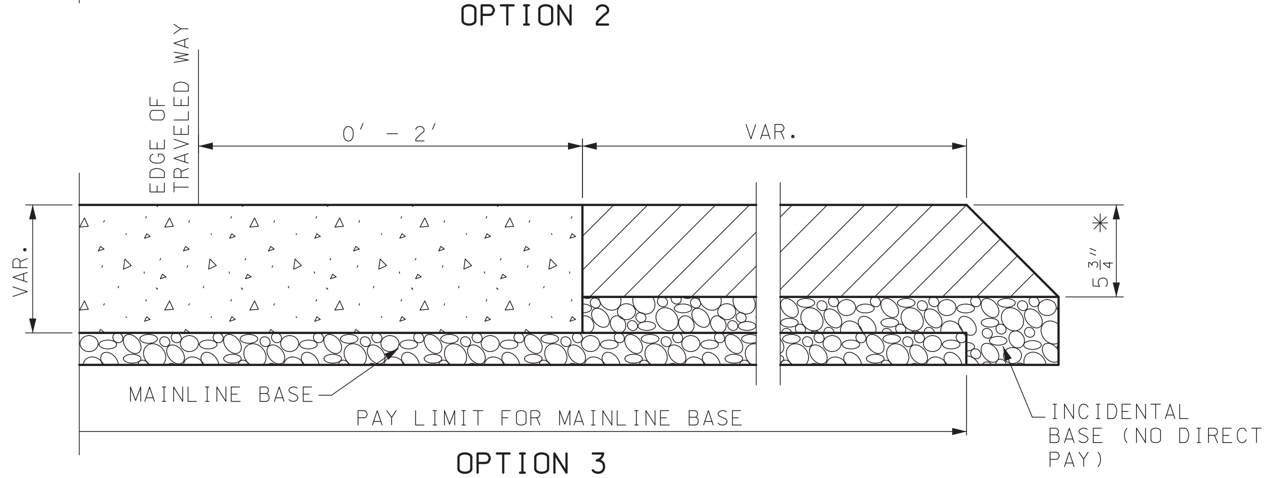
DATE EFFECTIVE: 03/01/1996 DATE PREPARED: 8/21/2009	204.30	SHEET NO. 1 OF 1



OPTION 1

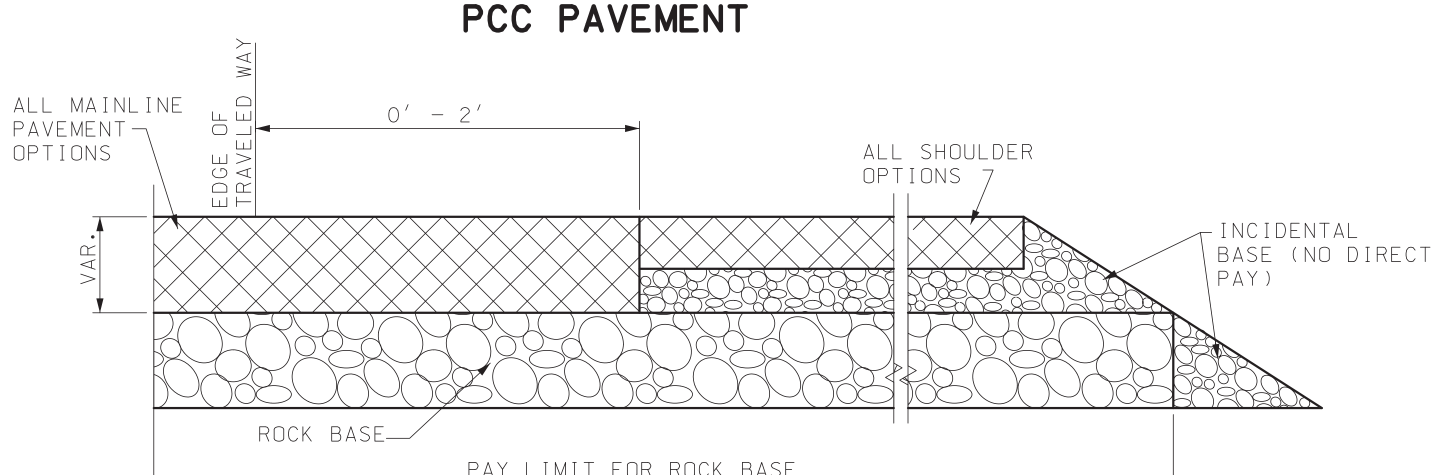


OPTION 2

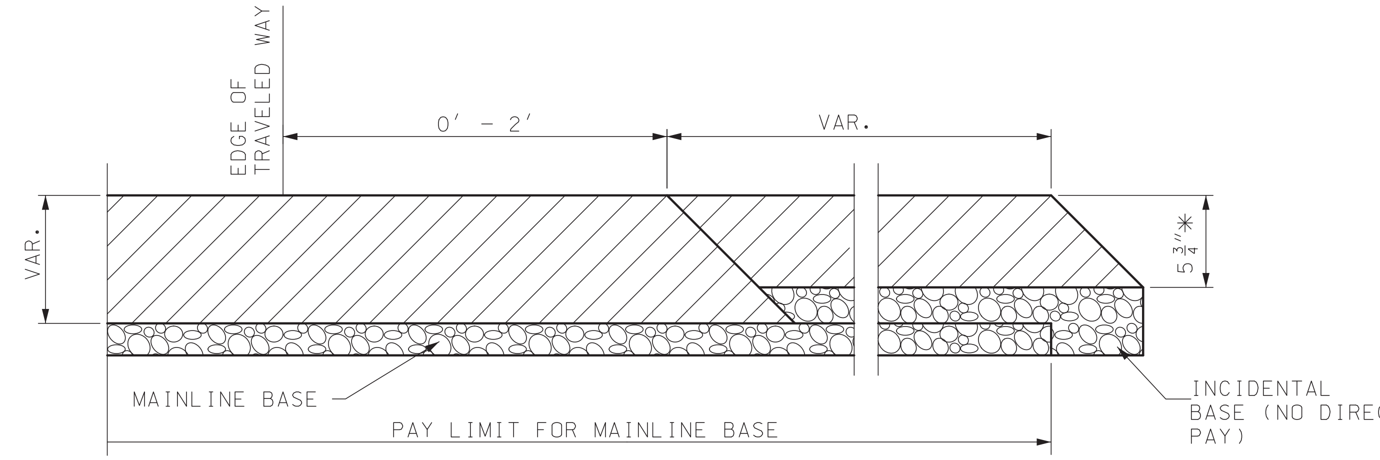


OPTION 3

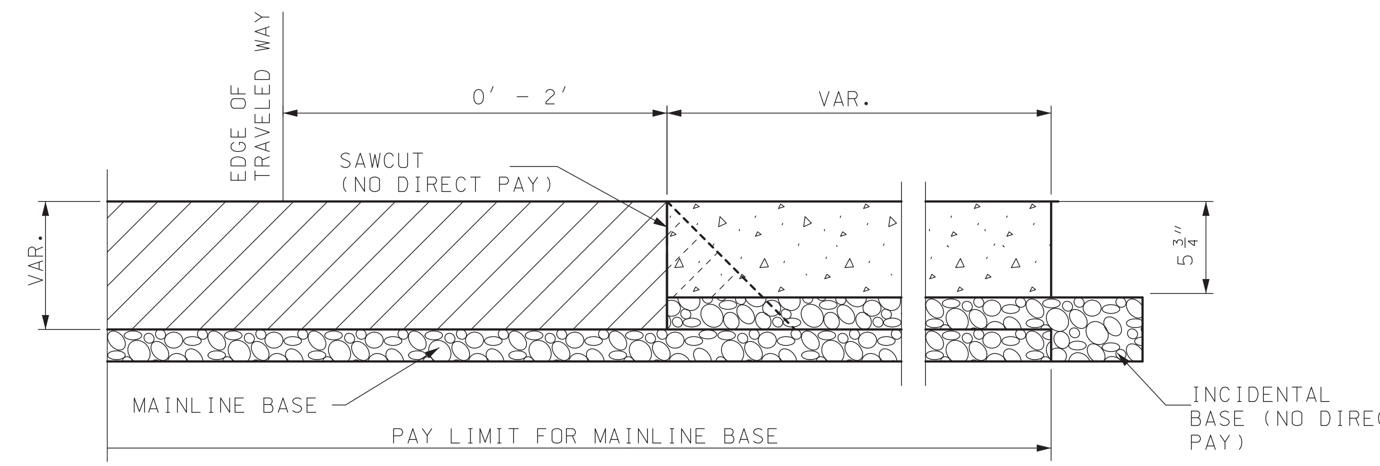
PCC PAVEMENT



PAVEMENT ON ROCK BASE



HMA PAVEMENT



HMA PAVEMENT

RCC (ROLLER COMPACTED CONCRETE) OR PCC (PORTLAND CEMENT CONCRETE)

HMA (HOT MIX ASPHALT)

BASE

✳ USE 1 3/4" BP-1 OVER 4" PMBB UNLESS OTHERWISE SPECIFIED ON THE PLANS.

GENERAL NOTE:

THE FINAL FINISH ON CONCRETE SHOULDERS MAY BE OBTAINED BY THE USE OF A DRAG CONSISTING OF A SEAMLESS STRIP OF DAMP BURLAP, COTTON FABRIC, PLASTIC TURF, OR OTHER SUITABLE MATERIAL CAPABLE OF PRODUCING A UNIFORM SURFACE OF GRITTY TEXTURE.

THE QUANTITY FOR ADDITIONAL BASE MATERIAL RESULTING FROM THE VARIABLE THICKNESS MATERIAL OR CONSTRUCTION METHOD OF TYPE A2 SHOULDER WILL BE CONSIDERED INCIDENTAL.

INCIDENTAL BASE SHALL CONSIST OF TYPE 1 OR 5 AGGREGATE FOR BASE, OR AN ALTERNATE MATERIAL THAT MEETS THE APPROVAL OF THE ENGINEER.

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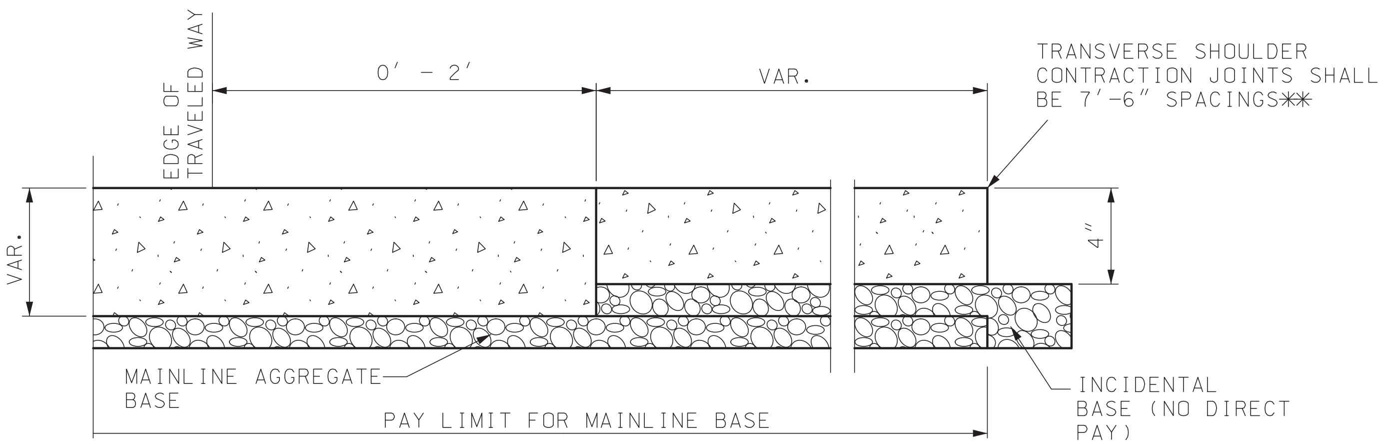
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TYPE A2 SHOULDERS

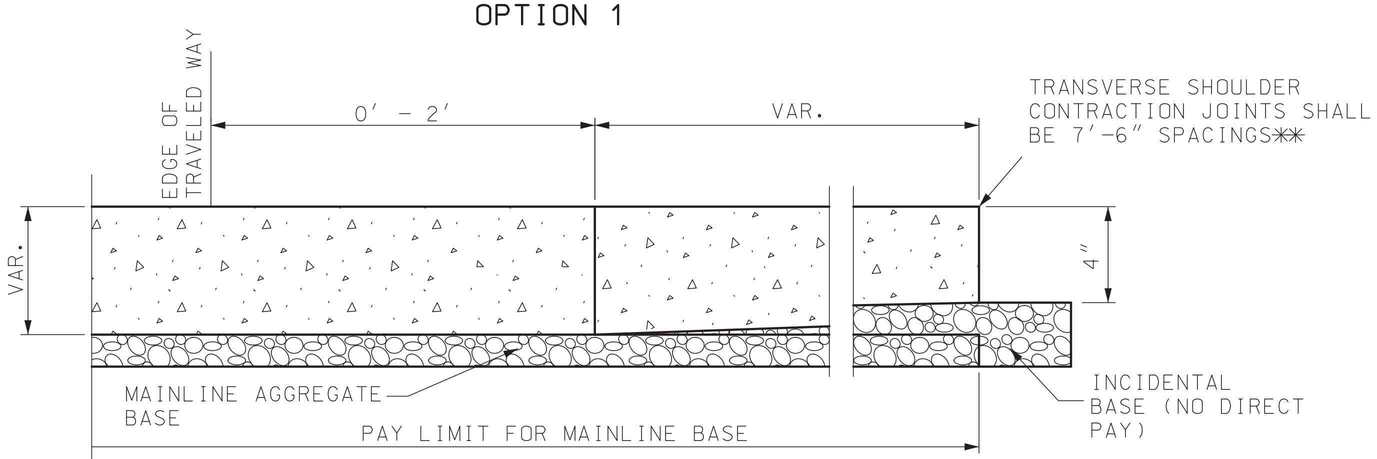
DATE EFFECTIVE: 07/01/2018
DATE PREPARED: 5/3/2018

401.00C

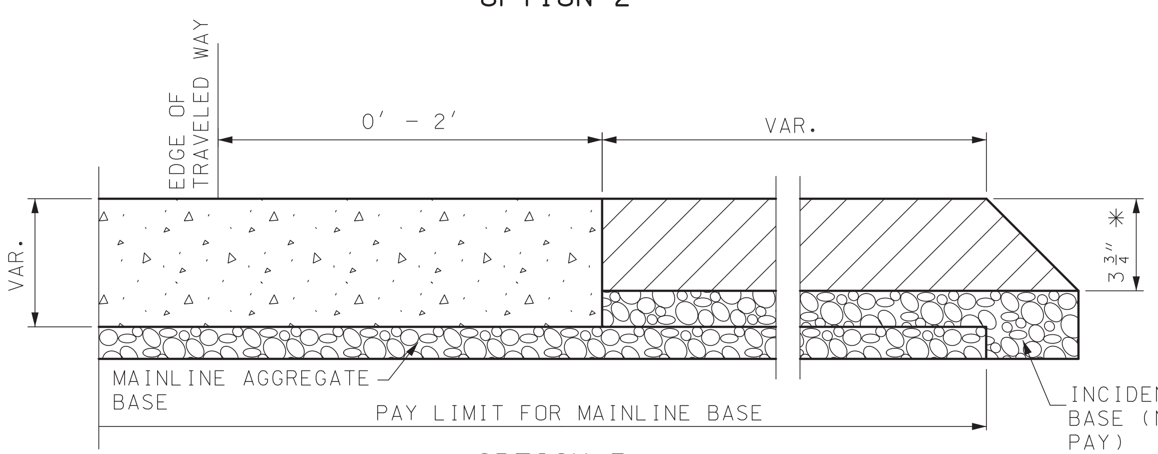
SHEET NO. 1 OF 3



OPTION 1

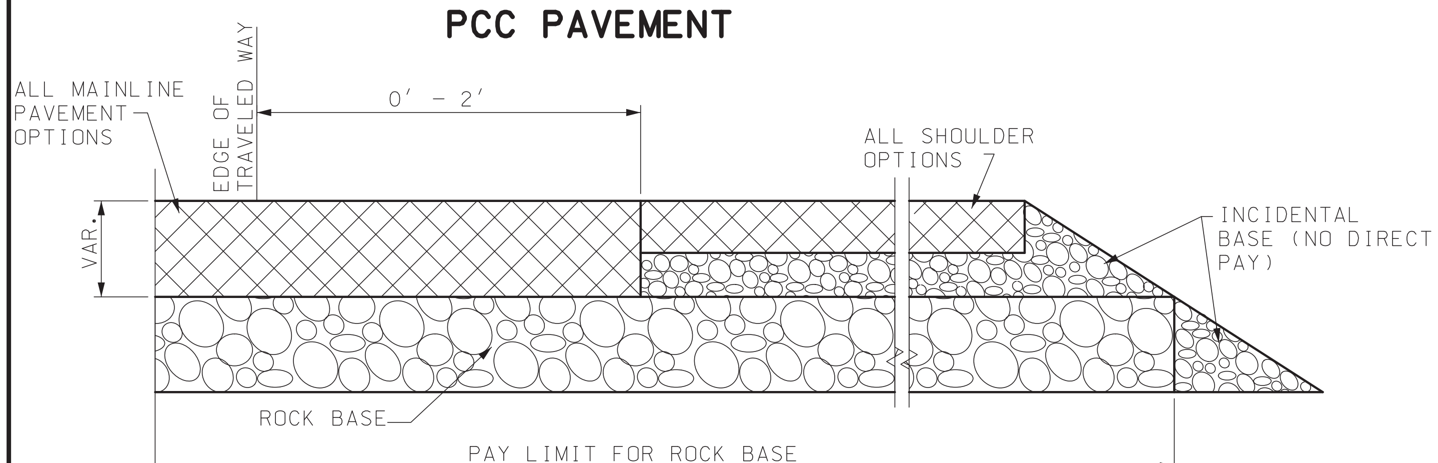


OPTION 2

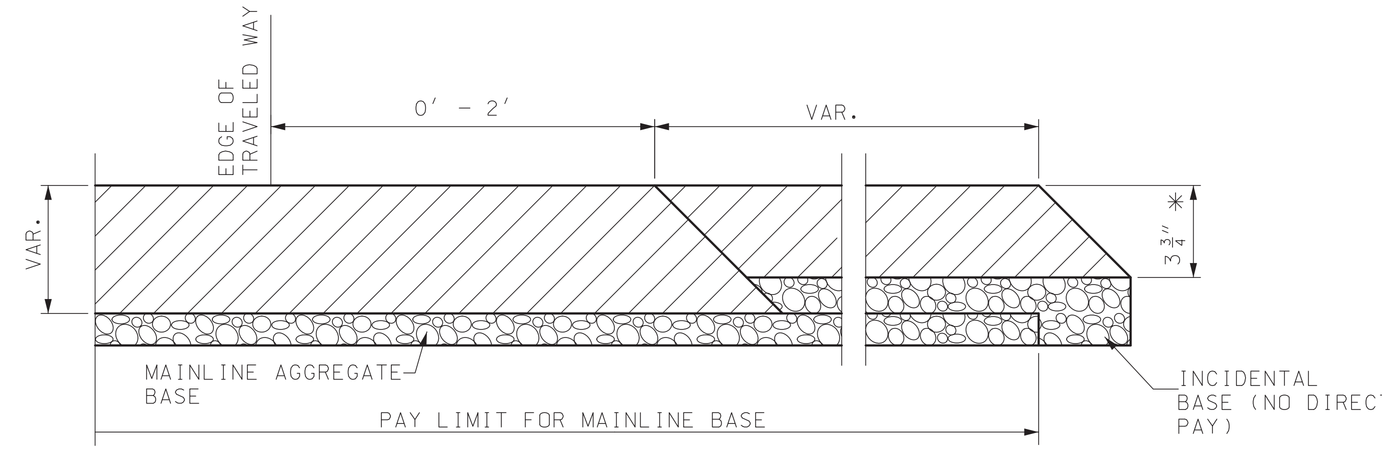


OPTION 3

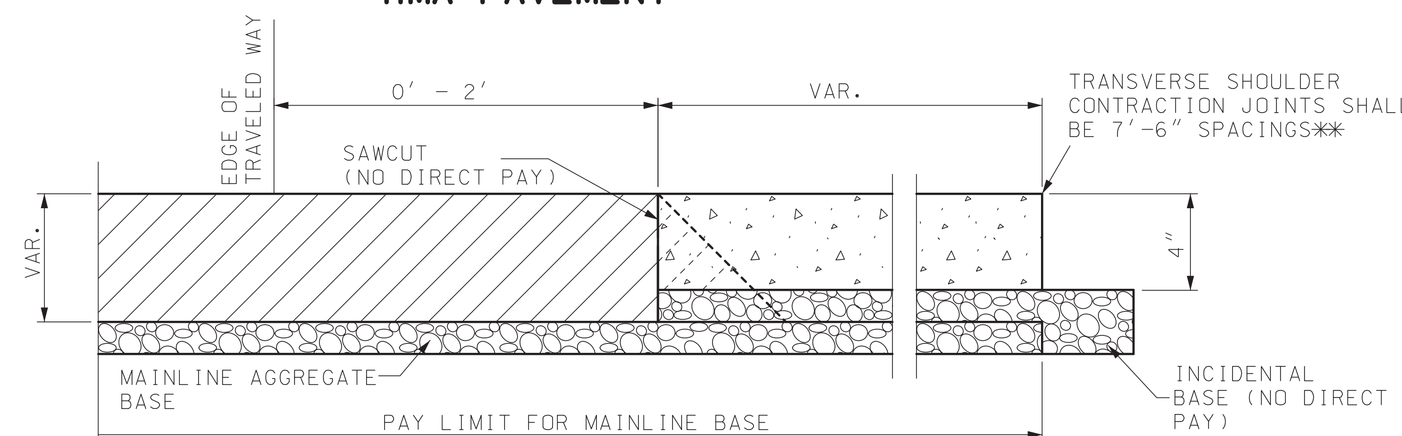
PCC PAVEMENT



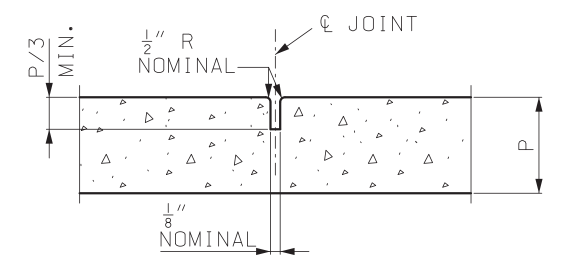
PAVEMENT ON ROCK BASE



HMA PAVEMENT



HMA PAVEMENT



TOOL JOINT

P = SHOULDER THICKNESS

GENERAL NOTE:

THE FINAL FINISH ON CONCRETE SHOULDERS MAY BE OBTAINED BY THE USE OF A DRAG CONSISTING OF A SEAMLESS STRIP OF DAMP BURLAP, COTTON FABRIC, PLASTIC TURF OR OTHER SUITABLE MATERIAL CAPABLE OF PRODUCING A UNIFORM SURFACE OF GRITTY TEXTURE.

THE QUANTITY FOR ADDITIONAL BASE MATERIAL RESULTING FROM THE VARIABLE THICKNESS MATERIAL OR CONSTRUCTION METHOD OF TYPE A3 SHOULDER WILL BE CONSIDERED INCIDENTAL.

INCIDENTAL BASE SHALL CONSIST OF TYPE 1 OR 5 AGGREGATE FOR BASE, OR AN ALTERNATE MATERIAL THAT MEETS THE APPROVAL OF THE ENGINEER.

RCC (ROLLER COMPACTED CONCRETE) OR PCC (PORTLAND CEMENT CONCRETE)
HMA (HOT MIX ASPHALT)
BASE

✻ USE 3 3/4" BP-1 UNLESS OTHERWISE SPECIFIED ON THE PLANS.

✻✻ JOINT DEPTH SHALL BE P/3 AND MAY BE SAWED OR TOOLED.

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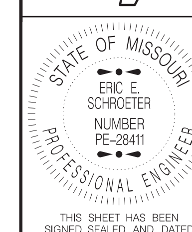
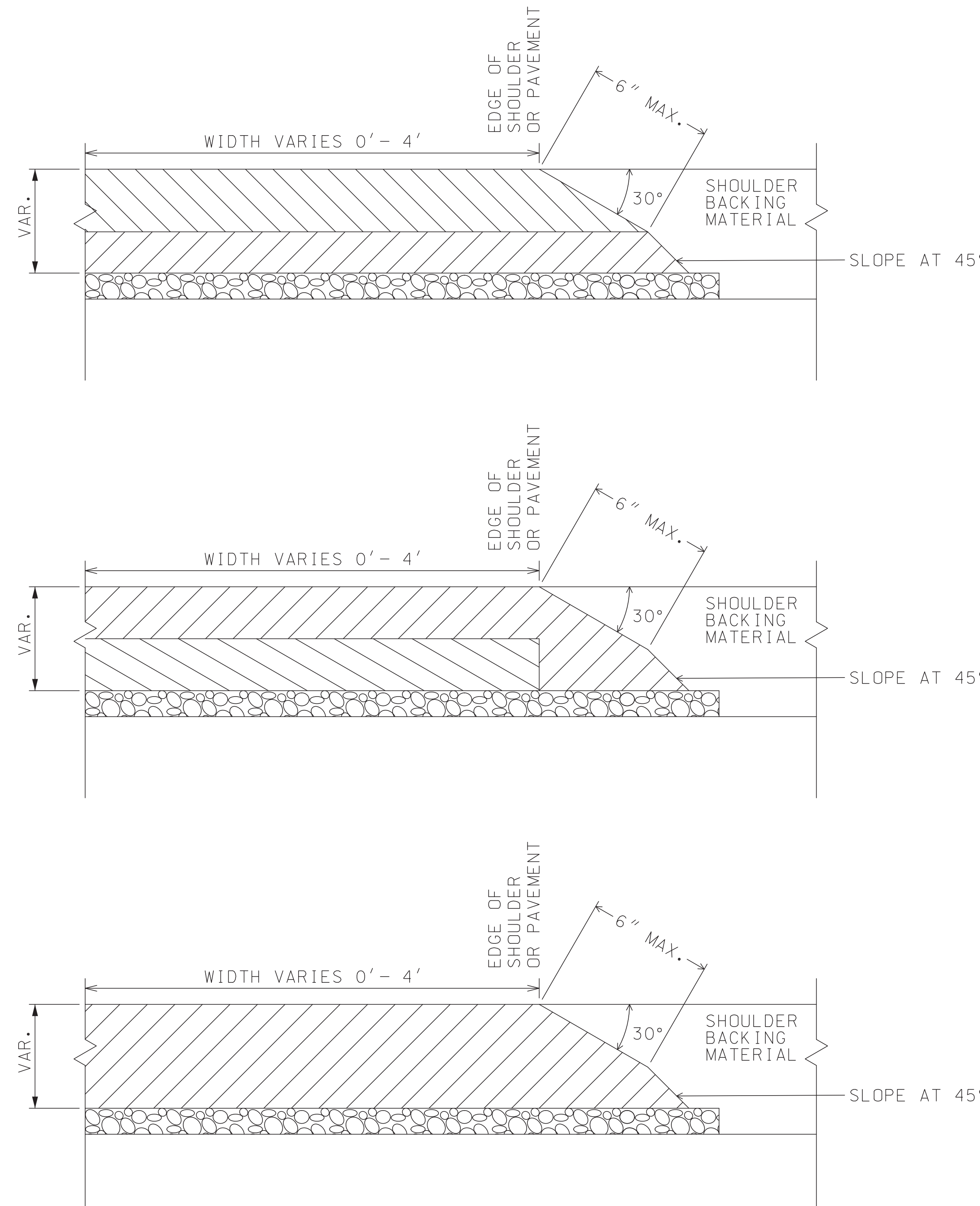


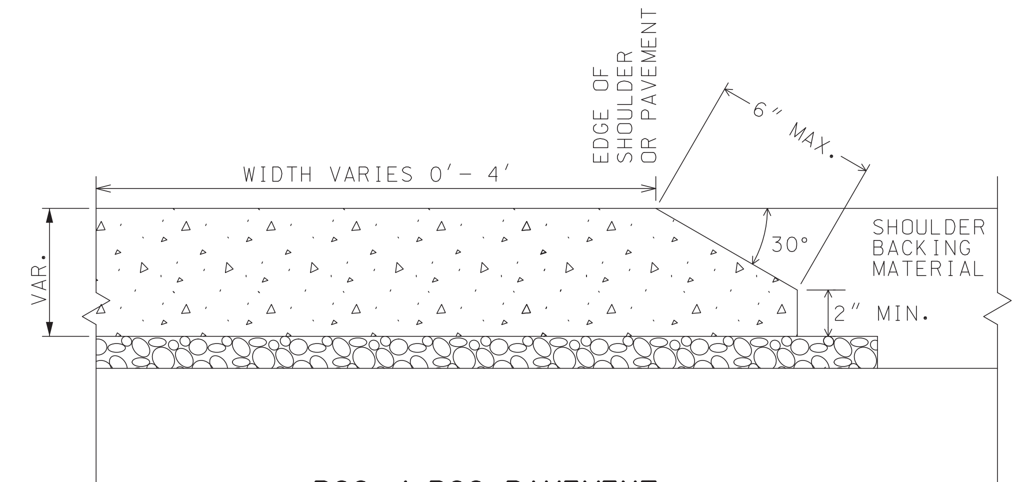
TYPE A3 SHOULDERS

DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018	401.00C	SHEET NO. 2 OF 3

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



HMA PAVEMENT



PCC / RCC PAVEMENT

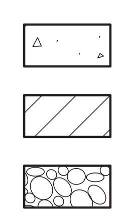
GENERAL NOTES:

THE SAFETY EDGE℠ SHALL BE CONSTRUCTED AT A SLOPE OF 30° FROM THE HORIZONTAL. THE LENGTH, AS MEASURED ALONG THE SLOPE, SHALL BE APPROXIMATELY 2 TIMES THE DEPTH, UP TO A MAXIMUM LENGTH OF 6".

THE SAFETY EDGE℠ SHALL BE CONSTRUCTED MONOLITHICALLY WITH THE SHOULDER OR PAVEMENT.

THE SAFETY EDGE℠ SHALL BE BACKFILLED AS SHOWN.

REGARDLESS OF PAVEMENT TYPE, WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE PER SQUARE YARD, THE MATERIAL NECESSARY TO CONSTRUCT THE SAFETY EDGE℠ IS CONSIDERED INCIDENTAL TO THE PAVEMENT OR SHOULDER. NO MEASUREMENT WILL BE MADE FOR THE MATERIAL USED IN THE SAFETY EDGE℠ EXCEPT WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE IN VOLUME OR WEIGHT.



RCC (ROLLER COMPACTED CONCRETE) OR PCC (PORTLAND CEMENT CONCRETE)

HMA (HOT MIX ASPHALT)

BASE MATERIAL (IF APPLICABLE)

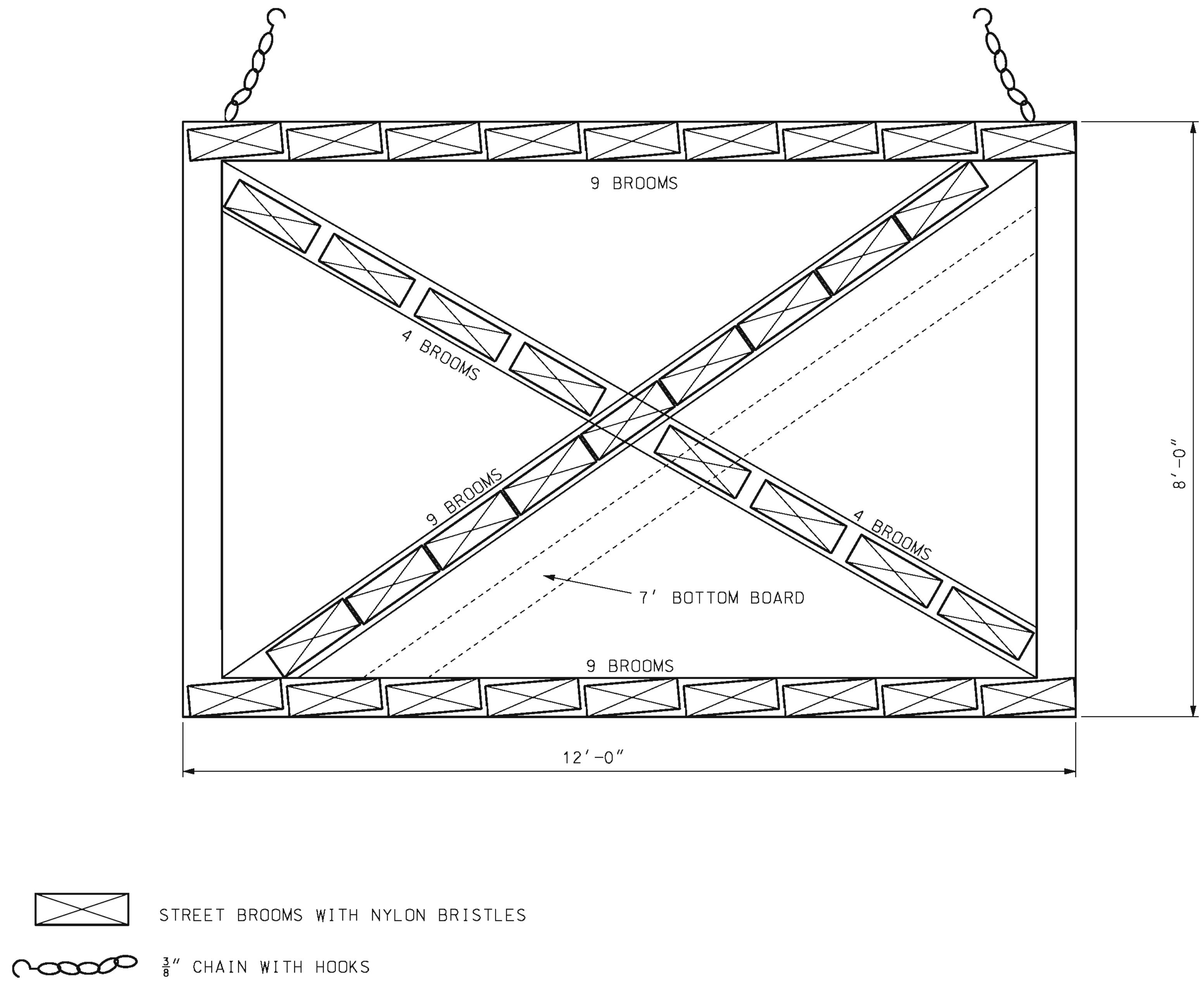
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SAFETY EDGE℠

DATE EFFECTIVE:	07/01/2018	401.00C	SHEET NO. 3 OF 3
DATE PREPARED:	5/3/2018		



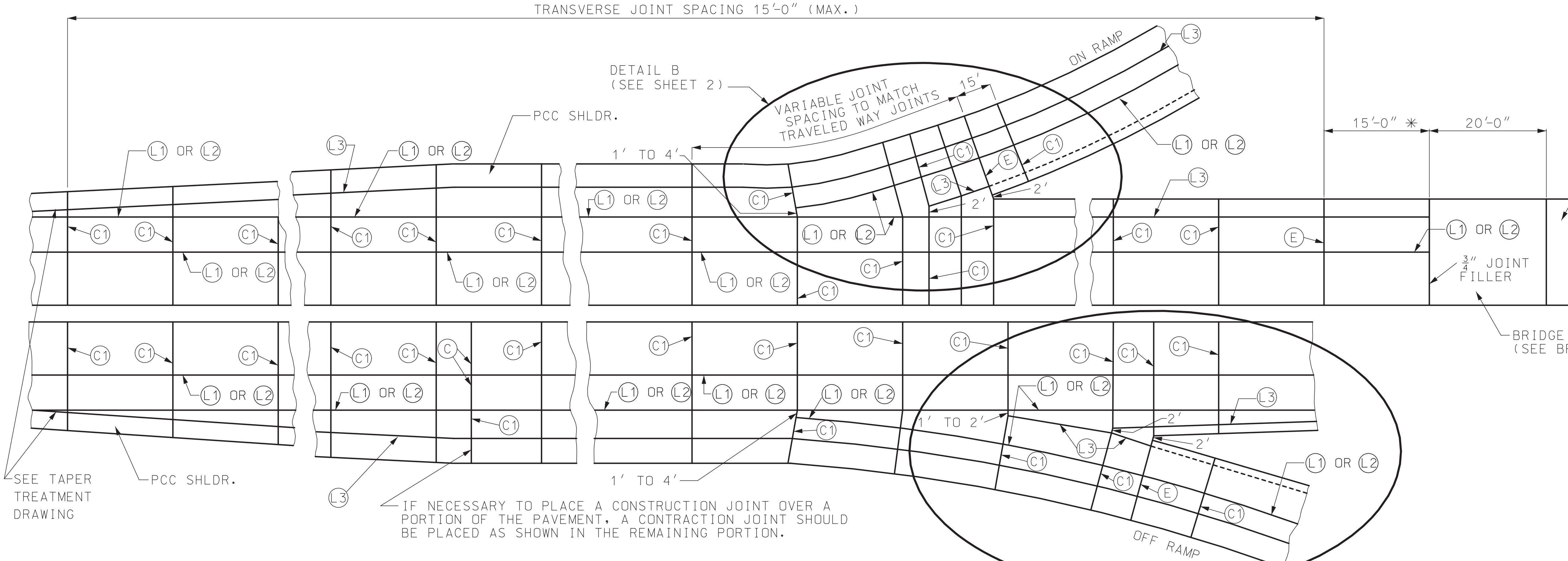
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

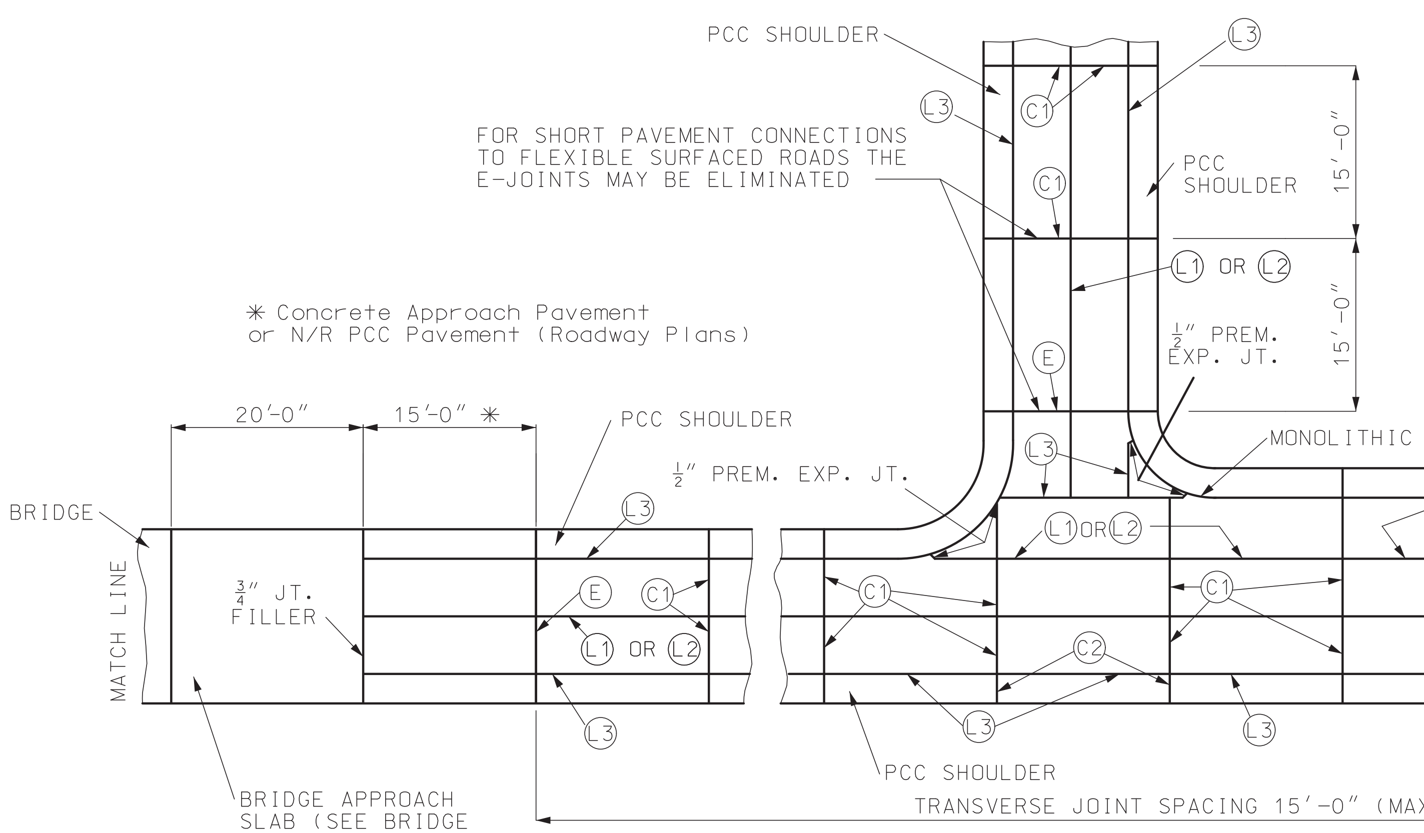
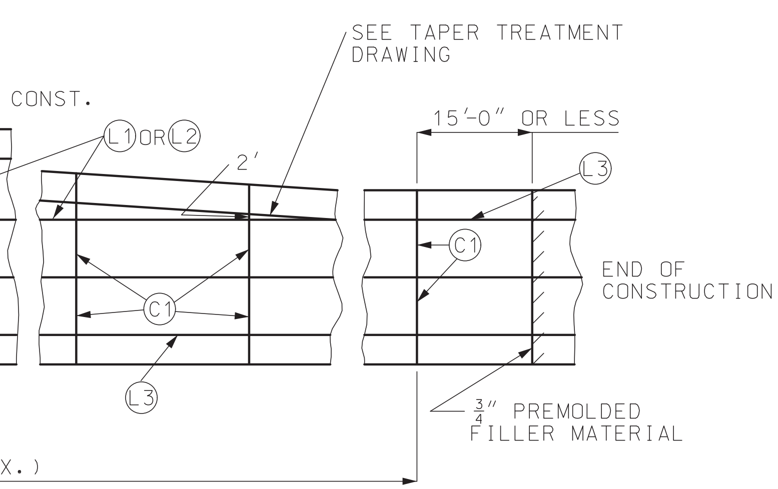
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SCRUB SEAL BROOM CONFIGURATION

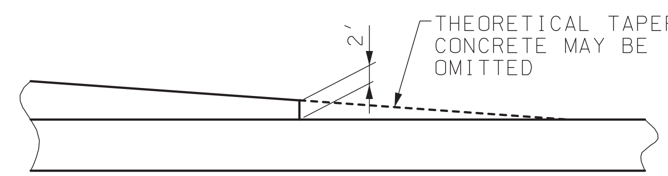
DATE EFFECTIVE:	07/01/2004	413.20	SHEET NO.
DATE PREPARED:	8/21/2009		1 OF 1



INTERCHANGE

NON-INTERCHANGE



TAPER TREATMENT

GENERAL NOTES:

ALL TRANSVERSE JOINTS ON SHOULDERS SHALL BE C2 .

THE CONTRACTOR SHALL DETERMINE THE PAVING WIDTH.

THE INTERCHANGE WILL EXTEND FROM THE BEGINNING OF THE ACCELERATION/DECELERATION LANE TO THE GORE RETURN TAPER ON THE MAINLINE. THE INTERCHANGE WILL ALSO INCLUDE THE RAMPS UP TO THE BEGINNING OF THE RADIUS WITH THE ROAD INTERSECTING THE RAMP.

FOR JOINT DETAILS, SEE SHEETS NO. 3 & 4.

THE JOINT LAYOUT OF RAMPS IS TYPICAL FOR OUTER RAMPS OF CLOVERLEAF AND DIAMOND INTERCHANGES. SEE OTHER DRAWINGS FOR SPECIAL JOINT LAYOUTS.

JOINT SPACING SHOWN IS MAXIMUM AND IS TO BE REDUCED TO AVOID CONFLICT WITH ABUTTING STRUCTURES. JOINTS IN MULTI-LANE PAVEMENT ARE TO BE CONTINUOUS.

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

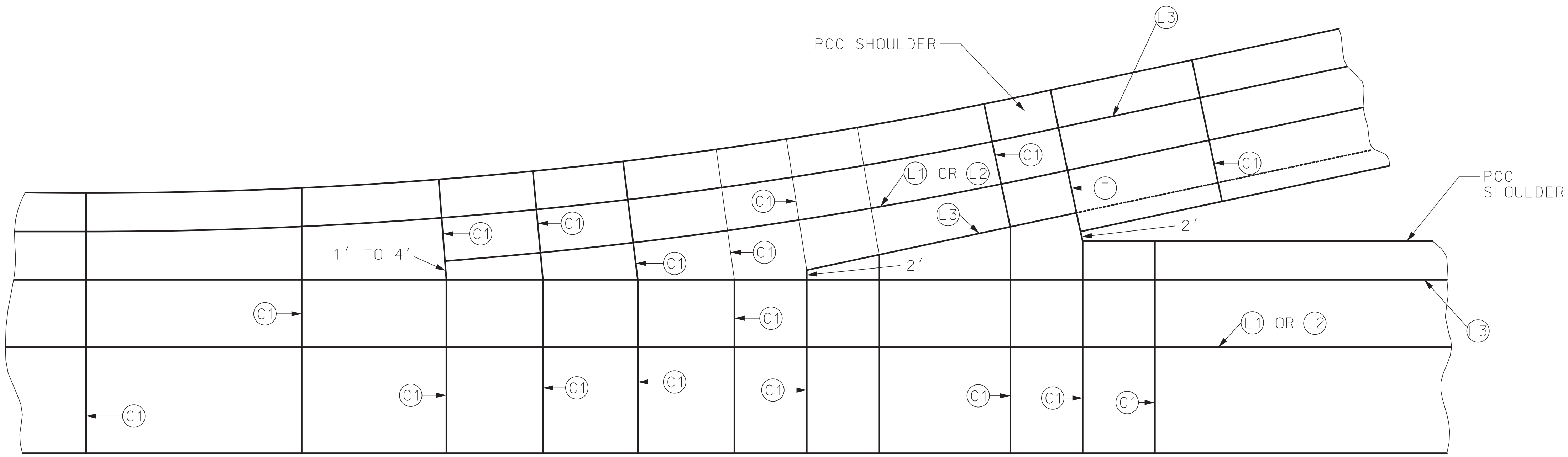
CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

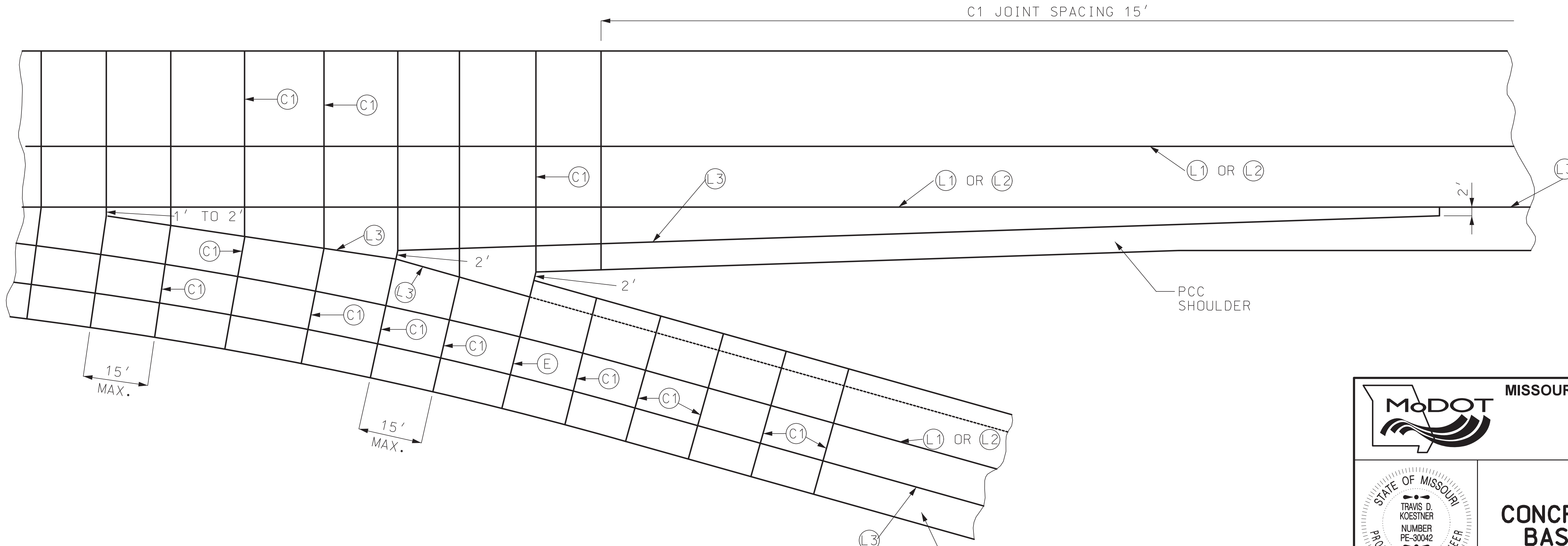
502.05S

SHEET NO. 1 OF 4

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



DETAIL B
(FROM SHEET 1 OF 4)



DETAIL A
(FROM SHEET 1 OF 4)

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

STATE OF MISSOURI
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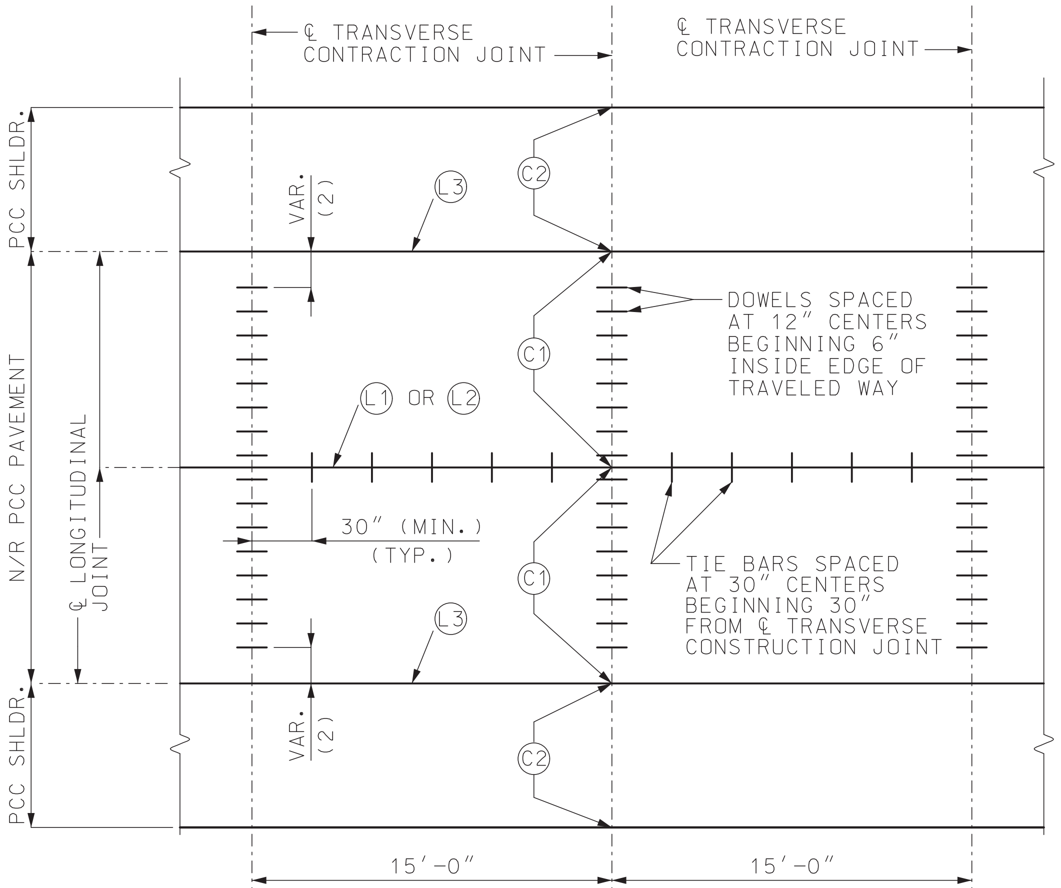
CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING

DATE EFFECTIVE:	4/1/2023	502.05S	SHEET NO. 2 OF 4
DATE PREPARED:	1/6/2023		

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



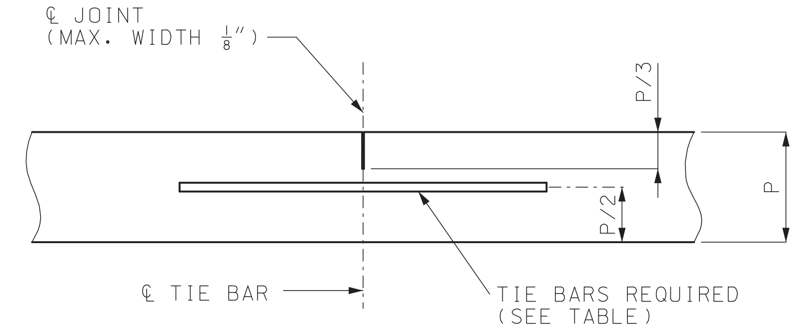
JOINT PLAN AND SPACING FOR CONTRACTION JOINTS (1)

(1) LONGITUDINAL JOINT NOT REQUIRED FOR 4′ OR NARROWER SHOULDER, PAVED MONOLITHICALLY WITH ADJACENT LANE AT THE SAME THICKNESS; FULL DEPTH SHOULDER WIDER THAN 4′ SHALL REQUIRE L1 OR L2 JOINT INSTEAD OF L3 JOINT.

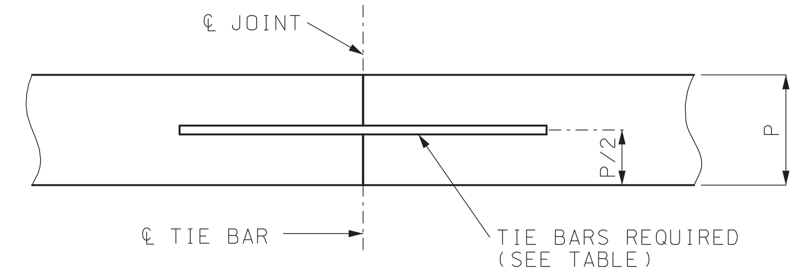
(2) DOWEL BARS BEGIN 6″ INSIDE EDGE OF TRAVELED WAY.

DOWEL AND TIE BAR TABLE

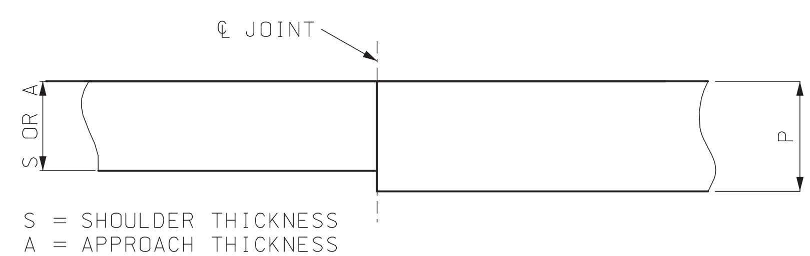
PCCP THICKNESS (P)	DOWEL		TIE BAR	
	SIZE	SPACING	SIZE	SPACING
LESS THAN 7″	NONE	NONE	#5X30″	30″ CTRS.
7″ TO 10″	$1\frac{1}{4}$″X18″	12″ CTRS.	#5X30″	30″ CTRS.
GREATER THAN 10″	$1\frac{1}{2}$″X18″	12″ CTRS.	#6X40″	30″ CTRS.



LONGITUDINAL JOINT L1

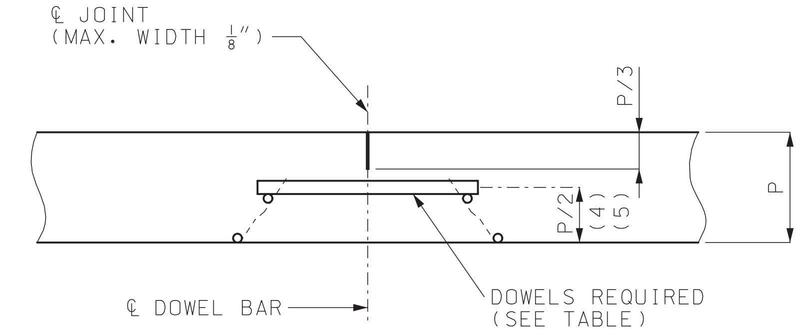


LONGITUDINAL CONSTRUCTION JOINT L2



S = SHOULDER THICKNESS
A = APPROACH THICKNESS

LONGITUDINAL CONSTRUCTION JOINT L3 FOR SHOULDER AND APPROACHES



FOR PERMISSIBLE TYPES OF DOWEL SUPPORTING UNITS, SEE OTHER DRAWINGS.

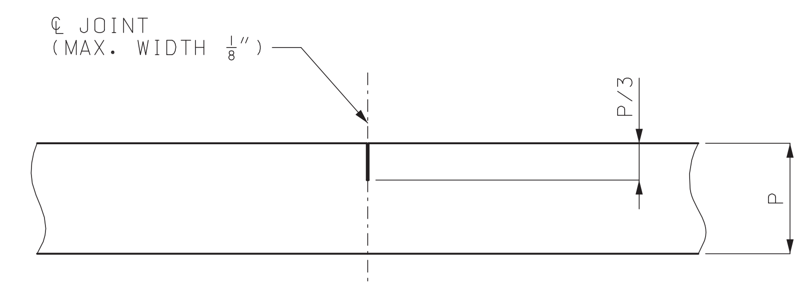
TRANSVERSE CONTRACTION JOINTS FOR CONCRETE PAVEMENT OR BASE WIDENING SHALL MATCH EXISTING JOINTS.

TRANSVERSE CONTRACTION JOINT C1 (3)

(3) DOWEL BARS ARE REQUIRED FOR ALL PAVEMENTS HAVING THE SAME THICKNESS AS THE TRAVELED WAY.

(4) FOR PAVEMENTS HAVING THICKNESS IN $\frac{1}{2}$″ INCREMENTS, DOWEL BASKETS SHALL BE (P-$\frac{1}{2}$″)/2.

(5) DOWEL BARS MAY BE PLACED BY MECHANICAL MEANS AT THE OPTION OF THE CONTRACTOR.



TRANSVERSE CONTRACTION JOINT C2

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.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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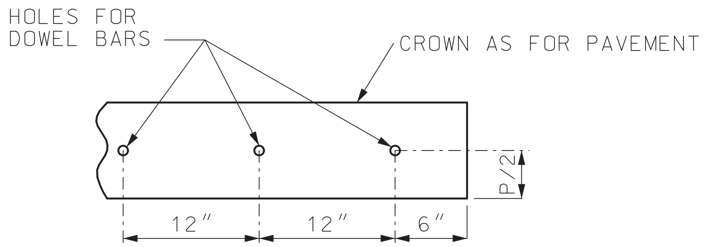
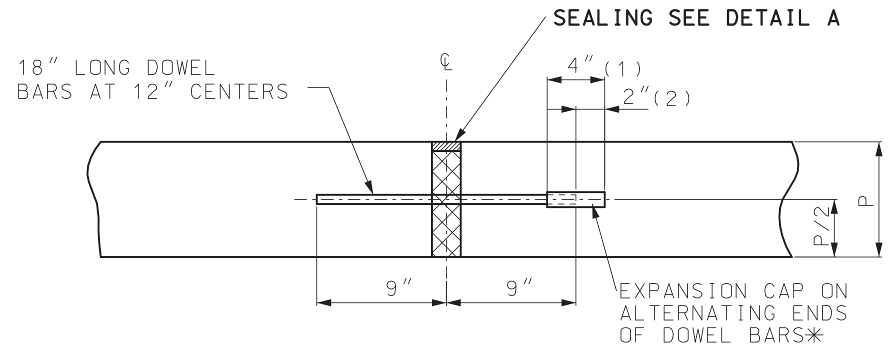
CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15′ JOINT SPACING

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

502.05S



PART ELEVATION OF
HEADER PLANK

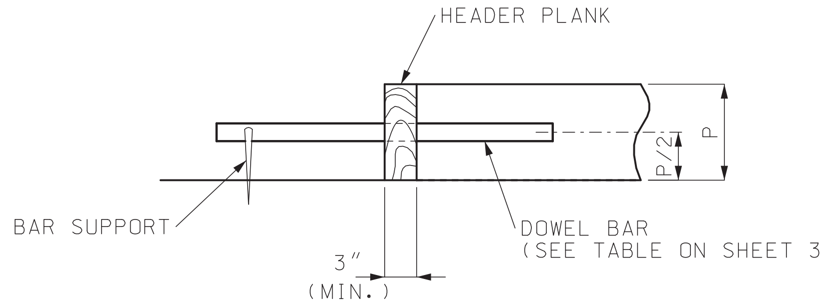


EXPANSION JOINT (E)

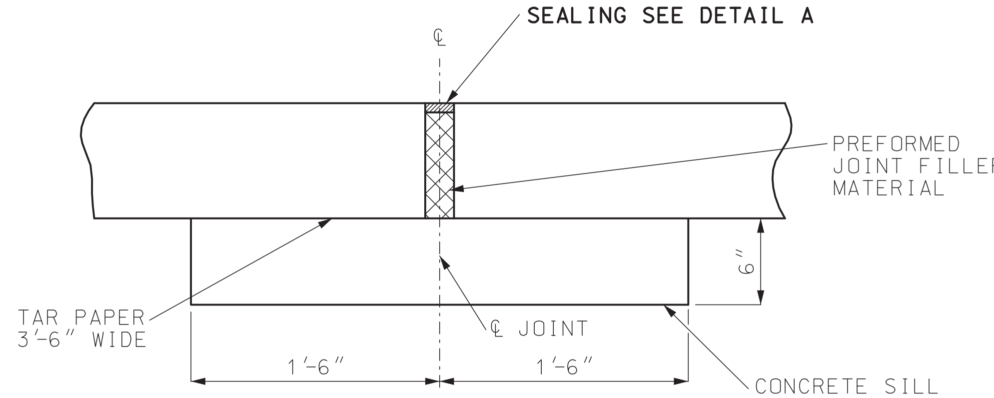
(1) LENGTH OF CAP

(2) GAP BETWEEN END OF
CAP AND DOWEL.

✳ FOR EXPANSION JOINTS FORMED USING A CONSTRUCTION HEADER, THE EXPANSION CAPS SHALL BE INSTALLED ON THE EXPOSED END OF EACH BAR ONCE THE HEADER HAS BEEN REMOVED AND THE JOINT FILLER MATERIAL HAS BEEN INSTALLED.



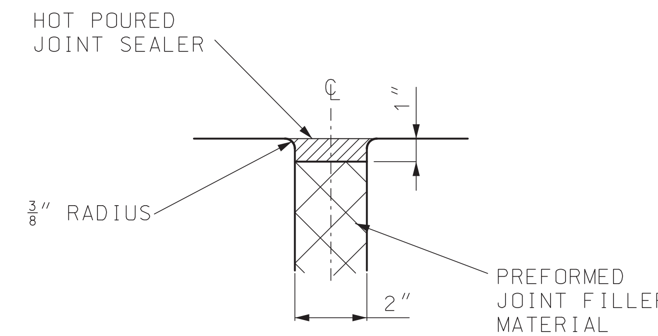
HEADER SECTION



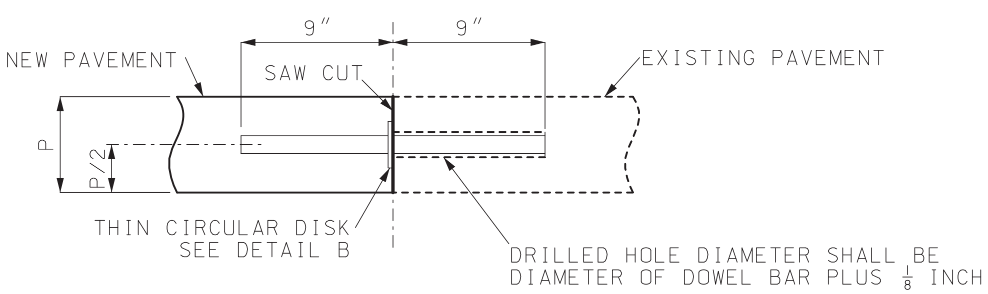
SILL SHALL EXTEND 18″ BEYOND EACH EDGE OF THE PAVEMENT AND SHALL BE CONSTRUCTED OF CONCRETE REGARDLESS OF ADJACENT BASE MATERIAL.

ALTERNATE EXPANSION JOINT (E)

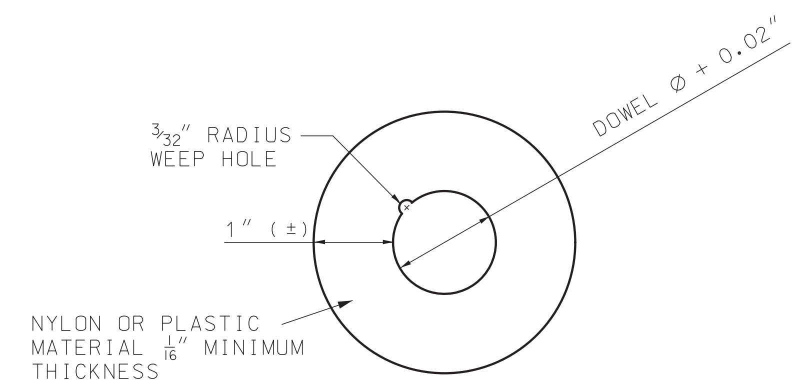
(CONTRACTOR MAY SELECT EITHER EXPANSION JOINT (E))



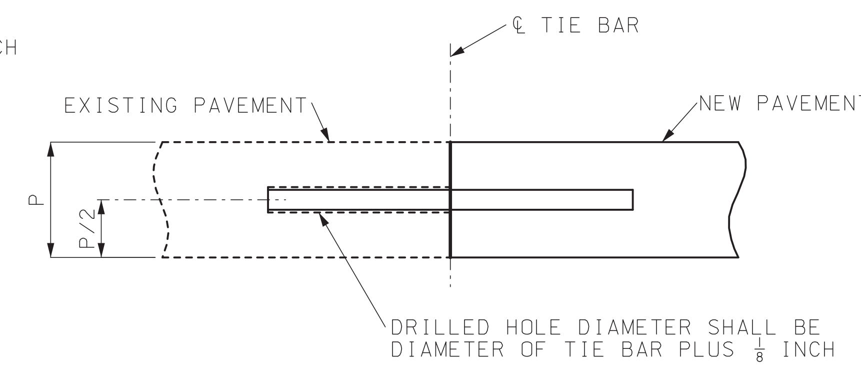
DETAIL A
SEALING



SAWED SECTION



DETAIL B
THIN CIRCULAR DISK



THE HEADER BOARD SHALL BE SUFFICIENTLY RIGID TO PREVENT DISTORTION FROM THE TYPICAL SECTION AND MAINTAIN A STRAIGHT LINE FROM PAVEMENT EDGE TO PAVEMENT EDGE.

THE CONSTRUCTION JOINT MAY BE SAWED FULL DEPTH. HOLES FOR DOWEL BARS SHALL BE DRILLED AFTER THE CONCRETE HAS SUFFICIENT SET TO PREVENT DAMAGE. DOWEL BARS SHALL BE BONDED INTO THE HOLES.

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

THE PORTION OF THE DOWEL OUTSIDE THE HOLE SHALL BE COATED WITH AN APPROVED LUBRICANT.

CONSTRUCTION JOINT (C)

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

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

TIE BAR SIZE AND LENGTH SHALL BE BASED ON THE THICKNESS OF THE THINNER PAVEMENT OR SHOULDER TO BE TIED TOGETHER.

LONGITUDINAL CONSTRUCTION JOINT (L)

(EXISTING PAVEMENT)

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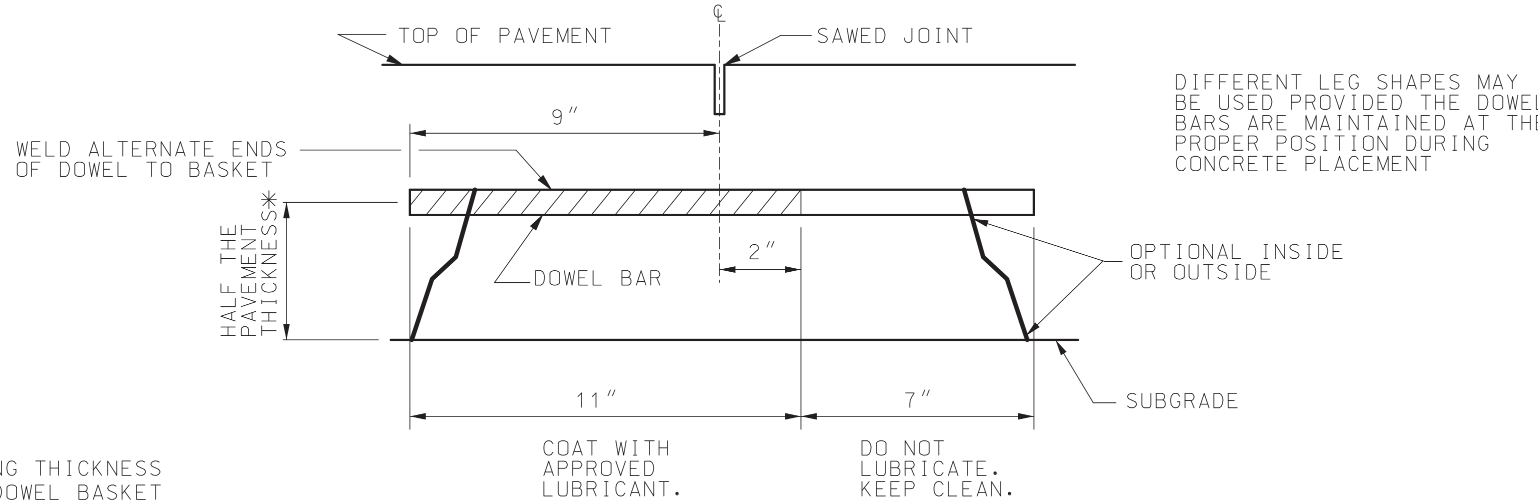
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15′ JOINT SPACING

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

502.05S

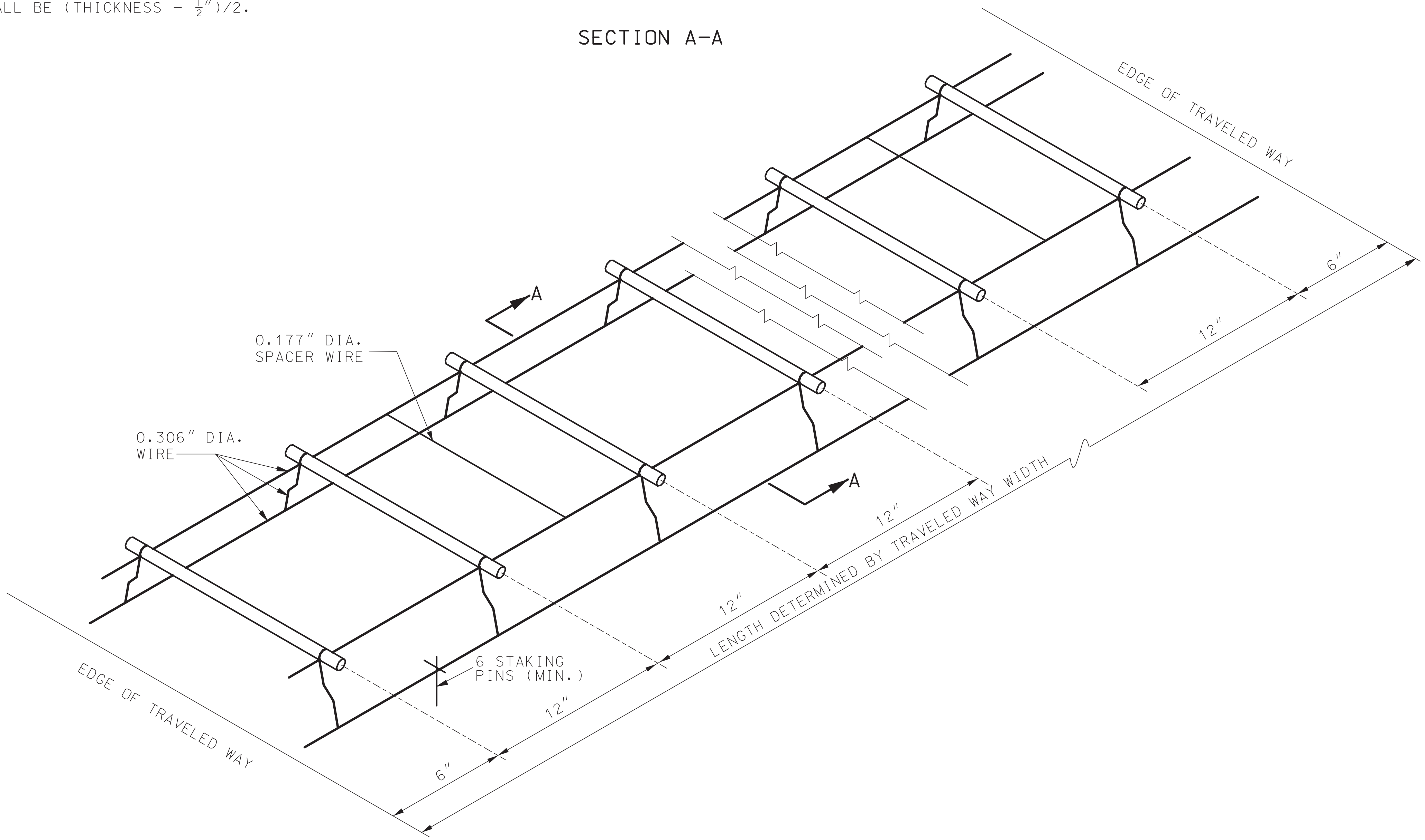
SHEET NO. 4 OF 4



* FOR PAVEMENT HAVING THICKNESS IN $\frac{1}{2}$″ INCREMENT, DOWEL BASKET SHALL BE (THICKNESS − $\frac{1}{2}$″)/2.

SECTION A-A

DOWEL BARS		
PAVEMENT THICKNESS	BAR SIZE	
	DIAMETER	LENGTH
LESS THAN 7″	NONE	NONE
7″ TO 10″	1 $\frac{1}{2}$″	18″
GREATER THAN 10″	1 $\frac{1}{2}$″	18″



GENERAL NOTES:

THE DOWEL SUPPORTING UNITS SHALL BE FACTORY ASSEMBLED AND CAPABLE OF HOLDING THE DOWELS IN THEIR REQUIRED POSITIONS. IN THE COMPLETED JOINT INSTALLATION, DOWELS SHALL BE POSITIONED WITHIN 1/2″ OF THE VERTICAL AND HORIZONTAL PLANE AND IN THE LONGITUDINAL DIRECTION. THE SKEW TOLERANCE SHALL BE 1/4″.

THE FREE END OF EACH EPOXY COATED DOWEL SHALL BE MARKED WITH A SPOT OF PAINT AT LEAST ONE INCH IN DIAMETER AND CONTRASTING IN COLOR WITH THE EPOXY COATING.

WIRE SIZES SHOWN ARE MINIMUM REQUIRED.

WIRES, BARS OR CLIPS SHALL BE USED AS NECESSARY TO STRENGTHEN THE ASSEMBLIES.

THE DIAMETER OF THE SPACER WIRE SHALL NOT EXCEED 0.200″.

SPACER WIRE MAY BE CUT OR LEFT INTACT.

STAKING PINS SHALL BE FABRICATED FROM 0.306″ DIAMETER WIRE MINIMUM WITH A SUITABLE HOOK. STAKING PINS SHALL HAVE A MINIMUM LENGTH OF 12″ FOR DOWEL ASSEMBLIES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

MINOR VARIATIONS IN THE CONFIGURATION OF THE SUPPORT UNITS WILL BE ALLOWED.

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TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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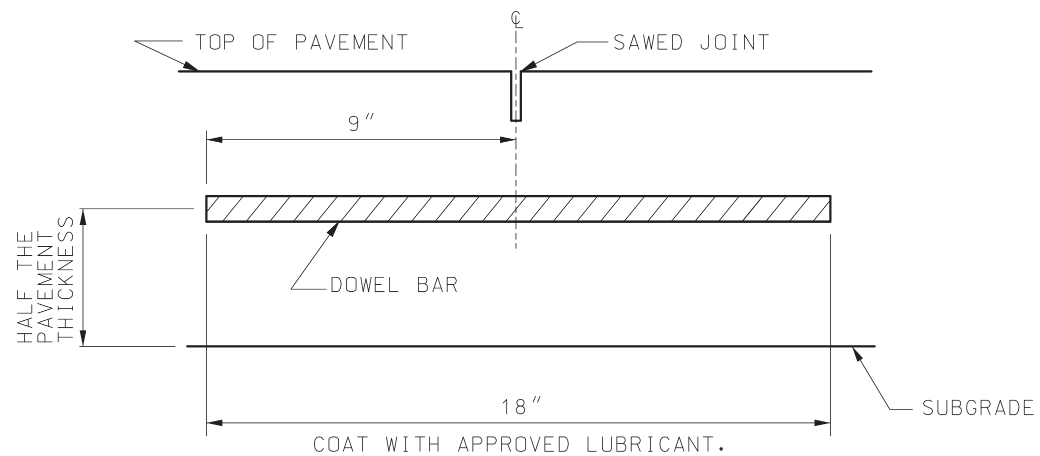
DOWEL SUPPORTING UNITS

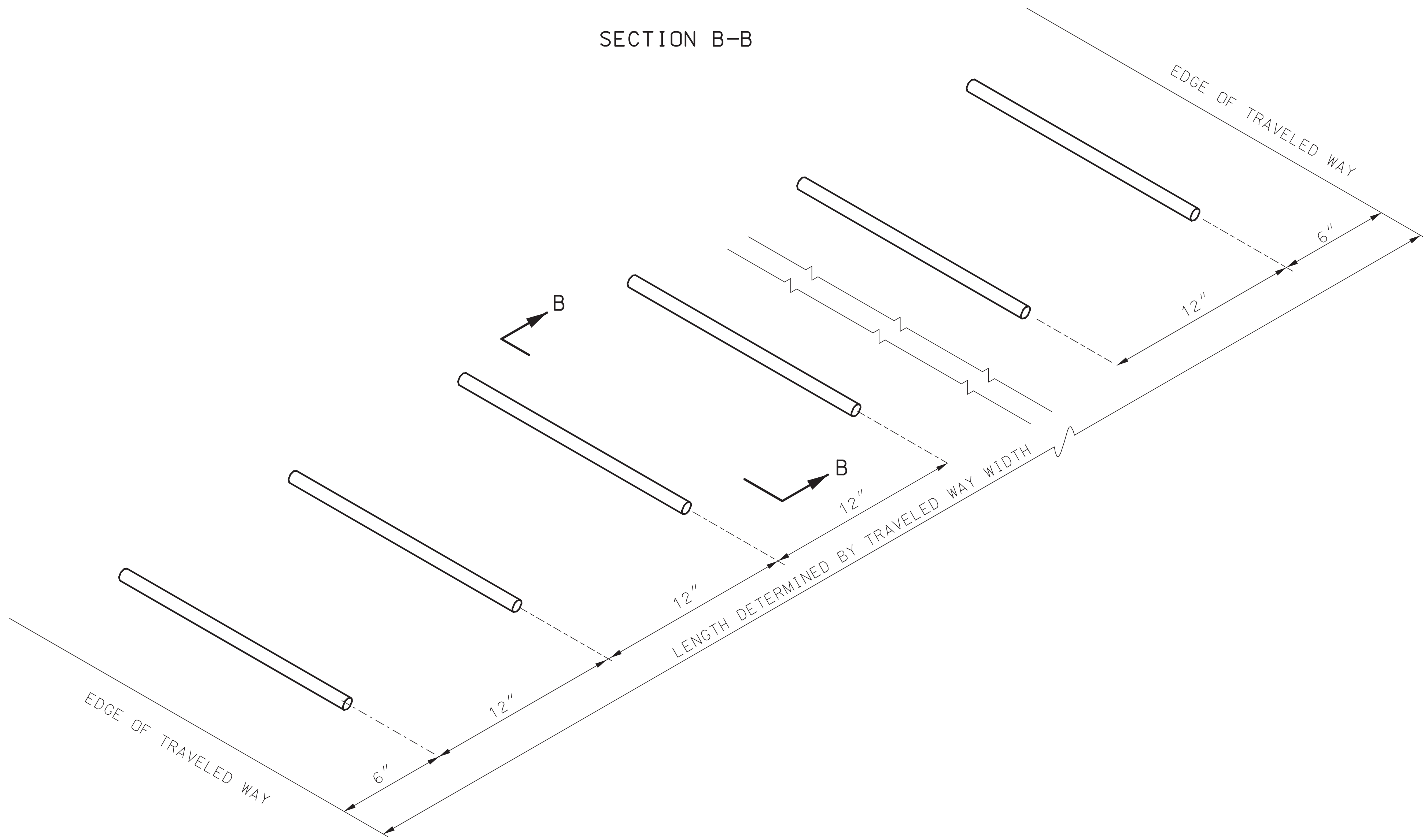
APPROVED FOR USE
WITH TRANSVERSE JOINTS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

502.10L



SECTION B-B



GENERAL NOTES:

IN THE COMPLETED JOINT INSTALLATION, DOWELS SHALL BE POSITIONED WITHIN 1/2" OF THE VERTICAL AND HORIZONTAL PLANE AND IN THE LONGITUDINAL DIRECTION. THE SKEW TOLERANCE SHALL BE 1/4".

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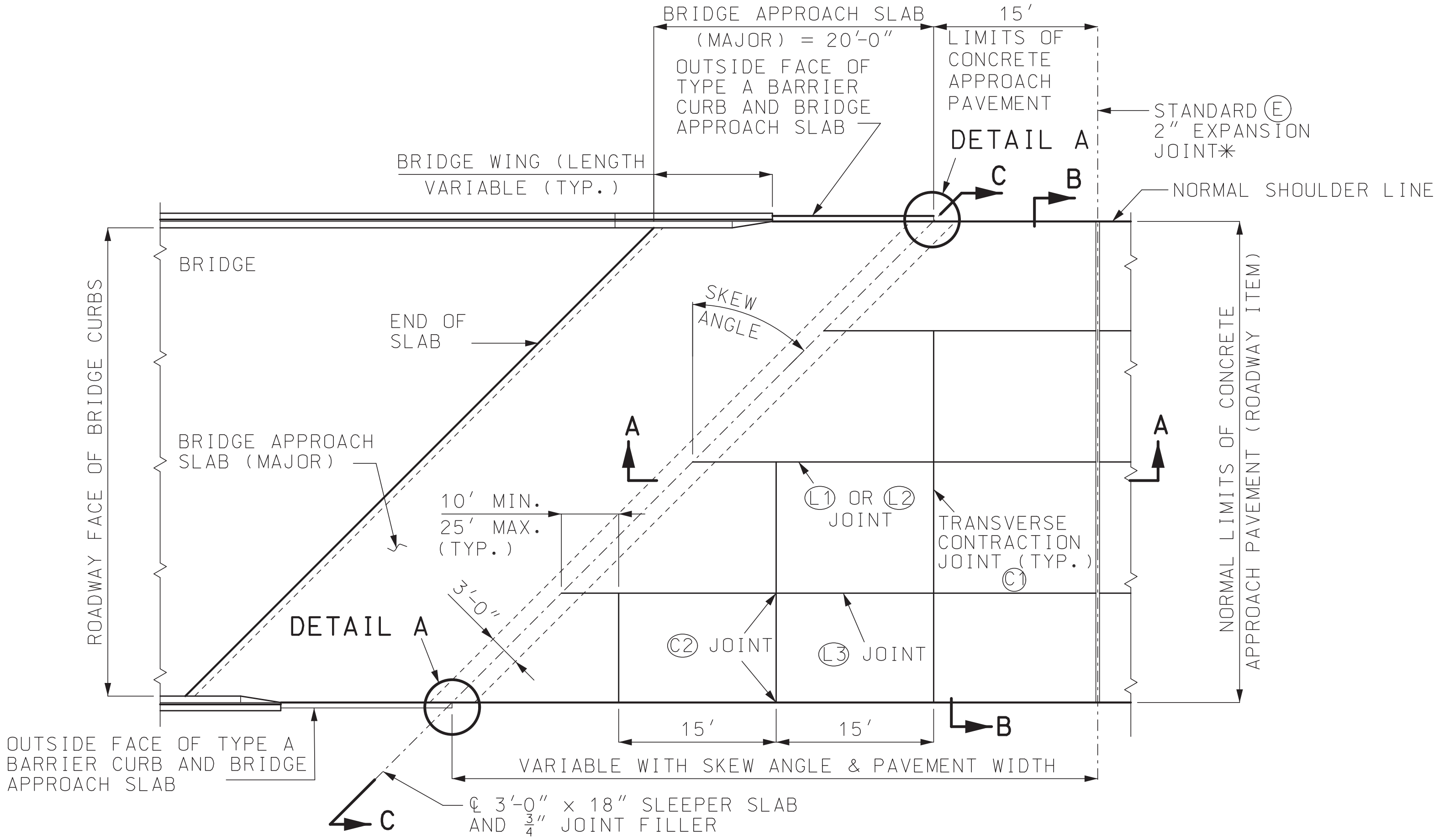
DOWEL SUPPORTING UNITS

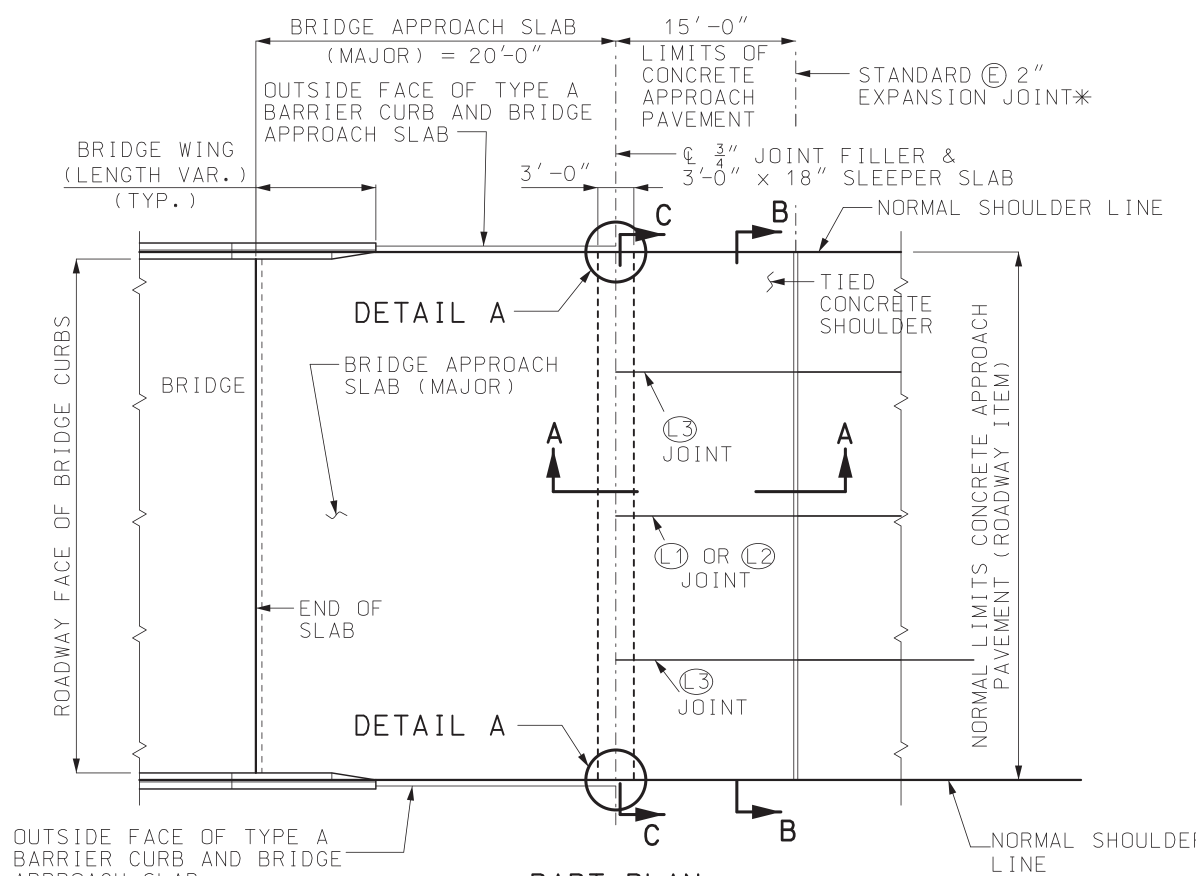
MECHANICAL PLACEMENT

DATE EFFECTIVE: 4/1/2023 DATE PREPARED: 1/6/2023	502.10L	SHEET NO. 2 OF 2



PART PLAN
(SKEWED)

* NOT REQUIRED WHEN ADJACENT PAVEMENT IS ASPHALT.



PART PLAN
(SQUARE)

SEE SHEET 2 OF 3 FOR DETAIL A.

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

GENERAL NOTES:

TYPE A CURB IS TO BE CONSTRUCTED WITH CONCRETE APPROACH PAVEMENT ONLY WHEN DRAIN BASINS ARE REQUIRED. TYPE A CURBS WILL BE CONSIDERED AS INCIDENTAL, AND WILL BE INCLUDED IN THE PAYMENT FOR CONCRETE APPROACH PAVEMENT.

FOR SHOULDER PAVING AND DRAIN BASINS AT BRIDGE ENDS, SEE STANDARD PLAN 609.40.

FOR TYPE A BARRIER CURBS, STANDARD 2" EXPANSION JOINTS, AND LONGITUDINAL JOINTS, SEE STANDARD PLANS 502.00 AND 609.00.

FOR BRIDGE APPROACH SLAB, SLEEPER SLAB, AND JOINT FILLER DETAILS, SEE BRIDGE PLANS.

A PREFORMED FIBER EXPANSION JOINT MATERIAL SHALL BE PLACED WITH CONCRETE APPROACH PAVEMENT AND MEET THE REQUIREMENTS OF SECTION 1057 OF THE STANDARD SPECIFICATION FOR HIGHWAY CONSTRUCTION.

COST OF FURNISHING AND PLACEMENT OF 4" TYPE 5 AGGREGATE BASE AND ¾" JOINT FILLER IS INCLUDED IN THE CONTRACT UNIT PRICE FOR CONCRETE APPROACH PAVEMENT.

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CONCRETE APPROACH PAVEMENT

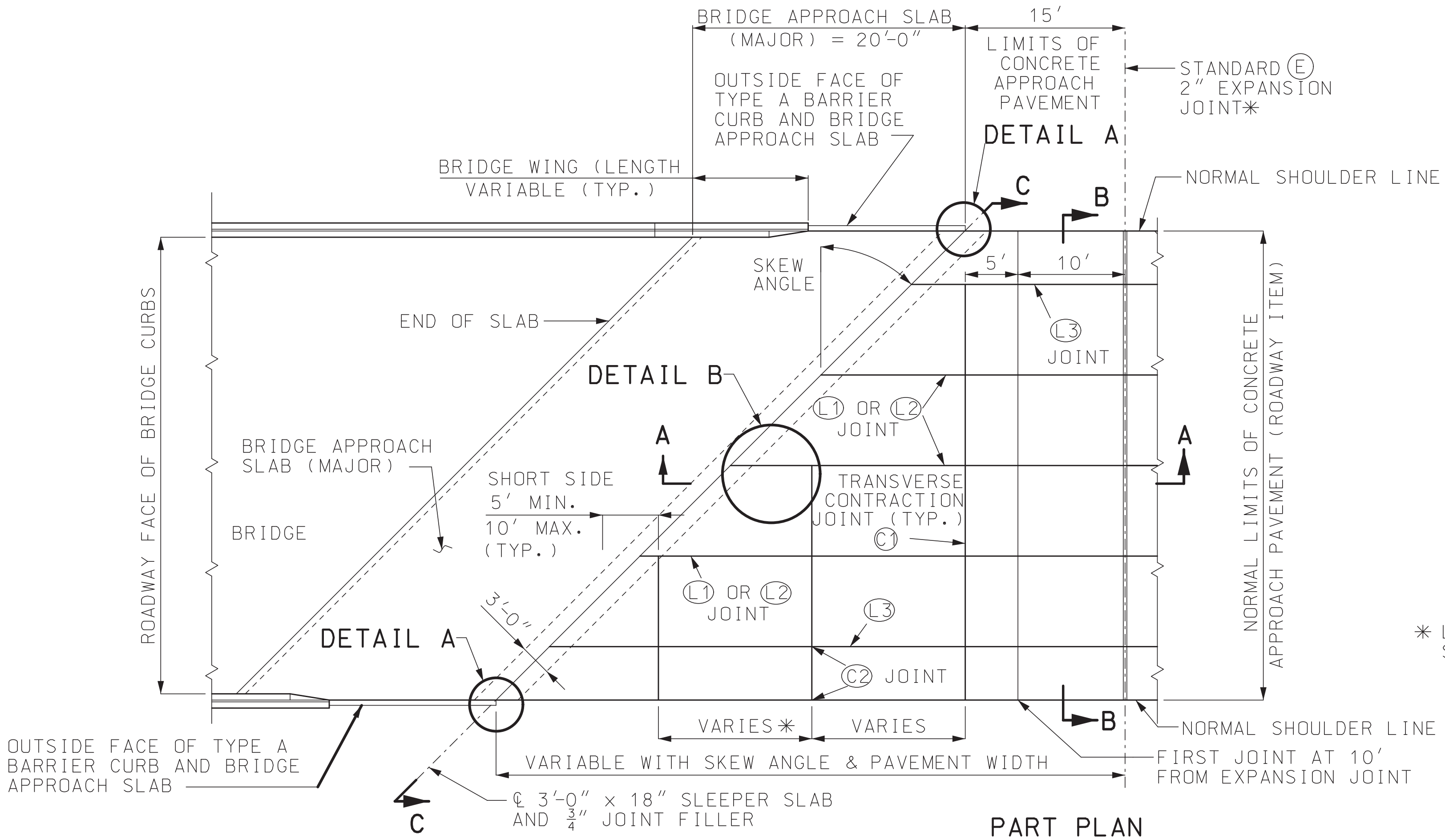
FOR TWO-LANE PAVEMENTS
(MAJOR ROUTE)

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

504.00L

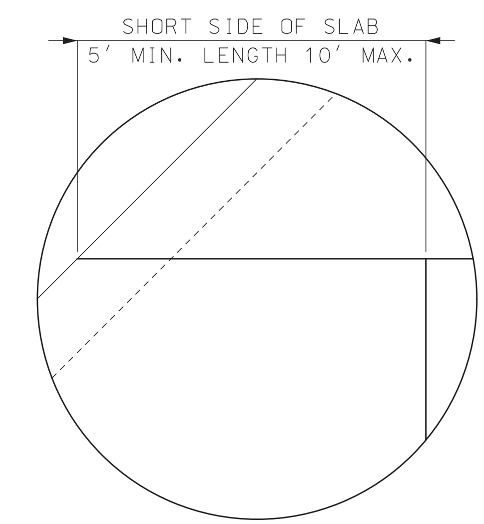
SHEET NO. 1 OF 3

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

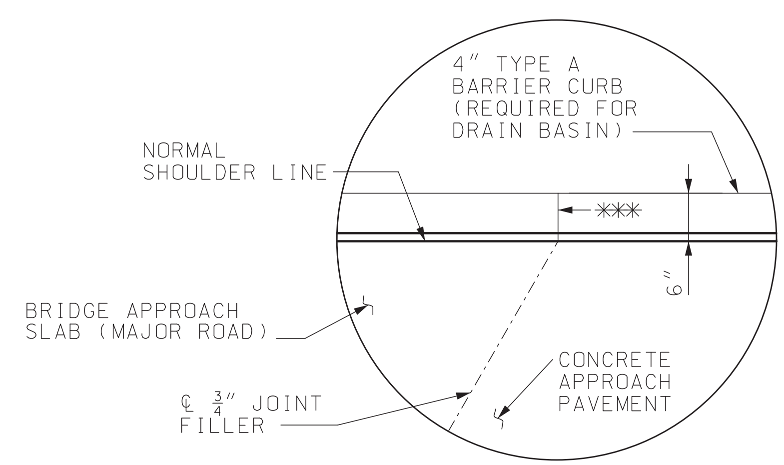


PART PLAN
(SKEWED)

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

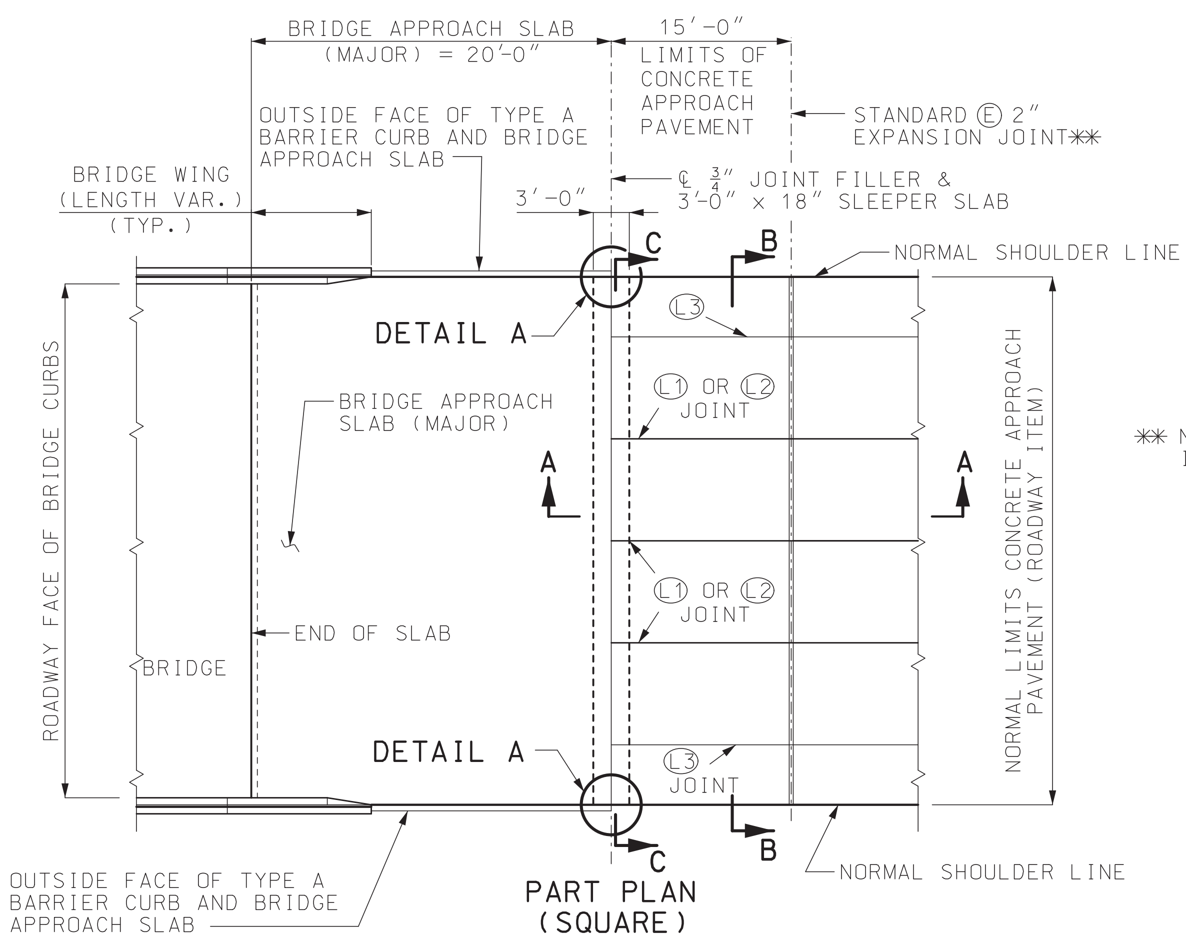


DETAIL B



DETAIL A

✳✳✳ USE ¾" JOINT FILLER BETWEEN TYPE A CURBS



PART PLAN
(SQUARE)

✳✳ NOT REQUIRED WHEN ADJACENT PAVEMENT IS ASPHALT.

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

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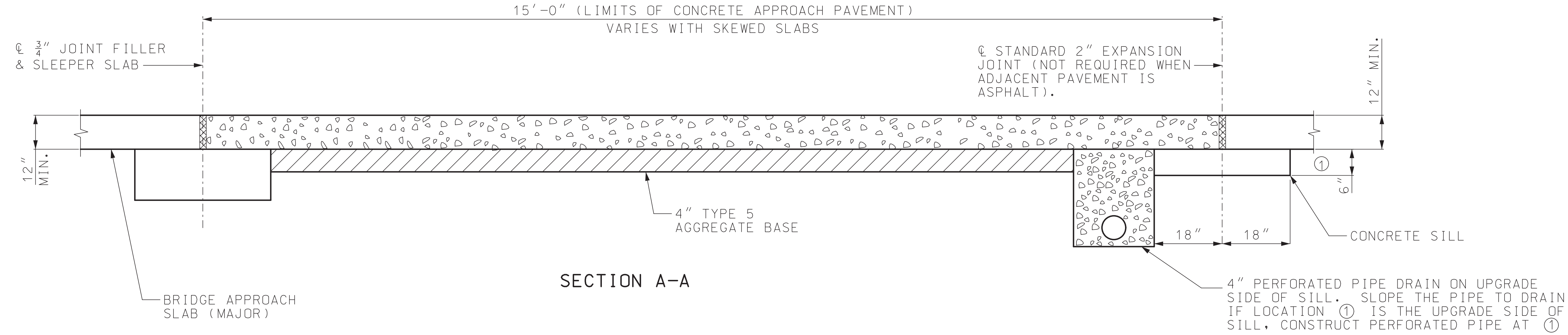
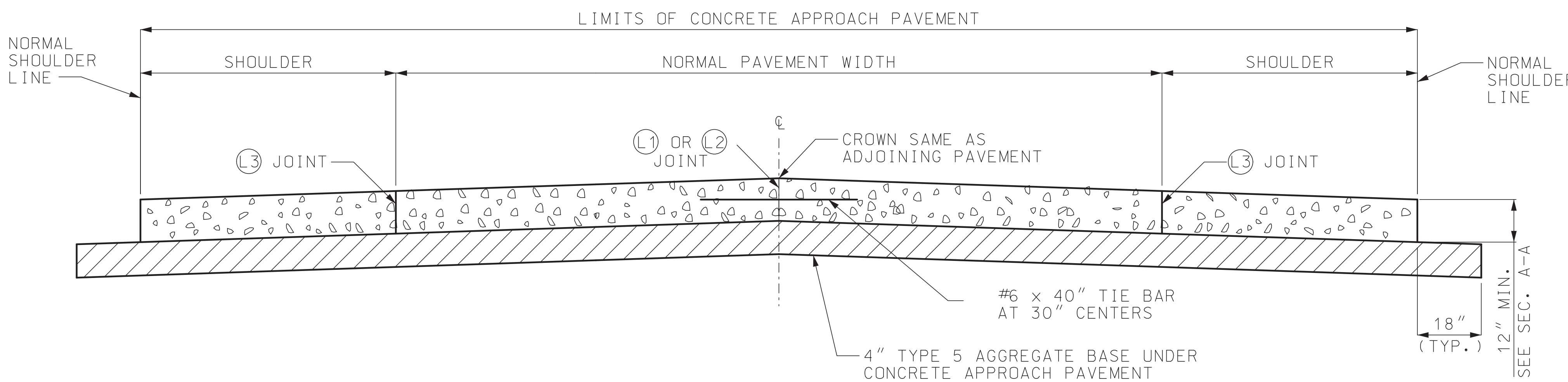
CONCRETE APPROACH PAVEMENT
FOR MULTI-LANE PAVEMENTS
(MAJOR ROUTE)

DATE EFFECTIVE:	10/01/2022	504.00L	SHEET NO. 2 OF 3
DATE PREPARED:	7/19/2022		

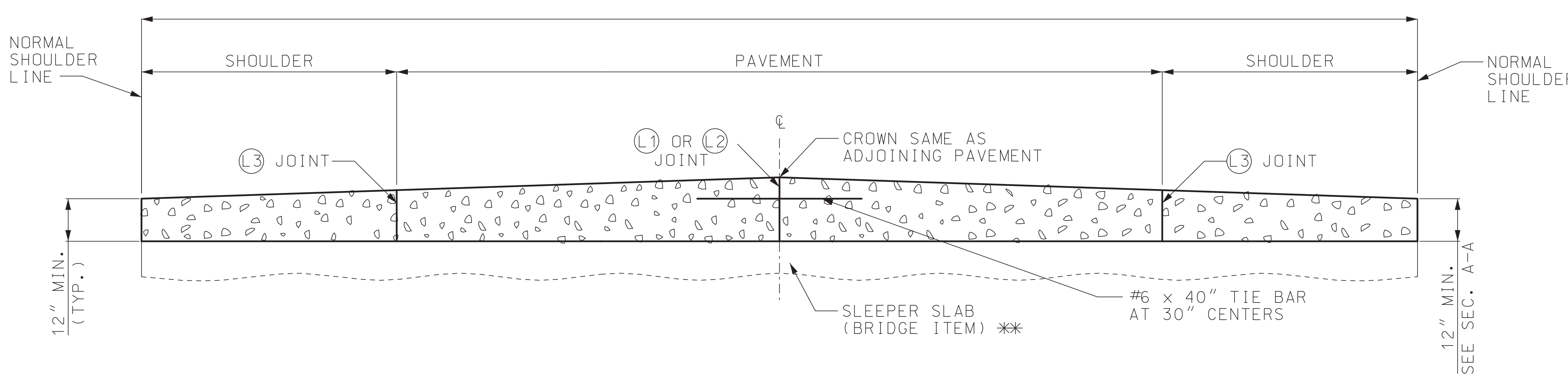


SECTION A-A



SECTION B-B

FOR LOCATIONS OF SECTIONS A-A, B-B AND C-C, SEE SHEETS 1 AND 2.



SECTION C-C

✻✻ TOP OF SLEEPER SLAB MAY BE FLAT OR CROWNED. SEE BRIDGE PLANS.

GENERAL NOTES:

SEE STANDARD DRAWING 605.10 FOR PIPE OUTLET DETAIL FROM SHOULDER POINT TO INSLOPE.

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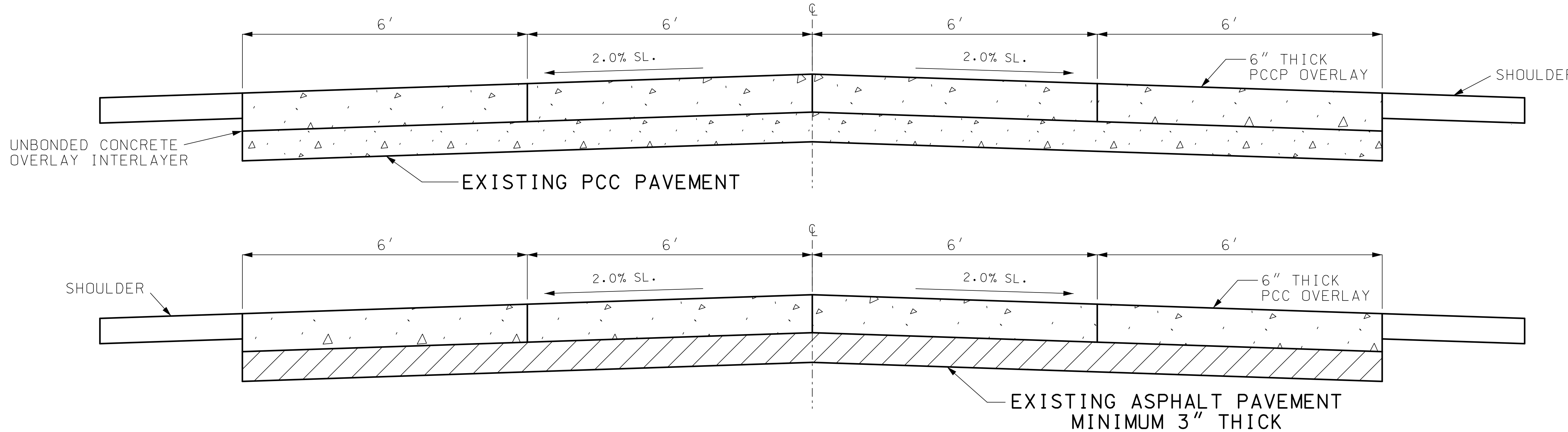
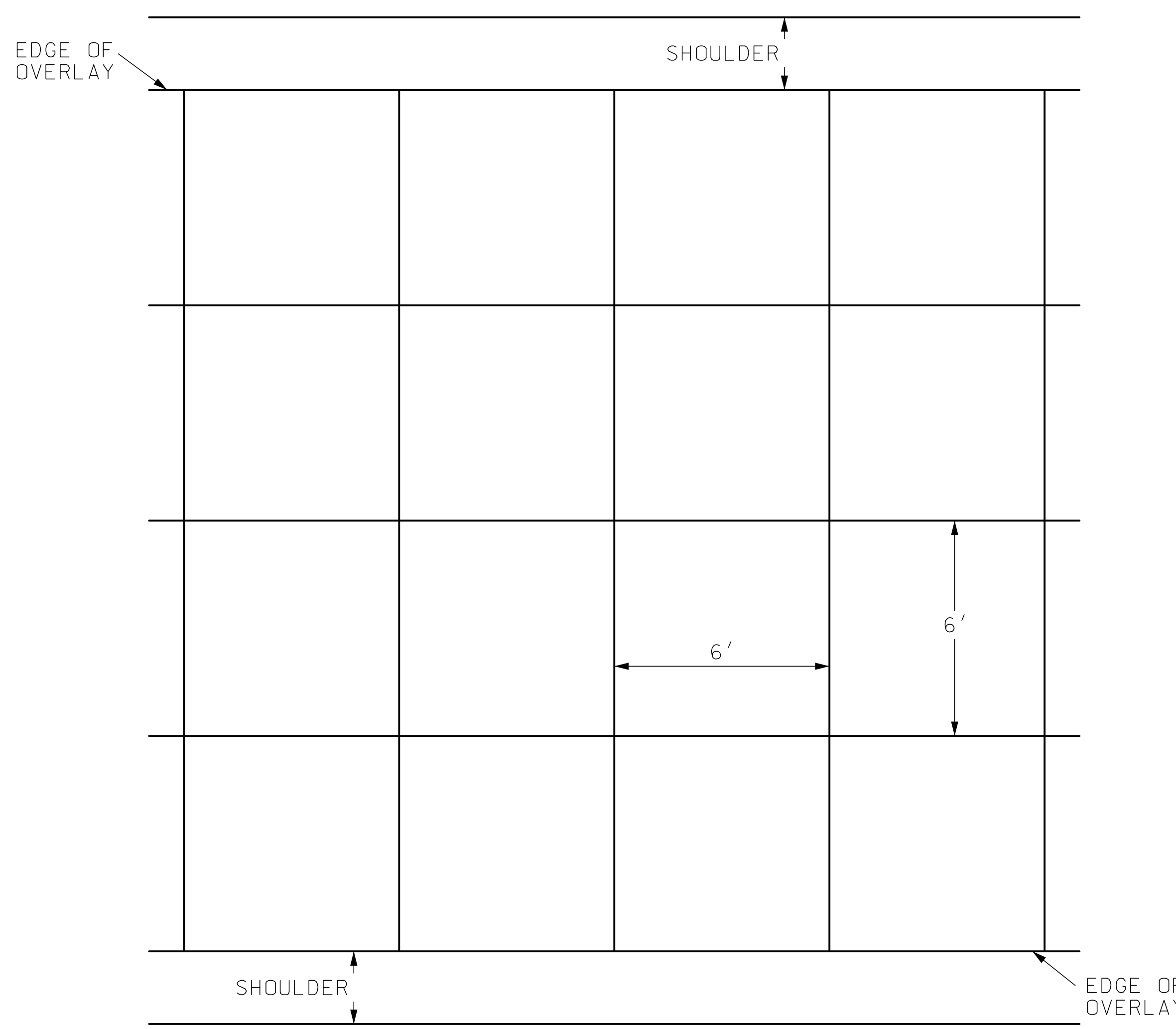
CONCRETE APPROACH PAVEMENT (MAJOR ROUTE)

DATE EFFECTIVE:	10/01/2022	504.00L	SHEET NO. 3 OF 3
DATE PREPARED:	7/19/2022		



PROFILE VIEW



JOINT LAYOUT

GENERAL NOTES:

CONCRETE OVERLAY DESIGN THICKNESS WILL VARY BASED ON TRAFFIC VOLUMES, BUT WILL TYPICALLY RANGE FROM 5½" TO 6". THE CONSTRUCTION AND MATERIALS PAVEMENT SECTION WILL DETERMINE THE DESIGN THICKNESS.

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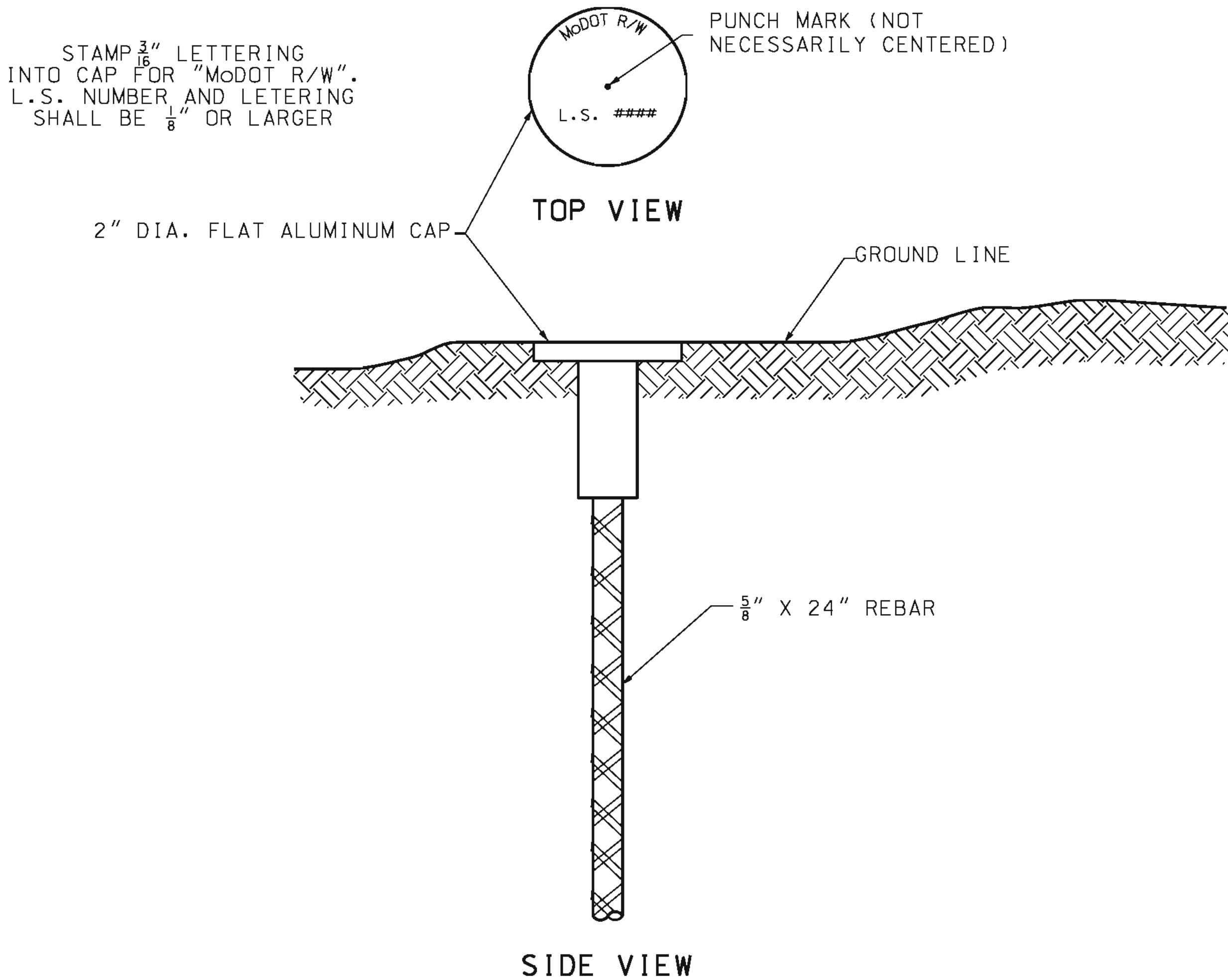
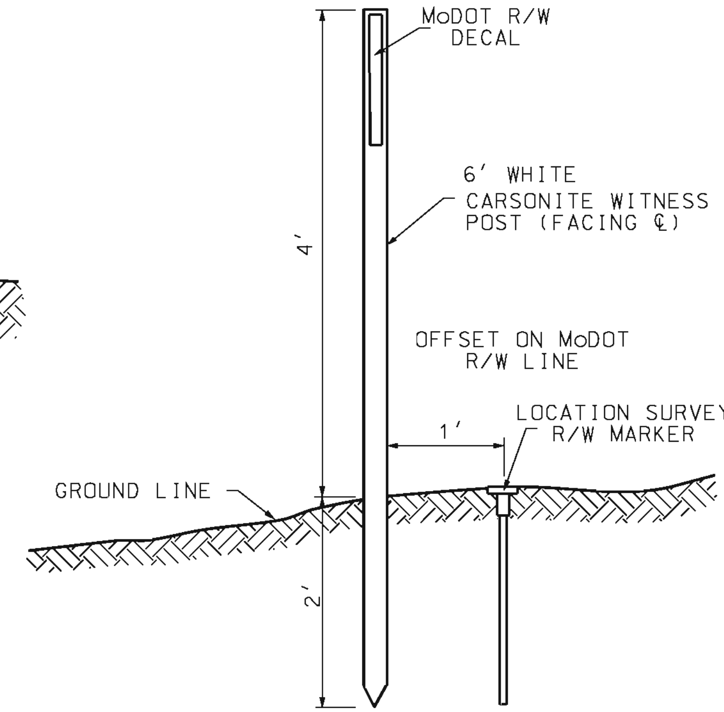
BIG BLOCK UNBONDED CONCRETE OVERLAY

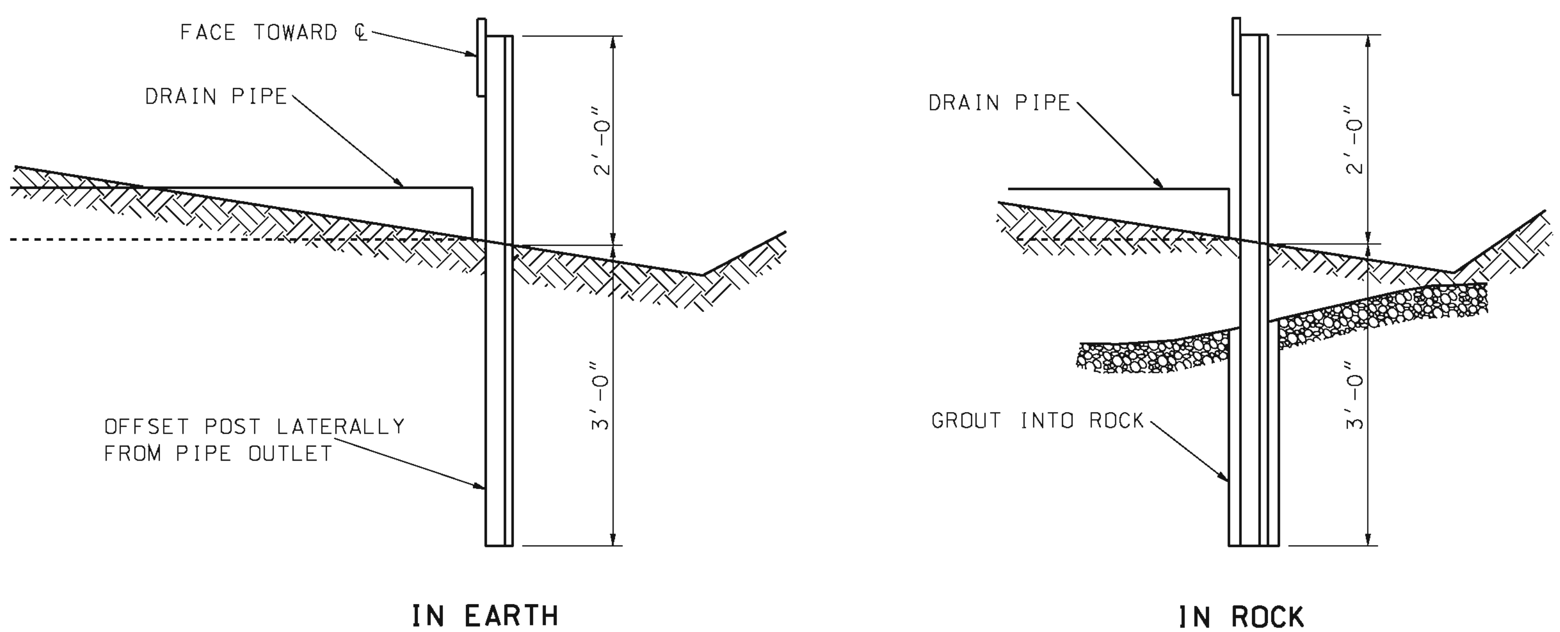
DATE EFFECTIVE:	07/01/2021	506.20	SHEET NO. 1 OF 1
DATE PREPARED:	4/29/2021		



LOCATION SURVEY RIGHT-OF-WAY MARKER



WITNESS POST



DRAIN MARKER

GENERAL NOTES:

WHEN STEEL AND LOCATION SURVEY R/W MARKERS ARE NOT SUITABLE DUE TO NATURAL GROUND FEATURES OR MAN-MADE STRUCTURES, ALTERNATIVE MONUMENTATION (IN COMPLIANCE WITH THE APPROVED MONUMENTATION, AS SPECIFIED BY THE MISSOURI MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS) MAY BE SET.

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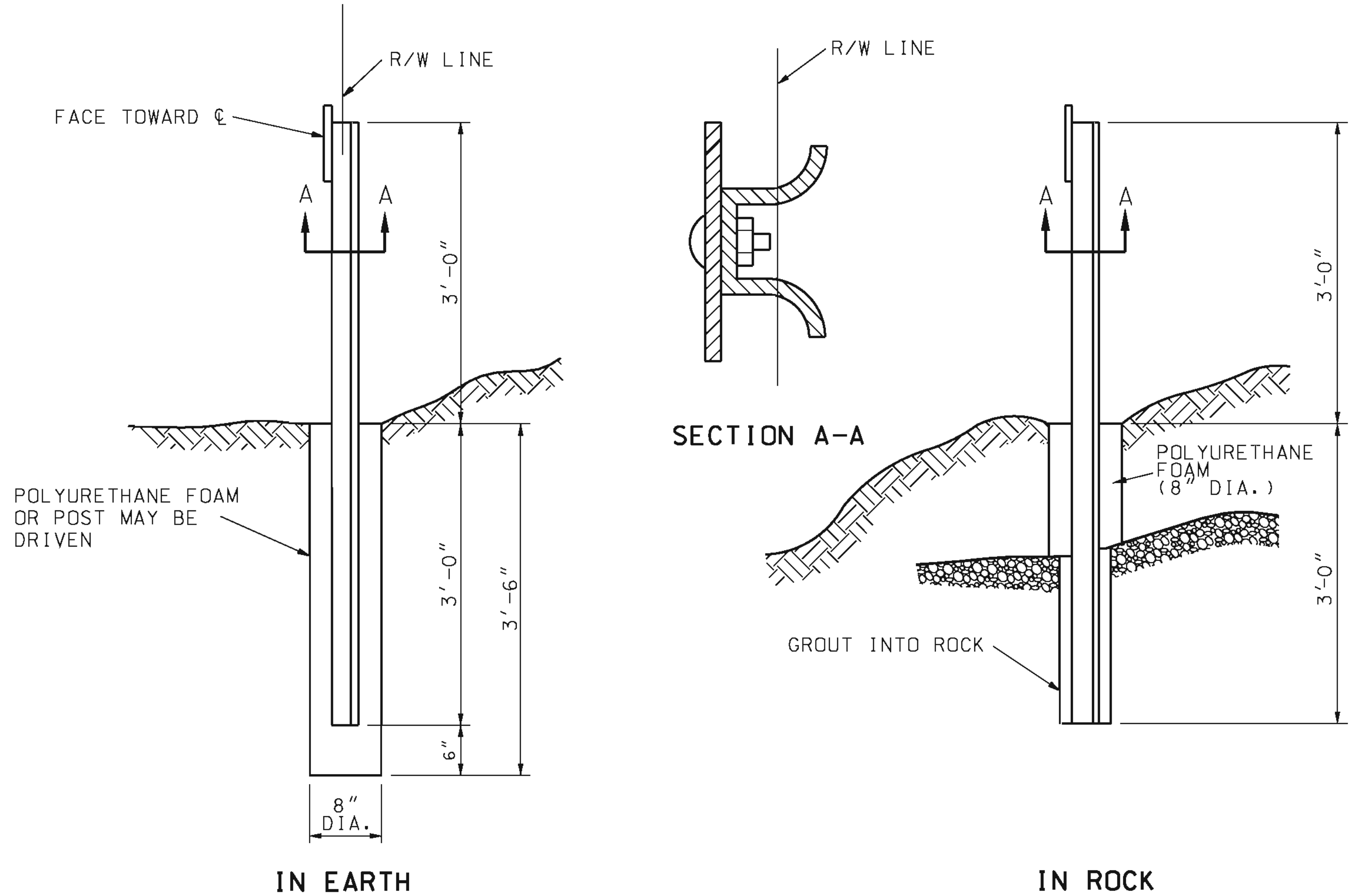
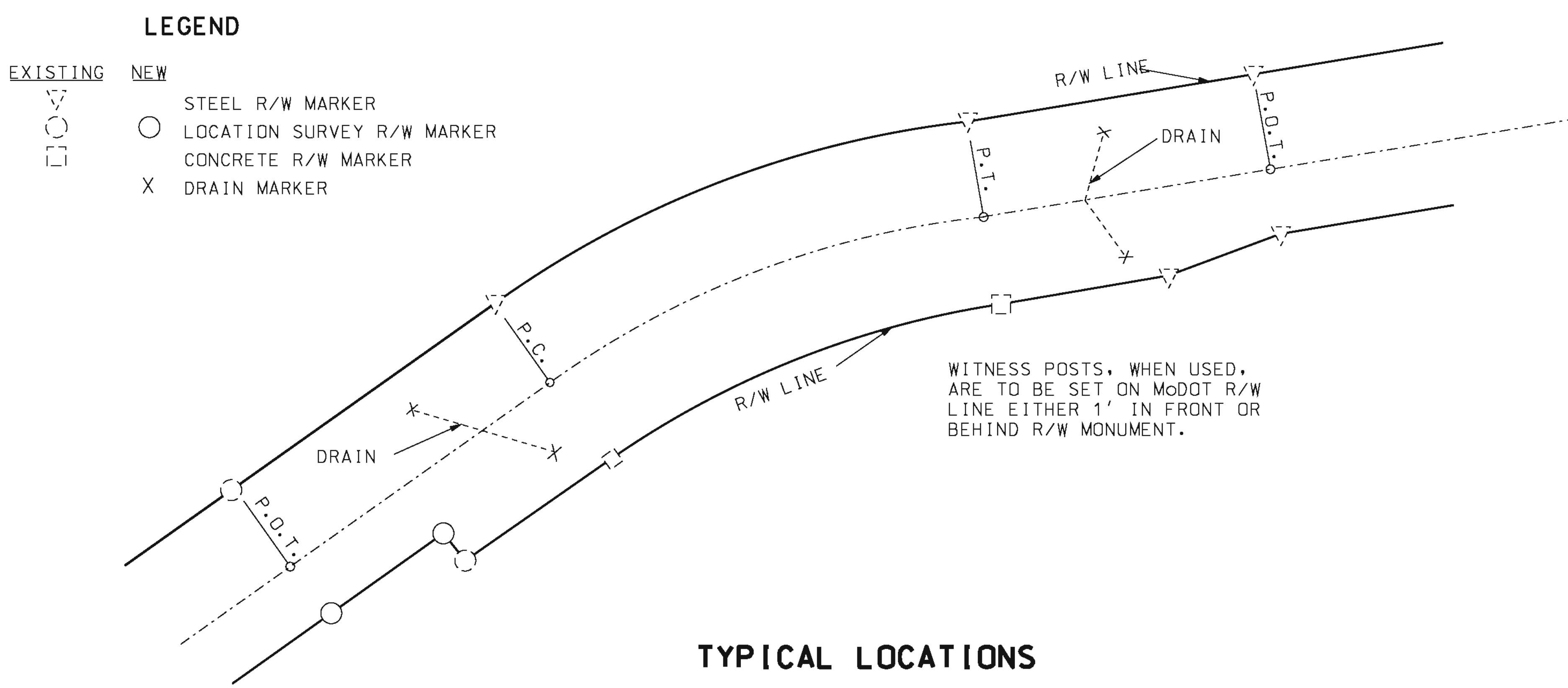
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

RIGHT-OF-WAY AND DRAIN MARKERS

DATE EFFECTIVE:	01/01/2003	602.00D	SHEET NO.
DATE PREPARED:	8/21/2009		1 OF 2



STEEL RIGHT-OF-WAY MARKER



WITNESS POSTS, WHEN USED, ARE TO BE SET ON MoDOT R/W LINE EITHER 1' IN FRONT OR BEHIND R/W MONUMENT.

TYPICAL LOCATIONS

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
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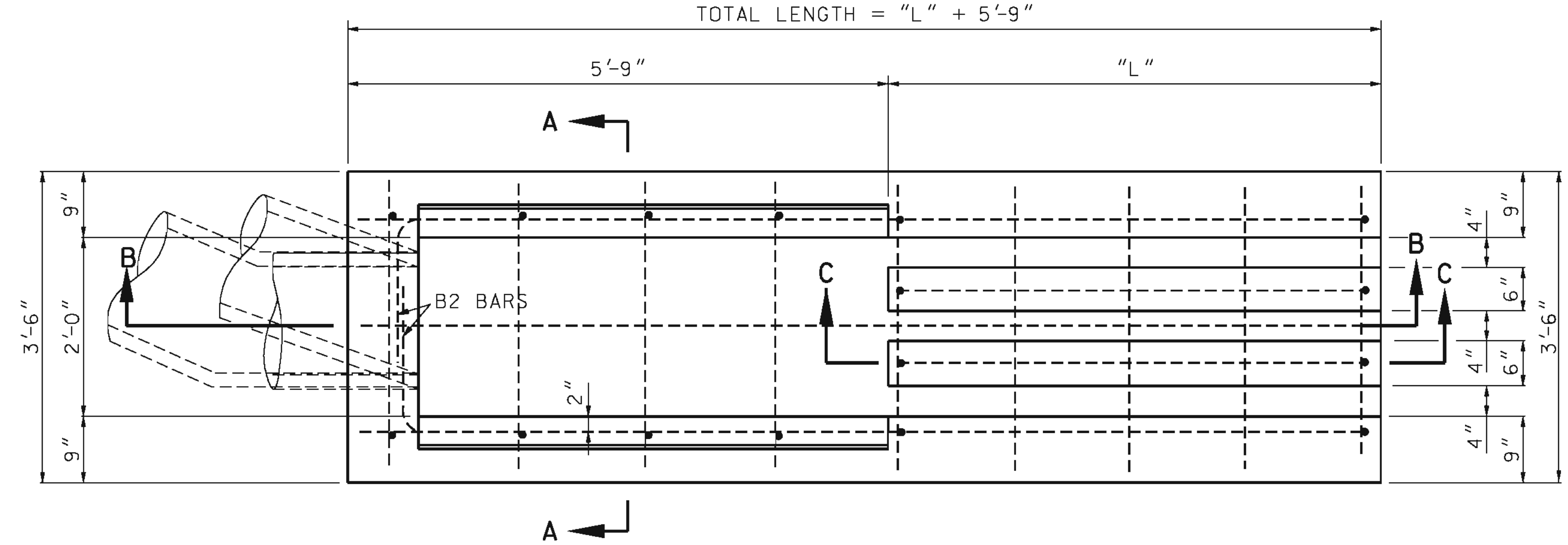
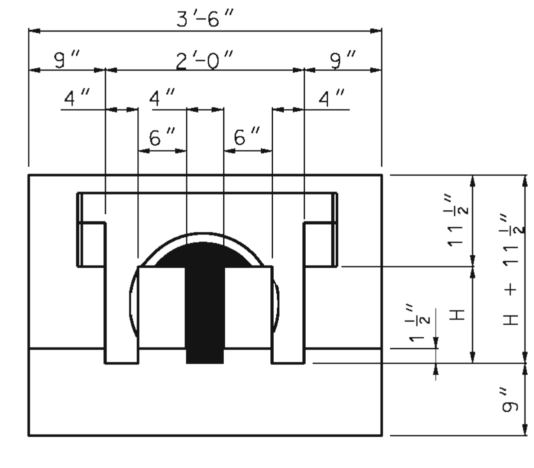
RIGHT-OF-WAY AND DRAIN MARKERS

DATE EFFECTIVE: 01/01/2003		602.00D	SHEET NO.
DATE PREPARED: 8/21/2009			2 OF 2

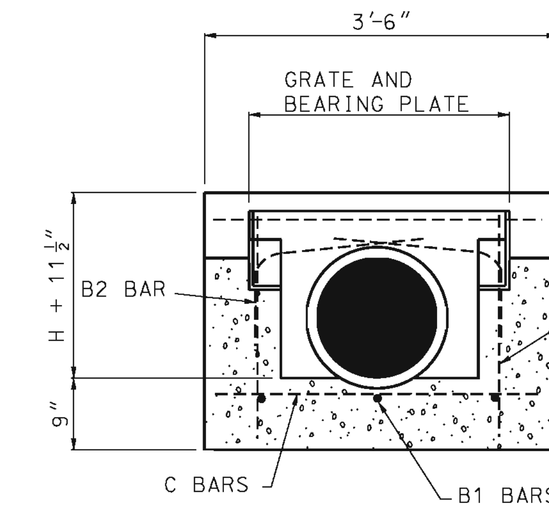
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



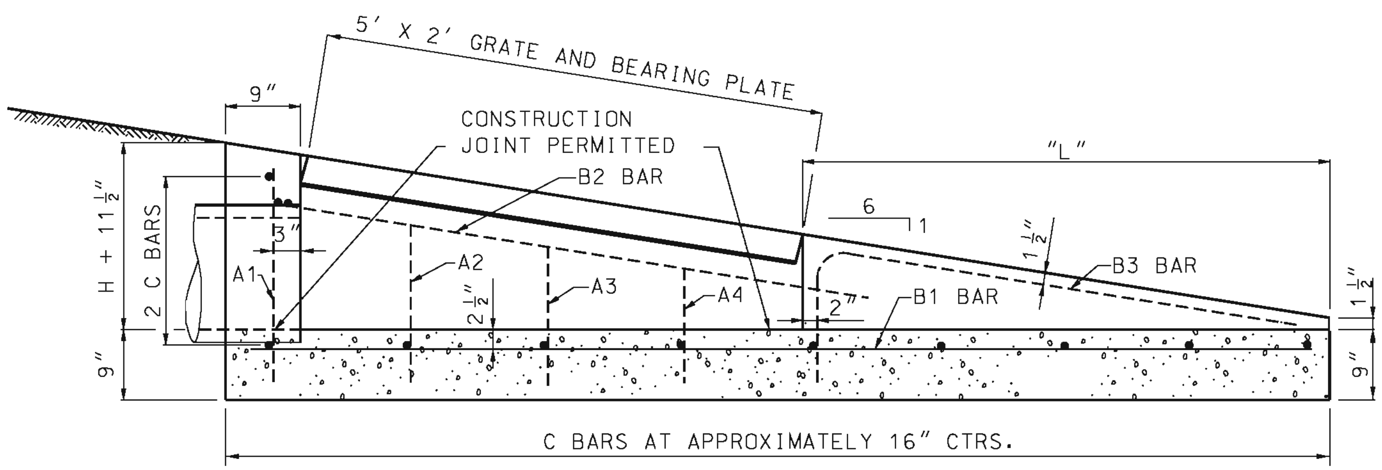
PLAN VIEW



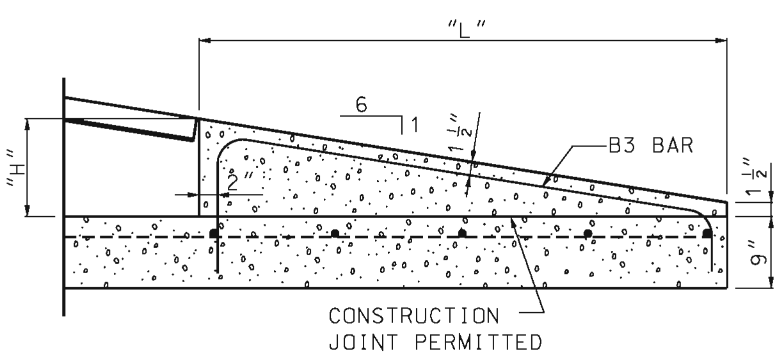
END SECTION



SECTION A-A



SECTION B-B



SECTION C-C

GENERAL NOTES:

USE RIGHT ANGLE HEADWALL FOR ALL INSTALLATIONS. SKEW PIPE BY USING A BEVELED END OR ELBOW ON PIPE. IN SPECIAL CASES, HEADWALL MAY BE TURNED TO FIT PIPE SKEW AND 1V TO 6H SLOPE WARPED TO FIT HEADWALL.

ALL CONCRETE SHALL BE CLASS "B".

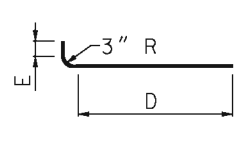
THIS DRAWING AND THE CONCRETE QUANTITIES SHOWN ARE BASED ON THE USE OF CONCRETE PIPE. QUANTITIES OF CONCRETE SHOWN WILL BE USED FOR PAYMENT REGARDLESS OF ANY QUANTITY CHANGES NECESSARY DUE TO THE USE OF ANY OTHER TYPE PIPE SPECIFIED OR PERMITTED.

FLOW LINE OF HEADWALL IS TO BE PLACED HORIZONTALLY.

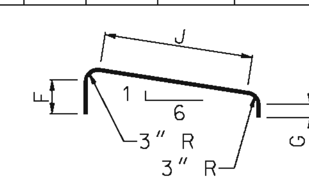
PRECAST NOTES:

THE CONTRACTOR MAY, SUBJECT TO APPROVAL OF THE ENGINEER, FURNISH PRECAST UNITS IN LIEU OF CAST-IN-PLACE. IF A PRECAST UNIT IS FURNISHED, IT SHALL CONFORM IN ALL RESPECTS TO THE THE REQUIREMENTS FOR CAST-IN-PLACE UNITS INCLUDING DIMENSIONS AND REINFORCEMENT, EXCEPT THAT THE FORMS MAY BE TAPERED TO FACILITATE REMOVAL OF THE UNIT FROM THE FORMS. SHOP DRAWINGS OF THE PRECAST UNIT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FIRST USE OF THE PRECASTING FORMS.

PIPE SIZE	DIMENSIONS			QUANTITIES		REINFORCING																						
	"H"	"L"	TOTAL LENGTH	CONC. C. Y.	STEEL LBS.	#4 A1 BARS		#4 A2 BARS		#4 A3 BARS		#4 A4 BARS		#4 B1 BARS		#4 B2 BARS				#4 B3 BARS					#4 C BARS	
						NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	E	D	LENGTH	NO.	F	G	J	LENGTH	NO.	LENGTH
12"	9"	3'-9"	9'-6"	1.5	70	2	2'-0"	2	1'-6"	2	1'-3"	2	1'-0"	3	9'-3"	2	1'-5"	5'-8"	7'-6"	4	11"	5"	2'-11"	5'-0"	8	3'-3"
15"	1'-0"	5'-3"	11'-0"	1.8	80	2	2'-3"	2	1'-9"	2	1'-6"	2	1'-3"	3	10'-9"	2	1'-5"	5'-8"	7'-6"	4	1'-2"	5"	4'-5"	6'-9"	9	3'-3"
18"	1'-3"	6'-9"	12'-6"	2.2	90	2	2'-6"	2	2'-0"	2	1'-9"	2	1'-6"	3	12'-3"	2	1'-5"	5'-8"	7'-6"	4	1'-5"	5"	5'-11"	8'-6"	10	3'-3"
21"	1'-6"	8'-3"	14'-0"	2.6	100	2	2'-9"	2	2'-3"	2	2'-0"	2	1'-9"	3	13'-9"	2	1'-5"	5'-8"	7'-6"	4	1'-8"	5"	7'-5"	10'-3"	11	3'-3"
24"	1'-9"	9'-9"	15'-6"	3.0	110	2	3'-0"	2	2'-6"	2	2'-3"	2	2'-0"	3	15'-3"	2	1'-5"	5'-8"	7'-6"	4	1'-11"	5"	8'-11"	12'-0"	12	3'-3"



B2 BARS



B3 BARS

BENDING DETAILS

MoDOT

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

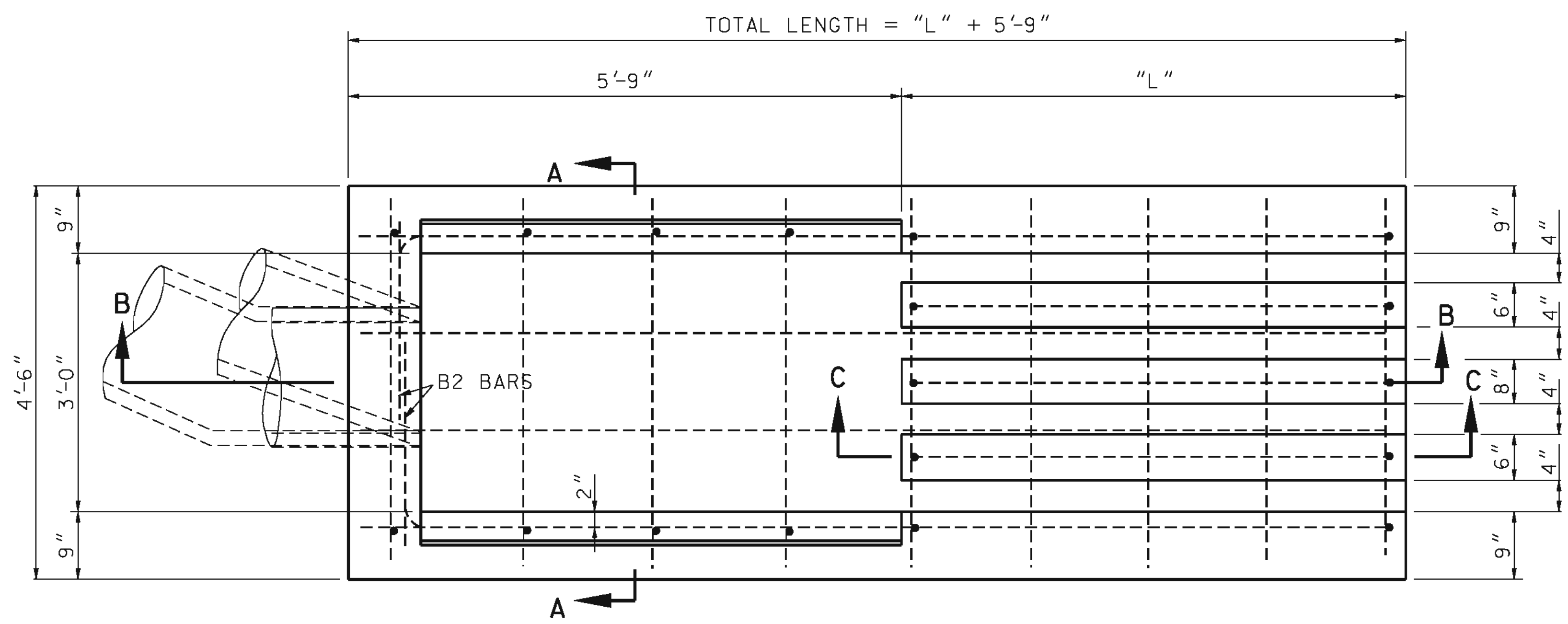
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PIPE CULVERT HEADWALLS
TYPE S
12" TO 24" DIAMETERS
- 1V:6H SLOPES

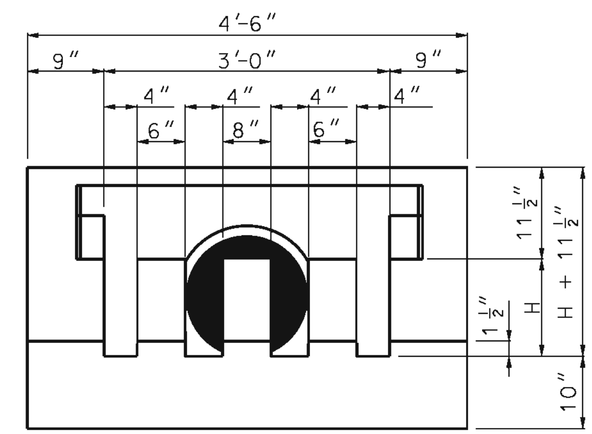
DATE EFFECTIVE: 08/01/2006
DATE PREPARED: 9/3/2009

604.05D

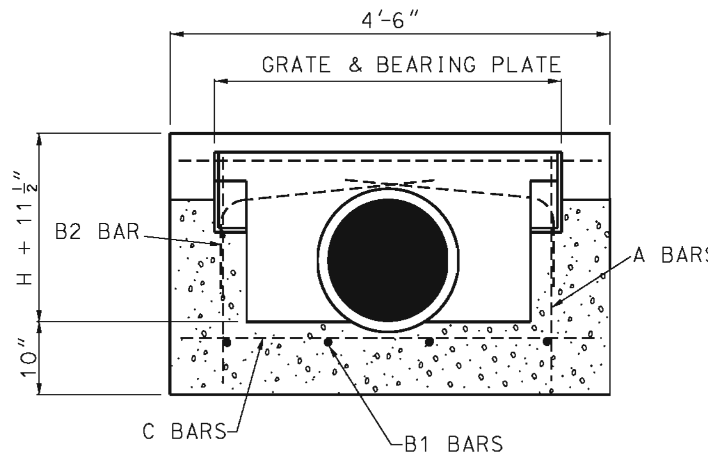
SHEET NO. 1 OF 2



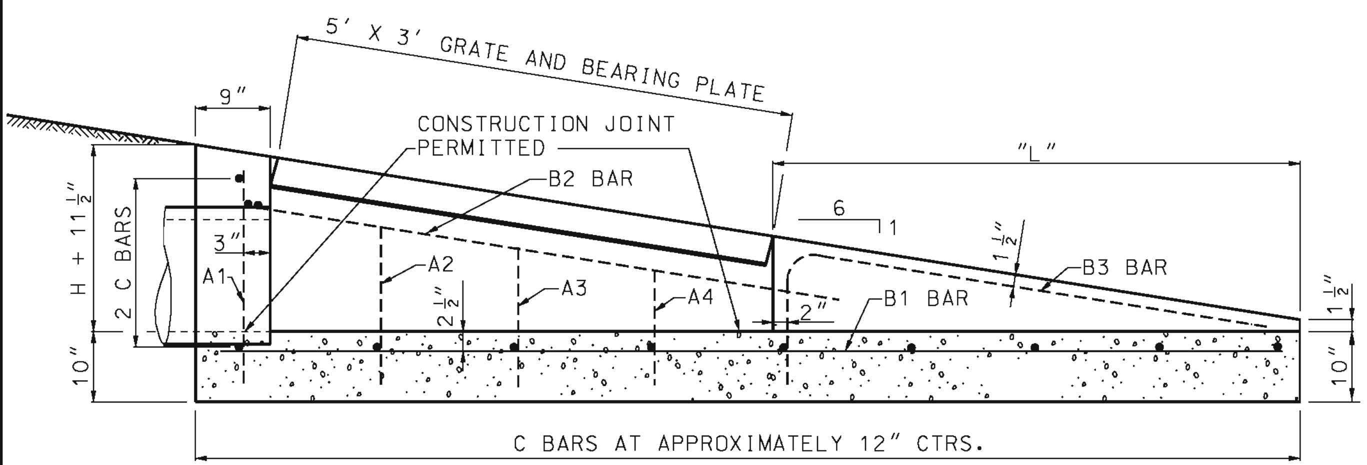
PLAN VIEW



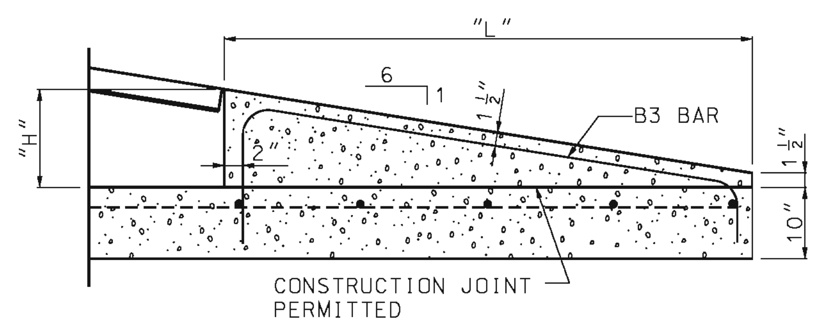
END SECTION



SECTION A-A

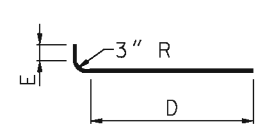


SECTION B-B

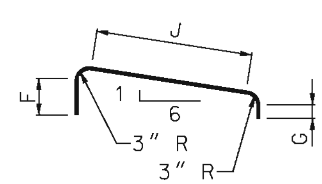


SECTION C-C

PIPE SIZE	DIMENSIONS			QUANTITIES		REINFORCING																				
						#4 A1 BARS		#4 A2 BARS		#4 A3 BARS		#4 A4 BARS		#4 B1 BARS		#4 B2 BARS				#4 B3 BARS					#4 C BARS	
	"H"	"L"	TOTAL LENGTH	CONC. C. Y.	STEEL LBS.	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	E	D	LENGTH	NO.	F	G	J	LENGTH	NO.	LENGTH
27"	2'-0"	11'-3"	17'-0"	4.5	160	2	3'-3"	2	2'-9"	2	2'-6"	2	2'-3"	4	16'-9"	2	1'-11"	5'-8"	8'-0"	5	2'-2"	5"	10'-5"	13'-9"	18	4'-3"
30"	2'-3"	12'-9"	18'-6"	5.0	170	2	3'-6"	2	3'-0"	2	2'-9"	2	2'-6"	4	18'-3"	2	1'-11"	5'-8"	8'-0"	5	2'-5"	5"	11'-11"	15'-6"	19	4'-3"
36"	2'-9"	15'-9"	21'-6"	6.1	200	2	4'-0"	2	3'-6"	2	3'-3"	2	3'-0"	4	21'-3"	2	1'-11"	5'-8"	8'-0"	5	2'-11"	5"	14'-11"	19'-0"	21	4'-3"



B2 BARS



B3 BARS

BENDING DETAILS

GENERAL NOTES:

SEE GENERAL NOTES ON SHEET 1.

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.

PIPE CULVERT HEADWALLS

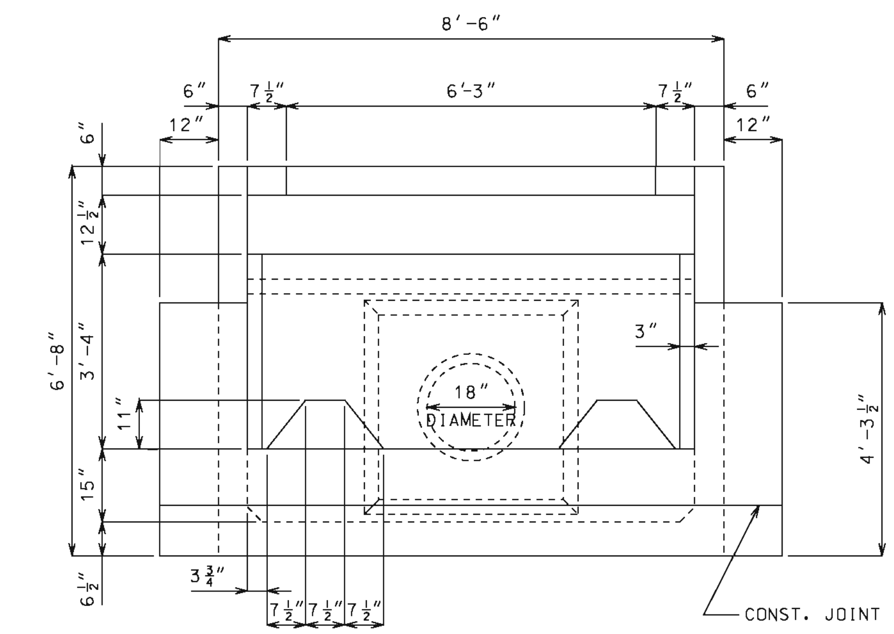
TYPE S
27" TO 36" DIAMETERS
- 1V:6H SLOPES

DATE EFFECTIVE: 08/01/2006
DATE PREPARED: 9/3/2009

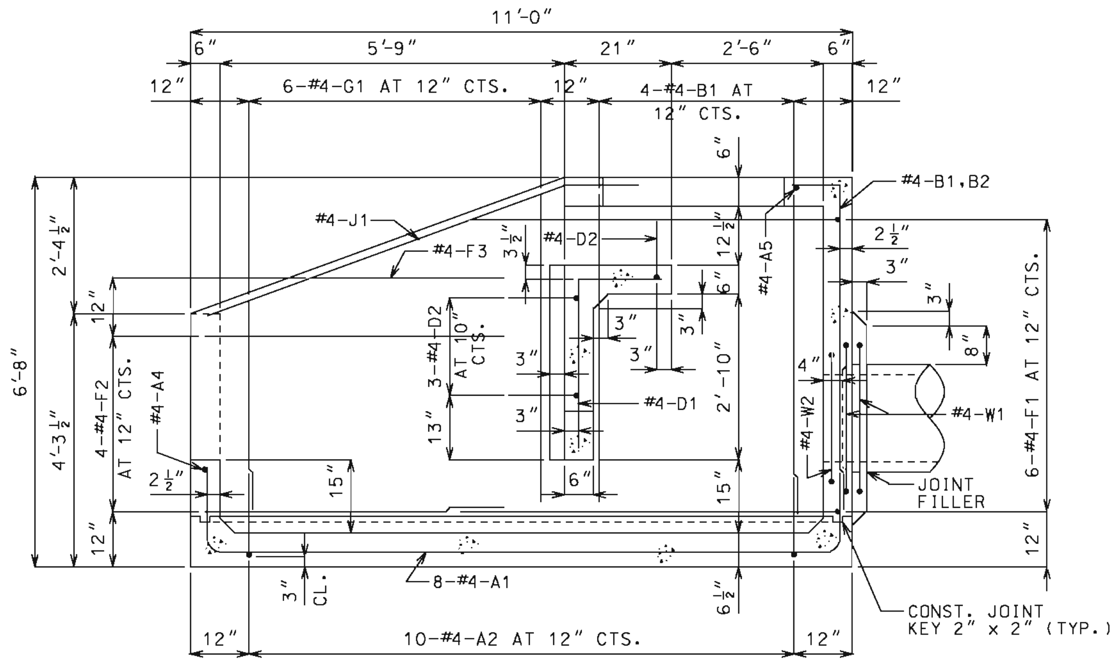
604.05D

SHEET NO. 2 OF 2

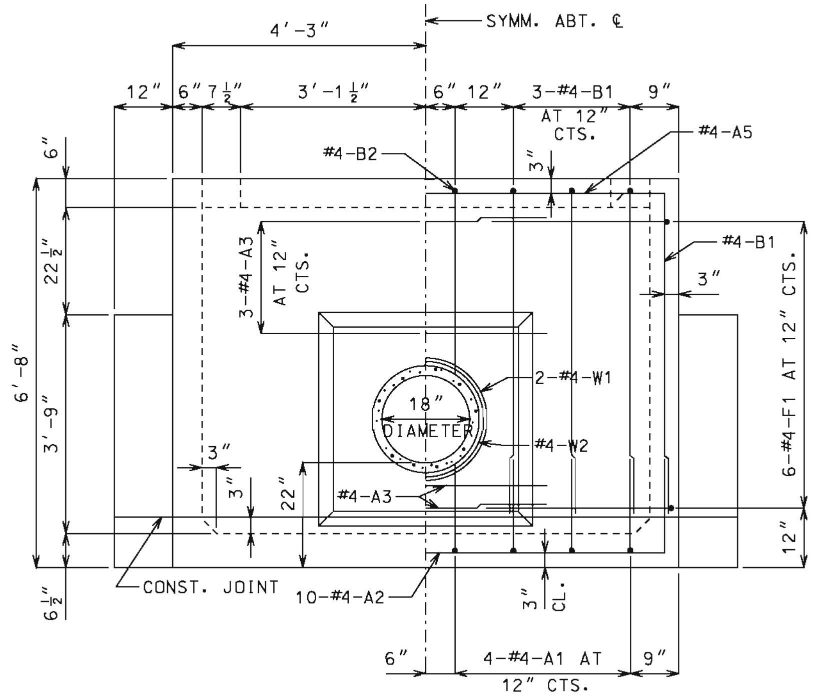
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DOWNSTREAM ELEVATION

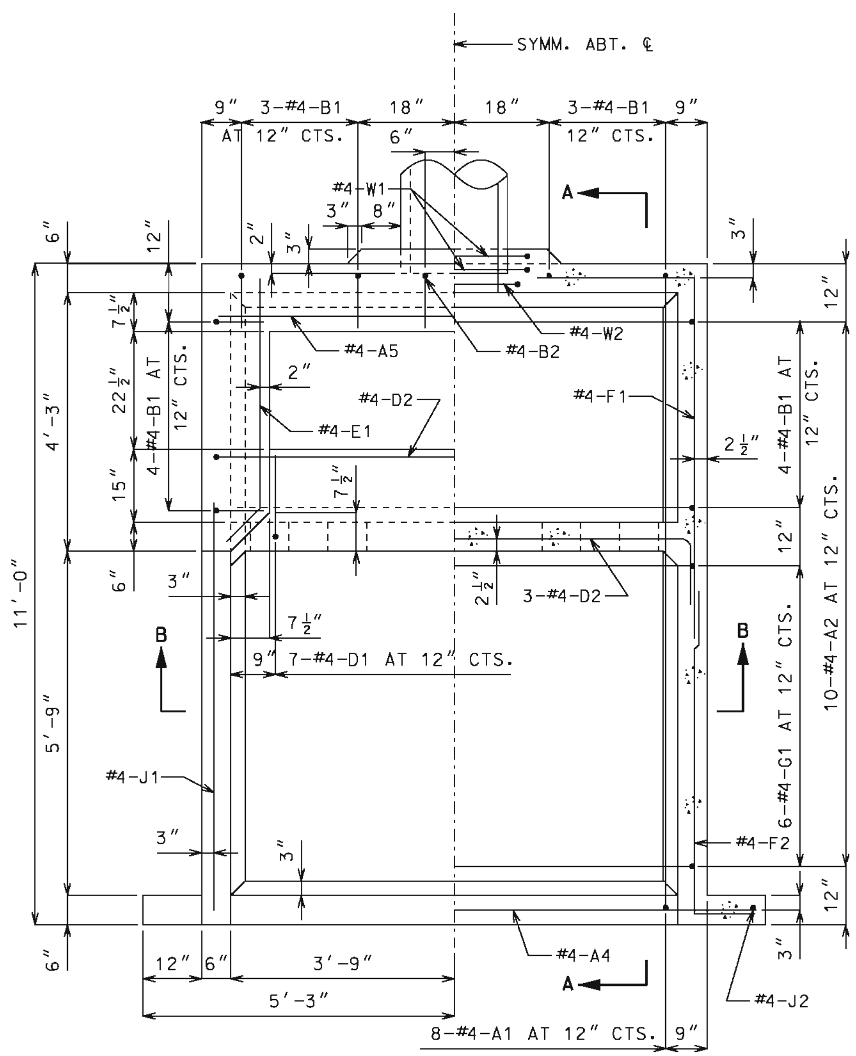


SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.



HALF PLAN HALF HORIZONTAL SECTION

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE f'c = 3,000 psi
REINFORCING STEEL (GRADE 60) fy = 60,000 psi

REINFORCING STEEL

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

DIMENSIONS

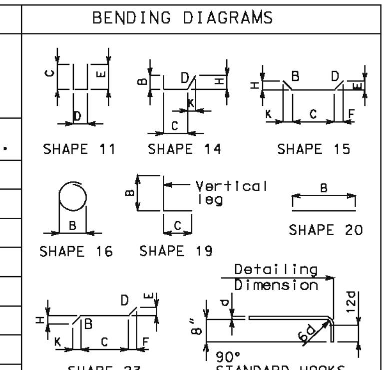
DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

ESTIMATED QUANTITIES		
ITEM		TOTAL
CLASS B CONCRETE	CU. YD.	6.1
REINFORCING STEEL	LBS.	490

COMPLETE BILL OF REINFORCING STEEL

NO. REQ'D	MARK NO. SIZE	MARK NO. MARK	SHAPE NO.	VARIES (V)	NO. EACH	B FT.IN.	C FT.IN.	D FT.IN.	E FT.IN.	F FT.IN.	H FT.IN.	K FT.IN.	NOMINAL LENGTH FT.IN.	ACTUAL LENGTH FT.IN.	WEIGHT LBS.
8	4	A1	11				0-16¼	10-7	0-17¾				13-5	13-3	71
10	4	A2	11				0-18¼	8-0	0-18¼				11-1	10-10	72
5	4	A3	20			4-6							4-6	4-6	15
1	4	A4	20			10-3							10-3	10-3	7
1	4	A5	20			8-3							8-3	8-3	6
14	4	B1	19			5-9	0-9						6-6	6-4	59
2	4	B2	19			2-11	0-9						3-8	3-6	5
7	4	D1	19			2-11	0-16						4-3	4-2	19
4	4	D2	11				0-20½	8-0	0-20½				11-5	11-3	30
1	4	D3	15			2-1½	2-11½	2-1½	0-21⅝	0-13½	0-21⅝	0-13½	7-3	7-2	5
2	4	D4	14			0-12	0-6	2-1½			0-21⅝	0-13½	3-8	3-6	5
2	4	E1	23			0-13	4-0⅜				0-9⅜	0-9	5-1	5-1	7
12	4	F1	19			2-10½	6-4⅛						9-3	9-1	73
8	4	F2	19			0-13	5-9						6-10	6-9	36
2	4	F3	20			4-0							4-0	4-0	5
12	4	G1	20	V	2	5-8							5-8	5-8	
						3-9	(INCREMENT = 4⅝ INCHES)						3-9	3-9	38
2	4	J1	20			7-5							7-5	7-5	10
2	4	J2	19			3-10¾	2-1½						6-0	5-11	8
2	4	W1	16			2-4							8-2	8-2	11
1	4	W2	16			0-23							6-11	6-11	5

BENDING DIAGRAMS



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

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

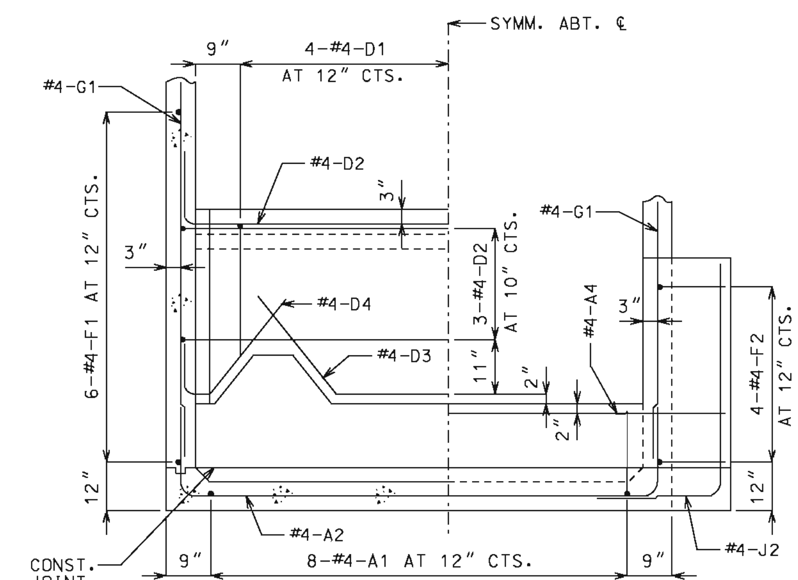
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF SECTION B-B

HALF ELEVATION OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

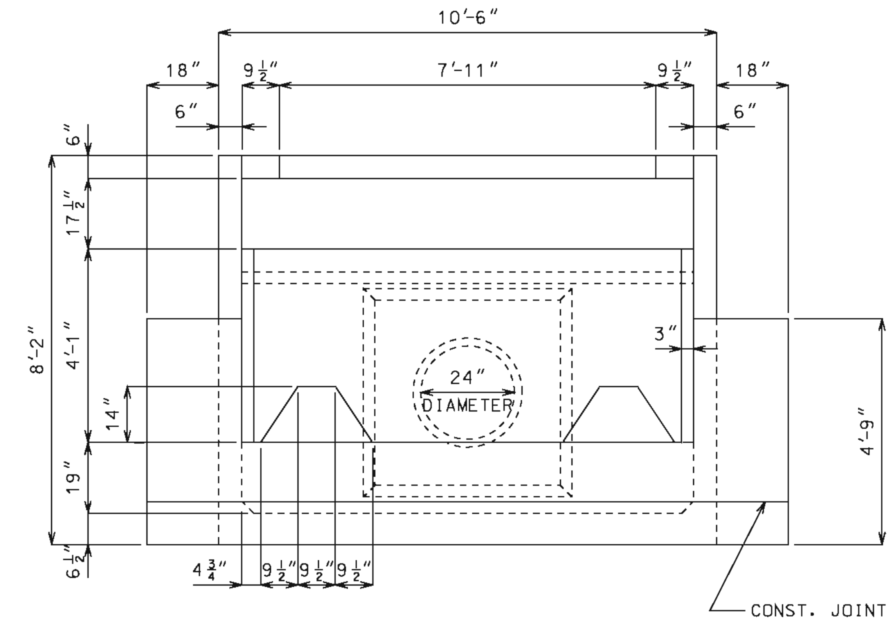
MoDOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

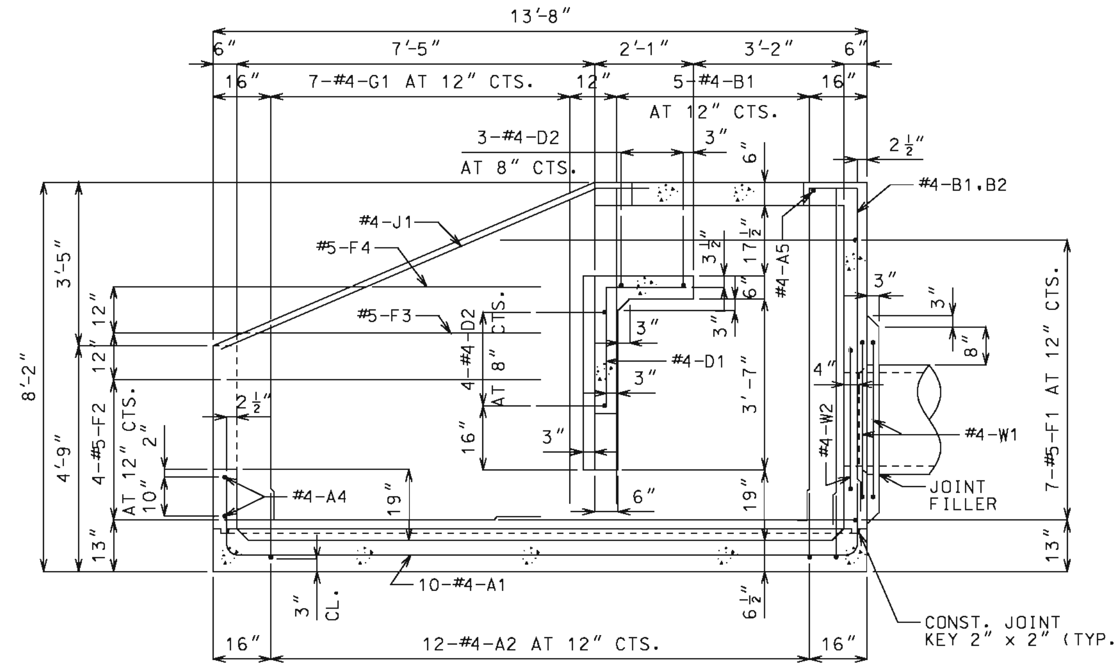
PIPE CULVERT HEADWALL

ENERGY DISSIPATOR (IMPACT TYPE) FOR 18" CONCRETE PIPE

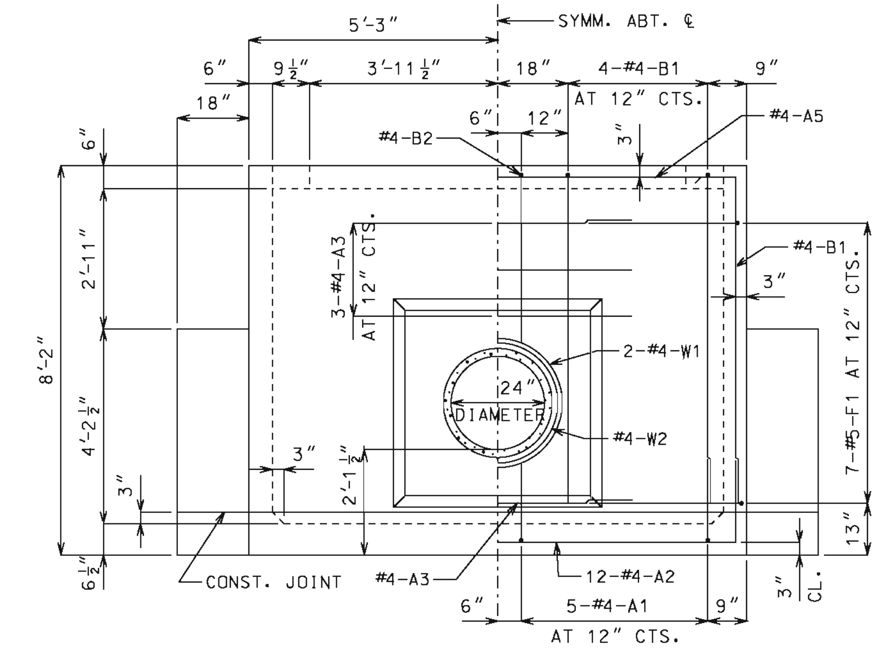
DATE EFFECTIVE: 07/01/2001
DATE PREPARED: 9/3/2009
604.10E
SHEET NO. 1 OF 1



DOWNSTREAM ELEVATION



SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE f'c = 3,000 psi
REINFORCING STEEL (GRADE 60) fy = 60,000 psi

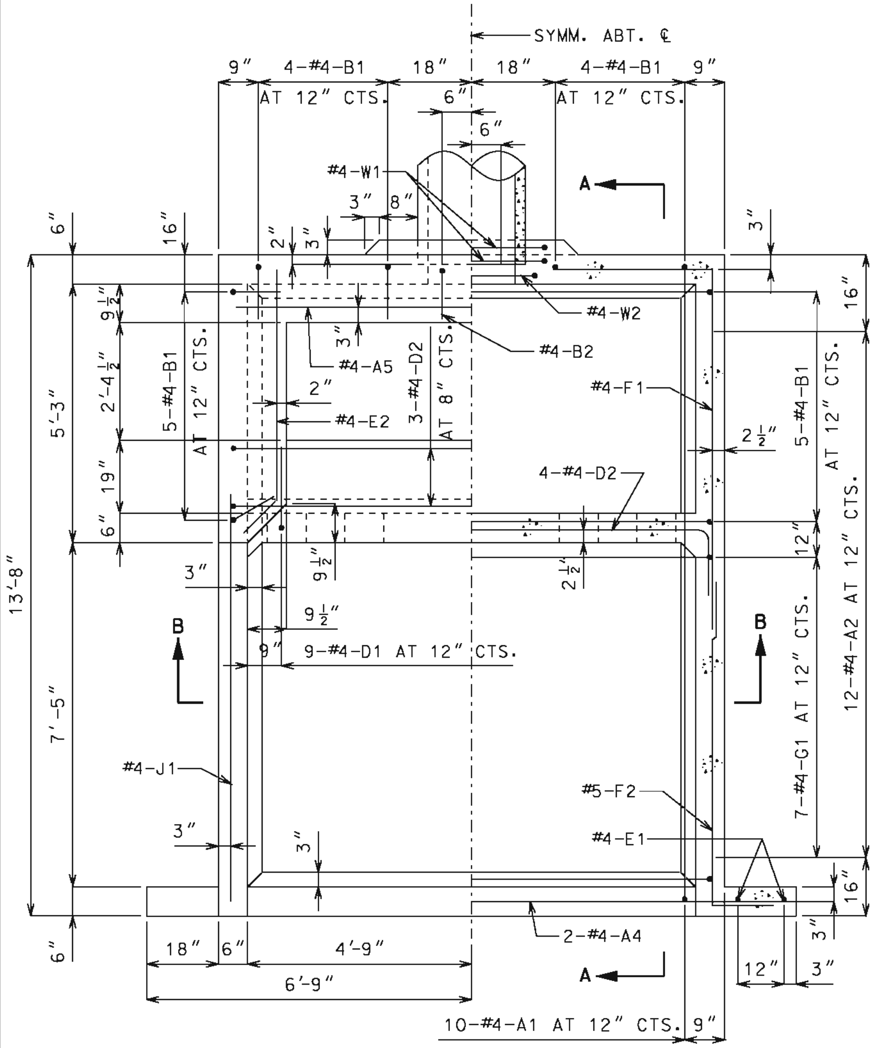
REINFORCING STEEL

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

DIMENSIONS

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

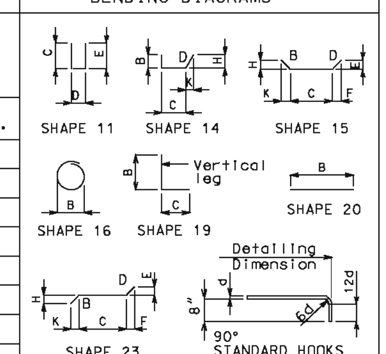
ESTIMATED QUANTITIES		
ITEM		TOTAL
CLASS B CONCRETE	CU. YD.	9.5
REINFORCING STEEL	LBS.	820



HALF PLAN HALF HORIZONTAL SECTION

COMPLETE BILL OF REINFORCING STEEL															
NO. REQ'D	MARK NO. SIZE	MARK NO. MARK	SHAPE NO.	VARIES (V)	NO. EACH	DIMENSIONS B	C	D	E	F	H	K	NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
						FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	LBS.
10	4	A1	11				0-20¼	13-2½	0-17¾				16-5	16-2	108
12	4	A2	11				0-18¾	10-0	0-18¾				13-2	12-11	104
4	4	A3	20			5-0							5-0	5-0	13
2	4	A4	20			13-3							13-3	13-3	18
1	4	A5	20			10-3							10-3	10-3	7
18	4	B1	19			7-1½	0-12						8-2	8-0	96
2	4	B2	19			3-8	0-10						4-6	4-5	6
9	4	D1	19			3-8	0-20½						5-5	5-3	32
7	4	D2	11				0-19	10-1	0-19				13-3	13-1	61
1	4	D3	15			2-9⅛	3-10	2-9⅛	2-3½	0-18½	2-3½	0-18½	9-4	9-3	6
2	4	D4	14			0-12	0-7	2-9⅛			2-3½	0-18½	4-4	4-2	6
4	4	E1	20			4-6							4-6	4-6	12
2	4	E2	23			0-17	5-0½				0-12	0-12	6-6	6-5	9
2	4	E3	20			2-8							2-8	2-8	4
14	5	F1	19			3-8	7-11						11-7	11-6	168
8	5	F2	19			0-19	7-0						8-7	8-6	71
2	5	F3	20			6-0							6-0	6-0	13
2	5	F4	20			3-9							3-9	3-9	8
14	4	G1	20	V	2	6-8							6-8	6-8	
						4-1	(INCREMENT = 5⅛ INCHES)						4-1	4-1	50
2	4	J1	20			9-6							9-6	9-6	13
2	4	W1	16			2-9							9-6	9-6	13
1	4	W2	16			2-5							8-6	8-6	6

BENDING DIAGRAMS



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

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

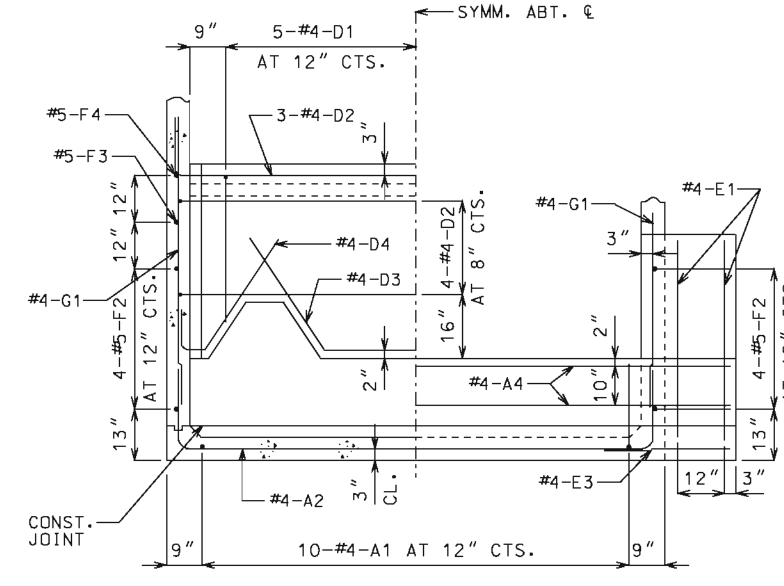
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF SECTION B-B

HALF ELEVATION OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

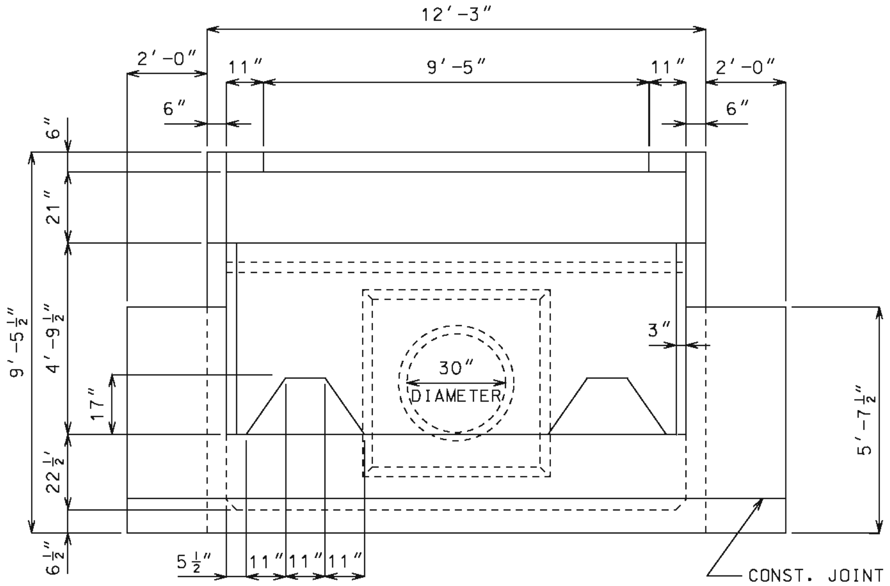
STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

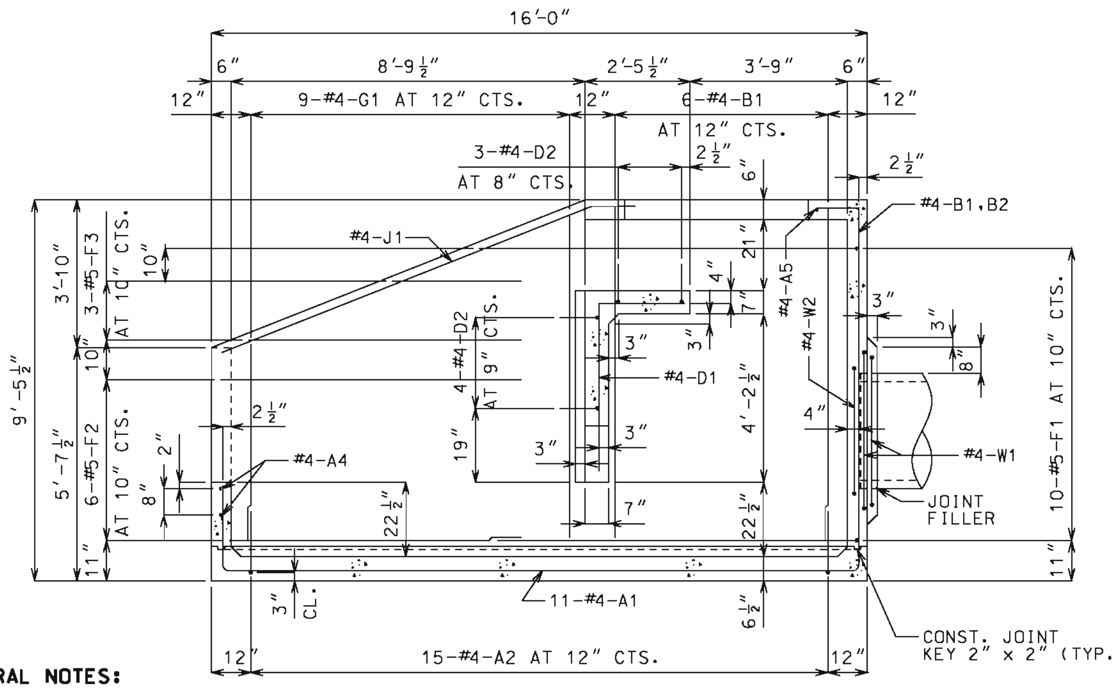
PIPE CULVERT HEADWALL

ENERGY DISSIPATOR (IMPACT TYPE) FOR 24" CONCRETE PIPE

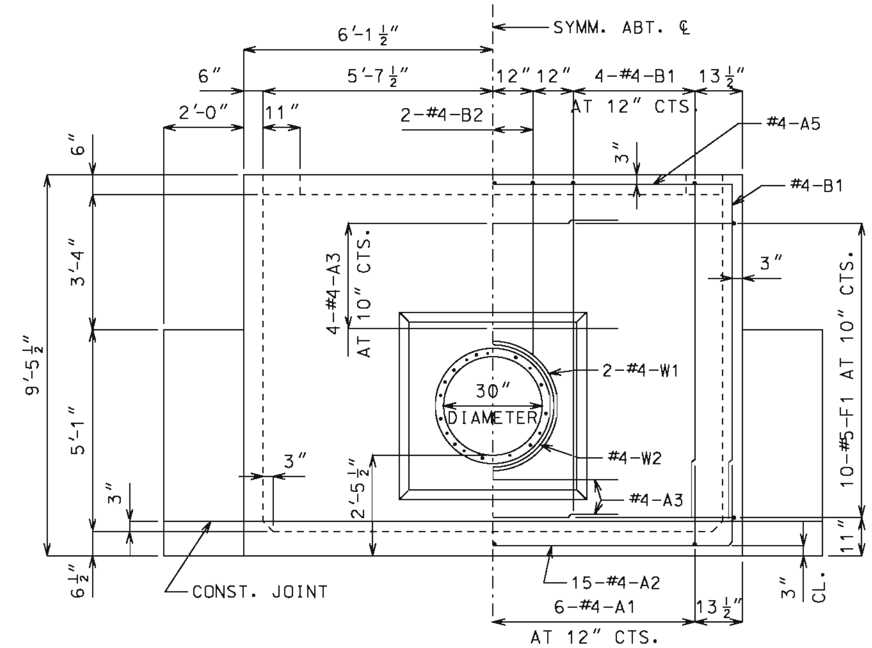
DATE EFFECTIVE: 07/01/2001	604.11E	SHEET NO.
DATE PREPARED: 9/3/2009		1 OF 1



DOWNSTREAM ELEVATION

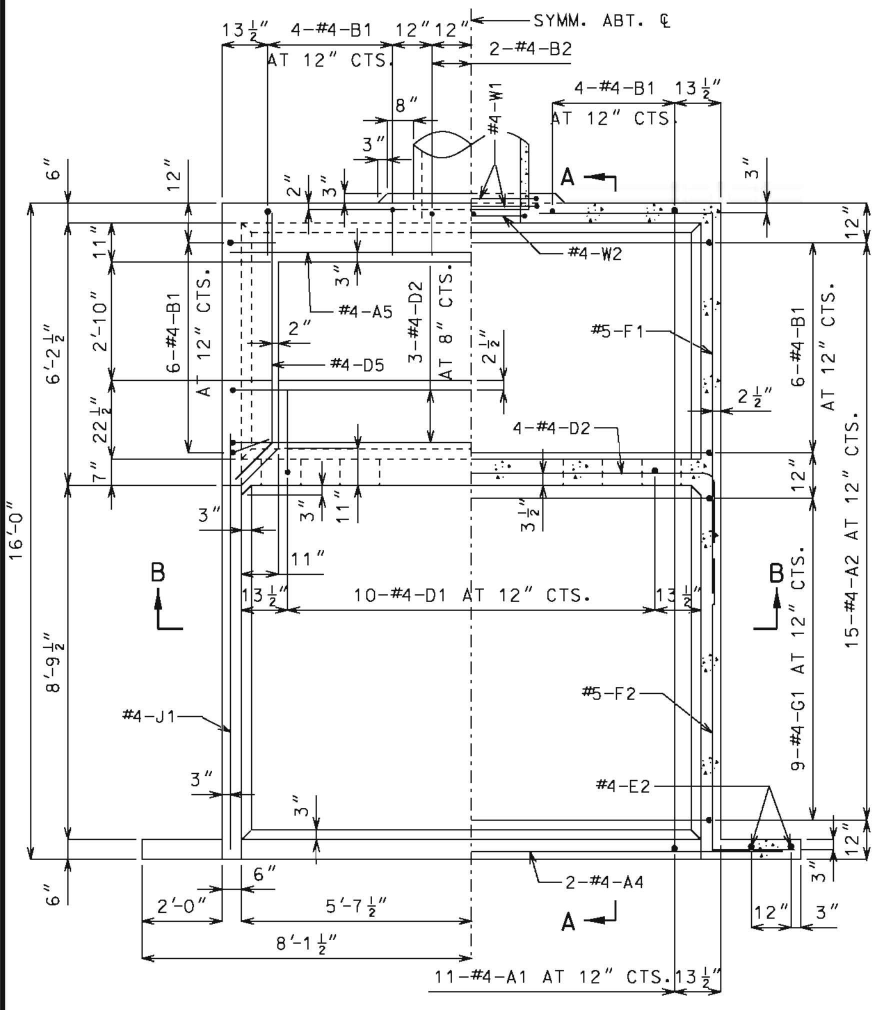


SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.



HALF PLAN HALF HORIZONTAL SECTION

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE f'c = 3,000 psi
REINFORCING STEEL (GRADE 60) fy = 60,000 psi

REINFORCING STEEL

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

DIMENSIONS

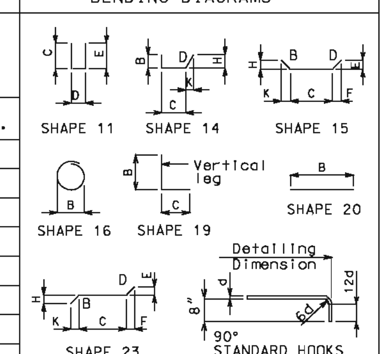
DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

ESTIMATED QUANTITIES		
ITEM		TOTAL
CLASS B CONCRETE	CU. YD.	13.2
REINFORCING STEEL	LBS.	1,170

COMPLETE BILL OF REINFORCING STEEL

NO. REQ'D	MARK NO. SIZE	MARK	SHAPE NO.	VARIES (V)	NO. EACH	B FT.IN.	C FT.IN.	D FT.IN.	E FT.IN.	F FT.IN.	H FT.IN.	K FT.IN.	NOMINAL LENGTH FT.IN.	ACTUAL LENGTH FT.IN.	WEIGHT LBS.
11	4	A1	11				2-0½	15-6	0-20½				19-3	19-1	140
15	4	A2	11				0-20½	11-10	0-20½				15-3	15-1	151
6	4	A3	20			5-4							5-4	5-4	21
2	4	A4	20			13-3							13-3	13-3	18
1	4	A5	20			11-9							11-9	11-9	8
20	4	B1	19			8-5½	0-13						9-7	9-5	126
3	4	B2	19			4-0	0-13						5-1	5-0	10
10	4	D1	19			4-4	2-0½						6-5	6-3	42
7	4	D2	11				0-12	11-10	0-12				13-10	13-8	64
1	4	D3	15			2-11	4-7	2-11	2-6	0-18	2-6	0-18	10-5	10-4	7
2	4	D4	14			0-12	0-7	3-0			2-6	0-20	4-7	4-5	6
2	4	D5	23			0-18⅜	5-7				0-13	0-13	7-1	7-1	9
2	4	E1	20			3-0							3-0	3-0	4
4	4	E2	20			5-3							5-3	5-3	14
20	5	F1	19			8-8⅜	4-2½						12-11	12-9	266
12	5	F2	19			2-1	8-1						10-2	10-1	126
6	5	F3	20	V	2	3-0⅞							3-1	3-1	
						7-0⅞	(INCREMENT = 24 INCHES)						7-1	7-1	32
18	4	G1	20	V	2	5-1⅜							5-1	5-1	
						8-5⅜	(INCREMENT = 5 INCHES)						8-5	8-5	81
2	4	J1	20			10-11							10-11	10-11	15
2	4	W1	16			3-6							11-10	11-10	16
1	4	W2	16			2-11							10-0	10-0	7

BENDING DIAGRAMS



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

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

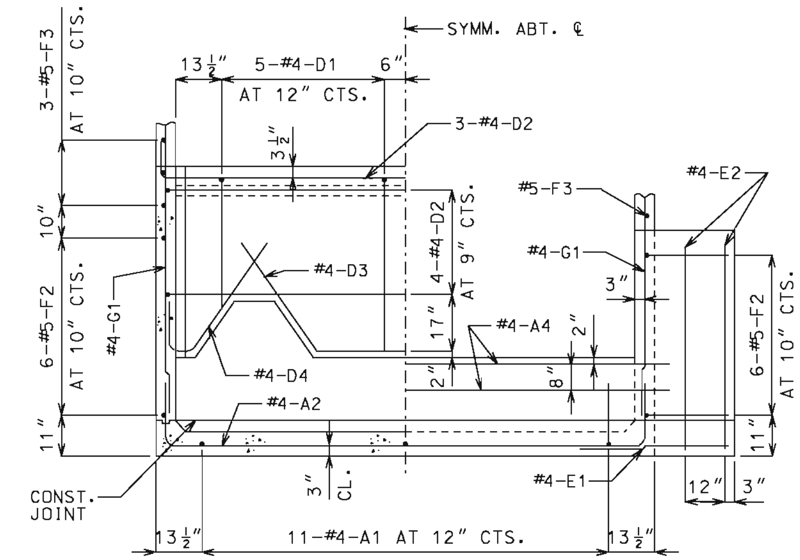
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF SECTION B-B HALF ELEVATION OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

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

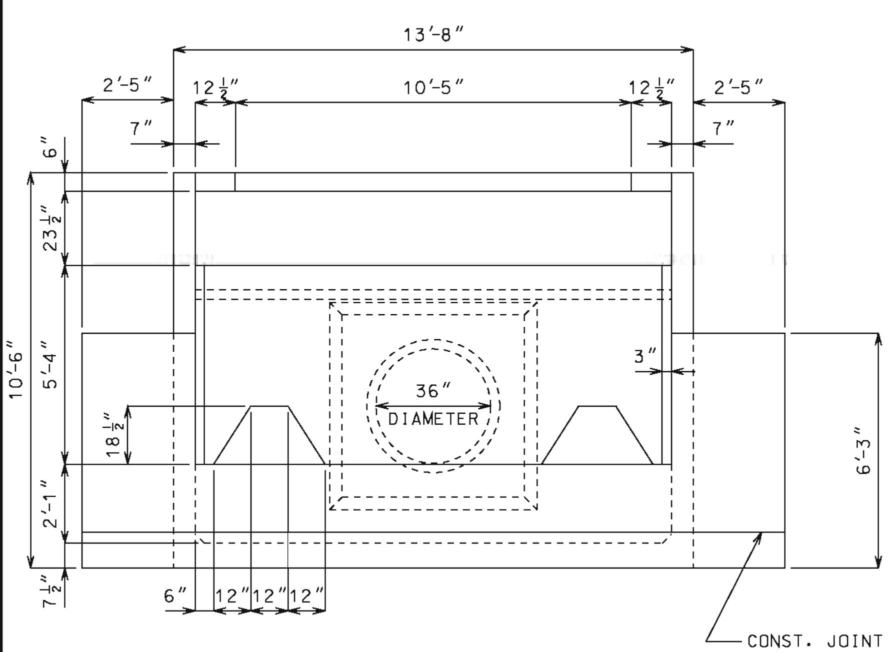
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PIPE CULVERT HEADWALL

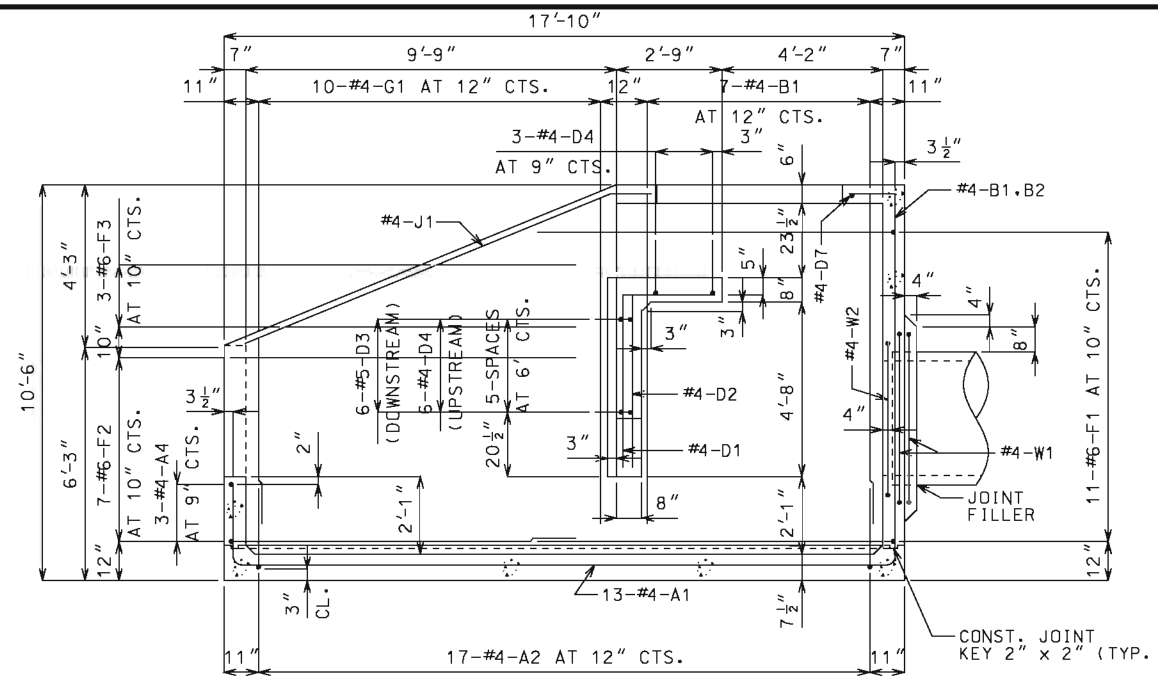
ENERGY DISSIPATOR (IMPACT TYPE) FOR 30" CONCRETE PIPE

DATE EFFECTIVE:	07/01/2001	604.12E	SHEET NO.
DATE PREPARED:	9/3/2009		1 OF 1

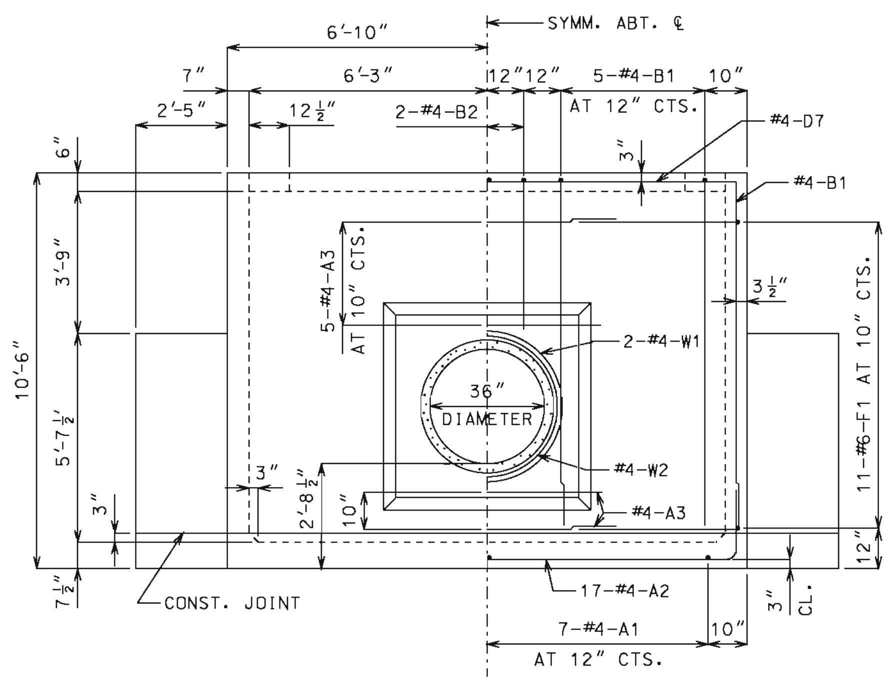
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DOWNSTREAM ELEVATION

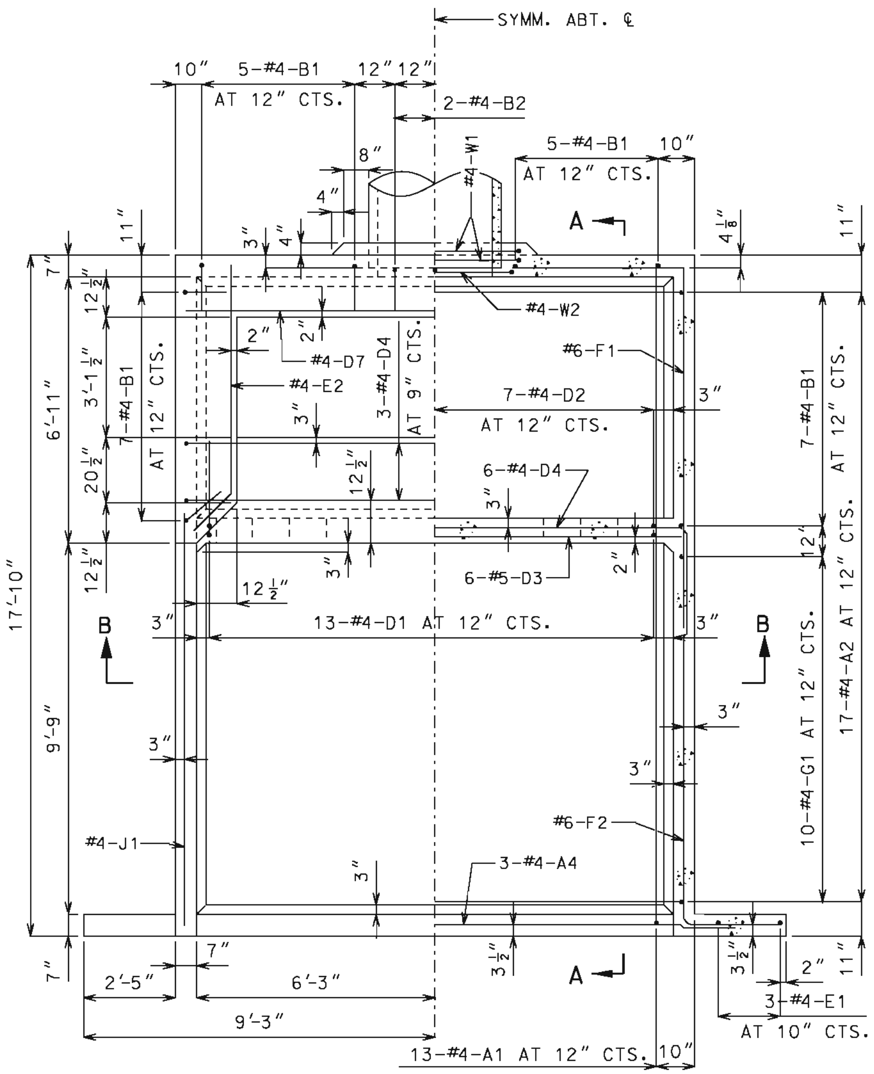


SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.



HALF PLAN HALF HORIZONTAL SECTION

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE f'c = 3,000 psi
REINFORCING STEEL (GRADE 60) fy = 60,000 psi

REINFORCING STEEL

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

DIMENSIONS

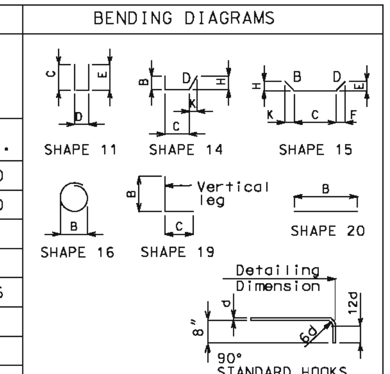
DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

ESTIMATED QUANTITIES		
ITEM		TOTAL
CLASS B CONCRETE	CU. YD.	19.0
REINFORCING STEEL	LBS.	1,870

COMPLETE BILL OF REINFORCING STEEL

NO. REQ'D	MARK NO. SIZE	MARK	SHAPE NO.	VARIES (V)	NO. EACH	B FT.IN.	C FT.IN.	D FT.IN.	E FT.IN.	F FT.IN.	H FT.IN.	K FT.IN.	NOMINAL LENGTH FT.IN.	ACTUAL LENGTH FT.IN.	WEIGHT LBS.
13	4	A1	11				2-2 1/2	17-5 1/2	2-4				22-0	21-10	190
17	4	A2	11				2-4	13-1	2-4				17-9	17-7	200
7	4	A3	20			5-11							5-11	5-11	28
3	4	A4	20			15-2							15-2	15-2	30
24	4	B1	19			8-7 1/2	0-15						9-11	9-9	156
3	4	B2	19			4-2 1/2	0-15						5-6	5-4	11
13	4	D1	19			4-11	2-5 1/2						7-5	7-3	63
13	4	D2	20			4-11							4-11	4-11	43
6	5	D3	20			13-5							13-5	13-5	84
9	4	D4	11				0-12	13-2	0-12				15-2	15-0	90
4	4	D5	14			0-12	0-8 3/4	3-0			2-6	0-20	4-9	4-7	12
2	4	D6	15			3-0	5-4 1/2	3-0	2-6	0-20	2-6	0-20	11-5	11-4	15
1	4	D7	20			13-5							13-5	13-5	9
6	4	E1	20			6-0							6-0	6-0	24
2	4	E2	15			0-22 5/8	6-0				0-16	0-16	7-11	7-10	10
2	4	E3	20			3-7							3-7	3-7	5
22	6	F1	19			9-10 1/2	4-7 1/2						14-6	14-4	474
14	6	F2	19			9-2 1/2	2-6 1/2						11-9	11-7	244
6	6	F3	20	V	2	3-6							3-6	3-6	
						7-6	(INCREMENT = 24 INCHES)						7-6	7-6	50
20	4	G1	20	V	2	4-9							4-9	4-9	
						8-5 1/2	(INCREMENT = 5 INCHES)						8-6	8-6	89
2	4	J1	20			12-0							12-0	12-0	16
2	4	W1	16			4-0 1/2							13-7	13-7	18
1	4	W2	16			3-4 1/2							11-6	11-6	8

BENDING DIAGRAMS



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

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

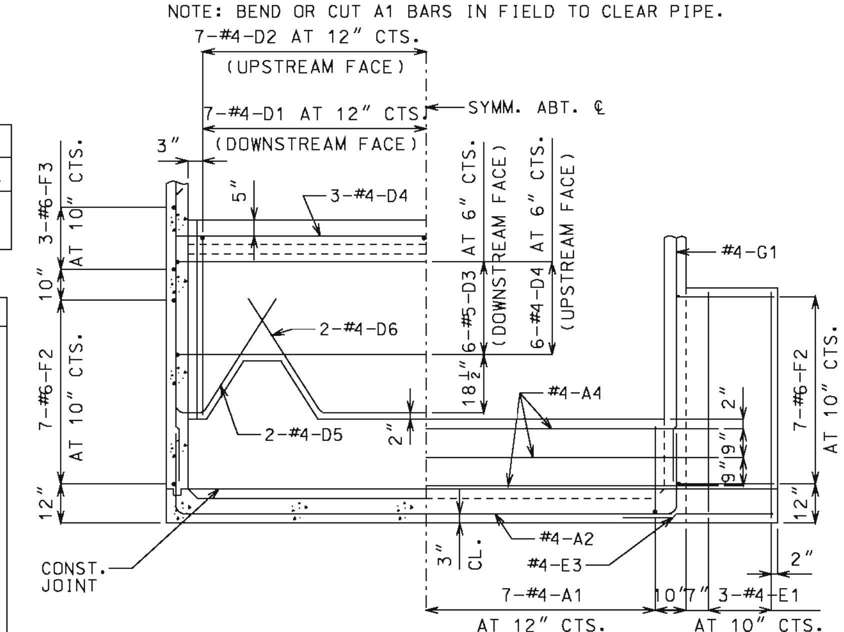
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF SECTION B-B

HALF ELEVATION OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 AND D2 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

MoDOT

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

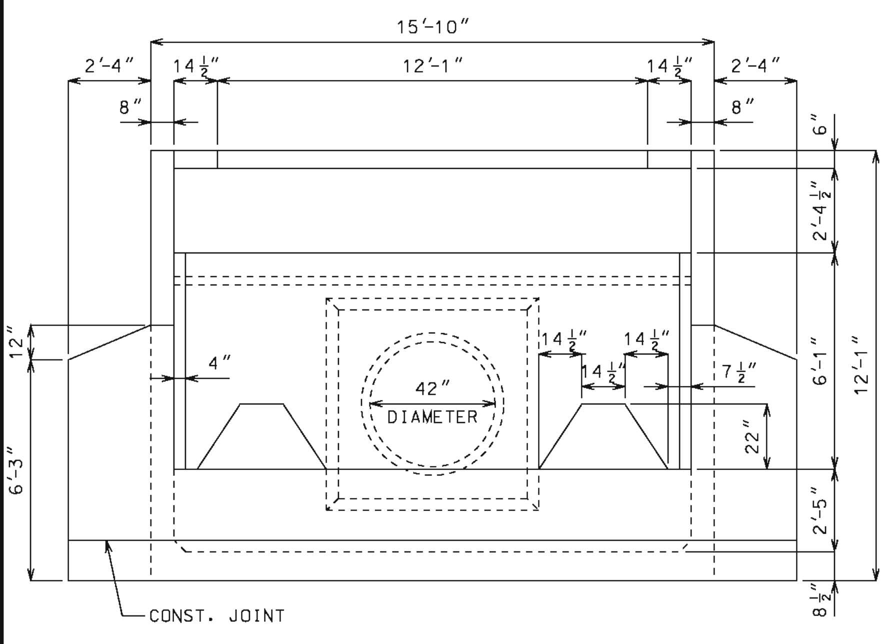
PIPE CULVERT HEADWALL

ENERGY DISSIPATOR (IMPACT TYPE) FOR 36" CONCRETE PIPE

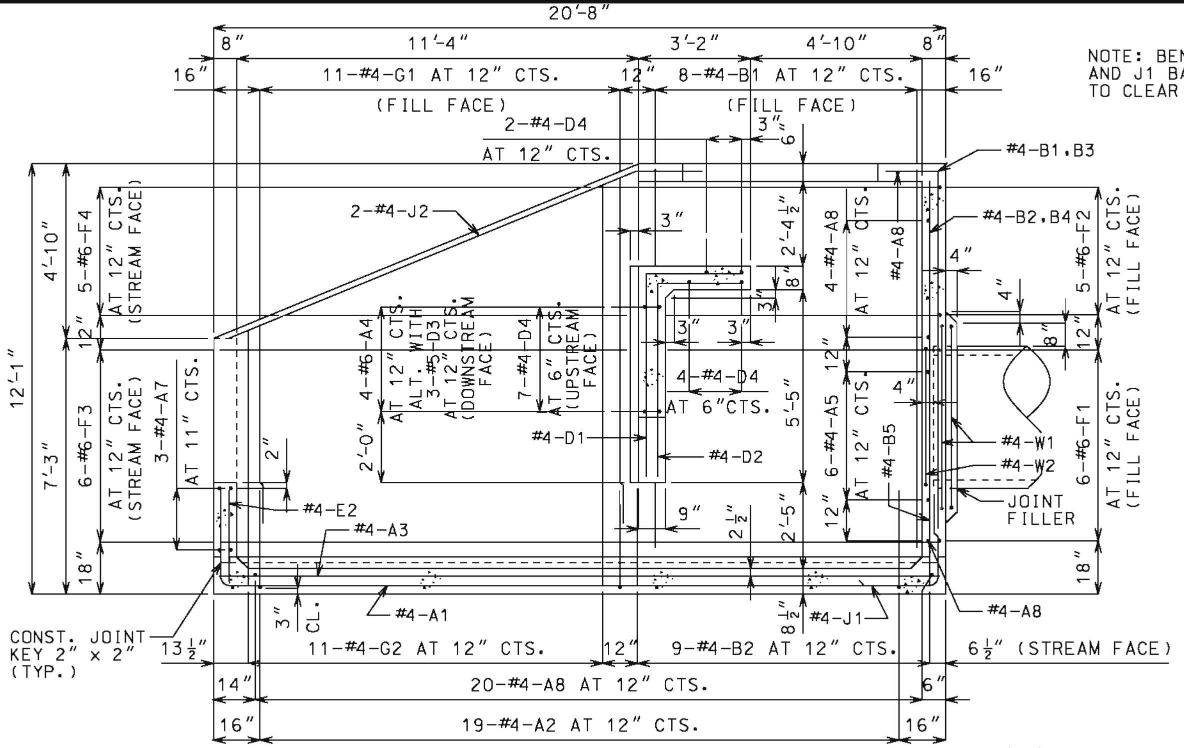
DATE EFFECTIVE: 07/01/2001
DATE PREPARED: 9/3/2009

604.13E

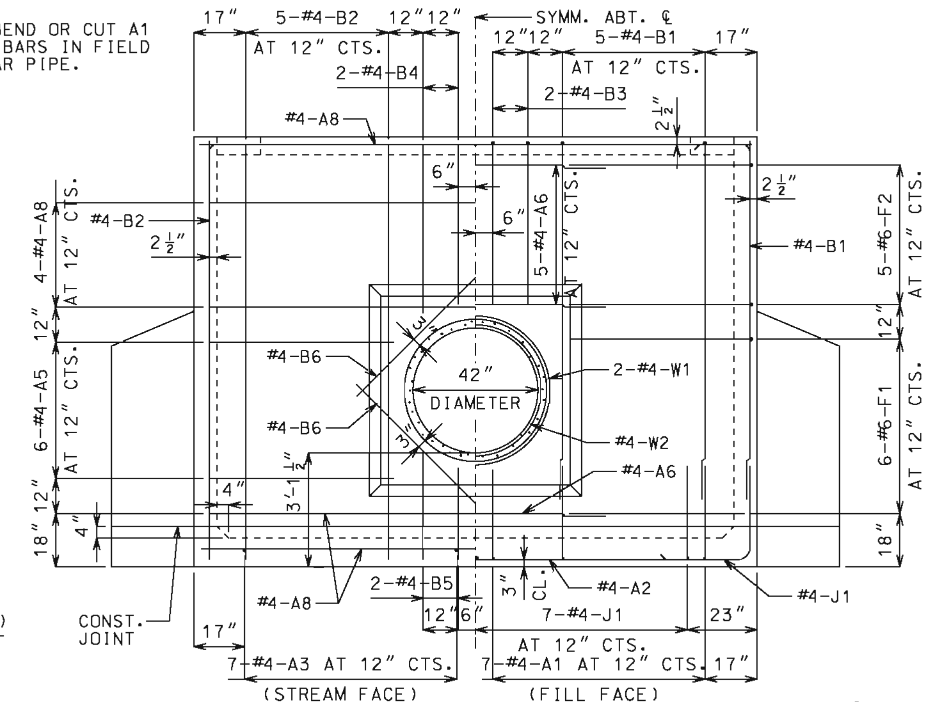
SHEET NO. 1 OF 1



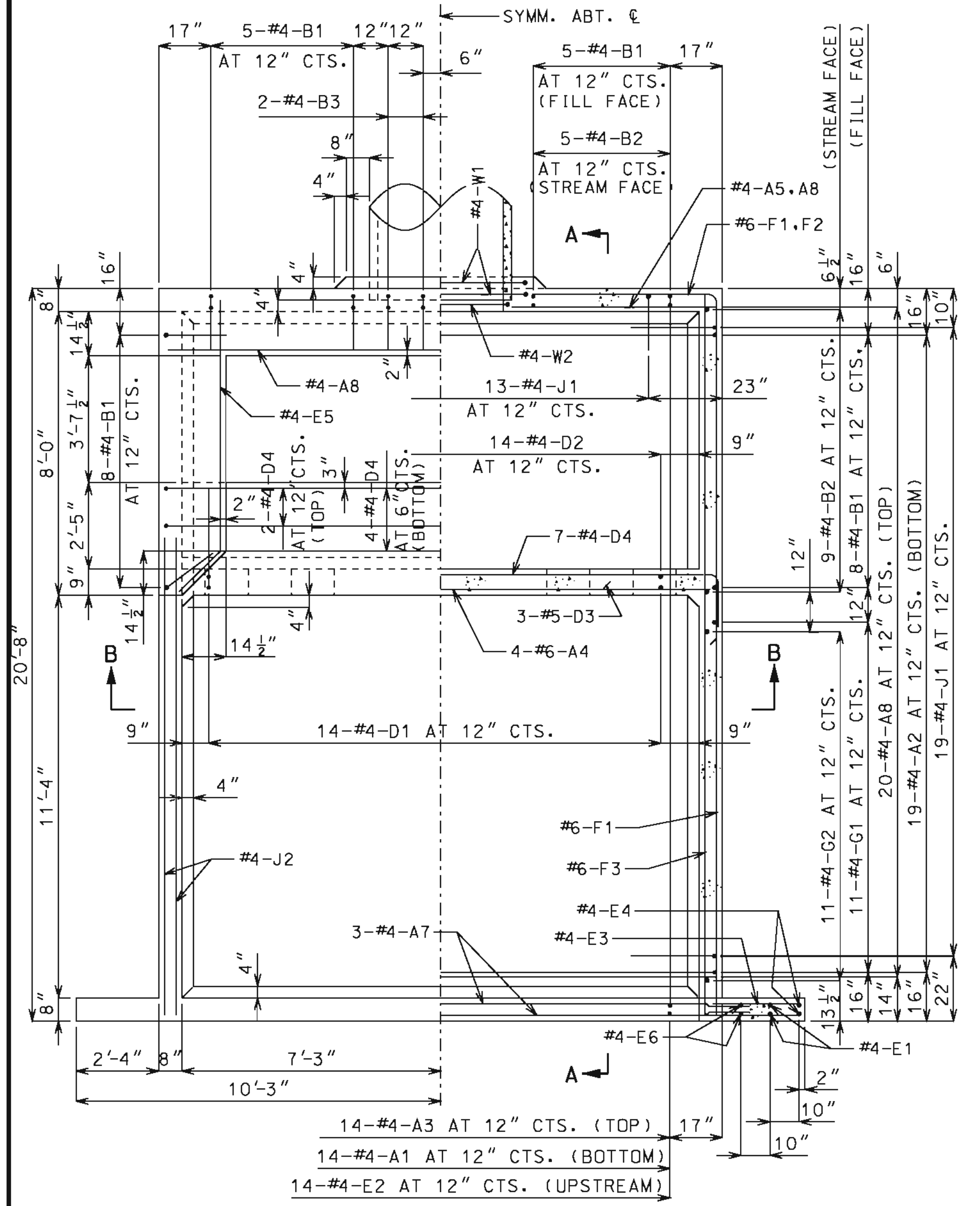
DOWNSTREAM ELEVATION



SECTION A - A



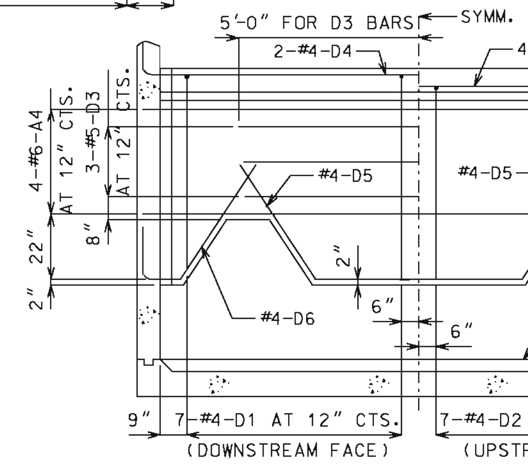
UPSTREAM ELEVATION



HALF PLAN HALF HORIZONTAL SECTION

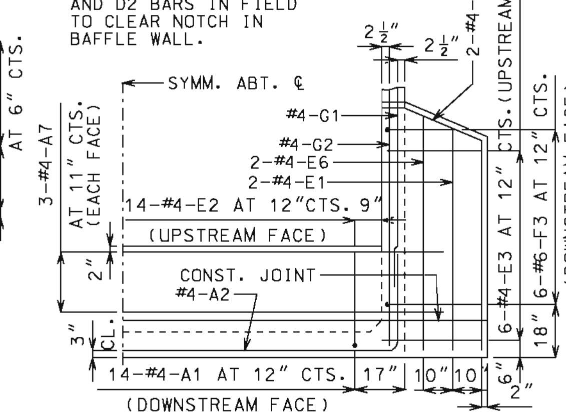
NO. REQ'D	SIZE	MARK	SHAPE NO.	VARIES (V)	NO. EACH	B	C	D	E	F	H	K	NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
						FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	LBS.
14	4	A1	11				2-9	20-4	2-9				25-10	25-8	240
19	4	A2	11				2-10	15-7	2-10				21-3	21-1	268
14	4	A3	20			20-4							20-4	20-4	190
4	6	A4	20			15-7							15-7	15-7	94
12	4	A5	20			5-7							5-7	5-7	45
6	4	A6	20			6-5							6-5	6-5	26
6	4	A7	20			16-9							16-9	16-9	67
26	4	A8	20			15-7							15-7	15-7	271
26	4	B1	19			9-11 1/2	0-19						11-7	11-5	198
28	4	B2	20			11-10							11-10	11-10	221
4	4	B3	19			4-10	0-19						6-5	6-4	17
4	4	B4	20			4-10							4-10	4-10	13
4	4	B5	20			2-6							2-6	2-6	7
4	4	B6	20			5-0							5-0	5-0	13
14	4	D1	19			5-9 1/2	2-10 1/2						8-8	8-7	80
14	4	D2	19			5-5 1/2	2-6						8-0	7-10	73
3	5	D3	20			10-0							10-0	10-0	31
13	4	D4	11				0-12	15-7	0-12				17-7	17-5	151
2	4	D5	15			3-7 5/8	5-10	3-7 5/8	3-0 1/2	2-0	3-0 1/2	2-0	13-1	13-0	17
4	4	D6	14			0-12	0-13 1/2	3-7 5/8			3-0 1/2	2-0	5-9	5-7	15
4	4	E1	20			6-5							6-5	6-5	17
14	4	E2	20			2-10							2-10	2-10	26
12	4	E3	20			2-9							2-9	2-9	22
4	4	E4	25			6-0	2-5	0-6 1/2			0-11 1/2	2-2 1/2	8-11	8-10	24
2	4	E5	15			2-2 7/8	7-3 1/2				0-19	0-19	9-6	9-6	13
4	4	E6	20			6-9							6-9	6-9	18
12	6	F1	19			20-5	5-5 1/2						25-11	25-9	464
10	6	F2	19	V	2	9-8	5-5 1/2						15-2	15-0	
						19-6	5-5 1/2	(INCREMENT = 29 1/2)					25-0	24-10	299
12	6	F3	19			20-5	2-9						23-2	23-0	415
10	6	F4	20	V	2	9-8							9-8	9-8	
						19-6		(INCREMENT = 29 1/2)					19-6	19-6	219
22	4	G1	20	V	2	5-7							5-7	5-7	
						9-6		(INCREMENT = 4 3/4)					9-6	9-6	111
22	4	G2	20	V	2	7-7							7-7	7-7	
						11-6		(INCREMENT = 4 3/4)					11-6	11-6	140
51	4	J1	19			3-3	3-3						6-6	6-5	219
4	4	J2	20			13-10							13-10	13-10	37
2	4	W1	16			4-7 1/2							15-5	15-5	21
1	4	W2	16			3-10 1/2							13-1	13-1	9

COMPLETE BILL OF REINFORCING STEEL



SECTION B-B

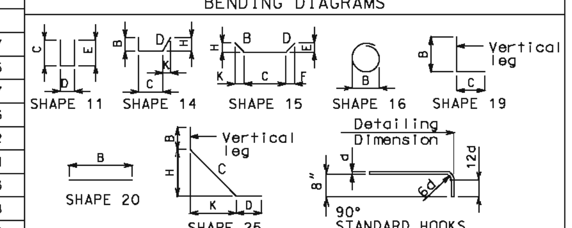
NOTE: BEND OR CUT D1 AND D2 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.



HALF ELEVATION OF LOWER BAFFLE AND WING

ESTIMATED QUANTITIES		
ITEM		TOTAL
CLASS B CONCRETE	CU. YD.	28.2
REINFORCING STEEL	LBS.	4,090

BENDING DIAGRAMS



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

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE f'c = 3,000 psi
REINFORCING STEEL (GRADE 60) fy = 60,000 psi

REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL

DIMENSIONS

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

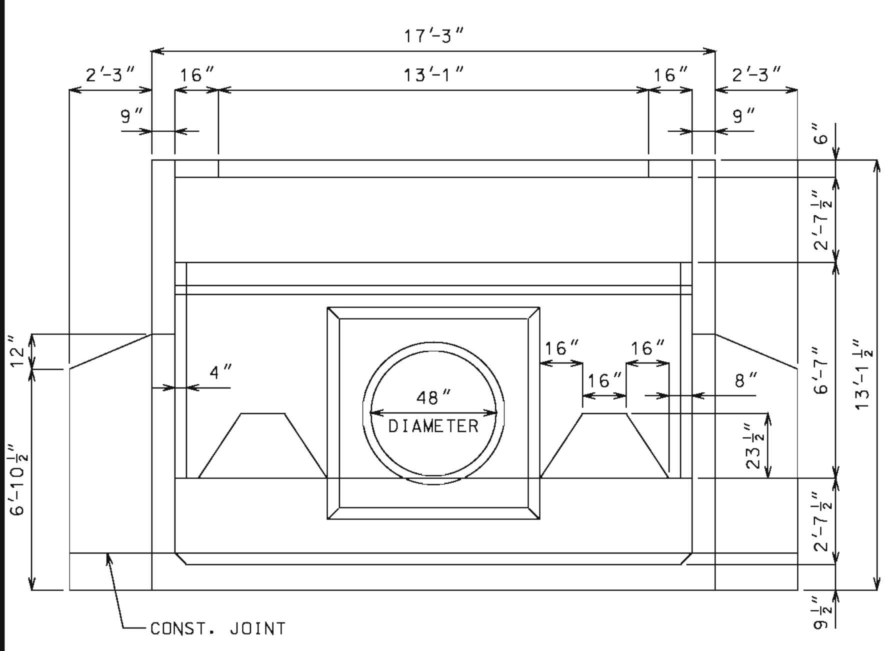
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PIPE CULVERT HEADWALL

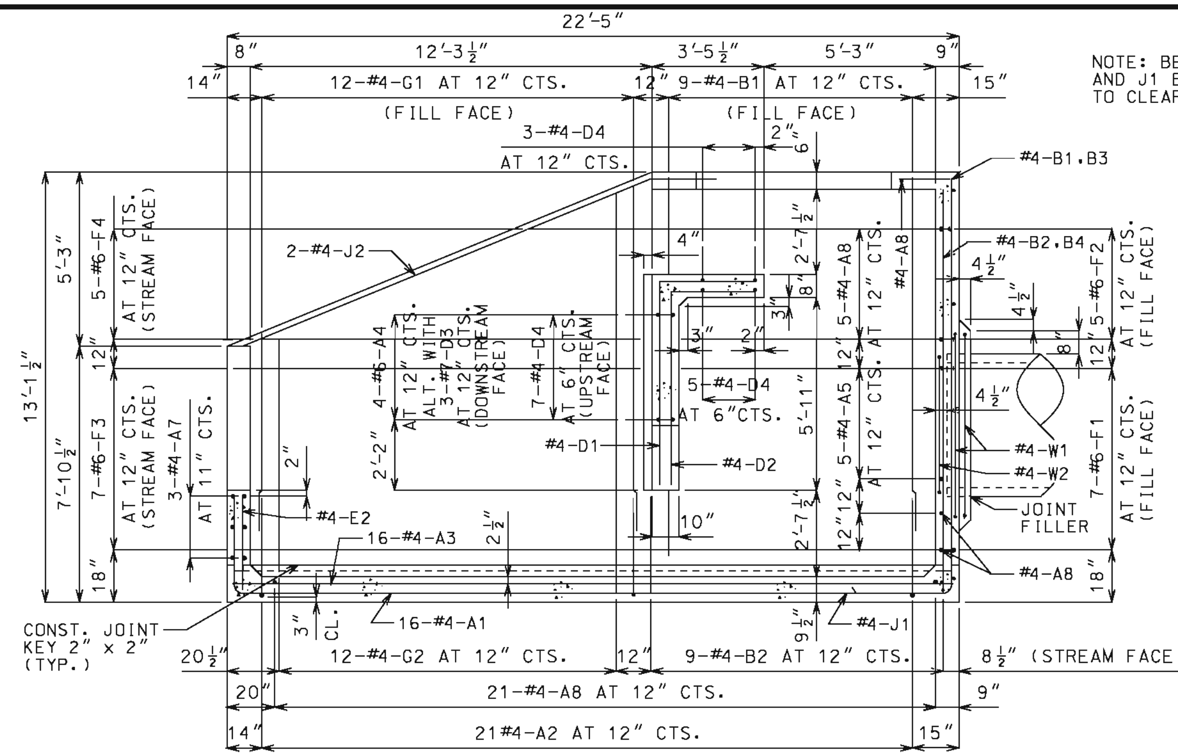
ENERGY DISSIPATOR (IMPACT TYPE) FOR 42" CONCRETE PIPE

DATE EFFECTIVE:	07/01/2001	604.14E	SHEET NO. 1 OF 1
DATE PREPARED:	9/3/2009		

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

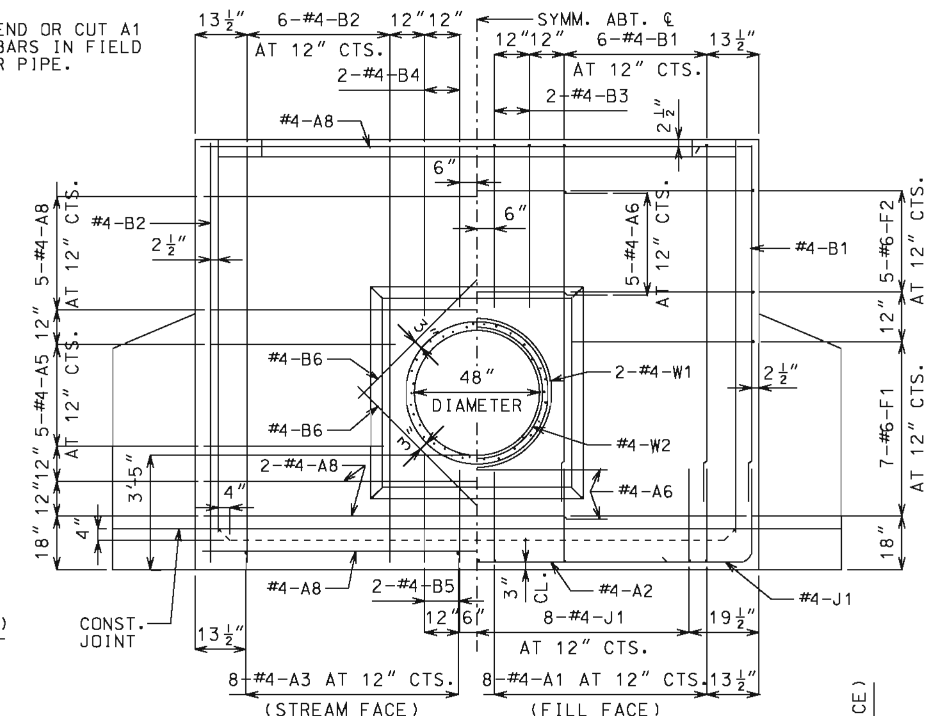


DOWNSTREAM ELEVATION

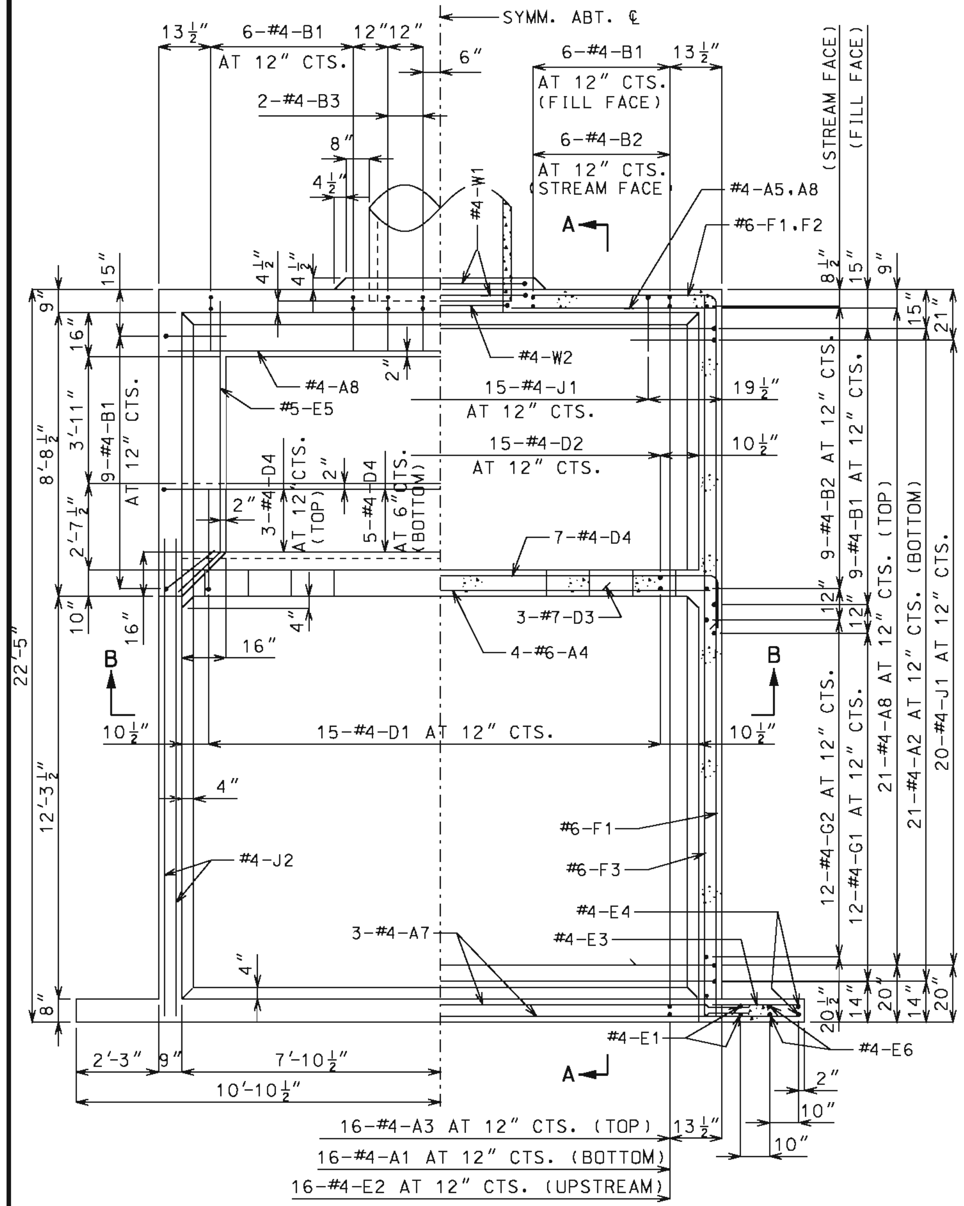


NOTE: BEND OR CUT A1 AND J1 BARS IN FIELD TO CLEAR PIPE.

SECTION A - A

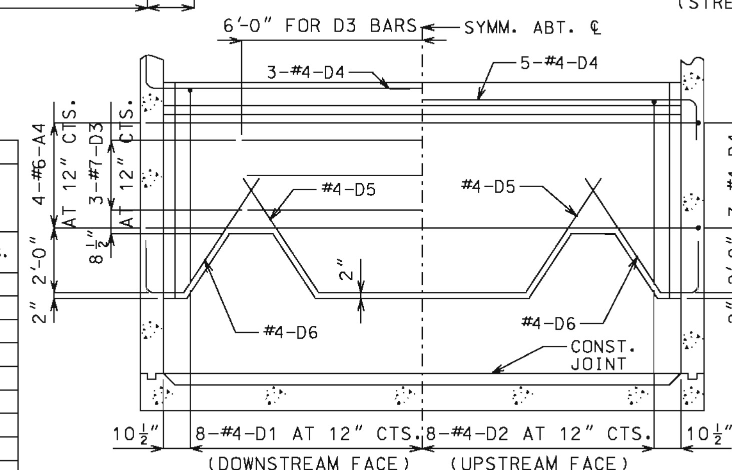


UPSTREAM ELEVATION

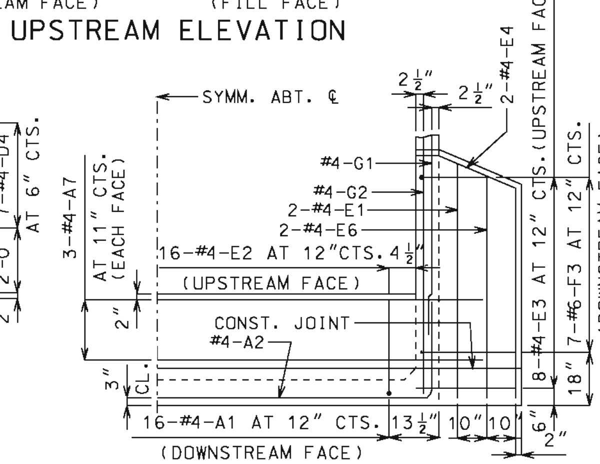


HALF PLAN HALF HORIZONTAL SECTION

COMPLETE BILL OF REINFORCING STEEL															
NO. REQ'D	MARK NO. SIZE	MARK NO. MARK	SHAPE NO.	VARIES (V)	NO. EACH	DIMENSIONS B	C	D	E	F	H	K	NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
						FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	LBS.
16	4	A1	11				3-0½	22-1	3-0½				28-2	28-0	299
21	4	A2	11				3-1	16-11	3-1				23-1	22-11	321
16	4	A3	20			22-2							22-2	22-2	237
4	6	A4	20			17-0							17-0	17-0	102
10	4	A5	20			6-0							6-0	6-0	40
7	4	A6	20			7-1							7-1	7-1	33
6	4	A7	20			18-0							18-0	18-0	72
29	4	A8	20			17-0							17-0	17-0	329
30	4	B1	19			10-8½	0-21½						12-6	12-5	249
30	4	B2	20			12-10½							12-11	12-11	259
4	4	B3	19			5-0½	0-21½						6-10	6-9	18
4	4	B4	20			5-1							5-1	5-1	14
4	4	B5	20			2-10							2-10	2-10	8
4	4	B6	20			5-1							5-1	5-1	14
15	4	D1	19			6-3½	3-2½						9-6	9-5	94
15	4	D2	19			5-11	2-8						8-7	8-6	85
3	7	D3	20			12-0							12-0	12-0	74
15	4	D4	11				0-12	17-0	0-12				19-0	18-10	189
2	4	D5	15			3-9⅞	6-4	3-9⅞	3-1¾	2-2	3-1¾	2-2	14-0	13-11	19
4	4	D6	14			0-12	0-15	3-9⅞			3-1¾	2-2	6-1	5-11	16
4	4	E1	20			7-5							7-5	7-5	20
16	4	E2	20			3-2							3-2	3-2	34
16	4	E3	20			2-9							2-9	2-9	29
4	4	E4	25			6-8	2-2⅞	0-7½			0-10	2-1	9-6	9-6	25
2	5	E5	15			2-7⅛	7-11½				0-22	0-22	10-7	10-6	22
4	4	E6	20			7-1							7-1	7-1	19
14	6	F1	19			22-3	6-0						28-3	28-1	591
10	6	F2	19	V	2	10-8½	6-0						16-9	16-7	
						20-6½	6-0	(INCREMENT = 29½)					26-7	26-5	323
14	6	F3	19			22-3	2-9						25-0	24-10	522
10	6	F4	20	V	2	10-8½							10-9	10-7	
						20-6½		(INCREMENT = 29½)					20-7	20-7	233
24	4	G1	20	V	2	8-1							8-1	8-1	
						12-6½		(INCREMENT = 4⅞)					12-7	12-7	166
24	4	G2	20	V	2	8-4							8-4	8-4	
						12-9½		(INCREMENT = 4⅞)					12-10	12-10	170
55	4	J1	19			3-3	3-3						6-6	6-5	236
4	4	J2	20			14-10							14-10	14-10	40
2	4	W1	16			5-2½							17-3	17-3	23
1	4	W2	16			4-4½							14-7	14-7	10



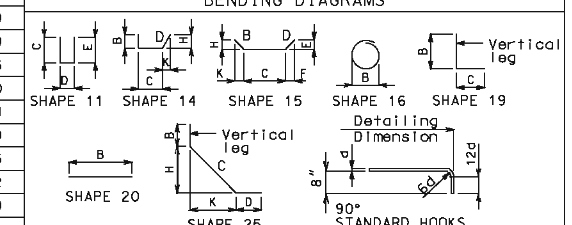
SECTION B-B



HALF ELEVATION OF LOWER BAFFLE AND WING

ESTIMATED QUANTITIES		
ITEM		TOTAL
CLASS B CONCRETE	CU. YD.	36.7
REINFORCING STEEL	LBS.	4,940

BENDING DIAGRAMS



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

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

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PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE f'c = 3,000 psi
REINFORCING STEEL (GRADE 60) fy = 60,000 psi

REINFORCING STEEL

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

DIMENSIONS

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

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DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

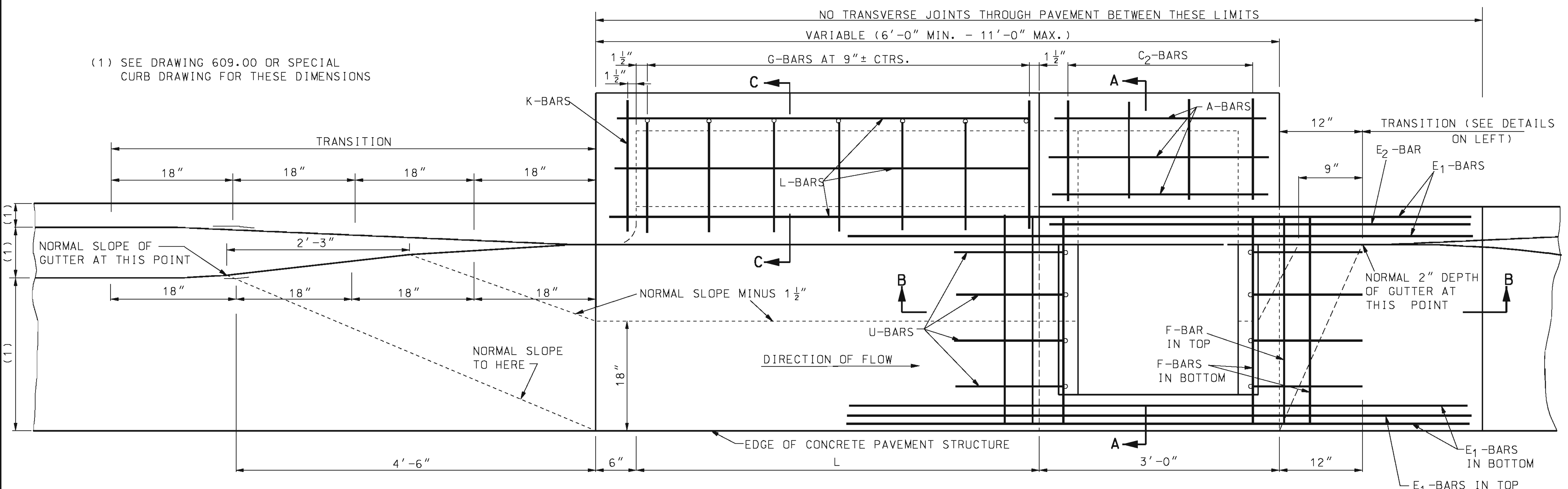
PIPE CULVERT HEADWALL ENERGY DISSIPATOR (IMPACT TYPE) FOR 48" CONCRETE PIPE

DATE EFFECTIVE: 07/01/2001
DATE PREPARED: 9/3/2009

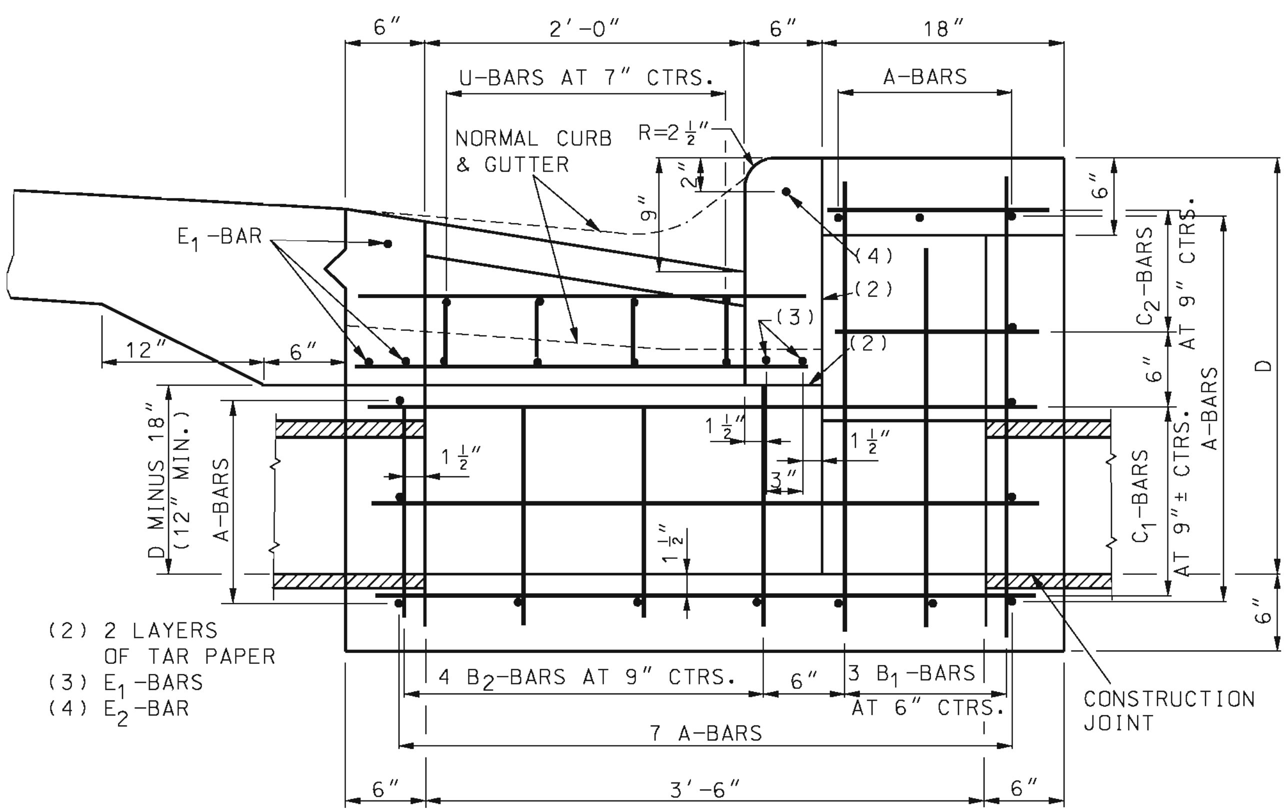
604.15E

SHEET NO. 1 OF 1

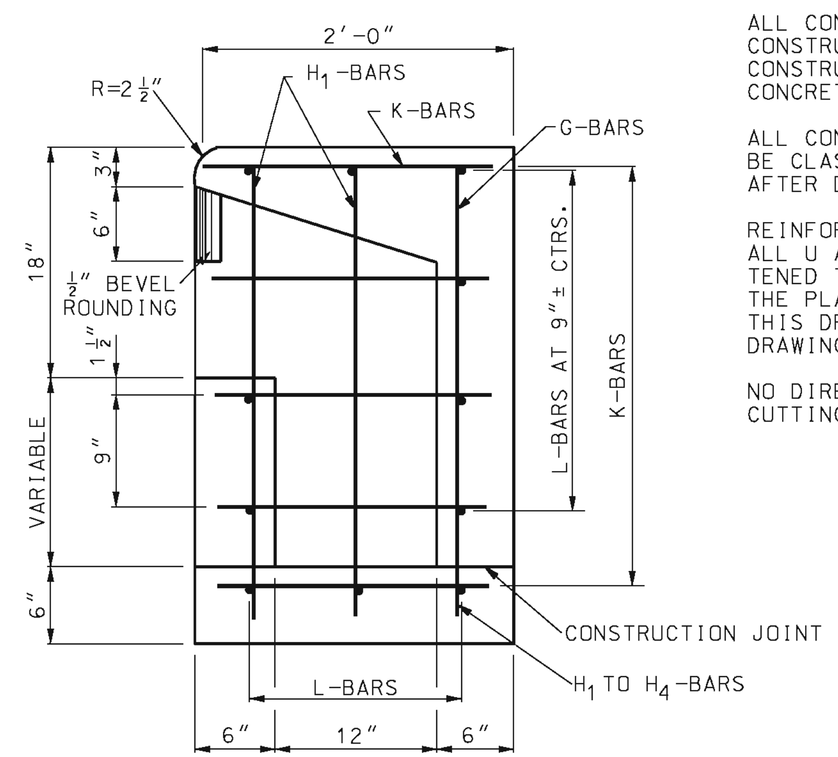
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN



SECTION A-A
(INTAKE BOX)



SECTION C-C
(EXTENSION)

GENERAL NOTES:

TOP OF DROP INLET WALLS SHALL BE LEVEL AND TO THE ELEVATION OF BOTTOM OF SLAB AT EDGE OF TRAVELED WAY OR BOTTOM OF CURB AND GUTTER AT DROP INLET.

ALL CONCRETE ABOVE THE TAR-PAPER SEPARATION JOINT IS TO BE CONSTRUCTED DURING PAVING OPERATIONS OR CURB AND GUTTER CONSTRUCTION; AND WILL BE PAID FOR AS SQUARE YARDS OF CONCRETE PAVEMENT OR LIEAR FEET OF CURB AND GUTTER.

ALL CONCRETE BELOW THE TAR-PAPER SEPARATION JOINTS SHALL BE CLASS "B" CONCRETE. CONCRETE IN INVERTS SHALL BE PLACED AFTER DROP INLET HAS BEEN CONSTRUCTED.

REINFORCING BARS SHALL BE CUT AND/OR BENT AT PIPE OPENINGS. ALL U AND F-BARS SHALL BE SECURELY TIED TOGETHER AND FASTENED TO SECURE AGAINST ANY POSSIBLE DISPLACEMENT DURING THE PLACING OF CONCRETE. THE REINFORCING STEEL SHOWN ON THIS DRAWING IS IN ADDITION TO ANY REINFORCING SHOWN ON DRAWINGS FOR CONCRETE PAVEMENT OR CURB AND GUTTER.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE NOR FOR CUTTING AND BENDING REINFORCING BARS.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DROP INLET
TYPE X

DATE EFFECTIVE:	04/01/1983	604.29C	SHEET NO. 1 OF 2
DATE PREPARED:	8/21/2009		

BAR BILL - EXTENSION

LENGTH OF EXT. L		2'-6"		5'-0"		7'-6"	
MARK	SIZE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
G	#5	4	3'-3"	7	3'-3"	10	3'-3"
H_1	#4	4	2'-6"	4	2'-6"	4	2'-6"
H_2	#4	2	2'-9"	3	2'-9"	3	2'-9"
H_3	#4			2	3'-0"	3	3'-0"
H_4	#4					2	3'-3"
H_5	#4	1	1'-0"	1	1'-0"	1	1'-0"
H_6	#4	2	1'-3"	3	1'-3"	3	1'-3"
H_7	#4			2	1'-6"	3	1'-6"
H_8	#4					2	1'-9"
K	#4	7	1'-9"	10	1'-9"	13	1'-9"
L	#4	11	2'-9"	11	5'-3"	11	7'-9"
DOWEL BAR	#4	8	1'-0"	9	1'-0"	10	1'-0"

CU. YDS. & LBS. ADDITIONS TO BE MADE FOR EACH EXTENSION

LENGTH	CU.YDS.	LBS.
2'-6"	0.39	60.0
5'-0"	0.70	101.4
7'-6"	1.04	143.8

CU. YDS. DEDUCTION TO BE MADE FOR PIPE OPENING

12"	15"	18"	24"
0.03	0.04	0.05	0.09

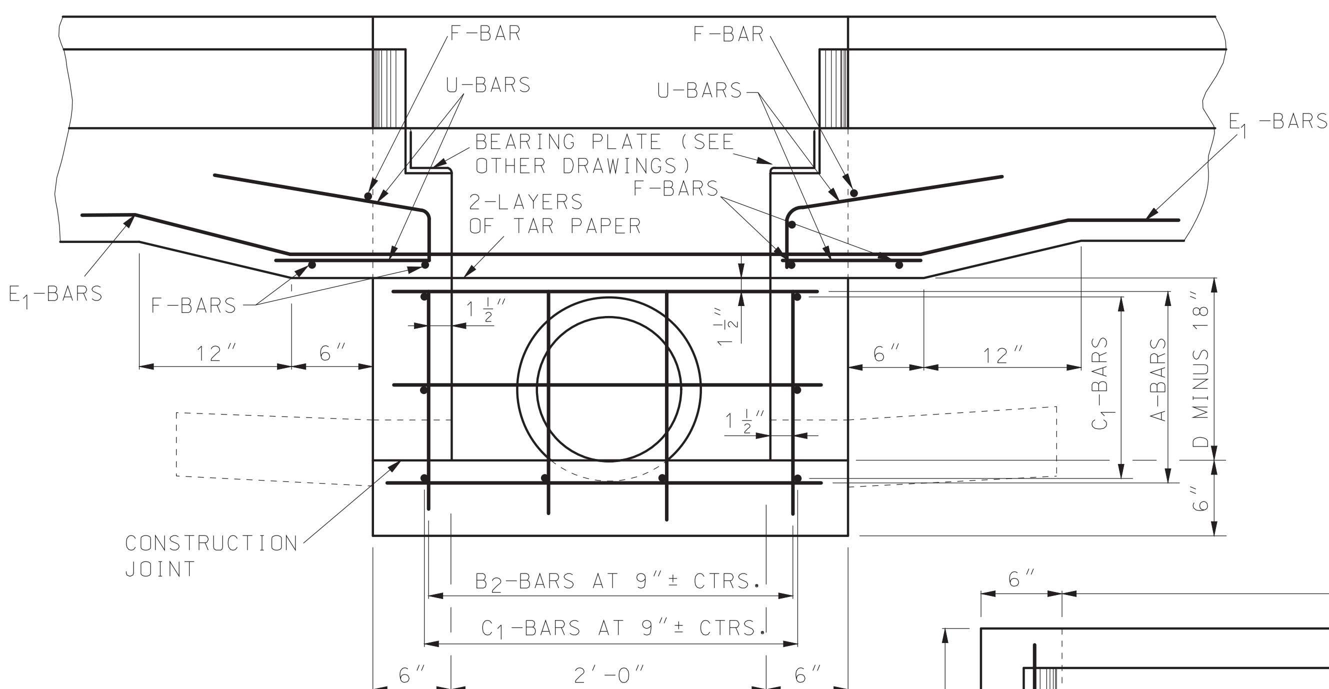
CONCRETE AND STEEL DEDUCTIONS TO BE MADE FOR EACH EXTENSION OPENING

9" X 12"	12" X 12"	15" X 12"
0.01 C.Y.	0.02 C.Y.	0.02 C.Y.
2.5 LBS.	3.7 LBS.	4.0 LBS.

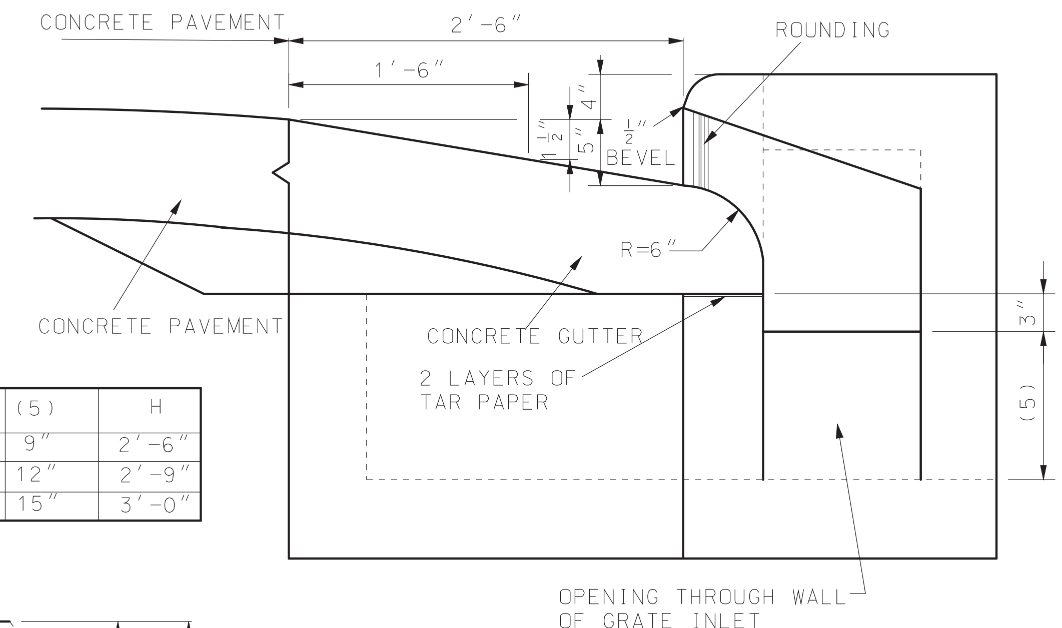
BAR BILL - INTAKE BOX

D	CONC. CU. YDS.	STEEL LBS.	A-BARS TRANSVERSE IN BOTTOM WALLS & TOP		B_1-BARS VERTICAL IN WALLS		B_2-BARS VERTICAL IN WALLS		C_1-BARS LONGITUDINAL IN BOTTOM AND SIDE		C_2-BARS LONGITUDINAL IN SIDE AND TOP		E_1-BARS LONGITUDINAL IN GUTTER		E_2-BARS LONGITUDINAL IN GUTTER		F-BARS TRANSVERSE IN GUTTER		U-BARS IN GUTTER	
			NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
2'-6"	0.82	131	15	2'-9"	8	2'-9"	10	1'-3"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
2'-9"	0.88	134	15	2'-9"	8	3'-0"	10	1'-6"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-0"	0.94	137	15	2'-9"	8	3'-3"	10	1'-9"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-3"	1.00	140	15	2'-9"	8	3'-6"	10	2'-0"	8	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-6"	1.06	152	17	2'-9"	8	3'-9"	10	2'-3"	10	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
3'-9"	1.12	155	17	2'-9"	8	4'-0"	10	2'-6"	10	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-0"	1.18	158	17	2'-9"	8	4'-3"	10	2'-9"	10	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-3"	1.24	170	19	2'-9"	8	4'-6"	10	3'-0"	12	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-6"	1.30	173	19	2'-9"	8	4'-9"	10	3'-3"	12	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
4'-9"	1.36	176	19	2'-9"	8	5'-0"	10	3'-6"	12	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"
5'-0"	1.42	189	21	2'-9"	8	5'-3"	10	3'-9"	14	4'-3"	6	1'-3"	5	7'-0"	1	4'-9"	6	2'-9"	8	2'-9"

CONCRETE QUANTITIES INCLUDE 0.15 CU.YDS. FOR INVERT | ALL BARS #4

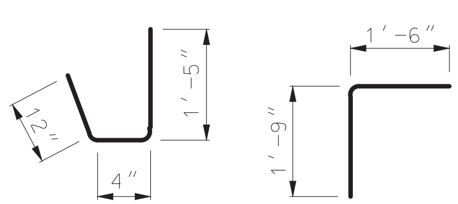


SECTION B-B



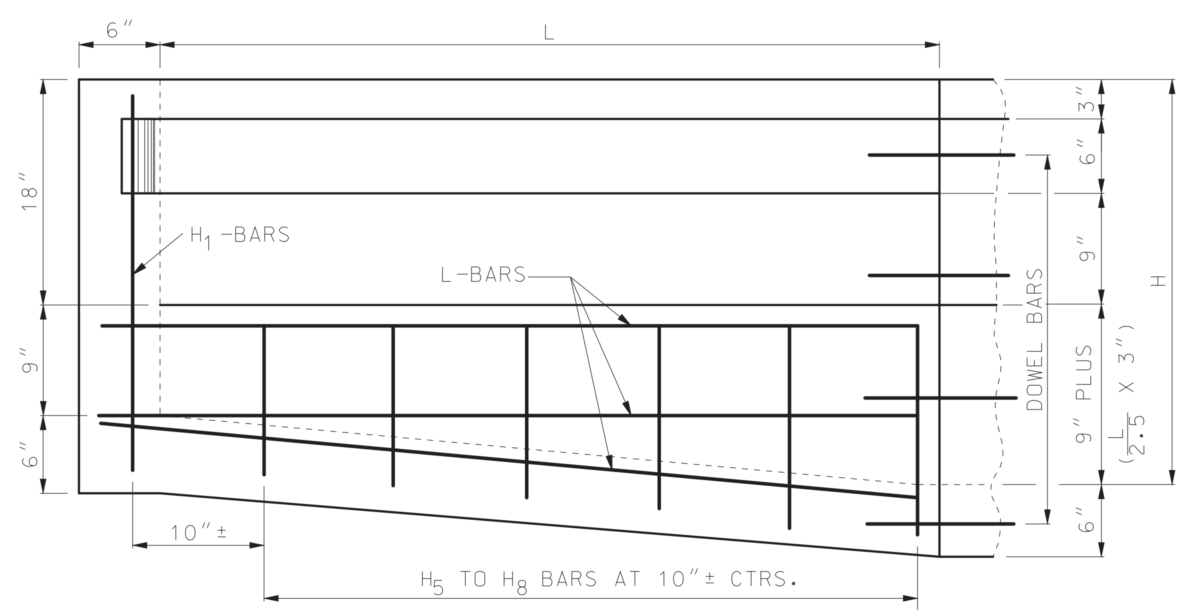
L	(5)	H
2'-6"	9"	2'-6"
5'-0"	12"	2'-9"
7'-6"	15"	3'-0"

SECTION SHOWING DETAILS OF OPENING AND DEPRESSION IN PAVEMENT OR GUTTER



U-BARS G-BARS

BENDING DIAGRAMS



LONGITUDINAL SECTION
(EXTENSION)

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.

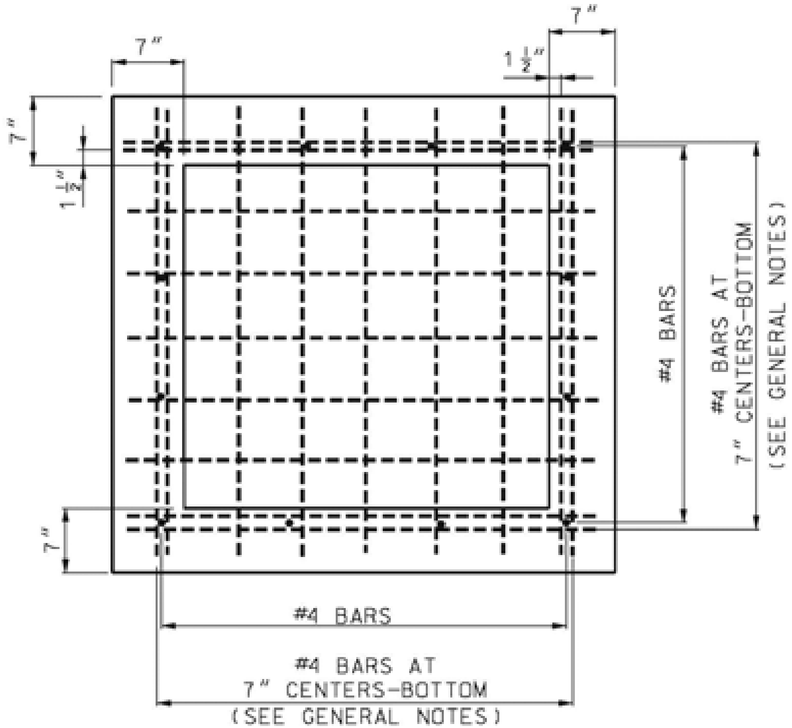
DROP INLET
TYPE X

DATE EFFECTIVE: 04/01/1983
DATE PREPARED: 2/9/2018

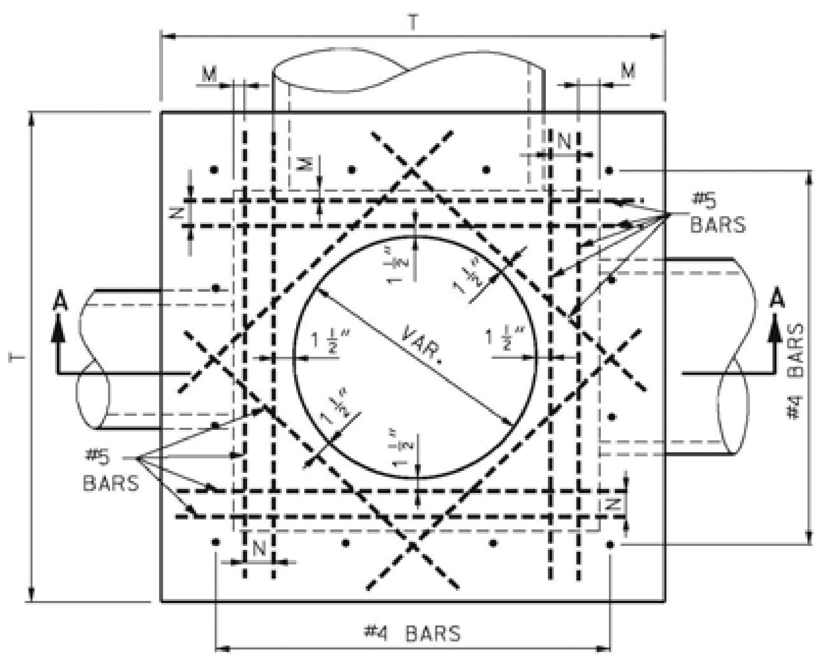
604.29C

SHEET NO. 2 OF 2

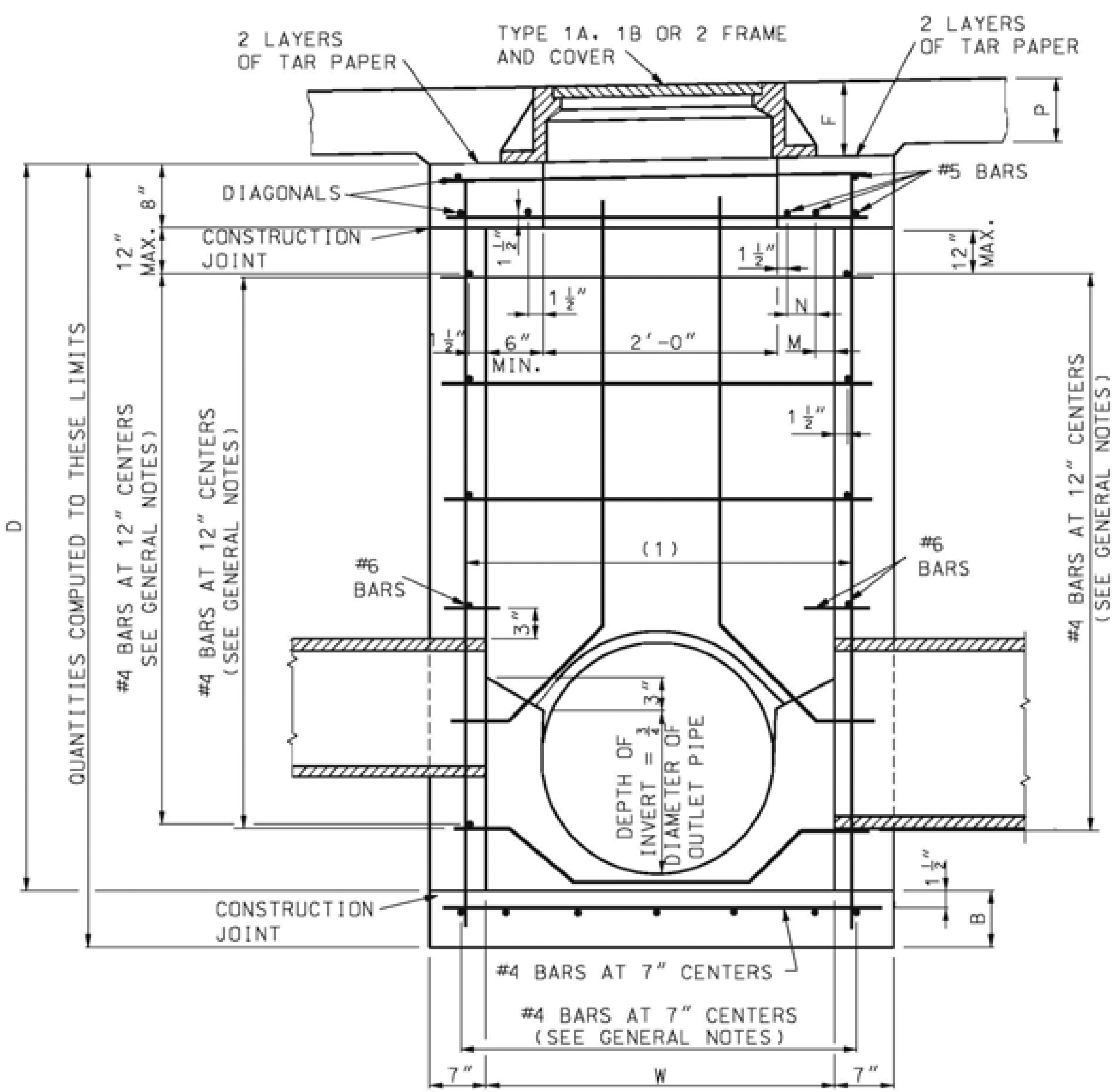
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



BASE PLAN



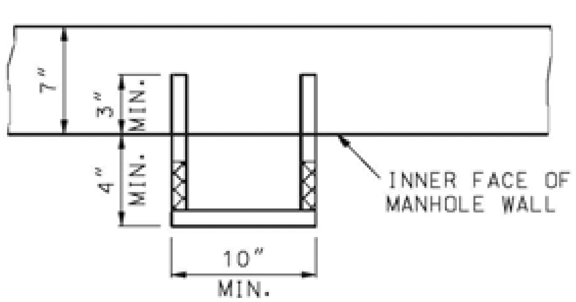
PLAN VIEW



SECTION A-A

MANHOLE FRAME AND COVER IN PAVED AREAS USE TYPE 1. IN UNPAVED AREAS USED TYPE 1A OR 1B. NO CHANGE IN QUANTITIES REQUIRED FOR FRAME AND COVER DETAILS. SEE OTHER DRAWINGS.

(1) 4-#4 FOR 3'-0" OPENING
5-#4 FOR 3'-6" & 4'-0"
6-#4 FOR 4'-6" & 5'-0"



STEP INSTALLATION

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL MANHOLES HAVING A DEPTH OF MORE THAN 4'-0". STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE SET LEVEL AND IN VERTICAL ALIGNMENT.

NO DIRECT PAYMENT WILL BE MADE FOR MANHOLE STEPS.

VARIABLE DIMENSIONS

SIZE OF PIPE	W	T	B	M	N
≤ 24"	3'-0"	4'-2"	7"	VARIABLE	2 1/2"
30"	3'-6"	4'-8"	7"		5 1/2"
36"	4'-0"	5'-2"	7"		8"
42"	4'-6"	5'-8"	8"		5 1/2"*
48"	5'-0"	6'-2"	8"		7"*

* 4-#5 BARS ADDED

NOTES:
MINIMUM "D "SHALL BE THE OUTSIDE DIAMETER OF LARGEST PIPE ENTERING MANHOLE PLUS 16" CARRIED TO THE NEAREST 3".

HORIZONTAL AND VERTICAL BARS HORIZONTAL AND VERTICAL BARS AROUND PIPES.

GENERAL NOTES:

THE MAXIMUM DEPTH OF MANHOLE USING #4 HORIZONTAL BARS AT 12" CENTERS IS 20'.

OVER 20' DEPTH, HORIZONTAL BARS SHALL BE INCREASED TO A #5 BAR AT 10" CENTERS TO A MAXIMUM DEPTH OF 30'.

OVER 30' DEPTH WILL REQUIRE A SPECIAL DESIGN.

BOTTOM STEEL AT MORE THAN 20' DEPTH TO A MAXIMUM DEPTH OF 30' IS INCREASED TO #6 BARS AT 7" CENTERS.

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE MANHOLES

DATE EFFECTIVE: 02-01-2009
DATE PREPARED: 8/26/2009

604.30G

FOR PIPE OPENINGS

	PIPE SIZES							
	12"	15"	18"	24"	30"	36"	42"	48"
CUBIC YARDS CONCRETE TO DEDUCT	0.03	0.04	0.06	0.11	0.16	0.23	0.31	0.40

ADDITIONAL STEEL REQUIRED FOR PIPE OPENING					
WIDTH OF WALL REQUIRED FOR PIPE	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
LENGTH OF #6 BAR REQUIRED	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
WEIGHT OF BAR LBS.	6.0	6.8	7.5	8.3	9.0

NOTE:
CONCRETE QUANTITIES IN TABLE INCLUDE INVERT. THE QUANTITY OF STEEL FOR 3" OF "D" IS NOT ¼ OF THAT FOR 1 FOOT OF "D". NEITHER IS THE QUANTITY FOR 6" OF "D" EQUAL TO ½ THAT FOR 1 FOOT OF "D". SO USE QUANTITY IN 1 FOOT COLUMN FOR FULL FEET AND IN 3" COLUMN FOR FRACTIONAL FEET.

QUANTITIES

SIZE (W)		TO AND INCLUDING 20' DEPTH				20' TO AND INCLUDING 30' DEPTH		
		D= 3'-3"	D= 4'-3"	ADD OR SUBTRACT FOR EACH 1 FT.	ADD OR SUBTRACT FOR EACH 3 IN.	ADD OR SUBTRACT FOR EACH 1 FT.	ADD OR SUBTRACT FOR EACH 3 IN.	ADDITIONAL STEEL IN BOTTOM DIFFERENCE IN #4 AND #6 BARS
3'-0" X 3'-0"	C	1.62	1.93	0.31	0.08	0.31	0.08	
	S	157.90	176.80	18.60	2.00	20.64	5.16	30.14
3'-0" X 3'-6"	C	1.77	2.11	0.33	0.08	0.33	0.08	
	S	173.80	194.60	20.60	2.30	23.12	5.78	34.85
3'-0" X 4'-0"	C	1.93	2.28	0.35	0.09	0.35	0.09	
	S	187.10	208.60	21.30	2.30	24.27	6.07	39.56
3'-0" X 4'-6"	C	2.16	2.53	0.38	0.09	0.38	0.09	
	S	211.20	234.70	23.30	2.70	26.75	6.69	44.26
3'-0" X 5'-0"	C	2.32	2.71	0.40	0.10	0.40	0.10	
	S	219.60	243.80	24.00	2.70	27.90	6.97	48.97
3'-6" X 3'-6"	C	1.94	2.29	0.35	0.09	0.35	0.09	
	S	192.40	215.10	22.70	2.70	25.60	6.40	40.27
3'-6" X 4'-0"	C	2.10	2.48	0.38	0.09	0.38	0.09	
	S	204.30	227.70	23.40	2.70	26.75	6.69	45.69
3'-6" X 4'-6"	C	2.35	2.75	0.40	0.10	0.40	0.10	
	S	230.00	255.50	25.30	3.00	29.23	7.31	51.11
3'-6" X 5'-0"	C	2.53	2.95	0.42	0.10	0.42	0.10	
	S	240.90	267.10	26.00	3.00	30.38	7.60	56.53
4'-0" X 4'-0"	C	2.28	2.68	0.40	0.10	0.40	0.10	
	S	216.70	240.80	24.10	2.70	27.90	6.97	51.83
4'-0" X 4'-6"	C	2.55	2.97	0.42	0.10	0.42	0.10	
	S	246.40	272.60	26.00	3.00	30.38	7.60	57.96
4'-0" X 5'-0"	C	2.74	3.18	0.44	0.11	0.44	0.11	
	S	255.60	282.50	26.70	3.00	31.53	7.88	64.10
4'-6" X 4'-6"	C	2.75	3.19	0.44	0.11	0.44	0.11	
	S	276.80	304.90	28.00	3.30	32.86	8.22	64.81
4'-6" X 5'-0"	C	2.94	3.41	0.46	0.12	0.46	0.12	
	S	289.40	318.20	28.70	3.30	34.01	8.50	71.66
5'-0" X 5'-0"	C	3.15	3.64	0.48	0.12	0.48	0.12	
	S	299.80	329.30	29.40	3.30	35.16	8.79	79.23

TO AND INCLUDING 20-FOOT DEPTH

NOTE:
TO COMPUTE THE QUANTITIES FOR DEPTHS ("D") NOT SHOWN, REFER TO TABLE FOR THE SIZE OF MANHOLE REQUIRED. SUBTRACT THE "D" VALUE FROM THE TABLE AND THE "D" VALUE FROM THE PLANS. MULTIPLY THE VALUES SHOWN IN THE 1-FOOT COLUMN FROM THE TABLE WITH THE FULL ONE FOOT INCREMENTS FROM THE DIFFERENCE BETWEEN THE "D" FROM THE PLANS AND THE "D" FROM THE TABLE. MULTIPLY THE VALUES SHOWN IN THE 3" COLUMN FROM THE TABLE WITH THE REMAINING FRACTIONAL FOOT VALUES PER 3" INCREMENTS. FOLLOW THIS SAME PROCESS FOR THE STEEL CALCULATIONS. SEE THE EXPAMPLE BELOW:

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 6'-9" "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:
"D" REQUIRED = 6'-9"
"D" GIVEN IN TABLE = 4'-3"
"D" ADDITIONAL = 2'-6"

2.76	CONCRETE	STEEL
FROM TABLE FOR 4'-3" "D"	2.28	208.6
ADD (2 X QUANTITIES FOR 1-FOOT)	0.70	42.6
ADD (6" = 2 X 3") (2 X QUANTITIES FOR 3")	0.18	255.8
SUBTOTAL	3.16	255.8
ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL)	-0.40	+19.5
TOTAL	2.76	275.3
USE	2.80	280.0

MORE THAN 20-FOOT TO AND INCLUDING 30-FOOT DEPTH

FIRST, COMPUTE QUANTITIES FOR 20-FOOT DEPTH FROM THE TABLE "TO AND INCLUDING 20-FOOT DEPTHS".

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 20'-0", "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:

"D" REQUIRED = 20'-0"
"D" GIVEN IN TABLE = 4'-3"
"D" ADDITIONAL = 15'-9"

	CONCRETE	STEEL
FROM TABLE FOR 4'-3" "D"	2.28	208.6
ADD (15 X QUANTITIES FOR 1-FOOT)	5.25	319.9
ADD (9" = 3 X 3") (3 X QUANTITIES FOR 3")	0.27	6.9
SUBTOTAL	7.80	535.0
ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL)	-0.40	+19.5
TOTAL	7.40	554.5

SECOND, COMPUTE QUANTITIES FOR THE DEPTHS BEYOND 20 FEET TO A MAXIMUM OF 30 FEET, USING THE TABLE "20-FOOT TO AND INCLUDING 30-FOOT DEPTH", AND ADD TO THE QUANTITIES FOR 20-FOOT DEPTH. ALSO, ADD THE DIFFERENCE IN STEEL IN THE BOTTOM DUE TO THE INCREASE IN SIZE OF BARS FROM #4 TO #6 BARS ON 7-INCH CENTERS.

FOR EXAMPLE:
"D" REQUIRED = 30'-0"
"D" COMPUTED = 20'-0"
"D" ADDITIONAL = 10'-0"

	CONCRETE	STEEL
ADD CONCRETE (10 X QUANTITIES FOR 1-FOOT)	3.50	
ADD STEEL (10 X QUANTITIES FOR 1-FOOT)	242.70	
ADD STEEL (ADDITIONAL STEEL IN BOTTOM)		39.56
TOTAL (30-FOOT DEPTH)	10.90	836.76
USE	10.9	840.0

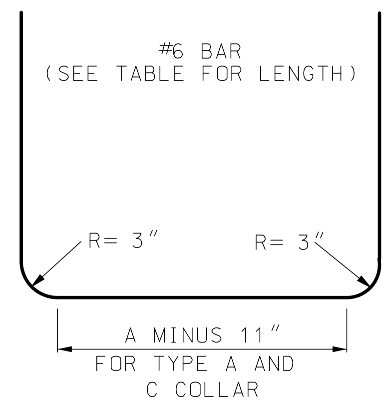
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE MANHOLES

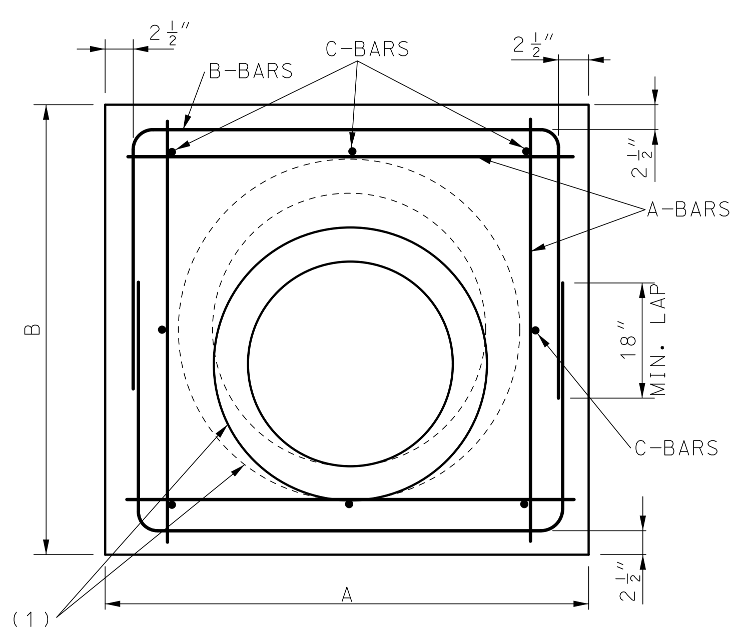
DATE EFFECTIVE: 02-01-2009
DATE PREPARED: 8/26/2009

604.30G

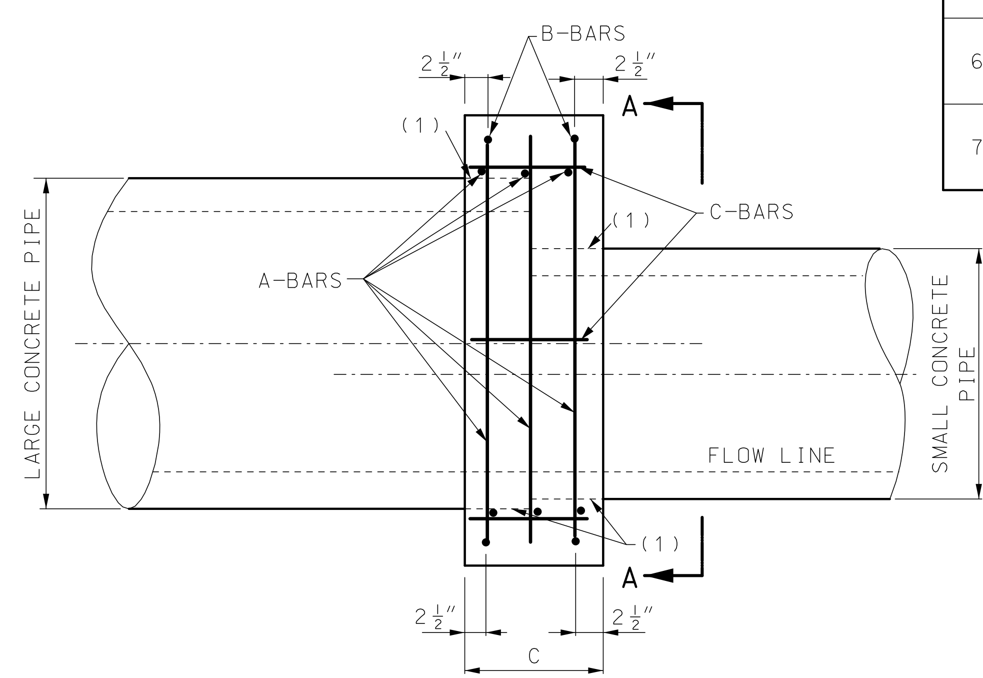


BENDING DIAGRAM FOR B-BARS

(1) ONE LAYER COMMERCIALLY AVAILABLE 55-POUND ROLL ROOFING.



SECTION A-A



ELEVATION
(FOR PIPES OF DISSIMILAR SIZE OR MATERIAL)

TYPE A COLLAR

TABLE OF DIMENSIONS

SIZE OF PIPE		DIMENSIONS		LENGTH OF BARS			QUANTITIES	
LARGE (IN.)	SMALL (IN.)	A & B (FT.-IN.)	C (FT.-IN.)	A(#5) 12 REQUIRED (FT.-IN.)	B(#6) 4 REQUIRED (FT.-IN.)	C(#4) 8 REQUIRED (FT.-IN.)	CONCRETE (CU. YD.)	STEEL (LBS.)
12	12	2-8	1-0	2-5	5-10	0-9	0.21	70
15	12 15	3-0	1-0	2-9	6-6	0-9	0.27 0.25	77
18	12 15 18	3-3	1-0	3-0	7-0	0-9	0.33 0.32 0.30	84
21	12 15 18	3-6	1-0	3-3	7-6	0-9	0.36 0.34 0.33	90
24	15 18 24	3-10	1-0	3-6	8-2	0-9	0.44 0.40 0.36	97
30	18 24 30	4-5	1-4	4-2	9-4	1-0	0.71 0.66 0.60	114
36	24 30 36	5-0	1-4	4-9	10-6	1-0	0.88 0.79 0.76	128
42	30 36 42	5-7	1-4	5-4	11-8	1-0	1.05 0.98 0.89	142
48	36 42 48	6-2	1-4	6-0	12-10	1-0	1.22 1.13 1.03	158
54	42 48 54	7-1	1-8	6-9	14-8	1-6	2.02 1.90 1.76	181
60	48 54 60	7-8	1-8	7-5	15-10	1-6	2.27 2.13 1.97	196
66	54 60 66	8-3	2-0	8-0	17-0	1-9	3.04 2.85 2.65	210
72	60 66 72	8-10	2-0	7-7	18-2	1-9	3.36 3.16 2.93	225

GENERAL NOTES:

FOR PIPE EXTENSIONS THAT ARE 5 FEET IN LENGTH OR SHORTER, A SMOOTH TAPERED SLEEVE MAY BE USED IN LIEU OF A TYPE A COLLAR, IF APPROVED BY THE ENGINEER. SEE SMOOTH TAPERED SLEEVE DETAIL IN STANDARD PLAN 732.00.

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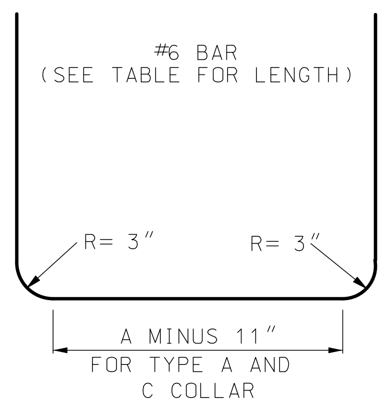
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

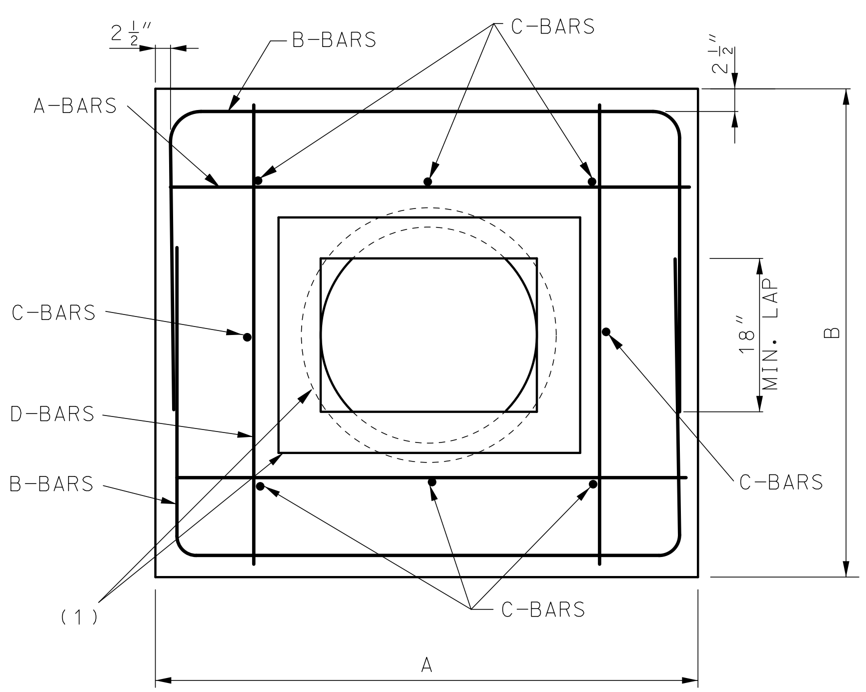
PIPE COLLARS TYPE A

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021
604.40G

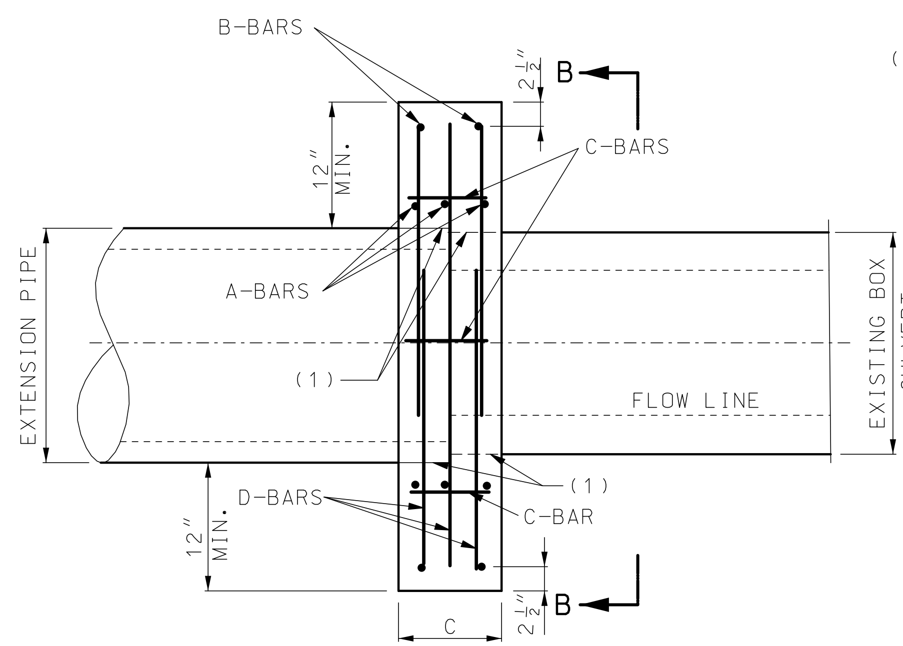


BENDING DIAGRAM FOR B-BARS

TABLE OF DIMENSIONS										
BOX SIZE (FT.)	PIPE SIZE (IN.)	DIMENSIONS			LENGTH OF BARS				QUANTITIES	
		A (FT.-IN.)	B (FT.-IN.)	C (FT.-IN.)	A(#5) 6 REQUIRED (FT.-IN.)	B(#6) 4 REQUIRED (FT.-IN.)	C(#4) 8 REQUIRED (FT.-IN.)	D(#5) 6 REQUIRED (FT.-IN.)	CONCRETE (CU.YD.)	STEEL (LBS.)
2 x 1½	24	5-1	4-9	1-0	4-10	10-4	0-9	4-6	0.65	124
2 x 2	30	5-3	5-3	1-4	5-0	11-0	1-0	5-0	0.93	134
3 x 2	36	6-1	5-10	1-4	5-10	12-5	1-0	5-7	1.16	151
3 x 3	42	6-5	6-5	1-4	6-0	13-4	1-0	6-0	1.29	162



SECTION B-B



ELEVATION
(FOR BOX CULVERT TO PIPE)

(1) ONE LAYER COMMERCIALLY AVAILABLE 55-POUND ROLL ROOFING.

TYPE C COLLAR

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JEFFERSON CITY, MO 65102
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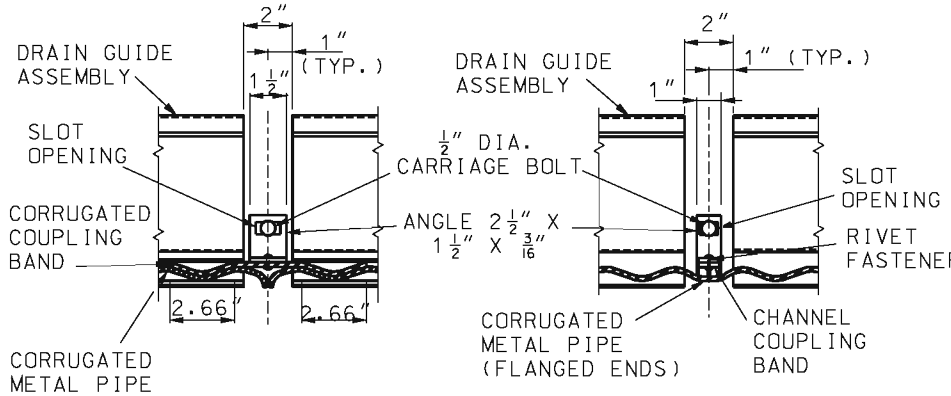
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER
PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PIPE COLLARS TYPE C

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021

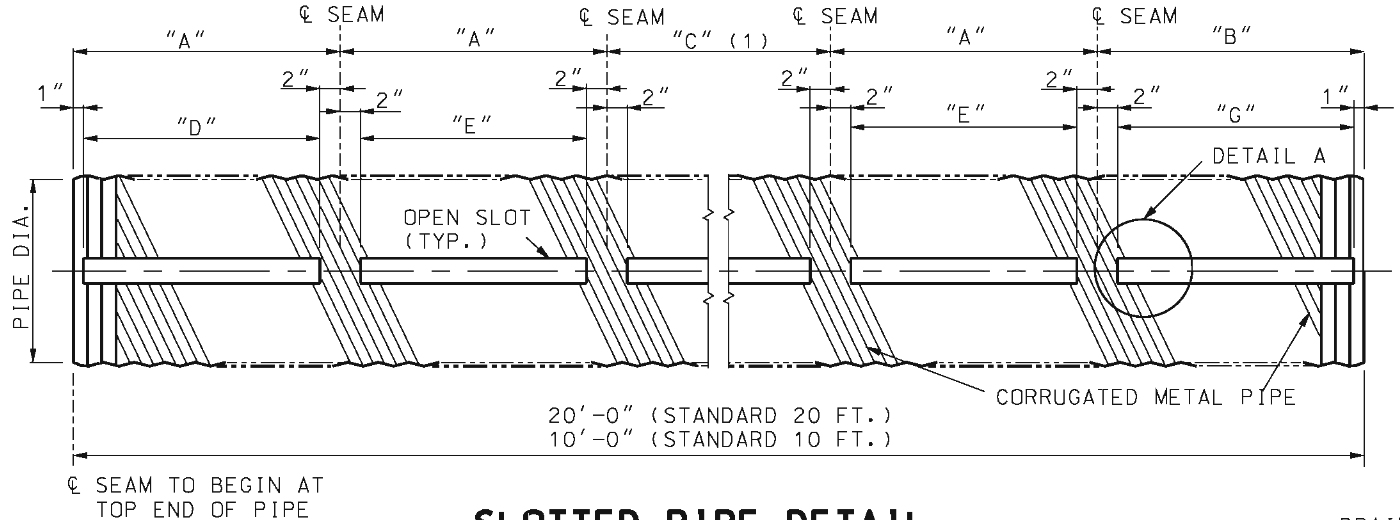
604.40G

SHEET NO.
2 OF 2

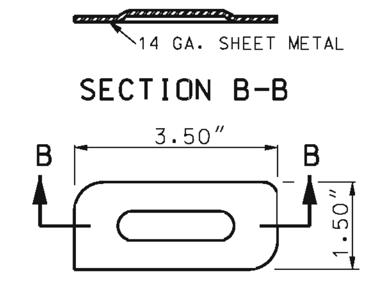


TYPE "A" TYPE "B"

JOINT CONNECTION SECTION

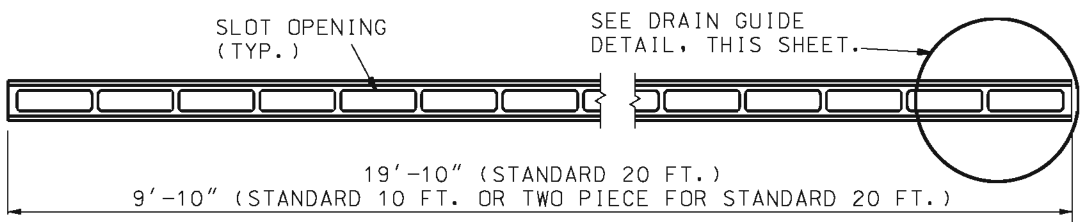


SLOTTED PIPE DETAIL

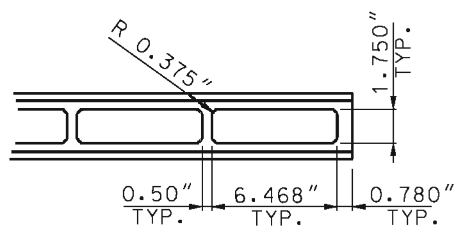


PLAN

LOCKING PLATE DETAIL

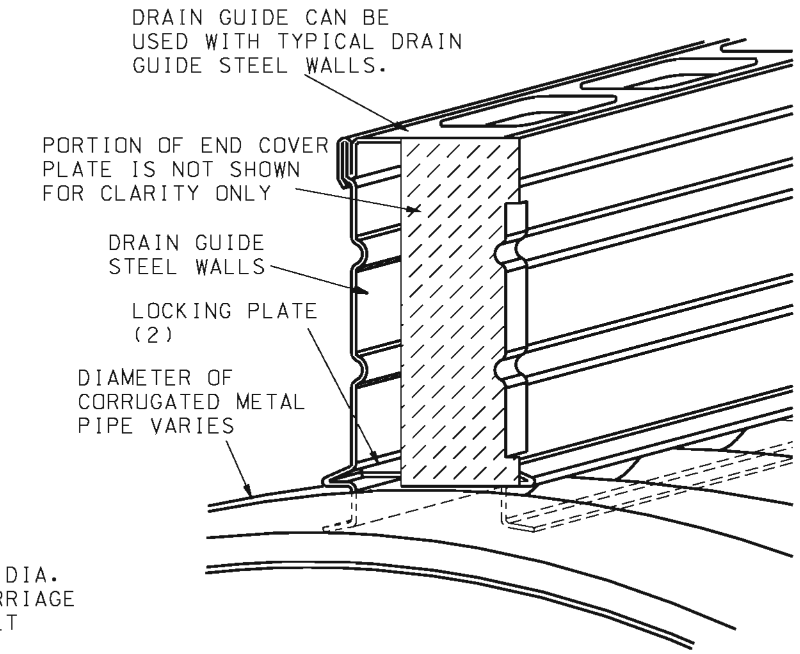


DRAIN GUIDE PLAN

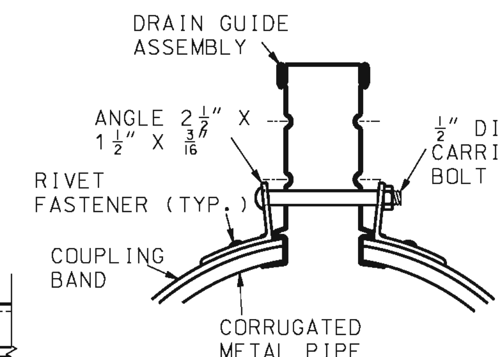


DRAIN GUIDE DETAIL

DIMENSION SCHEDULE								LOCKING PLATES REQUIRED (3)	
PIPE DIAMETER	A	B_{10}	G_{10}	B_{20}	G_{20}	D	E	10 FT.	20 FT.
12"	31 1/2"	25 1/2"	22 1/2"	19 1/2"	16 1/2"	28 1/2"	27 1/2"	9	17
15"	27 1/2"	10"	7"	20"	17"	24 1/2"	23 1/2"	10	19
18"	26 1/4"	15"	12"	33	3/4"	23 1/4"	22 1/4"	10	19
24"	25"	20"	17"	15"	12"	22"	21"	11	21
30"	24 3/4"	21"	18"	17 1/4"	14 1/4"	21 3/4"	20 3/4"	11	21
36"	24 5/8"	21 1/2"	18 1/2"	18 3/8"	15 3/8"	21 3/8"	20 5/8"	11	21



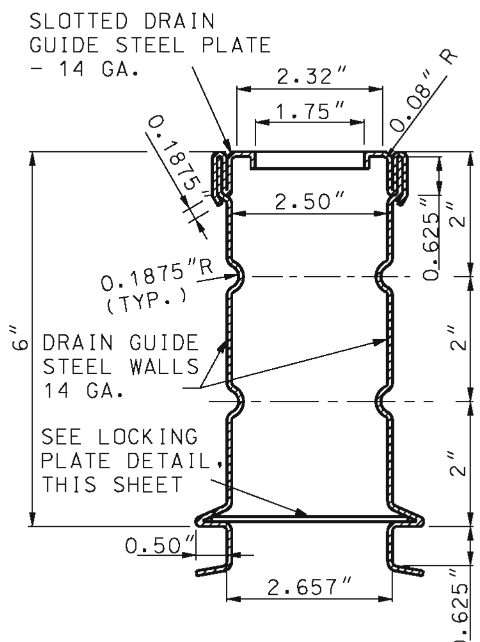
ISOMETRIC DETAIL



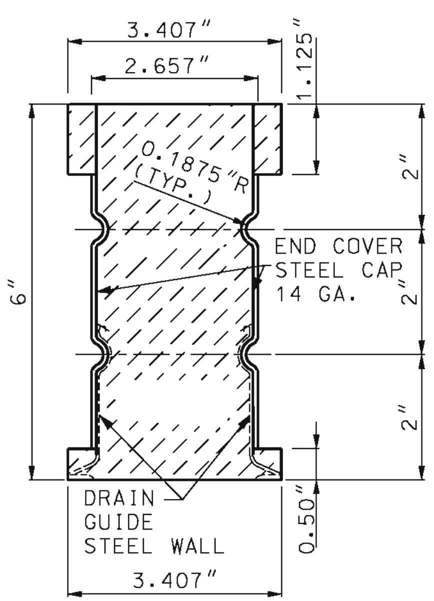
JOINT CONNECTION SECTION

(TYPICAL FOR JOINT CONNECTION SECTION TYPE "A" AND TYPE "B")

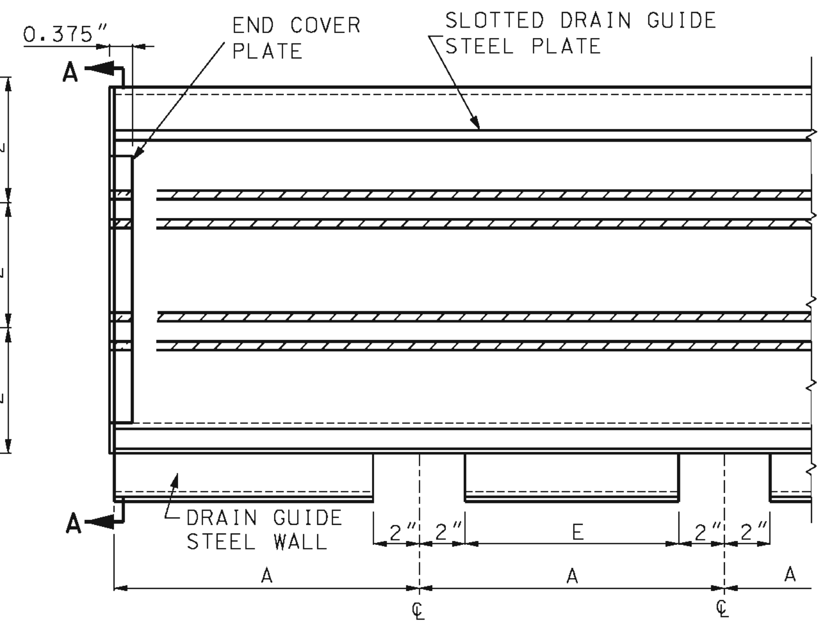
(1) FOR STANDARD 10 FT., 12" DIA. PIPE, "C" = 0. FOR ALL OTHER PIPE SIZES "C" IS IN MULTIPLES OF "A".
(2) LOCKING PLATE TO BE INSTALLED AT:
  A. EACH END OF DRAIN GUIDE.
  B. EACH SEAM.
  C. EACH MID-POINT OF OPEN SLOT.
(3) IN 20 FT. SECTION FOR TWO PIECE DRAIN GUIDE, INCREASE NUMBER OF LOCKING PLATES BY TWO.



DRAIN GUIDE SECTION (TYP.) DRAIN DETAILS



SECTION A-A
END COVER PLATE DETAIL



SIDE ELEVATION

TYPE A SLOTTED DRAIN

(FORMED SHEET)

CUT OUT SLOT FOR DRAIN GUIDE WALLS TO FIT OVER CORRUGATED METAL PIPE SEAMS (TYPICAL).

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SLOTTED DRAIN
TYPE A

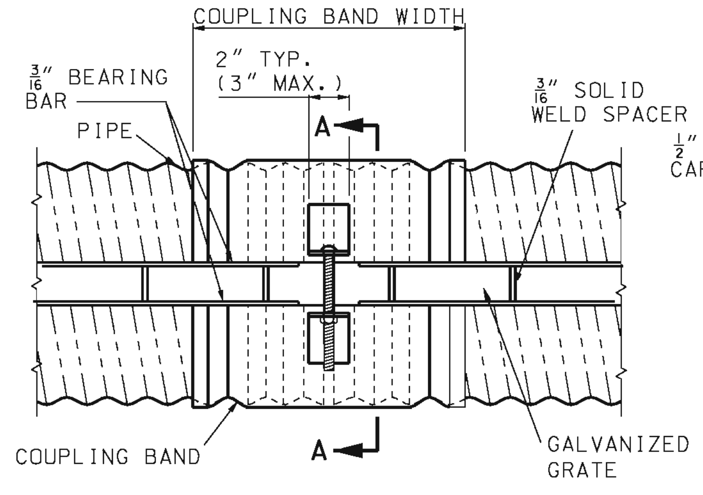
DATE EFFECTIVE: 03/01/1994
DATE PREPARED: 8/21/2009

604.70

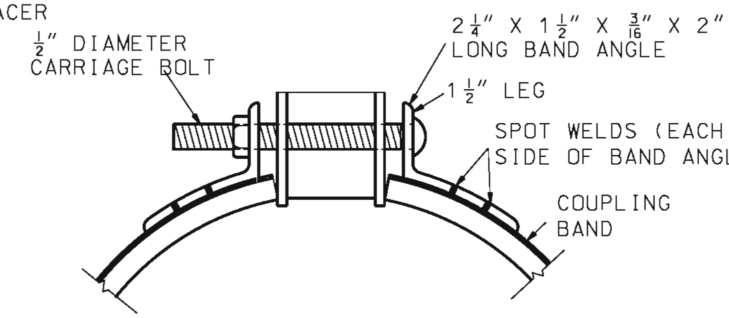
SHEET NO. 1 OF 2

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

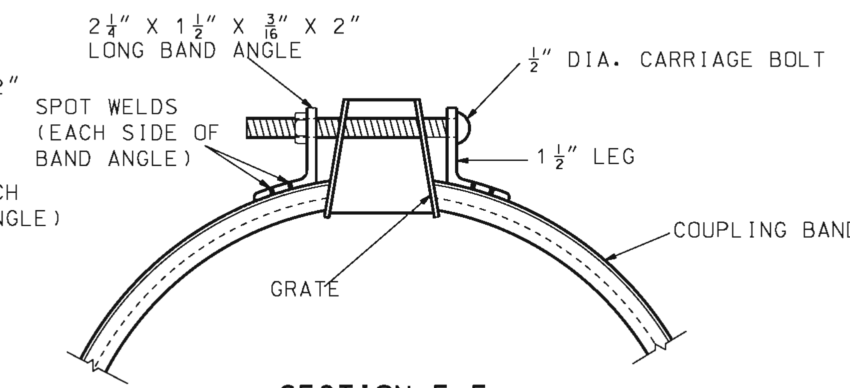
GRATE TYPE	"E"	"A"
C	2½"	2¼"
C	6"	3"



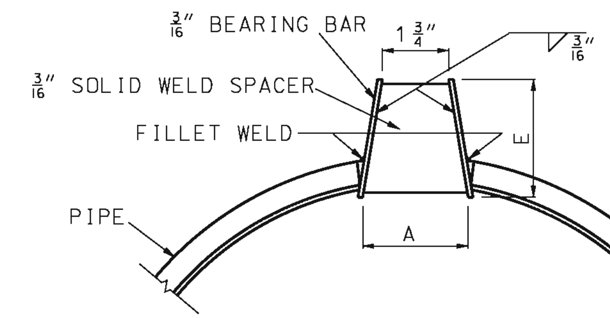
TOP VIEW



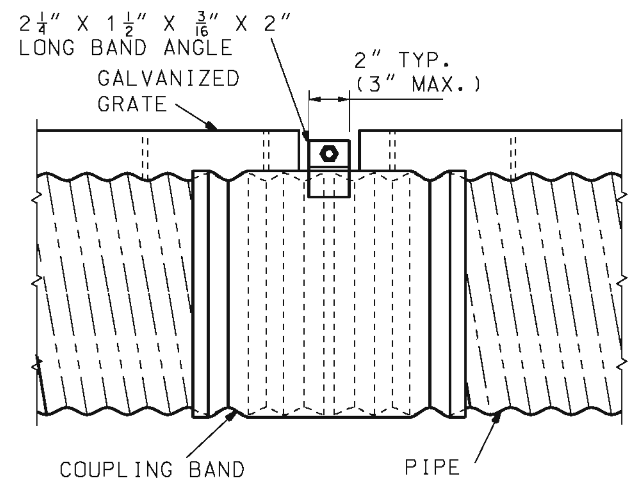
SECTION A-A



SECTION F-F

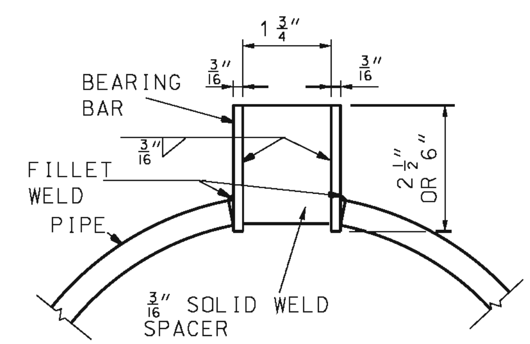


SECTION G-G

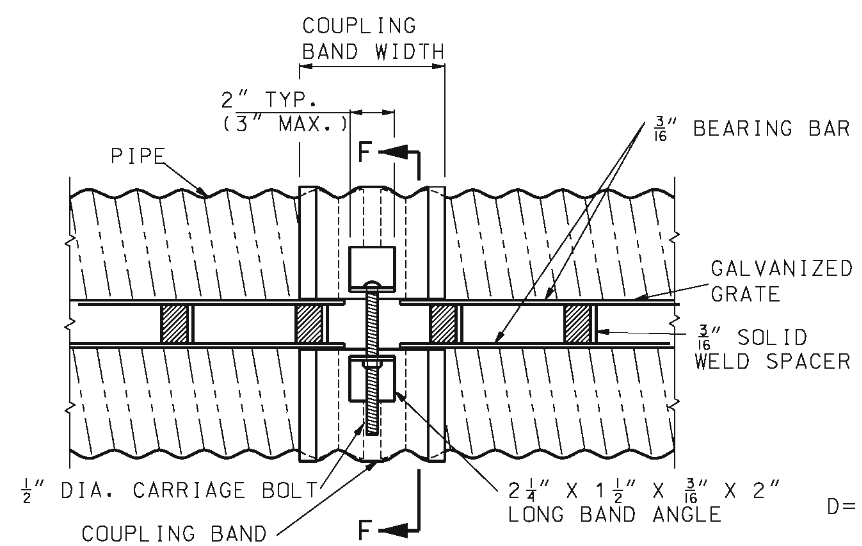


SIDE VIEW

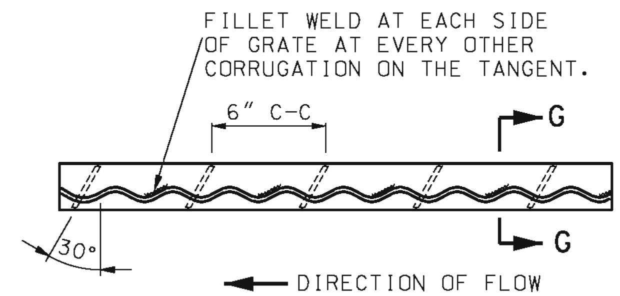
TYPICAL COUPLING BAND



SECTION D-D

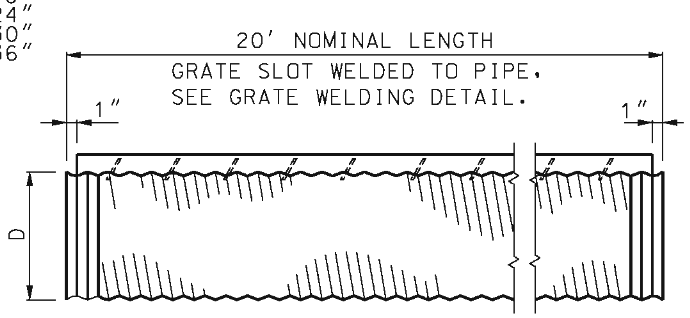


TOP VIEW

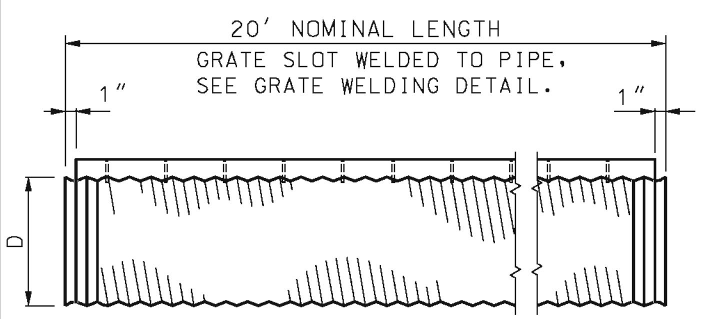


GRATE WELDING DETAIL

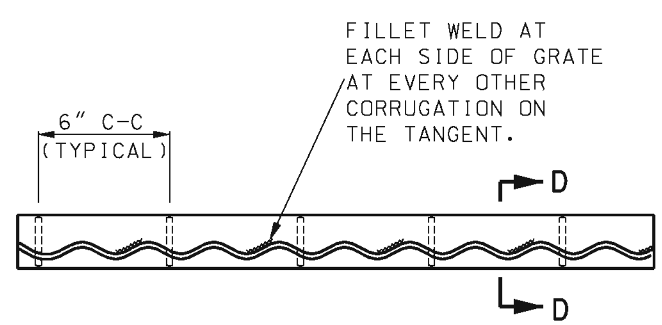
D= 12" 15" 18" 24" 30" 36"



TYPICAL PIPE SECTION



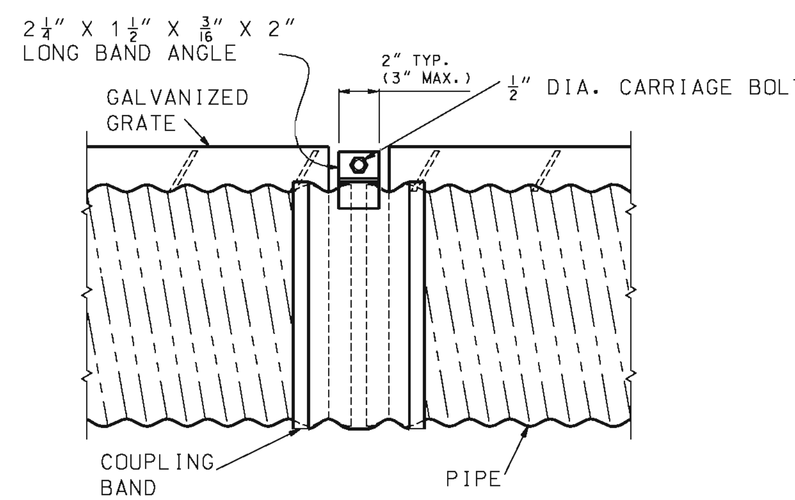
TYPICAL PIPE SECTION



GRATE WELDING DETAIL

D= 12" 15" 18" 24" 30" 36"

STRUCTURAL STEEL SLOTTED DRAIN
(TYPE B)



SIDE VIEW
TYPICAL COUPLING BAND

STRUCTURAL STEEL SLOTTED DRAIN
(TYPE C)

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

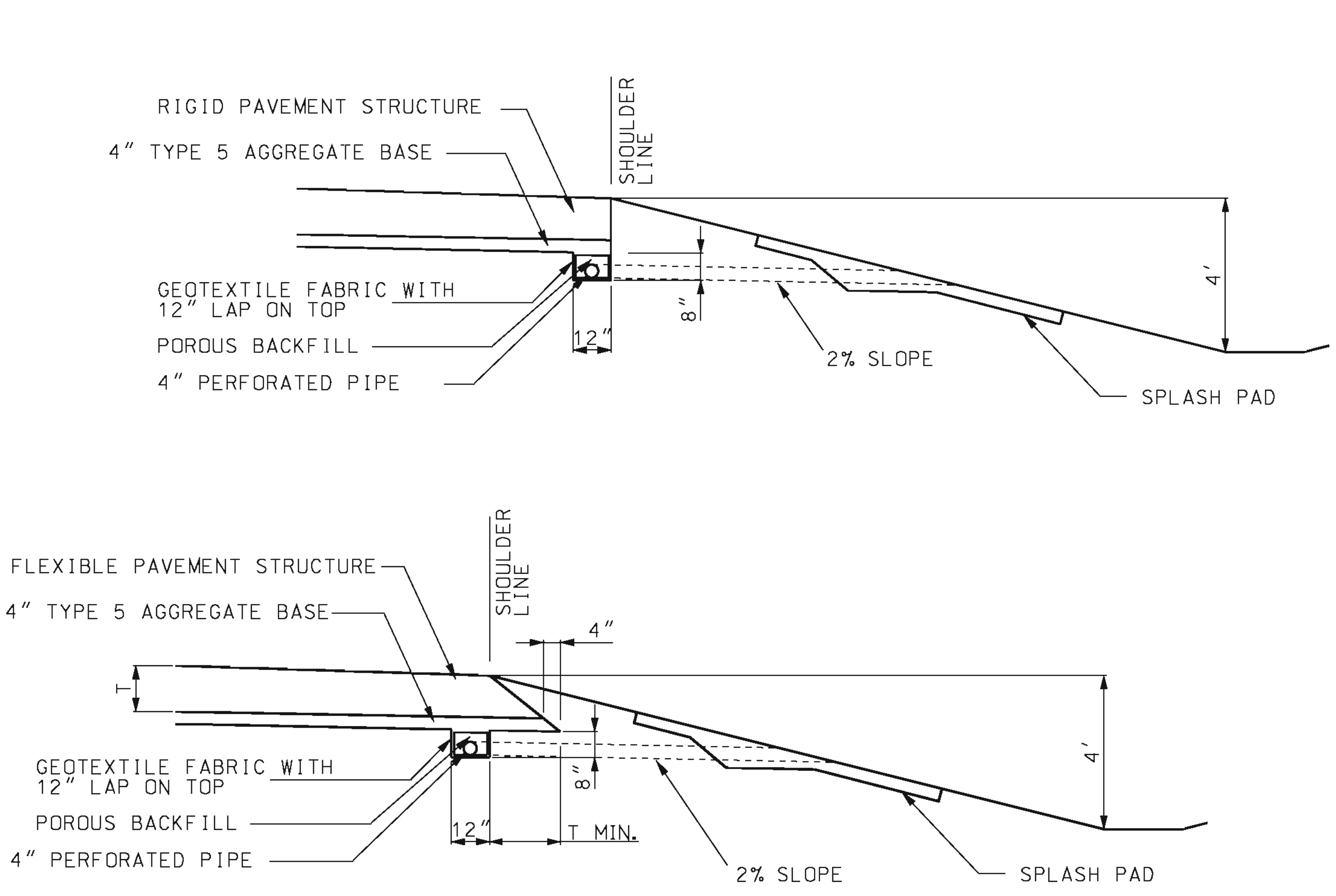
SLOTTED DRAIN
TYPE B AND TYPE C

DATE EFFECTIVE: 03/01/1994
DATE PREPARED: 8/21/2009

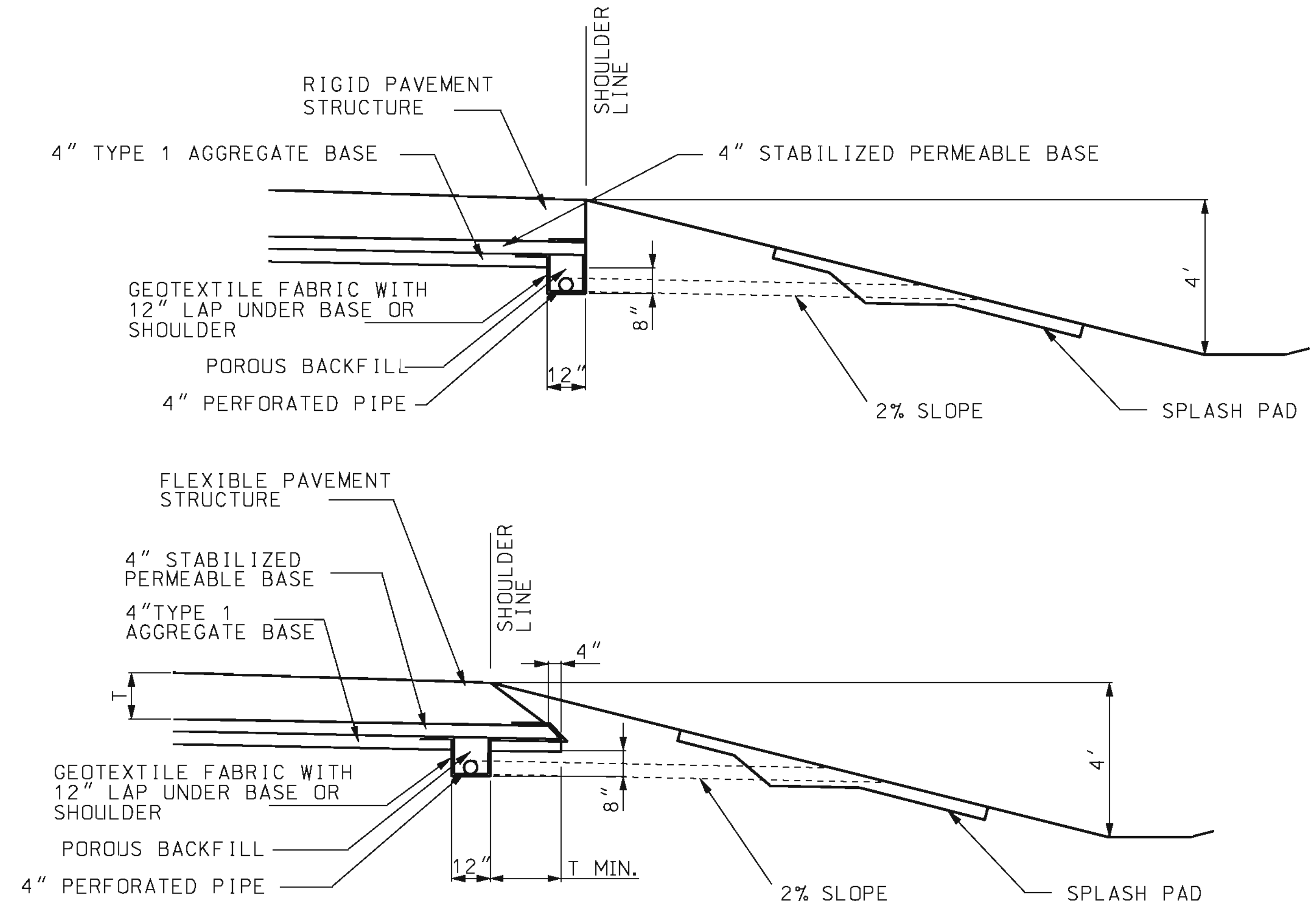
604.70

SHEET NO. 2 OF 2

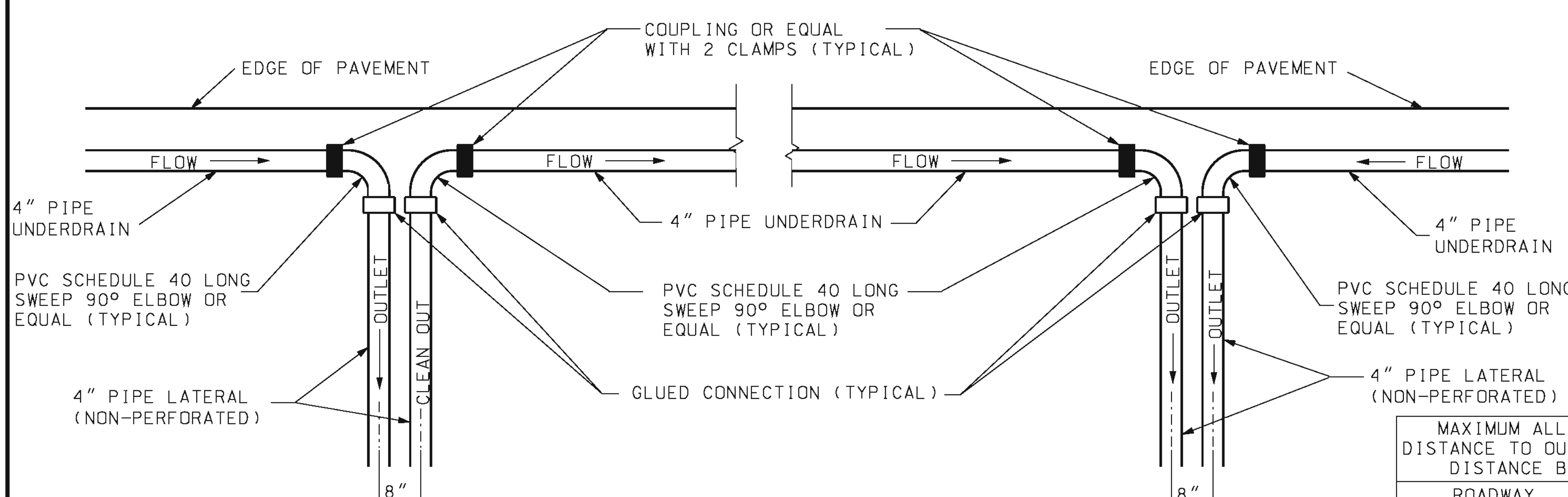
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



MEDIUM DUTY



HEAVY DUTY



ON GRADIENT

AT SAGS

DETAIL OF PIPE AGGREGATE DRAIN OUTLETS

MAXIMUM ALLOWABLE DRAINAGE DISTANCE TO OUTLET OR SEPARATION DISTANCE BETWEEN OUTLETS	
ROADWAY PROFILE GRADIENT (%)	DISTANCE
≤ 1	250 FT.
> 1 AND ≤ 2	375 FT.
> 2	500 FT.

GENERAL NOTES:

ON SUPERELEVATED CURVES PLACE LONGITUDINAL UNDERDRAIN ON LOW SIDE ONLY.

CONSTRUCT OUTLETS AT LOW POINT OF SAG CURVE.

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NUMBER PE-23751
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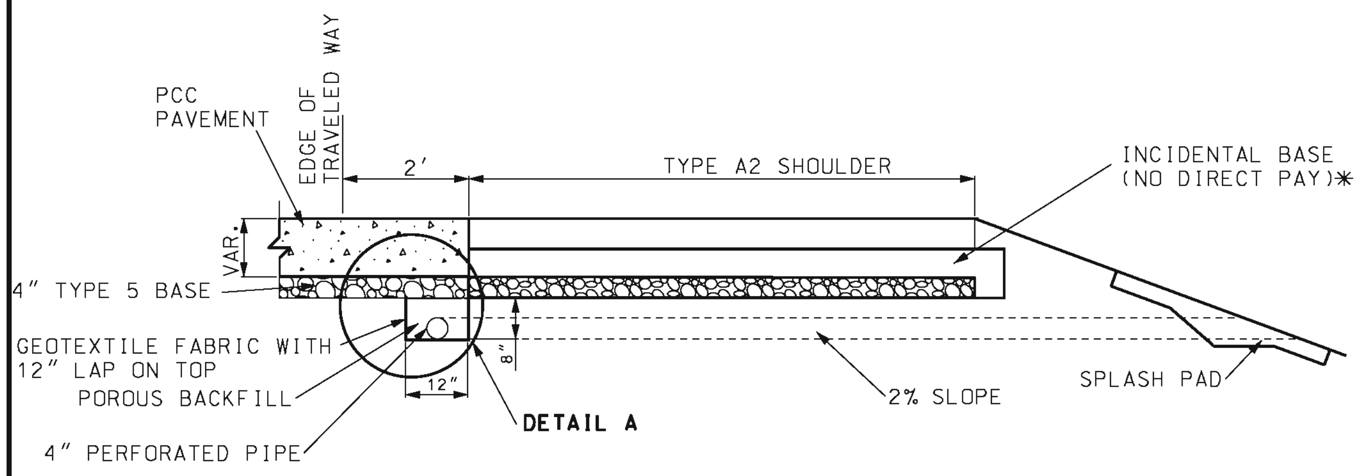
PAVEMENT UNDERDRAINAGE

PIPE AGGREGATE PAVEMENT EDGE DRAINS FOR FULL DEPTH SHOULDERS

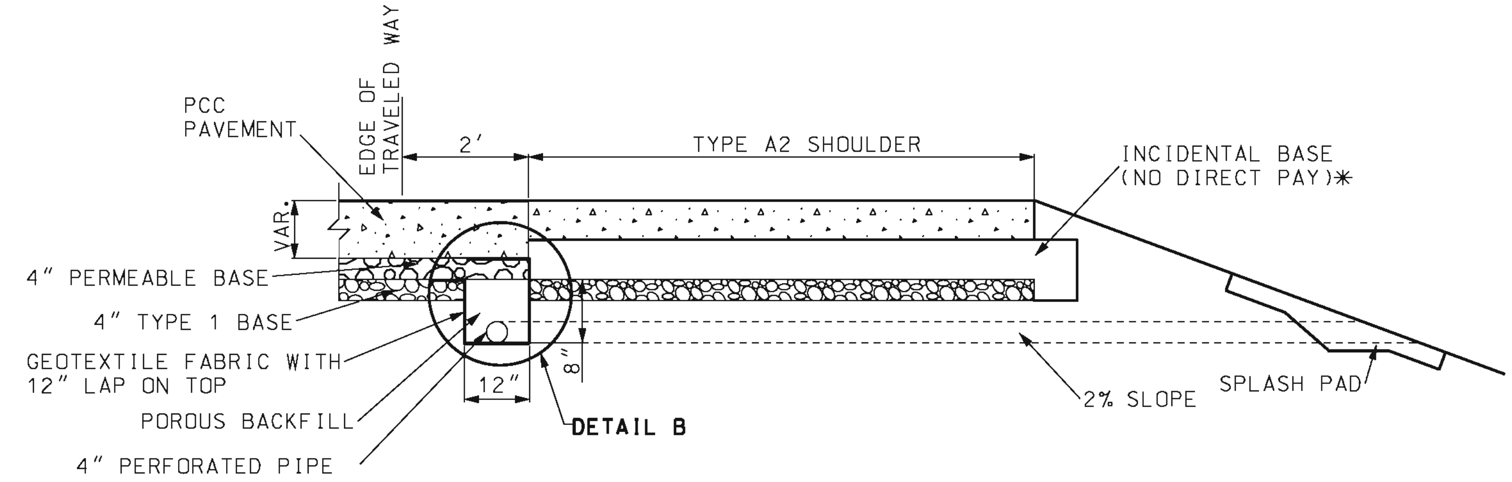
DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

605.10I

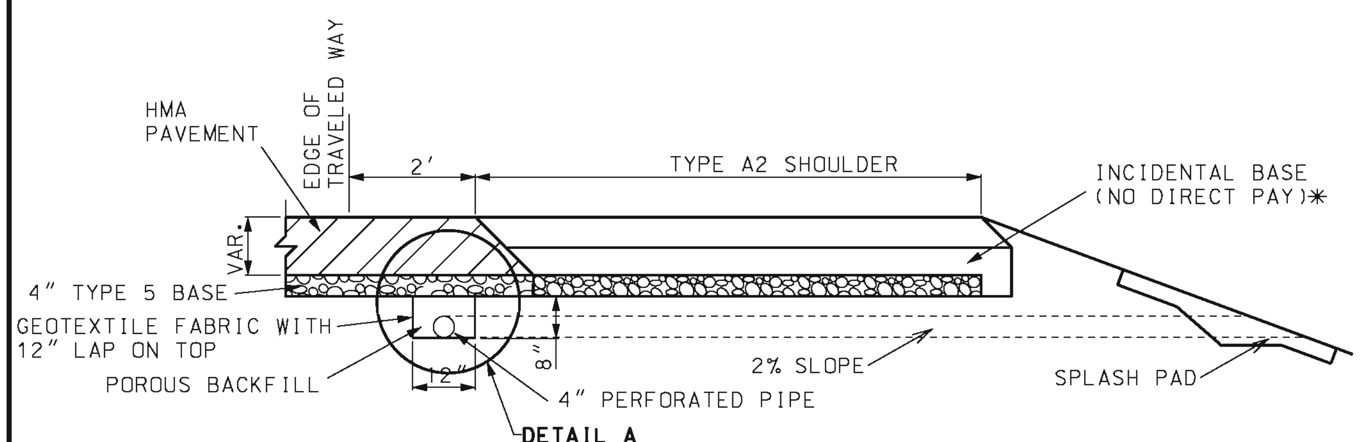
SHEET NO. 1 OF 4



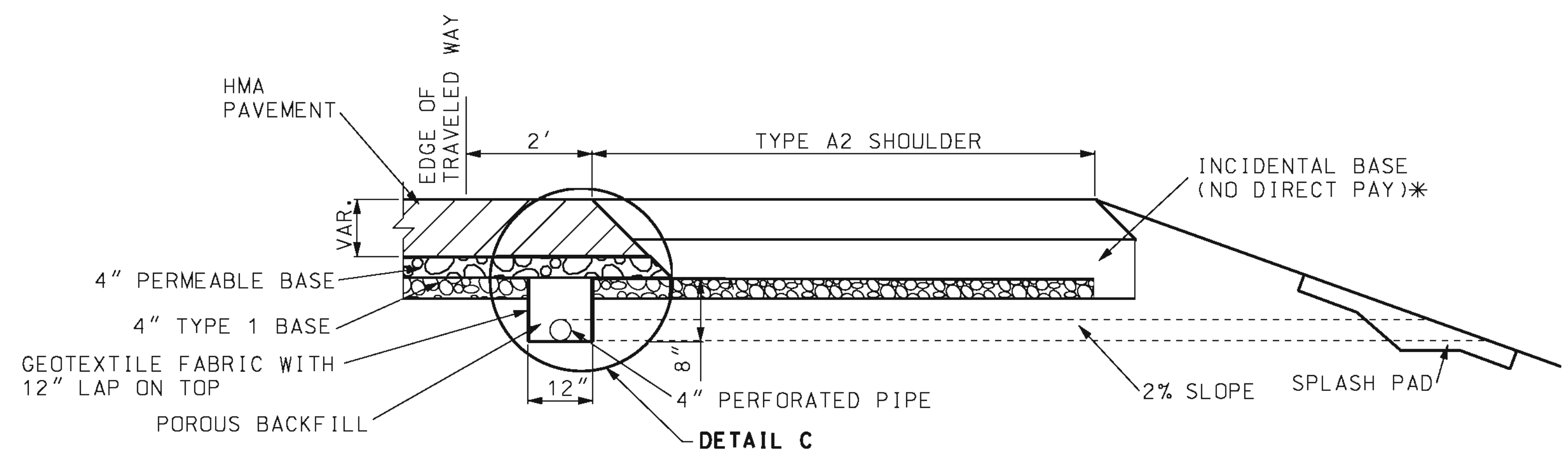
RIGID PAVEMENT WITH TYPE 5 BASE



RIGID PAVEMENT WITH PERMEABLE BASE



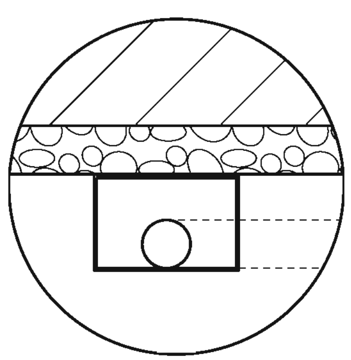
FLEXIBLE PAVEMENT WITH TYPE 5 BASE



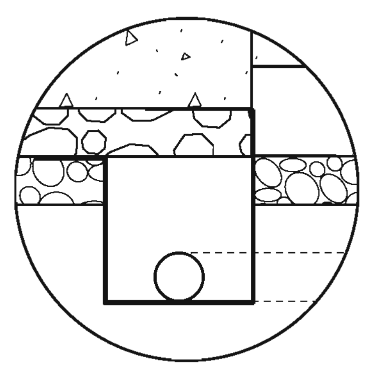
FLEXIBLE PAVEMENT WITH PERMEABLE BASE

PCC (PORTLAND CEMENT CONCRETE)
HMA (HOT MIX ASPHALT)
BASE

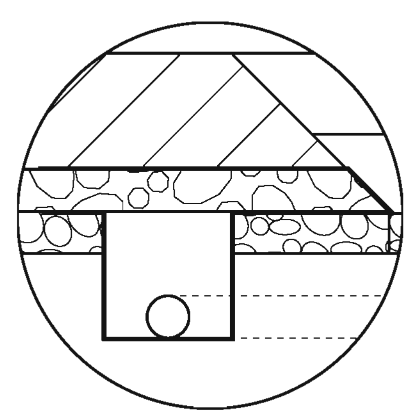
* BASE MATERIAL (ASPHALT MILLINGS, RECYCLED CONCRETE, TYPE 1 BASE, ETC.) APPROVED BY THE ENGINEER.



DETAIL A



DETAIL B



DETAIL C

GENERAL NOTES:

SEE DETAIL OF PIPE AGGREGATE DRAIN OUTLETS ON SHEET 1.

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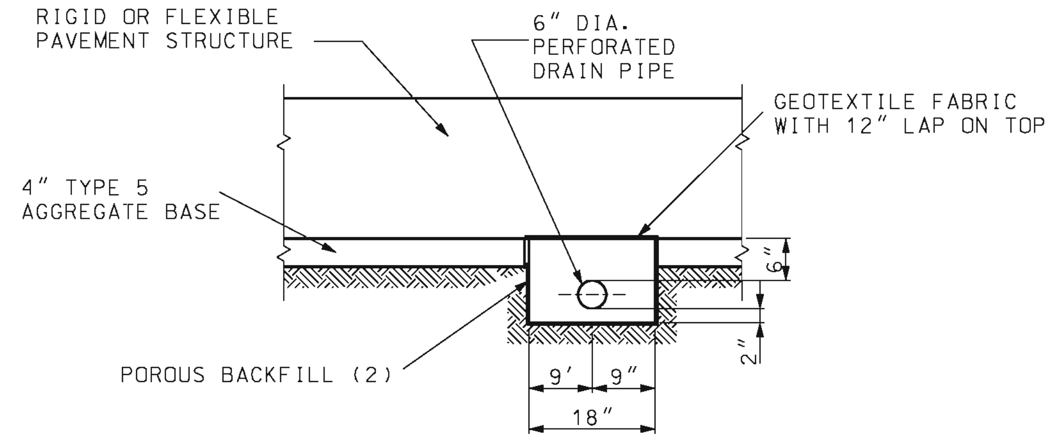
PAVEMENT UNDERDRAINAGE

PIPE AGGREGATE PAVEMENT EDGE DRAINS FOR TYPE A2 SHOULDERS

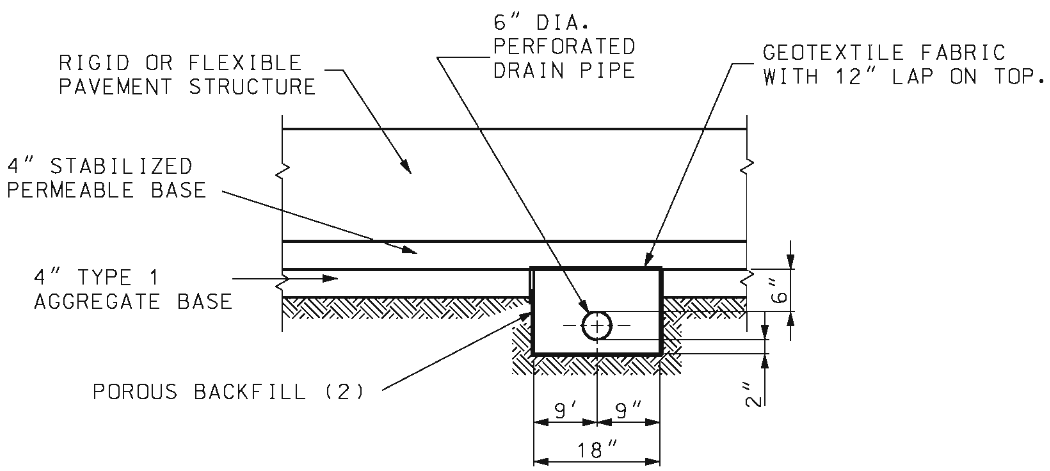
DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

605.101

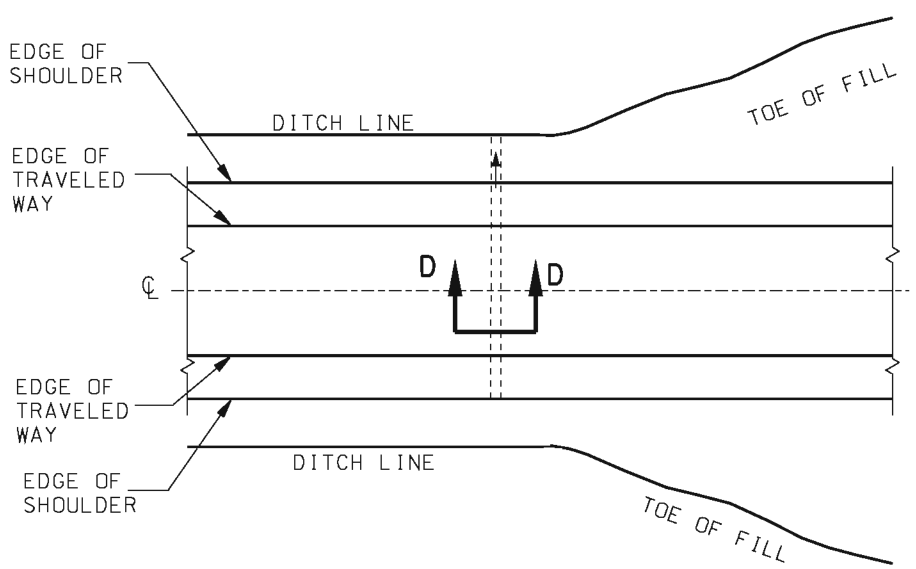
SHEET NO. 2 OF 4



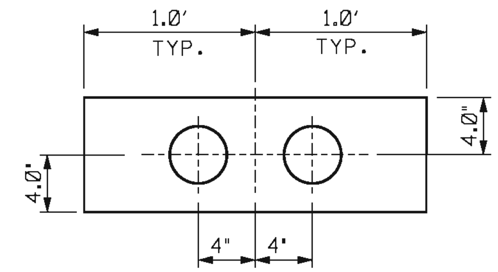
SECTION D-D
WITHOUT PERMEABLE BASE



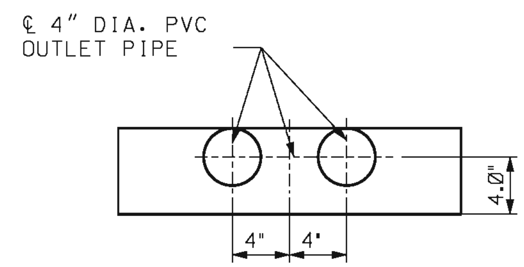
SECTION D-D
WITH PERMEABLE BASE



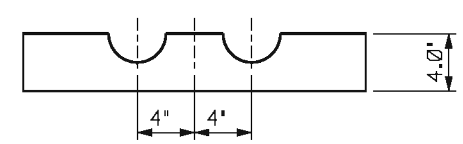
CROSS DRAIN



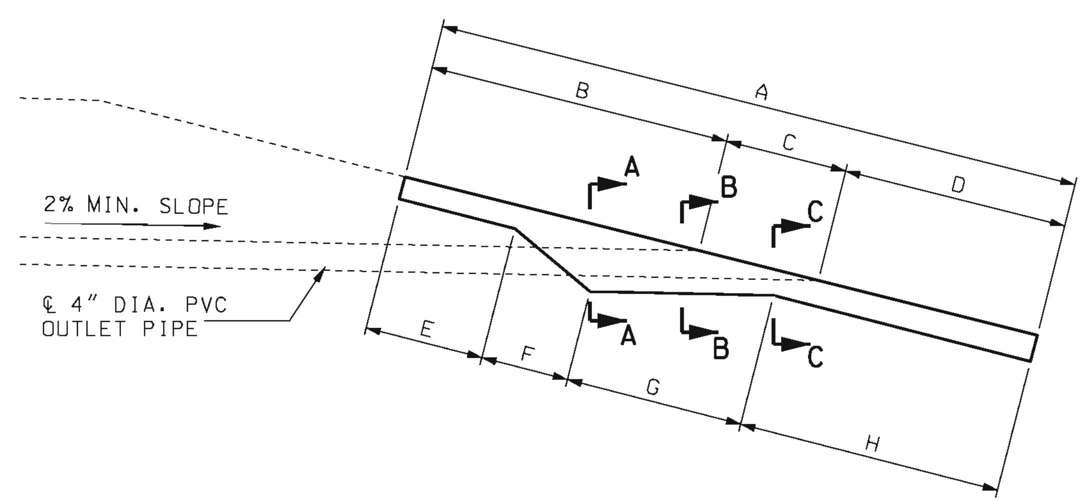
SECTION A-A



SECTION B-B



SECTION C-C



CONCRETE SPLASH PADS

ITEM	2:1	3:1	4:1	6:1
A	5.48'	6.19'	6.95'	8.58'
B	2.70'	3.07'	3.46'	4.28'
C	0.78'	1.12'	1.49'	2.30'
D	2.00'	2.00'	2.00'	2.00'
E	2.00'	2.00'	2.00'	2.00'
F	0.46'	0.61'	0.78'	1.18'
G	0.71'	1.07'	1.46'	2.27'
H	2.31'	2.51'	2.71'	3.13'
CONC.	0.15 C.Y.	0.17 C.Y.	0.20 C.Y.	0.25 C.Y.

GENERAL NOTES:

PRECAST CONCRETE SPLASH PADS MAY BE INSTALLED AS APPROVED BY THE ENGINEER.

TOP OF SPLASH PAD SHALL MATCH EXISTING CROSS SLOPE. CONSTRUCT BEND IN SPLASH PAD WHERE CROSS SLOPE CHANGES.

DIMENSIONS ARE APPROXIMATE AND CAN BE ADJUSTED AS DIRECTED BY THE ENGINEER.

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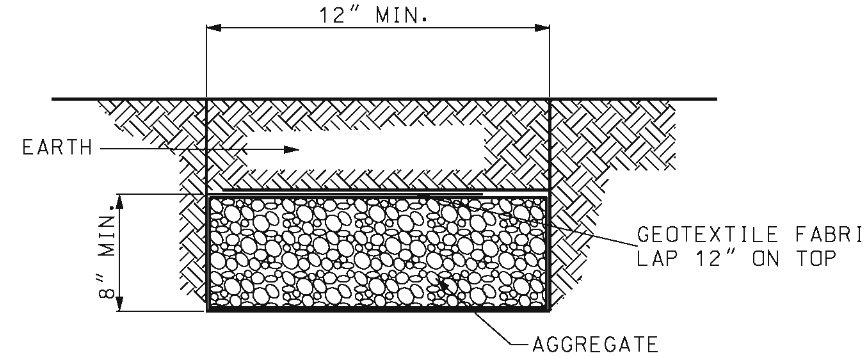
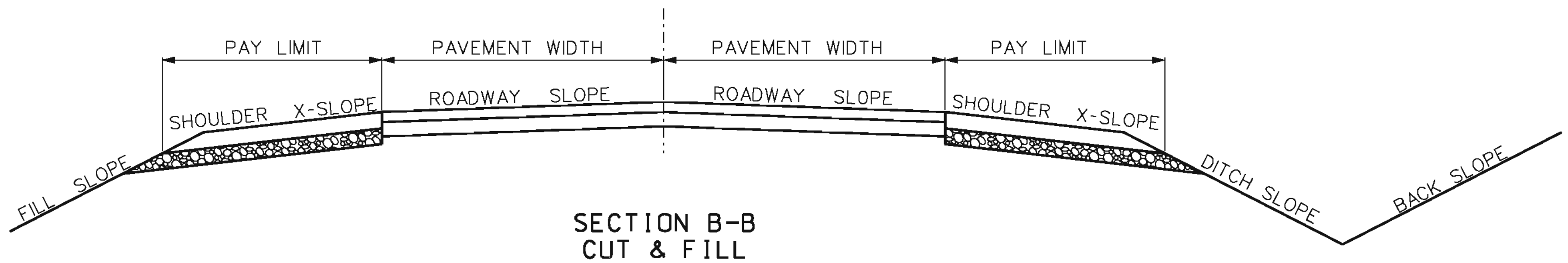
PAVEMENT UNDERDRAINAGE
CROSS DRAINS

DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

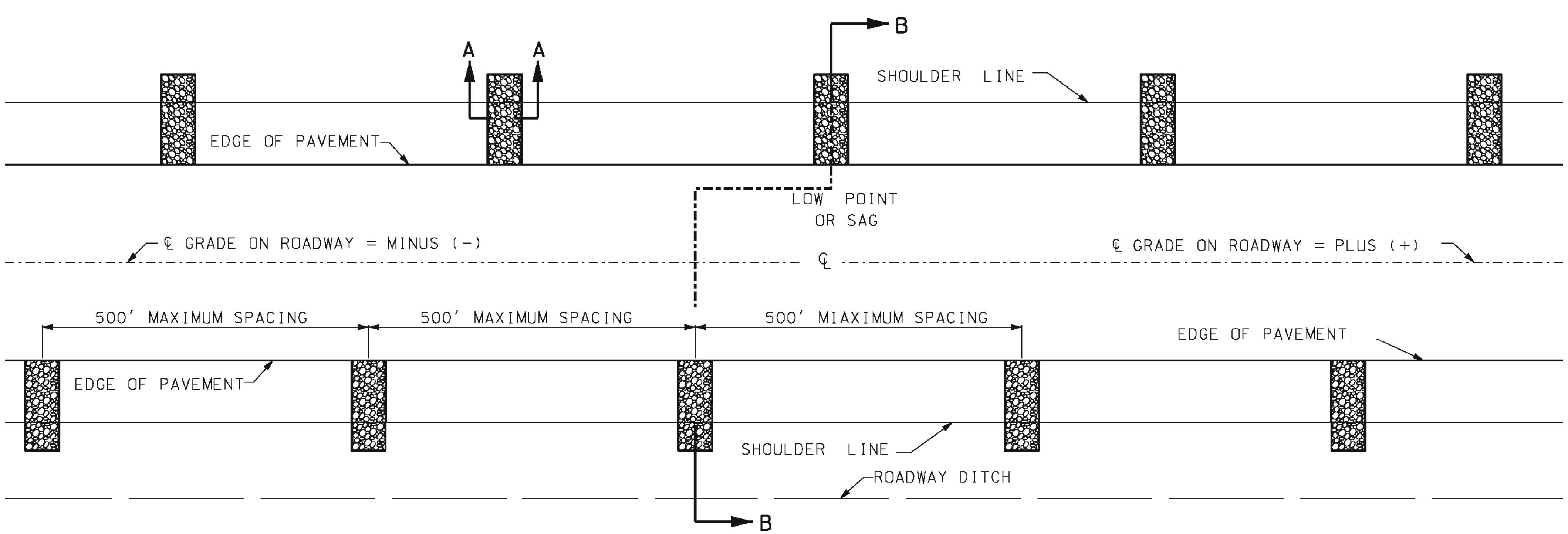
605.101



SECTION A-A



SECTION B-B
CUT & FILL
ELEVATION



PLAN

GENERAL NOTES:

AGGREGATE UNDERDRAIN TO BE USED ONLY WHERE DESIGNATED ON PLANS.

AGGREGATE UNDERDRAIN SHALL BE PLACED AT THE LOW POINT OF THE SAG AND THE SPACING OF AGGREGATE UNDERDRAIN SHALL BE APPROX. 500'. AGGREGATE UNDERDRAINS WILL BE OMITTED ON THE CREST VERTICAL CURVES AND ON THE HIGH SIDE OF SUPERELEVATION. THE LOW SIDE OF SUPER-ELEVATION SPACING MAY BE DECREASED AS DIRECTED BY ENGINEER.

THE BOTTOM OF THE AGGREGATE DRAINS SHALL BE AT OR BELOW THE BOTTOM OF THE PAVEMENT'S AGGREGATE SUBBASE AT THE POINT OF CONTACT. THE TOP OF THE AGGREGATE DRAINS SHALL BE NO HIGHER THAN THE BOTTOM OF THE SHOULDER'S AGGREGATE BASE.

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

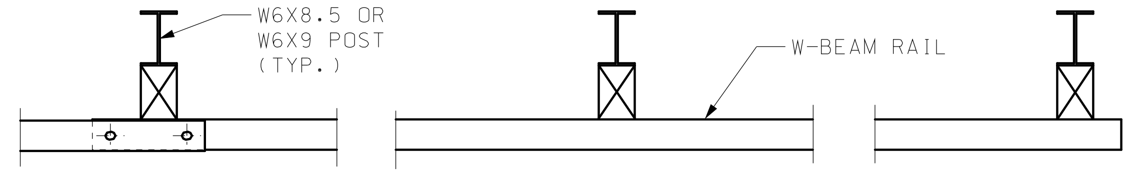
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

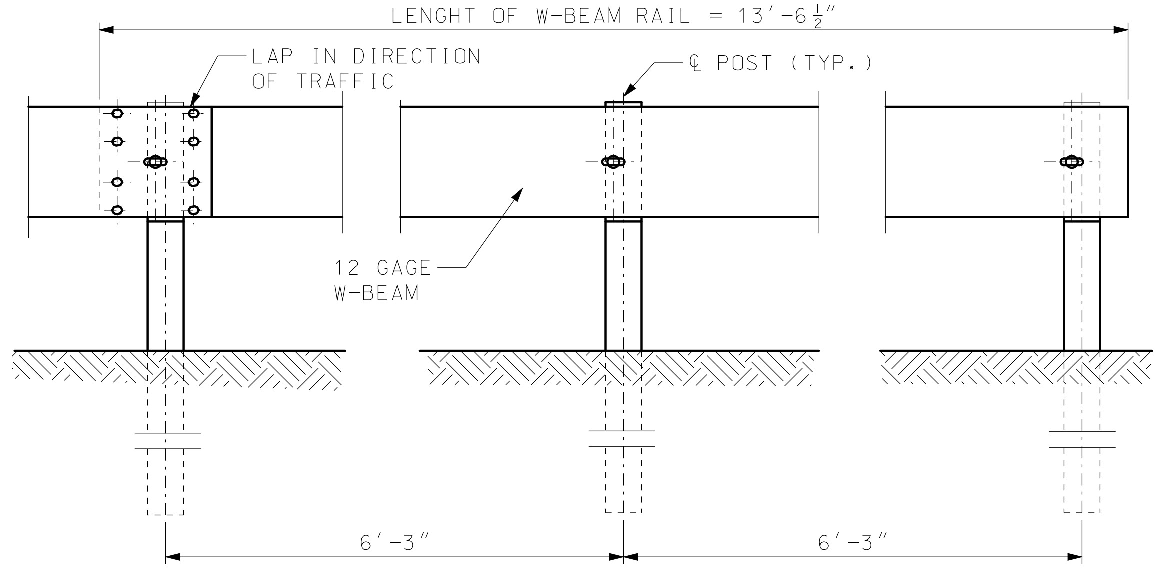
PAVEMENT UNDERDRAINAGE
AGGREGATE UNDERDRAINS

DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

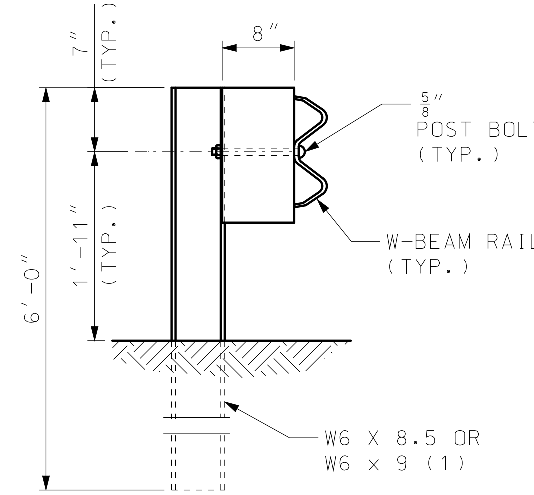
605.101



PLAN

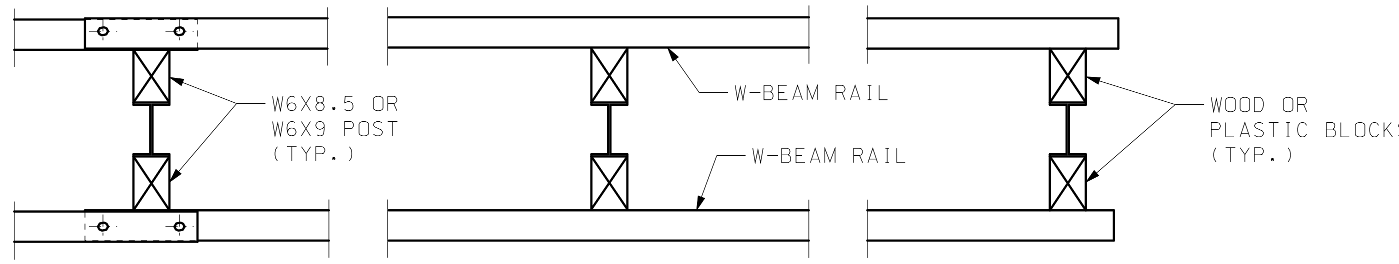


ELEVATION



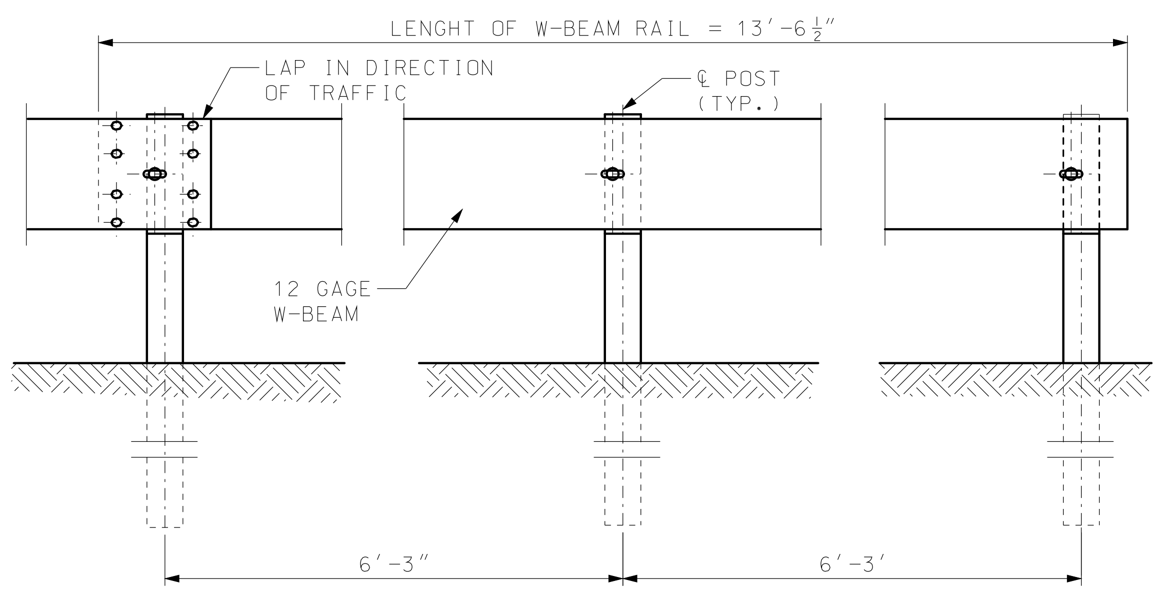
STEEL POST & WOOD OR
PLASTIC BLOCK

TYPE A GUARDRAIL

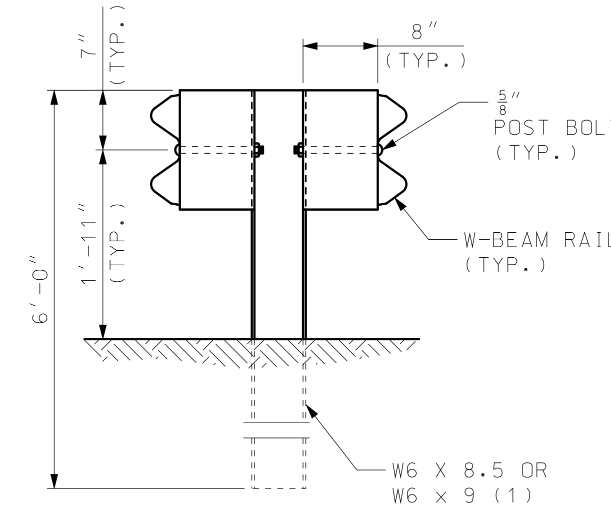


(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SECTION 1040.

PLAN



ELEVATION



STEEL POST & WOOD OR PLASTIC
BLOCKS

TYPE B GUARDRIAL

GENERAL NOTES:
SEE SHEET NO. 5 OF 7 FOR POST AND BLOCK DETAILS.

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

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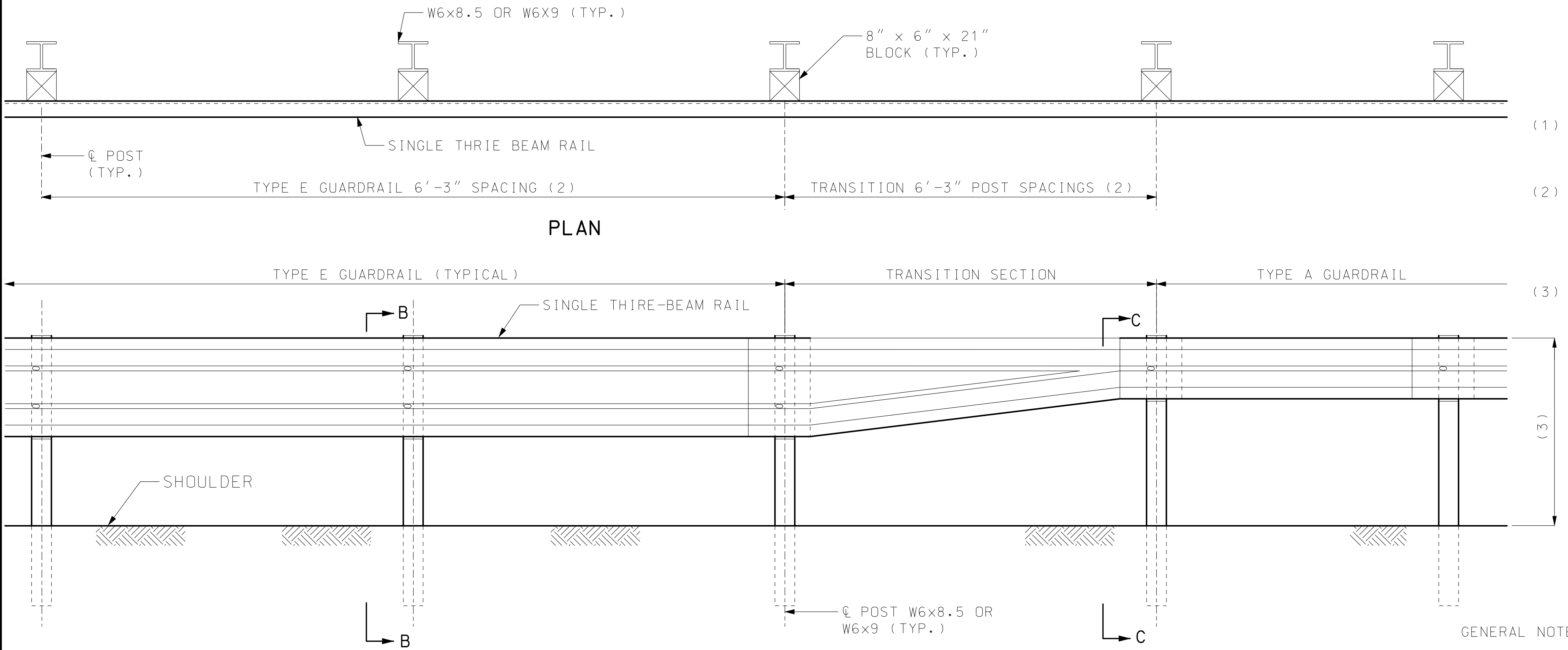
GUARDRAIL
TYPE A AND TYPE B

DATE EFFECTIVE:	01/01/2017	606.00AY	SHEET NO.
DATE PREPARED:	10/28/2016		1 OF 7



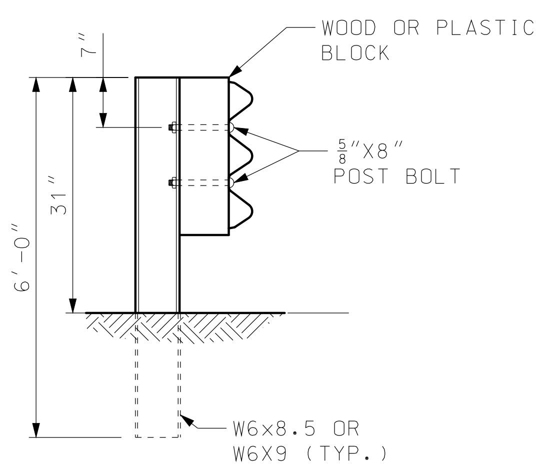
(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SEC 1040.

(2) IF THE TRANSITION IS CONNECTED TO A BRIDGE ANCHOR SECTION, POST SPACING FOR TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE 3'-1$\frac{1}{2}$" . FOR ALL OTHER CASES, POST SPACING SHALL BE 6'-3".

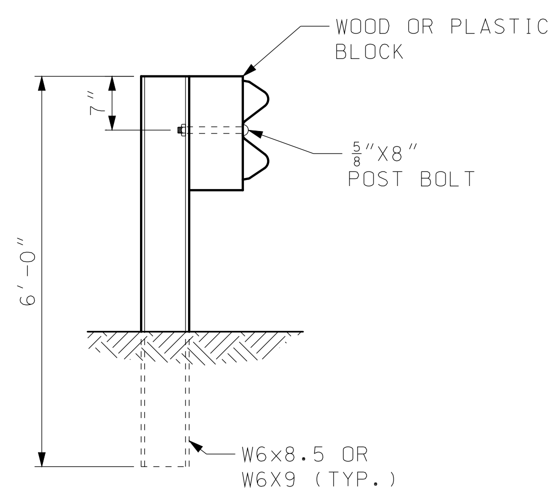
(3) TRANSITION FROM 31" TO 29" HEIGHT OVER 2-12.5' W-BEAMS OR 25'.

PART SECTION SHOWING TYPE E TO TYPE A GUARDRAIL TRANSITION

THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE $\frac{7}{8}$" ± $\frac{1}{4}$" FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.



SECTION B-B



SECTION C-C

GENERAL NOTES:

TYPE E GUARDRAIL SHALL USE 6'-3" POST SPACING UNLESS 3'-1$\frac{1}{2}$" POST IS SPECIFIED.

THE THRIE BEAM RAIL FOR THE TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 12 GAGE.

FOR PROTECTIVE COATING AND MATERAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

SEE SHEET 7 OF 7 FOR REQUIREMENTS FOR SPECIAL INSTALLATIONS.

ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES EXCEPT WHERE ALLOWABLE TOLERANCES ARE SHOWN.

FOR DETAILS NOT SHOWN, SEE OTHER SHEETS OF THIS DRAWING.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

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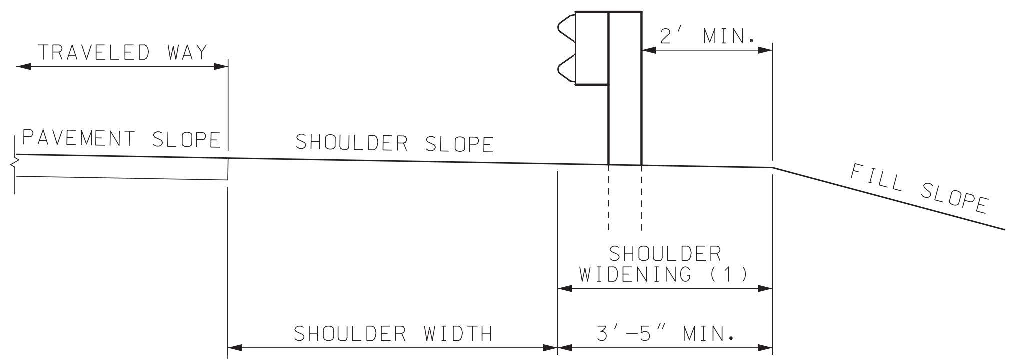
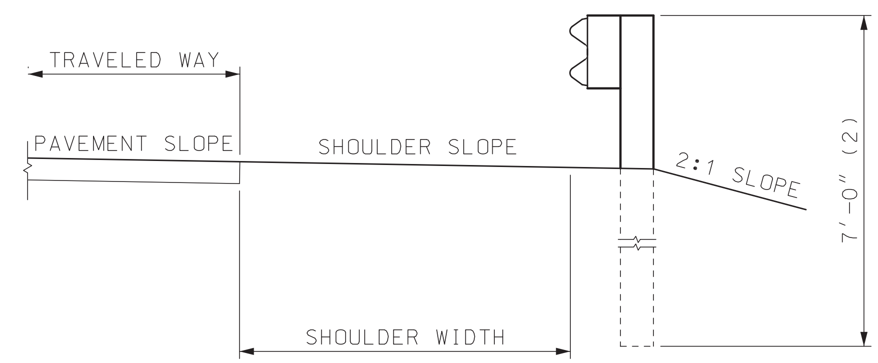
GUARDRAIL TYPE E

DATE EFFECTIVE:	01/01/2017	606.00AY	SHEET NO. 2 OF 7
DATE PREPARED:	10/28/2016		



TYPCIAL SECTION

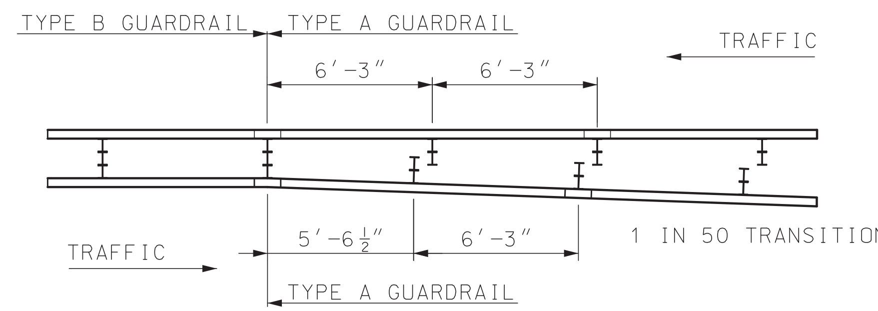


ALTERNATE TYPICAL SECTION AT SLOPE BREAKPOINT

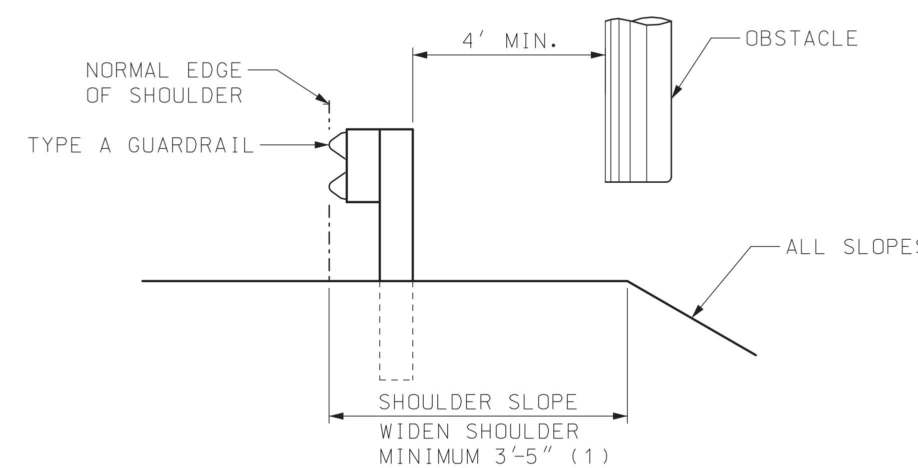
(1) SHOULDER WIDENING SHALL CONSIST OF EMBANKMENT MATERIAL COMPACTED IN ACCORDANCE WITH SEC 203.4 OF THE STANDARD SPECIFICATIONS.

(2) POST SHALL BE SPACED AT 3'-1½" ON CENTER.

(3) WHEN GUARDRAIL IS CONSTRUCTED OVER CURBS, THE CURBS SHALL BE CONSTRUCTED AS SHOWN.

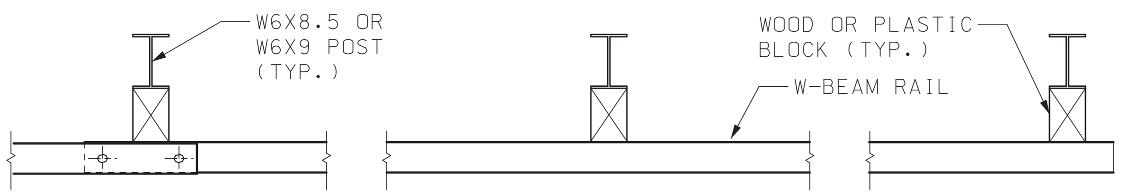


DETAIL FOR TRANSITIONING BETWEEN TYPE A AND TYPE B GUARDRAIL

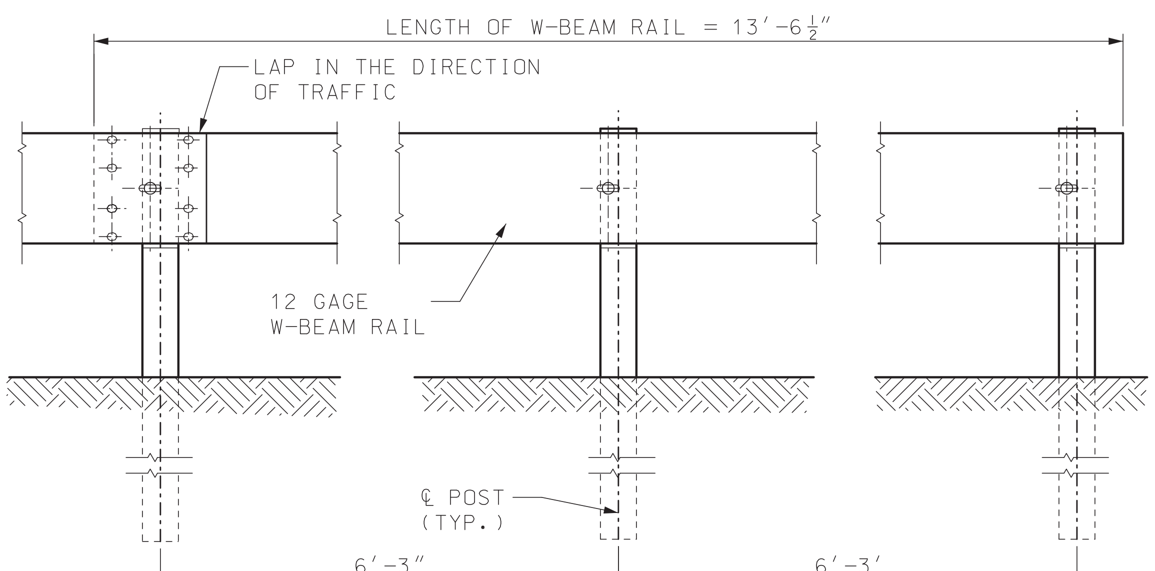


LOCATION OTHER THAN ℄ MEDIAN

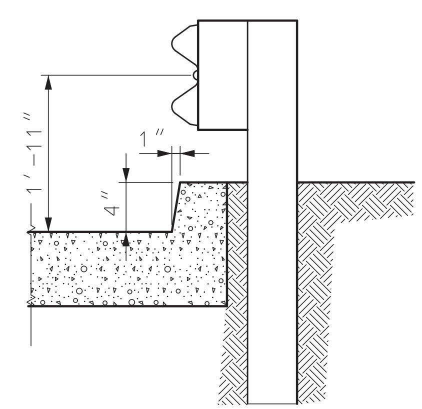
LATERAL PLACEMENT OF GUARDRAIL FOR SHOULDER INSTALLATION



PLAN



ELEVATION



GUARDRAIL AT CURBS (3)

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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER

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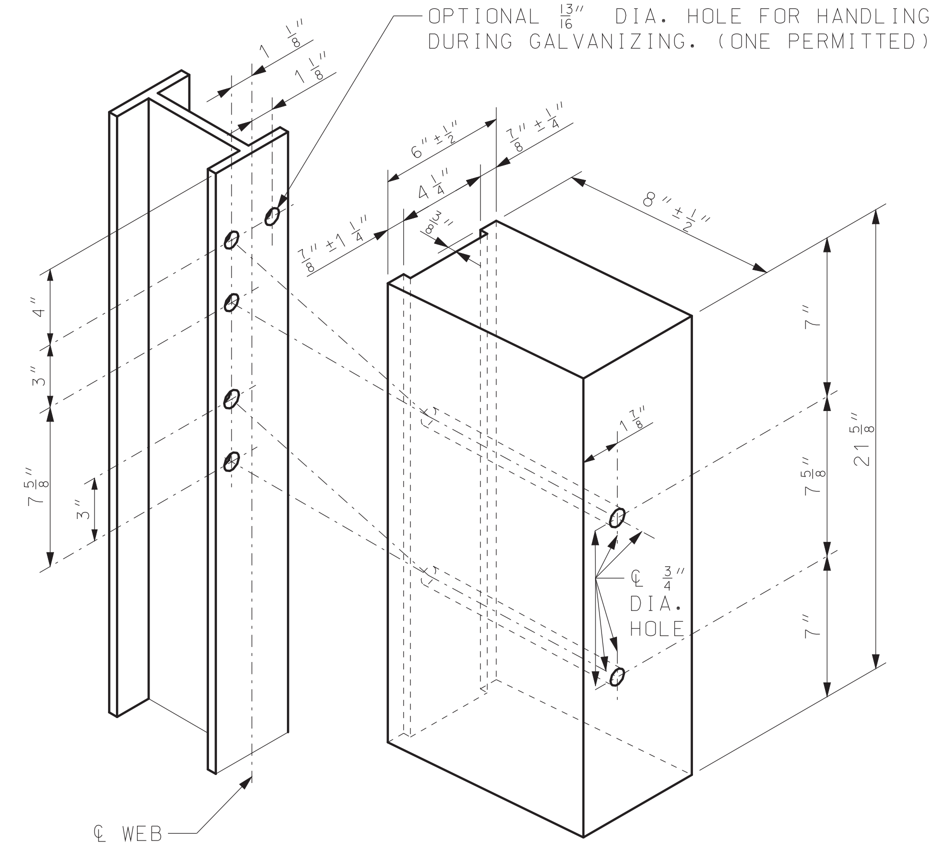
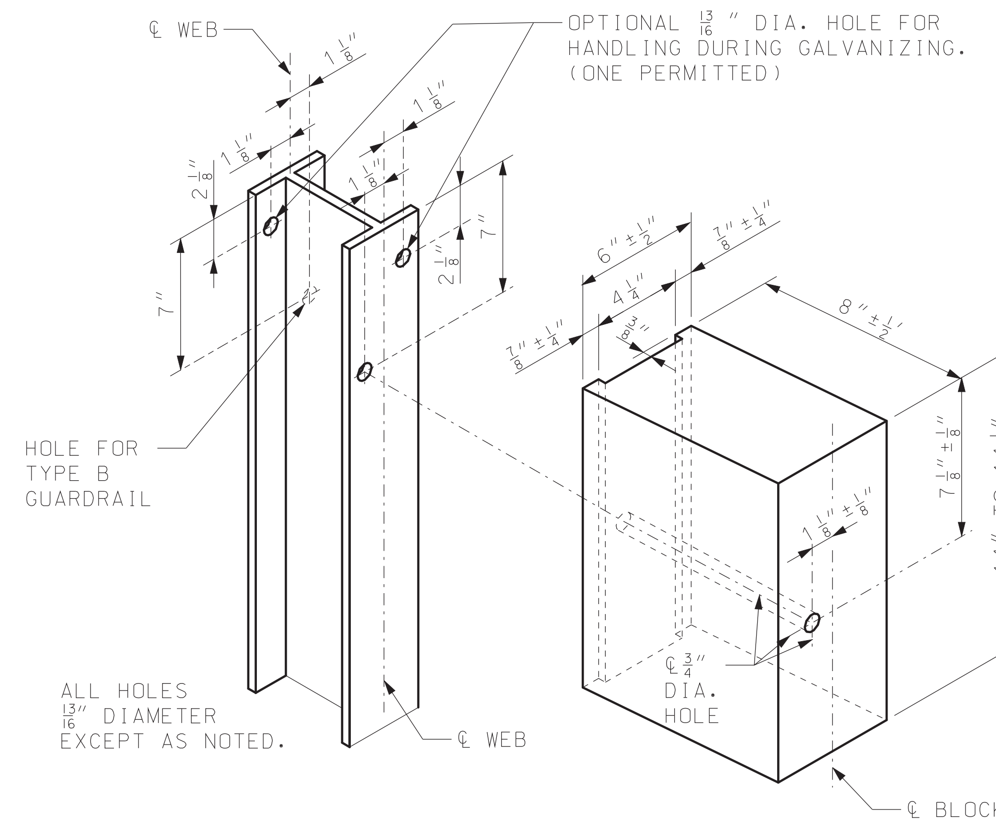
GUARDRAIL LAYOUT

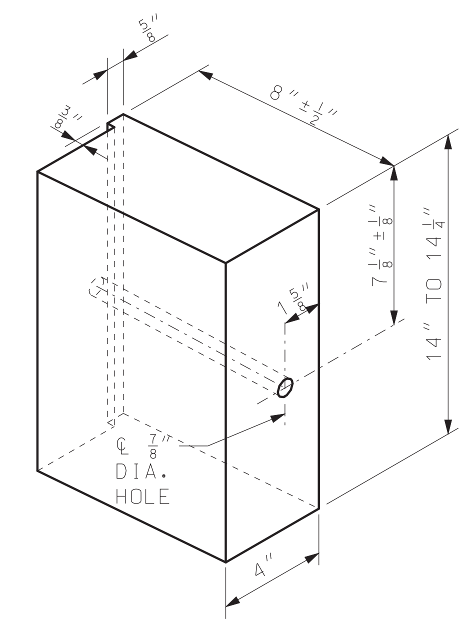
DATE EFFECTIVE:	01/01/2020	606.00AY	SHEET NO. 3 OF 7
DATE PREPARED:	10/21/2019		



TYPE E
FOR STEEL POST & WOOD OR PLASTIC BLOCKS (1)

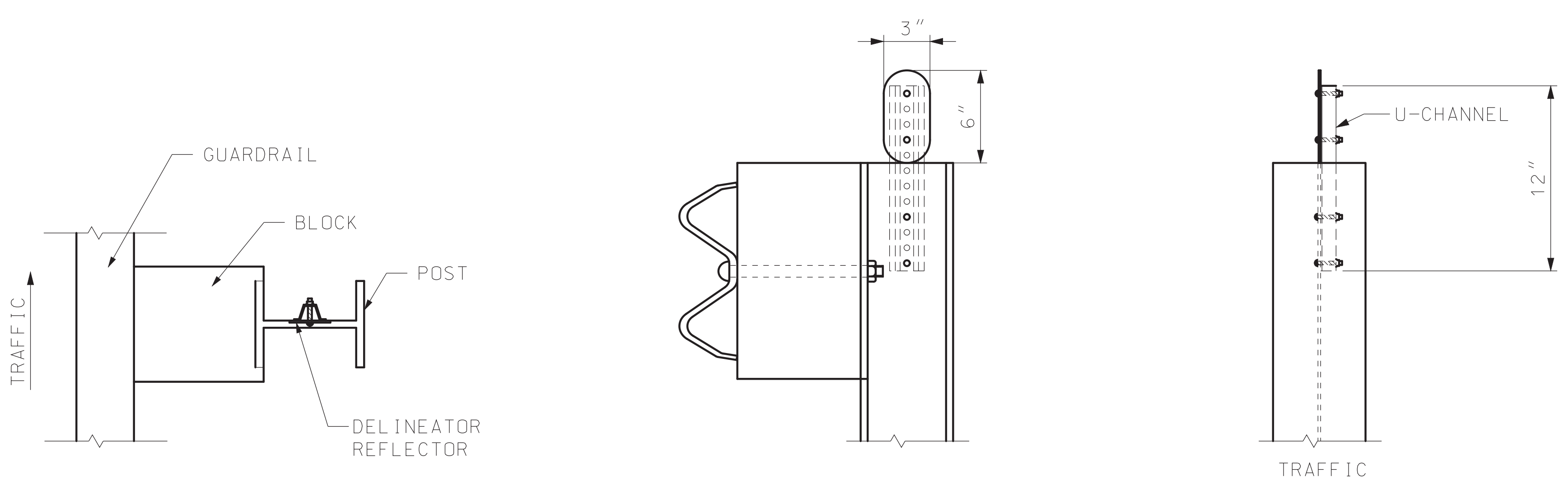


TYPE A AND TYPE B
FOR STEEL POST AND WOOD OR PLASTIC BLOCKS (1)



ALTERNATE DESIGN
FOR WOOD BLOCK

(1) THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE 7/8" ±1/4" FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.



DELINEATORS ON NEW GUARDRAIL

GENERAL NOTES:

FOR GUARDRAIL DELINEATION DETAILS SEE STD PLAN 903.03.

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ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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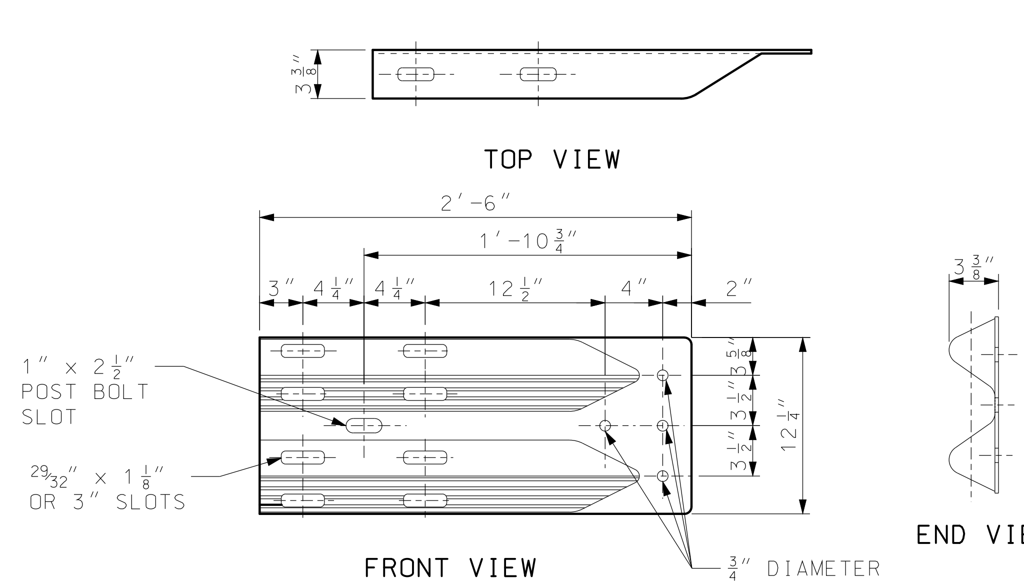
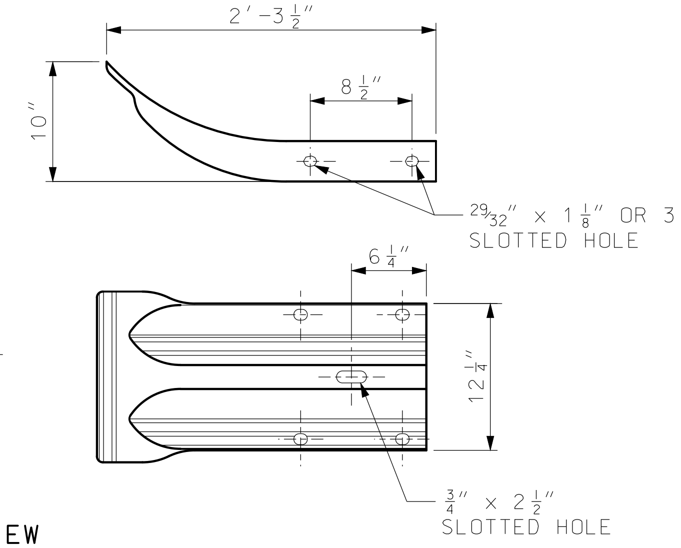
GUARDRAIL
POST AND BLOCK

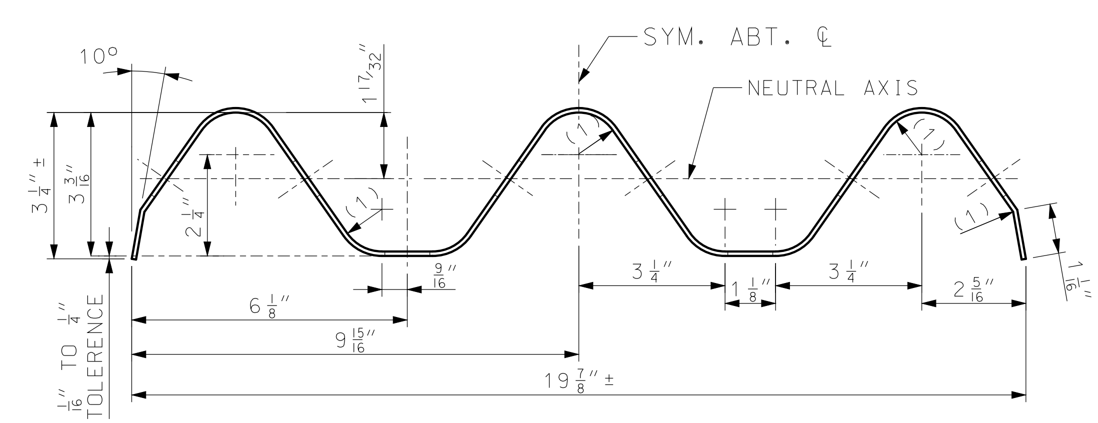
DATE EFFECTIVE:	04/01/2018	606.00AY	SHEET NO. 4 OF 7
DATE PREPARED:	2/9/2018		



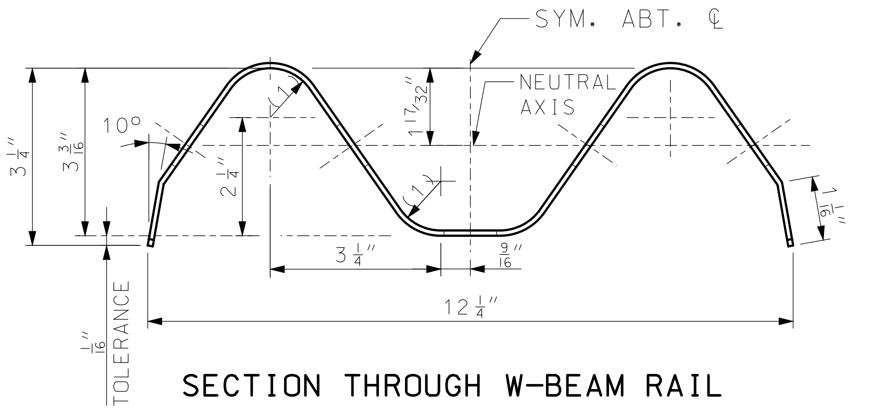
TERMIANL CONNECTOR



END SECTION
12 GAGE

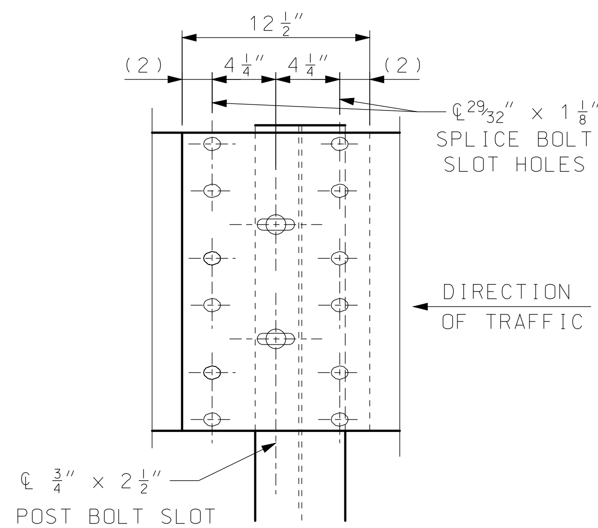


SECTION THROUGH THRIE BEAM RAIL

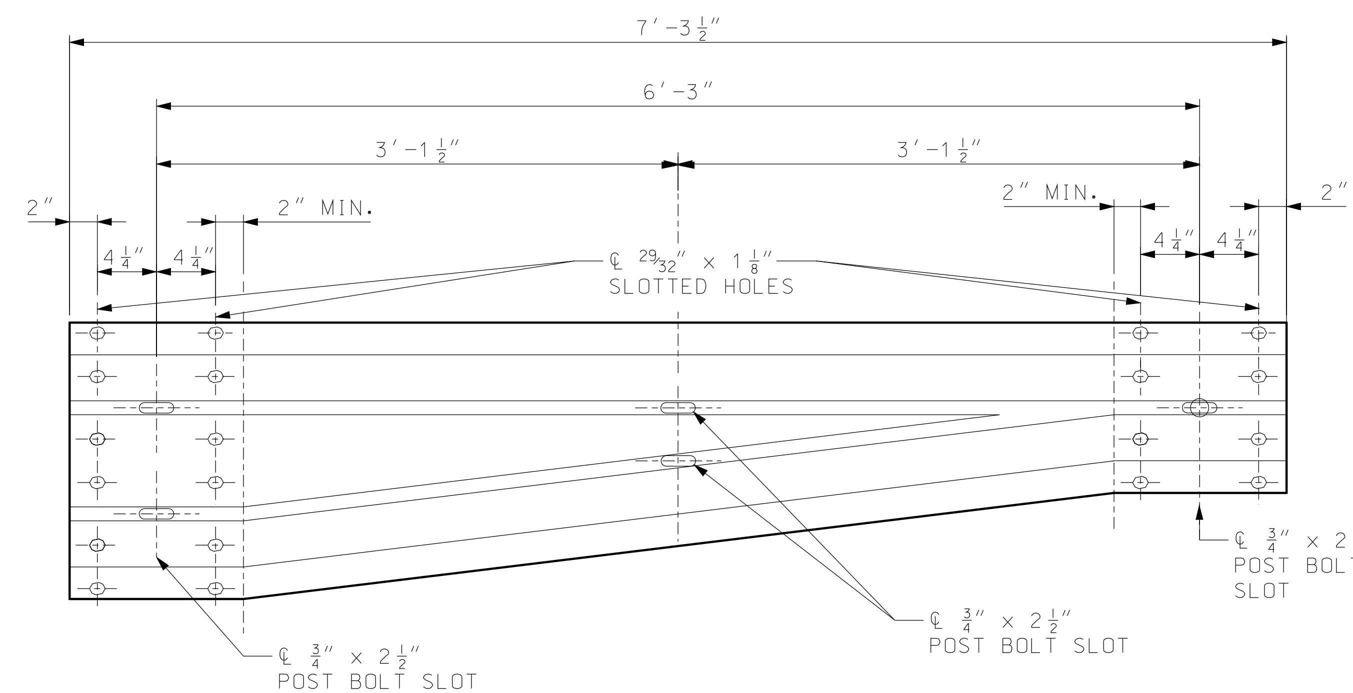


SECTION THROUGH W-BEAM RAIL

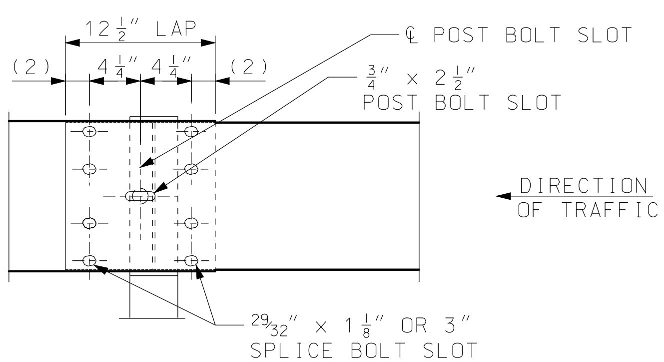
(1) 15/16" RADIUS
(2) 2" (TOLERANCE +1 1/4", -1/4")



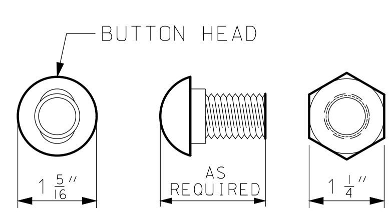
THRIE-BEAM SPLICE AT POST



ELEVATION OF ASYMMETRICAL TRANSITION SECTION

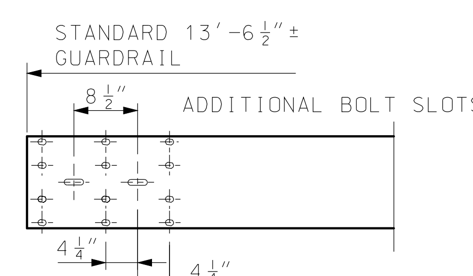


W-BEAM RAIL SPLICE AT POST



OVAL SHOULDER SHALL BE OF ADEQUATE HEIGHT, LENGTH & SHAPE TO PREVENT TURNING DURING INSTALLATION OR REMOVAL OF BOLT.

5/8" POST OR SPLICE BOLT



NOTE: PORTIONS OF BEAM WITH UNUSED BOLT SLOTS TO BE LAPPED BEHIND.

BEAM DETAILS SHOWING LOCATION OF ADDITIONAL BOLT SLOTS NECESSARY TO OBTAIN GUARDRAIL OFFSET.

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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

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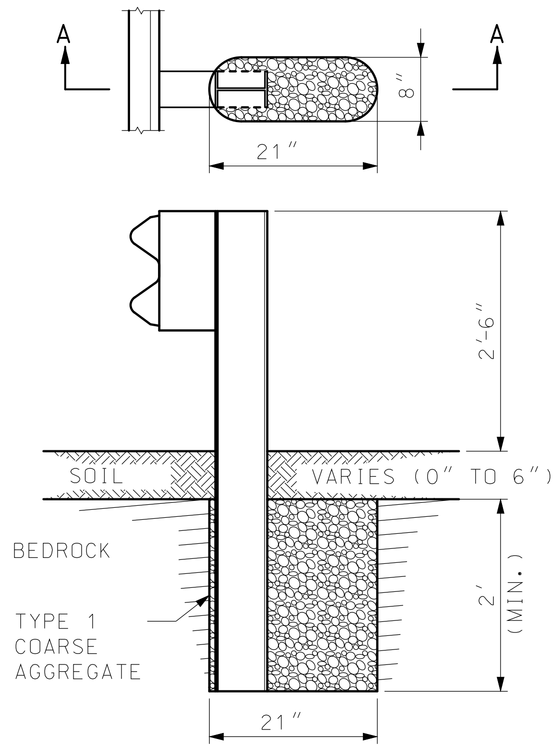
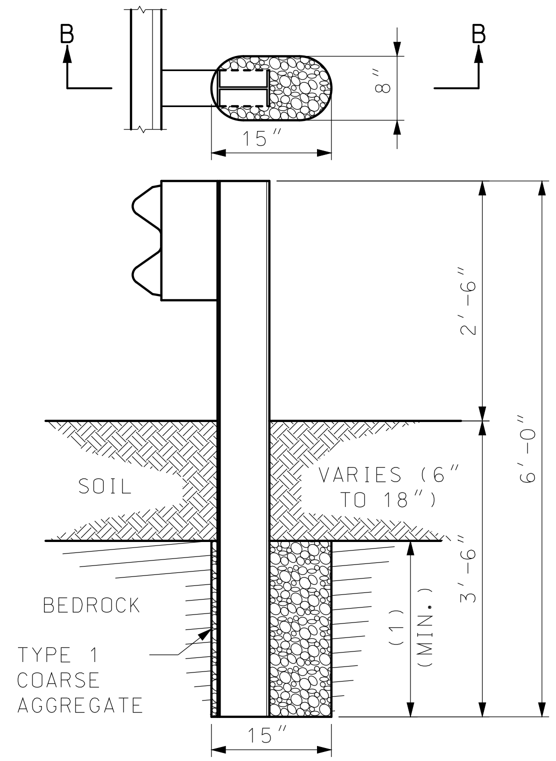
GUARDRAIL
RAIL ELEMENTS

DATE EFFECTIVE:	01/01/2017	606.00AY	SHEET NO. 5 OF 7
DATE PREPARED:	10/28/2016		

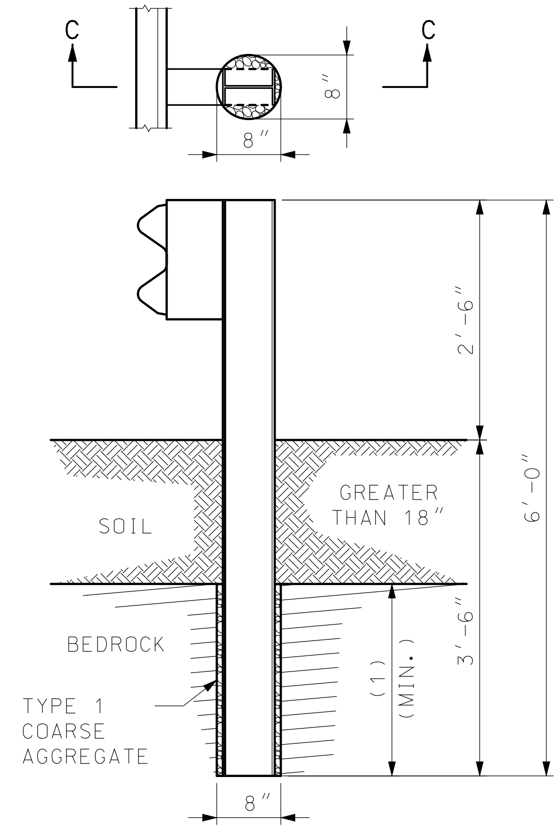


SECTION A-A
ROCK ENCOUNTERED
UP TO 6″ BENEATH SURFACE



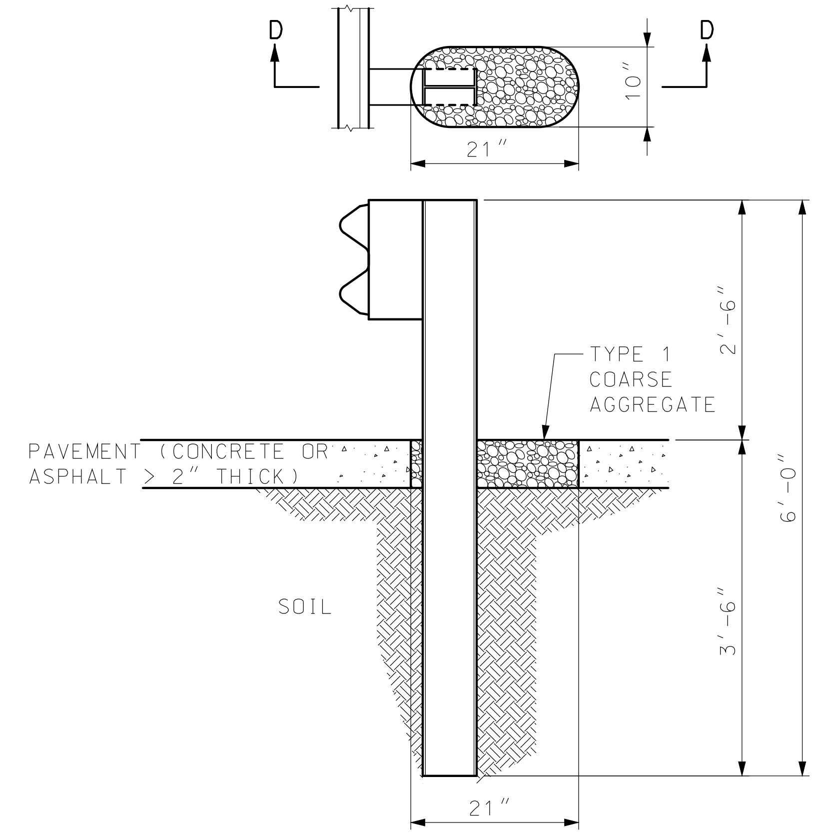
SECTION B-B
ROCK ENCOUNTERED
6″ TO 18″ BENEATH SURFACE

SETTING POST IN SOLID ROCK

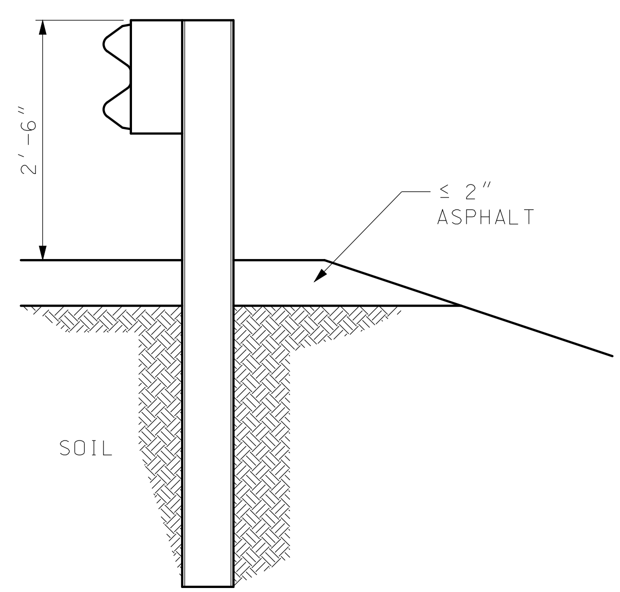


SECTION C-C
ROCK ENCOUNTERED MORE
THAN 18″ BENEATH SURFACE

(1) MINIMUM ROCK EMBEDMENT IS EQUAL TO FULL DEPTH POST EMBEDMENT MINUS SOIL DEPTH.



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



SETTING POST THROUGH ASPHALT ≤ 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 A MINIMUM 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.

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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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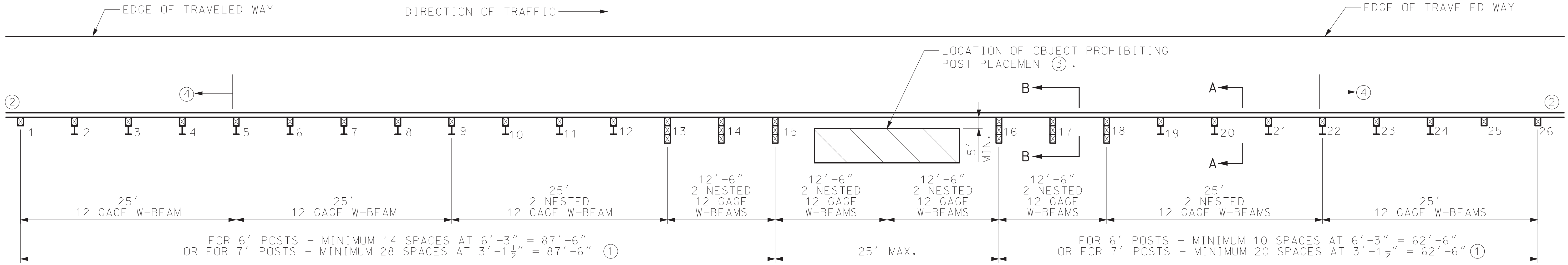
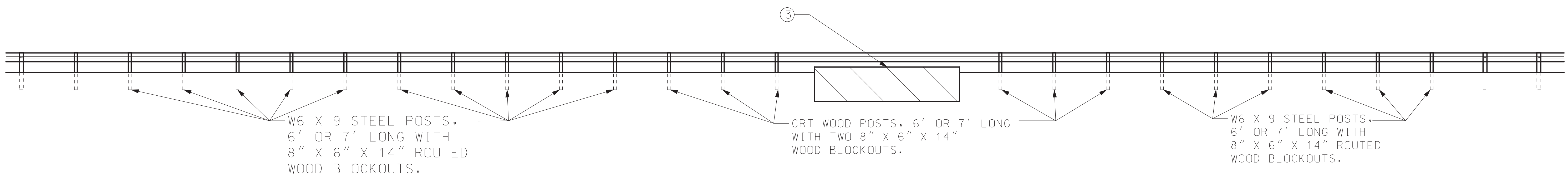
GUARDRAIL
SPECIAL INSTALLATIONS

DATE EFFECTIVE:	01/01/2017	606.00AY	SHEET NO.
DATE PREPARED:	10/28/2016		6 OF 7



PLAN



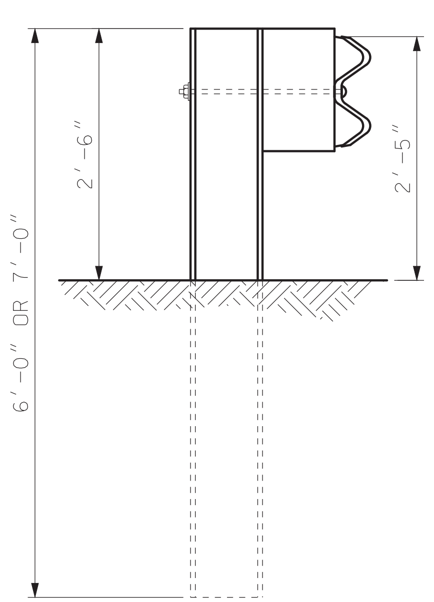
ELEVATION

(1) IF LOCATED WITHIN THE CLEAR ZONE OF A TWO-WAY ROADWAY, THE MINIMUM LENGTH IS 87'-6".

(2) ADDITIONAL GUARDRAIL AS REQUIRED, INCLUDING END TREATMENT.

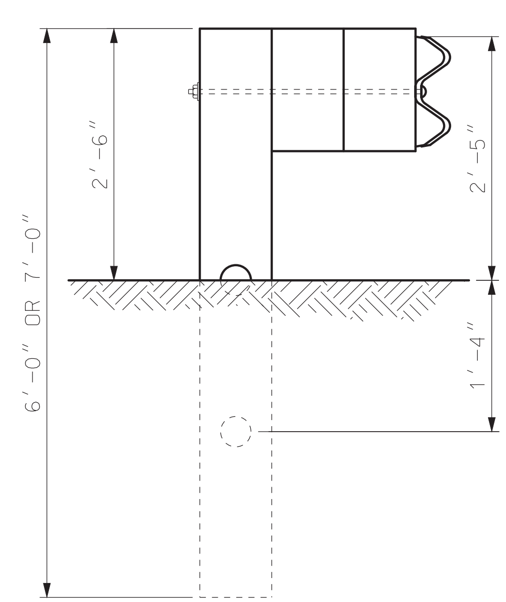
(3) THE POST MAY BE SKIPPED DUE TO THE PRESENCE OF AN OBSTACLE SUCH AS A CULVERT.

(4) PLACE END TREATMENT NO CLOSER TO THE SKIPPED POST THAN POSTS 5 AND 22.



SECTION A-A

W6 X 9 STEEL POSTS, 6' OR 7' LONG WITH 8" X 6" X 14" ROUTED WOOD BLOCKOUTS POSTS 3 THROUGH 12 AND 19 THROUGH 24.



SECTION B-B

CRT WOOD POSTS, 6' OR 7' LONG WITH TWO 8" X 6" X 14" WOOD BLOCKOUTS POSTS 13 THROUGH 18.

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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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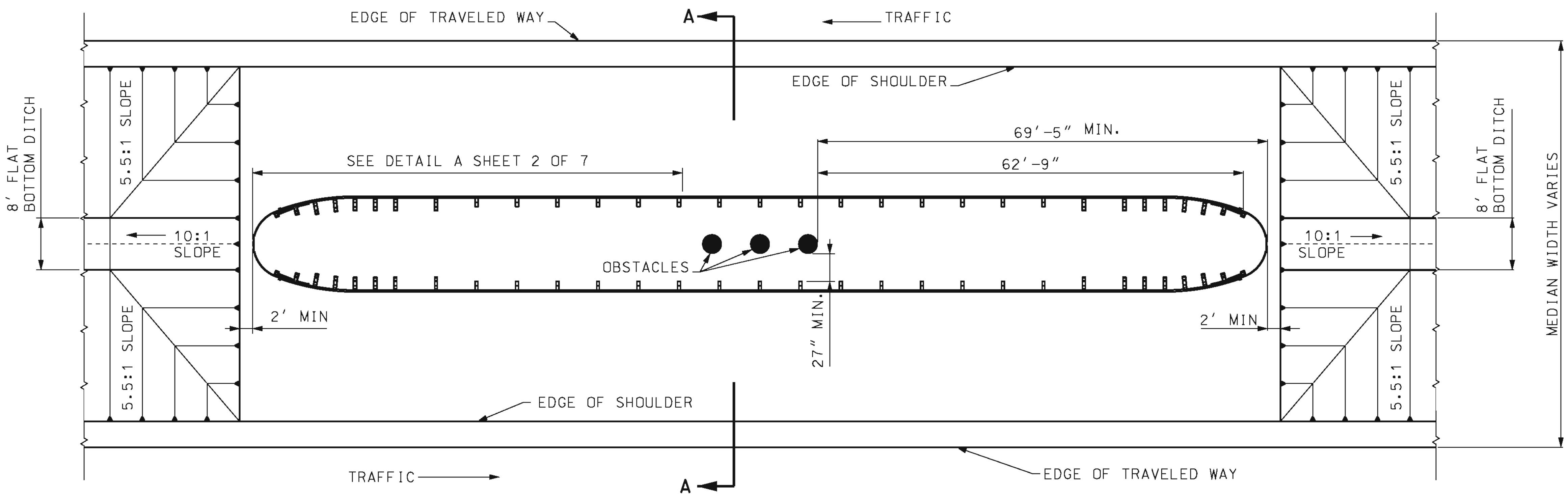
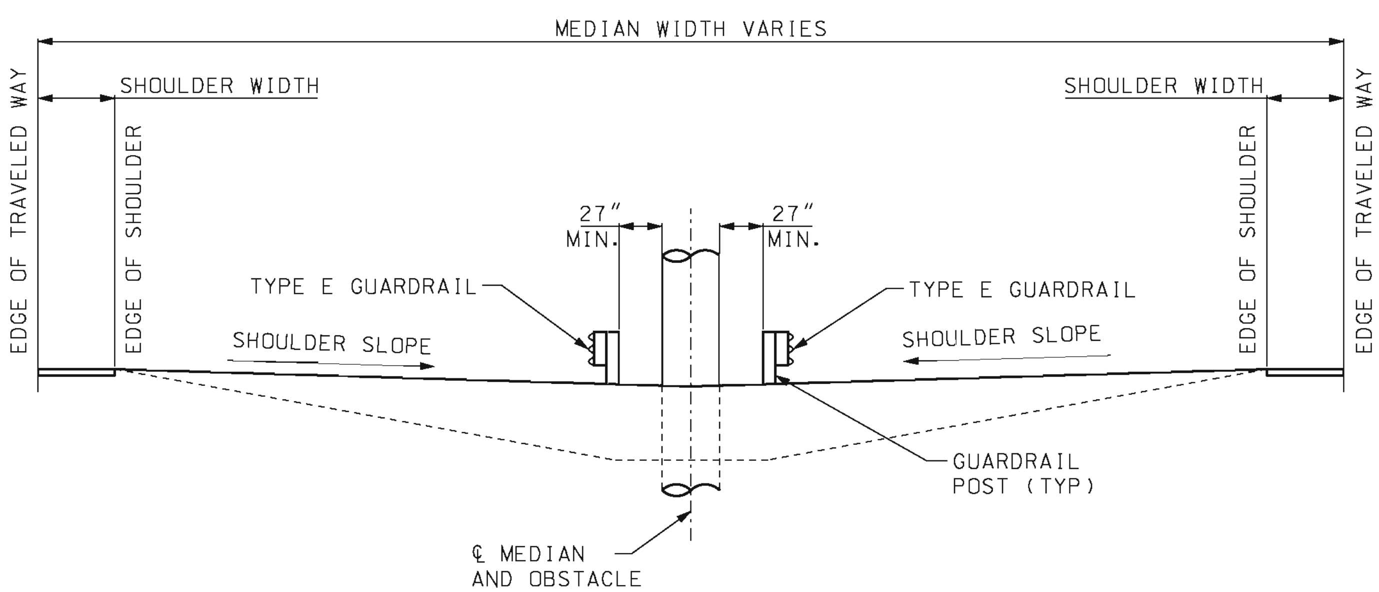
GUARDRAIL
LONG-SPAN NESTED W-BEAM

DATE EFFECTIVE: 10/01/2017			SHEET NO.
DATE PREPARED: 8/8/2017		606.00AY	7 OF 7

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



PIER AT ℄ OF MEDIAN
PLAN VIEW



SECTION A-A

GENERAL NOTES:

WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E GUARDRAIL.

THE BULLNOSE GUARDRAIL PAY ITEM INCLUDES THE STRUCTURE BETWEEN POST 10 AND THE NOSE. THE REMAINING GUARDRAIL WILL BE PAID FOR AS STANDARD GUARDRAIL ITEMS.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MEDIAN PIER PROTECTION
BULLNOSE GUARDRAIL SYSTEM

DATE EFFECTIVE:	08/01/2012	606.01F	SHEET NO. 1 OF 9
DATE PREPARED:	7/27/2012		

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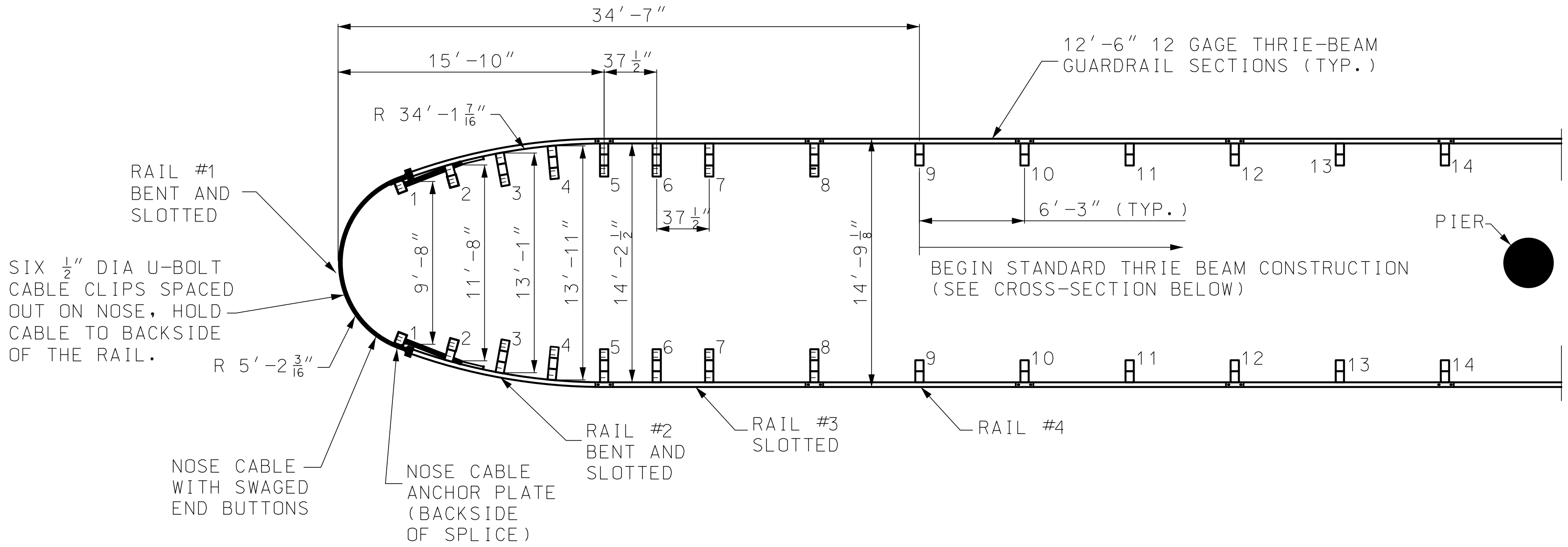
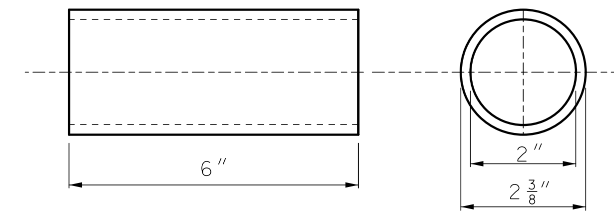
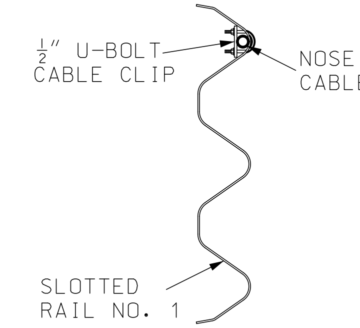


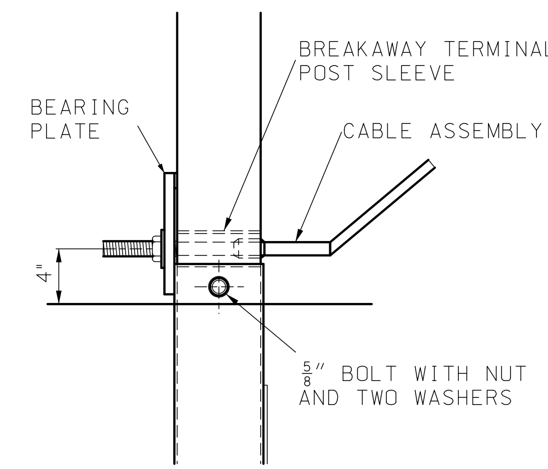
DETAIL A



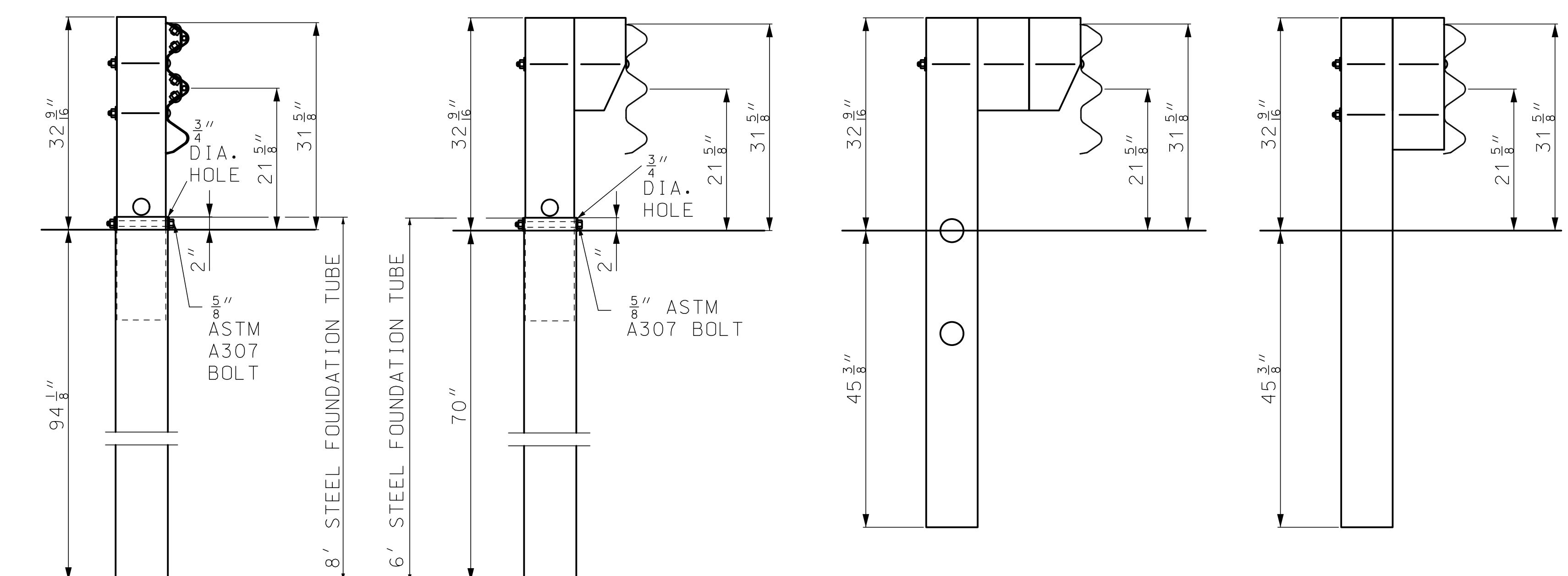
BREAKAWAY TERMINAL POST SLEEVE



U-BOLT CABLE CLIP DETAIL



POST 1 DETAIL



THRIE BEAM BCT POST
WITH 96 1/16" FOUNDATION TUBE
POST 1

THRIE BEAM BCT POST
WITH 72" FOUNDATION TUBE
AND 14" TAPERED BLOCK
POST 2

THRIE BEAM CRT POST
78" LONG
WITH 14" BLOCK AND
14" TAPERED BLOCK
POSTS 3, 4, 5, 6, 7, 8

THRIE BEAM POST
78" LONG
WITH 14" BLOCK
POSTS 9 AND 10

POST DETAILS

GENERAL NOTE:

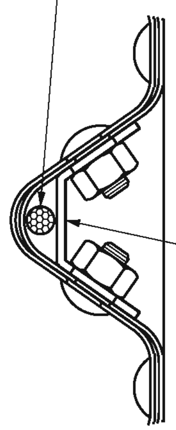
RAILS NUMBERS 1, 2, 3 AND 4 ARE TYPE E GUARDRAIL.
RAIL NUMBER 4 IS A STANDARD THRIE BEAM, NOT SLOTTED.

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

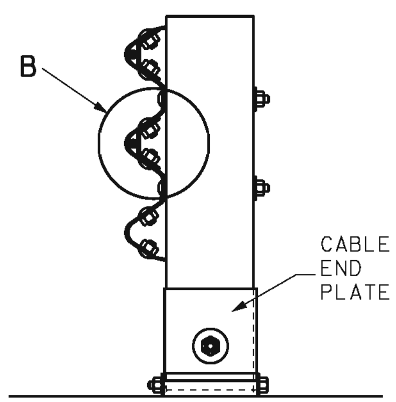
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MEDIAN PIER PROTECTION
BULLNOSE GUARDRAIL SYSTEM

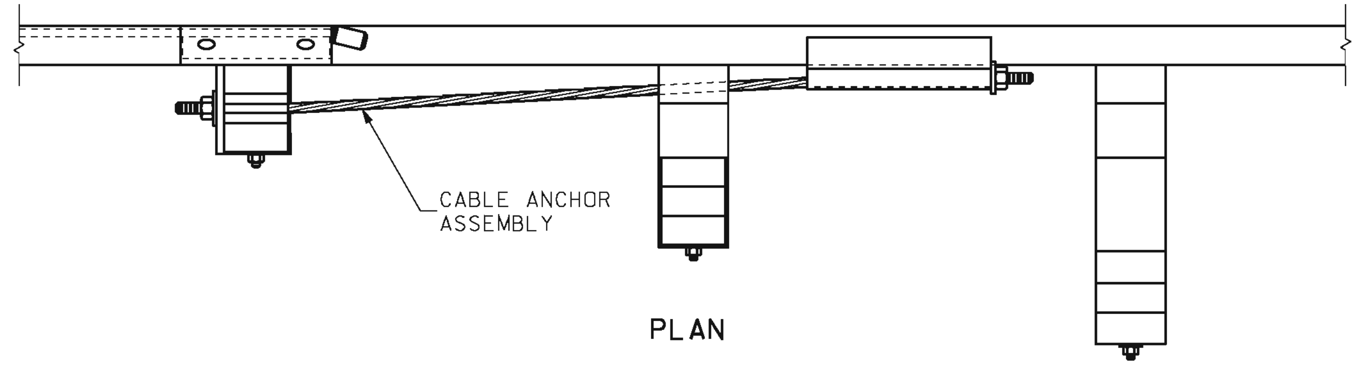
DATE EFFECTIVE:	04/01/2021	606.01F	SHEET NO.
DATE PREPARED:	1/27/2021		2 OF 9



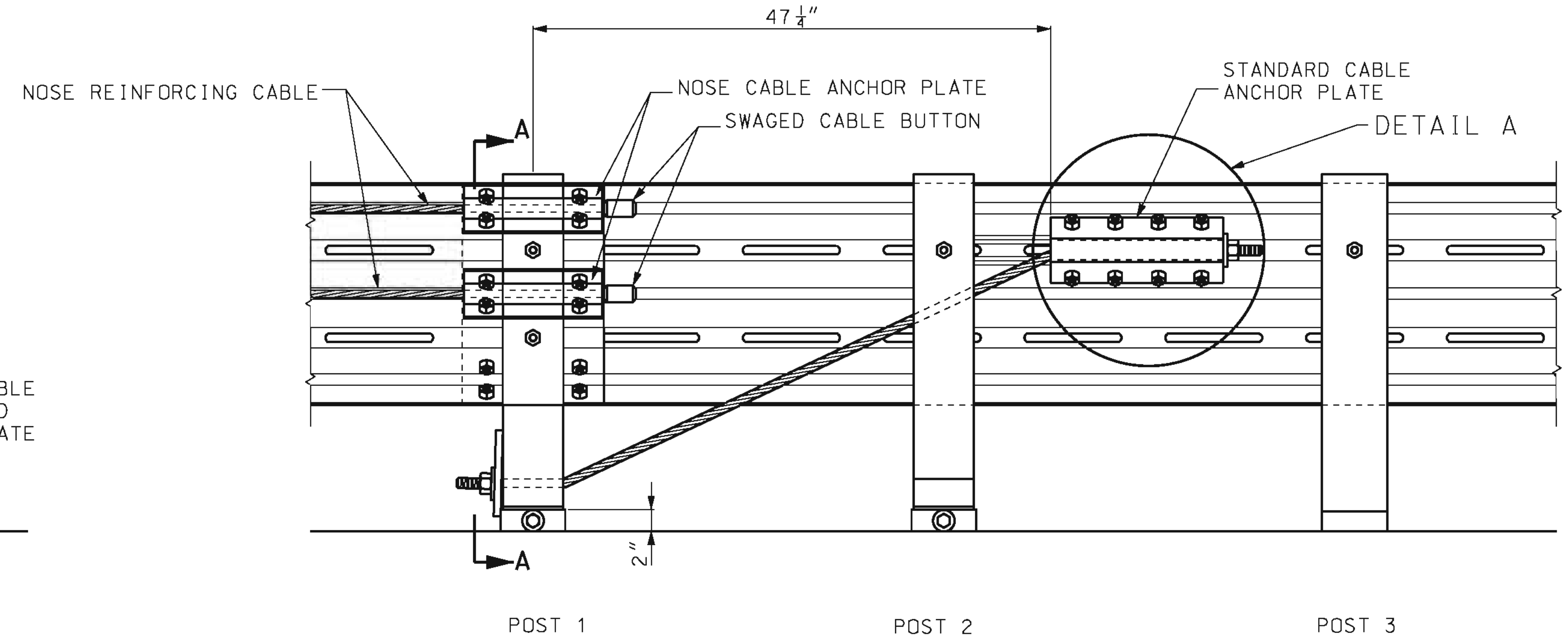
DETAIL B



SECTION A-A

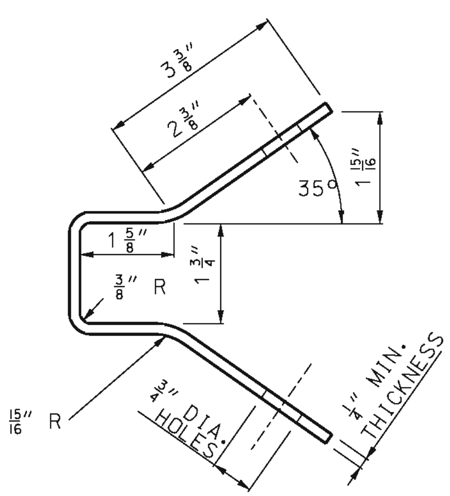


PLAN

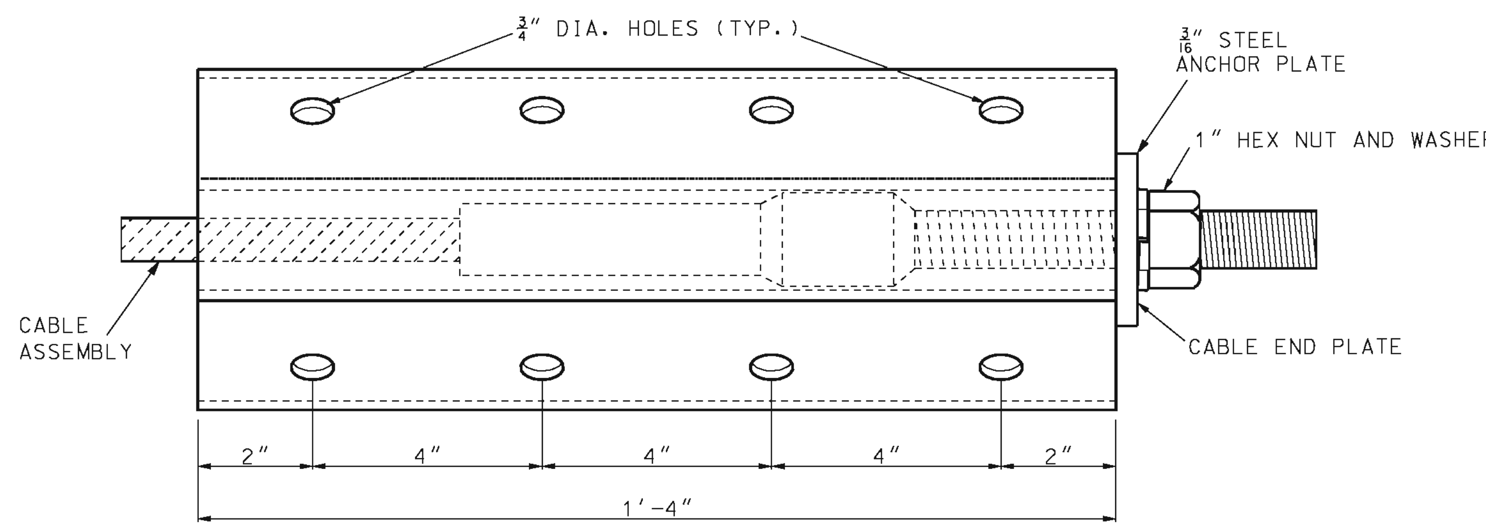


ELEVATION

CABLE ANCHOR ASSEMBLY



END VIEW



DETAIL A

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

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

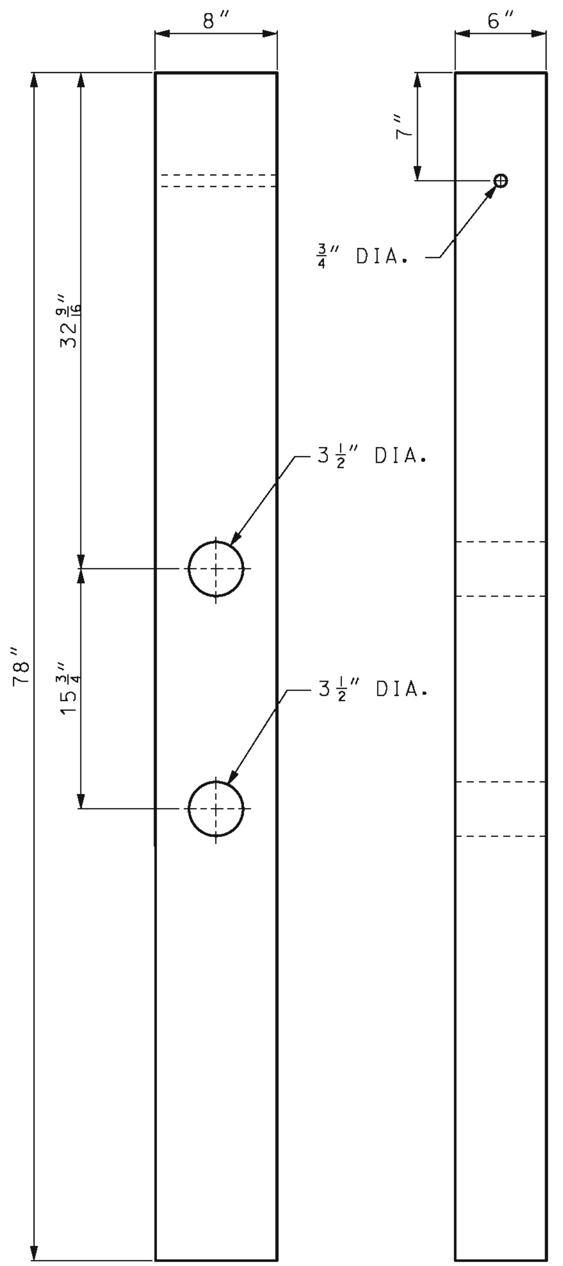
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

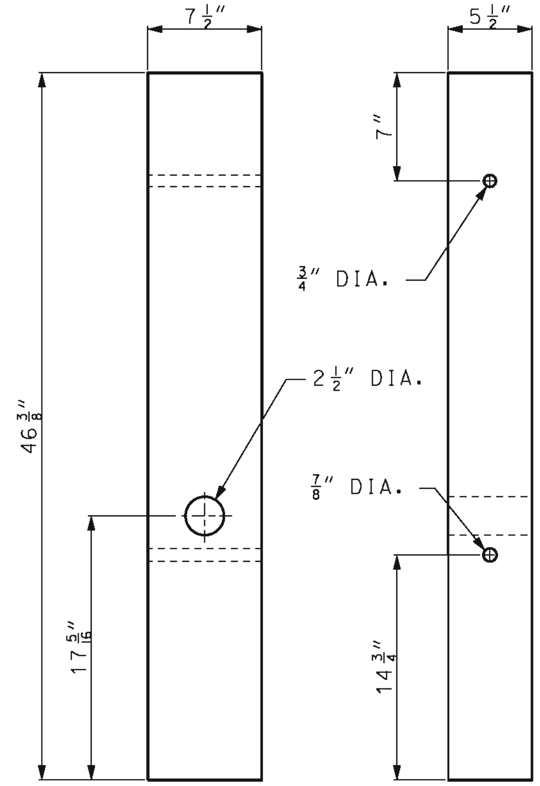
MEDIAN PIER PROTECTION

BULLNOSE GUARDRAIL SYSTEM
CABLE ANCHOR

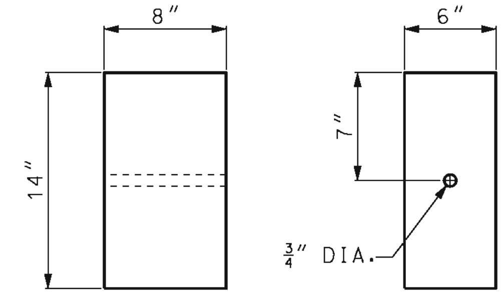
DATE EFFECTIVE:	08/01/2012	606.01F	SHEET NO.
DATE PREPARED:	7/27/2012		3 OF 9



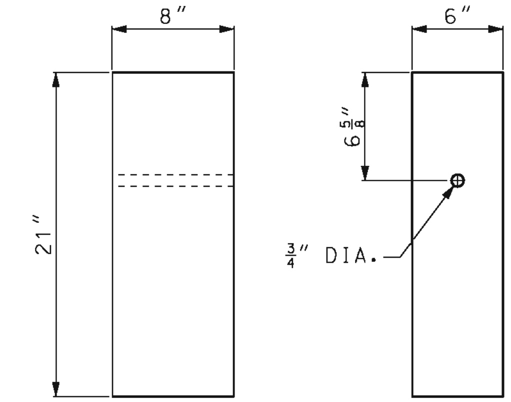
THRIE BEAM CRT POSTS



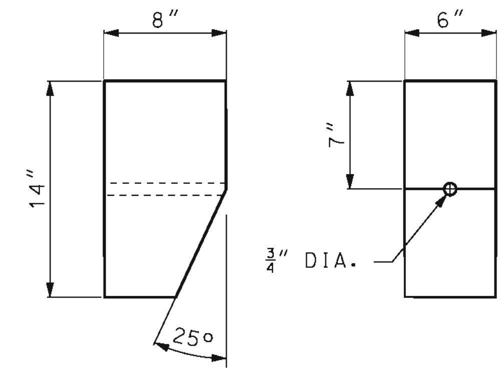
THRIE BEAM ANCHOR POSTS



POSTS 2 THROUGH 8
STANDARD BLOCKS



BLOCKS FOR POSTS 9 AND 10
STANDARD BLOCKS



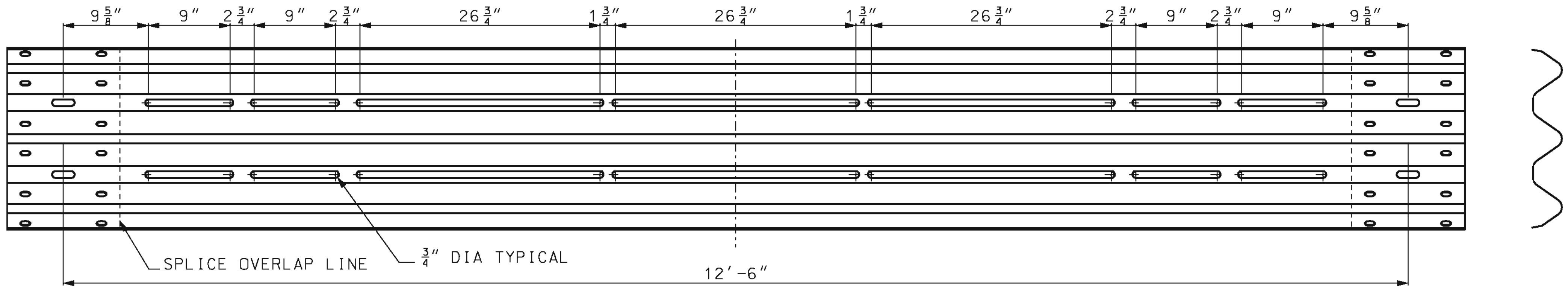
TAPERED BLOCK

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

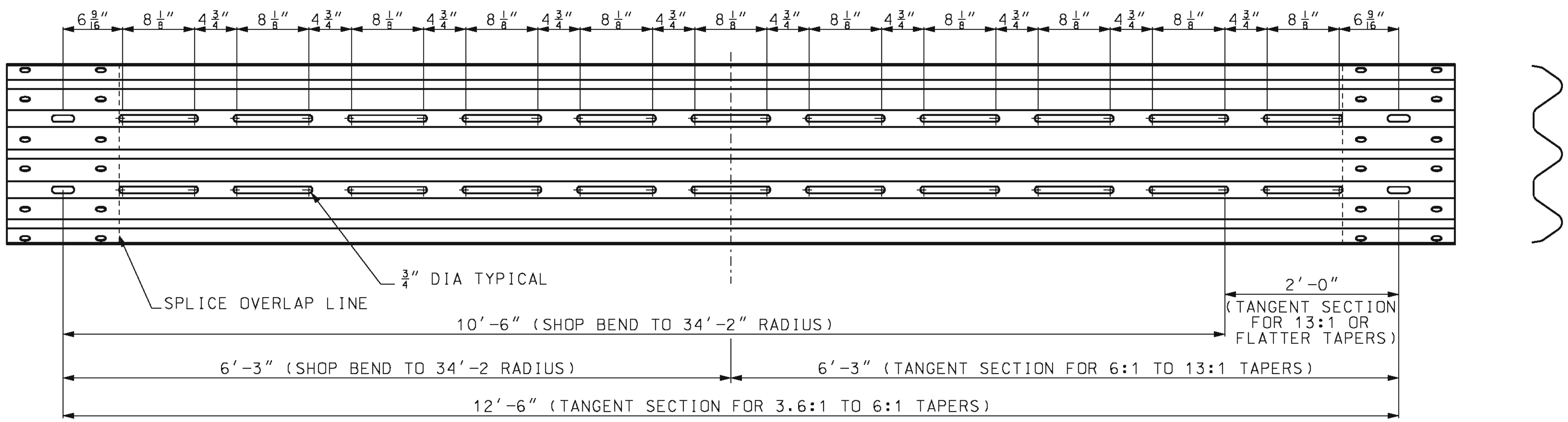
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MEDIAN PIER PROTECTION
BULLNOSE GUARDRAIL SYSTEM
POST AND BLOCKS

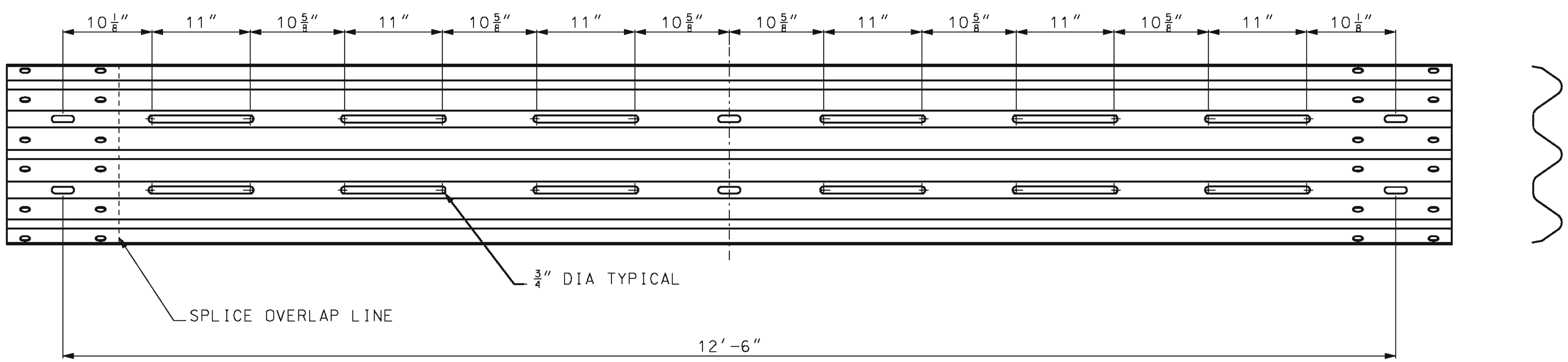
DATE EFFECTIVE:	08/01/2012	606.01F	SHEET NO.
DATE PREPARED:	7/27/2012		4 OF 9



RAIL SECTION 1 (NOSE SECTION)



RAIL SECTION 2



RAIL SECTION 3

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
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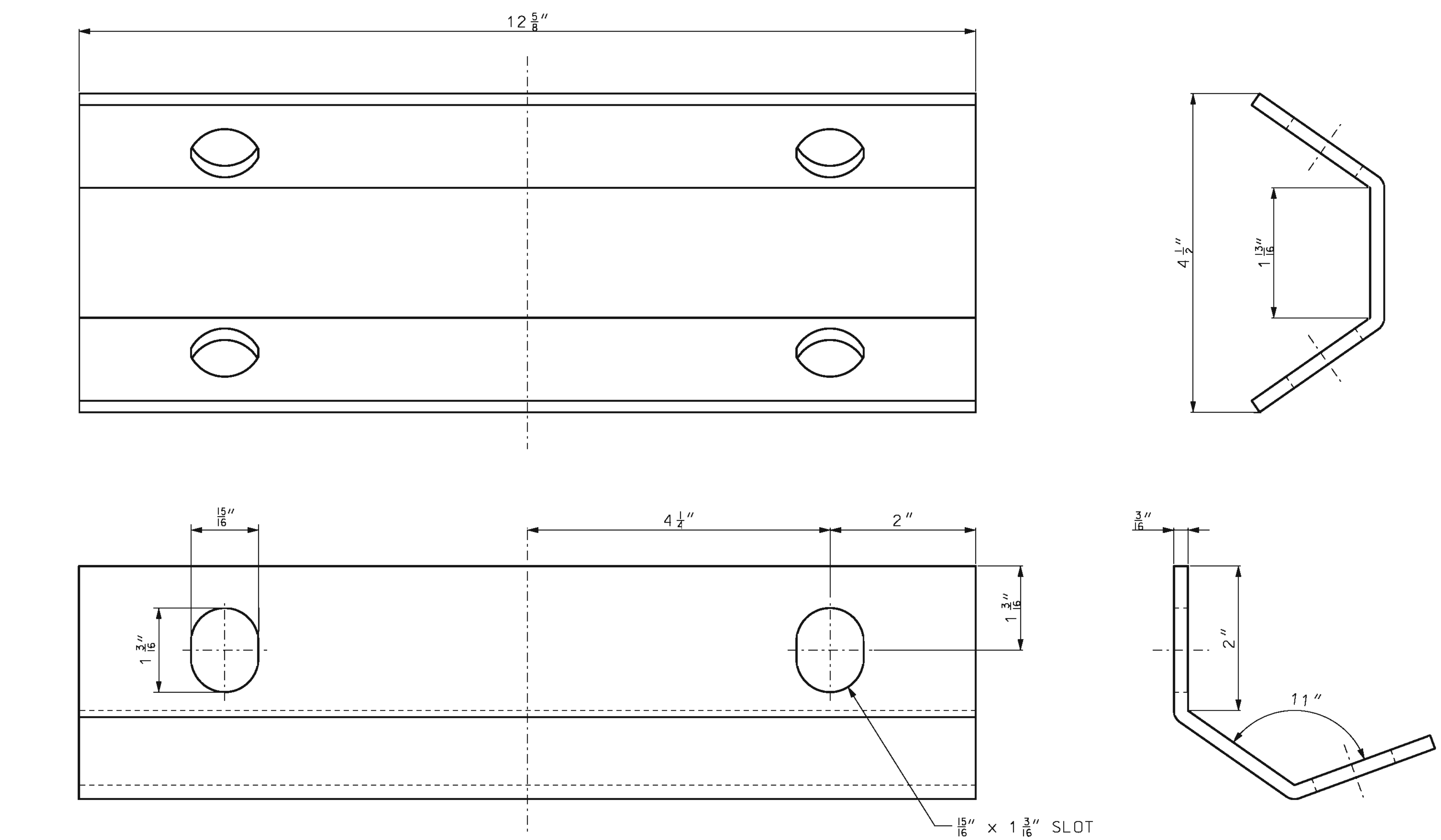
MEDIAN PIER PROTECTION
BULLNOSE GUARDRAIL SYSTEM
RAIL SECTION 1, 2 AND 3

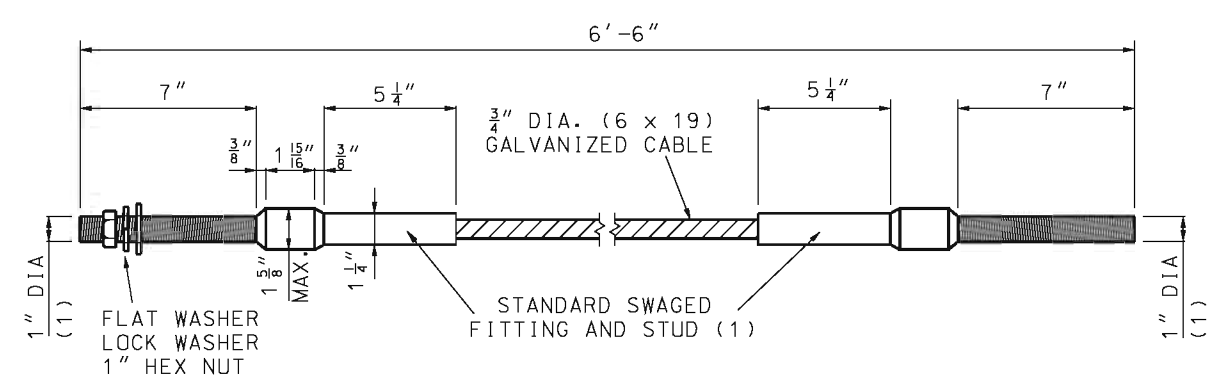
DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012	606.01F	SHEET NO. 5 OF 9

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

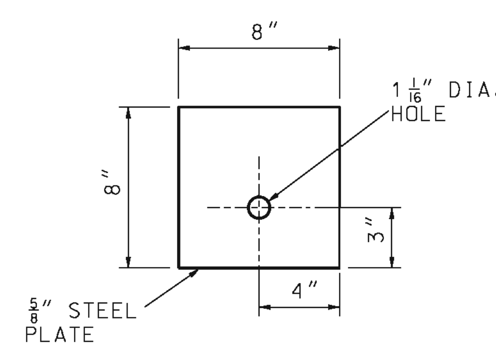


STEEL PLATE, A306
12 5/8" x 5 7/8" x 3/16"

(1) STUD, THREADED ENTIRE LENGTH.



DETAIL OF CABLE ASSEMBLY



DETAIL OF STEEL BEARING PLATE

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
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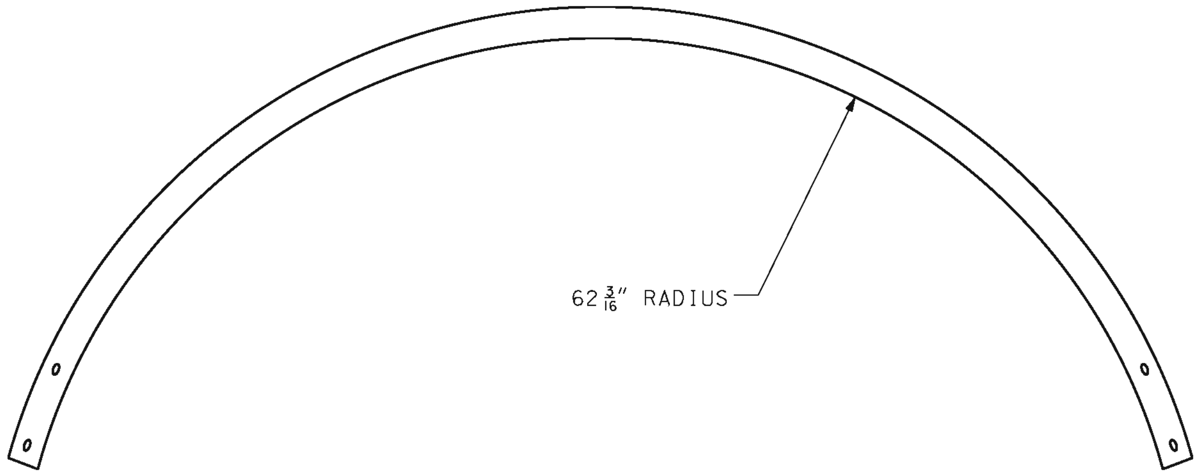
MEDIAN PIER PROTECTION
BULLNOSE GUARDRAILS SYSTEM
PLATES AND CABLE ASSEMBLY

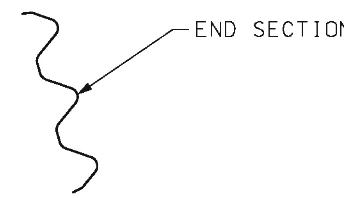
DATE EFFECTIVE: 08/01/2012
DATE PREPARED: 7/27/2012

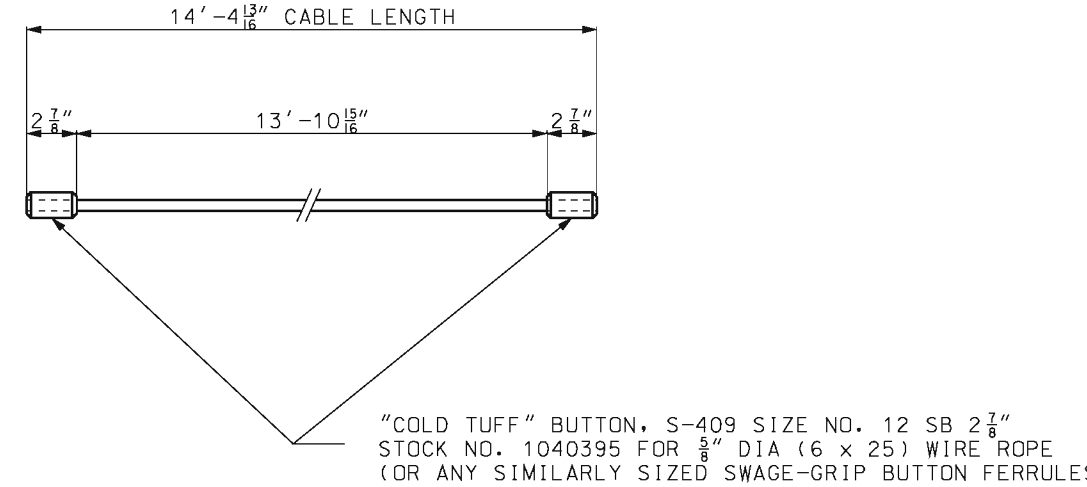
606.01F

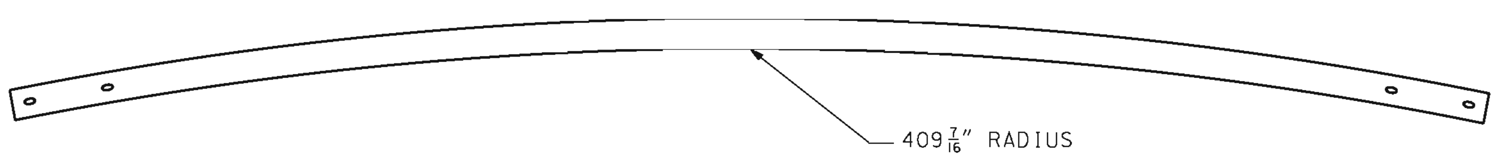
SHEET NO.
6 OF 9

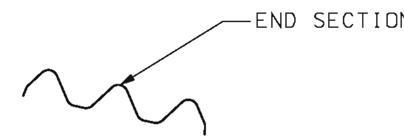


TOP VIEW, RAIL #1

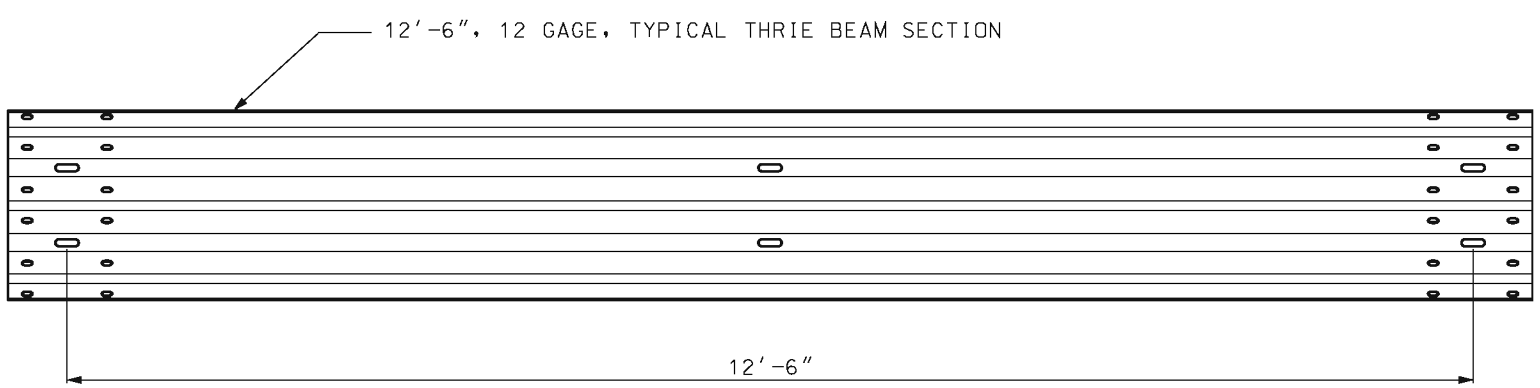


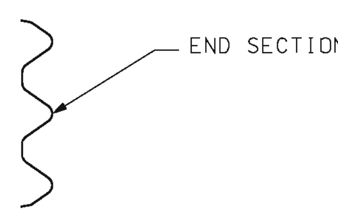






TOP VIEW, RAIL #2





FRONT VIEW (UNBENT)

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

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

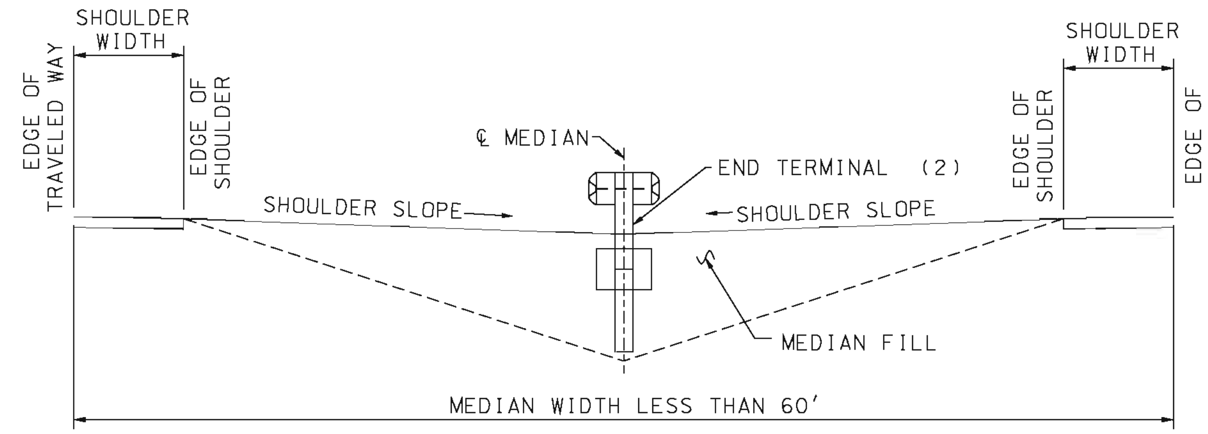
MEDIAN PIER PROTECTION

BULLNOSE GUARDRAIL SYSTEM
THRIE BEAM AND
CABLE LENGTH

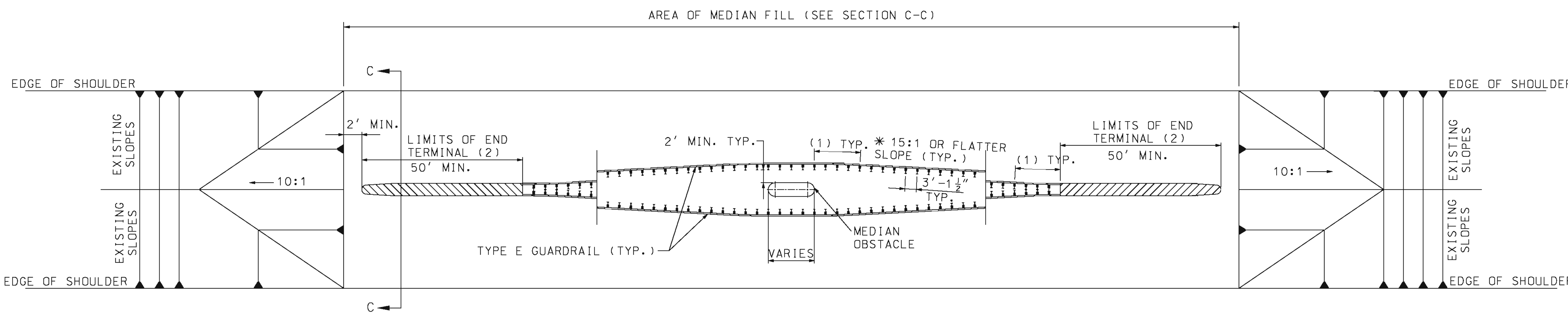
DATE EFFECTIVE: 08/01/2012
DATE PREPARED: 7/27/2012

606.01F

SHEET NO. 7 OF 9



SECTION C-C



(1) TYPE E GUARDRAIL 12'-6" IN LENGTH AND FACTORY FORMED TO THE REQUIRED RADIUS.

(2) PAYMENT FOR THE END TERMINAL WILL BE CONSIDERED FULL COMPENSATION FOR ANY TRANSITION SECTIONS, BACKUP ASSEMBLIES, OR OTHER ITEMS NECESSARY FOR PROPER INSTALLATION AS REQUIRED BY THE MANUFACTURER.

∗ VARY SLOPE NO STEEPER THAN 15:1 TO UTILIZE A FULL 12.5' LENGTH OF GUARDRAIL WHEN ATTACHING TO THE CRASHWORTHY END TERMINAL.

GENERAL NOTES:

TYPE B CRASHWORTHY END TERMINAL SHALL BE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMENDATIONS.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TYPE E MEDIAN PIER PROTECTION

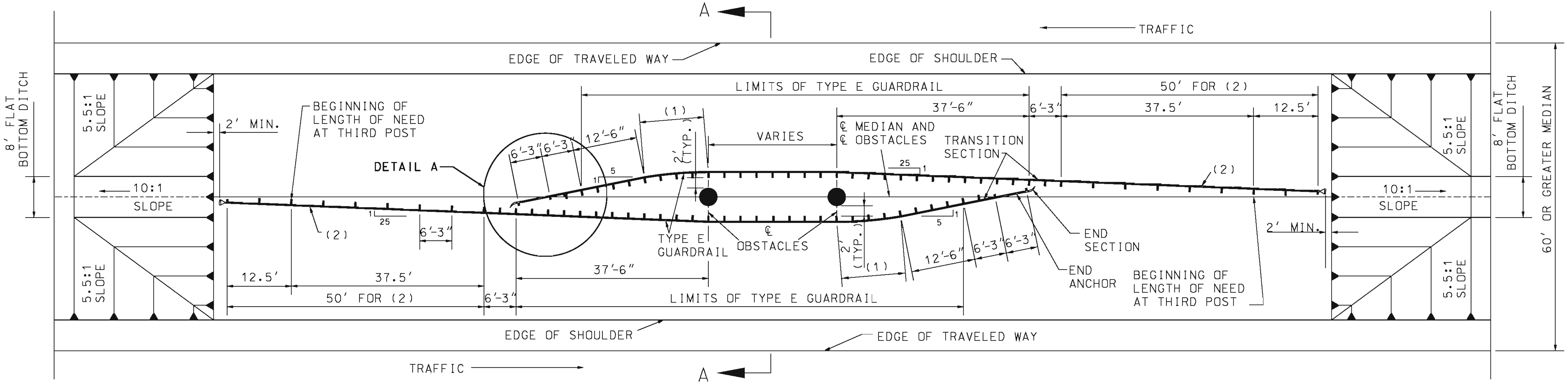
MEDIAN LESS THAN 60'

DATE EFFECTIVE: 08/01/2012
DATE PREPARED: 7/27/2012

606.01F

SHEET NO. 8 OF 9

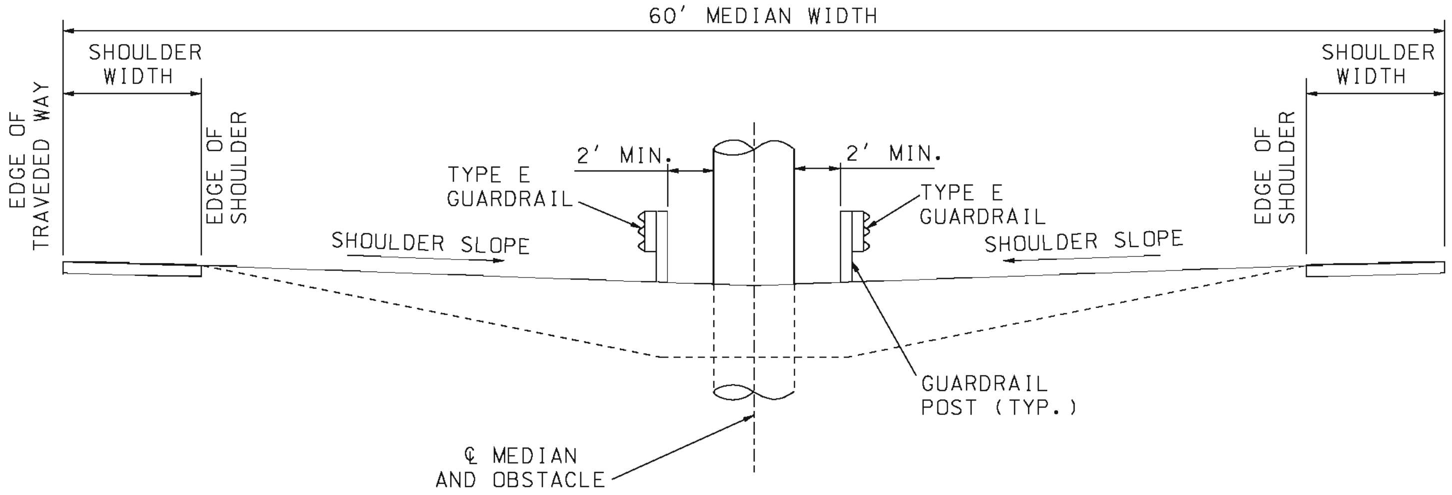
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



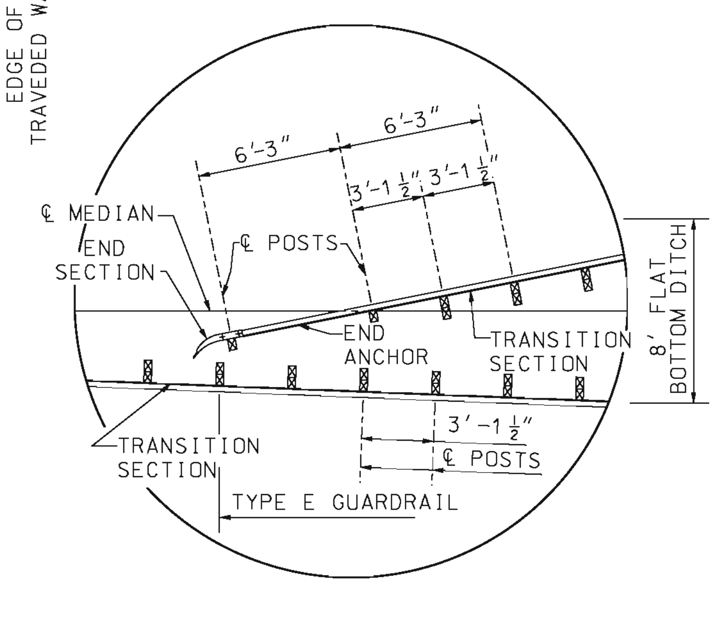
PIER AT ℄ OF MEDIAN

(1) TYPE E GUARDRAIL IN THIS REGION SHALL BE 12'6" IN LENGTH AND FACTORY FORMED TO A 75' RADIUS.

(2) TYPE A NON-FLARED CRASHWORTHY END TREATMENT.



SECTION A-A



DETAIL A

GENERAL NOTES:

WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E GUARDRAIL. END ANCHOR SECTION TO BE USED ON TERMINAL END OF TYPE E GUARDRAIL.

END ANCHOR TO BE LOCATED EYOND THE LONGITUDINAL LIMITS OF TYPE A NON-FLARED CRASHWORTHY END TERMINAL.

TYPE A NON-FLARED CRASHWORTHY END TERMINAL SHALL BE THE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TYPE E MEDIAN PIER PROTECTION

60' MEDIAN OR GREATER

DATE EFFECTIVE: 08/01/2012
DATE PREPARED: 7/27/2012

606.01F

SHEET NO. 9 OF 9

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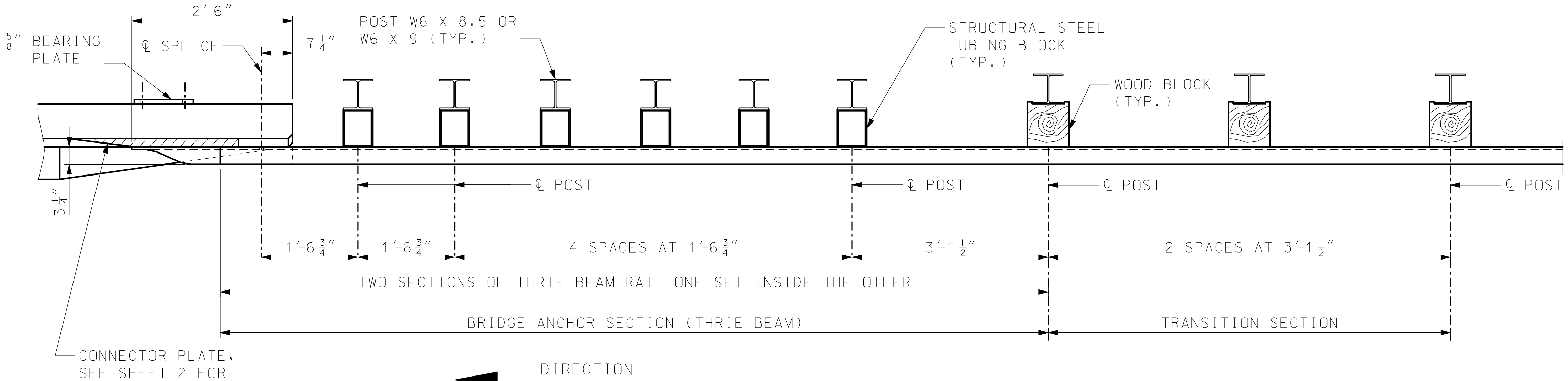
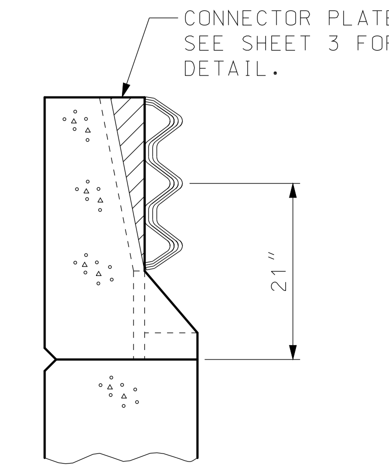
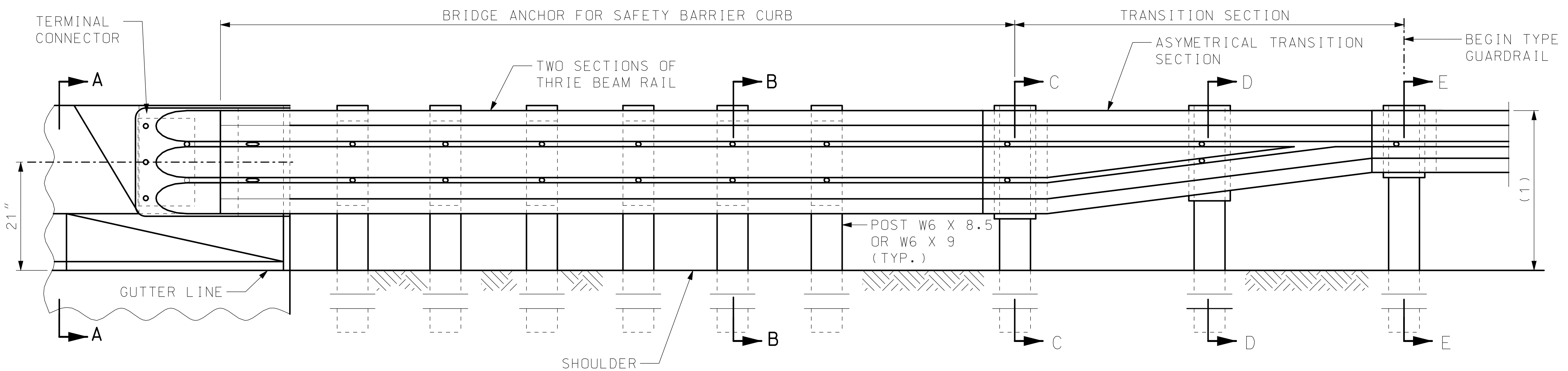


PLAN

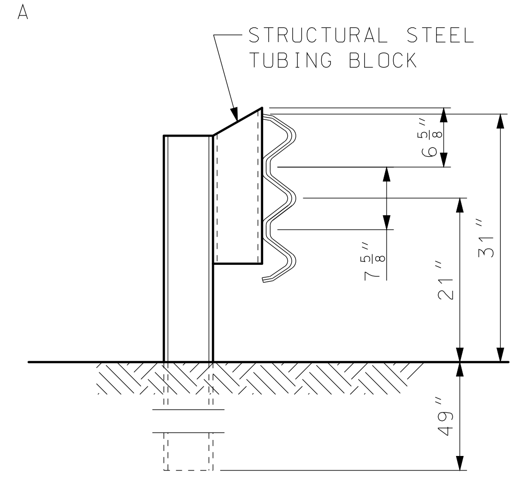


SECTION A-A

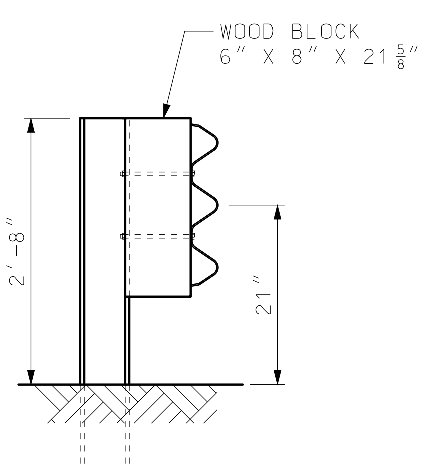


PART SECTION THRU SLAB AT END OF WING

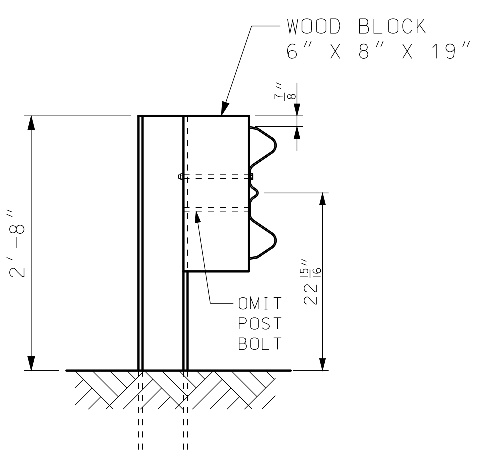
(1) TRANSITION FROM 31" TO 29" HEIGHT OVER NEXT TWO UPSTREAM 12'-6" W-BEAM RAILS.



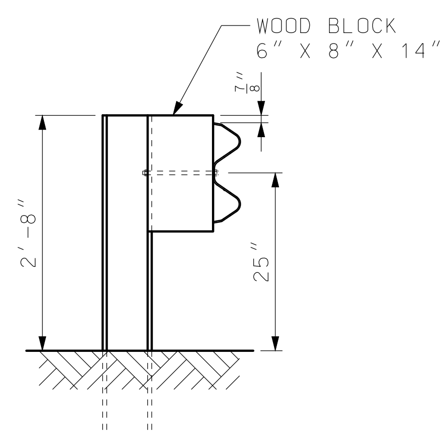
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

NOTES:

FOR GENERAL NOTES, SEE SHEET 3 OF 6

FOR DETAILS OF BLOCK ON STEEL POSTS, SEE SHEET 2 OF 6.

MoDOT

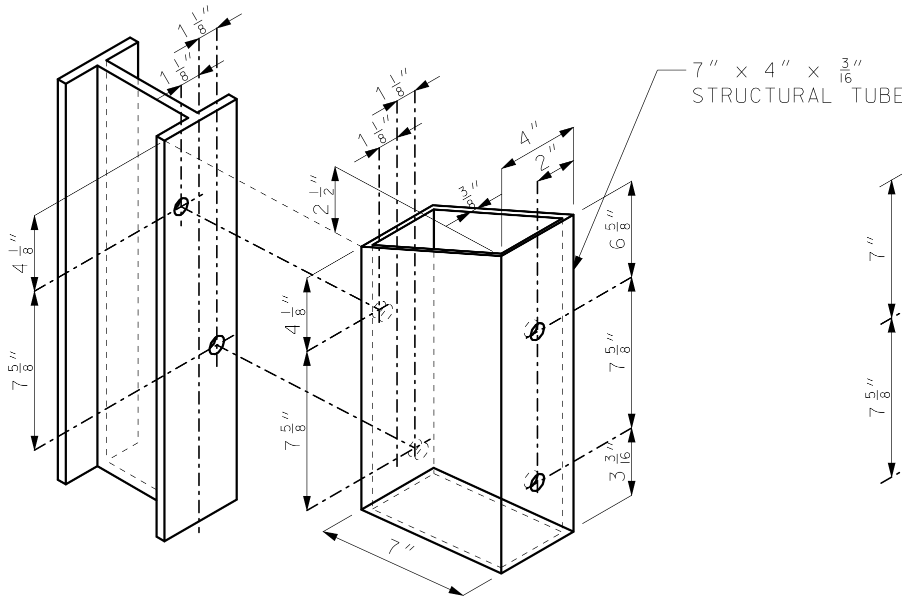
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

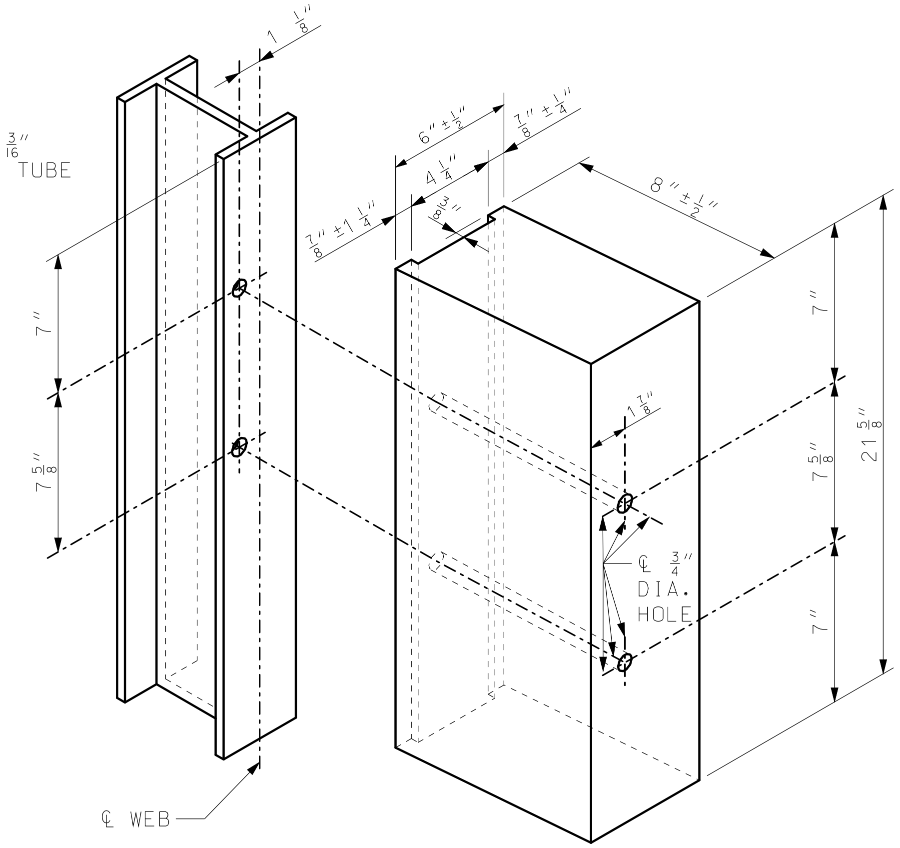
BRIDGE ANCHOR SECTION

SAFETY BARRIER CURB ON BRIDGE

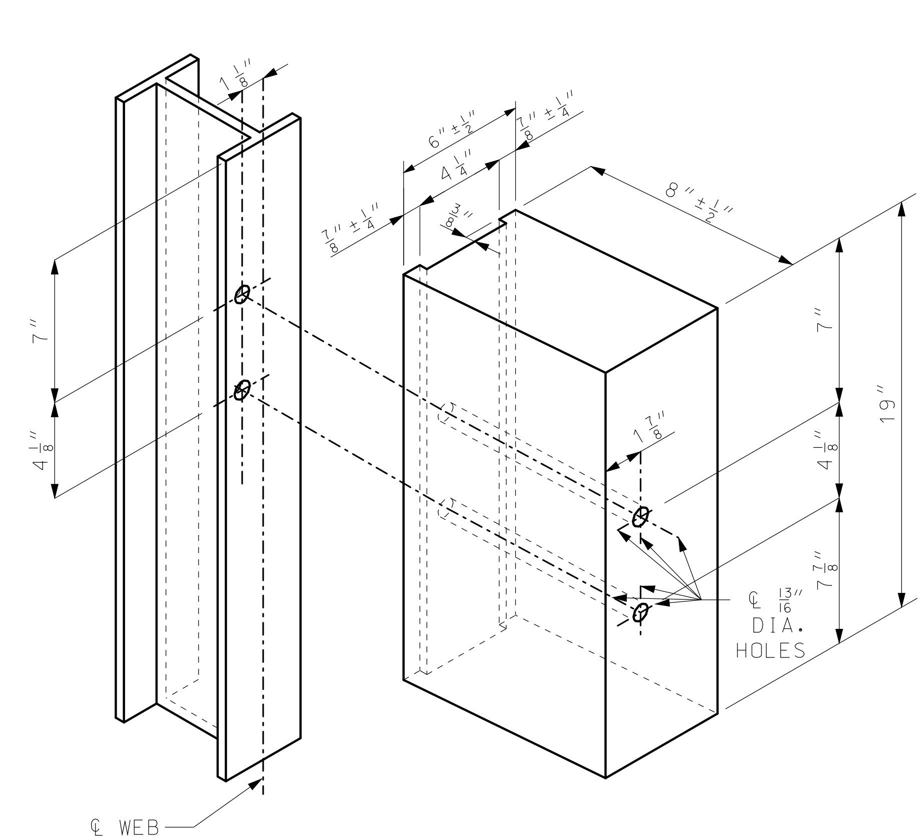
DATE EFFECTIVE:	07/01/2016	606.22U	SHEET NO.
DATE PREPARED:	5/13/2016		1 OF 6



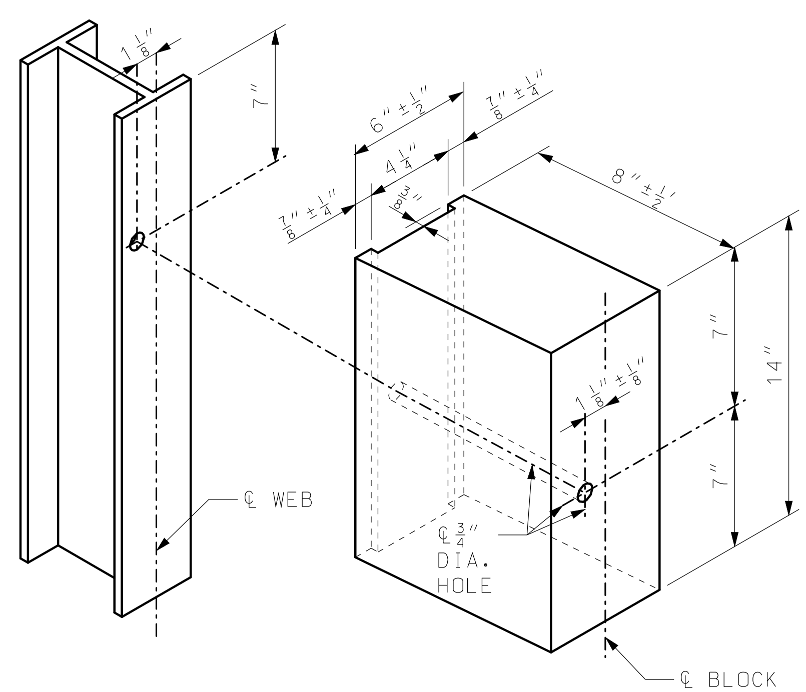
STRUCTURAL STEEL TUBING BLOCK DETAIL



21 5/8″ WOOD BLOCK DETAIL



19″ WOOD BLOCK DETAIL



14″ WOOD BLOCK DETAIL

ALL HOLES DRILLED OR PUNCHED 13/16″ DIA.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

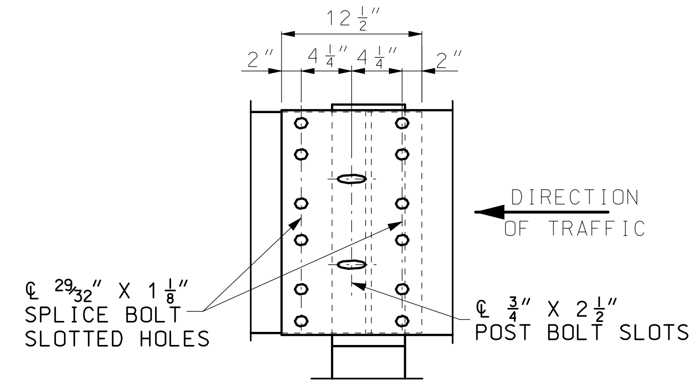
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

BRIDGE ANCHOR SECTION

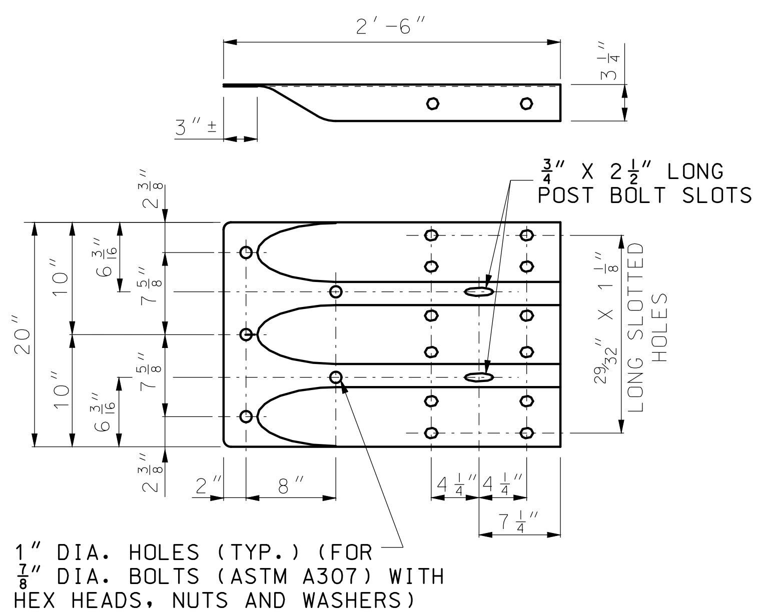
SAFETY BARRIER CURB ON BRIDGE

DATE EFFECTIVE:	07/01/2016	606.22U	SHEET NO. 2 OF 6
DATE PREPARED:	5/13/2016		

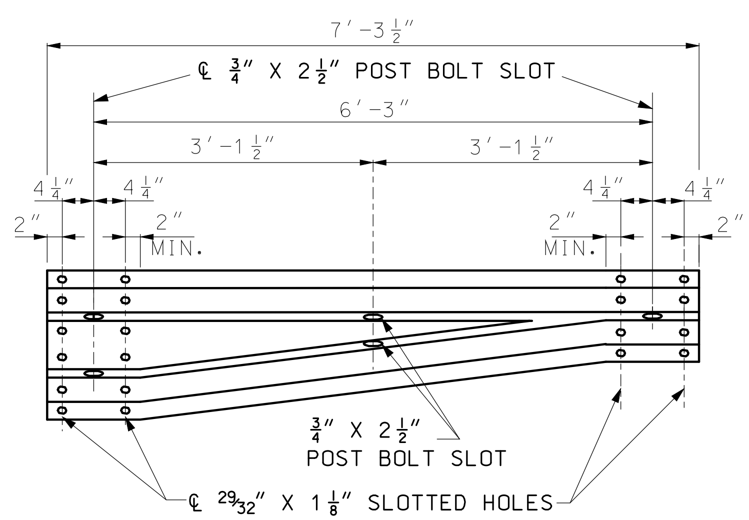


THRIE BEAM RAIL SPLICE AT POST

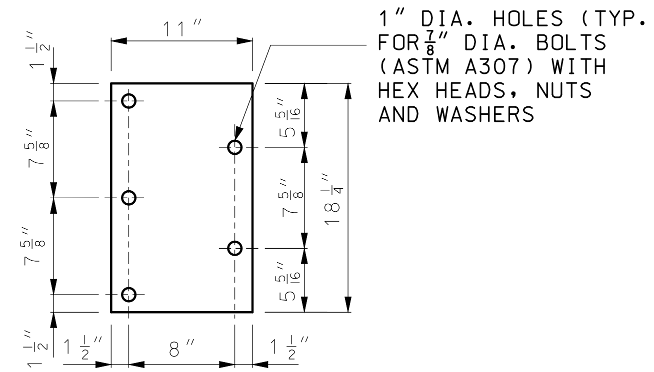
(1) THE CONTRACTOR MAY, AT HIS OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.



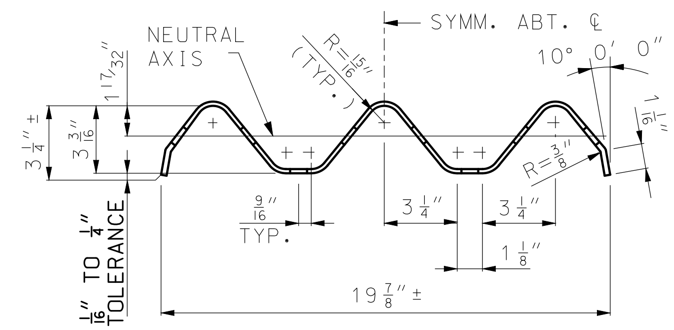
TERMINAL CONNECTOR



ASYMMETRICAL TRANSITION SECTION



⅝" BEARING PLATE



SECTION THROUGH THRIE BEAM RAIL

GENERAL NOTES:

DESIGN BASED ON NCHRP REPORT 350 TEST LEVEL 3.

THE THRIE BEAM RAIL, TERMINAL CONNECTOR AND THE TRANSITION SECTION FOR THE BRIDGE ANCHOR SECTION SHALL BE MADE OF STEEL AND SHLL BE 12 GAGE.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

STRUCTURAL TUBING BLOCK SHALL BE FABRICATED FROM ASTM A500 BRADE B STEEL AND GALVANIZED.

USE ⅝" BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = ⅜" MIN.).

THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.

ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

SEE STANDARD PLAN 606.00 FOR DETAILS NOT SHOWN.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (SAFETY BARRIER CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

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

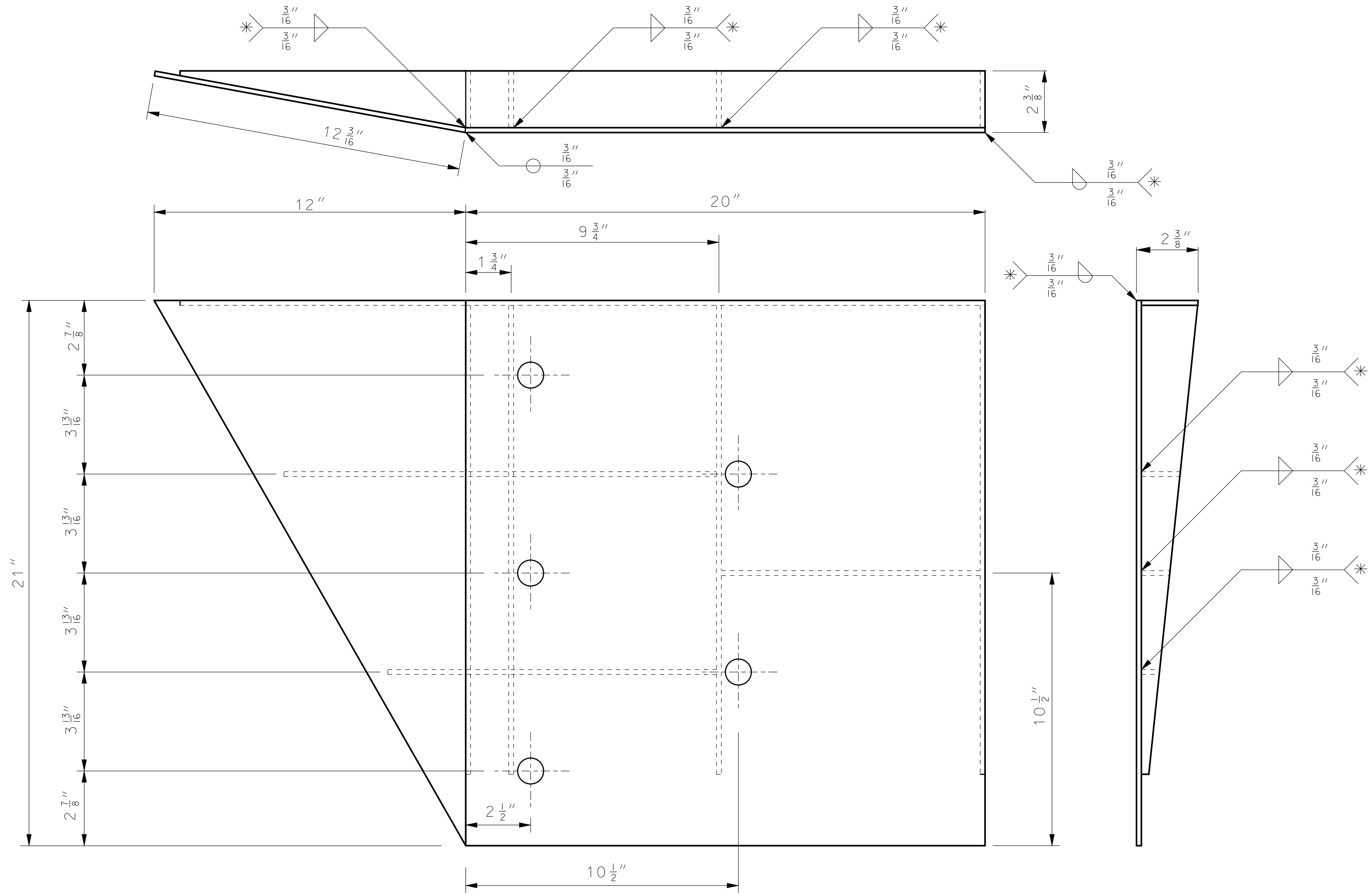
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

BRIDGE ANCHOR SECTION

SAFETY BARRIER CURB ON BRIDGE

DATE EFFECTIVE:	07/01/2016	606.22U	SHEET NO. 3 OF 6
DATE PREPARED:	5/13/2016		

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



WELDING INSTRUCTION

✳ ALL FILLET WELDS SHALL BE 1″ LONG SPACED AT 2″.

GENERAL NOTES:

COVER PLATE PANELS ARE 4. 3/16″ THICK.

ALL STIFFENERS ARE 1/4″ THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1″.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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BRIDGE ANCHOR SECTION
SAFETY BARRIER CURB ON BRIDGE
(CONNECTOR PLATE DETAIL)

DATE EFFECTIVE:	07/01/2016	606.22U	SHEET NO. 4 OF 6
DATE PREPARED:	5/13/2016		

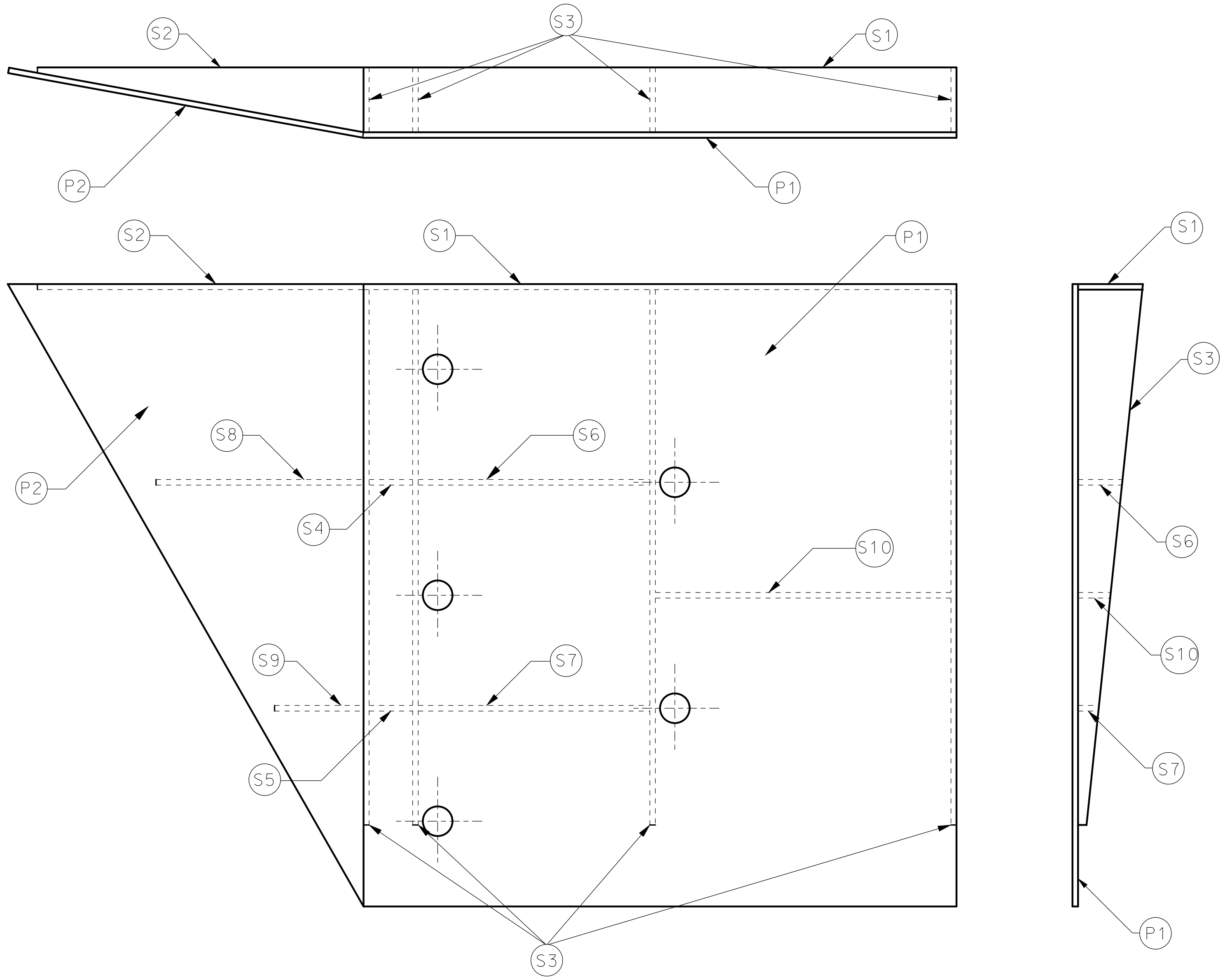
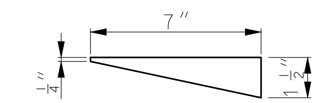
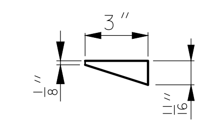


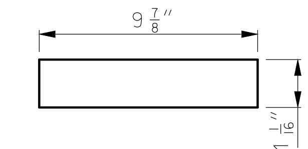
PLATE AND STIFFENER IDENTIFICATION



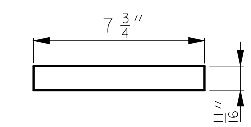
S8 STIFFENER #8: 1 EACH



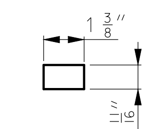
S9 STIFFENER #9: 1 EACH



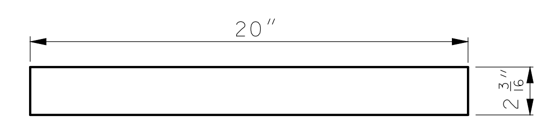
S10 STIFFENER #10: 1 EACH



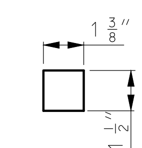
S7 STIFFENER #7: 1 EACH



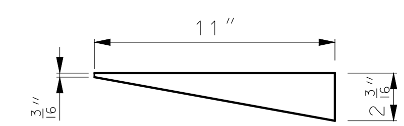
S5 STIFFENER #5: 1 EACH



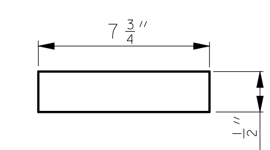
S1 STIFFENER #1: 1 EACH



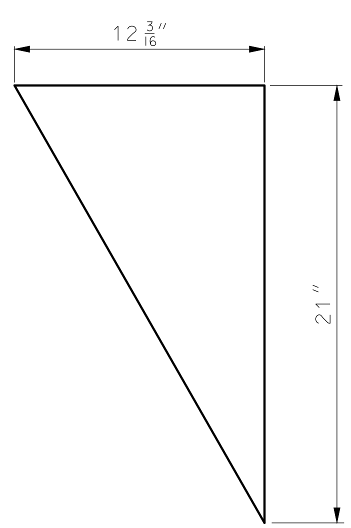
S4 STIFFENER #4: 1 EACH



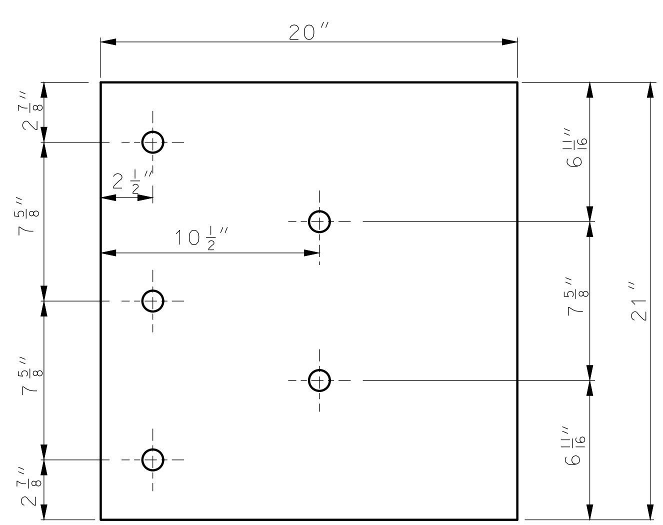
S2 STIFFENER #2: 1 EACH



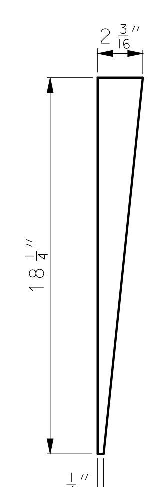
S6 STIFFENER #6: 1 EACH



P2 COVER PLATE #2



P1 COVER PLATE #1



S3 STIFFENER #3: 4 EACH

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NUMBER PE-28411
PROFESSIONAL ENGINEER

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BRIDGE ANCHOR SECTION

SAFETY BARRIER CURB ON BRIDGE (CONNECTOR PLATE DETAIL)

DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016	606.22U	SHEET NO.	5 OF 6

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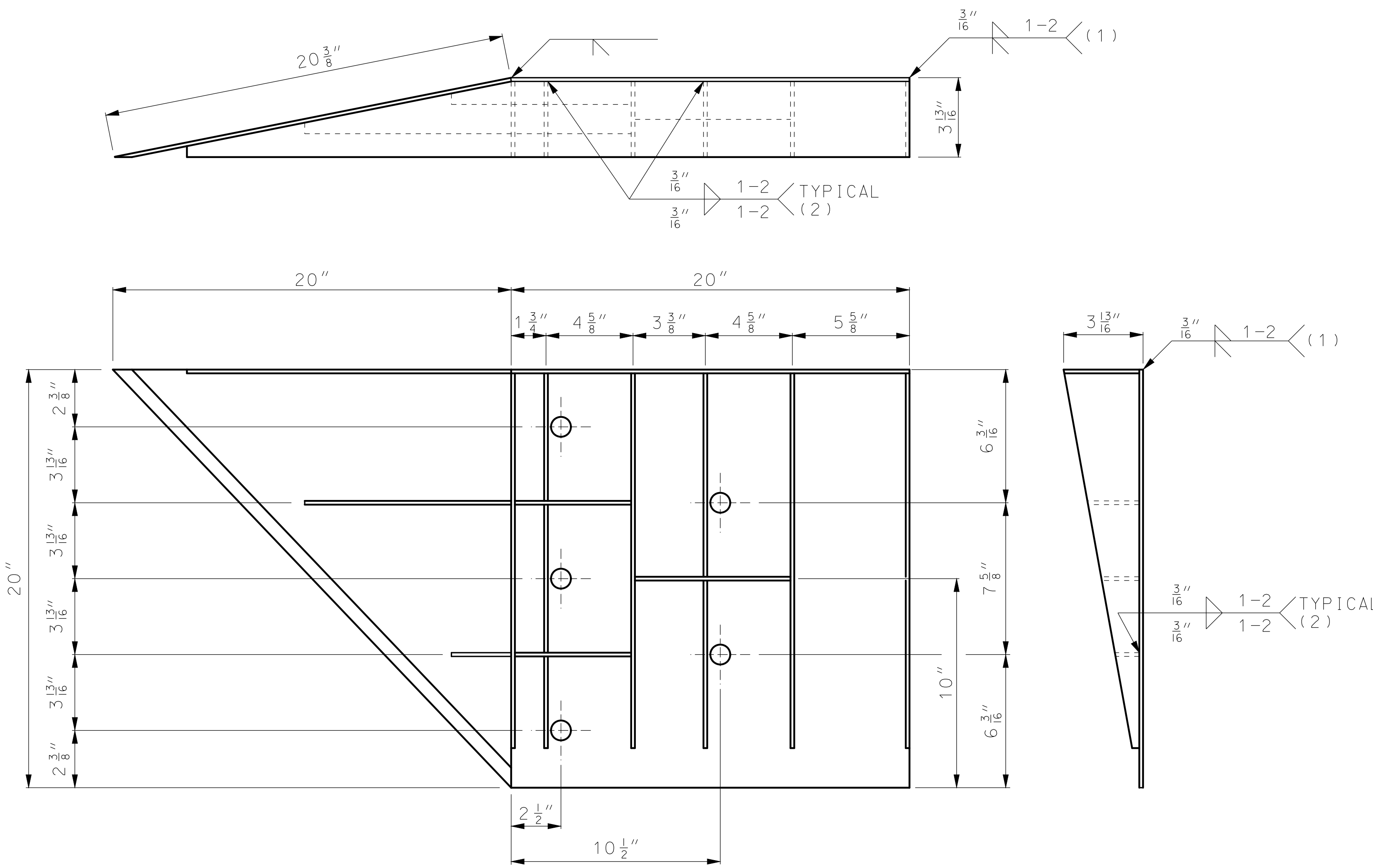

WELDING INSTRUCTION

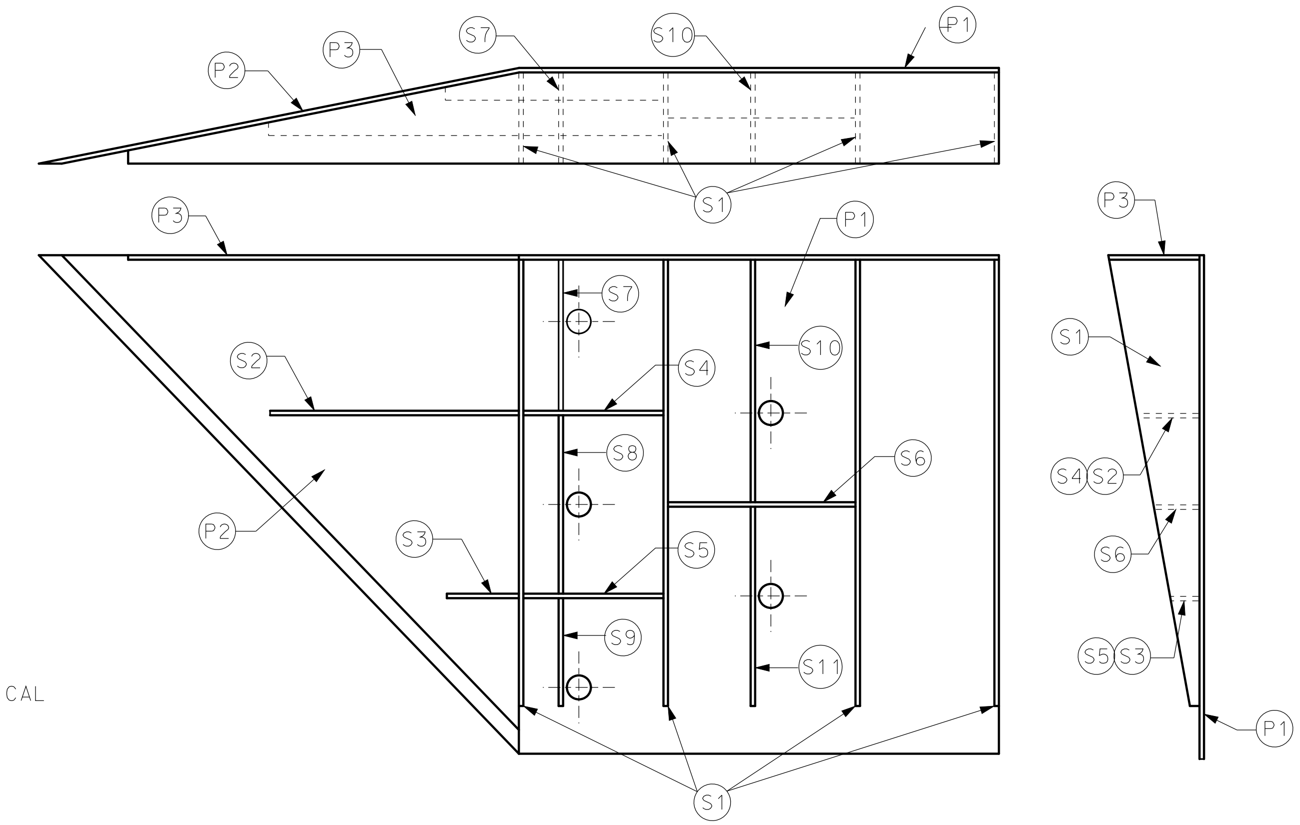

PLATE AND STIFFENER IDENTIFICATION

(1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.

(2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:
3/16" FILLET WELD BY 1" LONG SPACED AT 2".

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)

PLATE	QUANTITY	SHAPE	SIZE (A x B x C x D)	THICKNESS
P1	1		20" x 20"	3/16"
P2	1		20" x 20" x 28 9/16"	3/16"
P3	1		39" x 3 5/8" x 20" x 19 5/16"	3/16"
S1	4		18 7/16" x 3 5/8" x 18 3/4"	1/4"
S2	1		10 1/4" x 2 7/16" x 10 3/8" x 1/2"	1/4"
S3	1		3" x 1 1/16" x 3 1/8" x 1/2"	1/4"
S4	1		6 1/8" x 2 7/16"	1/4"
S5	1		6 1/8" x 1 1/16"	1/4"
S6	1		7 3/4" x 1 3/4"	1/4"
S7	1		2 9/16" x 6" x 3 5/8" x 5 7/8"	1/4"
S8	1		1 5/32" x 7 1/2" x 2 1/2" x 7 3/8"	1/4"
S9	1		6 1/16" x 6 3/16" x 1 3/32"	1/4"
S10	1		1 7/8" x 9 7/8" x 3 5/8" x 9 11/16"	1/4"
S11	1		8 1/2" x 8 3/4" x 1 13/16"	1/4"

GENERAL NOTES:

COVER PLATE PANELS ARE 3/16" THICK.

ALL STIFFENERS ARE 1/4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

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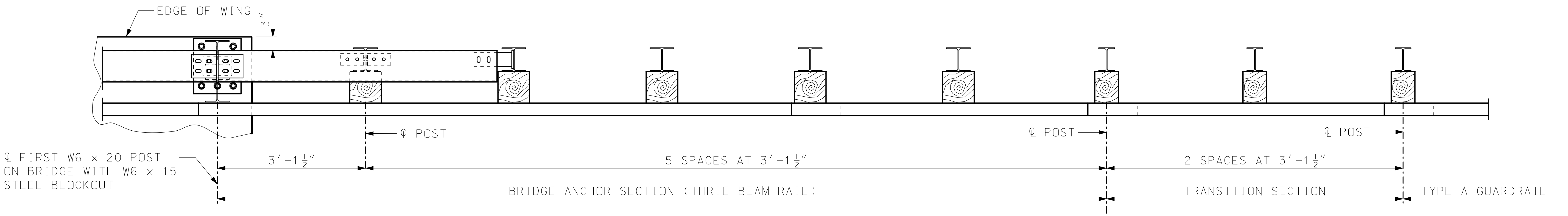
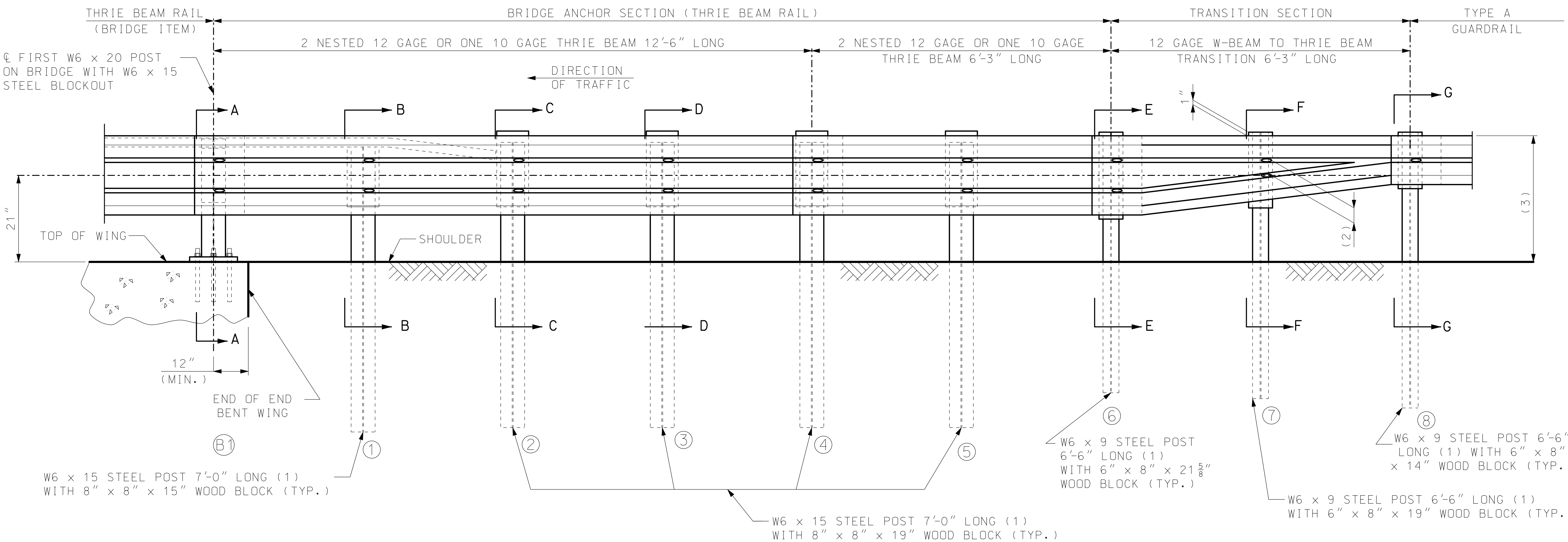
BRIDGE ANCHOR SECTION
SAFETY BARRIER CURB ON BRIDGE (CONNECTOR PLATE DETAIL) SINGLE SLOPE BARRIERS

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

606.22U



PLAN



PART SECTION THROUGH SLAB AT END OF WING

NOTES:

FOR GENERAL NOTES, SEE SHEET 2 OF 5.

FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

(1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.

(2) VERIFY BY RAIL TRANSITION PRODUCER.

(3) TRANSITION FROM 31″ TO 29″ HEIGHT OVER NEXT TWO UPSTREAM 12′-6″ W-BEAM RAILS.

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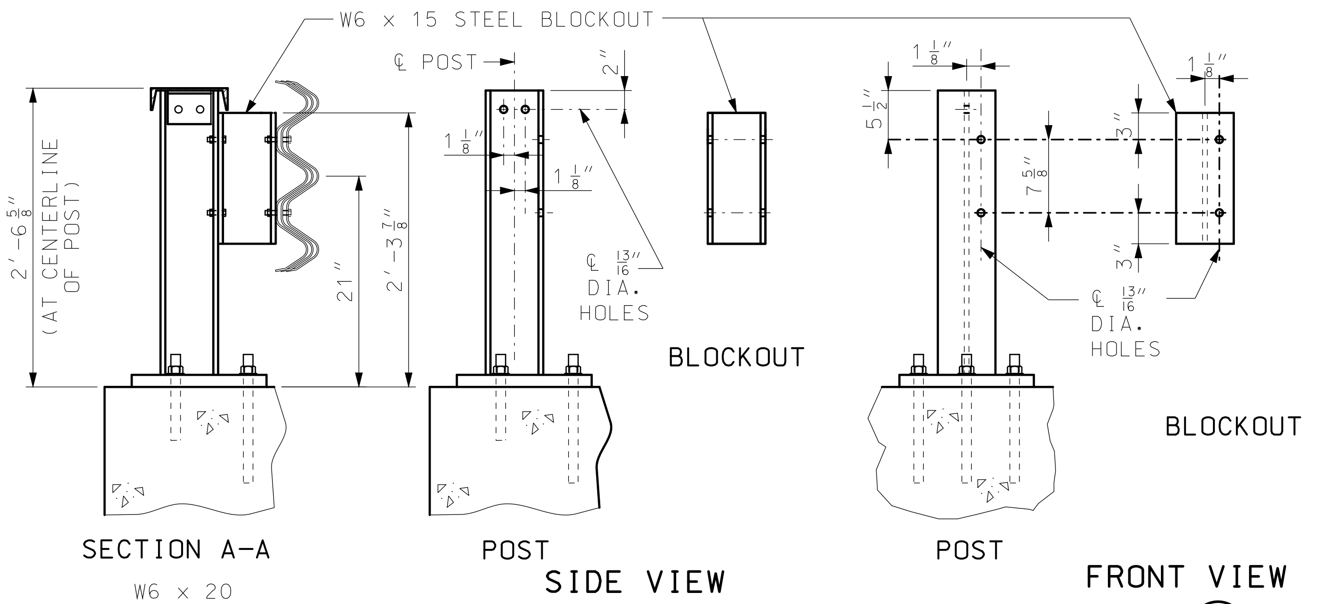
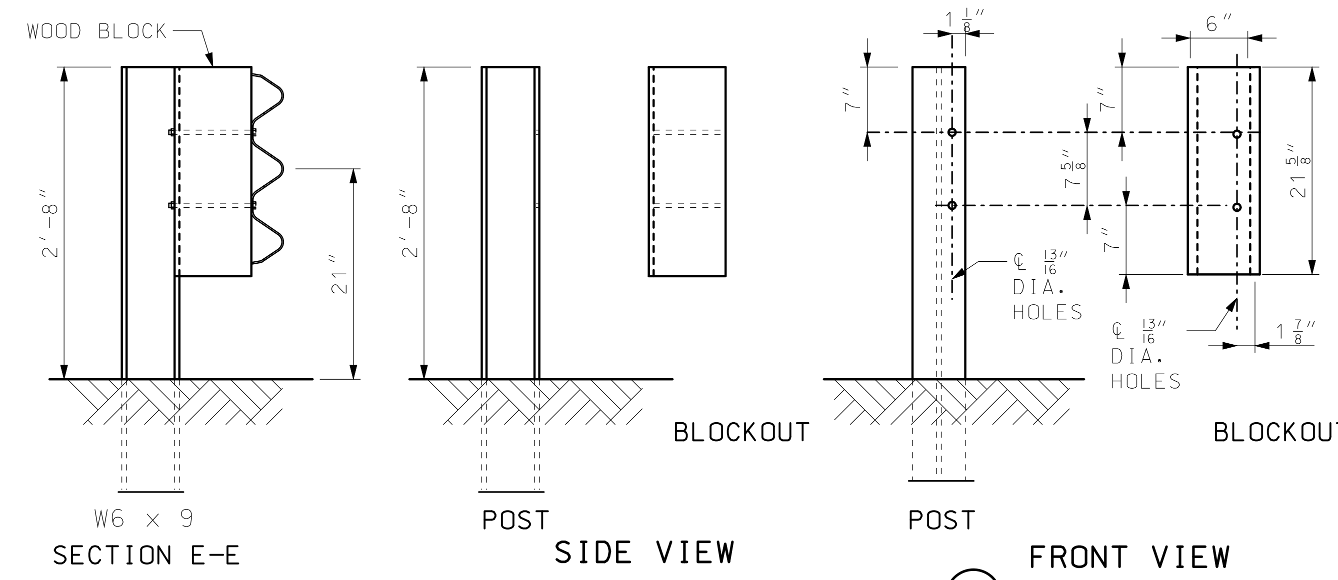
BRIDGE ANCHOR SECTION
(THRIE BEAM RAIL ON BRIDGE)

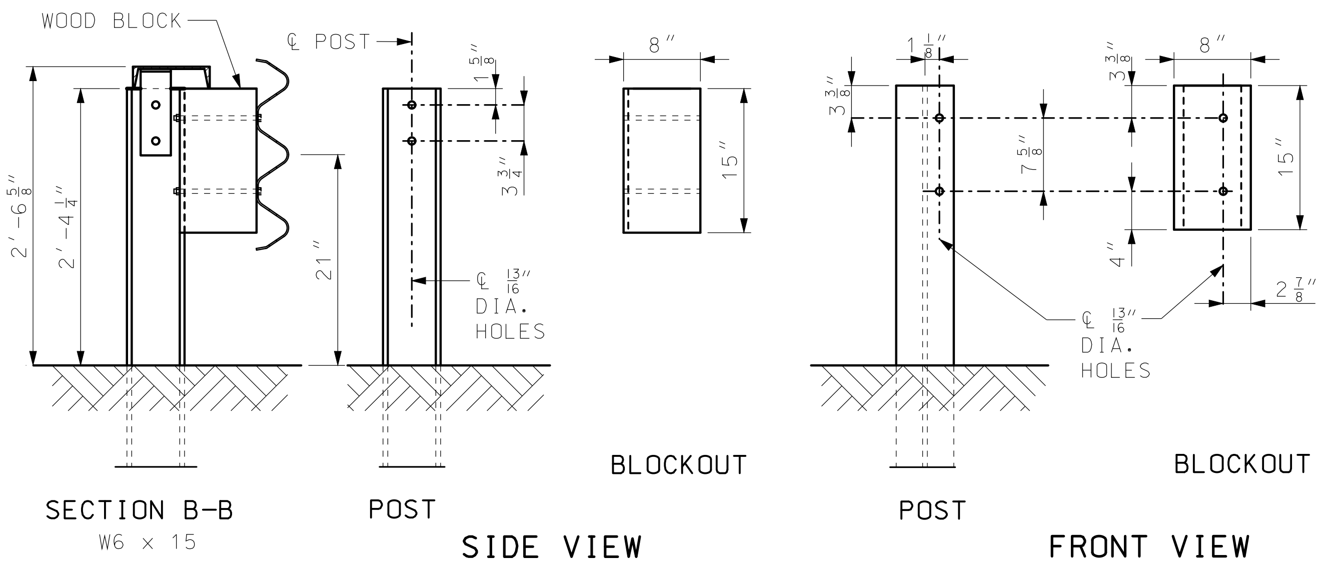
DATE EFFECTIVE:	7/01/016	606.23J	SHEET NO.
DATE PREPARED:	5/13/2016		1 OF 5



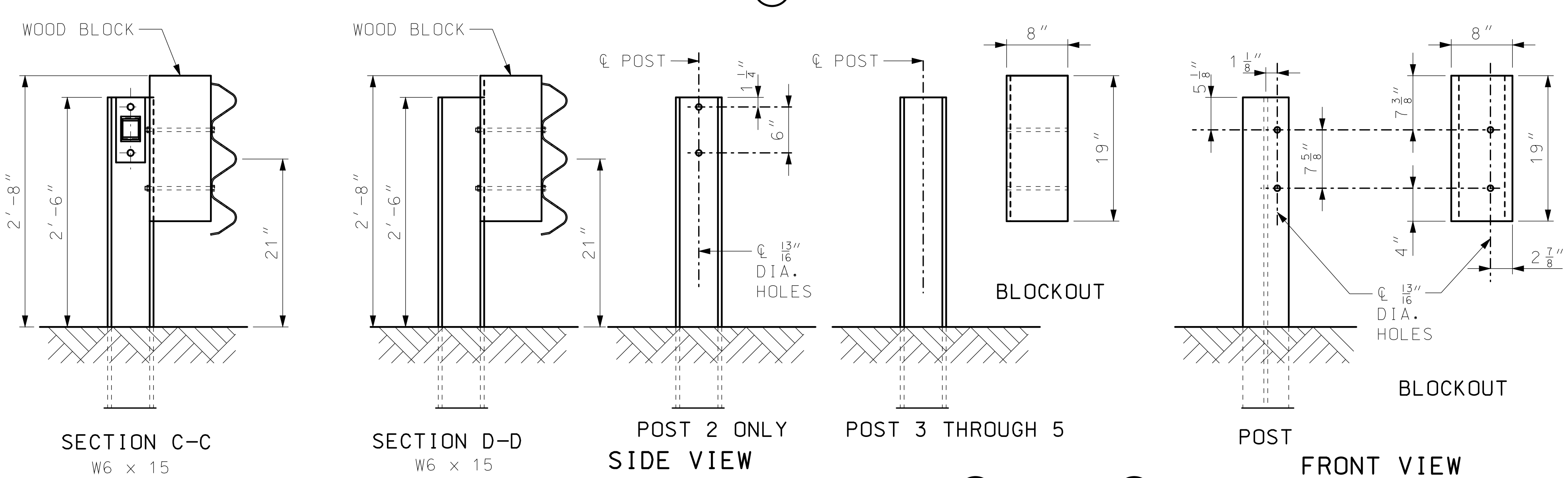
STEEL POST AND STEEL BLOCKOUT (B1)



STEEL POST AND WOOD BLOCKOUT (6)



STEEL POST AND WOOD BLOCKOUT (1)



STEEL POST AND WOOD BLOCKOUT (2) THROUGH (5)

(2) VERIFY BY RAIL TRANSITION PRODUCER.

GENERAL NOTES:

DESIGN BASED UPON NCHRP REPORT 350 TEST LEVEL 3 (TL-3).

THE THRIE BEAM RAIL FOR THE BRIDGE ANCHOR SECTION SHALL BE 12 GAGE OR 10 GAGE AT THE CONTRACTOR'S OPTION, AND THE TRANSITION SECTION SHALL BE 12 GAGE.

FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

USE 5/8" BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS = 3/8" MIN.) AT ALL SLOTS.

ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL SHEET.

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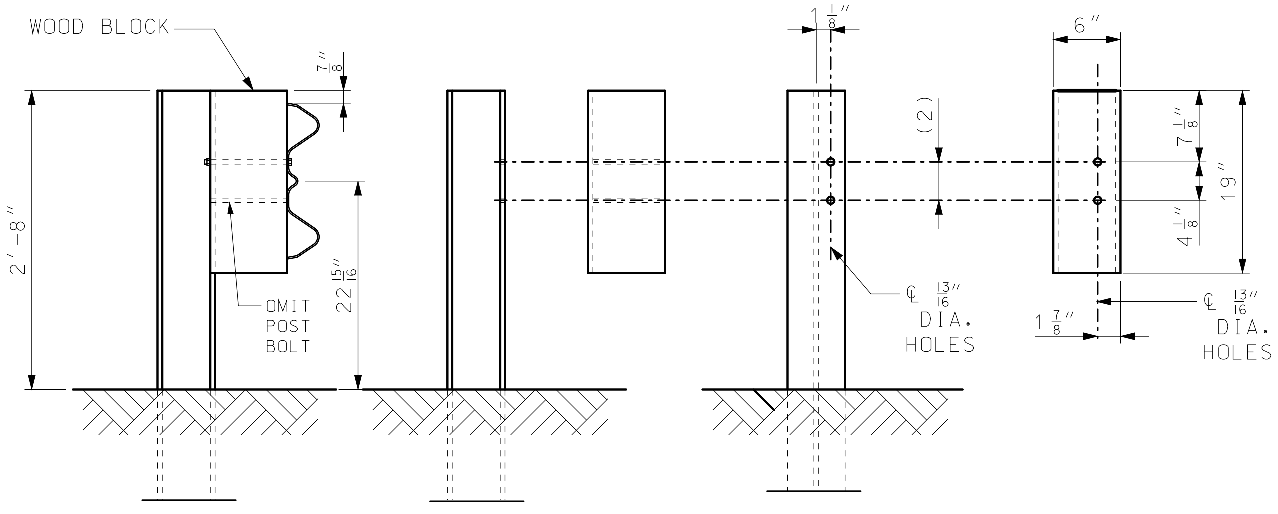
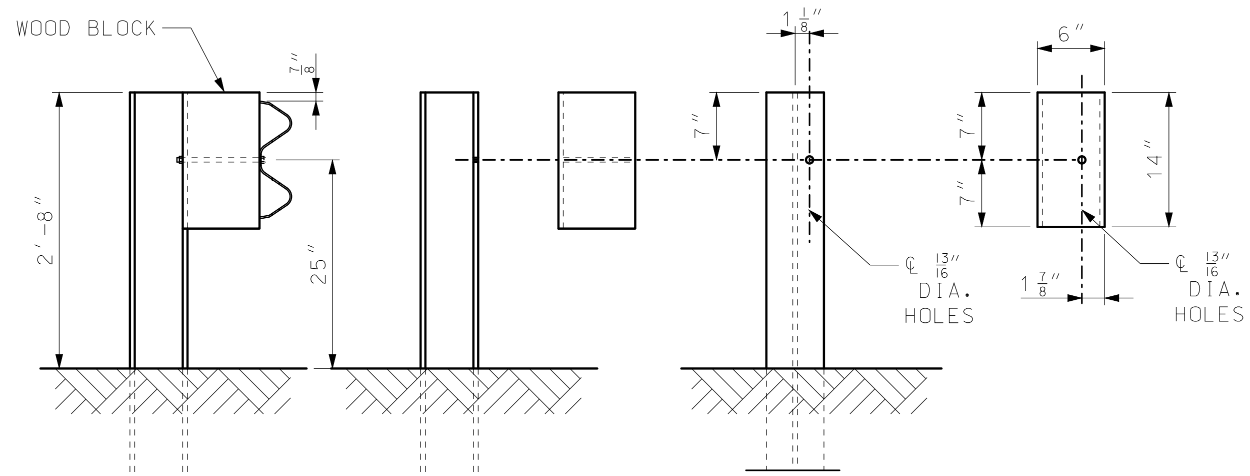
BRIDGE ANCHOR SECTION
(THRIE BEAM RAIL ON BRIDGE)

DATE EFFECTIVE:	07/01/2016	606.23J	SHEET NO. 2 OF 5
DATE PREPARED:	5/13/2016		



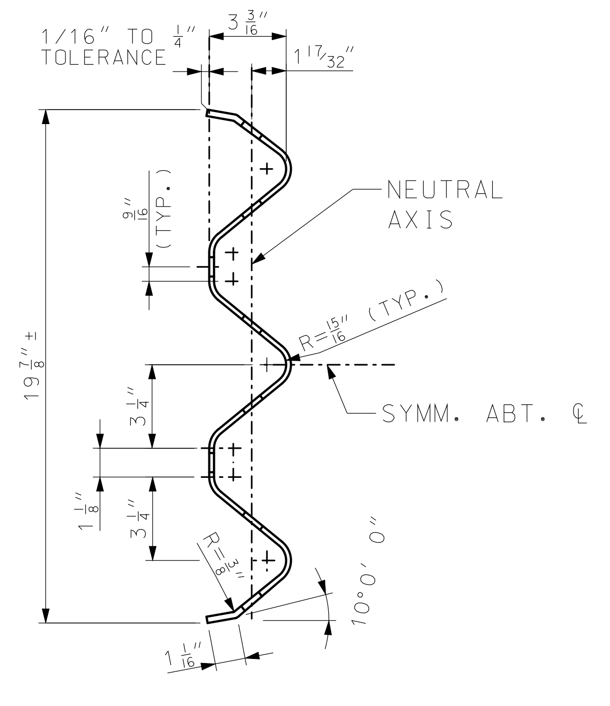
SECTION F-F SIDE VIEW FRONT VIEW

STEEL POST AND WOOD BLOCKOUT (7)



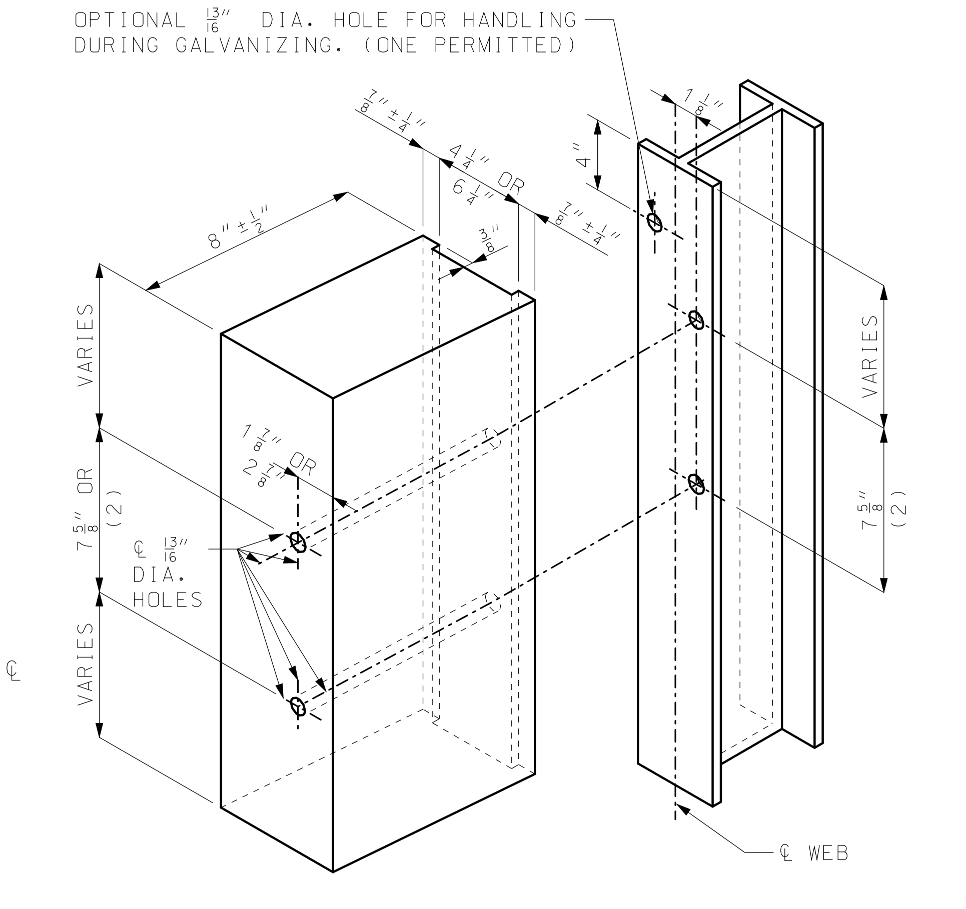
SECTION G-G SIDE VIEW FRONT VIEW

STEEL POST AND WOOD BLOCKOUT (8)



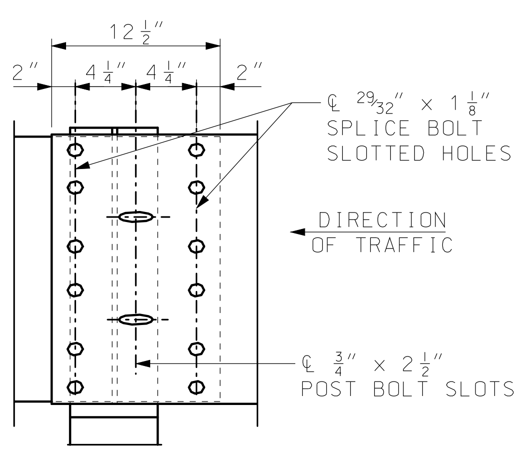
SECTION H-H

THROUGH THRIE BEAM RAIL

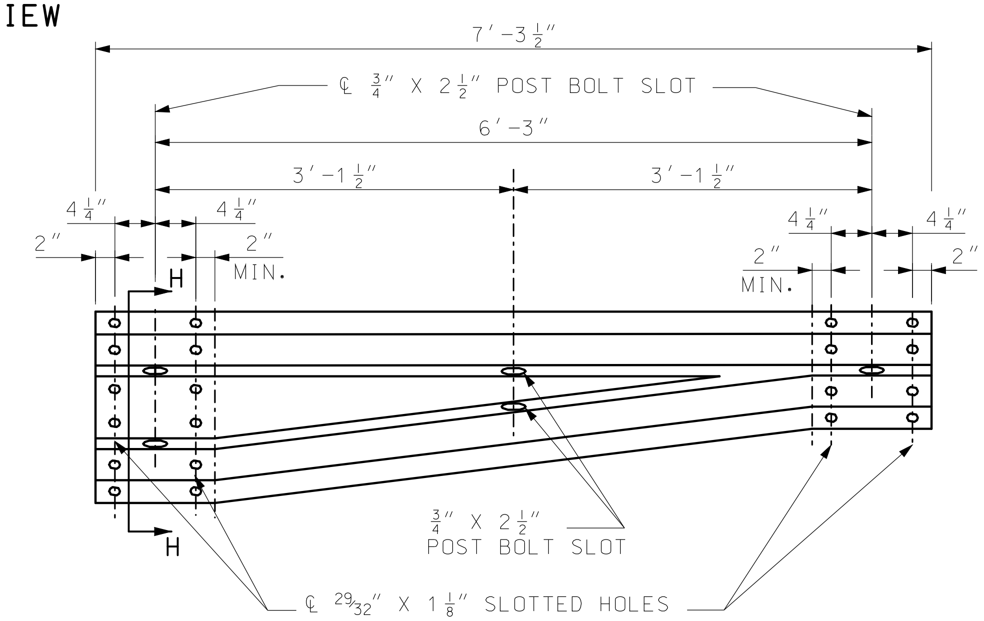


POST (7) - (2) VERIFY BY RAIL TRANSITION PRODUCER (SEE FRONT SHEET)
POST (8) - ONLY 1 HOLE REQUIRED
ALL HOLES 13/16″ DIAMETER EXCEPT AS NOTED

HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD BLOCKS (6″ AND 8″)



THRIE BEAM RAIL SPLICE AT POST



ASYMMETRICAL TRANSITION SECTION

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

STATE OF MISSOURI
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PROFESSIONAL ENGINEER

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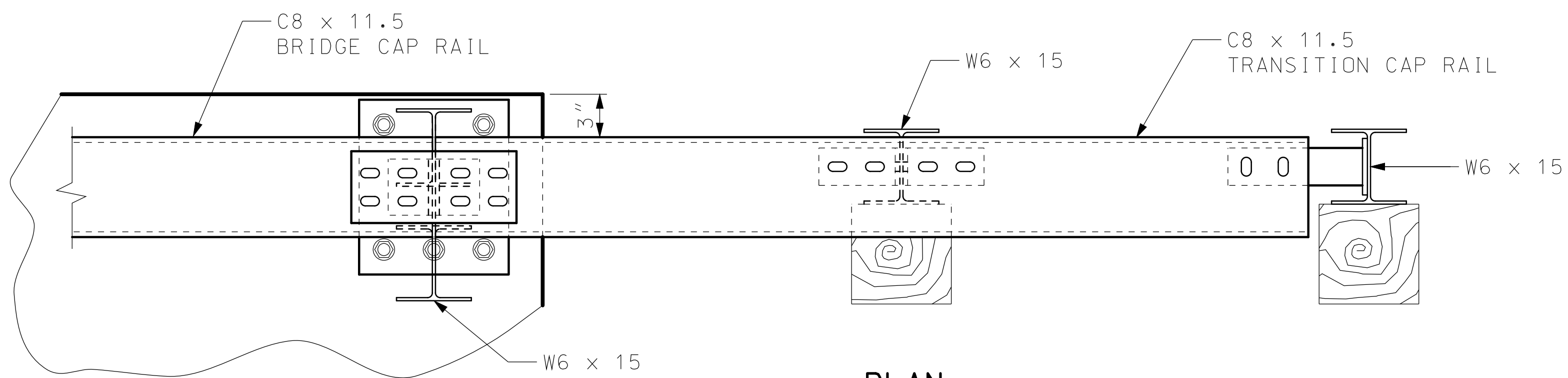
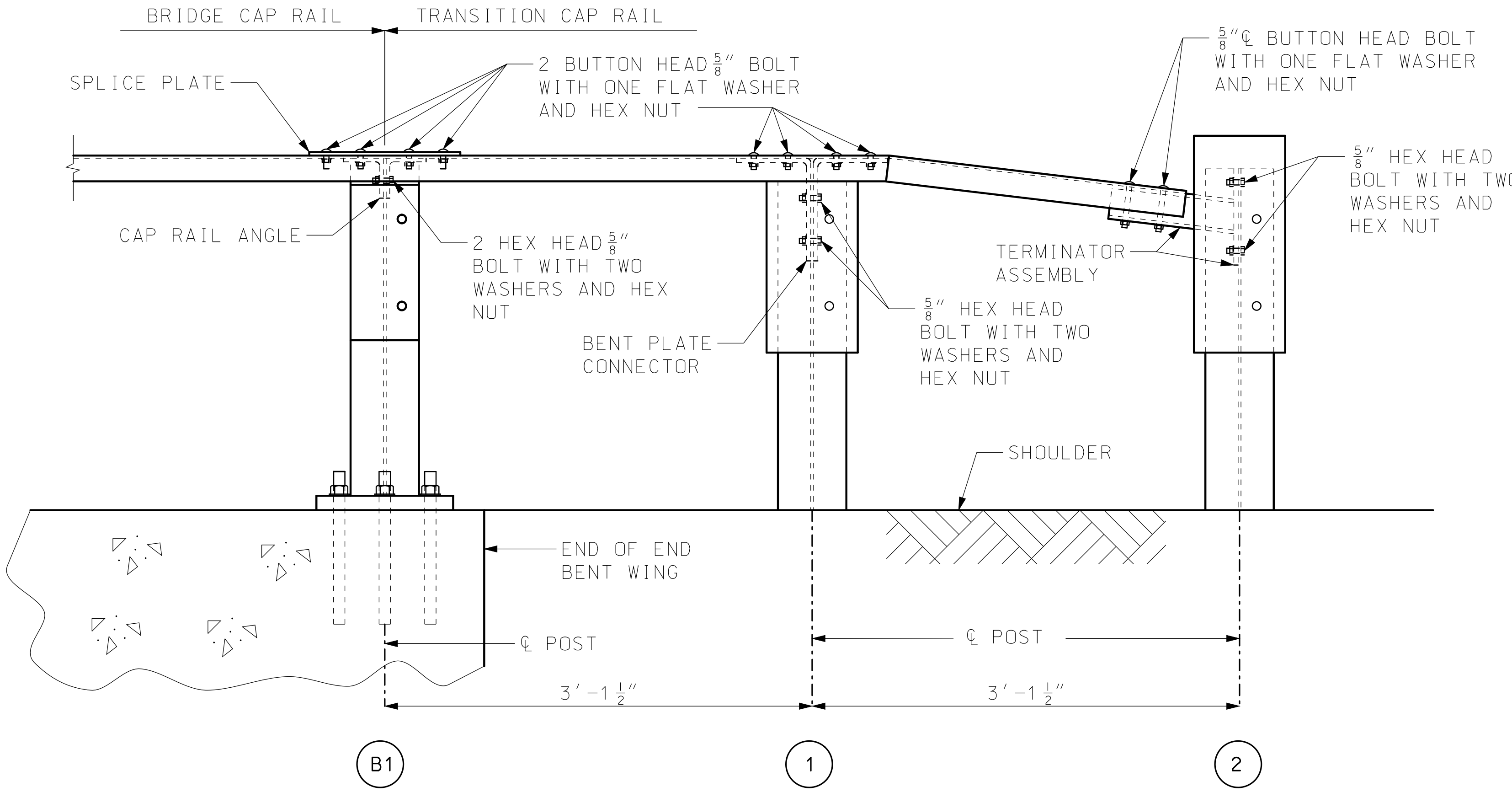
BRIDGE ANCHOR SECTION
(THRIE BEAM RAIL ON BRIDGE)

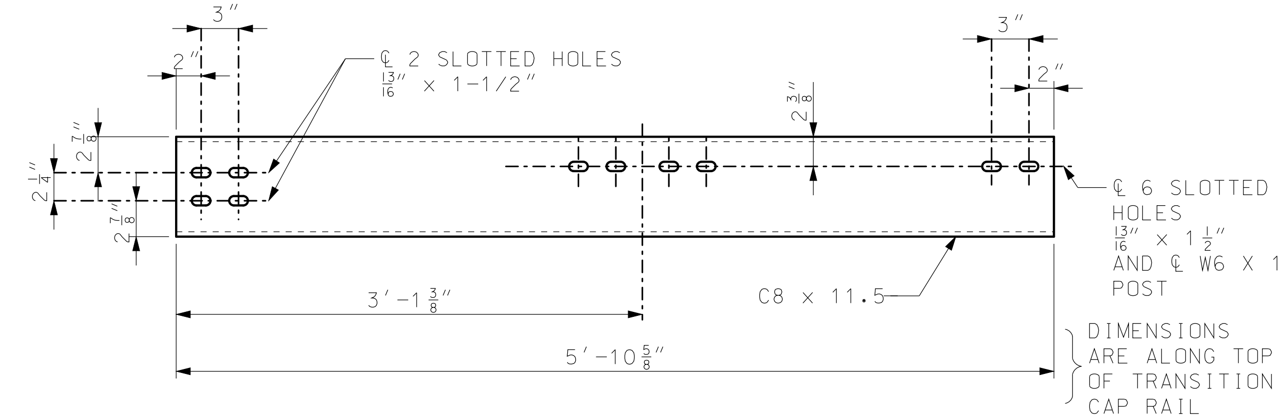
DATE EFFECTIVE:	07/01/2016	606.23J	SHEET NO. 3 OF 5
DATE PREPARED:	5/13/2016		



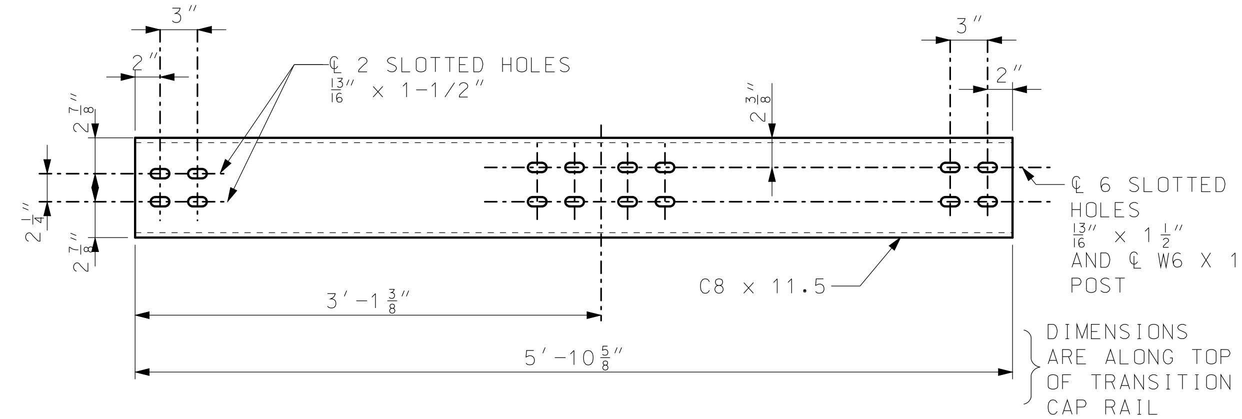
PLAN



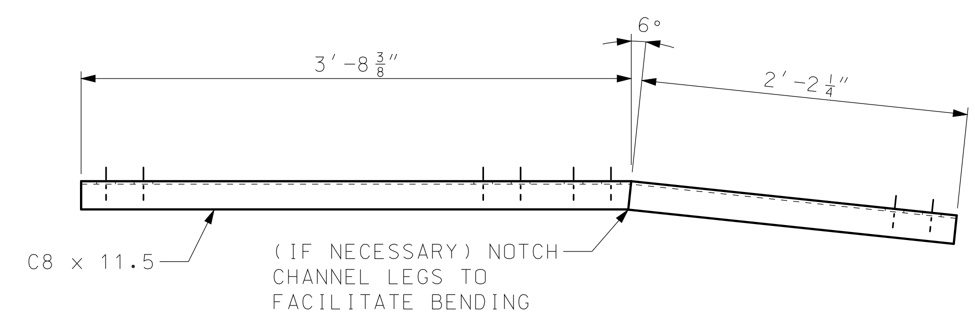
ELEVATION
(THRIE BEAM RAIL NOT SHOWN)



TOP VIEW (ALTERNATE 1)



TOP VIEW (ALTERNATE 2)



ELEVATION
TRANSITION CAP RAIL

GENERAL NOTES:

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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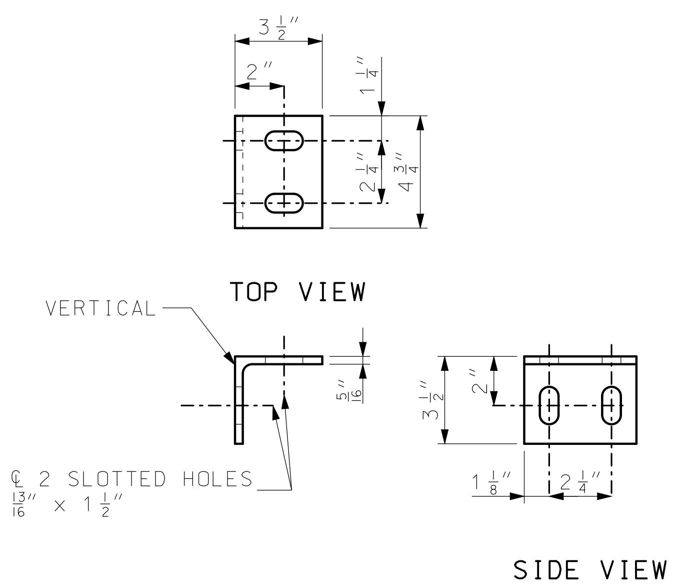
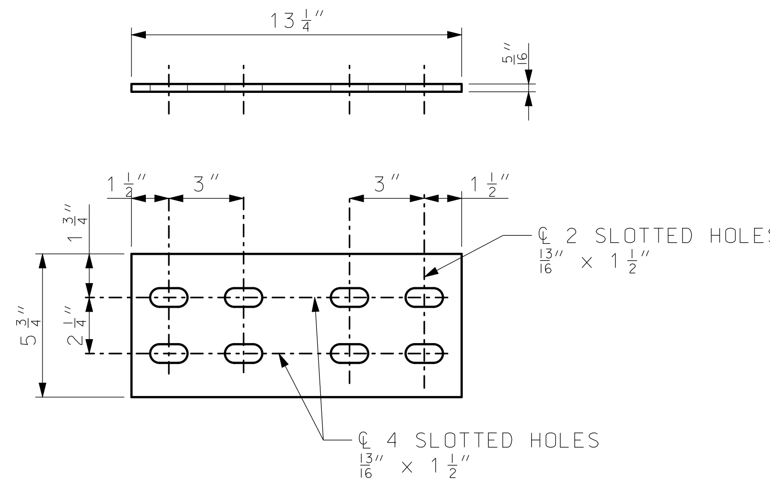
BRIDGE ANCHOR SECTION
(THRIE BEAM RAIL ON BRIDGE)

DATE EFFECTIVE:	07/01/2016	606.23J	SHEET NO. 4 OF 5
DATE PREPARED:	5/13/2016		

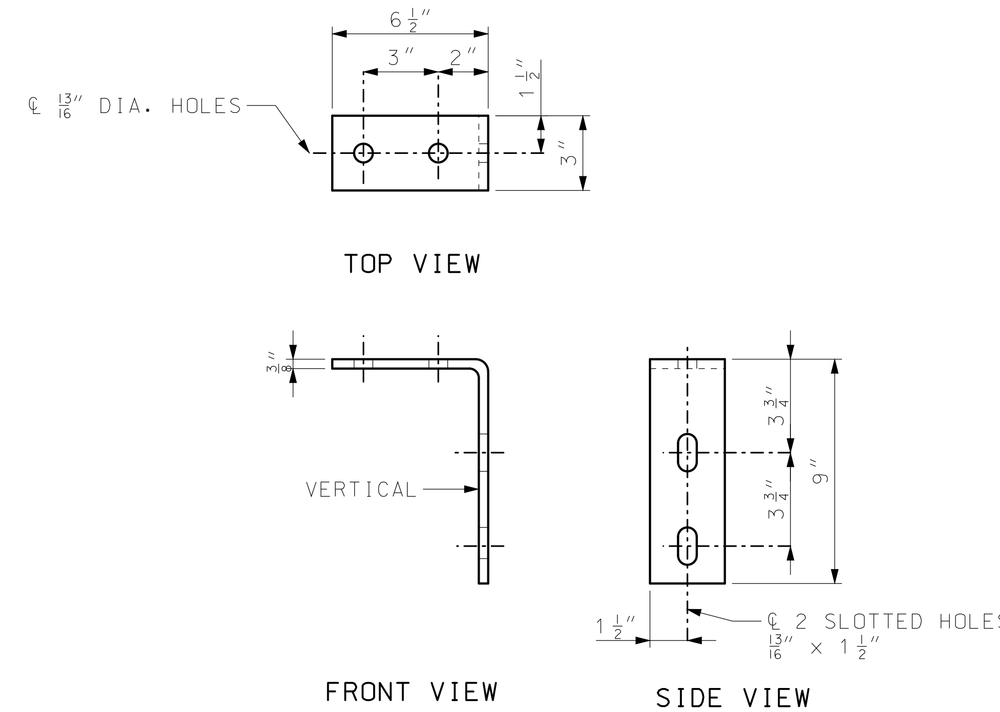


CAP RAIL ANGLE

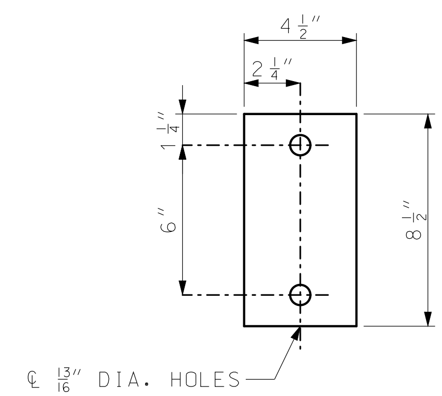
∠ 3 1/2" × 3 1/2" × 5/16"



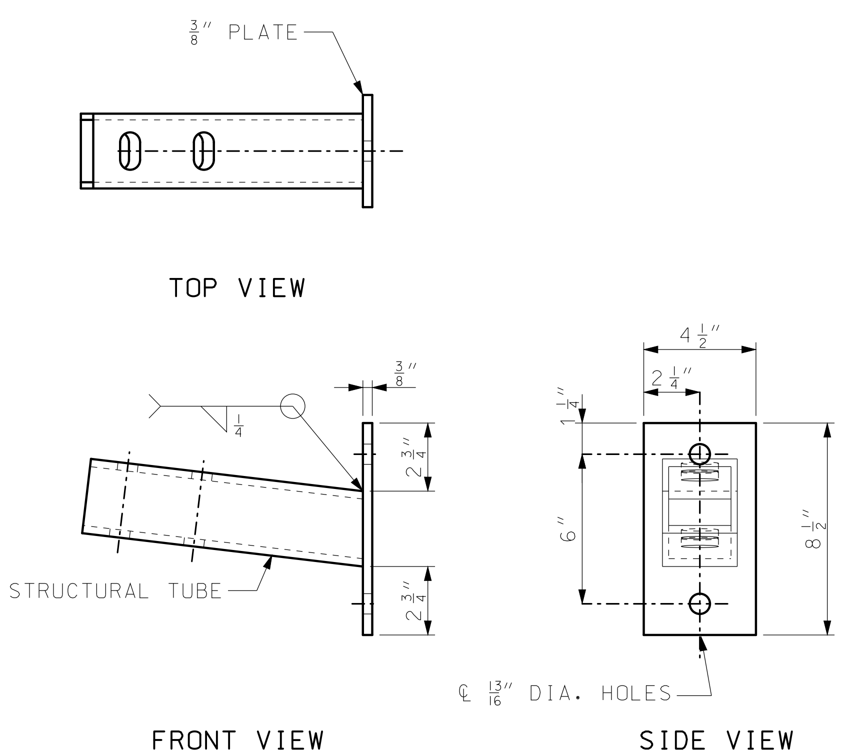
SPLICE PLATE

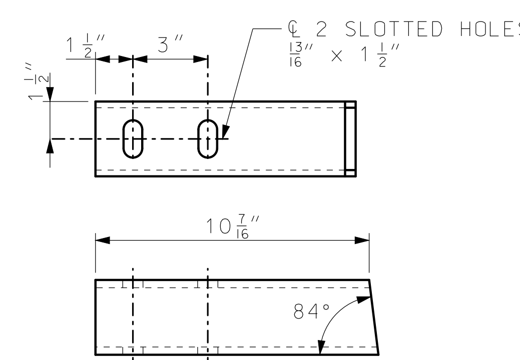


BENT PLATE CONNECTOR



3/8" PLATE





STRUCTURAL TUBE

TS 3" × 3" × 5/16"

TERMINATOR ASSEMBLY

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.

BRIDGE ANCHOR SECTION

(THRIE BEAM RAIL ON BRIDGE)

DATE EFFECTIVE:	07/01/2016	606.23J	SHEET NO.
DATE PREPARED:	5/13/2016		5 OF 5

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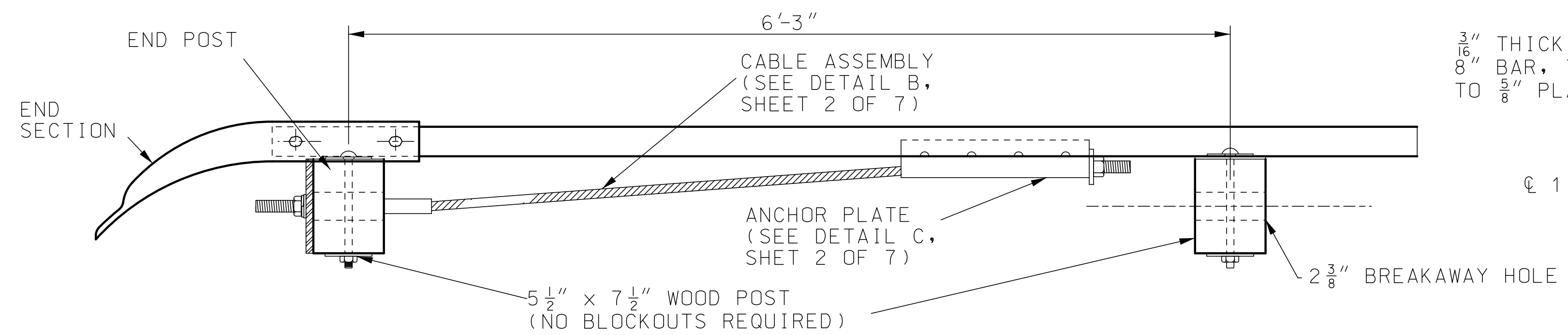
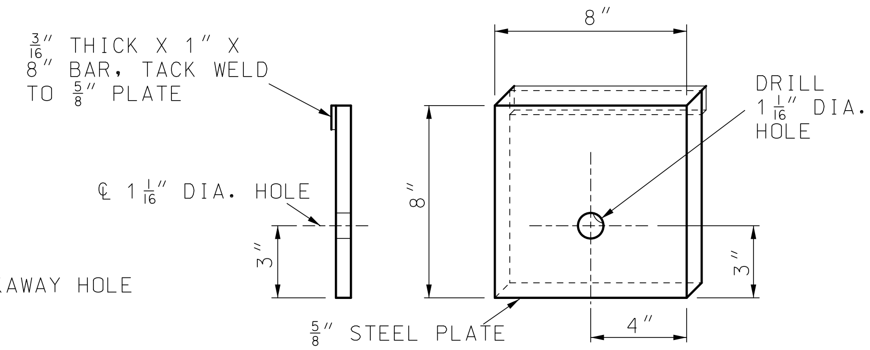
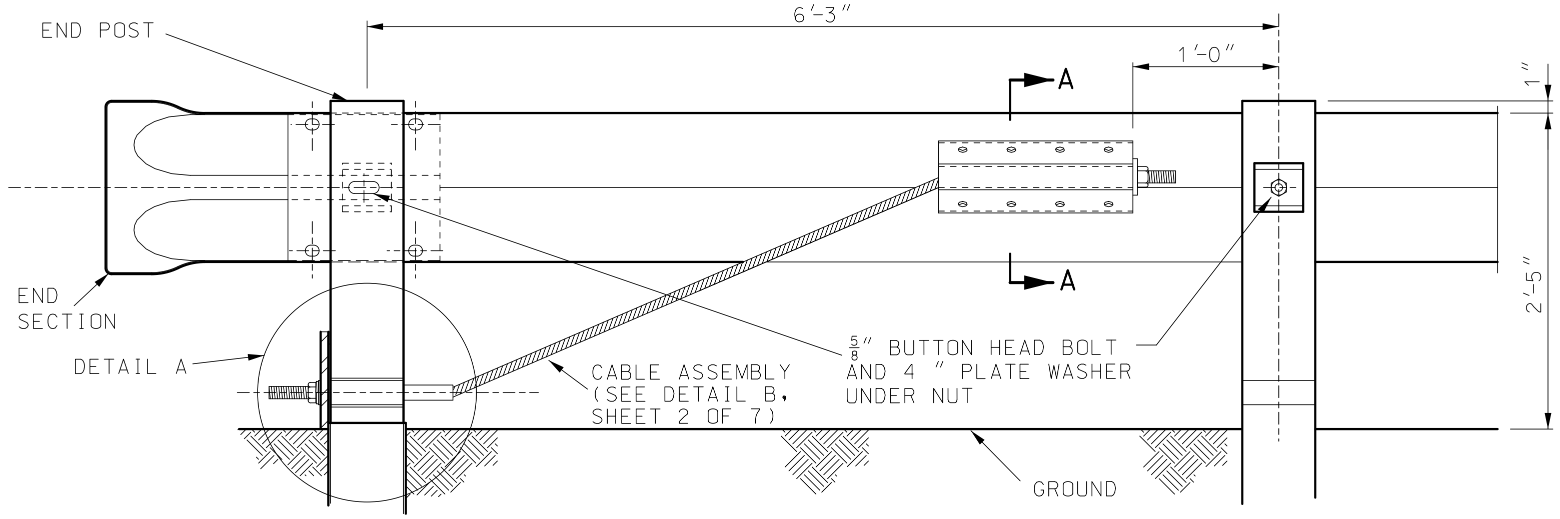


NOTE: FOR DETAILS OF END SECTION, SEE STD PLANS 606.00.

PLAN

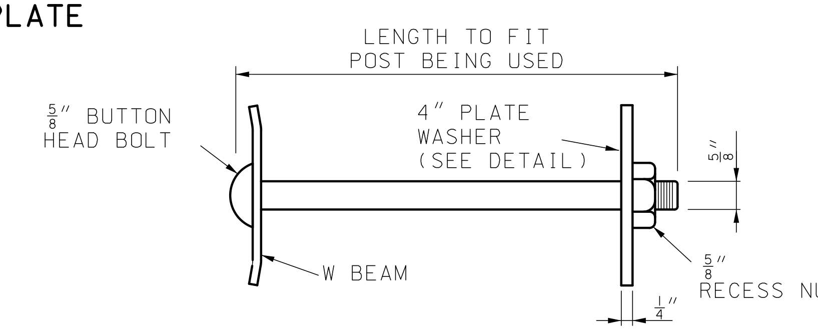


DETAIL OF STEEL BEARING PLATE

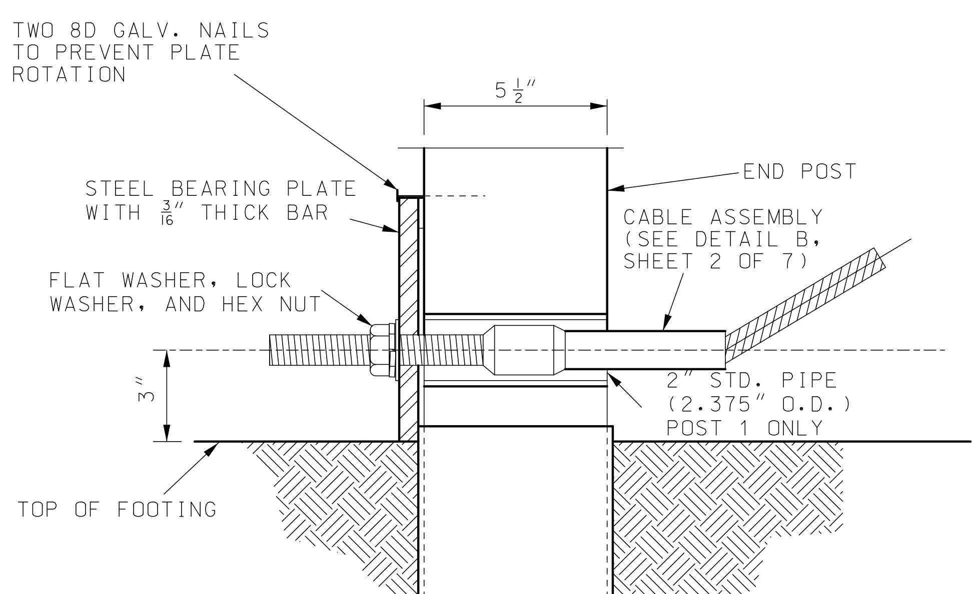


ELEVATION
(BACK SIDE)

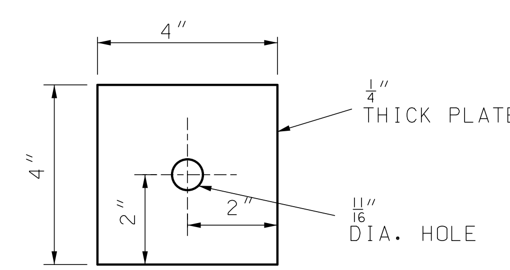
END ANCHOR DETAILS



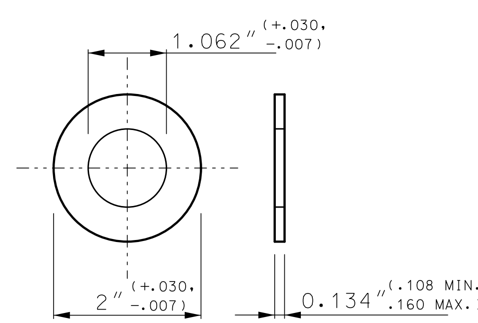
POST BOLT ASSEMBLY



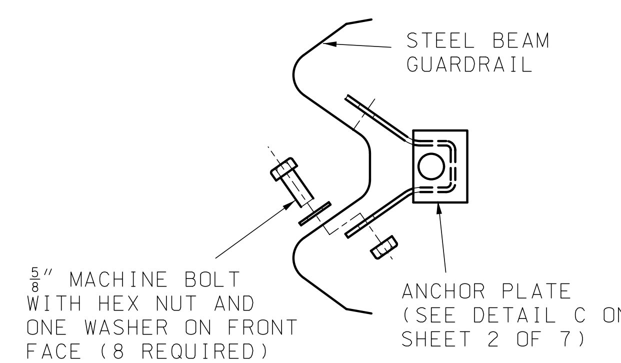
DETAIL A
(END POST DETAIL)



4" PLATE WASHER



TYPE A WASHER



SECTION A-A

GENERAL NOTES:

END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON DOWN STREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR IS REQUIRED.

THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM FOR GUARDRAIL. GUARDRAIL AND POSTS ARE PAID FOR SEPARATELY.

CABLE ASSEMBLY AND ANCHOR PLATE SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER AND SHALL HAVE A MINIMUM BREAKING STRENGTH OF 20 TONS.

ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED AFTER FABRICATION, SEE SECTION 1040 STANDARD SPECIFICATION.

WOOD POSTS 1 AND 2 SHALL BE 5 1/2" X 7 1/2".

SEE SHEET 3 FOR WOOD POST DETAILS.

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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

GUARDRAIL

TERMINAL ANCHOR ENDS

DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021

606.30L

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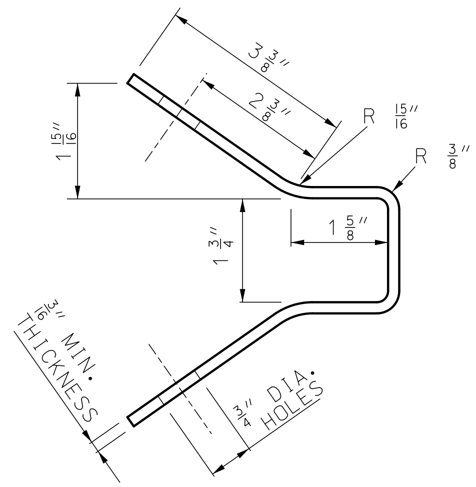
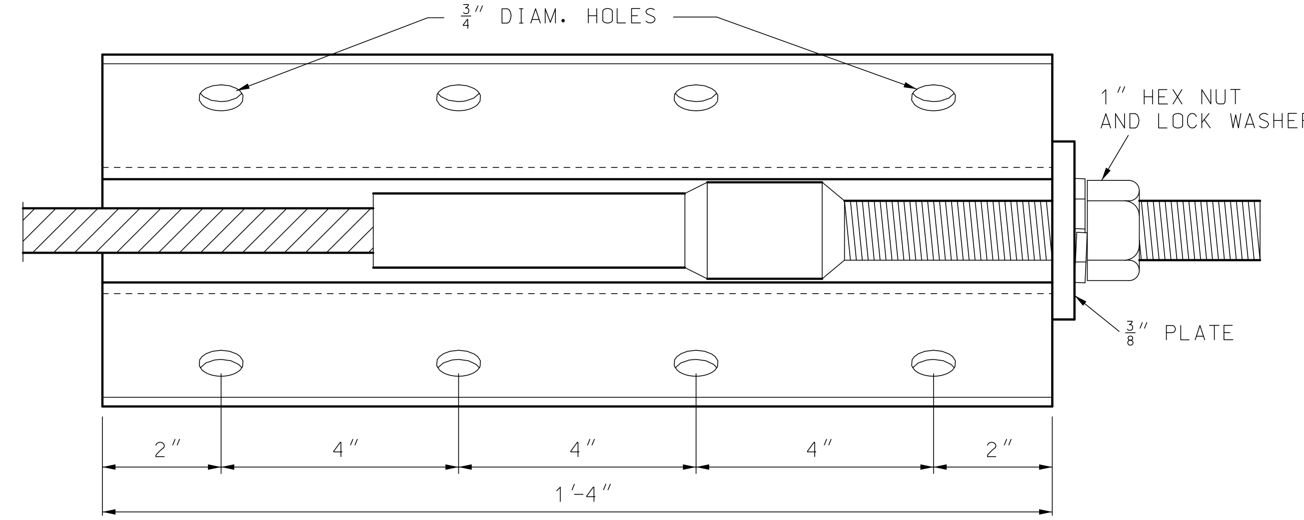
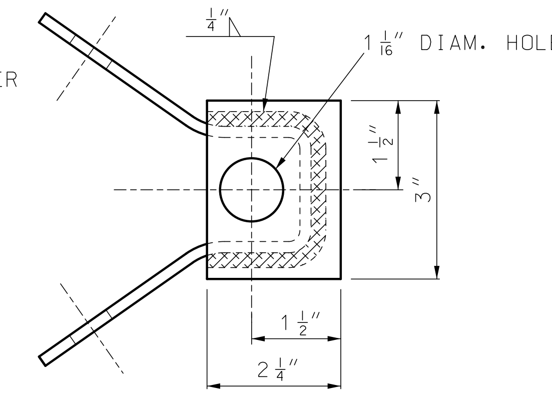


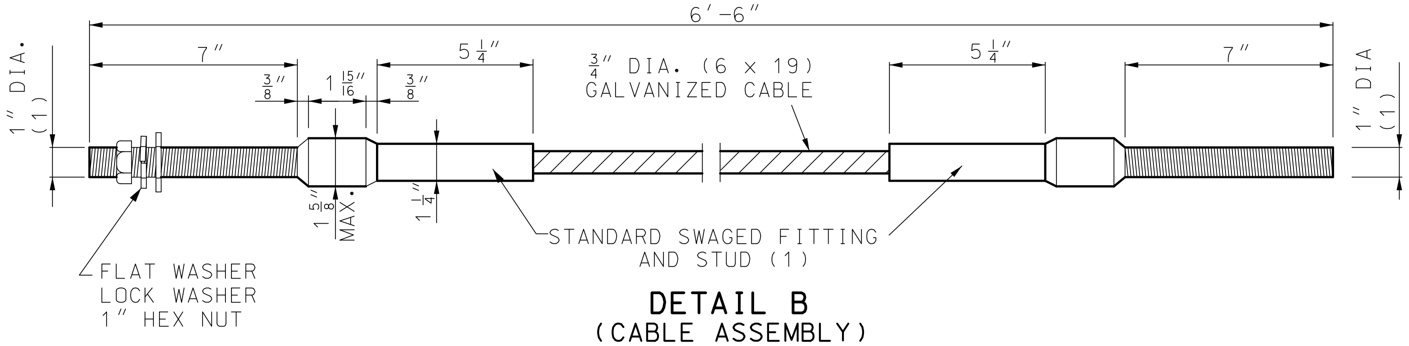
FABRICATION DETAIL



DETAIL C
ASSEMBLED VIEW
(ANCHOR PLATE)

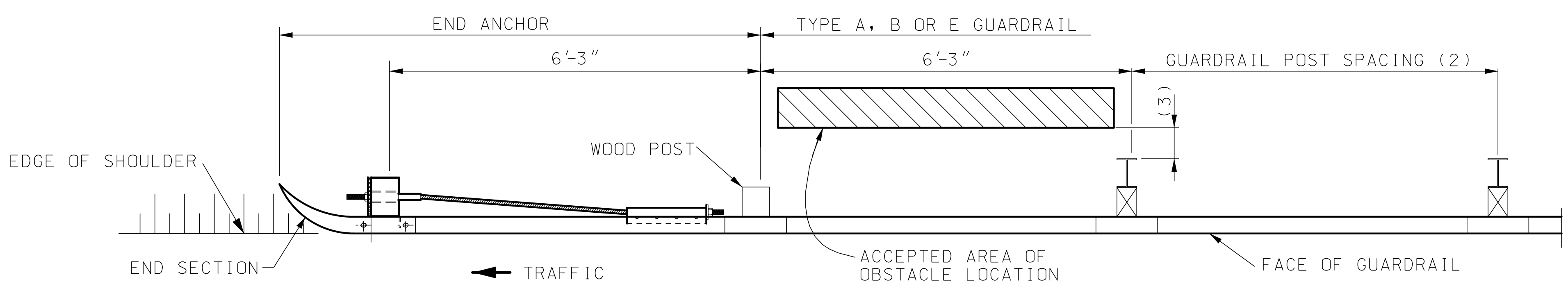


END VIEW

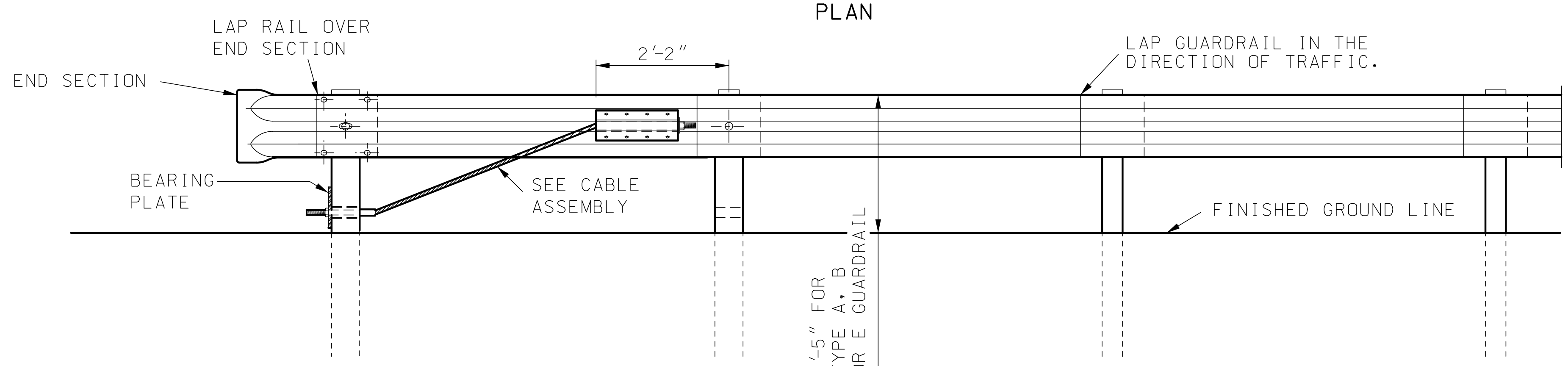


DETAIL B
(CABLE ASSEMBLY)

(1) STUD, THREADED ENTIRE LENGTH.
(2) 6'-3" SPACING FOR TYPE A OR B GUARDRAIL; 3'-1 1/2" SPACING FOR TYPE E GUARDRAIL.
(3) 27" MINIMUM BUT LESS THAN 4' FOR TYPE E GUARDRAIL; 4' MINIMUM FOR TYPE A GUARDRAIL.



PLAN



POST 1

POST 2

ELEVATION
END ANCHOR

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STATE OF MISSOURI
TRAVIS D. KOESTNER
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PROFESSIONAL ENGINEER
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GUARDRAIL

TERMINAL ANCHOR ENDS

DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021

606.30L

SHEET NO.
2 OF 7

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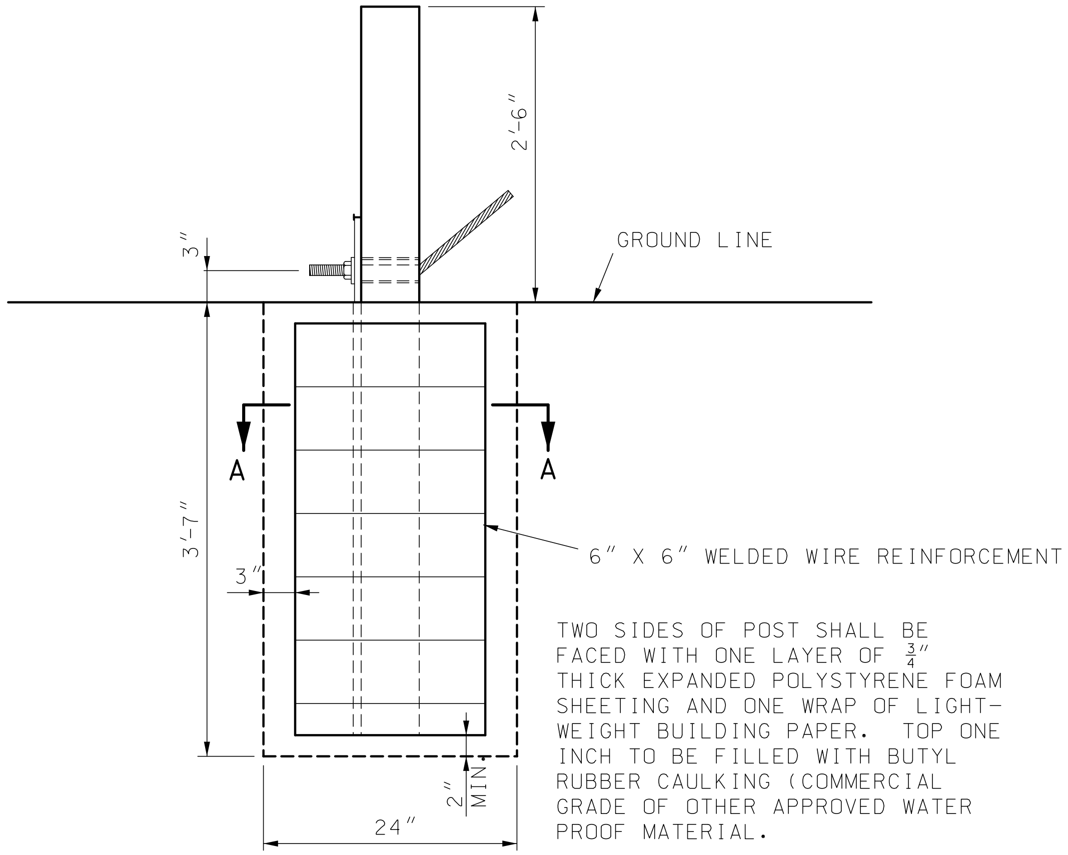
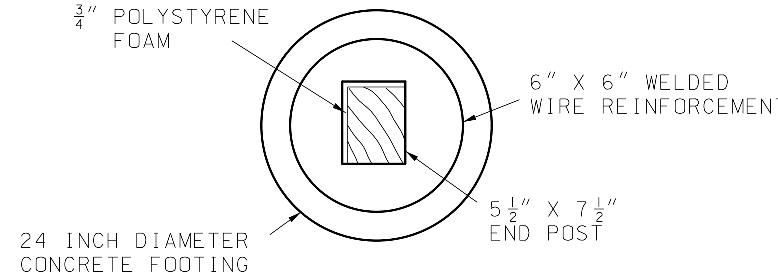


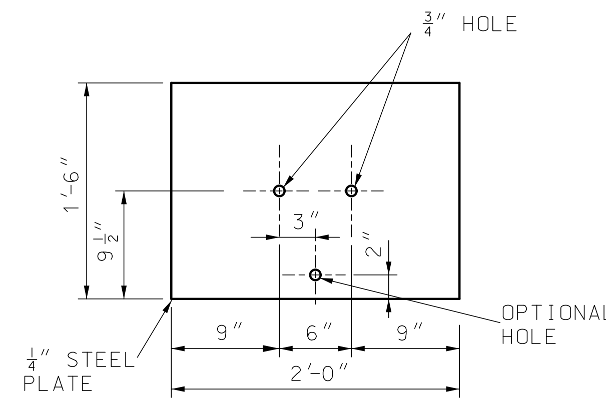
TWO SIDES OF POST SHALL BE FACED WITH ONE LAYER OF $\frac{3}{4}$" THICK EXPANDED POLYSTYRENE FOAM SHEETING AND ONE WRAP OF LIGHT-WEIGHT BUILDING PAPER. TOP ONE INCH TO BE FILLED WITH BUTYL RUBBER CAULKING (COMMERCIAL GRADE OF OTHER APPROVED WATER PROOF MATERIAL.

POST 1

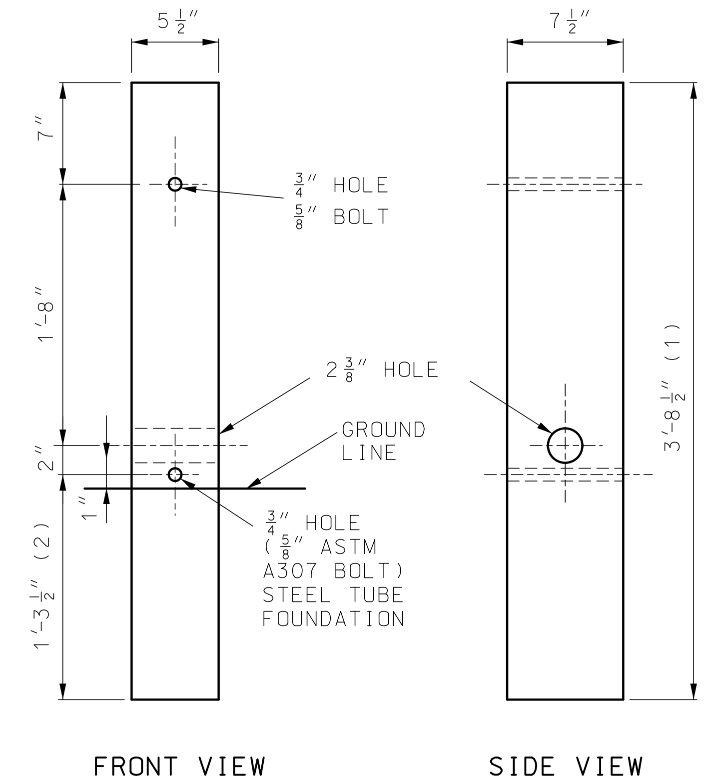
CONCRETE FOUNDATION FOR END ANCHORS



SECTION A-A
EXPANDED POLYSTYRENE FOAM INSTALLATION DETAIL

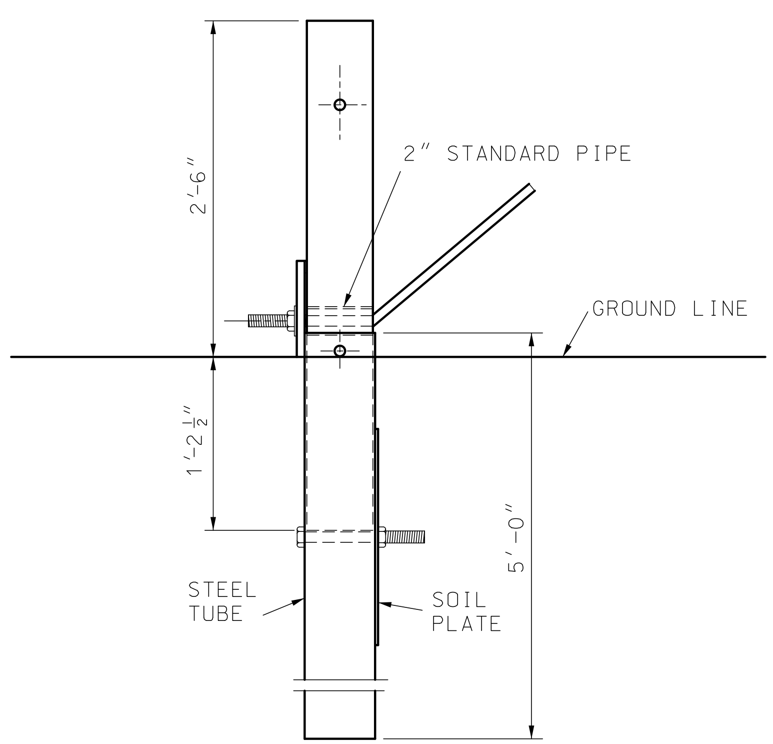


SOIL PLATE



WOOD BREAKAWAY POST
SEE SECTION 1050

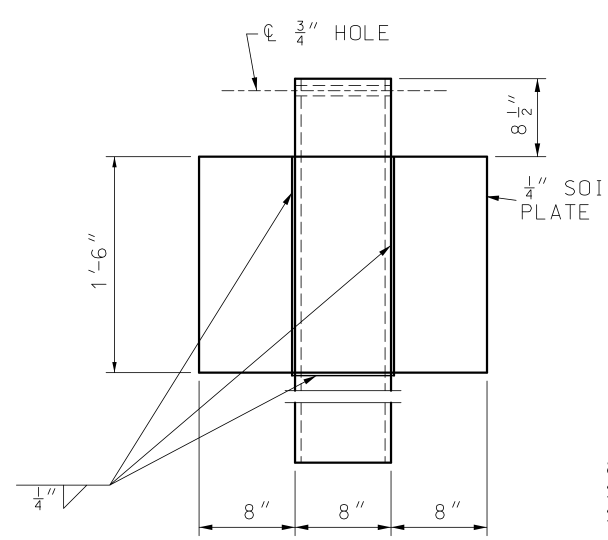
(1) $5'-11\frac{1}{2}$" FOR CONCRETE FOUNDATION ALTERNATE.
(2) $3'-8\frac{1}{2}$" FOR CONCRETE FOUNDATION ALTERNATE.



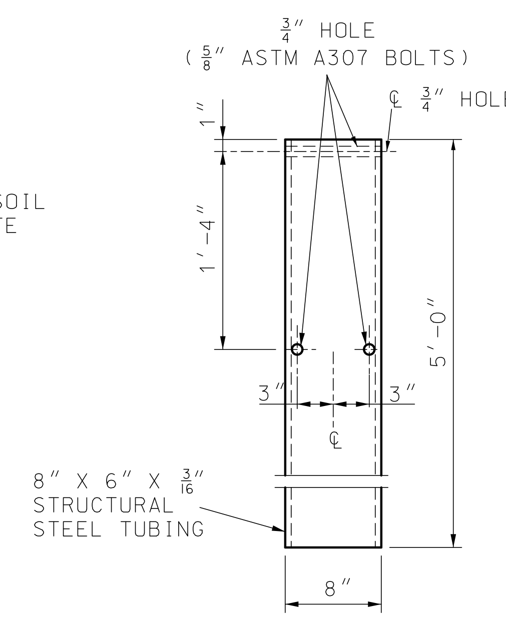
POST 1

STEEL TUBE FOUNDATION FOR END ANCHORS

BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1080 OF THE MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.



SHOP WELDED SOIL PLATE CONNECTION



STEEL TUBE

GENERAL NOTES:

THE CONTRACTOR HAS THE OPTION TO INSTALL WOOD POST 1 AND 2 IN STEEL TUBE OR CONCRETE FOUNDATION.

TRIMMING OF WOOD POST MAY BE NECESSARY FOR STEEL TUBE FOUNDATION.

STEEL TUBE FOUNDATIONS SHALL BE DRILLED AND BACK-FILLED WITH A SUITABLE MATERIAL WHEN THE SOIL PLATE IS BOLTED, AS SHOWN, TO THE STEEL TUBE. STEEL TUBE FOUNDATION MAY BE DRIVEN WHEN THE SOIL PLATE IS WELDED, AS SHOWN, TO THE STEEL TUBE.

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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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GUARDRAIL
TERMINAL ANCHOR ENDS

DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021	606.30L	SHEET NO. 3 OF 7

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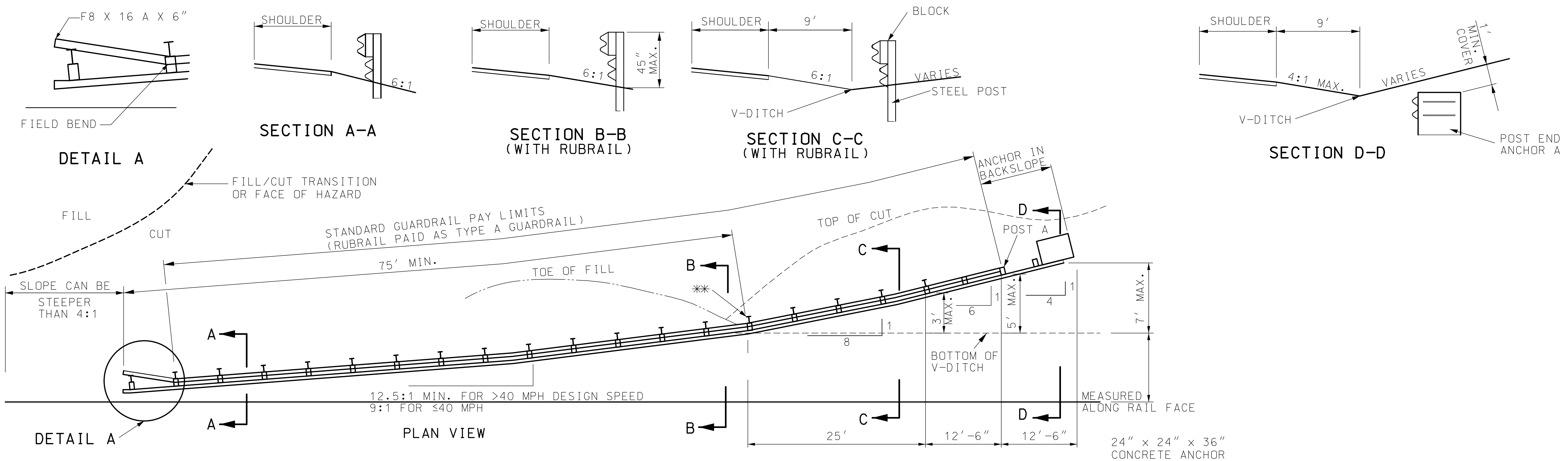
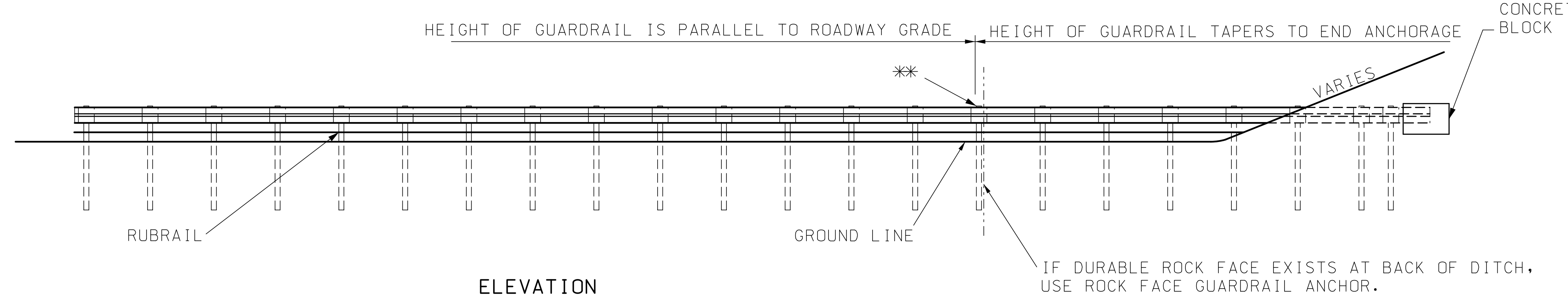


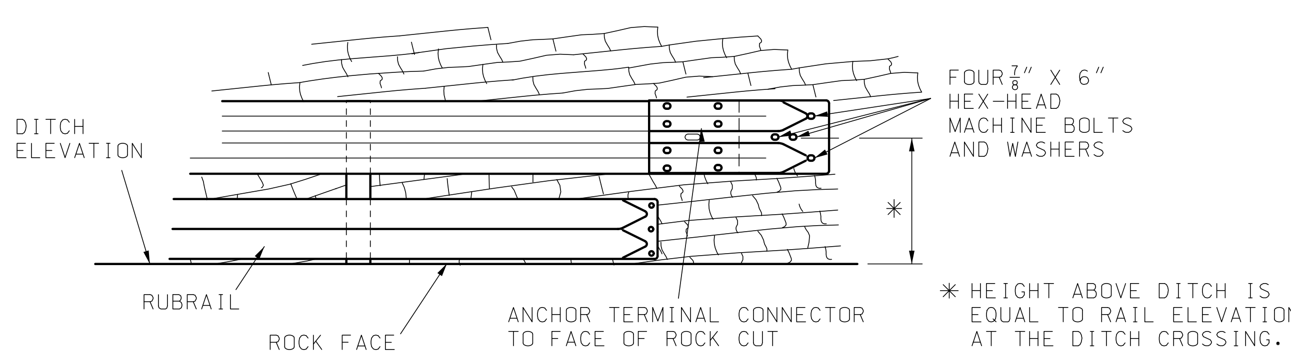


ELEVATION

ANCHORED IN BACKSLOPE GUARDRAIL

✱✱ THE POST BEHIND THE DITCHLINE MAY BE SHORTENED TO PROVIDE 48″ MIN. EMBEDMENT.

COST OF SHAPING ROCK FACE FOR PLACING OF TERMINAL CONNECTOR, DRILLING HOLES, FURNISHING AND PLACING BOLTS, WASHERS, CAULKING, ANCHORS AND END SHOE TO BE INCLUDED IN THE PRICE OF GUARDRAIL ANCHOR, ROCK FACE.



✱ HEIGHT ABOVE DITCH IS EQUAL TO RAIL ELEVATION AT THE DITCH CROSSING.

ROCK FACE GUARDRAIL ANCHOR

GENERAL NOTES:

FOR END ANCHOR DETAILS, SEE SHEET 1-3 OF 7.

EIGHT FOOT POST IS REQUIRED WITH RUBRAIL.

RUBRAIL BEGINS WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18″ AND INCREASING.

END ANCHOR POSTS 1 AND 2 SHALL HAVE FOUNDATION TYPE AS SHOWN ON SHEET 3 OF 7.

THE CONTRACT UNIT PRICE FOR EMBEDDED GUARDRAIL ANCHOR SHALL INCLUDE THE CONCRETE ANCHOR. EXCAVATION AND BACKFILLING, OR TERMINAL CONNECTOR, AND ALL INCIDENTIAL HARDWARE AND WORK NECESSARY TO COMPLETE THE INSTALLATION.

THE GUARDRAIL SHALL EXTEND 50′± BEYOND THE DITCH LINE AND TERMINATE A MINIMUM OF 12 INCHES BELOW GROUND ELEVATION OF THE BACKSLOPE.

BLOCKOUTS WILL NOT BE REQUIRED FOR ANY POST WHICH WILL BE COMPLETELY BELOW GROUND. THE ALIGNMENT OF SUCH POSTS SHALL BE APPROVED BY THE ENGINEER.

SEE OTHER DRAWINGS AND STANDARD SPECIFICATIONS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS NOT SHOWN.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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NUMBER PE-30042
PROFESSIONAL ENGINEER
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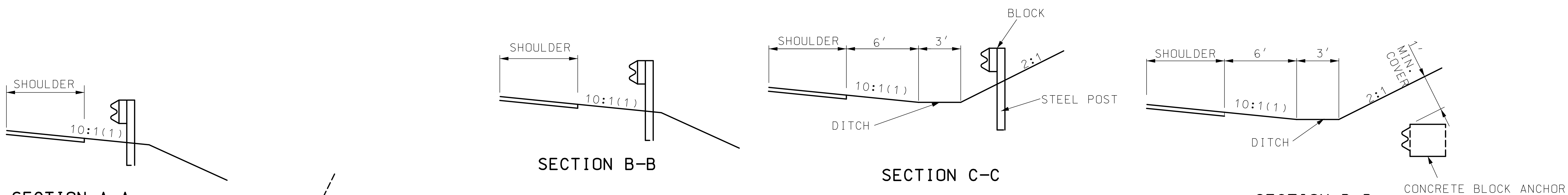
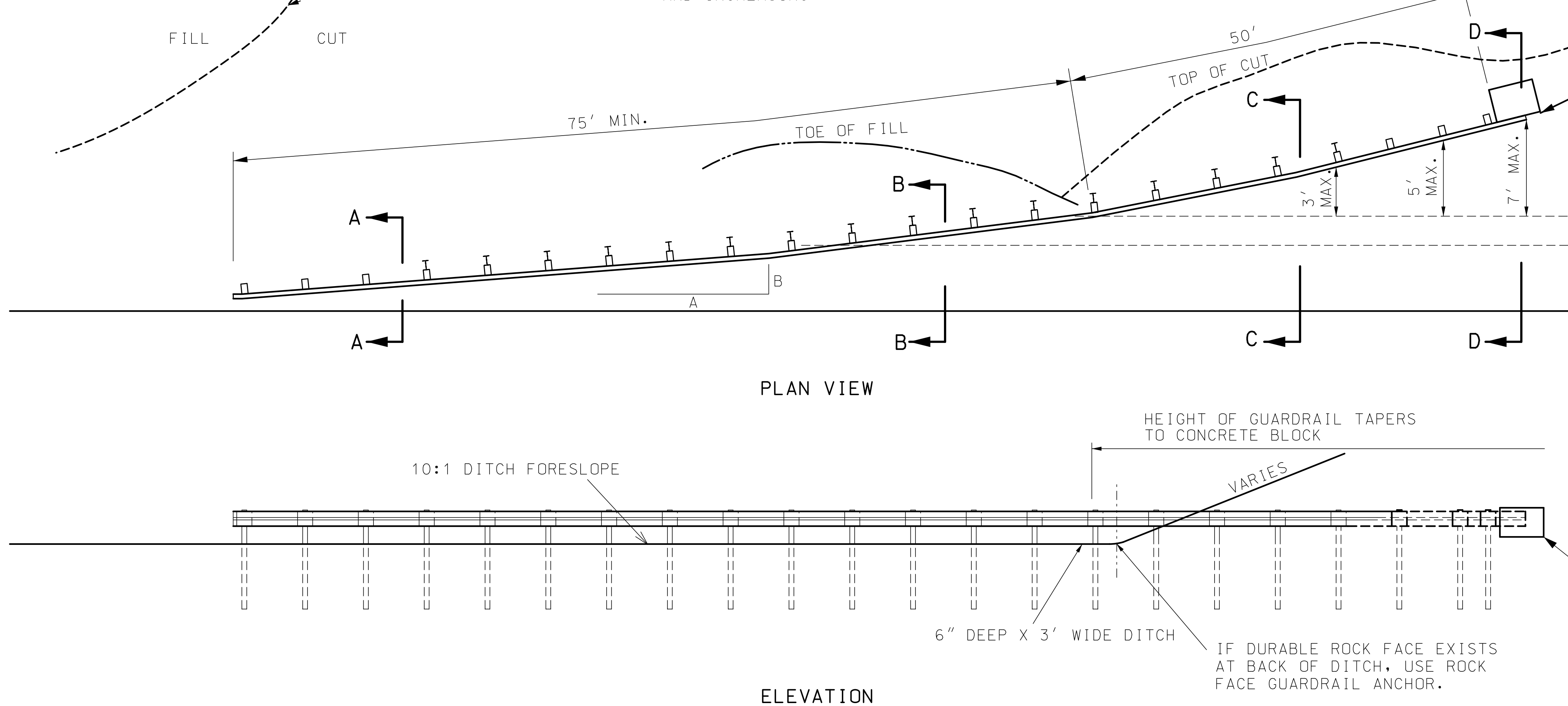
GUARDRAIL

TERMINAL ENDS
EMBEDDED AND ROCK FACE
(V-DITCH STEEPER THAN 10:1, 4:1 MAX. FORESLOPE)

DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021
606.30L



(1) MAX. CROSS SLOPE SHALL NOT EXCEED 6:1. RUBRAIL IS REQUIREDWHEN CROSS SLOPE EXCEEDS 10:1 OR WHEN THE DISTANCE BETWEENTHE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.



ANCHORED IN BACKSLOPE GUARDRAIL

10:1 CROSS SLOPE	
DESIGN SPEED mph	A:B
70	15:1
60	13:1
55	12:1
50	11:1
45	10:1
40	9:1
30 OR LESS	7:1

STEEPER THAN 10:1 CROSS SLOPE (1)	
DESIGN SPEED mph	A:B
45-70	12.5:1
40	9:1
30 OR LESS	7:1

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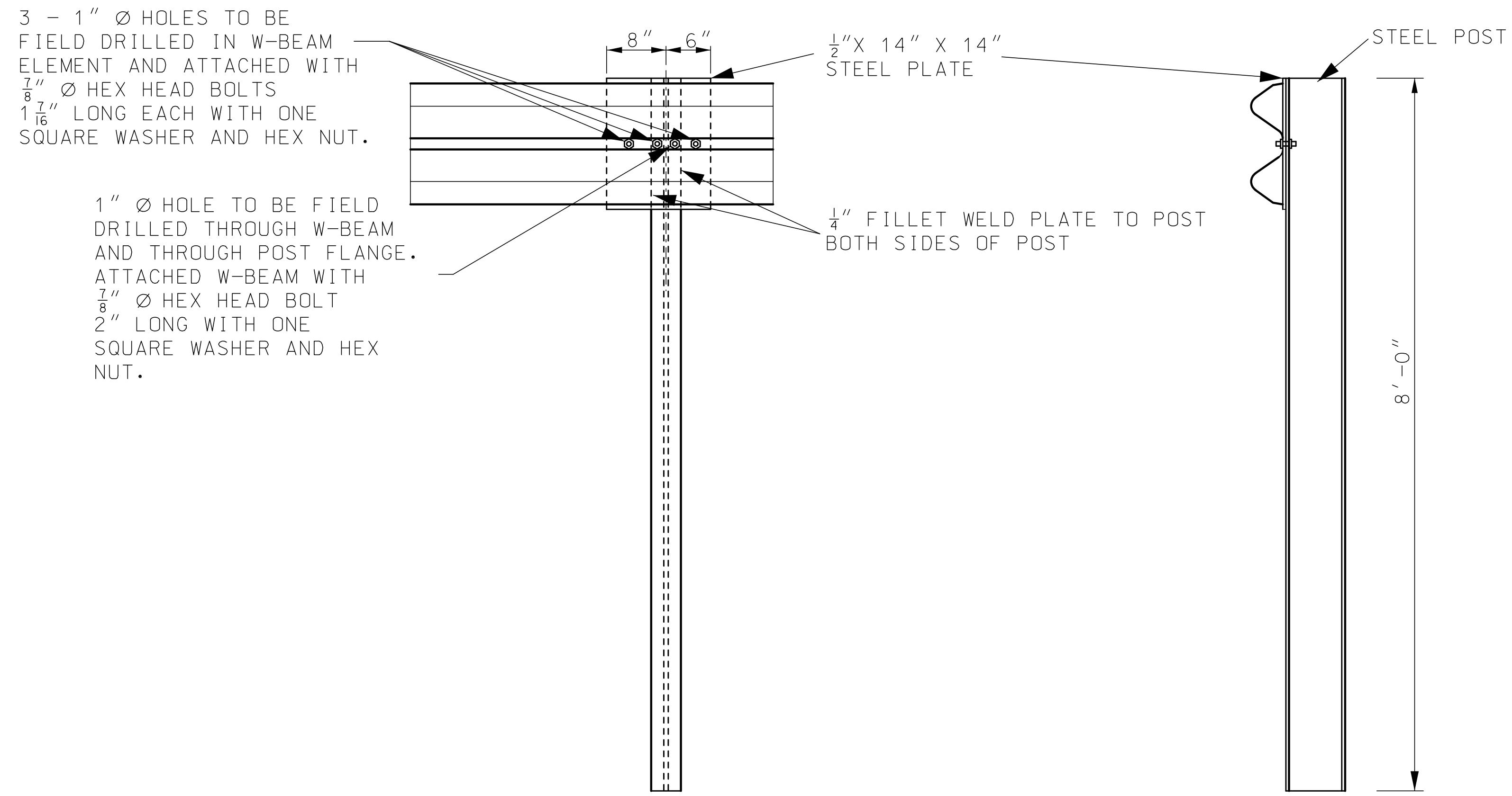
GUARDRAIL
EMBEDDED TERMINAL ENDS (FLAT DITCH)

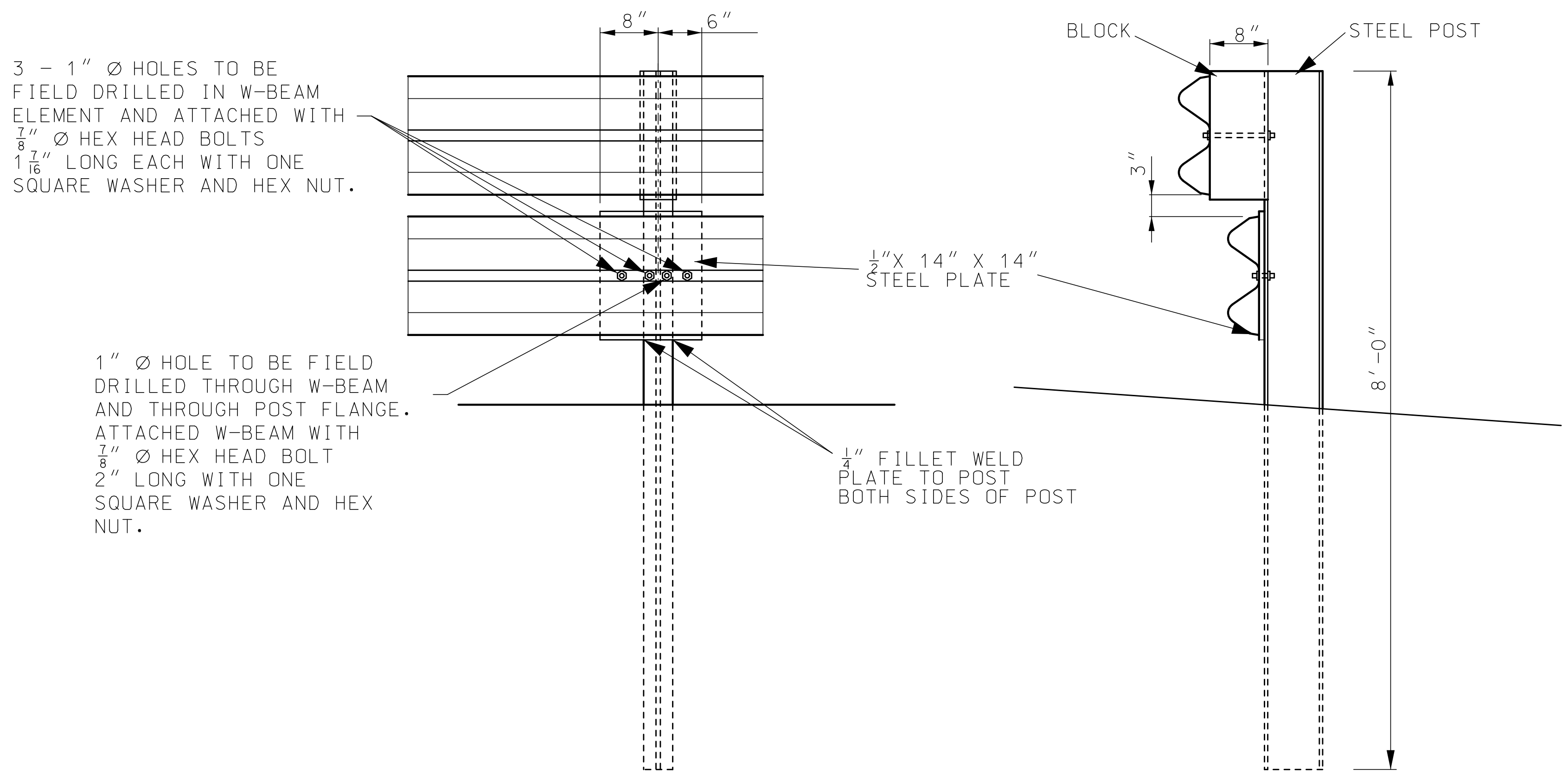
DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021

606.30L

SHEET NO. 5 OF 7



EMBEDDED STEEL POST



SPECIAL RUBRAIL TO POST CONNECTION AT POST A

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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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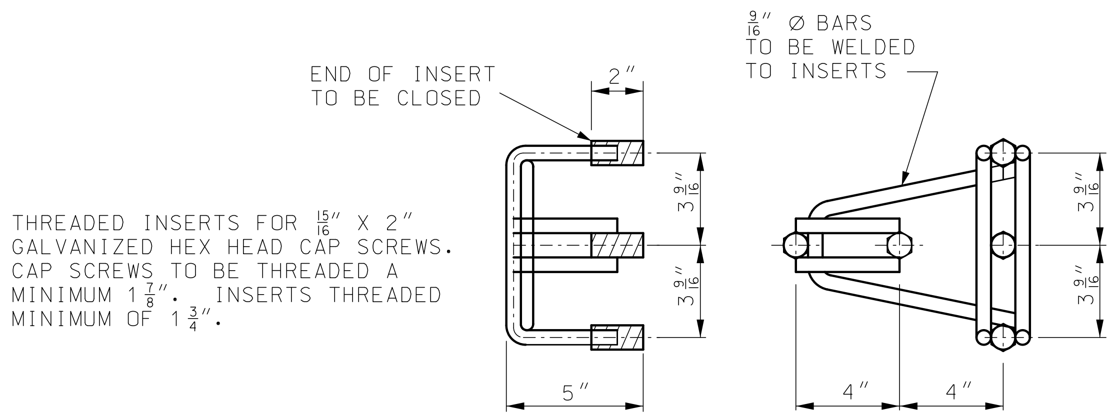
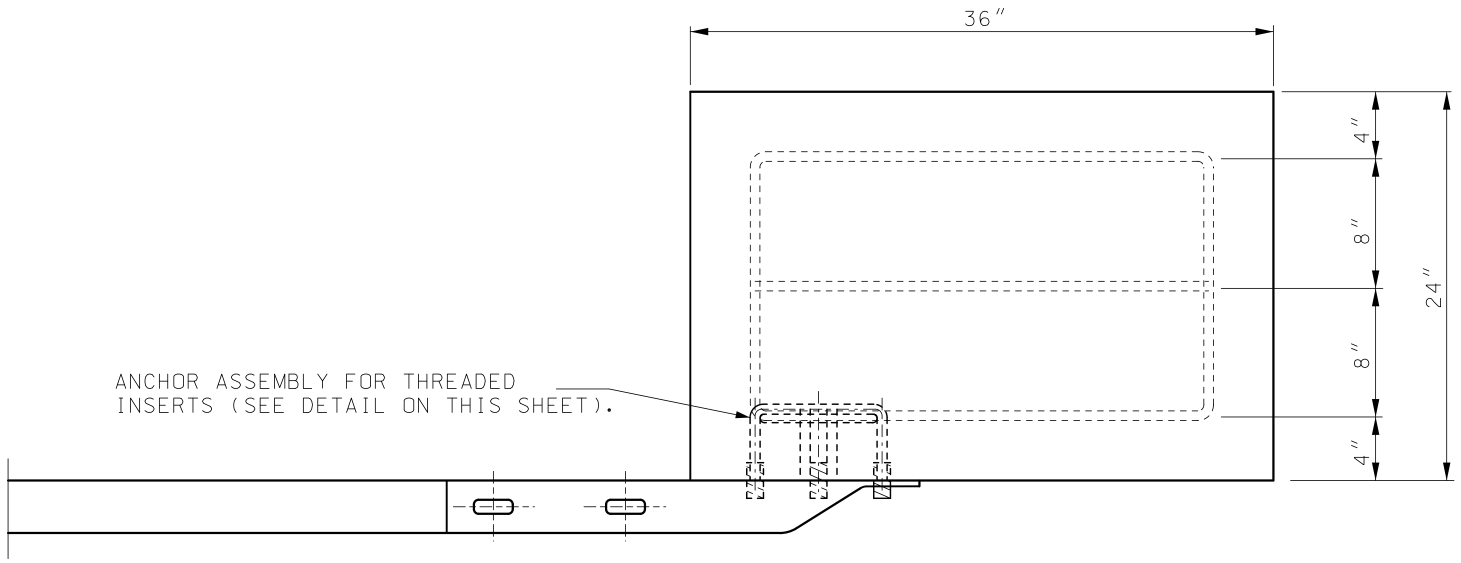
GUARDRAIL
EMBEDDED ANCHOR TERMINAL ENDS
(STEEL POST OPTION)

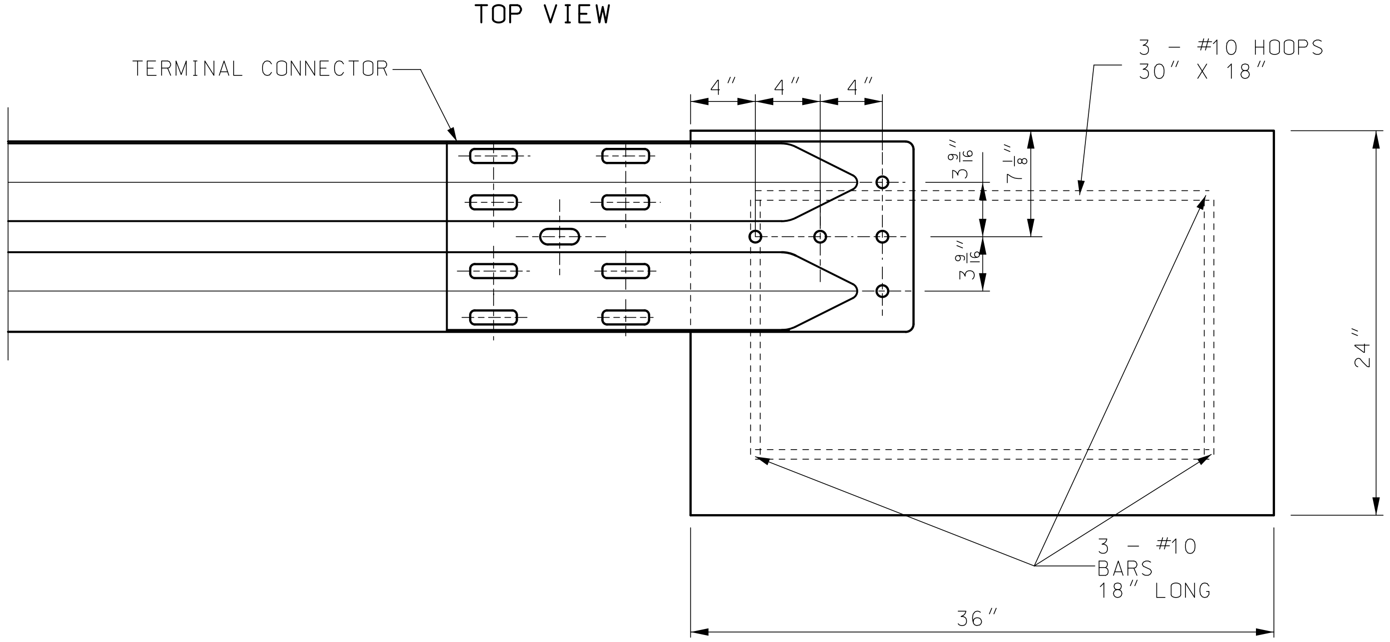
DATE EFFECTIVE:	04/01/2021	606.30L	SHEET NO.
DATE PREPARED:	1/27/2021		6 OF 7



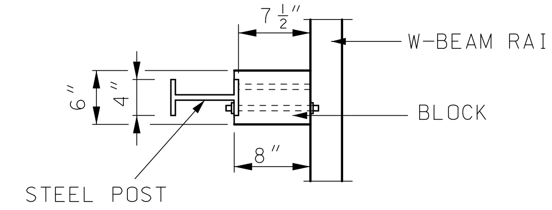
CONCRETE BLOCK ANCHOR
ANCHOR ASSEMBLY



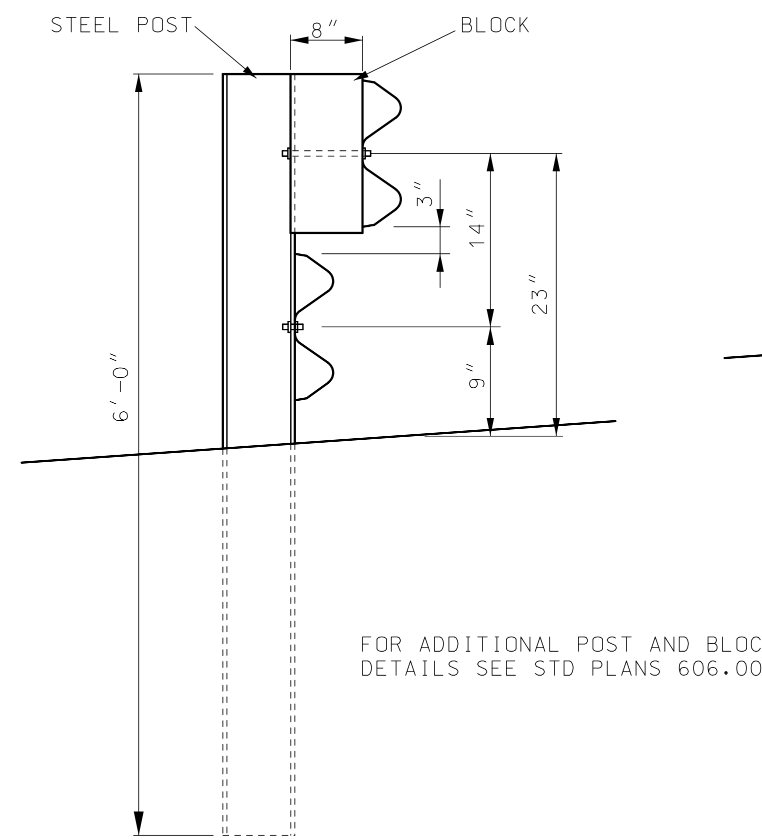
TOP VIEW



ELEVATION
CONCRETE BLOCK ANCHOR
(24" X 24" X 36")

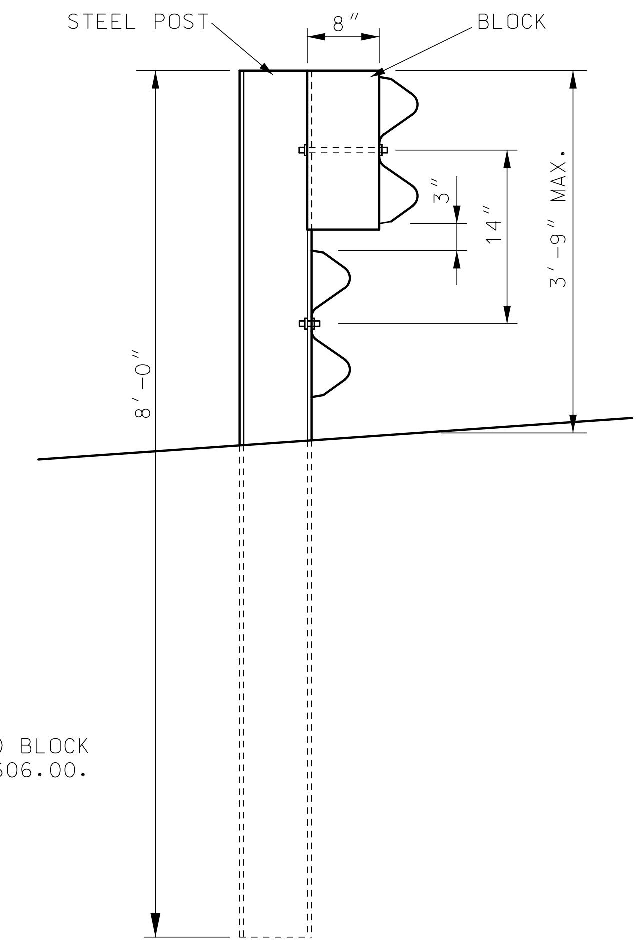


PLAN



FOR ADDITIONAL POST AND BLOCK DETAILS SEE STD PLANS 606.00.

ELEVATION OF 6' POST



ELEVATION 8' POST

STEEL POST AND BLOCK DETAIL

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STATE OF MISSOURI
TRAVIS D. KOESTNER
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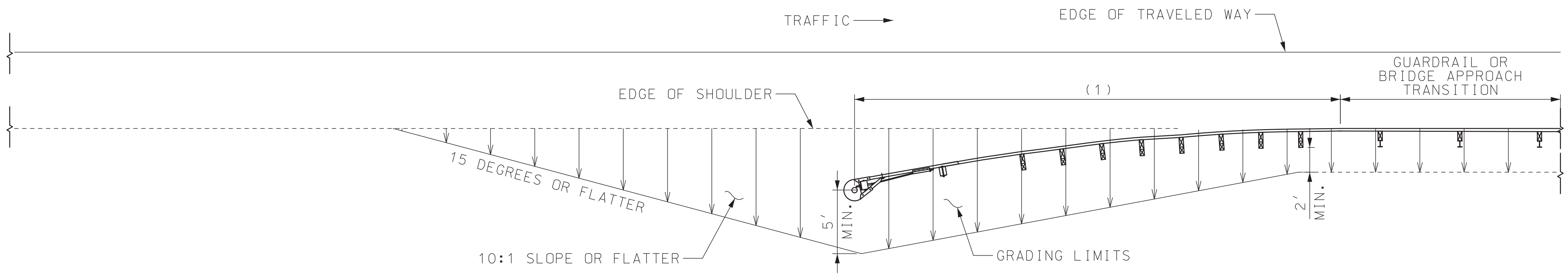
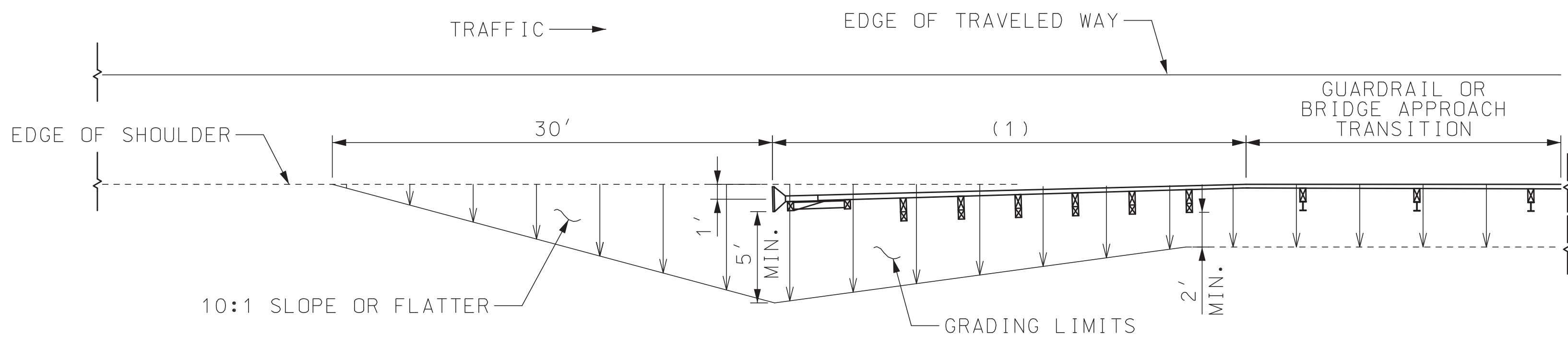
GUARDRAIL
EMBEDDED TERMINAL ENDS
GENERAL DETAILS

DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021

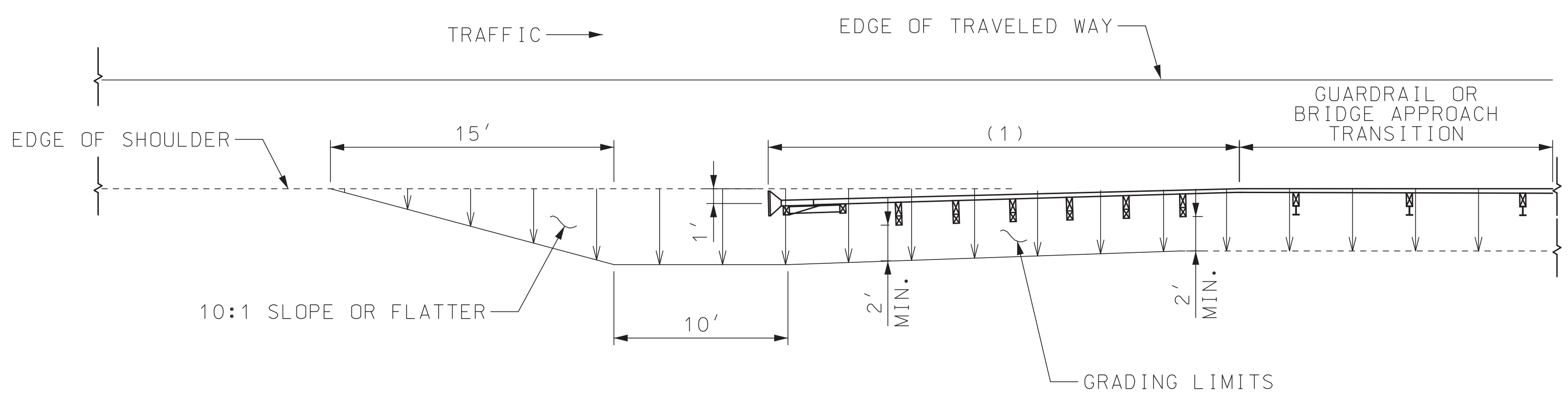
606.30L



GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS



ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS

(1) APPROVED CRASHWORTHY END TERMINAL

GENERAL NOTES:

STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE APPROVED CRASHWORTHY END TERMINAL.

END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED.

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CRASHWORTHY END TERMINALS
TYPE A
GRADING LIMITS

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

606.31B

SHEET NO. 1 OF 1

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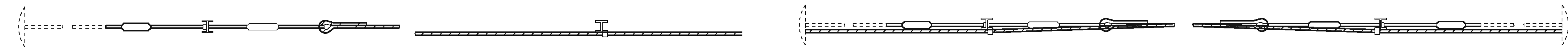
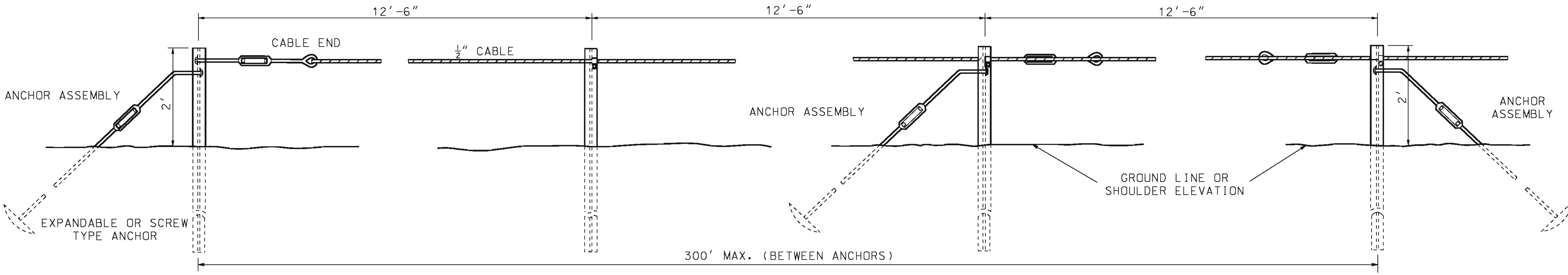


PLAN

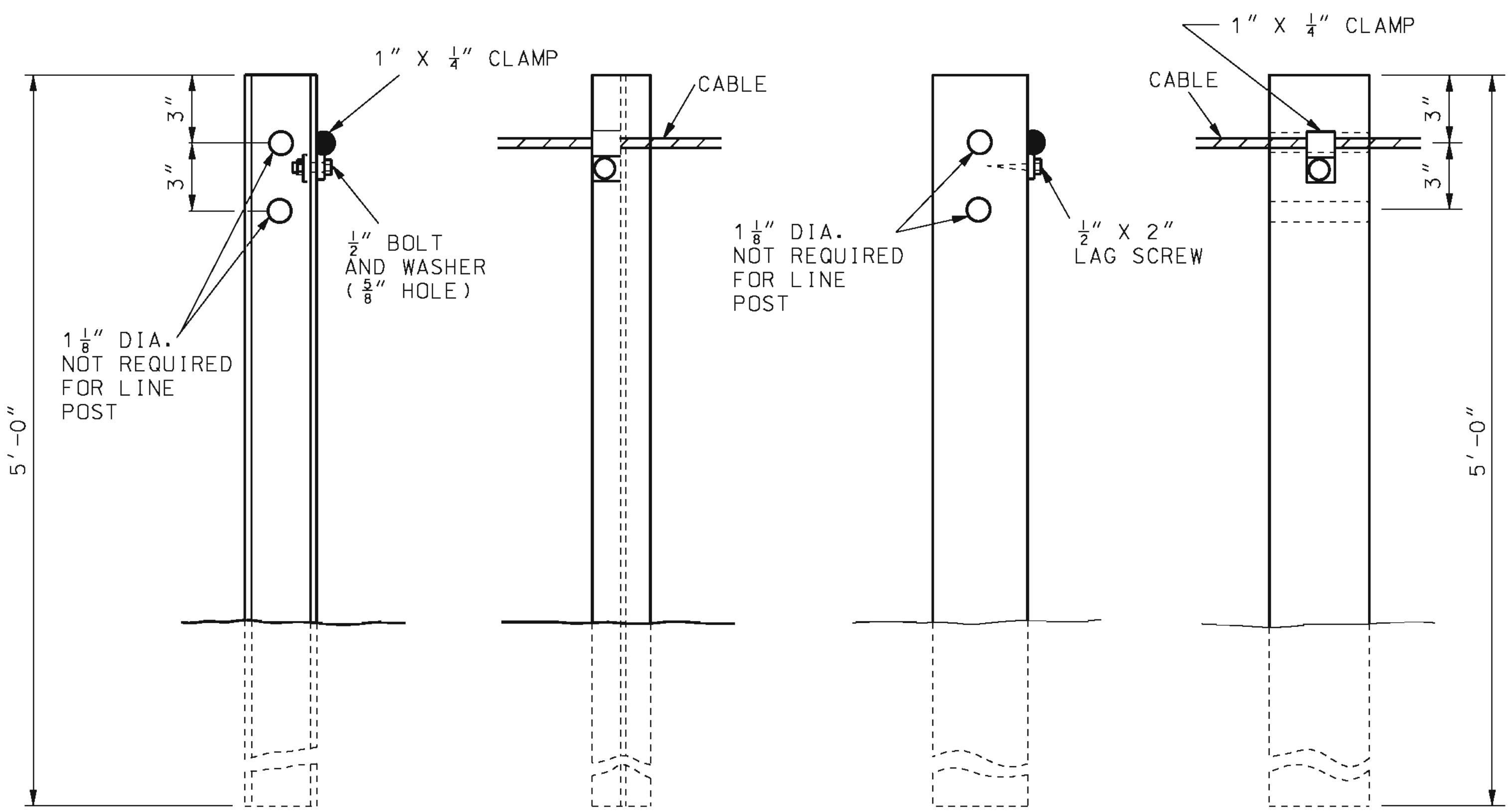


END ANCHOR

LINE POST

INTERMEDIATE ANCHOR

ELEVATION



STEEL POST

(S3 X 5.7 STD. BEAM)

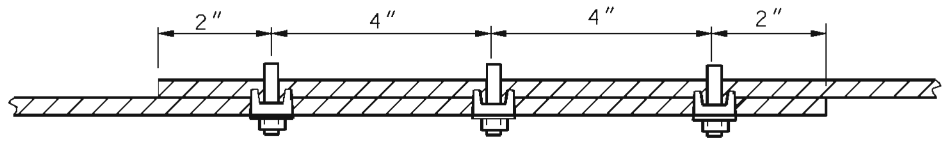
WOOD POST

(4″ X 4″ SQUARE OR 4″ ROUND)

POST DETAILS

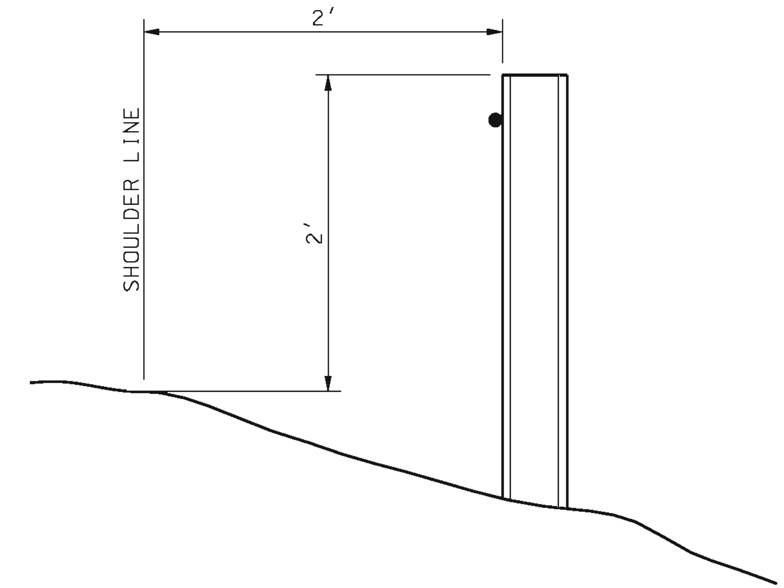
MoDOT	**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION** 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)
STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.	**ONE-STRAND ACCESS RESTRAINT CABLE**

DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/21/2009	606.40D	SHEET NO. 1 OF 2

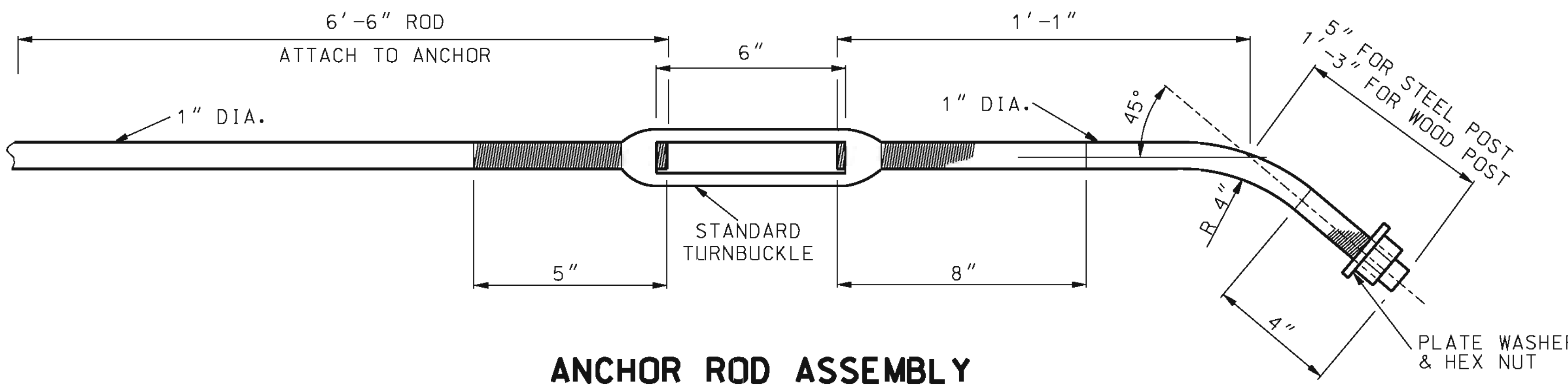


ACCESS-RESTRAINT CABLE GREATER THAN 300 FEET IN LENGTH REQUIRES AN INTERMEDIATE ANCHOR AS SHOWN.

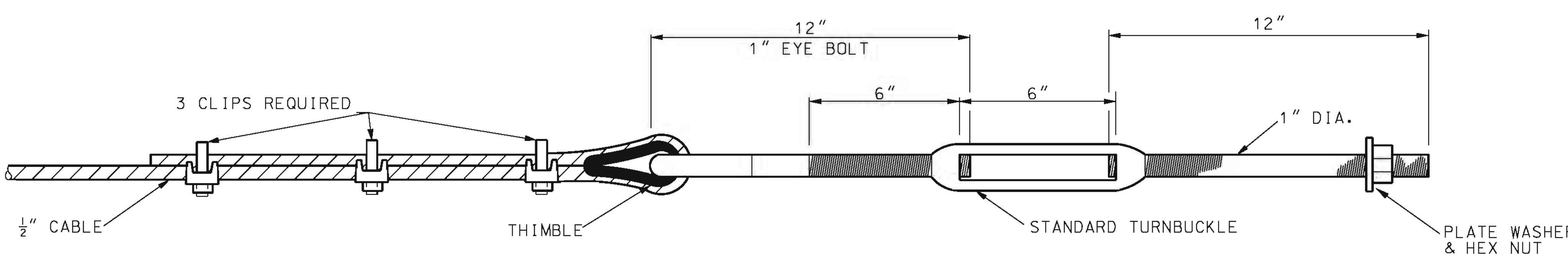
SPLICE DETAIL



TYPICAL LOCATION SHOULDER INSTALLATION



ANCHOR ROD ASSEMBLY



CABLE END

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
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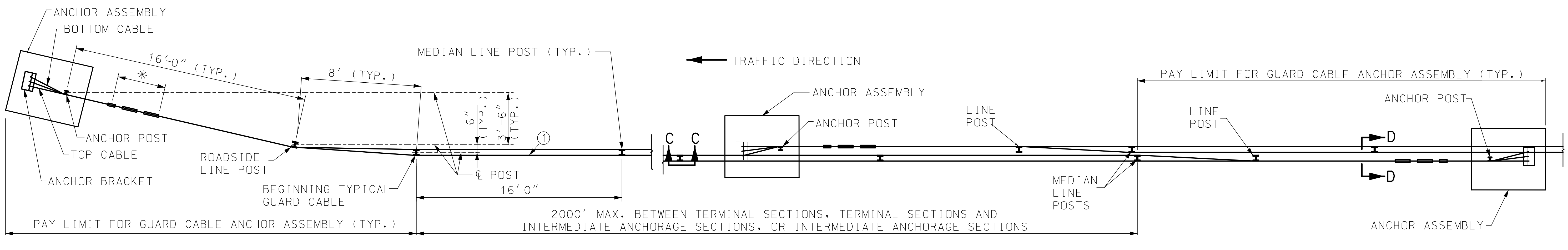
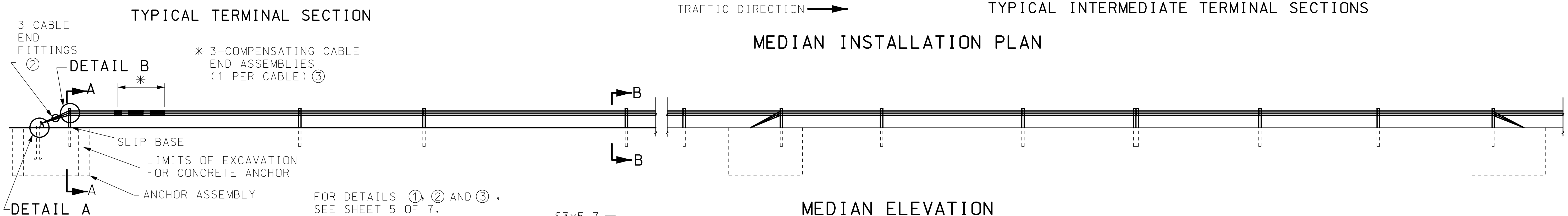
ONE-STRAND ACCESS RESTRAINT CABLE

DATE EFFECTIVE:	07/01/2004	606.40D	SHEET NO. 2 OF 2
DATE PREPARED:	8/21/2009		

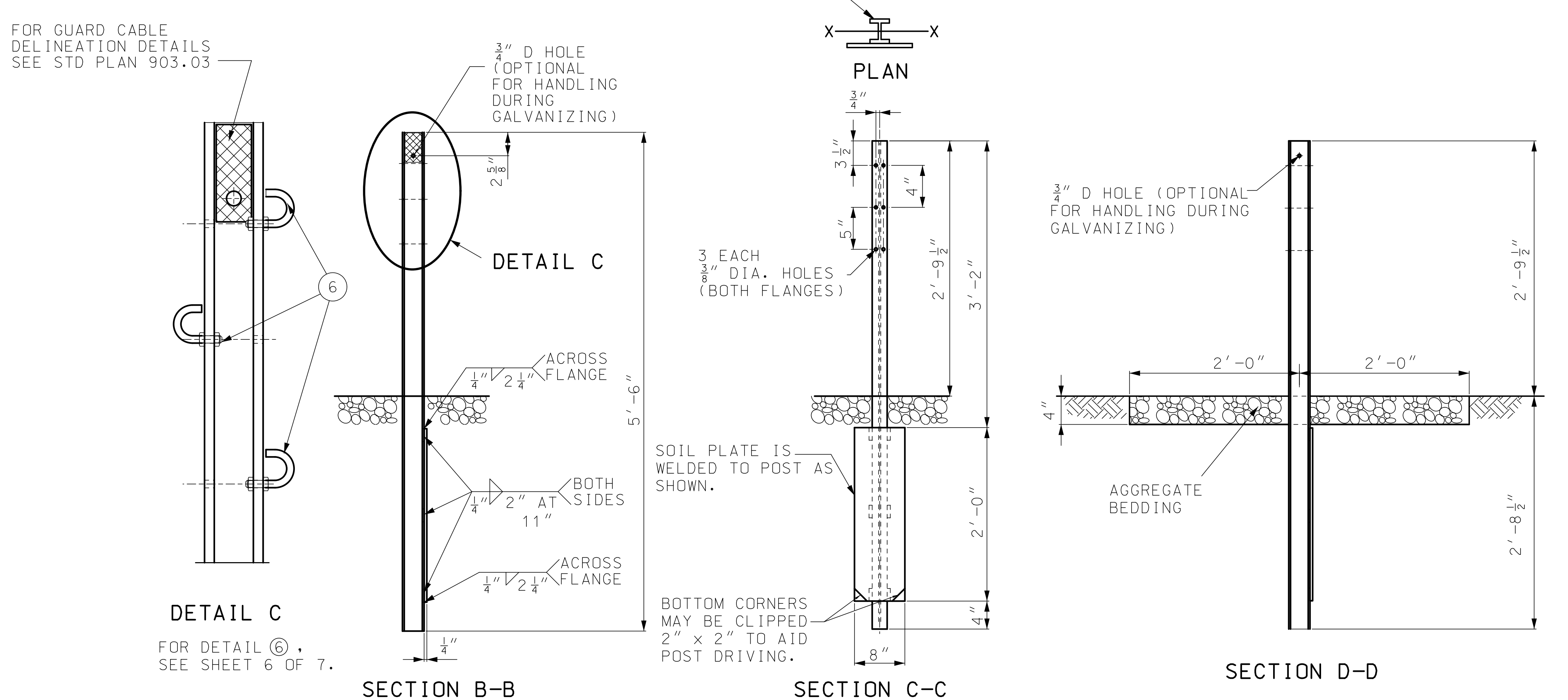
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



MEDIAN INSTALLATION PLAN



MEDIAN ELEVATION



LINE POST AND WELDED SOIL PLATE

GENERAL NOTES:

IN THE EVENT THE NORMAL 16' POST SPACING WOULD PLACE A POST ON A DROP INLET, THE SPACING OF THE TWO POSTS IMMEDIATELY PRECEDING THE INLET SHALL BE REDUCED SUCH THAT THE FOLLOWING POST CLEARS THE INLET. EACH SUBSEQUENT POST SHALL BE SPACED AT 16'. IN NO CASE SHALL THE SPACING EXCEED 16'.

IN THE EVENT A LONGITUDINAL MEDIAN PIPE IS ENCOUNTERED THE CABLE SHALL BE PLACED PARALLEL TO THE PIPE AT A MINIMUM OFFSET OF 12". THE OFFSET SHALL BE ACHIEVED BY A MINIMUM 16:1 TAPER ON THE UPSTREAM AND DOWNSTREAM END OF THE PIPE.

FOR SECTION A-A AND DETAIL B, SEE SHEET 4 OF 7.

FOR GUARD CABLE DELINEATION DETAILS SEE STD PLAN 903.03.

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TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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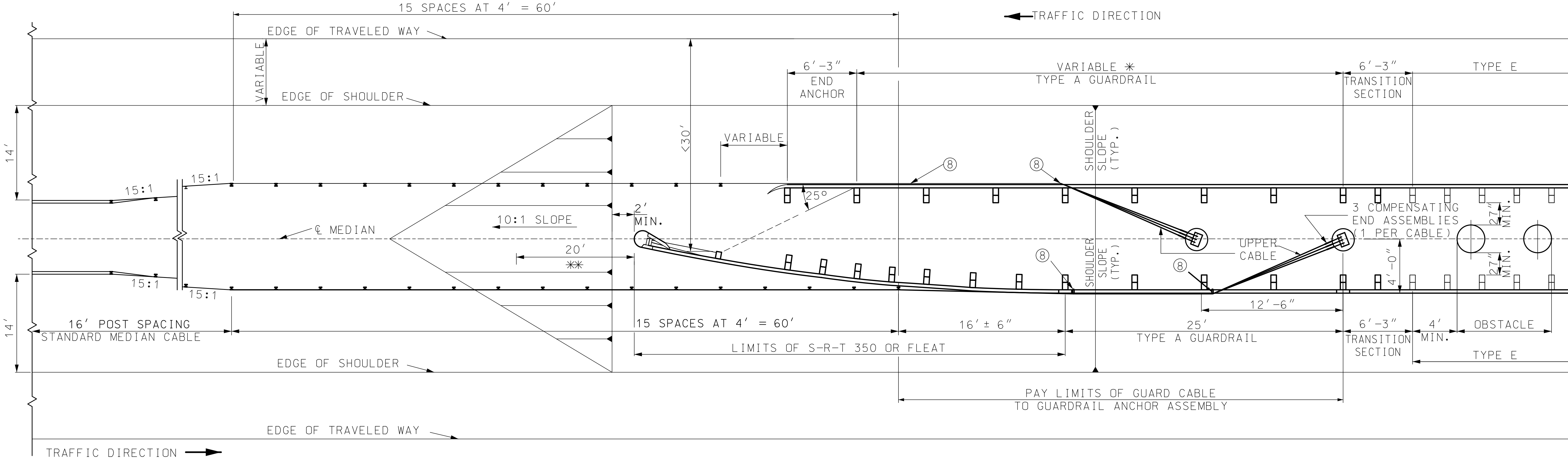
THREE-STRAND GUARD CABLE
MEDIAN APPLICATION

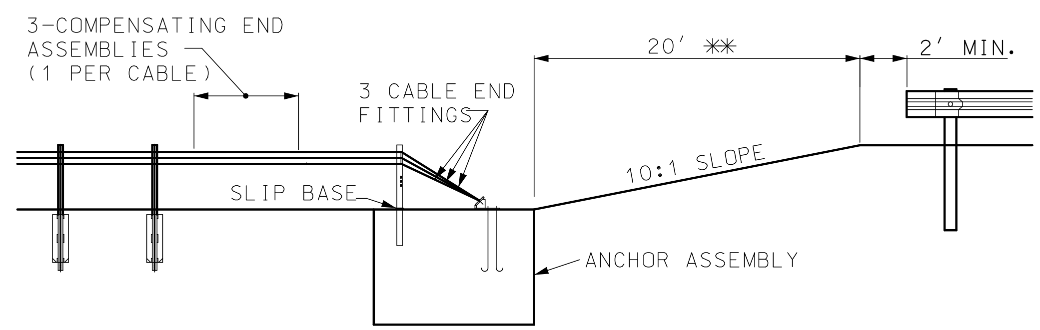
DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021
606.41M



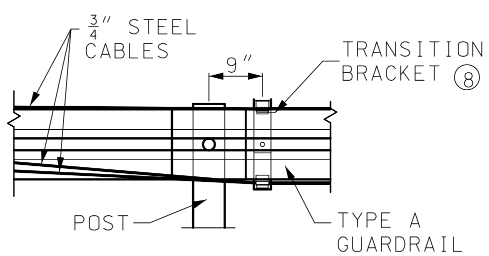
GUARD CABLE TO GUARDRAIL TRANSITION AT MEDIAN OBSTACLE

✳ VARY LENGTH TO ACHIEVE 25° DEFLECTION TO SECOND POST OF S-R-T 350 OR FLEAT.

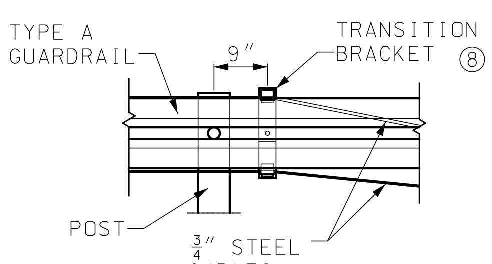
✳✳ IF GUARD CABLE IS USED WITH BULLNOSE GUARDRAIL SYSTEM, OR A CRASHWORTHY END TERMINAL ON A MEDIAN LESS THAN 60′ IN WIDTH, THE CABLE ANCHORAGE SHALL BE PLACED ON THE MEDIAN CENTERLINE 20′ FROM THE NOSE OF THE CRASHWORTHY END TERMINAL OR BULLNOSE GUARDRAIL SYSTEM.



PROFILE OF TRANSITION AT MEDIAN OBSTACLE WITH BULLNOSE OR IN A MEDIAN NARROWER THAN 60′

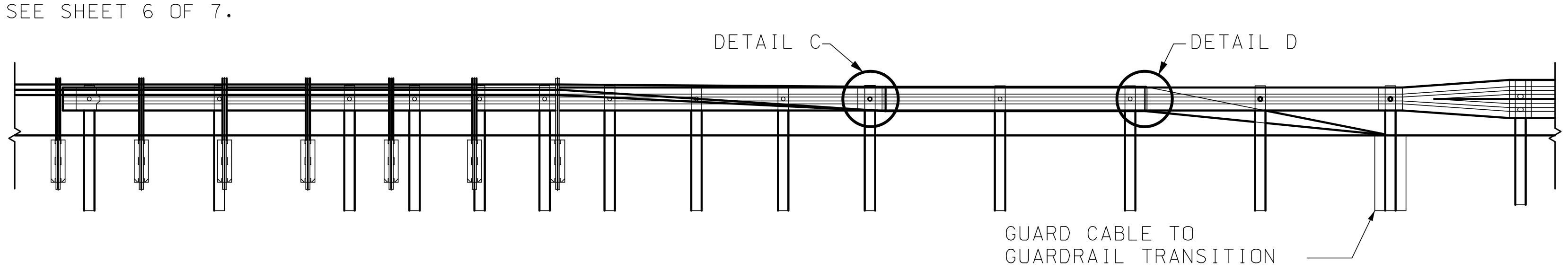


DETAIL C



DETAIL D

FOR DETAIL 8 SEE SHEET 6 OF 7.



TYPICAL GUARD CABLE TO GUARDRAIL TRANSITION ELEVATION

GENERAL NOTES:

WHEN GUARD CABLE IS LOCATED ALONG THE MEDIAN CENTERLINE NEAR A BRIDGE END OR CONCRETE BARRIER, IT SHALL BE ANCHORED BEHIND THE GUARDRAIL ASSEMBLY WITH THE GUARD CABLE ANCHOR ASSEMBLY. THE GUARD CABLE ANCHOR SHALL BE CONSTRUCTED SO THAT IT IS PROTECTED BY THE GUARDRAIL.

THIS DRAWING DEPICTS OPTIONS FOR THE ATTACHMENT OF GUARD CABLE TO GUARDRAIL. IT DOES NOT INDICATE THAT TWO RUNS OF CABLE ARE REQUIRED.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

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THREE-STRAND GUARD CABLE

DATE EFFECTIVE: 04/01/2021
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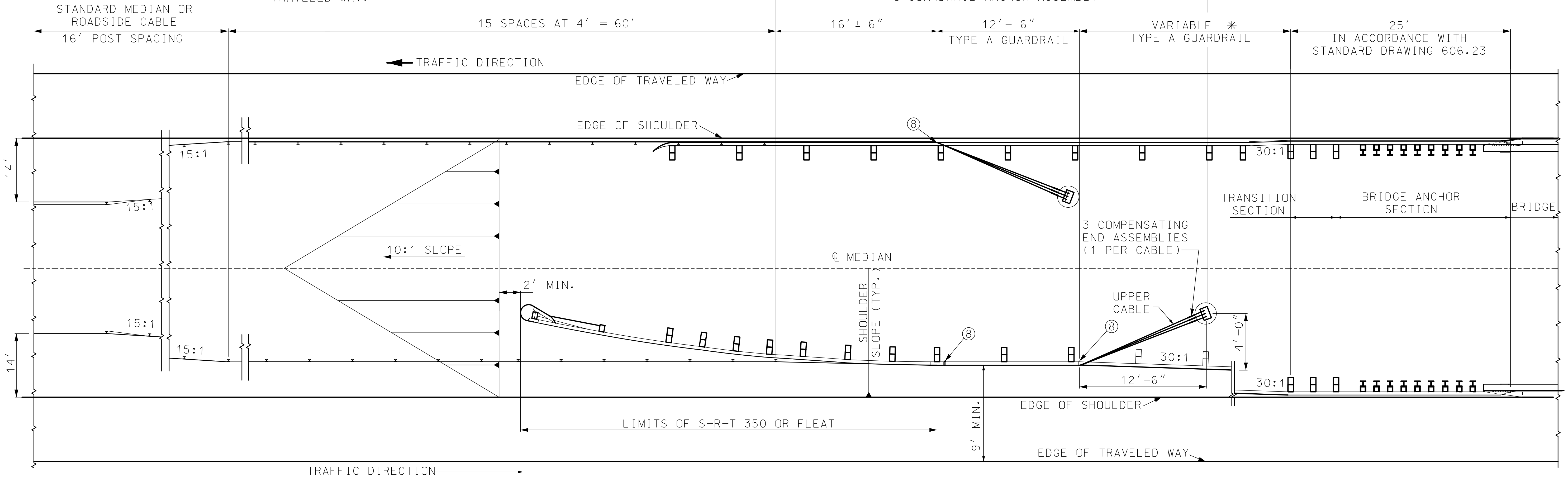
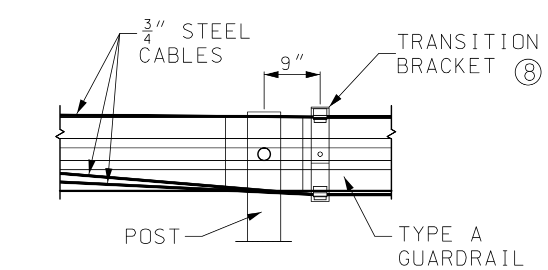
606.41M

SHEET NO. 2 OF 7

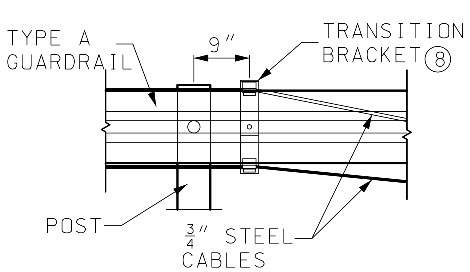
✻ LENGTH VARIES ACCORDING TO 30:1 TRANSITION LENGTH NEEDED TO ACHIEVE 9' MIN. OFFSET FROM EDGE OF TRAVELED WAY.



GUARD CABLE TO GUARDRAIL TRANSITION AT MEDIAN BRIDGE END

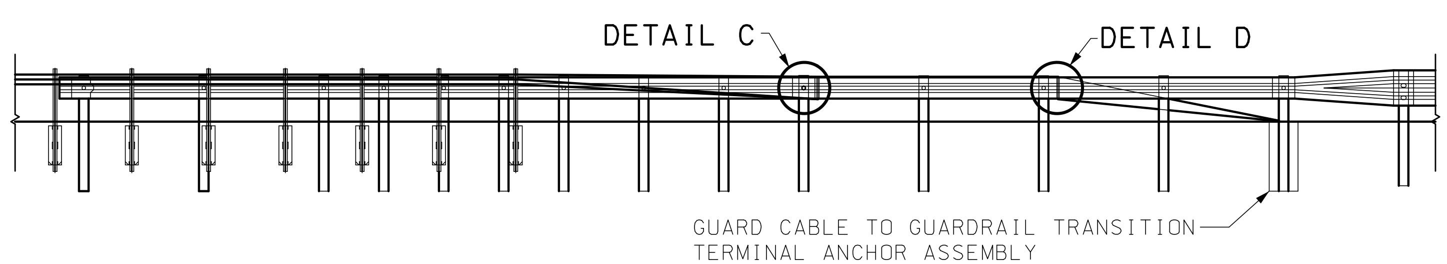


DETAIL C



DETAIL D

FOR DETAIL 8 SEE SHEET 6 OF 7.



TYPICAL GUARD CABLE TO GUARDRAIL TRANSITION ELEVATION

GENERAL NOTES:

WHEN GUARD CABLE IS LOCATED ALONG THE MEDIAN CENTERLINE NEAR A BRIDGE END OR CONCRETE BARRIER, IT SHALL BE ANCHORED BEHIND THE GUARDRAIL ASSEMBLY WITH THE GUARD CABLE ANCHOR ASSEMBLY. THE GUARD CABLE ANCHOR SHALL BE CONSTRUCTED SO THAT IT IS PROTECTED BY THE GUARDRAIL.

THIS DRAWING DEPICTS OPTIONS FOR THE ATTACHMENT OF GUARD CABLE TO GUARDRAIL. IT DOES NOT INDICATE THAT TWO RUNS OF CABLE ARE REQUIRED.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

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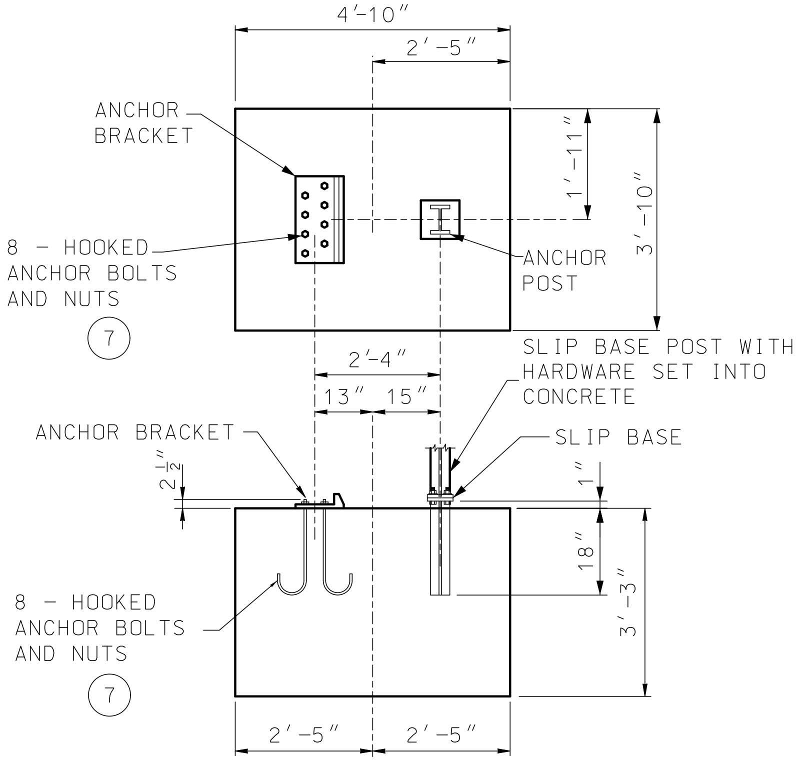
THREE-STRAND GUARD CABLE

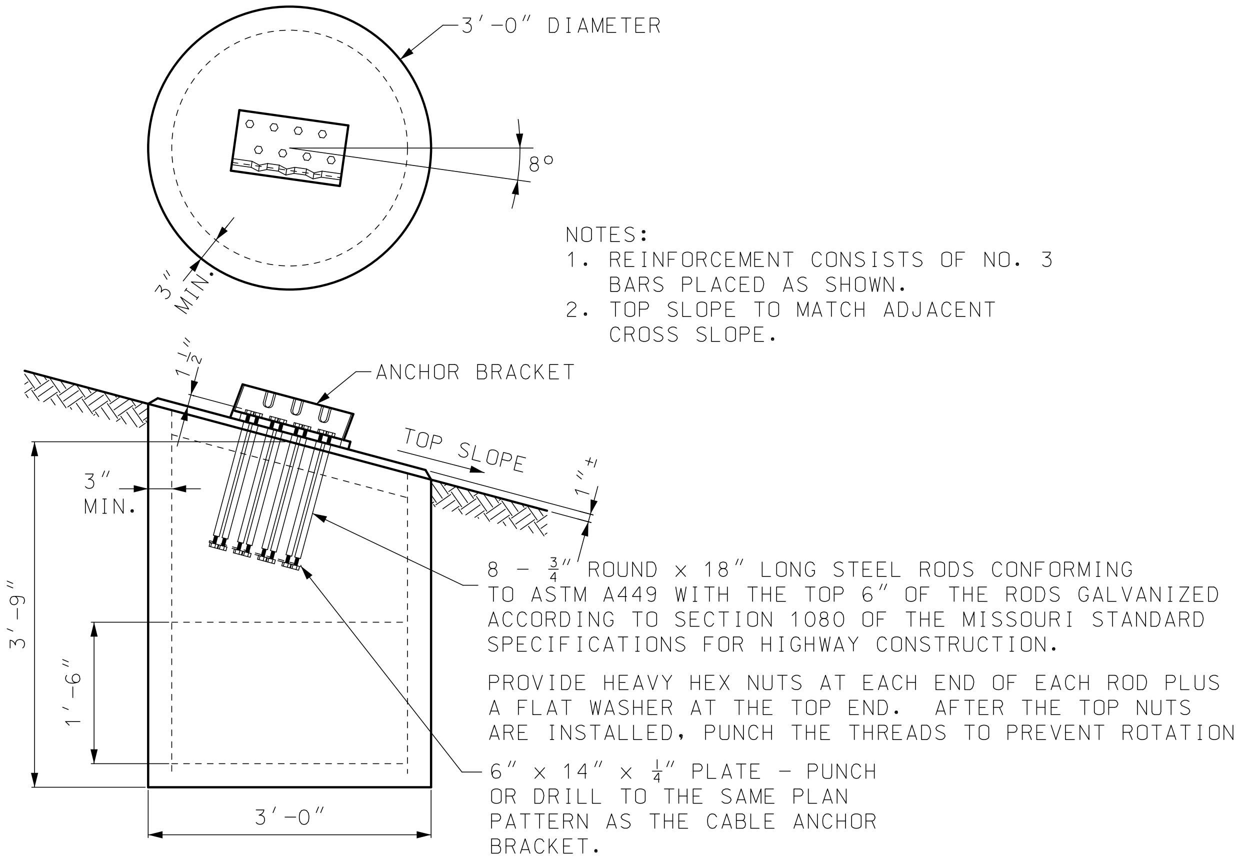
DATE EFFECTIVE: 04/01/2021		606.41M	SHEET NO. 3 OF 7
DATE PREPARED: 1/27/2021			

TERMINAL ANCHOR ASSEMBLY



MEDIAN AND ROADSIDE CABLE

NOTES:
1. PLACE ANCHORS SO THE TOPS ARE LEVEL; WARP SLOPE TO FIT.
2. THE CONCRETE ANCHOR BLOCK DOES NOT REQUIRE REINFORCEMENT.



NOTES:
1. REINFORCEMENT CONSISTS OF NO. 3 BARS PLACED AS SHOWN.
2. TOP SLOPE TO MATCH ADJACENT CROSS SLOPE.

GUARD CABLE TO GUARDRAIL TRANSITION

STANDARDIZED HARDWARE	
1	WIRE ROPE
2	CABLE END FITTING
3	COMPENSATING CABLE END ASSEMBLY
4	ANCHOR BRACKET
5	U-BOLT CABLE CLIPS
6	CABLE HOOK BOLT AND NUT
7	HOOKED ANCHOR BOLT AND NUTS
8	CABLE TRANSITION BRACKET

GENERAL NOTES:

FOR ARRANGEMENT OF SPRING AND COMPENSATING CABLE END ASSEMBLIES AND TURNBUCKLE CABLE END ASSEMBLIES, THE FOLLOWING CRITERIA SHALL APPLY: LENGTH OF CABLE RUNS TO 1000' - USE COMPENSATING CABLE END ASSEMBLY ON ONE END AND THE TURNBUCKLE CABLE END ASSEMBLY ON THE OTHER END OF EACH INDIVIDUAL CABLE. FOR LENGTHS LONGER THAN 1000' AND UP TO AND INCLUDING 2000' - USE COMPENSATING CABLE END ASSEMBLY ON EACH END OF THE INDIVIDUAL CABLE.

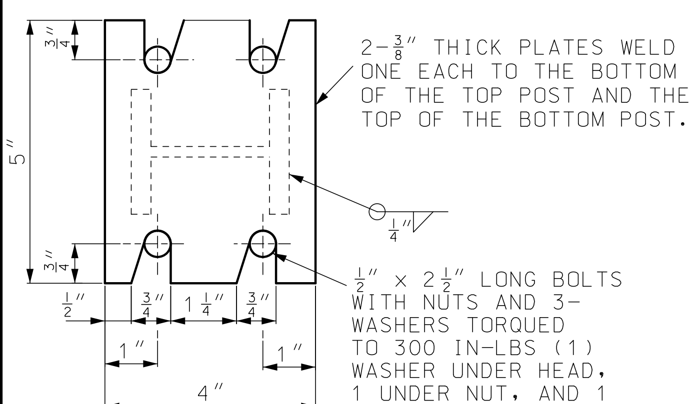
PRIOR TO FINAL ACCEPTANCE BY THE ENGINEER, THE FOLLOWING PROCEDURES SHALL BE USED TO TIGHTEN THE TURNBUCKLES. DEPENDING ON THE TEMPERATURE AT THE TIME OF THE ADJUSTMENT IN ACCORDANCE WITH THE FOLLOWING TABLE:

TEMPERATURE (°F)	SPRING COMPRESSION FROM UNLOADED POSITION IN EACH SPRING
120 TO 100	1"
99 TO 80	1 1/2"
79 TO 60	2"
59 TO 40	2 1/2"
39 TO 20	3"
19 TO 0	3 1/2"
-1 TO -20	4"

THE SPECIFICATIONS AND DIMENSIONS OF ALL HARDWARE AND FITTINGS SHALL COMPLY WITH AASHTO-AGC-ARTBA JOINT COMMITTEE TASK FORCE 13 REPORT, A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.

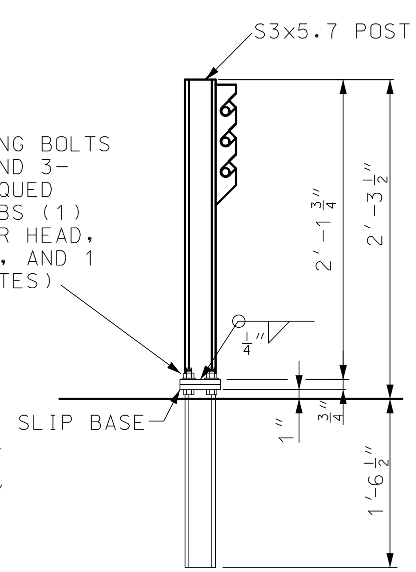
FOR DETAILS 2 AND 4, SEE SHEET 5 OF 7.

FOR DETAIL 5 AND 7, SEE SHEET 6 OF 7.

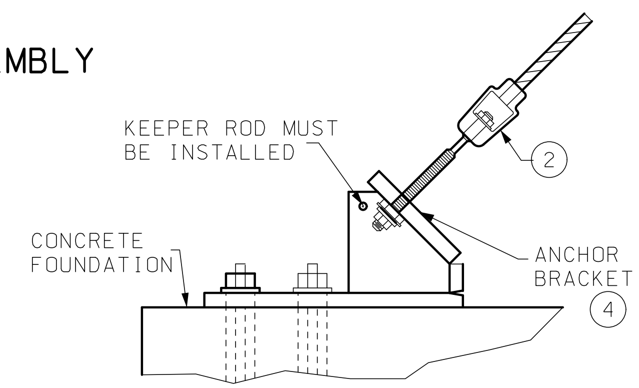


SLIP BASE PLATE

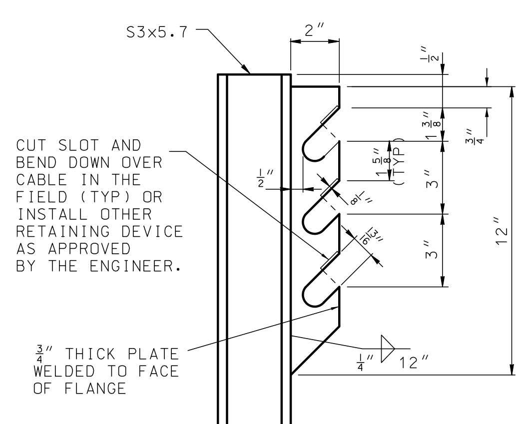
NOTES:
1. LINE POST CABLE SPACING SHALL BE TRANSITIONED TO 3" BETWEEN THE TWO LINE POSTS IMMEDIATELY PRECEDING THE ANCHOR POST.
2. CABLES PLACED ON BOTH POST FACES SHALL BE TRANSITIONED TO THE FRONT FACE BETWEEN THE TWO LINE POSTS IMMEDIATELY PRECEDING THE ANCHOR POST.



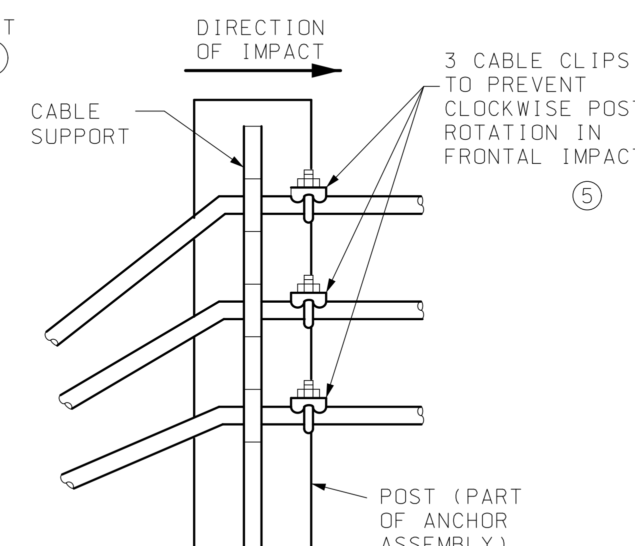
SECTION A-A
ANCHOR POST



DETAIL A
ANCHOR BRACKET
DETAIL FROM SHEET 1.



CABLE SUPPORT



DETAIL B
CABLE CLIPS

DETAIL FROM SHEET 1.

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STATE OF MISSOURI
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NUMBER PE-30042
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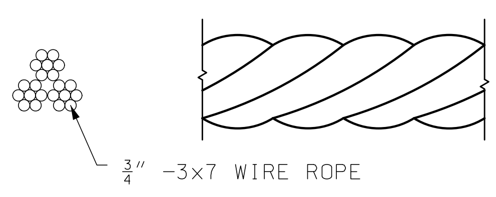
THREE-STRAND GUARD CABLE

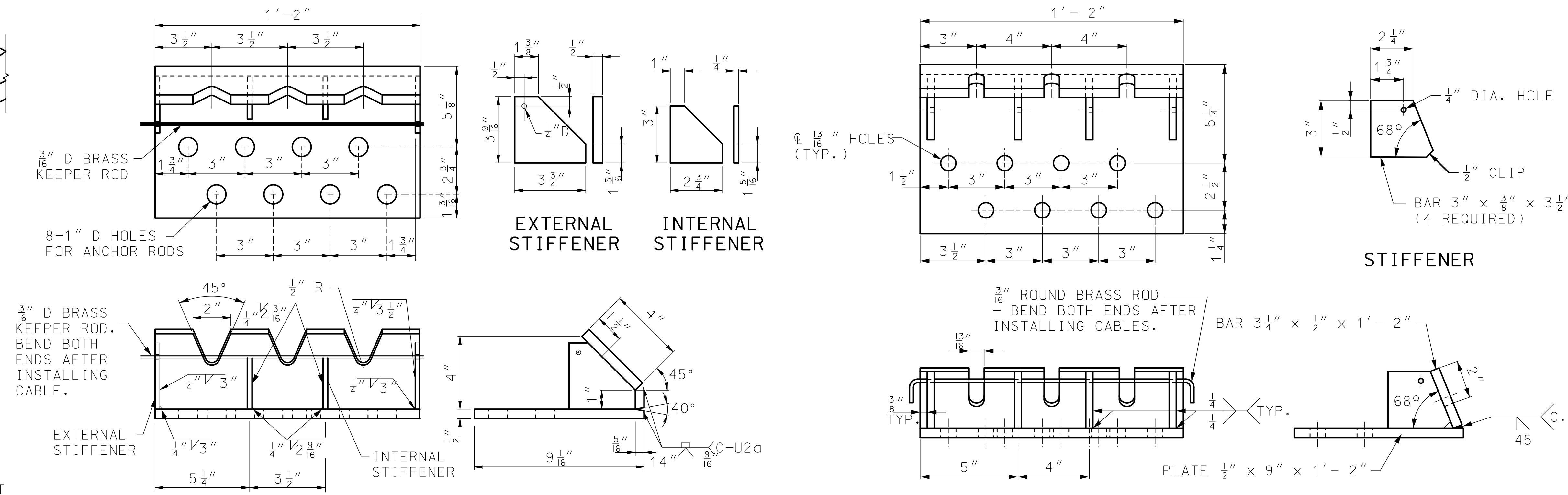
DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021

606.41M

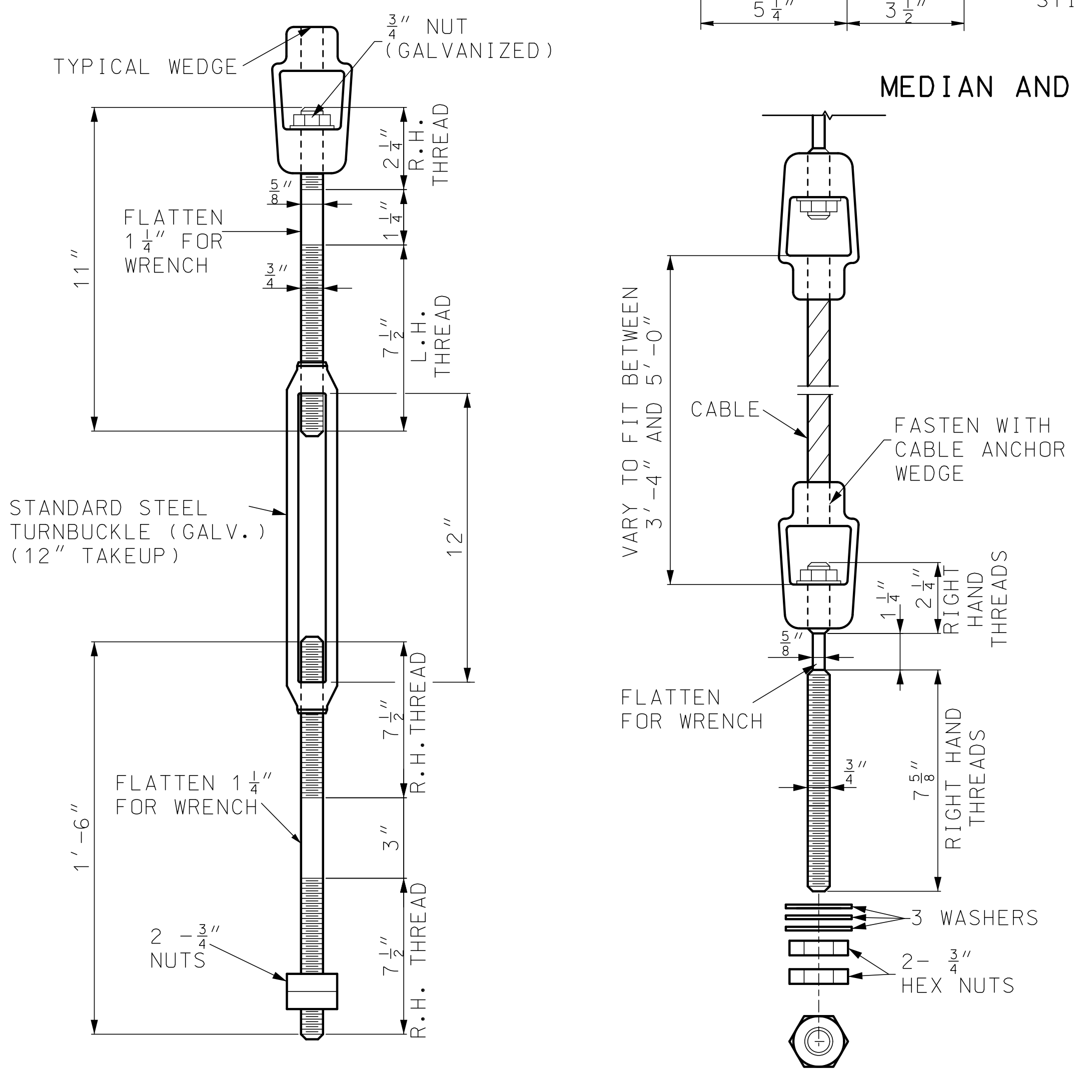
SHEET NO. 4 OF 7



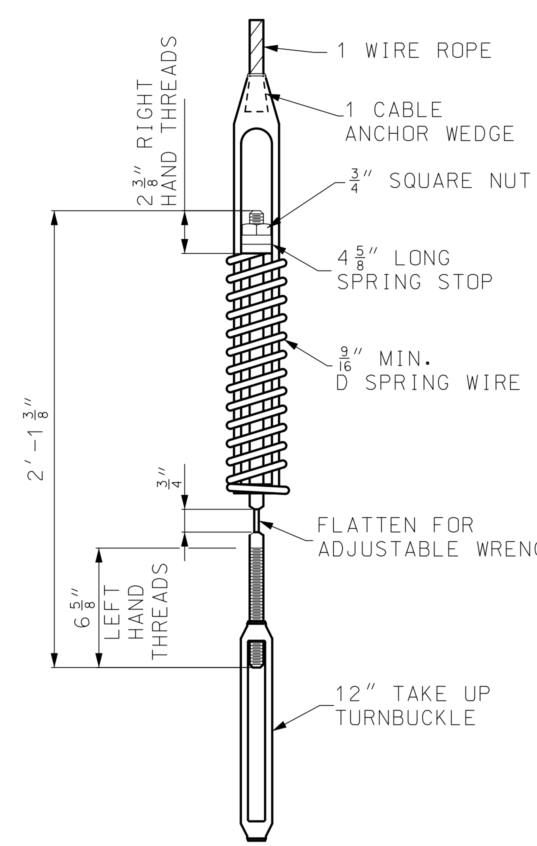
① WIRE ROPE



④ ANCHOR BRACKET



② CABLE END FITTINGS



③ COMPENSATING CABLE END ASSEMBLY

GENERAL NOTES:

AT ALL LOCATIONS WHERE THE CABLE IS CONNECTED TO A CABLE SOCKET WITH A WEDGE TYPE CONNECTION, ONE WIRE OF THE WIRE ROPE SHALL BE CRIMPED OVER THE BASE OF THE WEDGE TO HOLD IT FIRMLY IN PLACE.

THE SPECIFICATIONS AND DIMENSIONS OF ALL HARDWARE AND FITTINGS SHALL COMPLY WITH AASHTO-AGC-ARTBA JOINT TASK FORCE 13 REPORT, A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.

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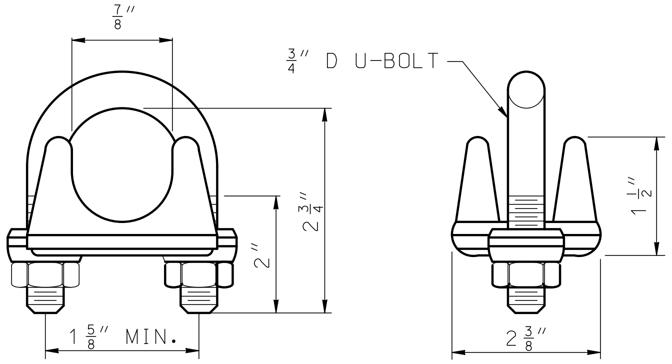
THREE-STRAND GUARD CABLE

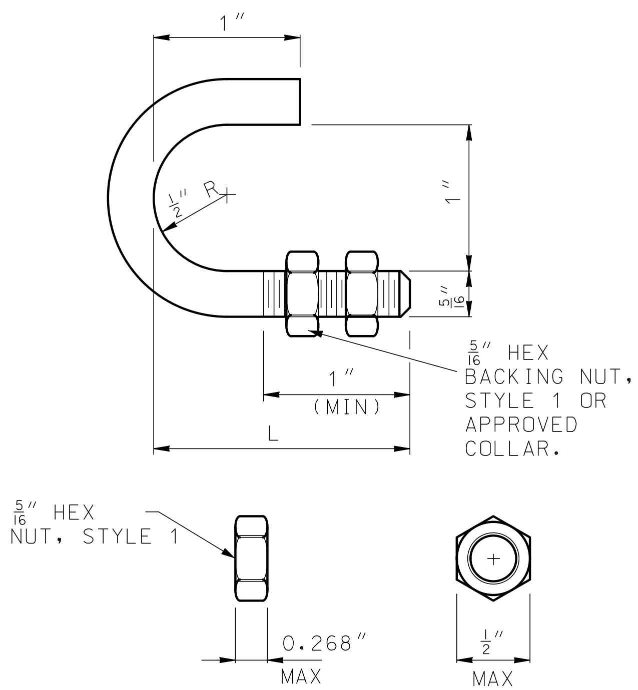
DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021

606.41M

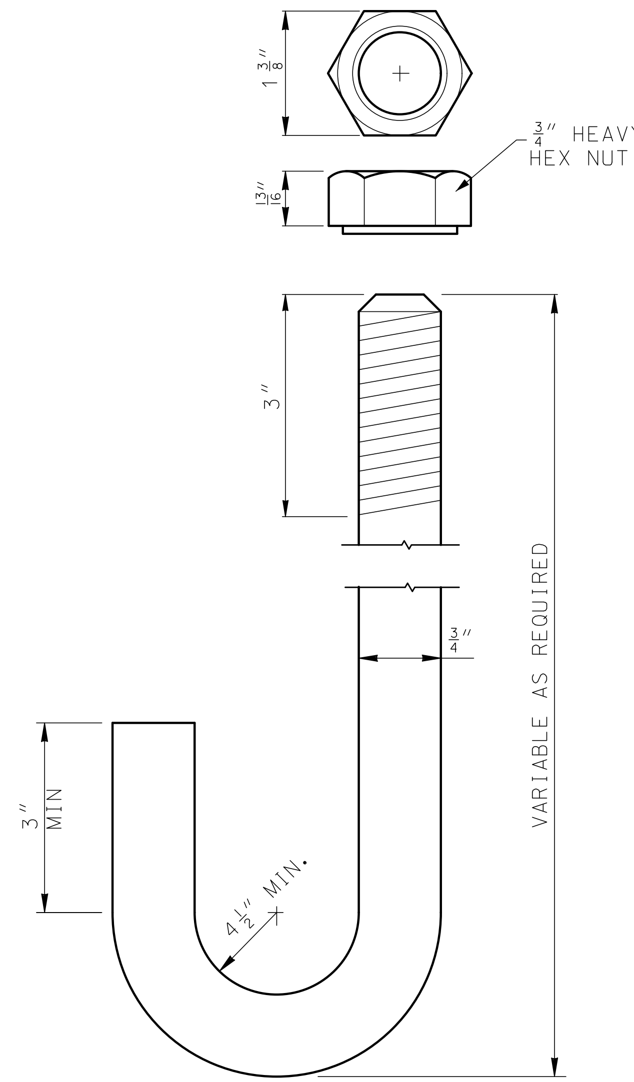
SHEET NO. 5 OF 7



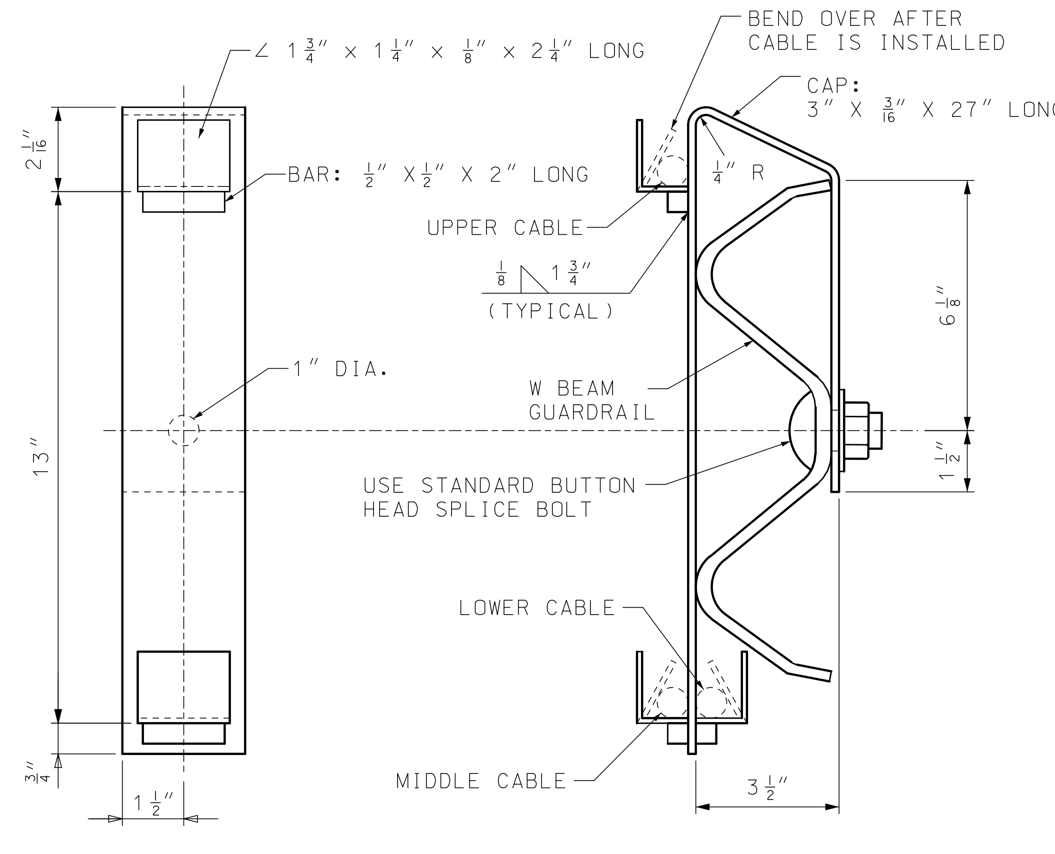
⑤ U-BOLT CABLE CLIPS



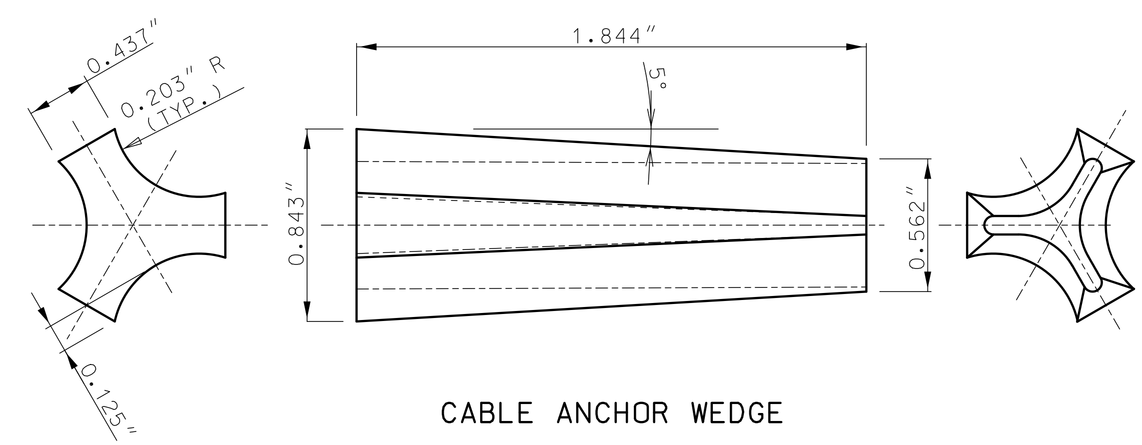
⑥ CABLE HOOK BOLT AND NUT



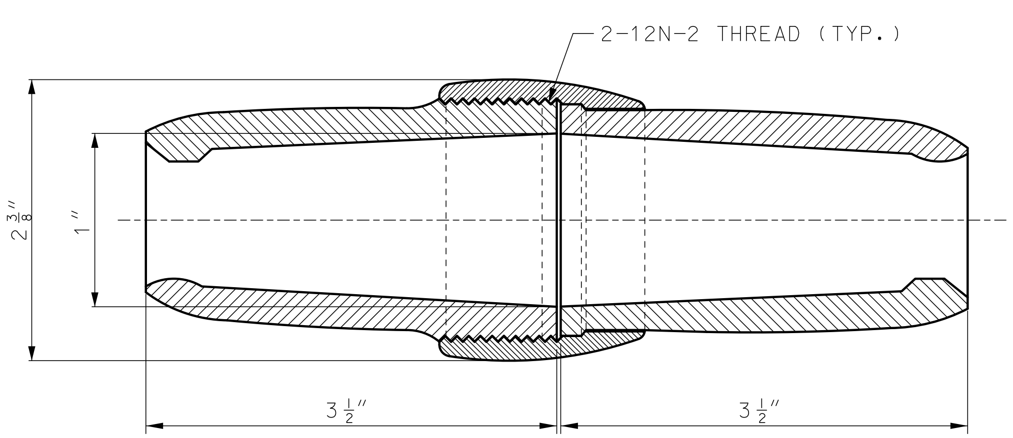
⑦ 25″ HOOKED ANCHOR
BOLT AND NUT



⑧ CABLE TRANSITION BRACKET



CABLE ANCHOR WEDGE



NOTE:
FITTING SPLICE SHALLDEVELOP THE FULL
STRENGTH OF THE CABLE (25,000 LB.).

CABLE SPLICE

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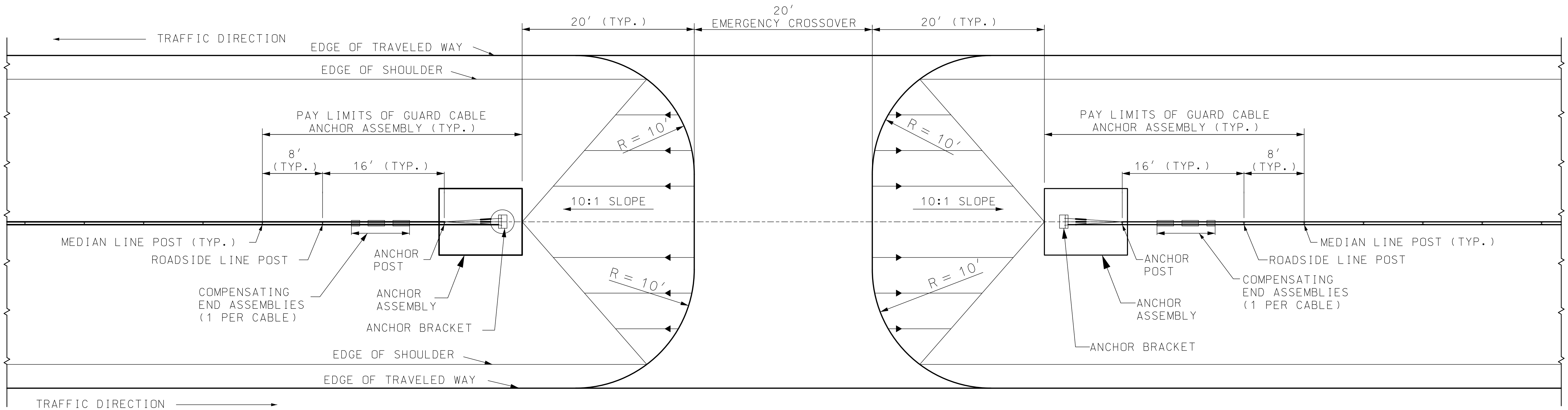
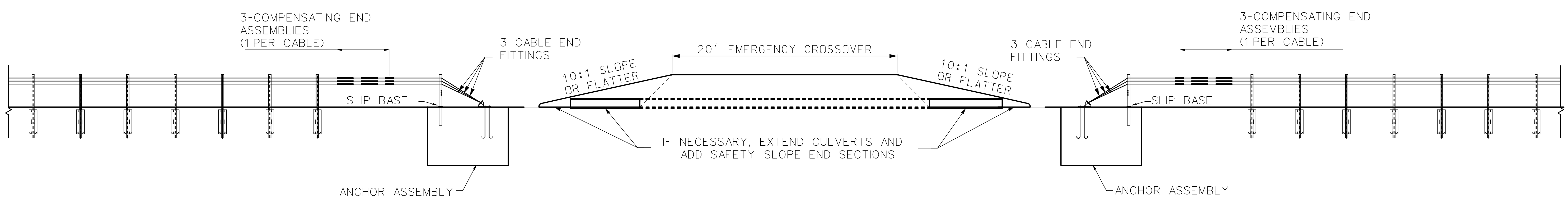
THREE-STRAND
GUARD CABLE

DATE EFFECTIVE:	04/01/2021	606.41M	SHEET NO. 6 OF 7
DATE PREPARED:	1/27/2021		



PLAN



PROFILE

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

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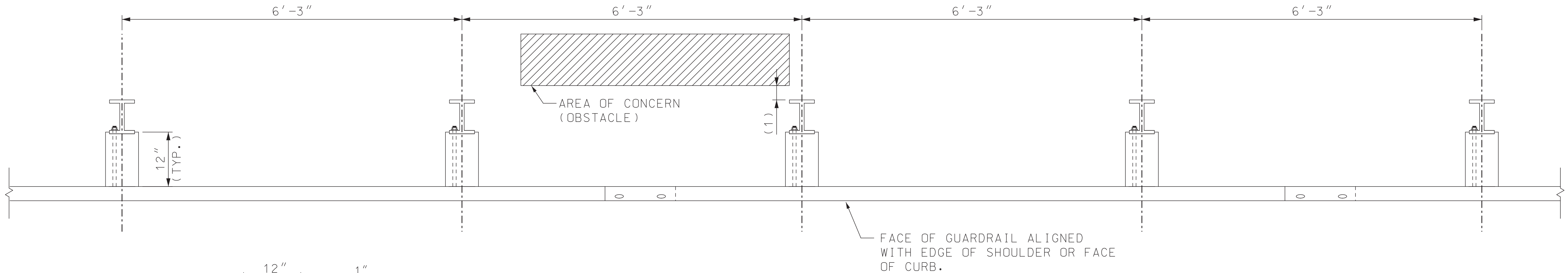
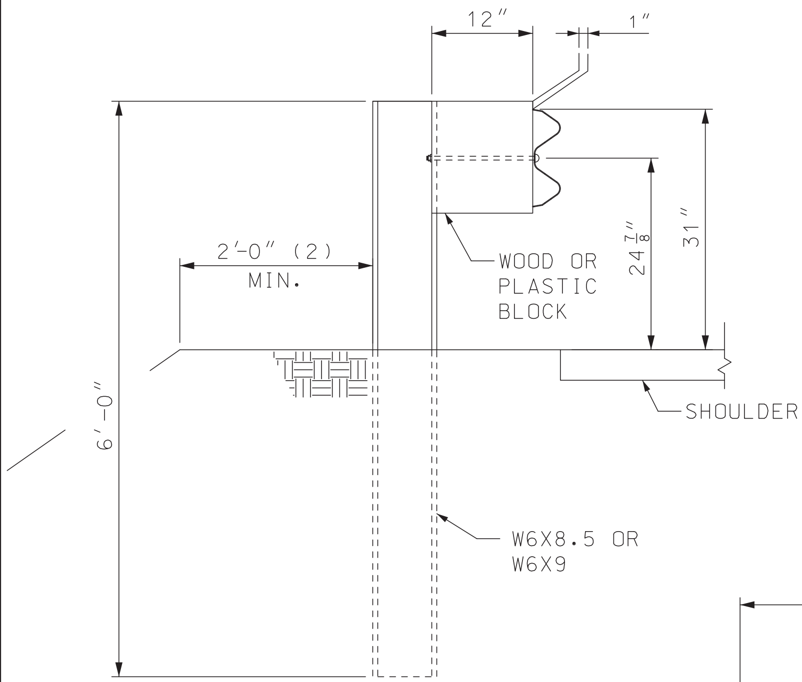
THREE-STRAND
GUARD CABLE
TRANSITION AT MEDIAN OPENING

DATE EFFECTIVE:	04/01/2021	606.41M	SHEET NO. 7 OF 7
DATE PREPARED:	1/27/2021		



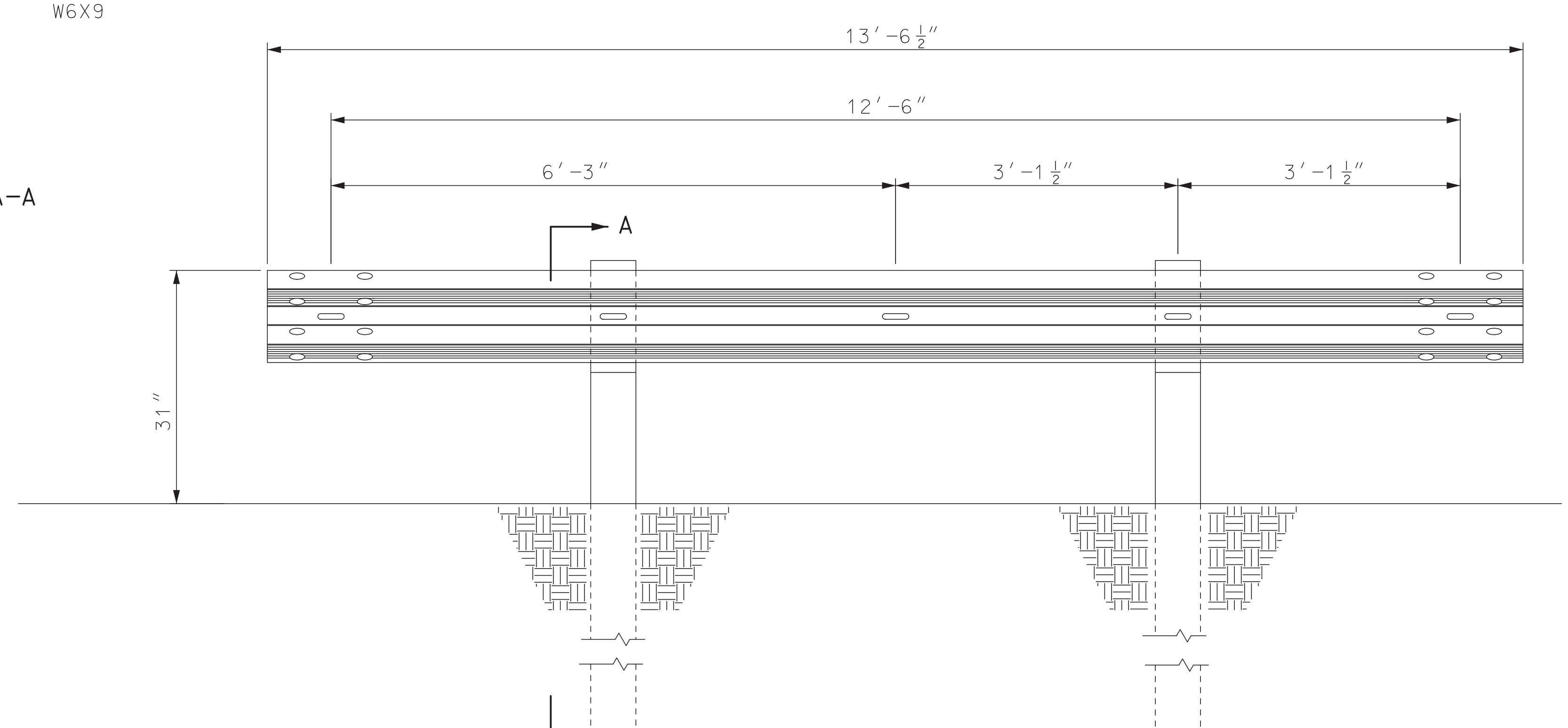
PLAN VIEW



SECTION A-A

(1) 2′-6″ MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6′-3″ POST SPACINGS, 2′-0″ MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 3′-1½″ POST SPACINGS, OR 1′-6″ MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 1′-6¾″ POST SPACINGS. SEE SHEET 4 OF 8 FOR POST SPACING DETAILS.

(2) WHEN 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).



ELEVATION VIEW

GENERAL NOTES:

FOR INITIAL INSTALLATION, CONSTRUCT THE GUARDRAIL WITHIN 1″ OF THE STANDARD 31″ HEIGHT TO THE TOP OF W-BEAM RAIL. WHEN SUBSEQUENT PROJECTS, SUCH AS RESURFACINGS, AFFECT THE HEIGHT OF EXISTING GUARDRAIL, ADJUSTMENT IS NOT REQUIRED IF THE FINISHED HEIGHT IS WITHIN 3″ OF THE STANDARD HEIGHT.

THE STANDARD POST LENGTH IS 6′-0″ (+3″,-0″ TOLERANCE).

THE SUBSTITUTION OF 8 FOOT POSTS IN LIEU OF REQUIRED GRADING, TO CONSTRUCT LESS THAN THE DESIGNED TYPICAL SECTION, SHALL NOT BE ALLOWED.

REFER TO AASHTO M 180 FOR DIMENSIONAL DETAILS OF W-BEAM, RELATED BUFFER AND END SECTIONS, BEAM SPLICES, POST AND SPLICE BOLTS, NUTS, AND TYPE 1 W-BEAM TO THRIE BEAM TRANSITION SECTIONS.

BEAM WASHERS ARE NOT TO BE USED. BOLT SHALL BE ASTM A307.

UNLESS OTHERWISE SPECIFIED, W-BEAM RAIL IS 12 GAUGE STEEL WITH AN EFFECTIVE LENGTH OF 12′-6″ OR 25′-0″, WITH 29⁄32″ X 1⅛″ SPLICE BOLT SLOTS, AND ¾″ X ½″ POST BOLT SLOTS ON 3′-1½″ CENTERS REGARDLESS OF POST SPACING.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

LAP SPLICES BETWEEN TWO RAILS OR BETWEEN A RAIL AND TERMINAL CONNECTOR IN THE DIRECTION OF TRAFFIC. LAP THE FLARED END SECTIONS IN THE DIRECTION OF TRAFFIC.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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JEFFERSON CITY, MO 65102
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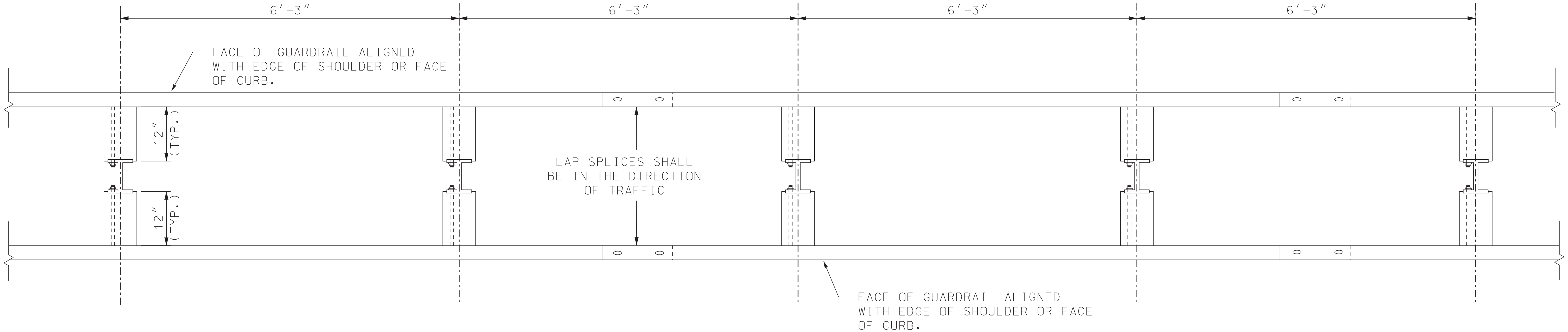
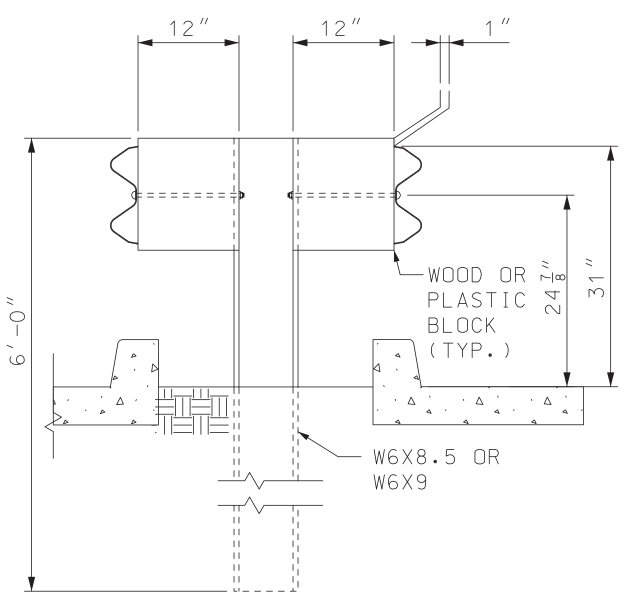
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL

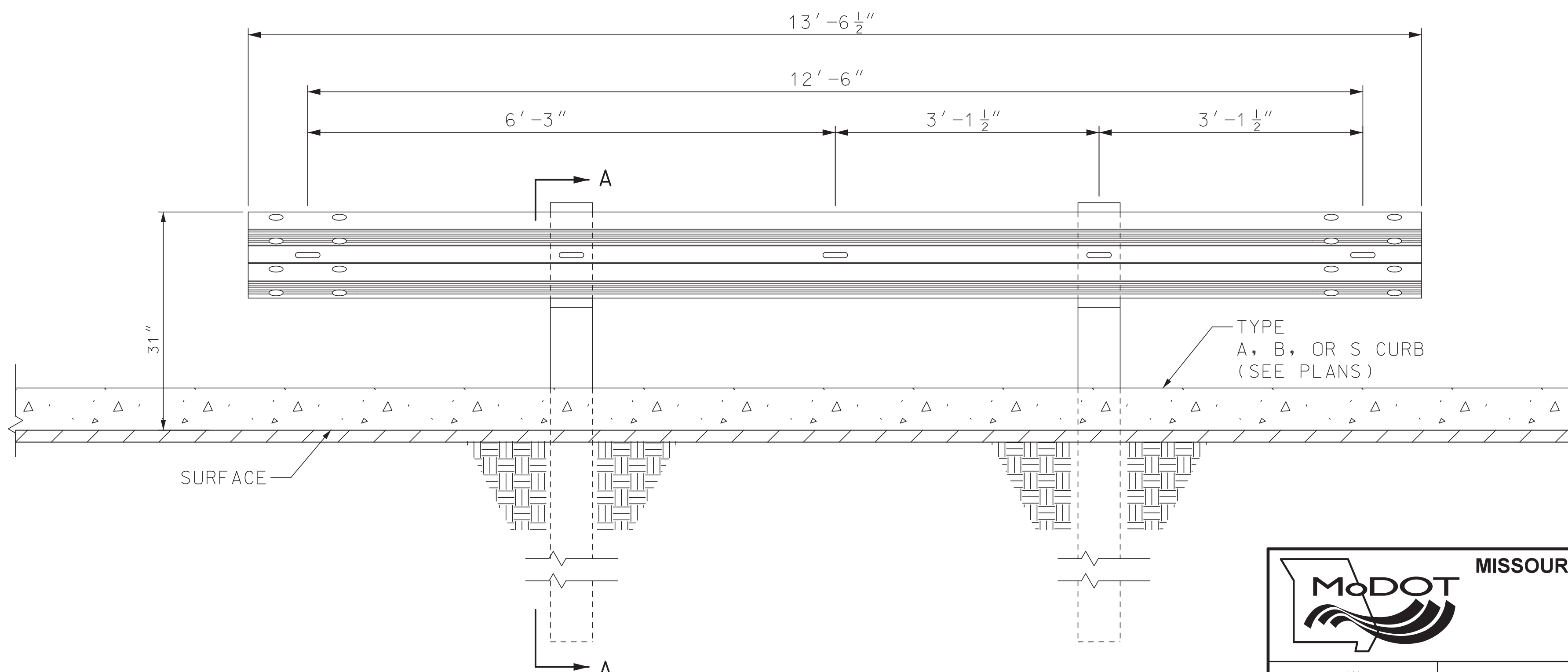
DATE EFFECTIVE: 01/01/2023
DATE PREPARED: 10/7/2022
606.50E



PLAN VIEW



SECTION A-A



ELEVATION VIEW

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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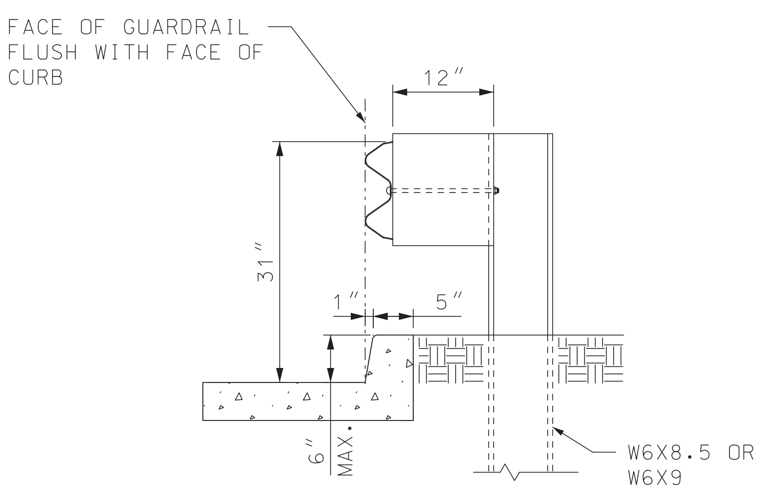
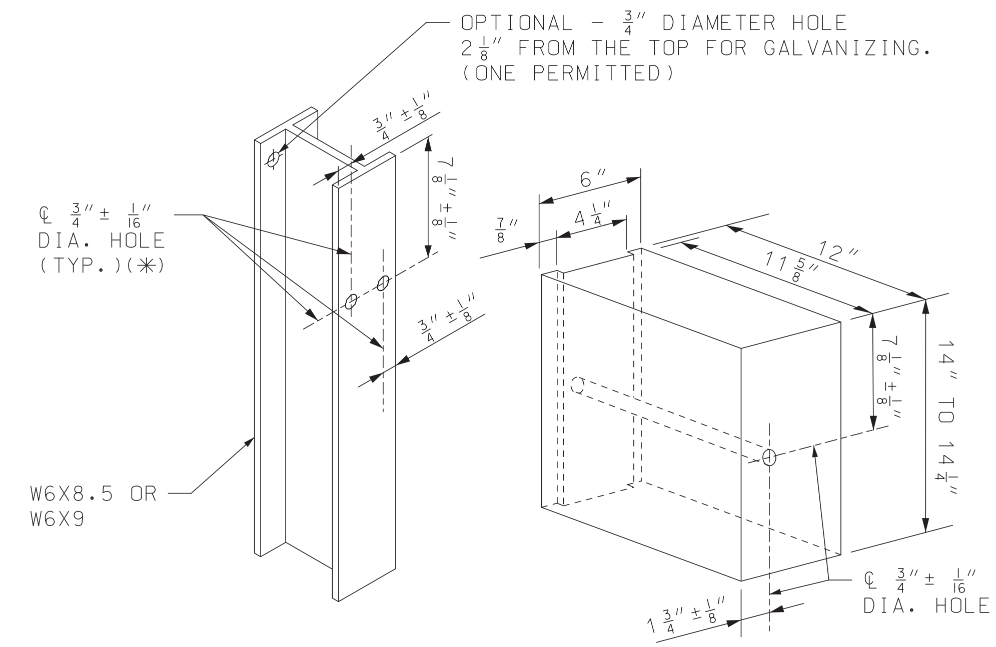
MIDWEST GUARDRAIL SYSTEM (MGS) DOUBLE FACED GUARDRAIL

DATE EFFECTIVE:	01/01/2023	606.50E	SHEET NO. 2 OF 8
DATE PREPARED:	10/7/2022		



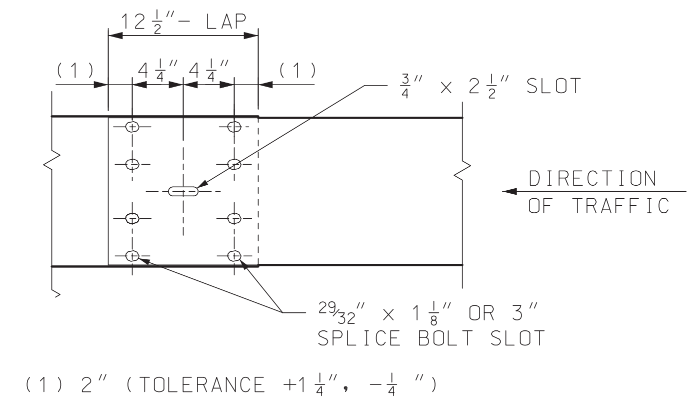
MGS GUARDRAIL AT CURB



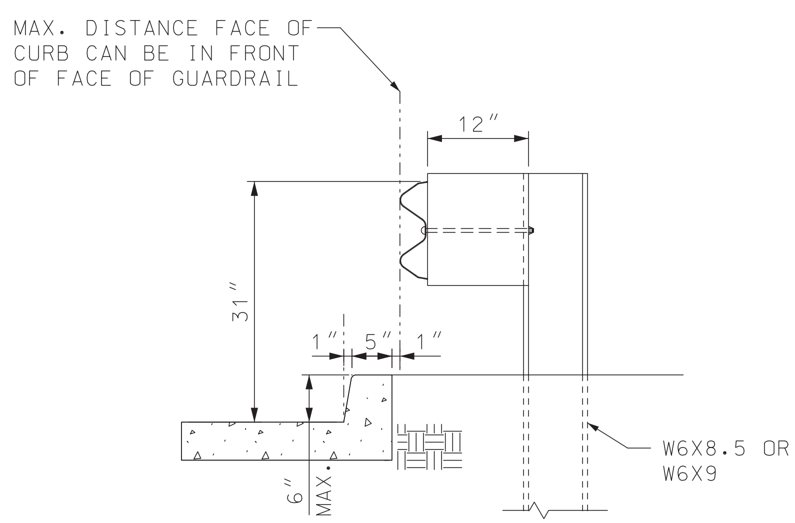
FOR STEEL POST AND NOTCHED WOOD OR PLASTIC BLOCK

HOLE PUNCHING DETAIL

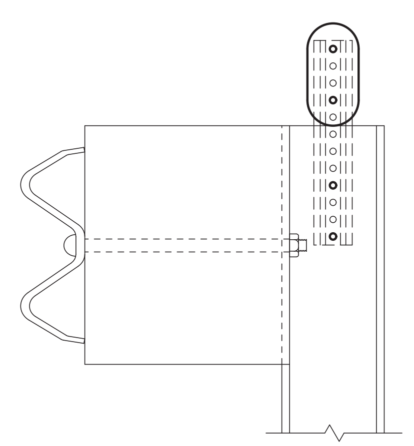
(✳) TWO HOLES CAN BE PROVIDED ON EACH FLANGE OF POST, ONLY ONE IS REQUIRED FOR FLANGE OF POST THAT HAS A BLOCK ATTACHMENT.



RAIL ELEMENT SPLICE DETAIL



ALTERNATE MGS AT CURB



DELINEATORS ON GUARDRAIL

GENERAL NOTES:

FOR GUARDRAIL DELINEATION DETAILS SEE STD PLAN 903.03.

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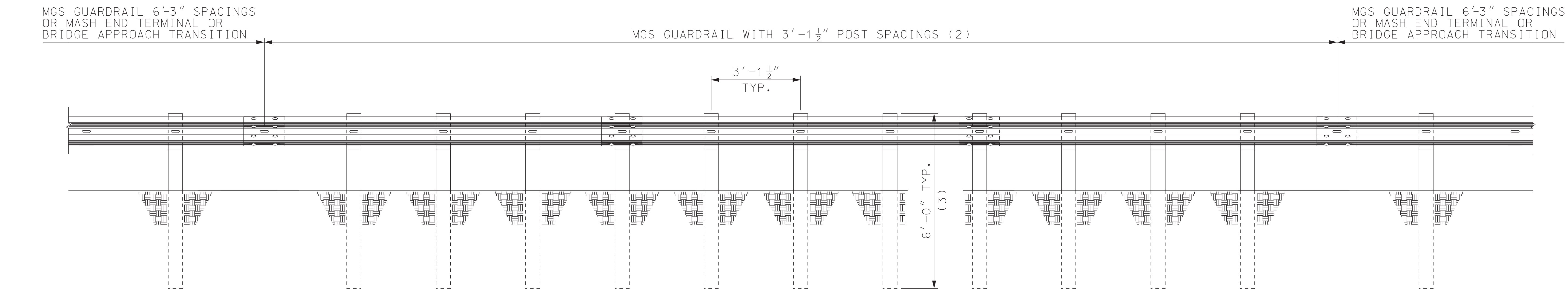
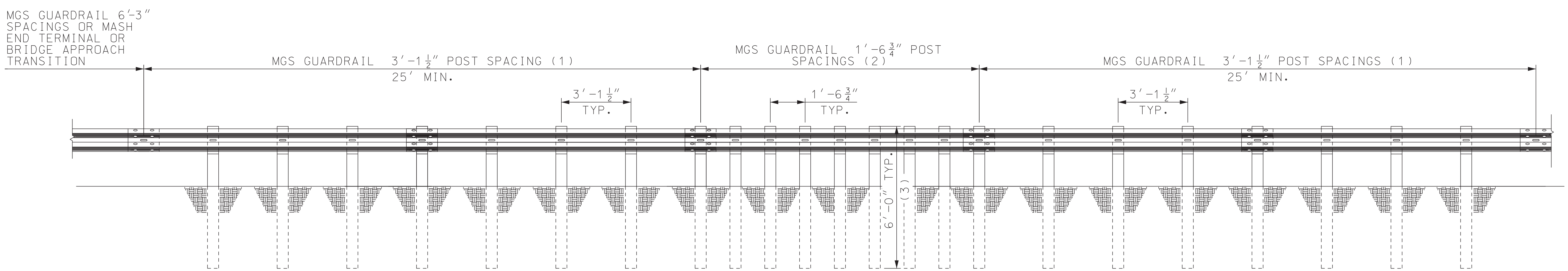
MIDWEST GUARDRAIL SYSTEM (MGS) POST AND BLOCK

DATE EFFECTIVE:	01/01/2023	606.50E	SHEET NO. 3 OF 8
DATE PREPARED:	10/7/2022		

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



MGS GUARDRAIL WITH 3'-1½" POST SPACING



MGS GUARDRAIL WITH 1'-6¾" POST SPACING

(1) 25 FEET OF MGS 3'-1½" POST SPACING GUARDRAIL IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF 1'-6¾" 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)

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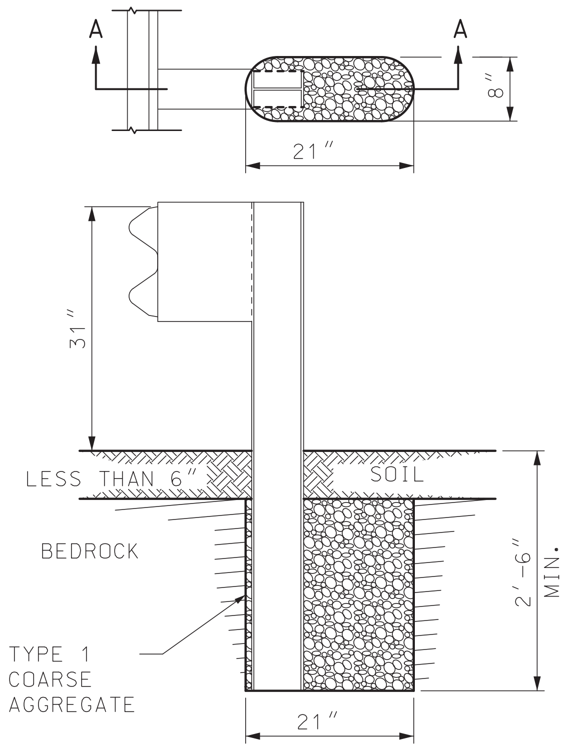
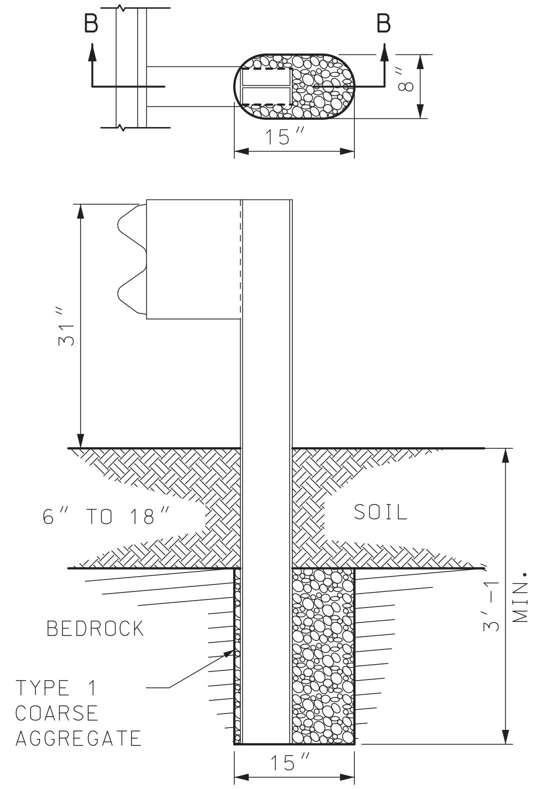
MIDWEST GUARDRAIL SYSTEM (MGS) REDUCED POST SPACINGS

DATE EFFECTIVE: 01/01/2023		606.50E	SHEET NO. 4 OF 8
DATE PREPARED: 10/7/2022			



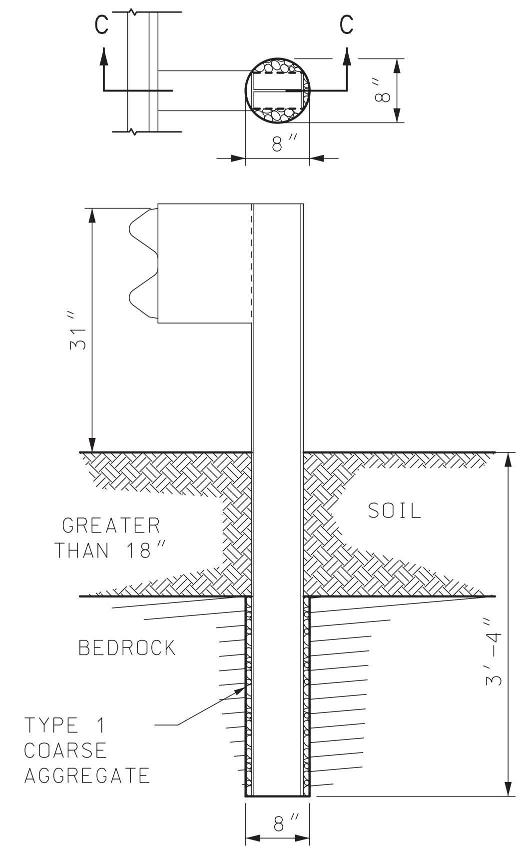
SECTION A-A

ROCK ENCOUNTERED
UP TO 6" BENEATH SURFACE



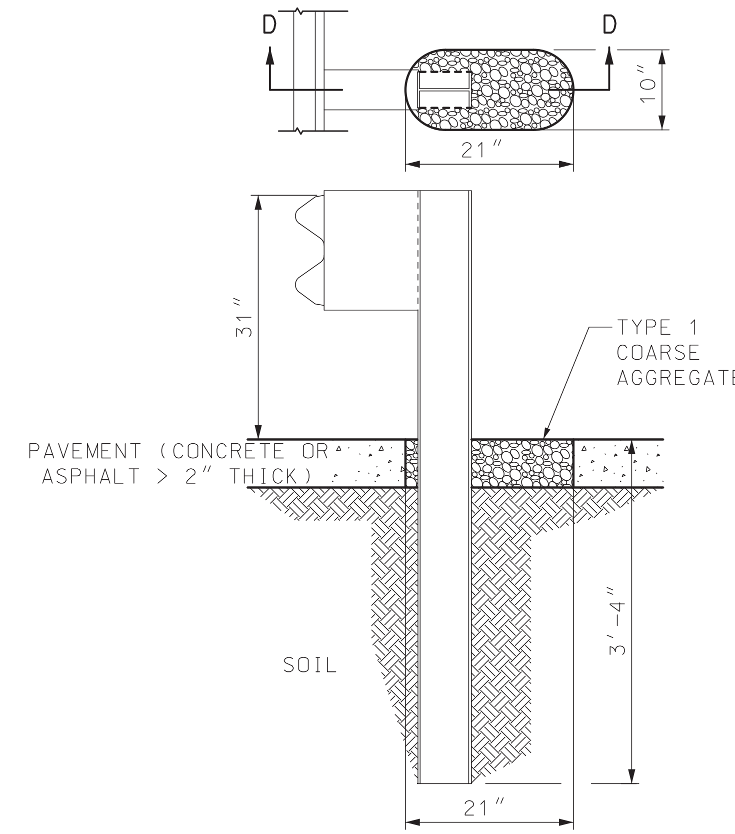
SECTION B-B

ROCK ENCOUNTERED
6" TO 18" BENEATH SURFACE



SECTION C-C

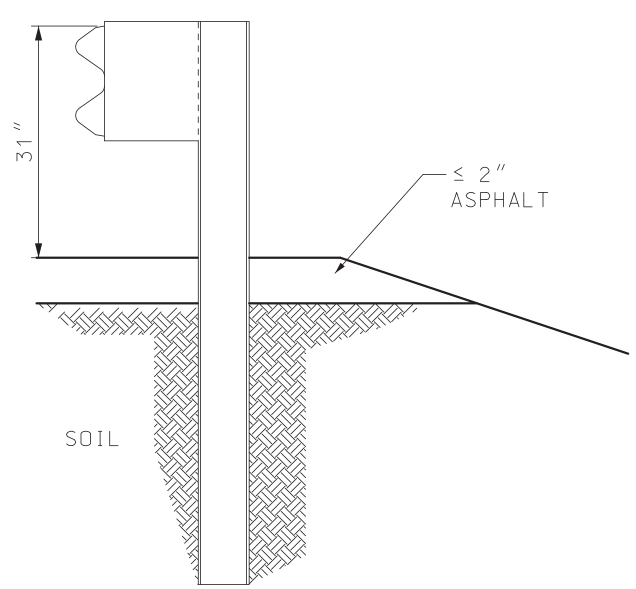
ROCK ENCOUNTERED MORE
THAN 18" BENEATH SURFACE



SECTION D-D

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

SETTING POST IN SOLID ROCK



SETTING POST THROUGH ASPHALT ≤ 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.

NO ADDITIONAL PAYMENT WILL BE MADE FOR CUTTING THE OVERSIZED HOLES OR PLACING AGGREGATE IN THE HOLES, AS INDICATED IN THIS PLAN.

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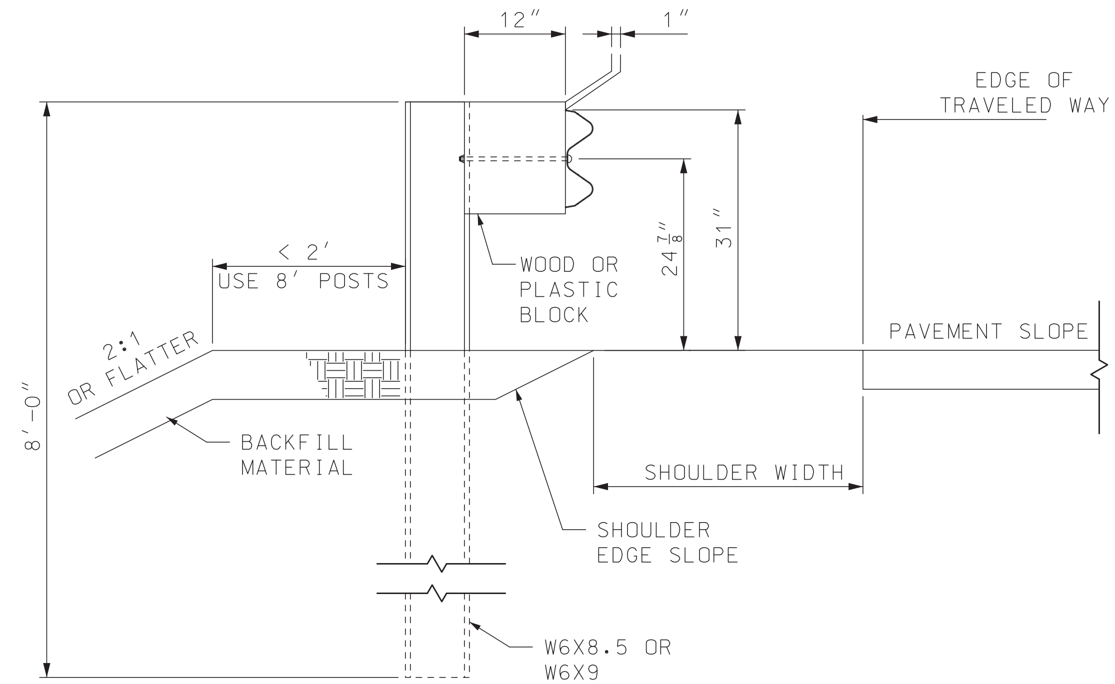
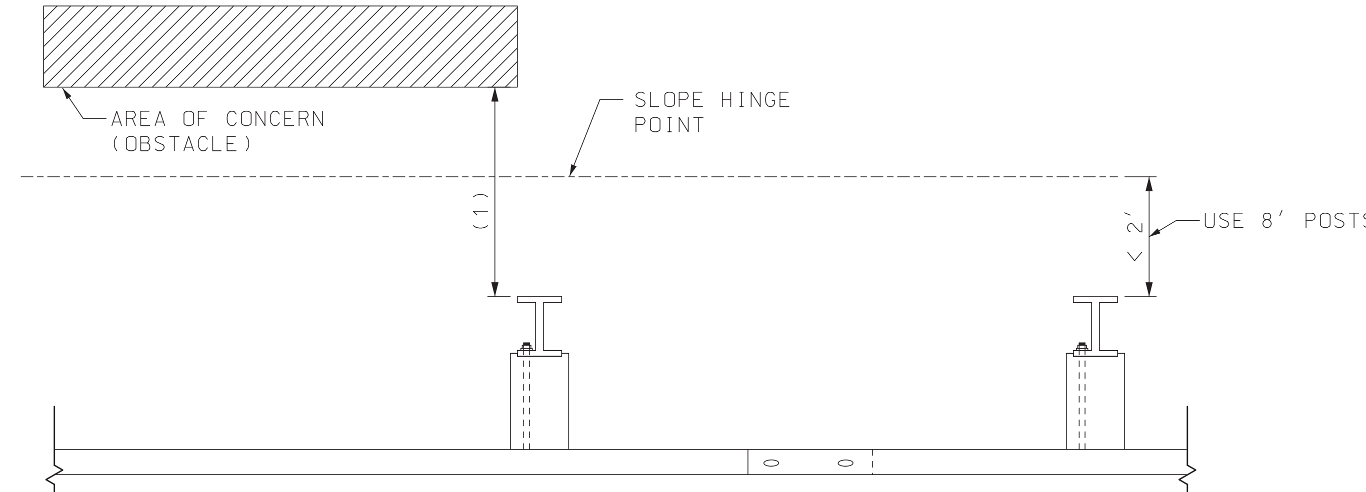
MIDWEST GUARDRAIL SYSTEM (MGS) SPECIAL INSTALLATIONS

DATE EFFECTIVE: 01/01/2023
DATE PREPARED: 10/7/2022

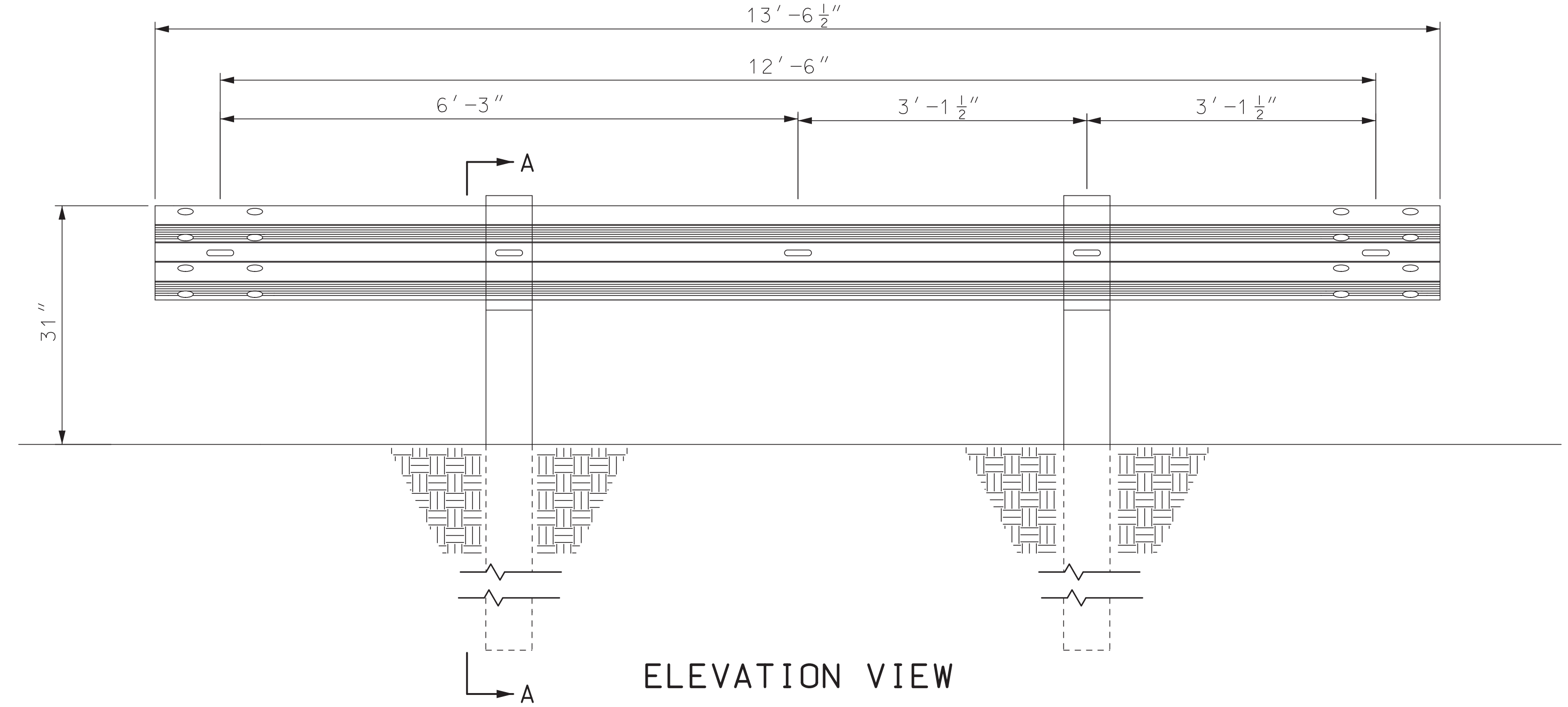
606.50E



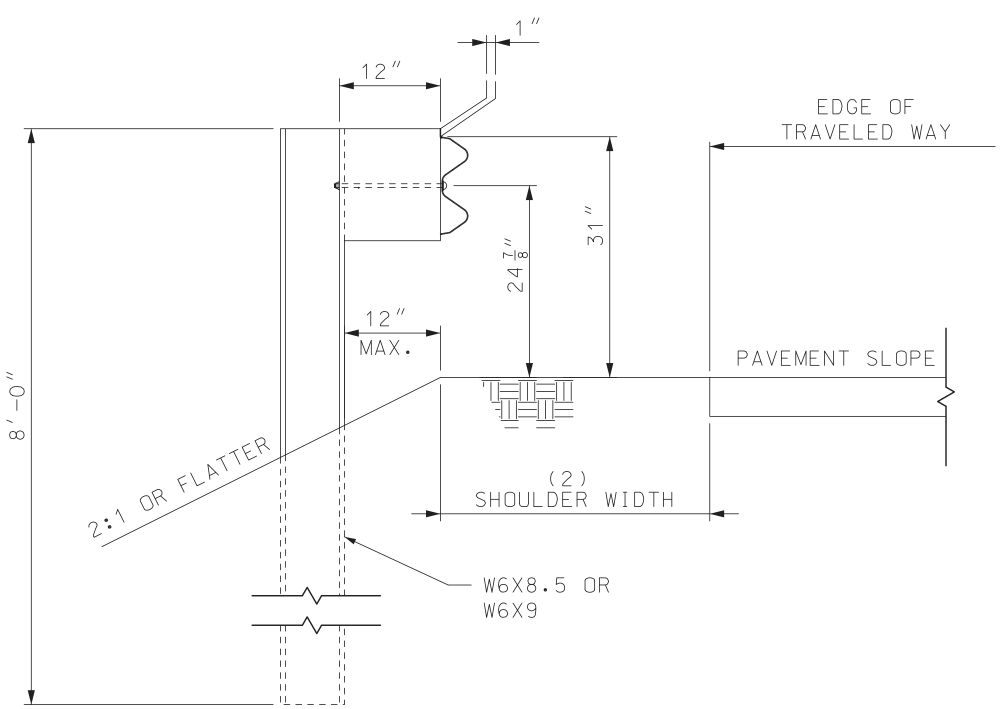
SECTION A-A
8′ STEEL POST



PLAN VIEW



ELEVATION VIEW



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

(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.

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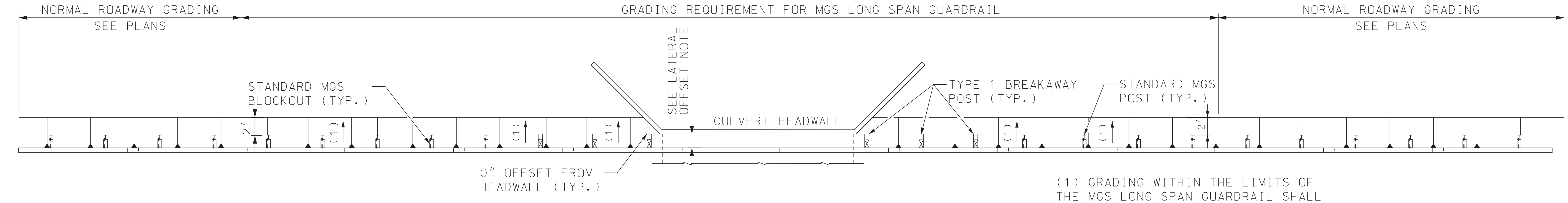
MIDWEST GUARDRAIL SYSTEM
(MGS)
8 FT. POST

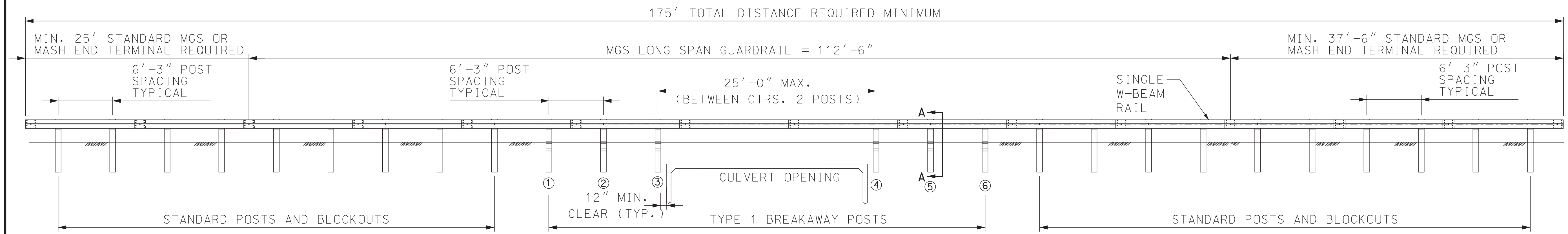
DATE EFFECTIVE: 01/01/2023
DATE PREPARED: 10/7/2022

606.50E



(1) GRADING WITHIN THE LIMITS OF THE MGS LONG SPAN GUARDRAIL SHALL BE THE SAME CROSS SLOPE AS SHOULDER.

PLAN VIEW



ELEVATION VIEW

NOTES:

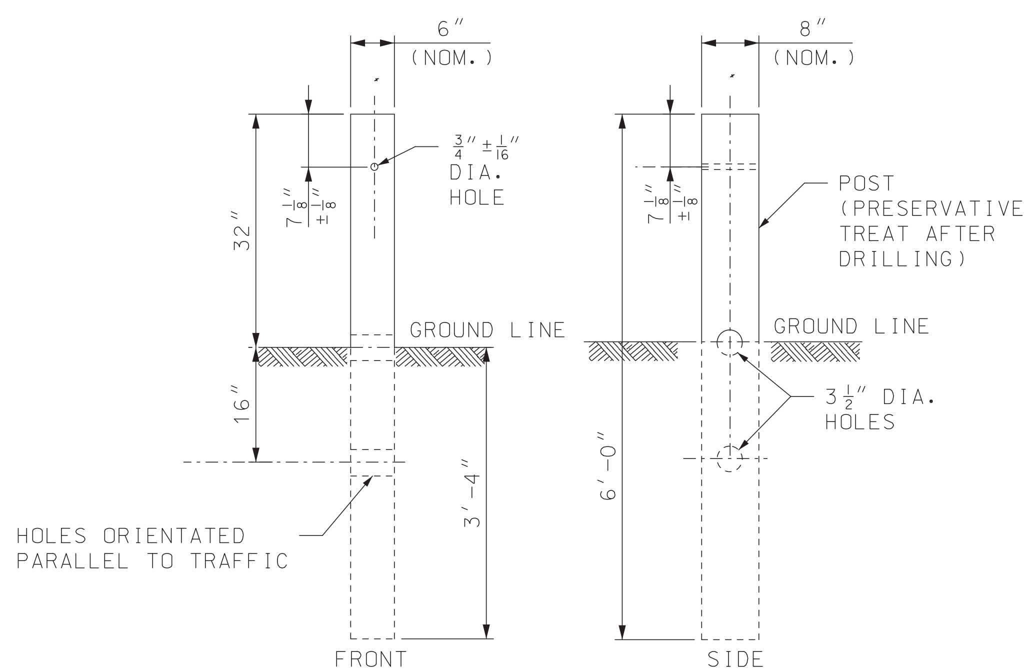
A MINIMUM LENGTH OF STANDARD MGS GUARDRAIL OR AN END TERMINAL IS REQUIRED BEFORE THE 112'-6" OF MGS LONG SPAN AND AFTER TO MAINTAIN STABILITY IN THE SYSTEM. 8'POSTS MAY BE USED OUTSIDE THE GRADING LIMITS SHOWN.

USE TYPE 1 BREAKAWAY WOOD POST FOR POSTS NO. 1-6. ALL OTHER POSTS SHALL BE W6X8.5 OR W6X9 STEEL POSTS.

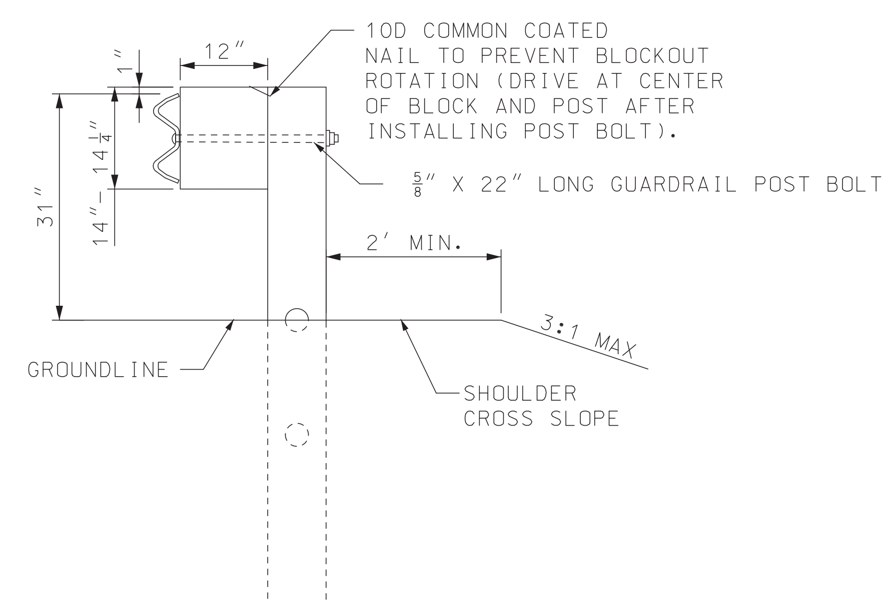
WHEN THE HEADWALL IS FLUSH WITH THE GRADE, THE BACK OF THE POST CAN BE ALIGNED WITH THE NEAR SIDE OF THE HEADWALL. BUT IF THE HEADWALL CONTINUES ABOVE GRADE, THE SYSTEM SHOULD BE OFFSET 8' FROM THE FIXED OBJECT.

FOR LOCATIONS WHERE A GUARDRAIL FLARE IS DESIRED, THE SYSTEM SHOULD REMAIN TANGENT FOR 50'-0" BEFORE POST 1 OR AFTER POST 6, AT WHICH POINT THE GUARDRAIL MAY FLARE AT A MAXIMUM TAPER RATE OF 7:1.

ALL POSTS, BLOCK, RAILS, AND HARDWARE SHALL COMPLY WITH SEC 606, MGS GUARDRAIL AND AS DETAILED ON THIS STANDARD.



TYPE 1 BREAKAWAY WOOD POST



SECTION A-A

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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MIDWEST GUARDRAIL SYSTEM (MGS) LONG SPAN GUARDRAIL

DATE EFFECTIVE:	01/01/2023	606.50E	SHEET NO.
DATE PREPARED:	10/7/2022		7 OF 8

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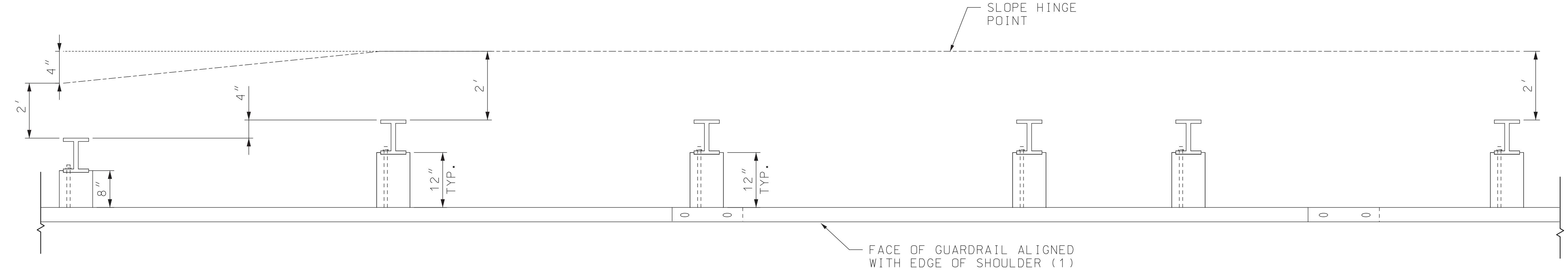
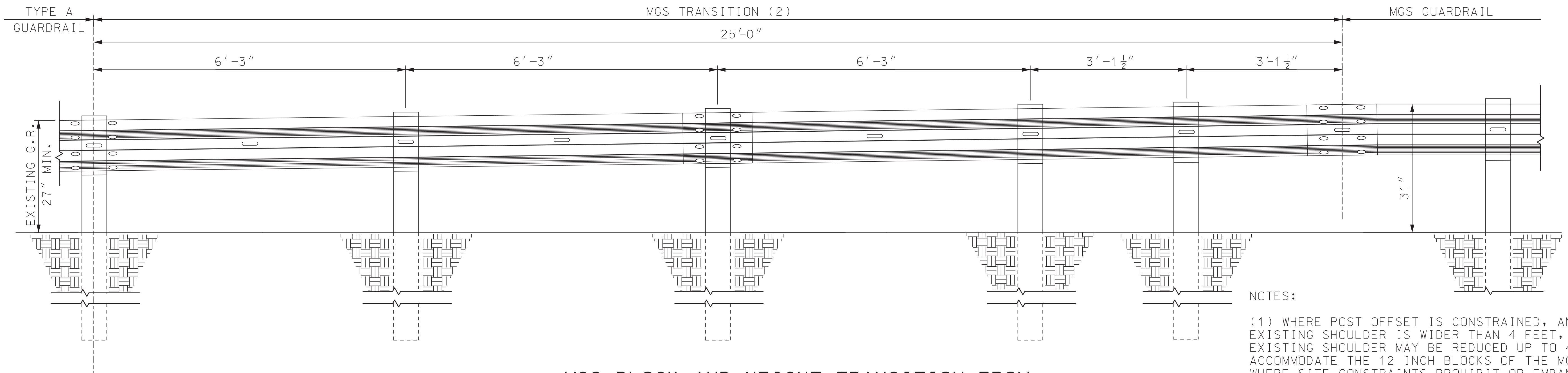
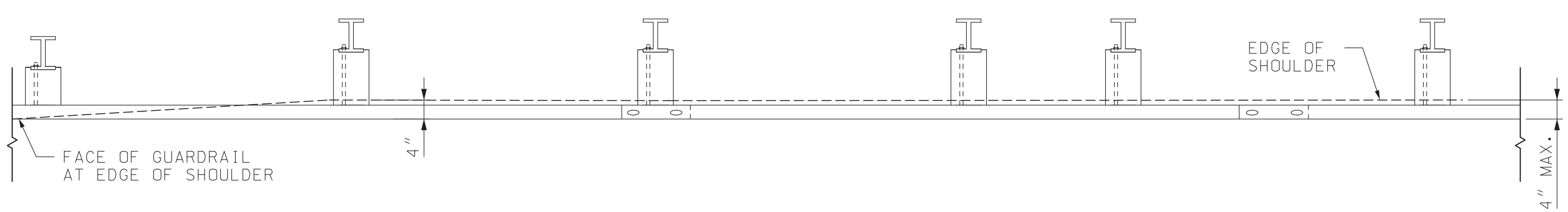


PLAN VIEW



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



ALTERNATE PLAN VIEW - ALIGNMENT TAPER

SEE NOTE (1)

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.

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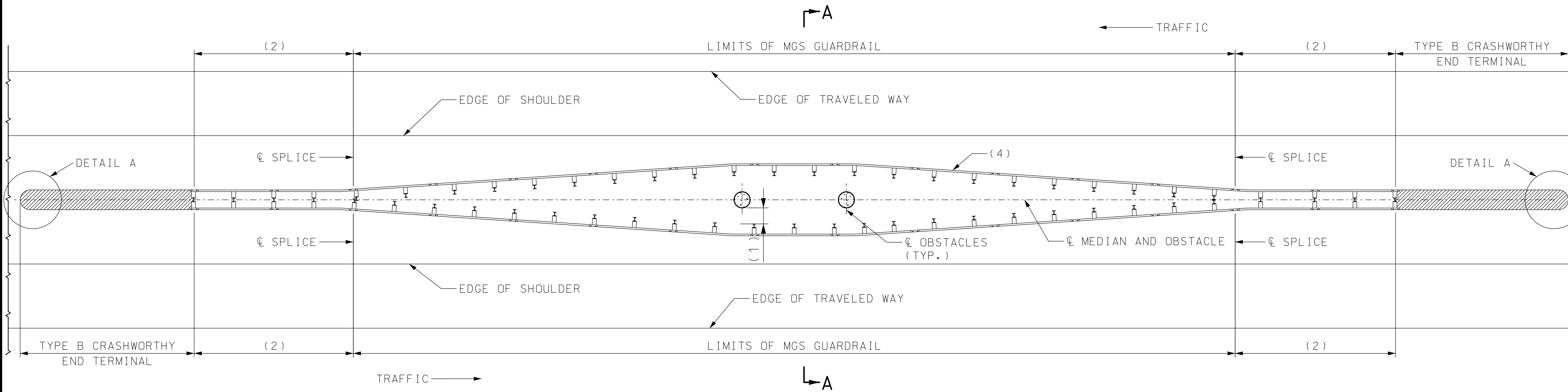
MIDWEST GUARDRAIL SYSTEM (MGS)
BLOCK AND HEIGHT TRANSITION

DATE EFFECTIVE: 01/01/2023
DATE PREPARED: 10/7/2022

606.50E

SHEET NO. 8 OF 8



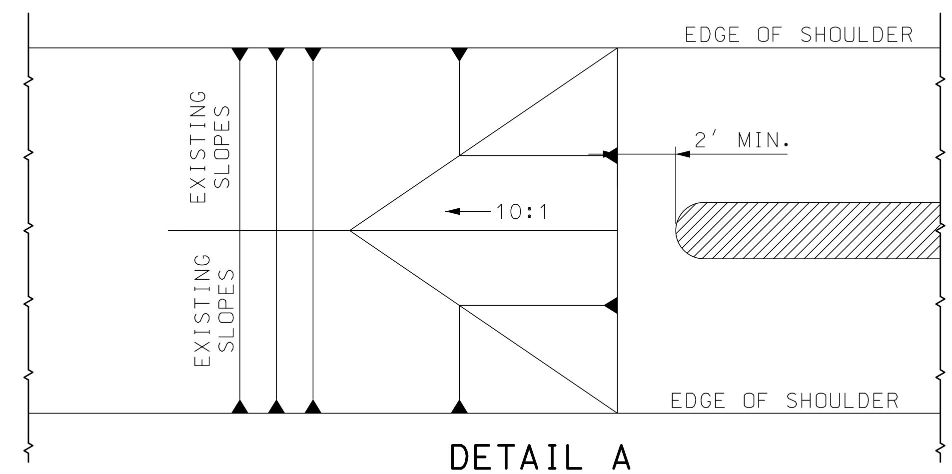
PIER AT ℄ MEDIAN

(1) 2'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACING IS PREFERRED
2'-0" MINIMUM CLEARANCE USE 3'-1 1/2" POST SPACING
1'-6" MINIMUM CLEARANCE USE 1'-6 3/4" POST SPACING
SEE STD. PLANS 606.50 FOR POST SPACING DETAILS.

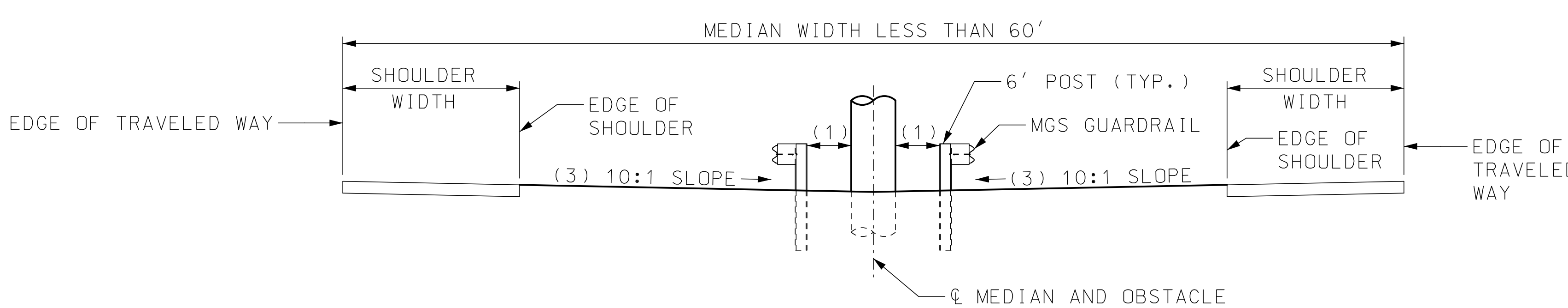
(2) TRANSITION DOUBLE FACED GUARDRAIL HEIGHT AND WIDTH IF NEEDED FOR TYPE B CRASHWORTHY END TERMINAL PER MANUFACTURE'S REQUIREMENTS. SEE STD. PLANS 606.50 FOR HEIGHT TRANSITION DETAILS.

(3) CONTINUE 10:1 SLOPE TO OBSTACLE OR A MINIMUM OF 2' PAST THE BACK OF THE GUARDRAIL POST.

(4) 15:1 FLARE RATE OR AS RECOMMENDED BY TABLE 5-9 OF THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE".



DETAIL A
(GRADING LIMITS)



SECTION A-A

GENERAL NOTE:

TYPE B CRASHWORTHY END TERMINAL SHALL BE MGS COMPATIBLE, LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

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MGS GUARDRAIL MEDIAN PIER PROTECTION

MEDIAN LESS THAN 60'

DATE EFFECTIVE:	04/01/2021	606.51	SHEET NO. 1 OF 2
DATE PREPARED:	1/27/2021		

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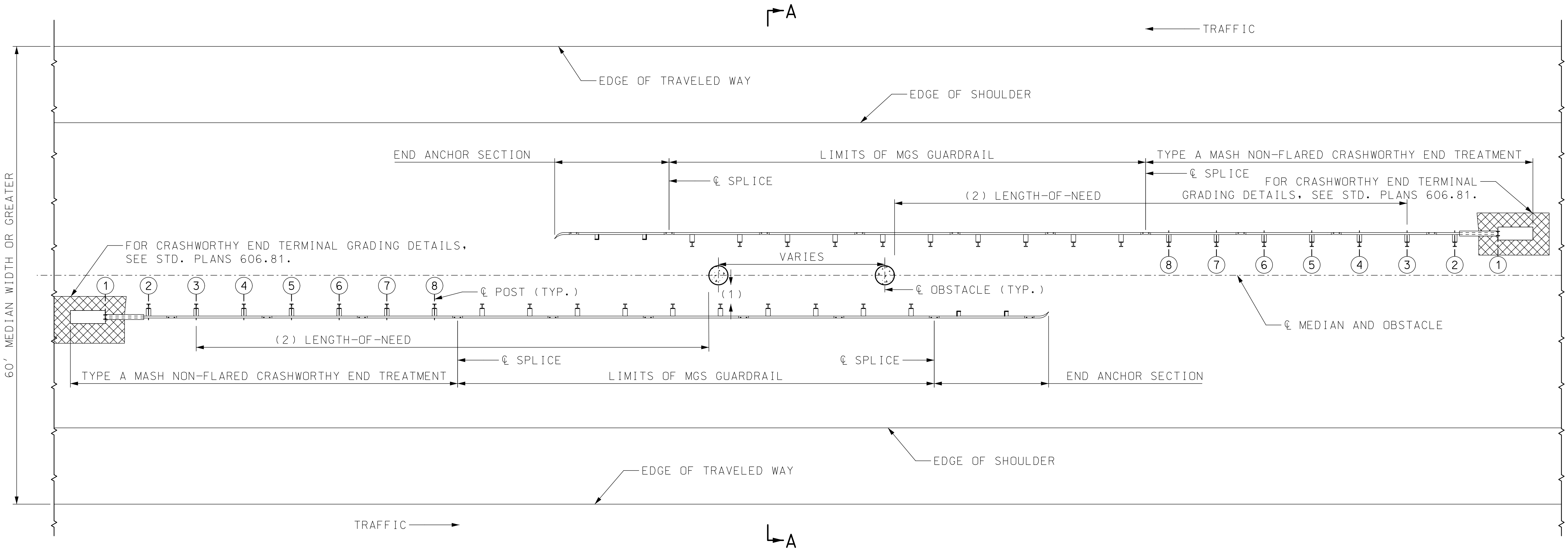
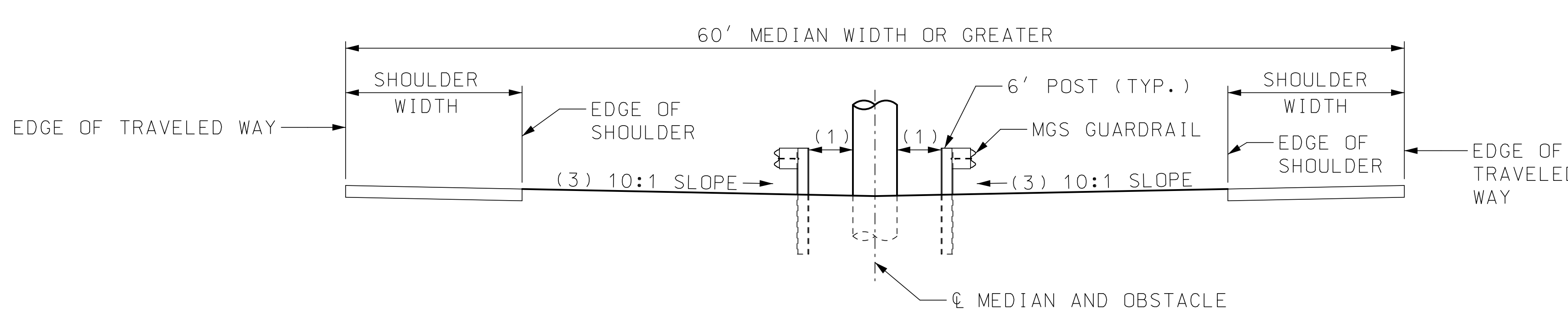


PIER AT ℄ MEDIAN

(1) 2'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACING IS PREFERRED
2'-0" MINIMUM CLEARANCE USE 3'-11#2" POST SPACING
1'-6" MINIMUM CLEARANCE USE 1'-63#4" POST SPACING
SEE STD. PLANS 606.50 FOR POST SPACING DETAILS.

(2) FOR LENGTH-OF-NEED, SEE THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE 5.6.4 LENGTH-OF-NEED".

(3) CONTINUE 10:1 SLOPE TO OBSTACLE OR A MINIMUM OF 2' PAST THE BACK OF THE GUARDRAIL POST.



SECTION A-A

GENERAL NOTE:
MEDIAN WIDTHS GREATER THAN 60' THAT THE PIER OBSTACLES ARE BEYOND THE CLEAR-ZONE DO NOT REQUIRE MEDIAN PIER PROTECTION. FOR CLEAR-ZONE DISTANCES, SEE THE LASTEST VERSION OF THE "ROADSIDE DESIGN GUIDE 3.1 THE CLEAR-ZONE CONCEPT".

TYPE A NON-FLARED CRASHWORTHY END TERMAINAL SHALL BE THE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

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MGS GUARDRAIL MEDIAN PIER PROTECTION

60' MEDIAN OR GREATER

DATE EFFECTIVE:	04/01/2021	606.51	SHEET NO. 2 OF 2
DATE PREPARED:	1/27/2021		

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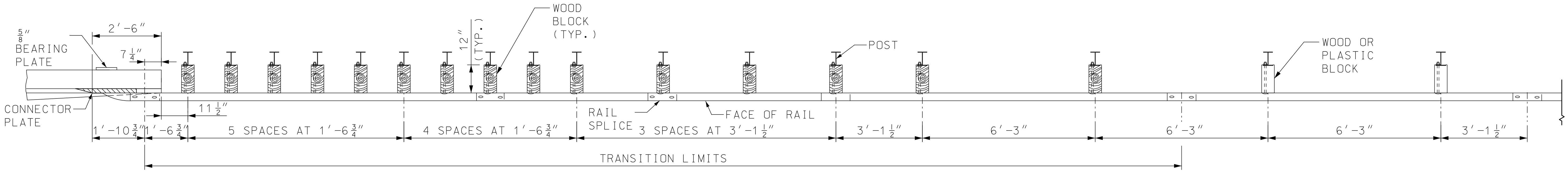
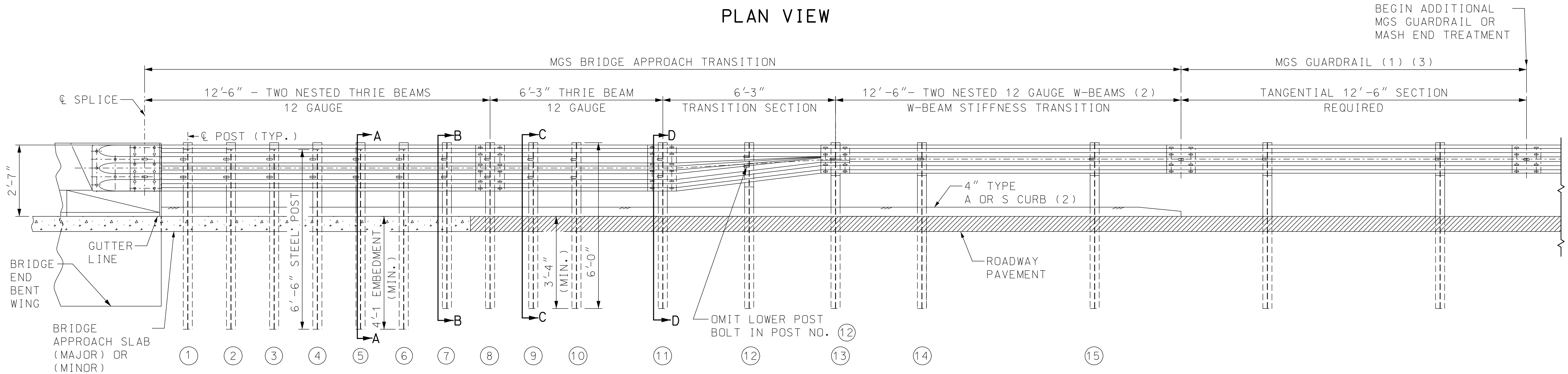


PLAN VIEW



BRIDGE APPROACH TRANSITION (EXTENDED CURB)(2)

GENERAL NOTES:

MGS GUARDRAIL SHALL BE TANGENTIAL WITH BRIDGE APPROACH TRANSITION FOR 12'-6" BEYOND THE TWO NESTED W-BEAM STIFFNESS TRANSITION AND 25'-0" BEYOND THRIE BEAM TRANSITION SECTION.

AT THE CONTRACTORS OPTION, A SINGLE 18'-9" PIECE OF THRIE BEAM MAY BE SUBSTITUTED FOR ONE OF THE 12'-6" PANELS AND THE 6'-3" SECTION AS SHOWN.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE 5/8" BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = 3/8" MIN.).

THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.

ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (EXTENDED CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE CONTRACTOR MAY, AT THEIR OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BEGALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.

(1) PLACE THE FIRST POST OF THE MGS 6'-3" PAST THE LAST POST OF THE BRIDGE APPROACH TRANSITION TO KEEP POSTS OFFSET FROM THE RAIL SPLICES.

(2) WHERE CURB EXTENDS UPSTREAM OF POST NO. 11 FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. 13). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. WHEN CURBS DO NOT EXTEND UPSTREAM OF POST NO. 11, PAY FOR A BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB). FOR DETAILS OF BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB), SEE SHEET 2 OF 6.

(3) THE ADDITIONAL REQUIRED MGS GUARDRAIL IS INCLUDED IN THE TOTAL LENGTH OF NEED AND SHALL BE PAID FOR AS A GUARDRAIL PAY ITEM.

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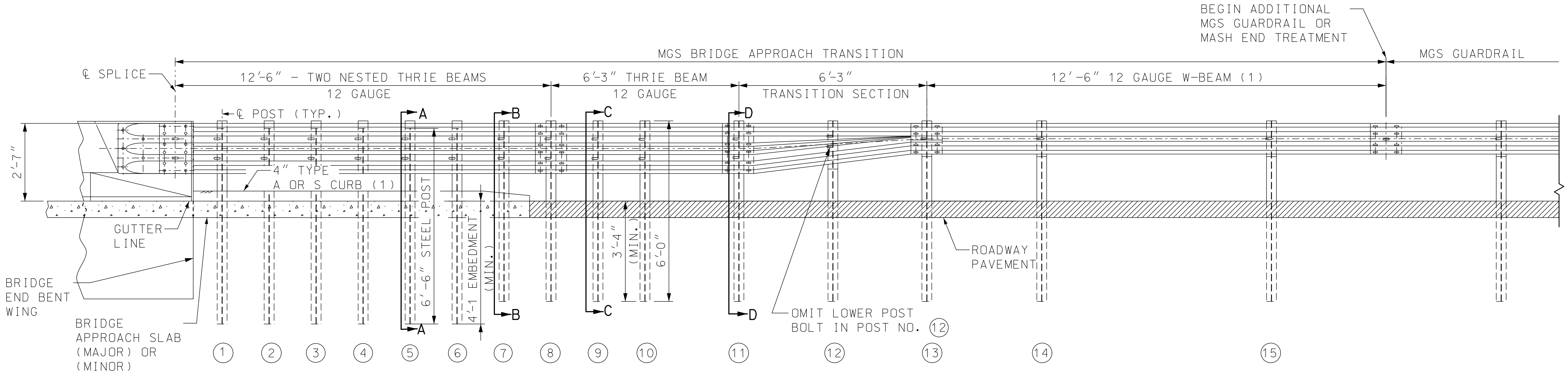
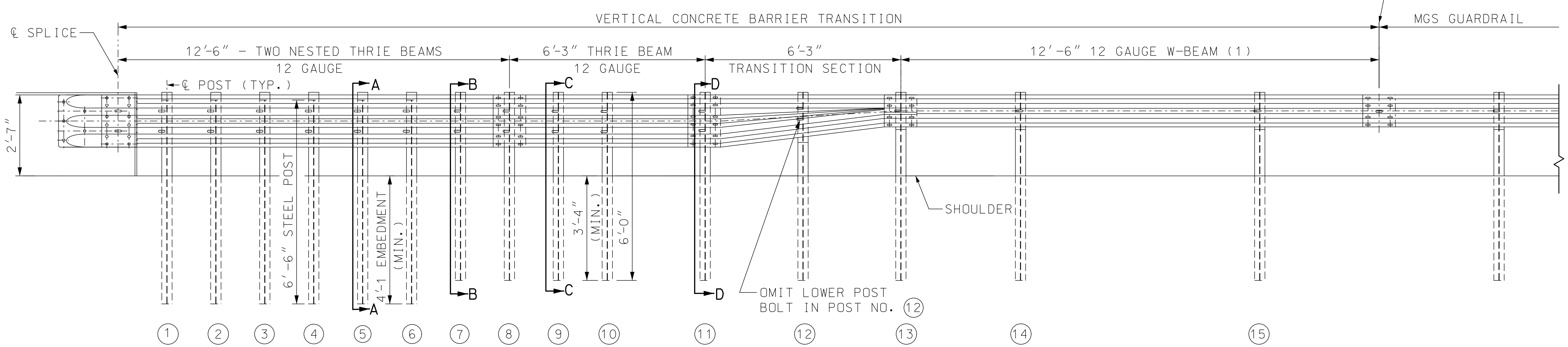
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS

DATE EFFECTIVE:	07/01/2021	606.60B	SHEET NO. 1 OF 6
DATE PREPARED:	4/29/2021		



BRIDGE APPROACH TRANSITION (WITH REGULAR LENGTH CURB OR NO CURB)(1)



VERTICAL CONCRETE BARRIER TRANSITION (REGULAR LENGTH CURB OR NO CURB)(1)
(VIEW SHOWN WITHOUT CURB)

GENERAL NOTES:
SEE SHEET 1 FOR ADDITIONAL NOTES NOT INCLUDED ON THIS SHEET.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (REGULAR/NO CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

(1) WHERE CURB EXTENDS UPSTREAM OF POST NO. 11 FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. 13). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. IF CURB EXTENDS BEYOND POST NO. 11, PAY FOR A BRIDGE APPROACH TRANSITION (EXTENDED CURB).

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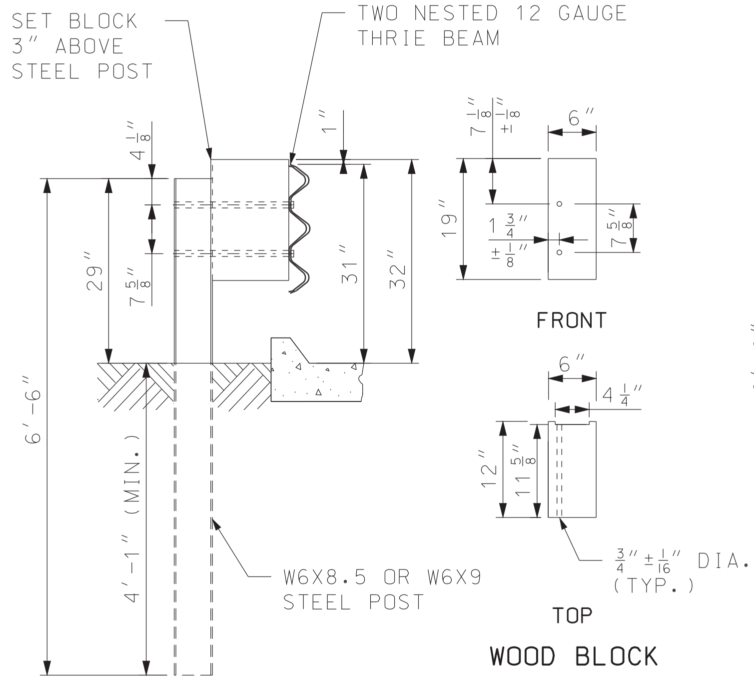
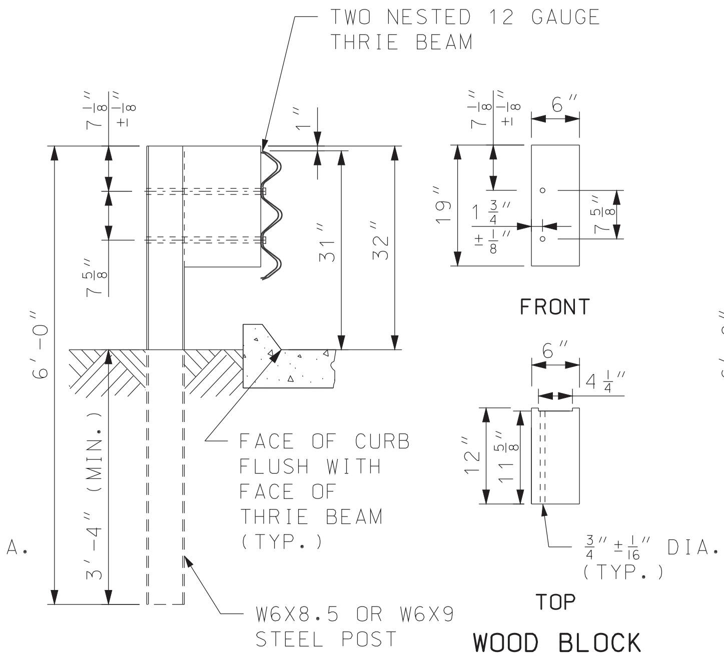
MIDWEST GUARDRAIL SYSTEM (MGS)
VERTICAL BARRIER TRANSITIONS

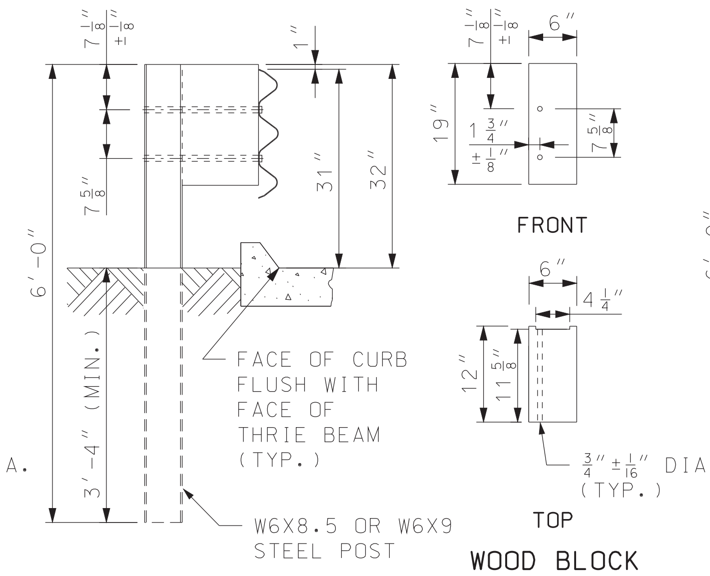
DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 5/5/2021
606.60B
SHEET NO. 2 OF 6



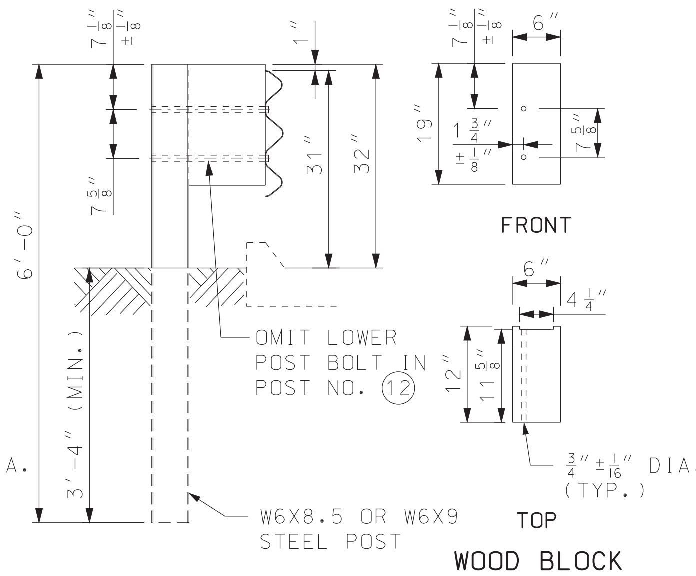
SECTION A–A



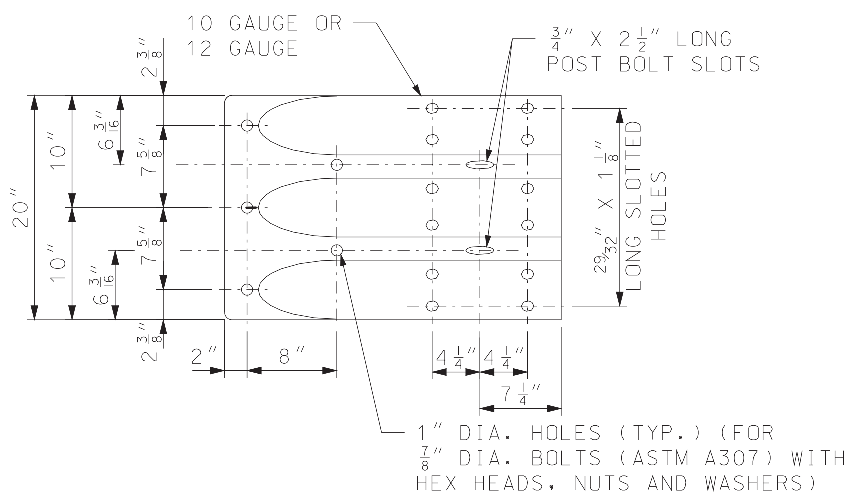
SECTION B–B



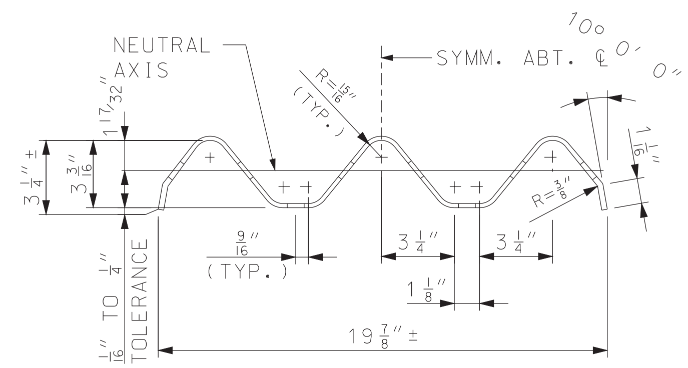
SECTION C–C



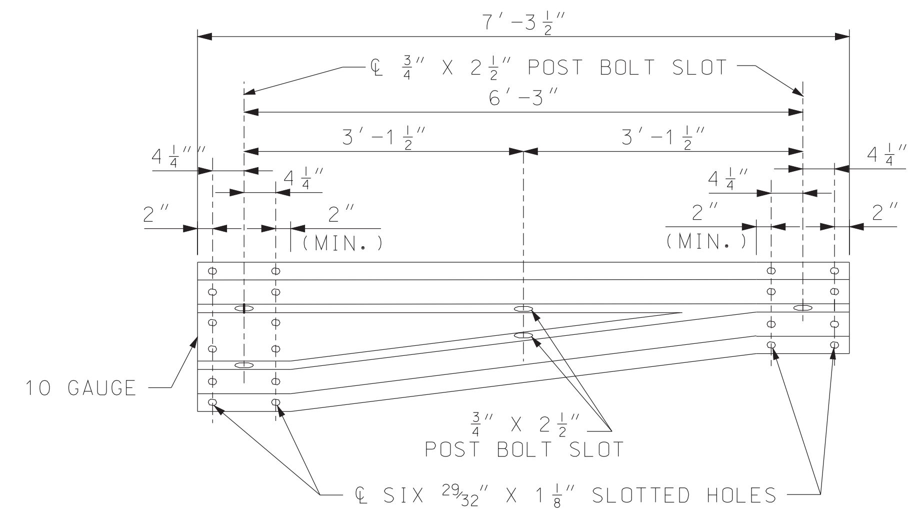
SECTION D–D



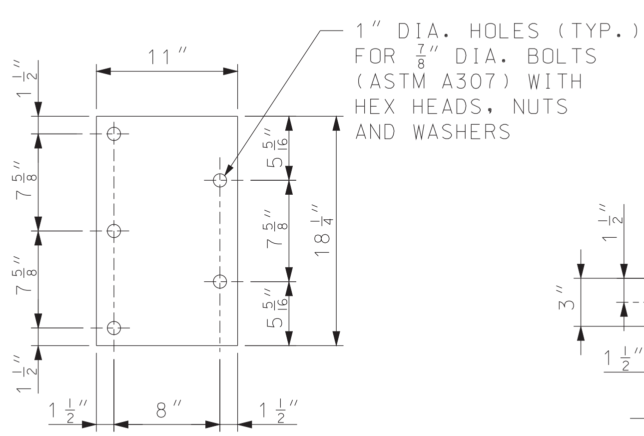
TERMINAL CONNECTOR



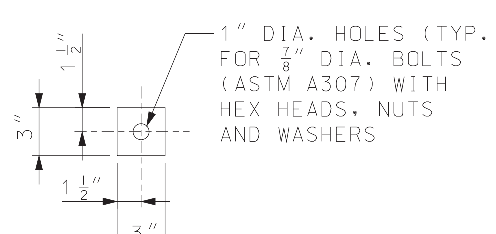
SECTION THROUGH THRIE BEAM RAIL



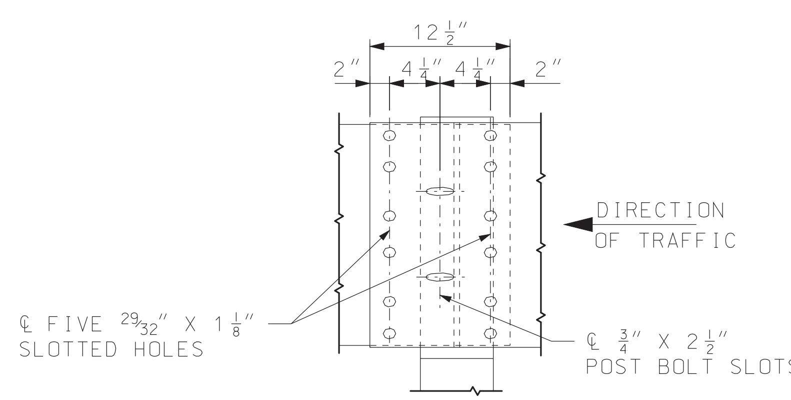
TRANSITION SECTION



5/8" BEARING PLATE



OPTIONAL 5/8" BEARING PLATE
(5 REQUIRED)



THRIE BEAM RAIL SPLICE AT POST

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ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS)

VERTICAL BARRIER TRANSITIONS

DATE EFFECTIVE:	07/01/2017	606.60B	SHEET NO.
DATE PREPARED:	5/1/2017		3 OF 6

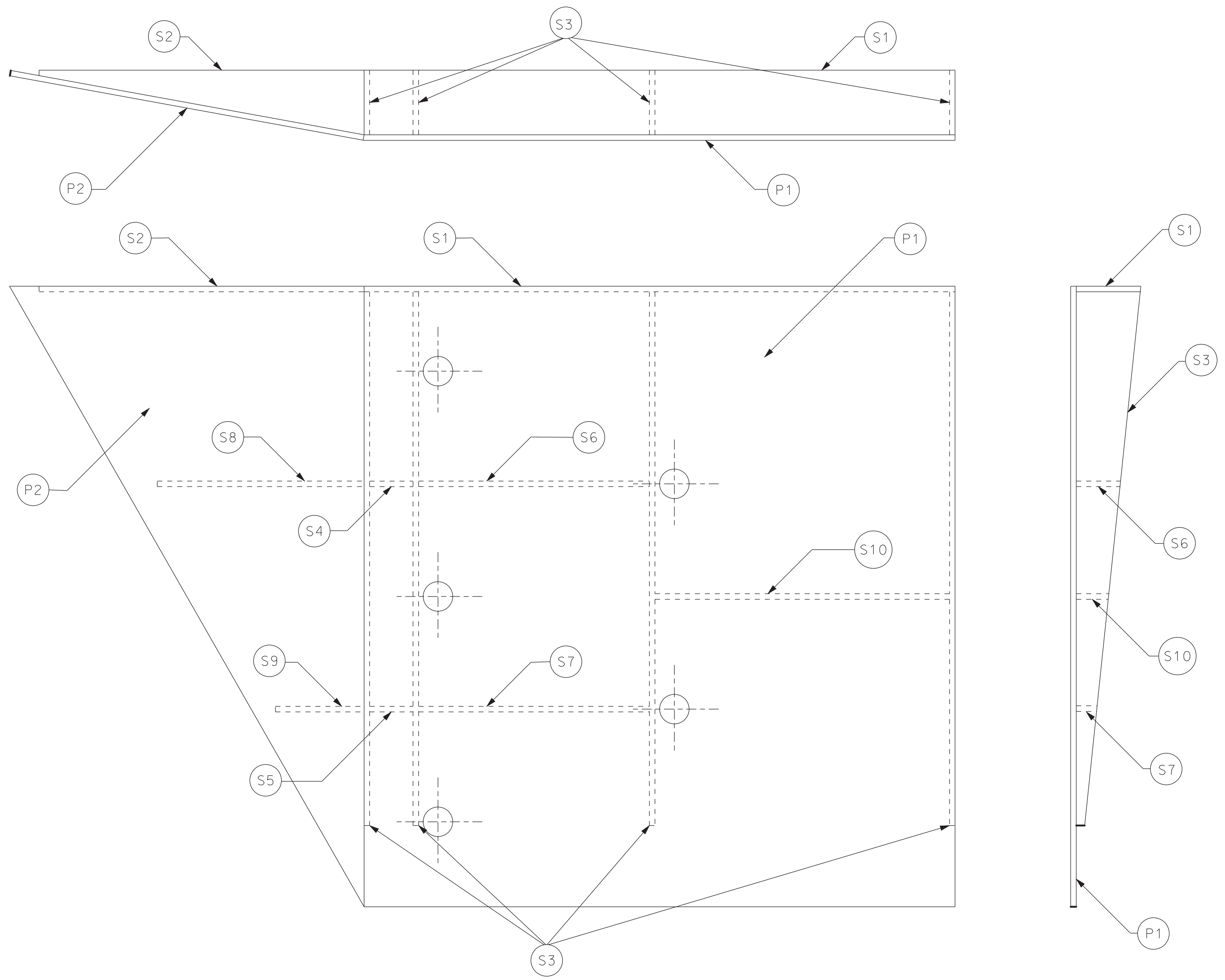
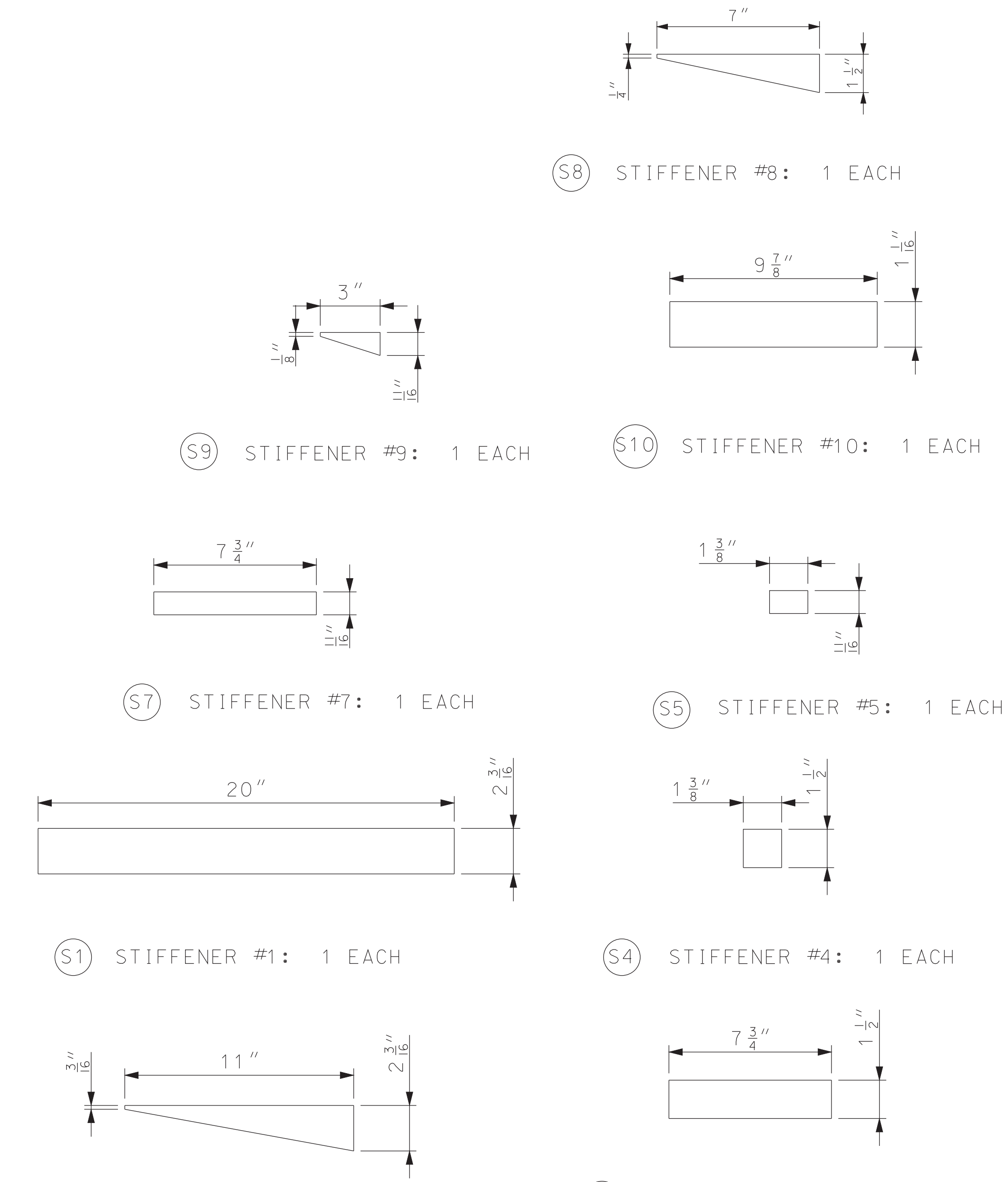


PLATE AND STIFFENER IDENTIFICATION



S8 STIFFENER #8: 1 EACH

S9 STIFFENER #9: 1 EACH

S10 STIFFENER #10: 1 EACH

S7 STIFFENER #7: 1 EACH

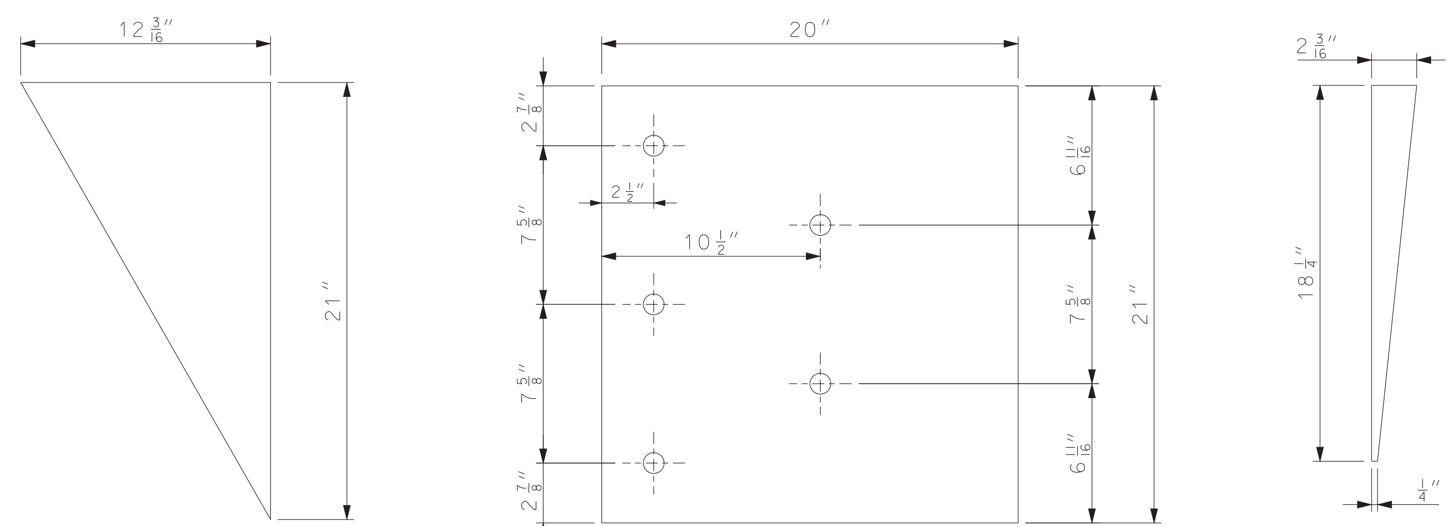
S5 STIFFENER #5: 1 EACH

S1 STIFFENER #1: 1 EACH

S4 STIFFENER #4: 1 EACH

S2 STIFFENER #2: 1 EACH

S6 STIFFENER #6: 1 EACH



P2 COVER PLATE #2

P1 COVER PLATE #1

S3 STIFFENER #3: 4 EACH

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STATE OF MISSOURI
ERIC E. SCHROETER
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PROFESSIONAL ENGINEER

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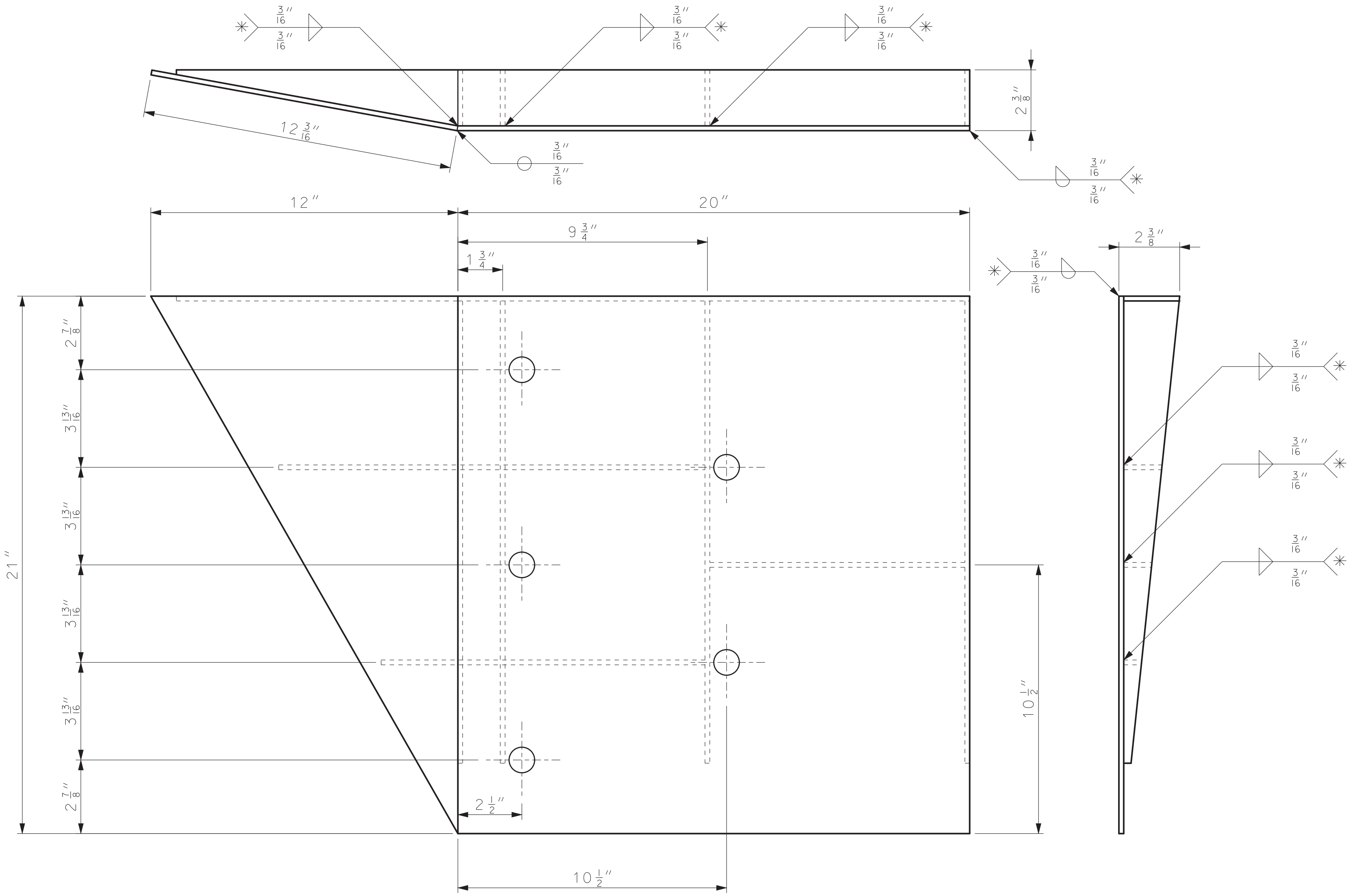
MIDWEST GUARDRAIL SYSTEM (MGS)
VERTICAL BARRIER TRANSITIONS
(CONNECTOR PLATE DETAIL)

DATE EFFECTIVE:	07/01/2017	606.60B	SHEET NO. 4 OF 6
DATE PREPARED:	5/1/2017		

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



WELDING INSTRUCTION

* ALL FILLET WELDS SHALL BE 1" LONG SPACED AT 2".

GENERAL NOTES:

COVER PLATE PANELS ARE 3/16" THICK.

ALL STIFFENERS ARE 1/4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

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NUMBER
PE-28411
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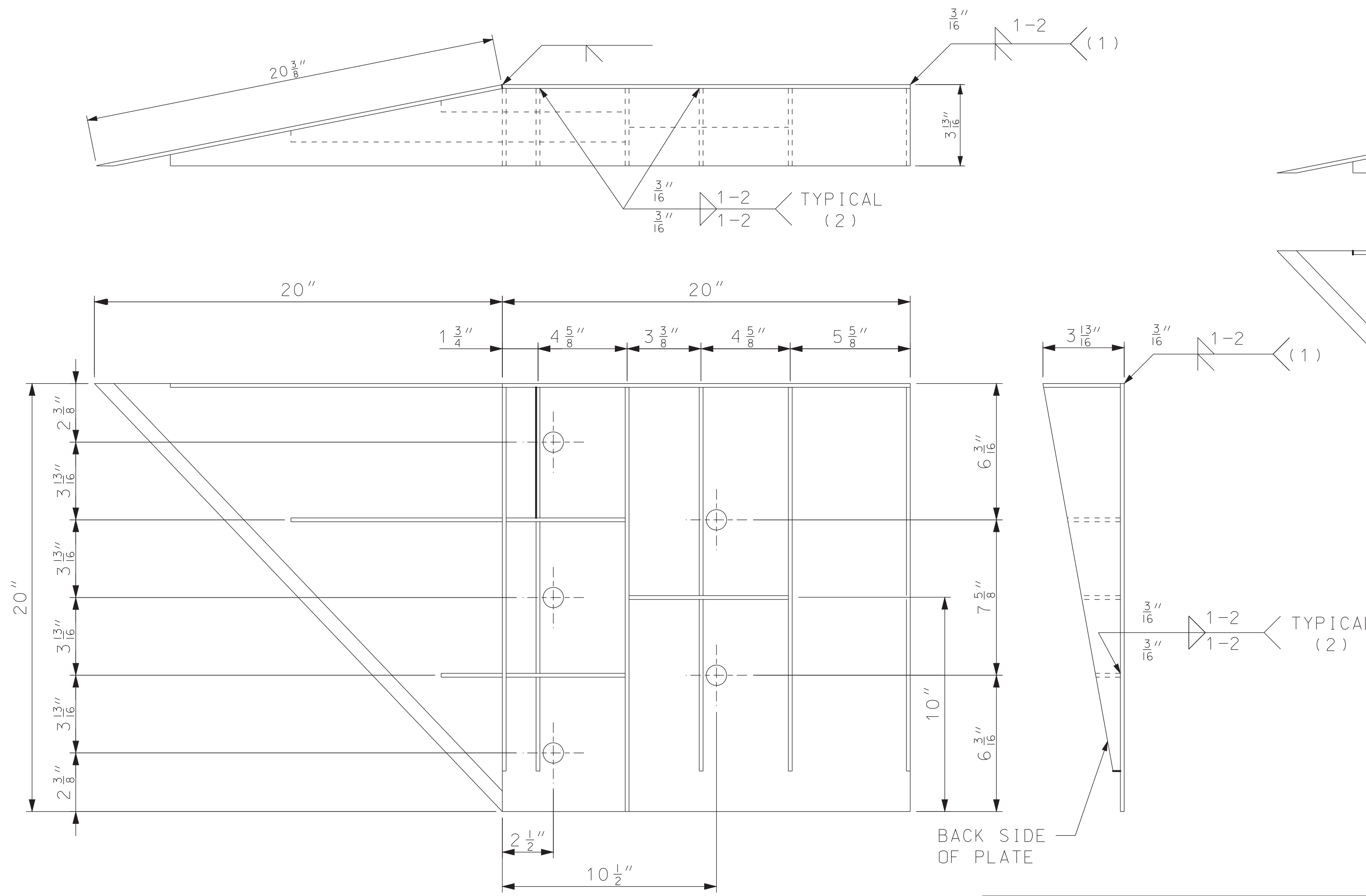
MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS (CONNECTOR PLATE DETAIL)

DATE EFFECTIVE:	07/01/2017	606.60B	SHEET NO. 5 OF 6
DATE PREPARED:	5/1/2017		



WELDING INSTRUCTION

(VIEWED FROM BACK SIDE OF PLATE)

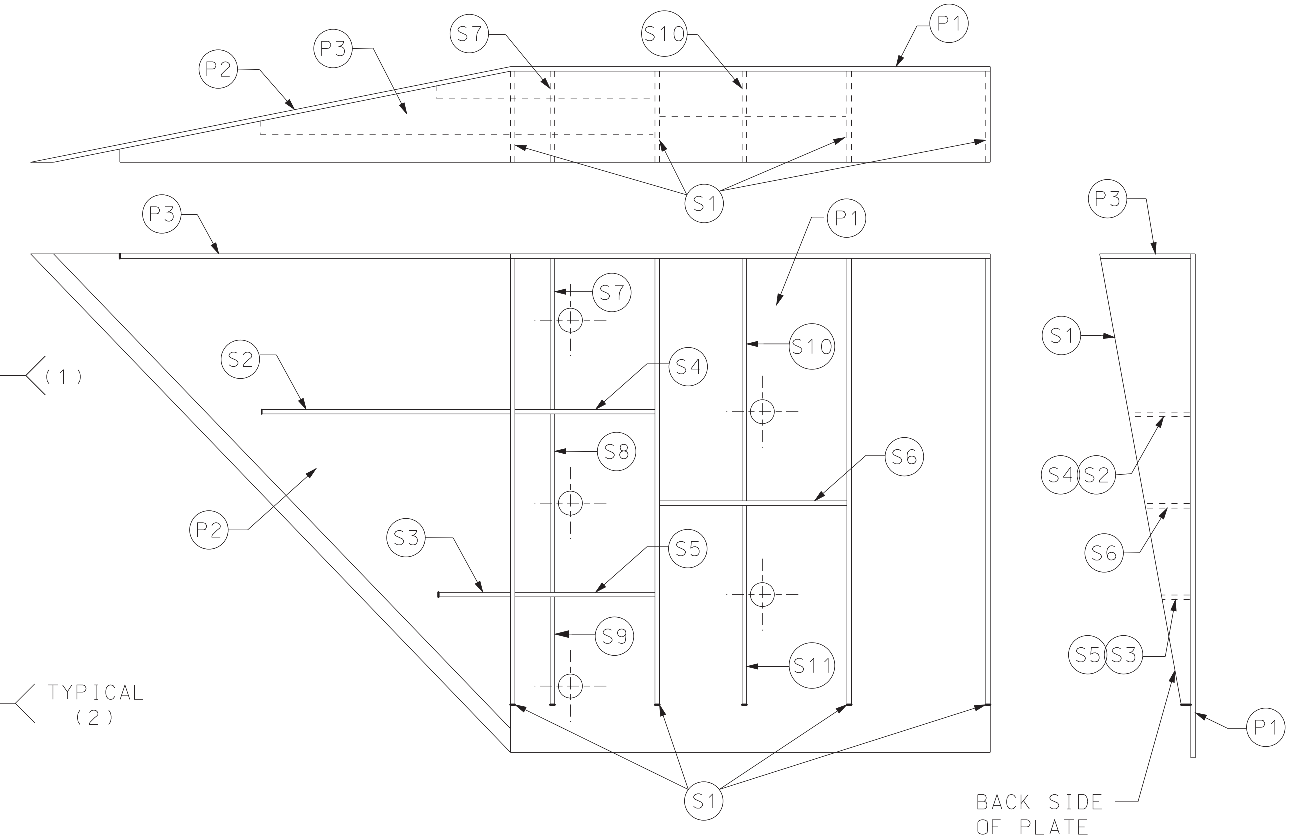


PLATE AND STIFFENER IDENTIFICATION

(VIEWED FROM BACK SIDE OF PLATE)

(1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS: SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND $\frac{3}{16}$" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.

(2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS: $\frac{3}{16}$" FILLET WELD BY 1" LONG SPACED AT 2".

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)

PLATE	QUANTITY	SHAPE	SIZE (A x B x C x D)	THICKNESS
P1	1		20" x 20"	$\frac{3}{16}$"
P2	1		20" x 20" x 28 $\frac{9}{16}$"	$\frac{3}{16}$"
P3	1		39" x 3 $\frac{5}{8}$" x 20" x 19 $\frac{5}{16}$"	$\frac{3}{16}$"
S1	4		18 $\frac{7}{16}$" x 3 $\frac{5}{8}$" x 18 $\frac{3}{4}$"	$\frac{1}{4}$"
S2	1		10 $\frac{1}{4}$" x 2 $\frac{7}{16}$" x 10 $\frac{3}{8}$" x $\frac{1}{2}$"	$\frac{1}{4}$"
S3	1		3" x 1 $\frac{1}{16}$" x 3 $\frac{1}{8}$" x $\frac{1}{2}$"	$\frac{1}{4}$"
S4	1		6 $\frac{1}{8}$" x 2 $\frac{7}{16}$"	$\frac{1}{4}$"
S5	1		6 $\frac{1}{8}$" x 1 $\frac{1}{16}$"	$\frac{1}{4}$"
S6	1		7 $\frac{3}{4}$" x 1 $\frac{3}{4}$"	$\frac{1}{4}$"
S7	1		2 $\frac{9}{16}$" x 6" x 3 $\frac{5}{8}$" x 5 $\frac{7}{8}$"	$\frac{1}{4}$"
S8	1		1 $\frac{5}{32}$" x 7 $\frac{1}{2}$" x 2 $\frac{1}{2}$" x 7 $\frac{3}{8}$"	$\frac{1}{4}$"
S9	1		6 $\frac{1}{16}$" x 6 $\frac{3}{16}$" x 1 $\frac{3}{32}$"	$\frac{1}{4}$"
S10	1		1 $\frac{7}{8}$" x 9 $\frac{7}{8}$" x 3 $\frac{5}{8}$" x 9 $\frac{11}{16}$"	$\frac{1}{4}$"
S11	1		8 $\frac{1}{2}$" x 8 $\frac{3}{4}$" x 1 $\frac{13}{16}$"	$\frac{1}{4}$"

GENERAL NOTES:

COVER PLATE PANELS ARE $\frac{3}{16}$" THICK.

ALL STIFFENERS ARE $\frac{1}{4}$" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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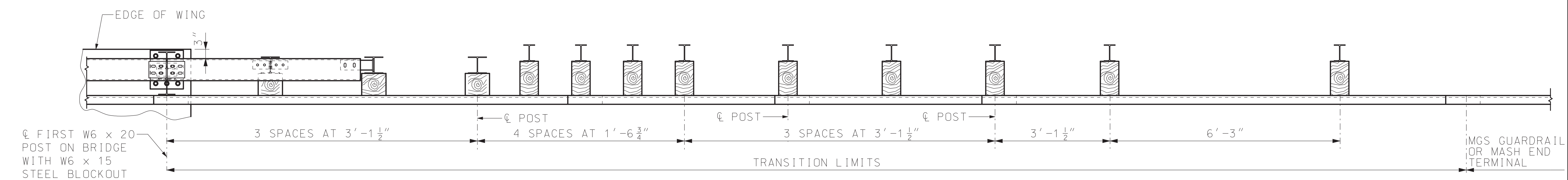
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS (CONNECTOR PLATE DETAIL) SINGLE SLOPE BARRIERS

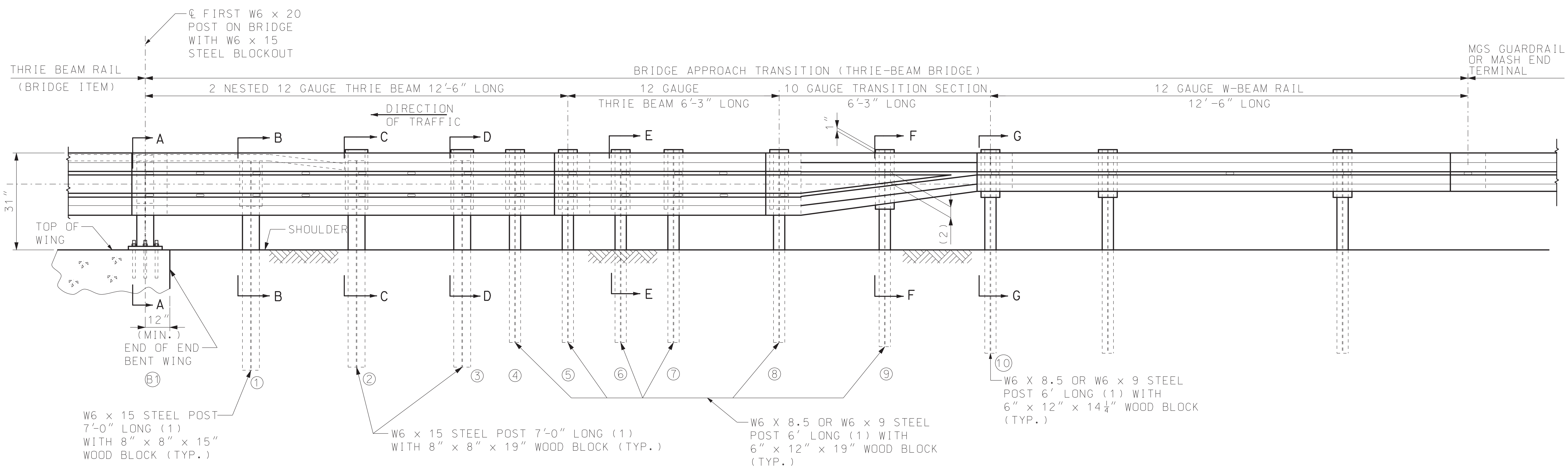
DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

606.60B

SHEET NO. 6 OF 6



PLAN



PART SECTION THROUGH SLAB AT END OF WING

NOTES:

FOR GENERAL NOTES, SEE SHEET 2 OF 5.

FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

(1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.

(2) VERIFY BY RAIL TRANSITION PRODUCER.

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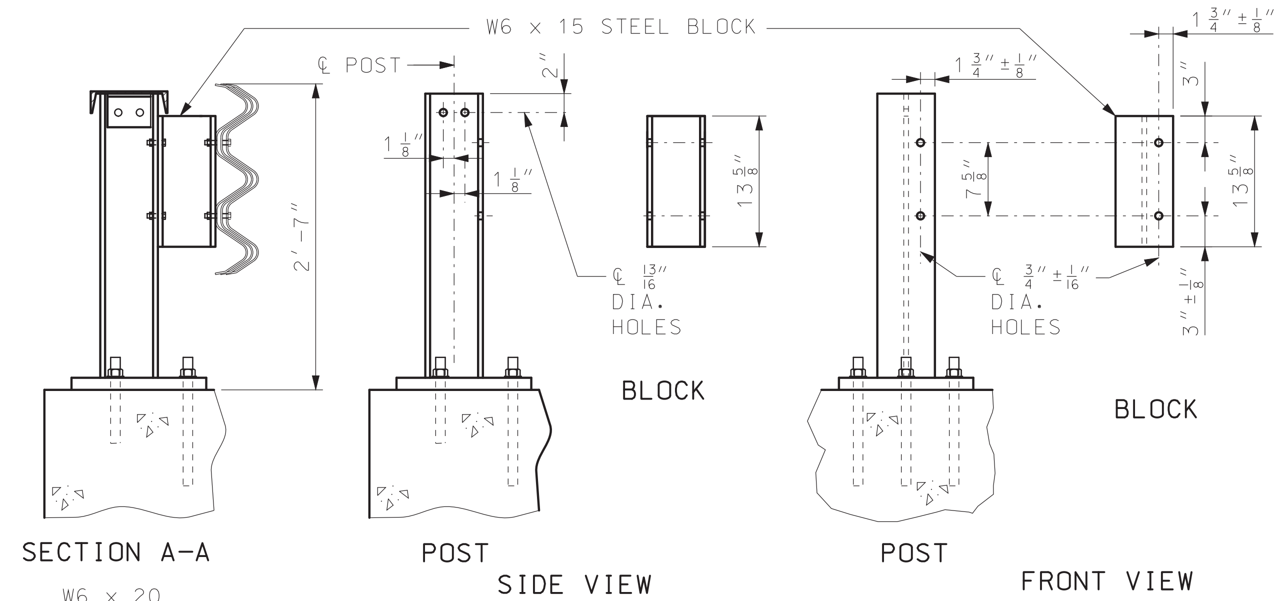
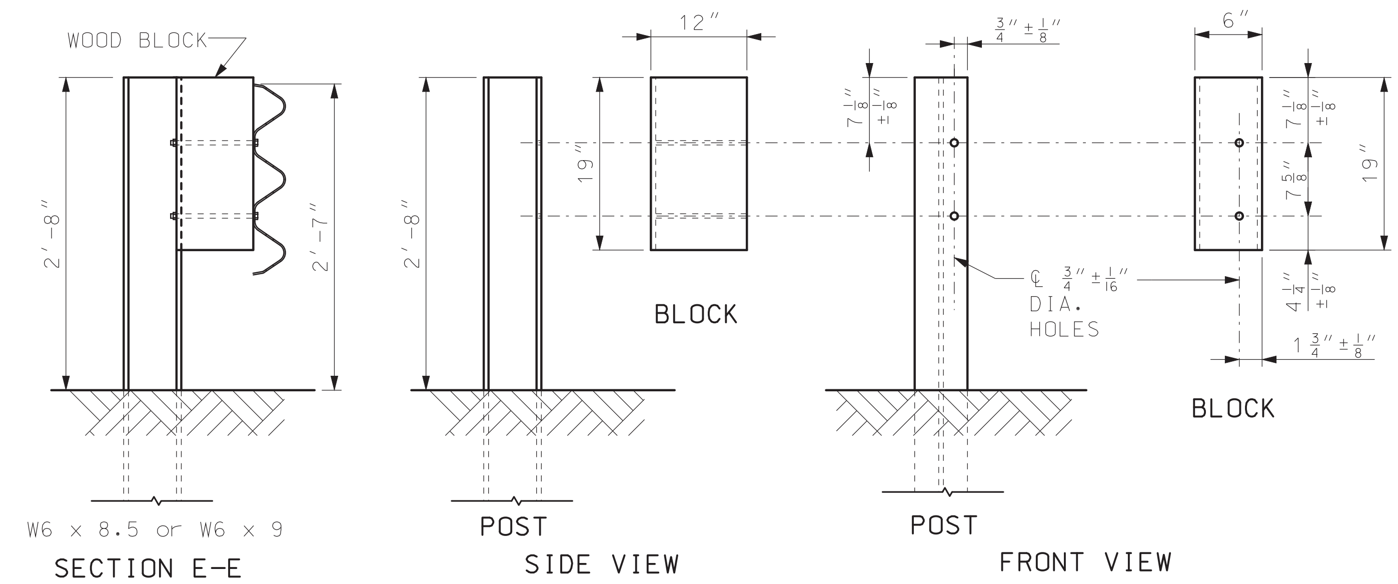
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

MIDWEST GUARDRAIL SYSTEM (MGS)
BRIDGE APPROACH TRANSITION
(THRIE BEAM ON BRIDGE)

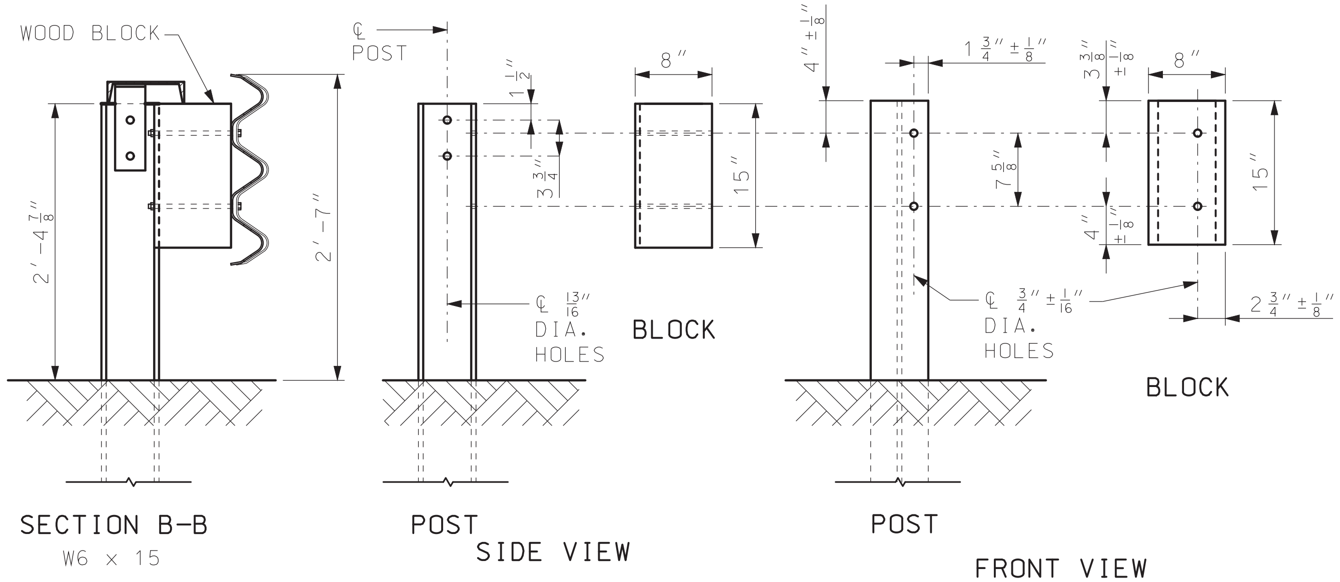
DATE EFFECTIVE:	07/01/2017	606.70B	SHEET NO.
DATE PREPARED:	5/1/2017		1 OF 5



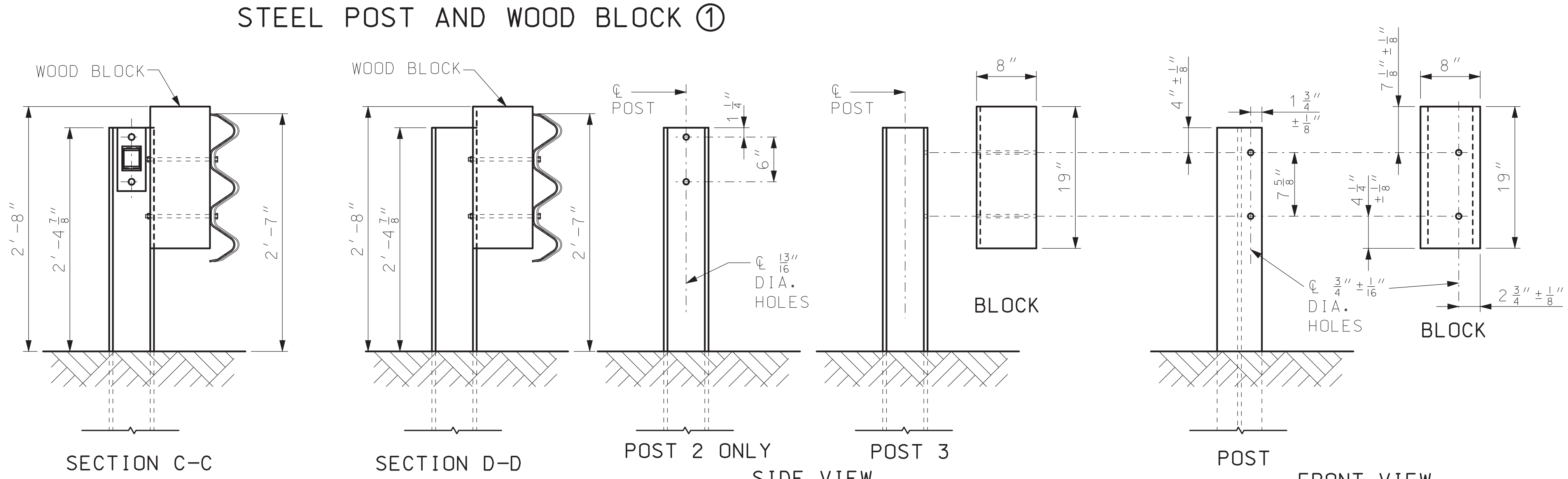
STEEL POST AND STEEL BLOCK (B1)



STEEL POST AND WOOD BLOCK (4) THROUGH (8)



STEEL POST AND WOOD BLOCK (1)



STEEL POST AND WOOD BLOCK (2) and (3)

GENERAL NOTES:

DESIGN BASED UPON MASH TEST LEVEL 3 (TL-3).

FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE 5/8" BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS = 3/8" MIN.) AT ALL SLOTS.

ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL SHEET.

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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

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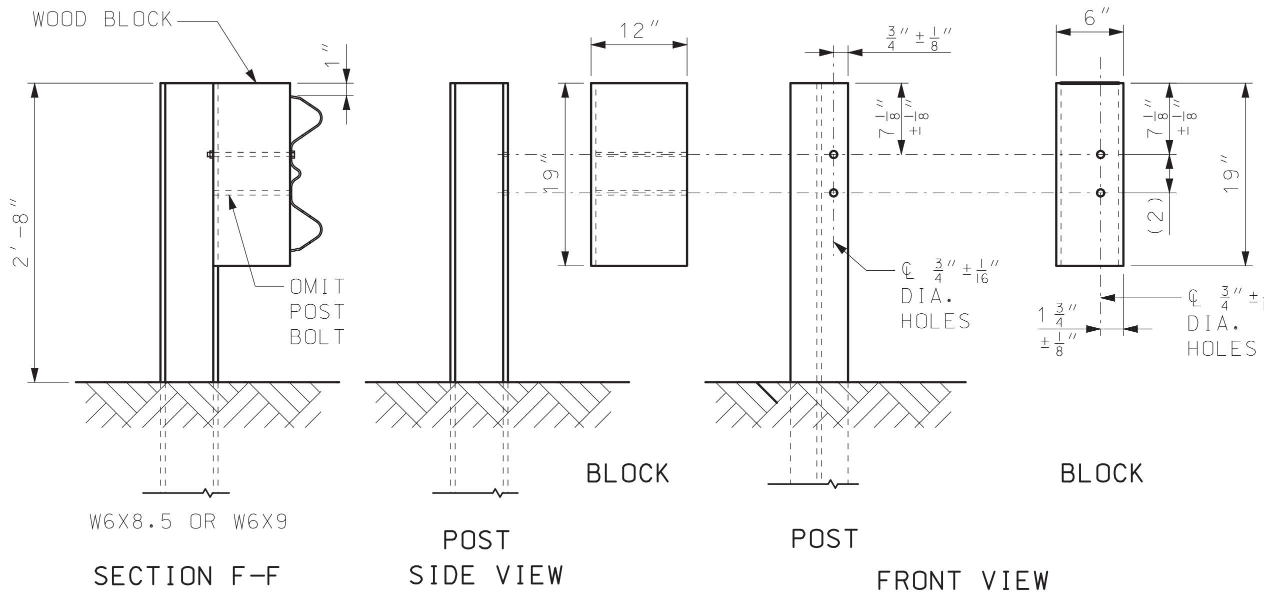
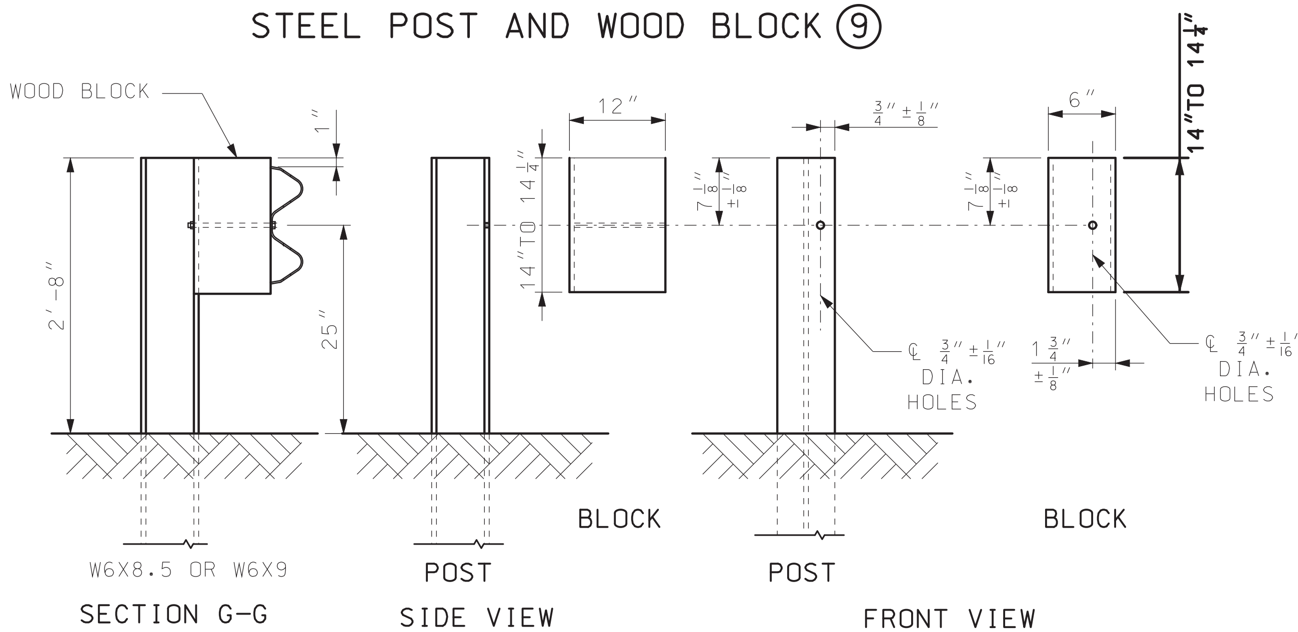
MIDWEST GUARDRAIL SYSTEM (MGS) BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE)

DATE EFFECTIVE:	07/01/2017	606.70B	SHEET NO. 2 OF 5
DATE PREPARED:	5/1/2017		

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

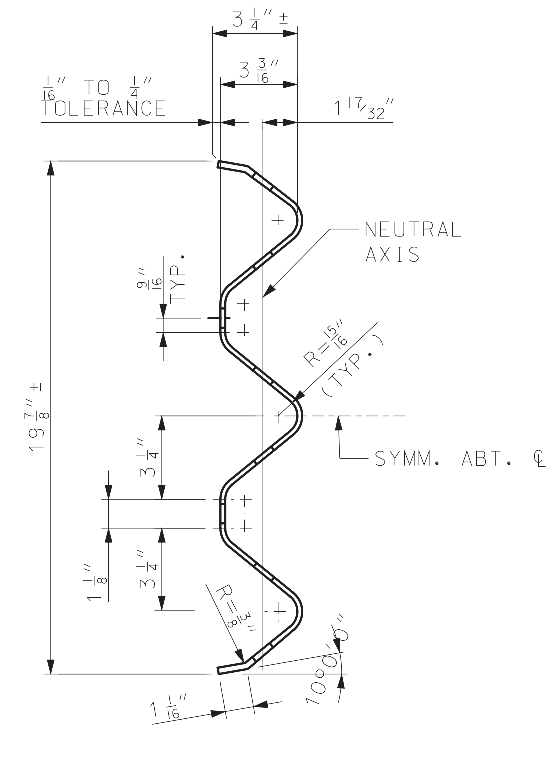


STEEL POST AND WOOD BLOCK ⑨

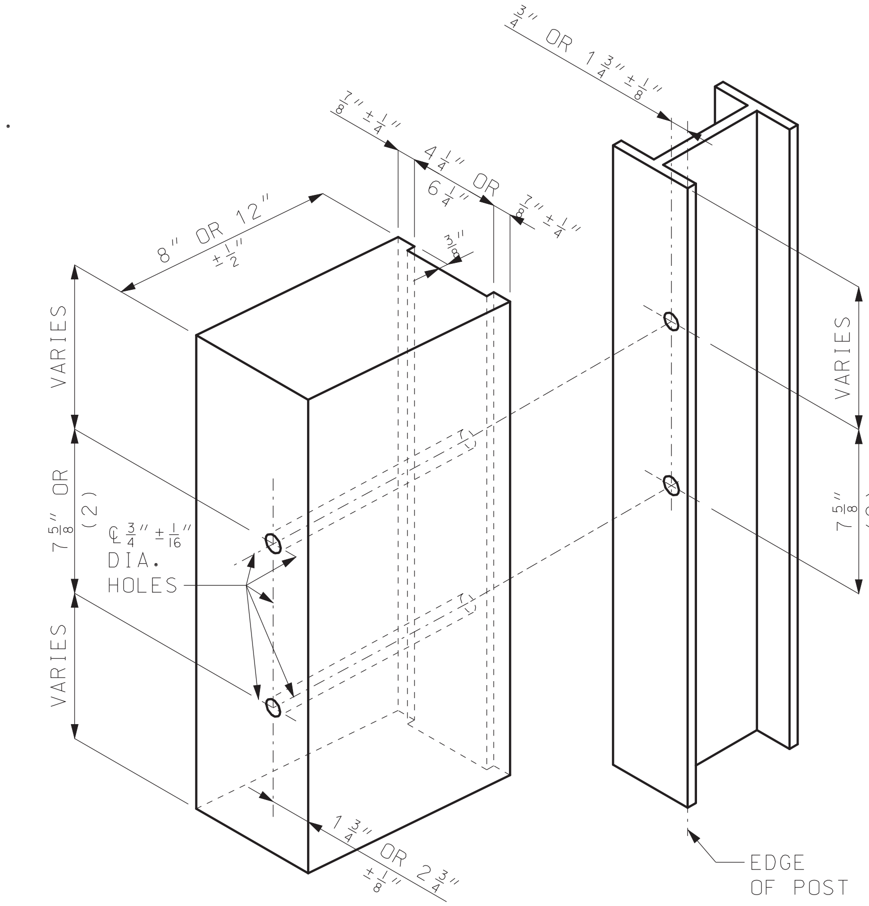


STEEL POST AND WOOD BLOCK ⑩

(2) VERIFY BY RAIL TRANSITION PRODUCER.

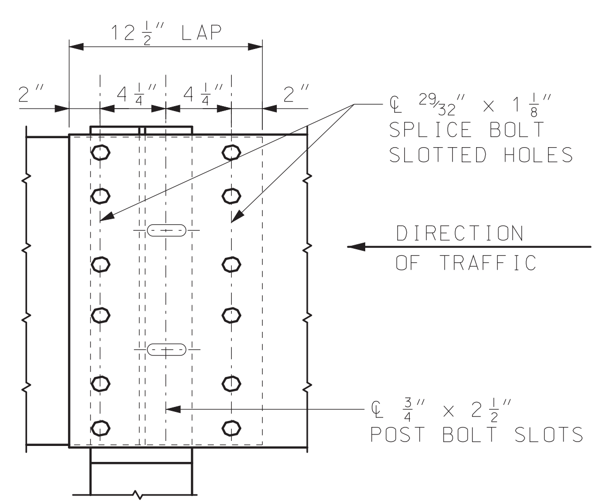


THROUGH THRIE BEAM RAIL

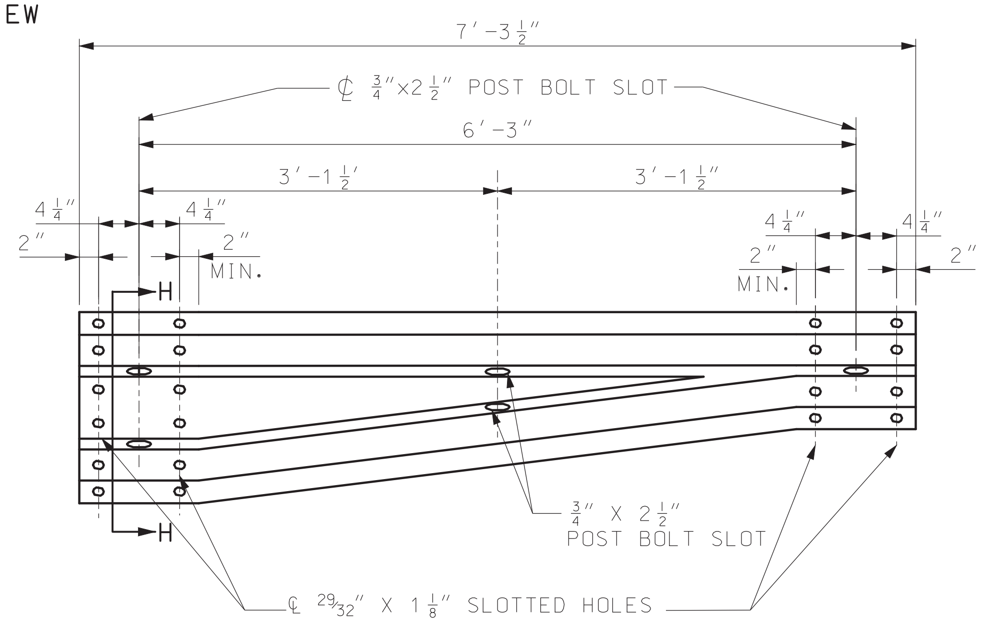


POST ⑨ - (2) VERIFY BY RAIL TRANSITION PRODUCER (SEE FRONT SHEET)
POST ⑩ - ONLY 1 HOLE REQUIRED
ALL HOLES $\frac{3}{4}" \pm \frac{1}{16}"$ DIAMETER EXCEPT AS NOTED

HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD BLOCKS (6" AND 8")



THRIE BEAM RAIL SPLICE AT POST



ASYMMETRICAL TRANSITION SECTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER
PE-28411
PROFESSIONAL ENGINEER
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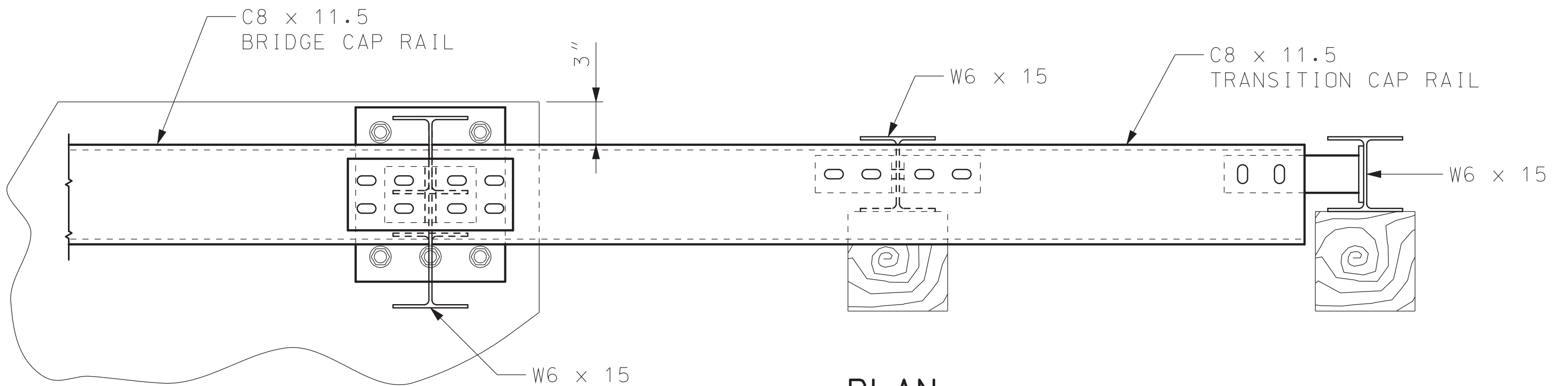
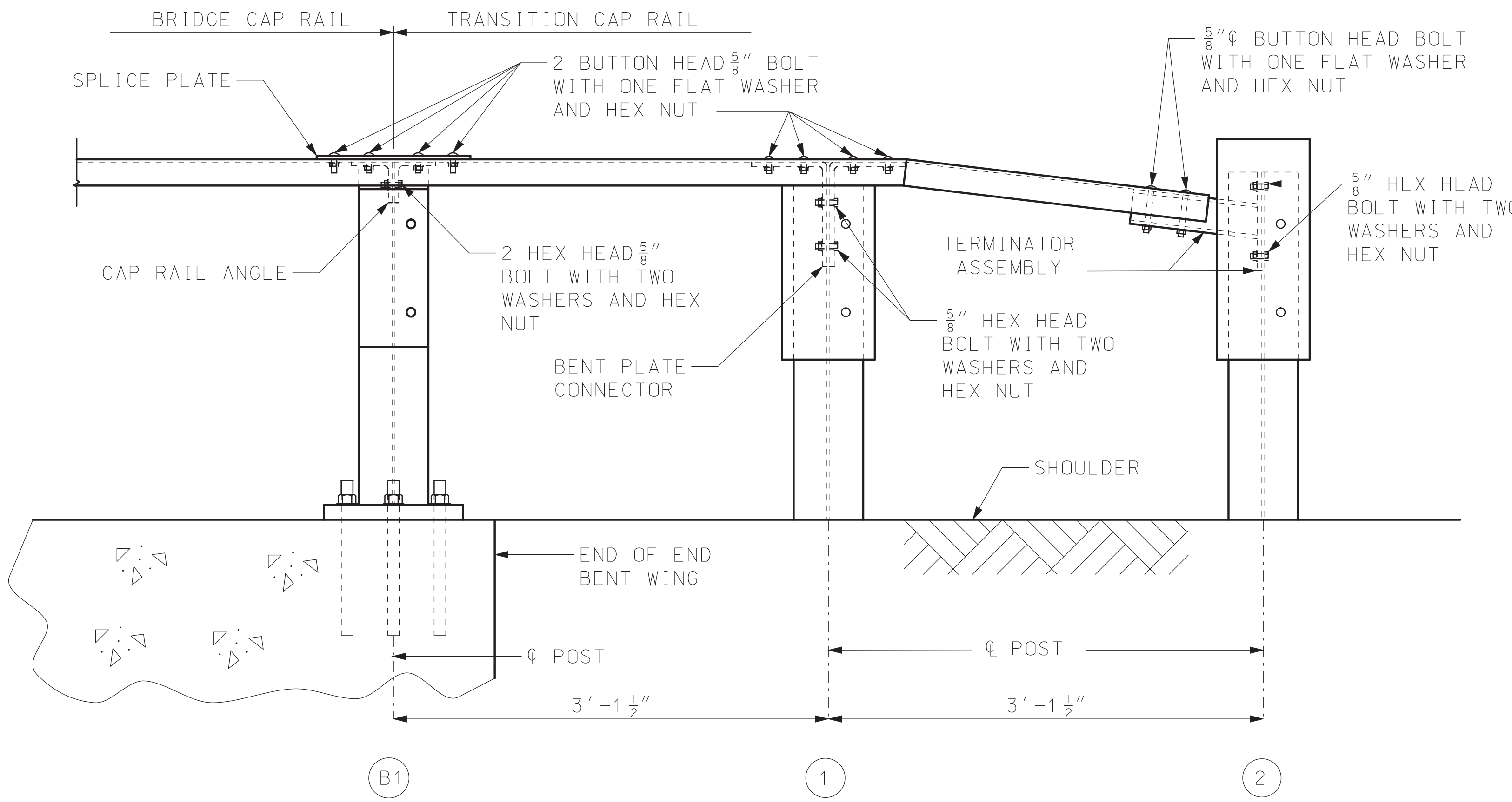
MIDWEST GUARDRAIL SYSTEM (MGS)
BRIDGE APPROACH TRANSITION
(THRIE BEAM ON BRIDGE)

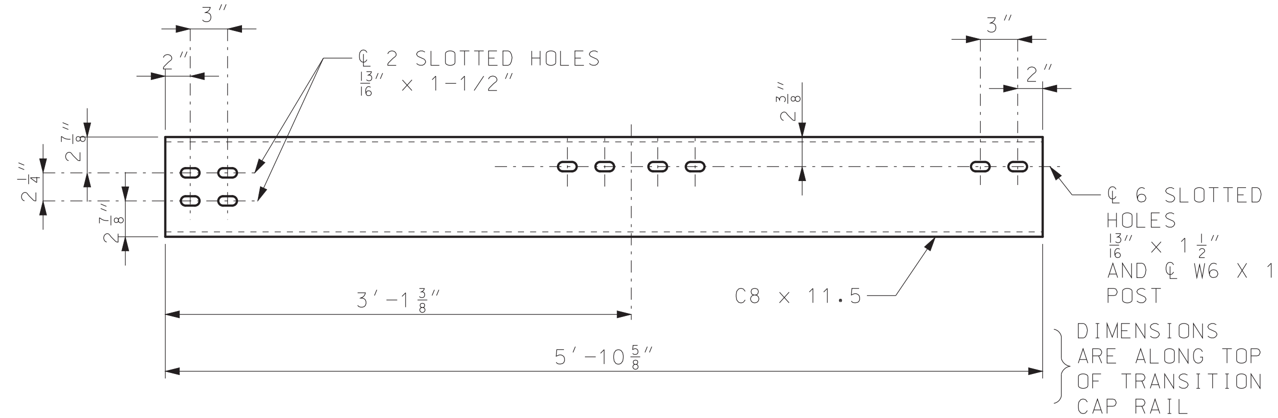
DATE EFFECTIVE:	04/01/2018	606.70B	SHEET NO. 3 OF 5
DATE PREPARED:	2/9/2018		



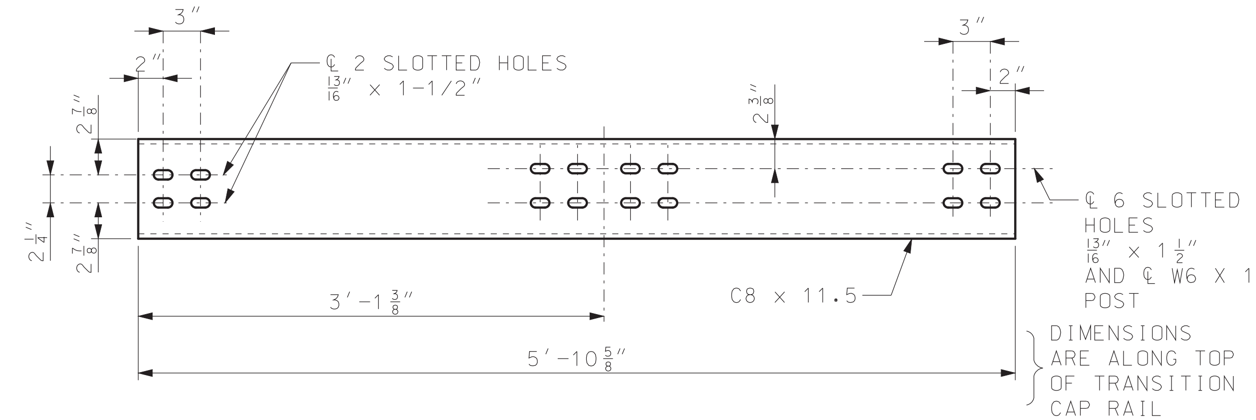
PLAN



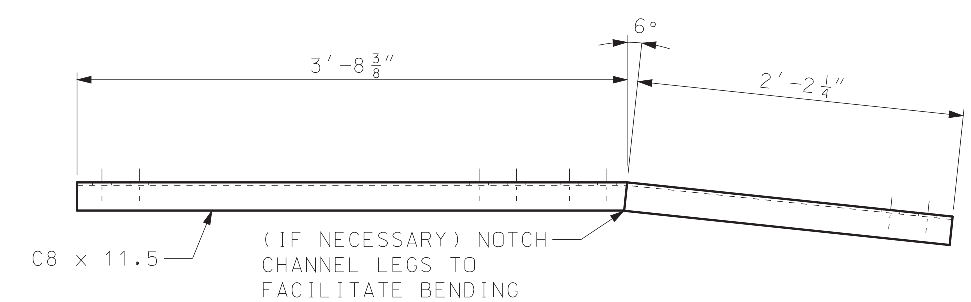
ELEVATION
(THRIE BEAM RAIL NOT SHOWN)



TOP VIEW (ALTERNATE 1)



TOP VIEW (ALTERNATE 2)



ELEVATION

TRANSITION CAP RAIL

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JEFFERSON CITY, MO 65102
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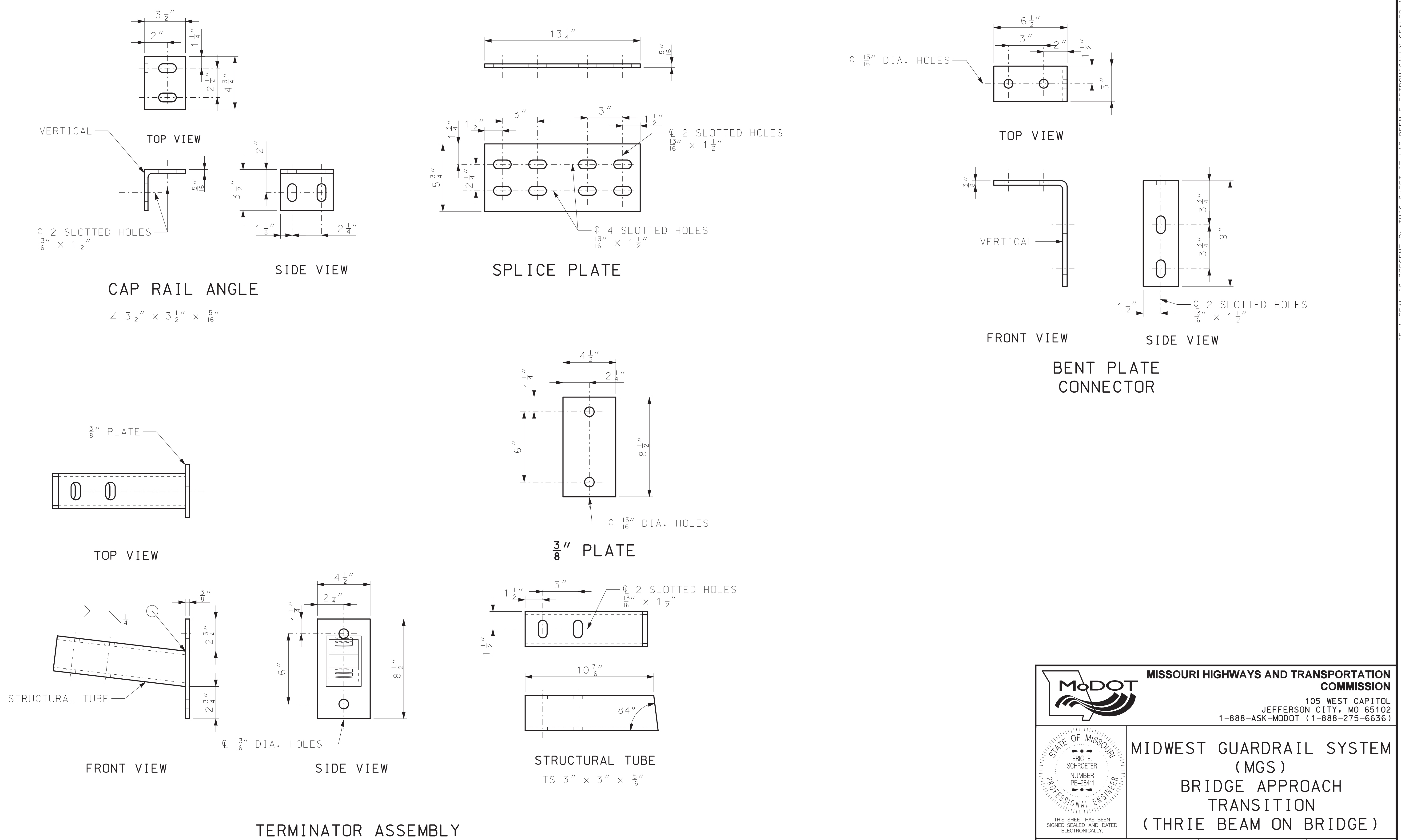
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER
PE-28411
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS) BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE)

DATE EFFECTIVE:	07/01/2017	606.70B	SHEET NO.
DATE PREPARED:	5/1/2017		4 OF 5



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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
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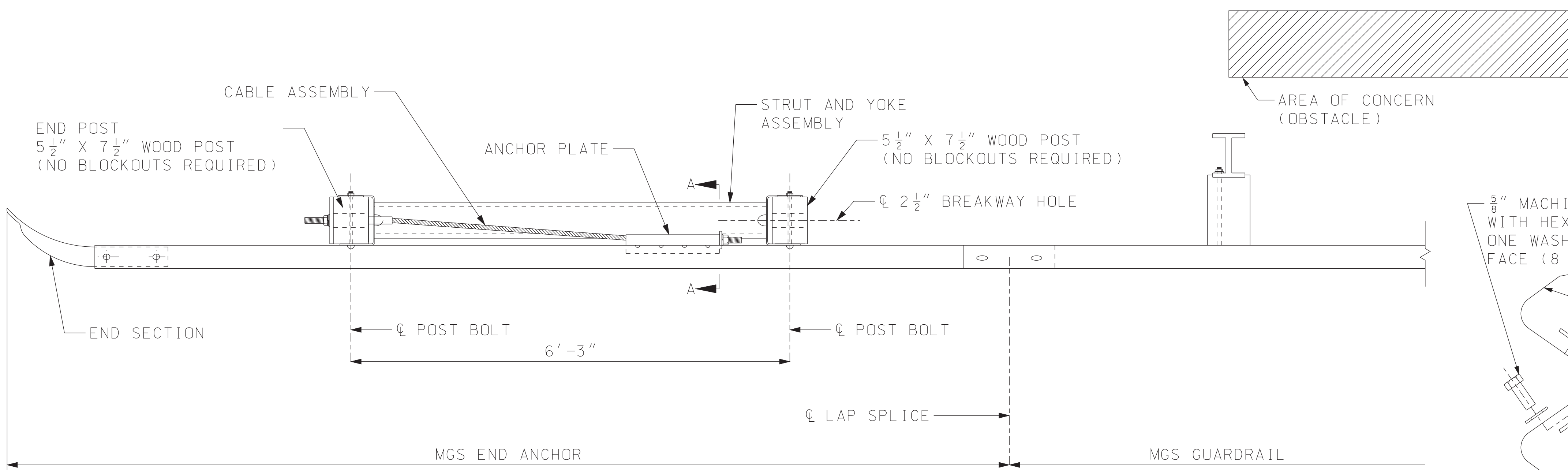
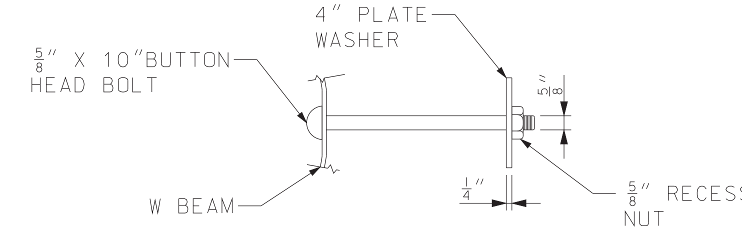
MIDWEST GUARDRAIL SYSTEM (MGS)
BRIDGE APPROACH TRANSITION
(THRIE BEAM ON BRIDGE)

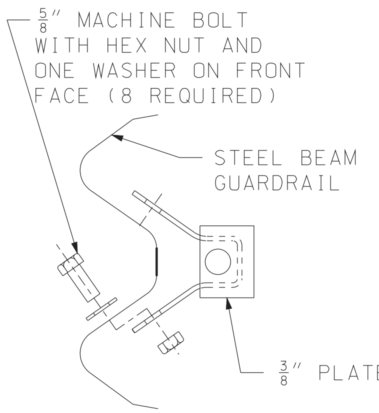
DATE EFFECTIVE:	07/01/2017	606.70B	SHEET NO. 5 OF 5
DATE PREPARED:	5/1/2017		



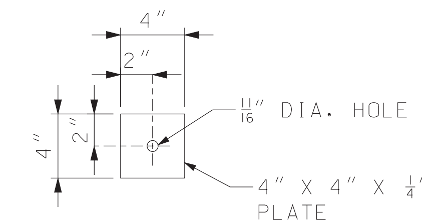
PLAN VIEW



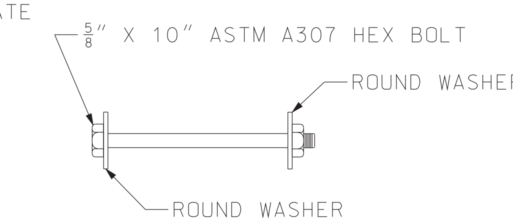
POST BOLT AT W-BEAM



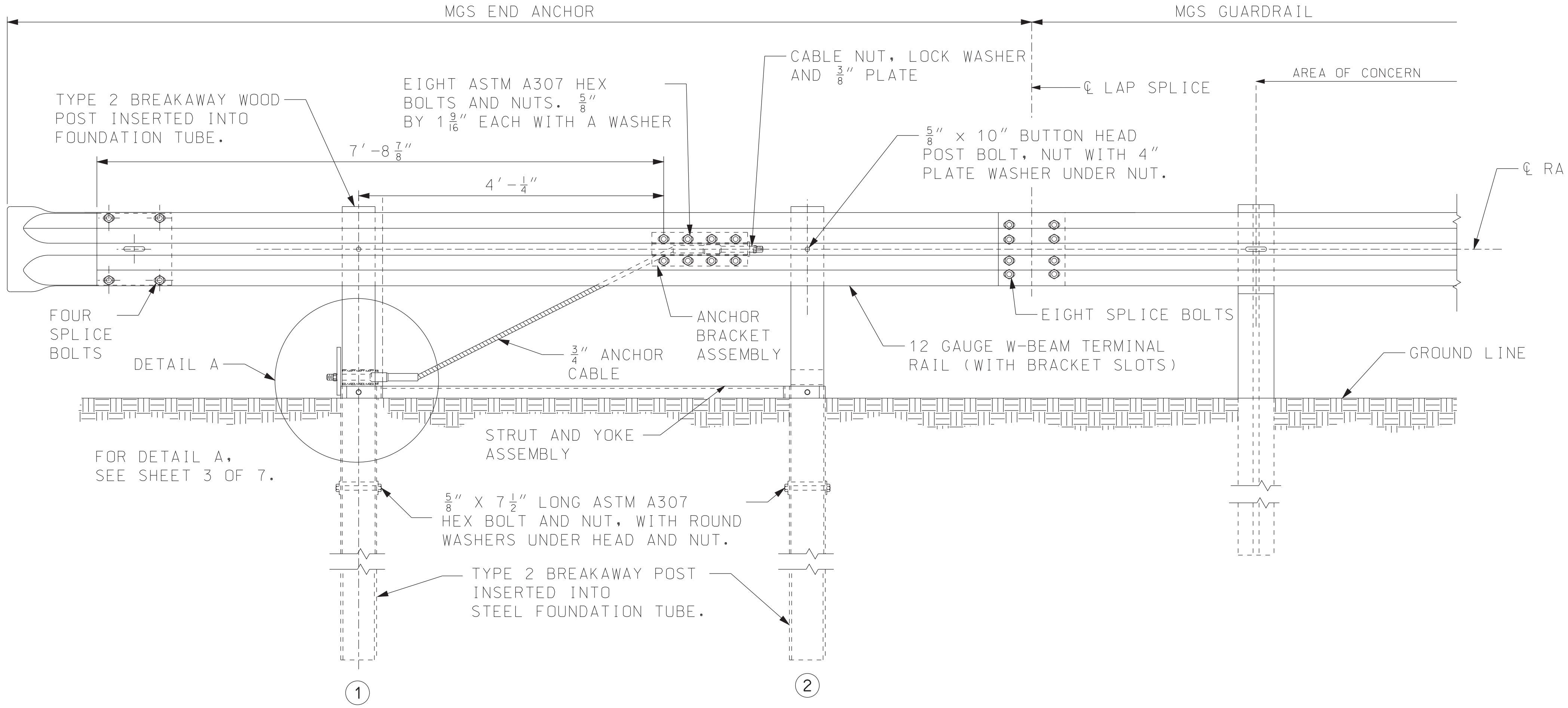
SECTION A-A



4" PLATE WASHER



POST BOLT AT YOKE



ELEVATION VIEW

GENERAL NOTES:

END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON DOWNSTREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR IS REQUIRED.

THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM FOR GUARDRAIL.

CABLE ASSEMBLY AND ANCHOR PLATE SHALL HAVE A MINIMUM BREAKING STRENGTH OF 20 TONS.

ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1040.

WOOD POSTS 1 AND 2 SHALL BE 5½" X 7½".

SEE SHEET NO. 2 OF 7 FOR WOOD POST DETAILS.

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ERIC E. SCHROETER
NUMBER
PE-28411
PROFESSIONAL ENGINEER
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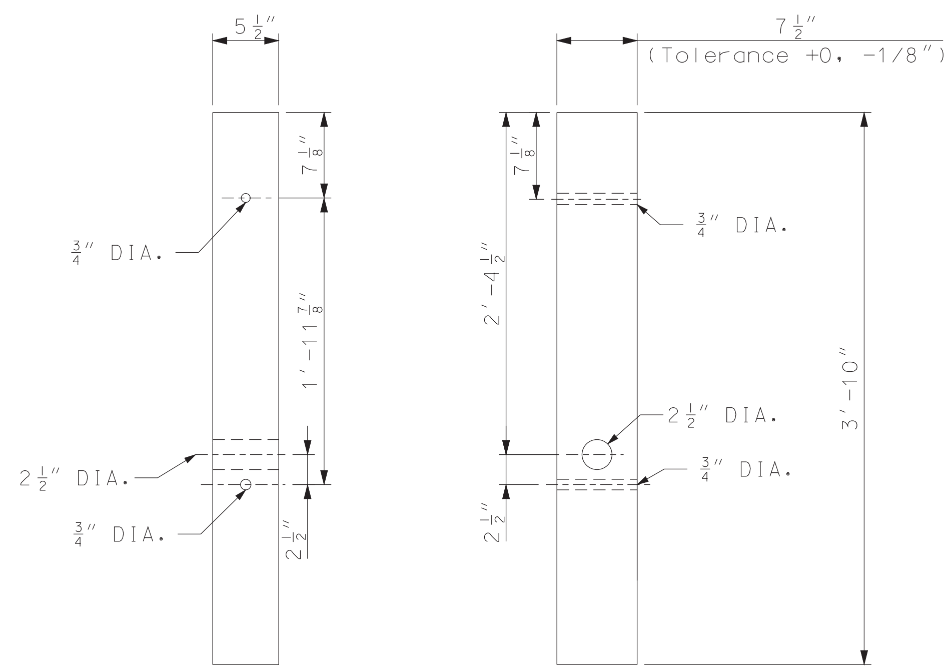
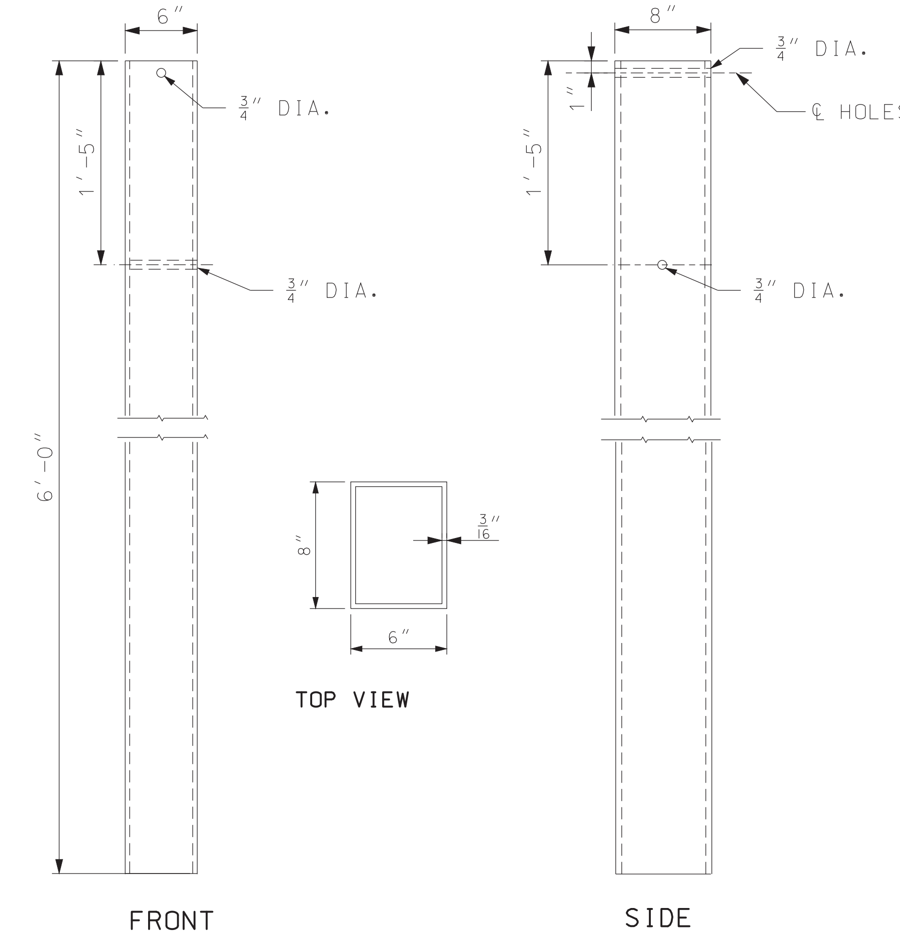
MIDWEST GUARDRAIL SYSTEM (MGS) TERMINAL ANCHOR ENDS

DATE EFFECTIVE:	07/01/2017	606.80C	SHEET NO.
DATE PREPARED:	5/1/2017		1 OF 7

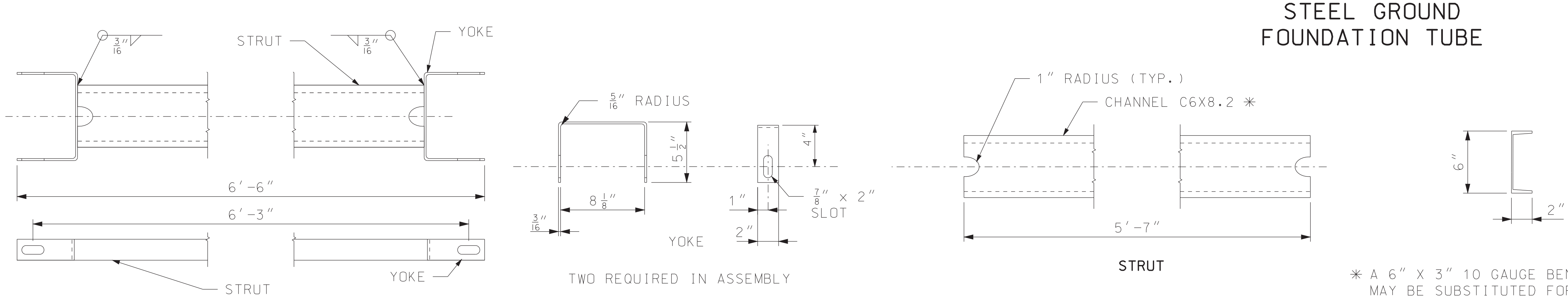
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPE 2 BREAKAWAY
WOOD POST



STEEL GROUND
FOUNDATION TUBE



✳ A 6" X 3" 10 GAUGE BENT PLATE STRUT
MAY BE SUBSTITUTED FOR THE C-CHANNEL

STRUT AND YOKE ASSEMBLY

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

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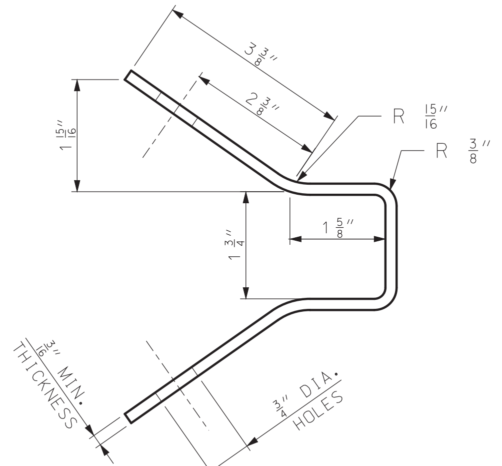
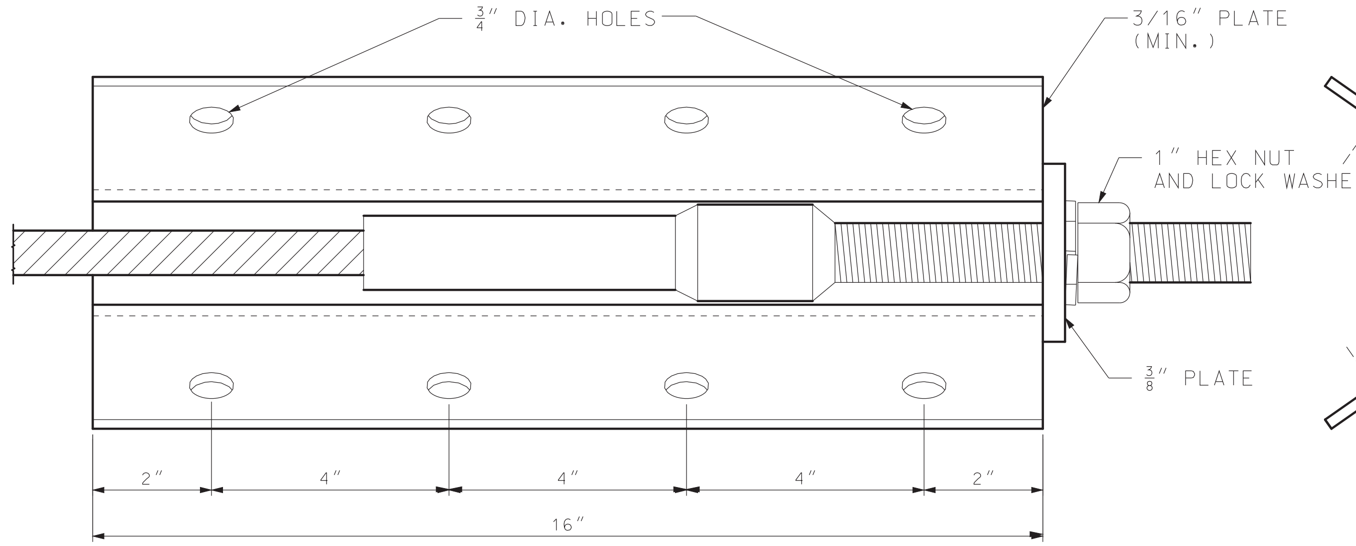
MIDWEST GUARDRAIL SYSTEM
(MGS)
TERMINAL ANCHOR ENDS

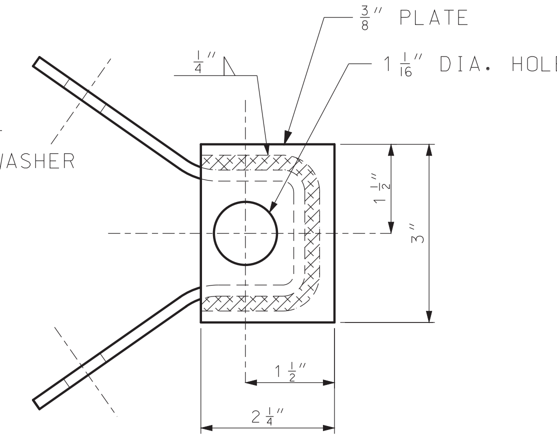
DATE EFFECTIVE:	07/01/2017	606.80C	SHEET NO.
DATE PREPARED:	5/1/2017		2 OF 7



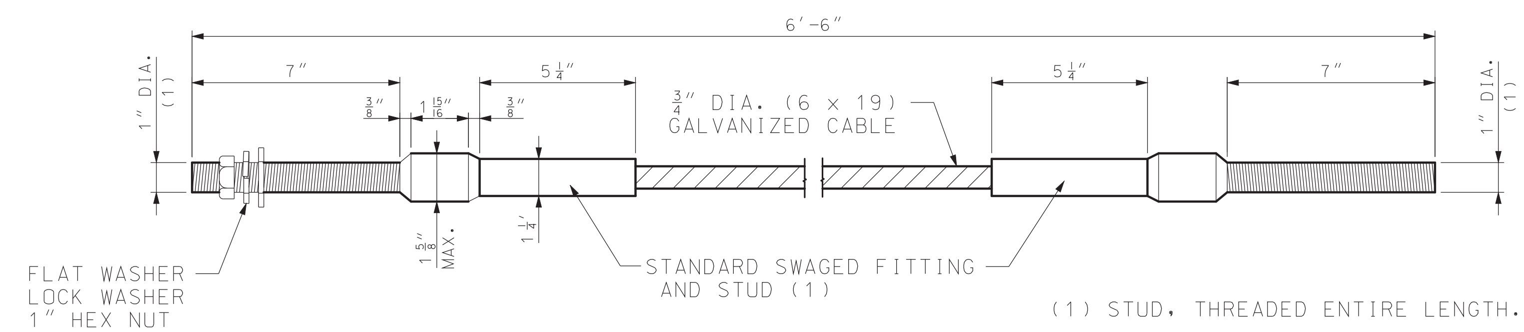
FABRICATION DETAIL



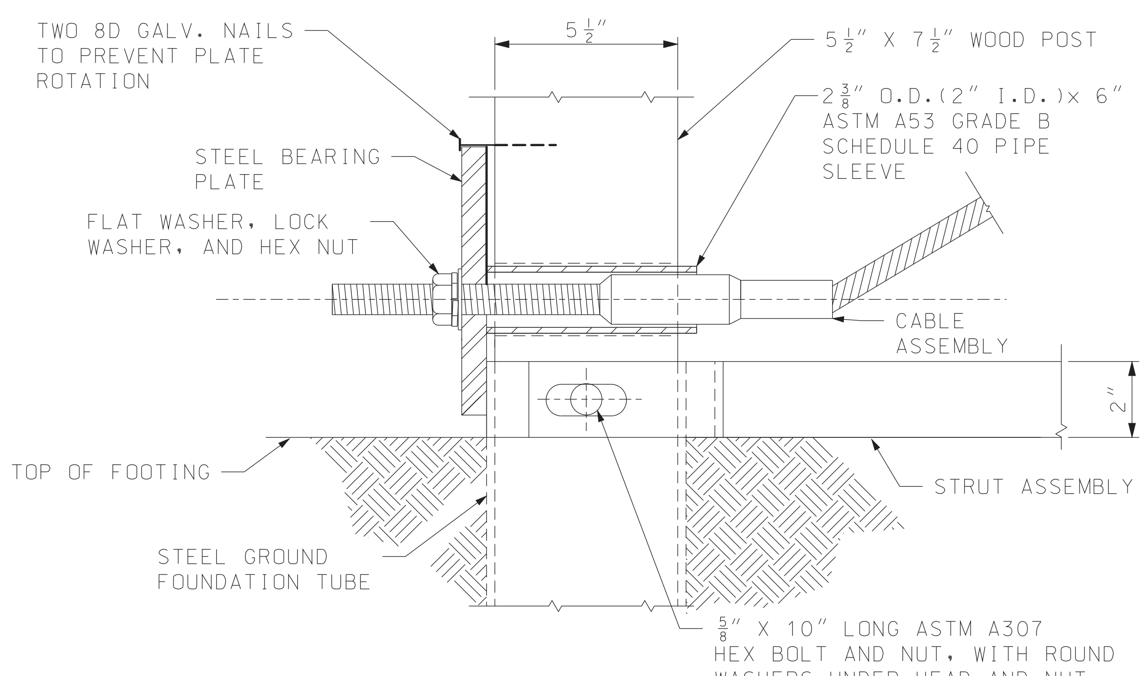
ASSEMBLED VIEW
ANCHOR BRACKET



END VIEW

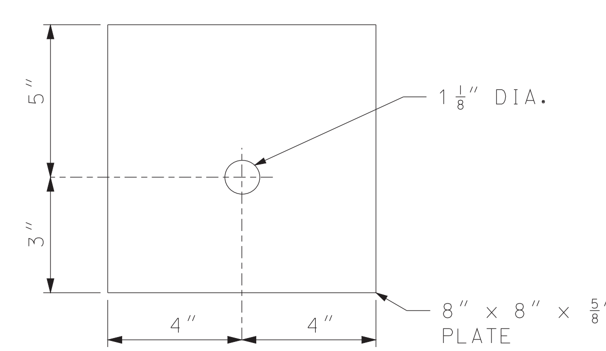


CABLE ASSEMBLY



DETAIL A
(END POST DETAIL)

FOR LOCATION OF DETAIL A, SEE SHEET 1 OF 7.



STEEL BEARING PLATE

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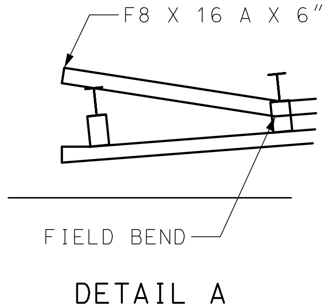
MIDWEST GUARDRAIL SYSTEM
(MGS)
TERMINAL ANCHOR ENDS

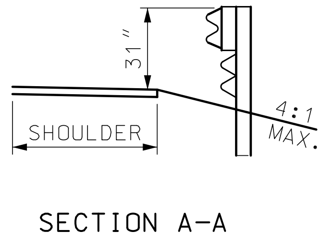
DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

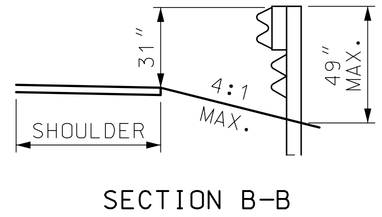
606.80C

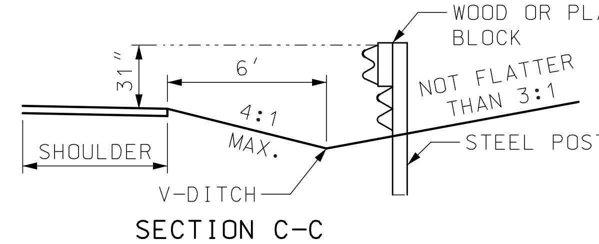
SHEET NO.
3 OF 7

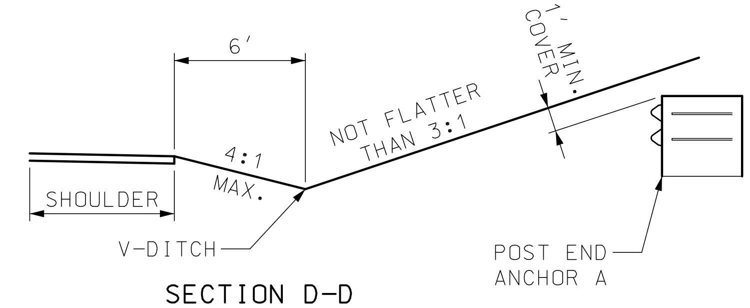
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

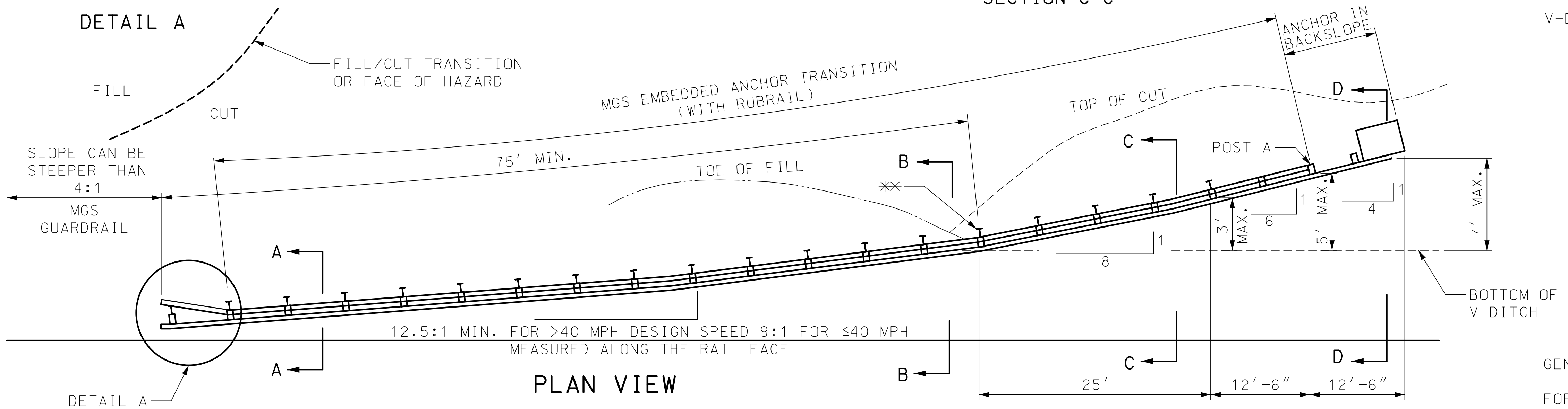


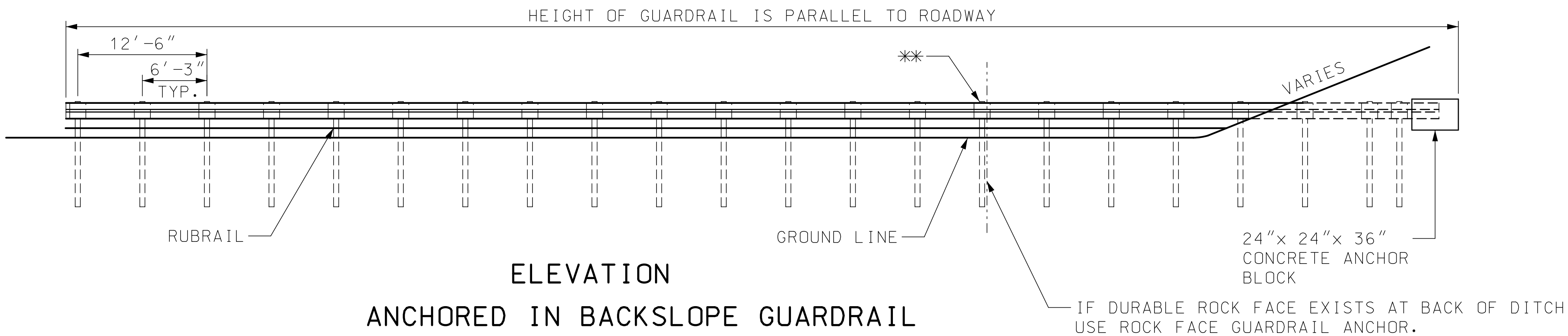






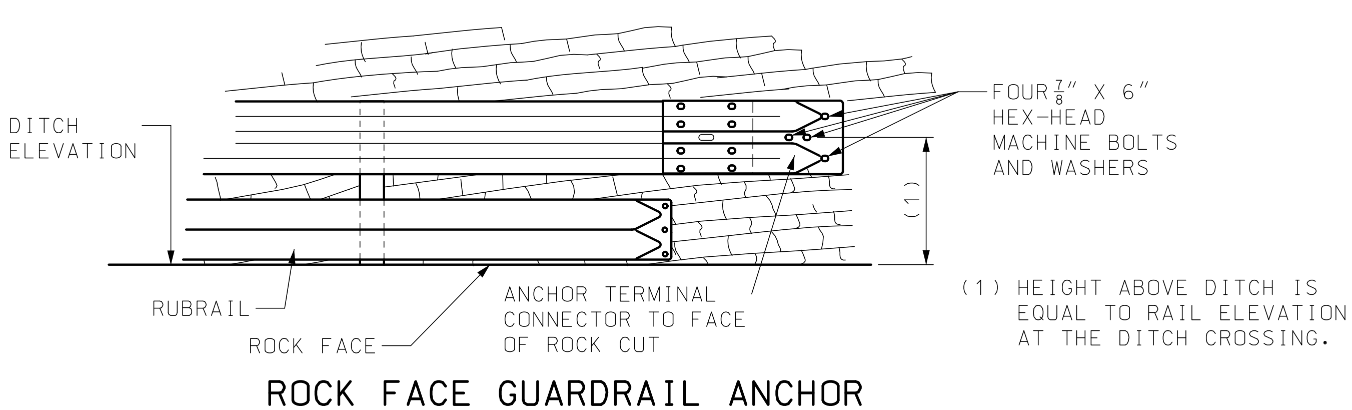






✱✱ THE POST BEHIND THE DITCHLINE MAY BE SHORTENED TO PROVIDE 48″ MIN. EMBEDMENT.

COST OF SHAPING ROCK FACE FOR PLACING OF TERMINAL CONNECTOR, DRILLING HOLES, FURNISHING AND PLACING BOLTS, WASHERS, EPOXY, ANCHORS AND END SHOE TO BE INCLUDED IN THE PRICE OF GUARDRAIL ANCHOR, ROCK FACE.



ROCK FACE GUARDRAIL ANCHOR

GENERAL NOTES:

FOR END ANCHOR DETAILS, SEE SHEET 1-3 OF 7.

RUBRAIL BEGINS WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18″ AND INCREASING.

END ANCHOR POSTS 1 AND 2 SHALL HAVE FOUNDATION TYPE AS SHOWN ON SHEET 3 OF 7.

THE CONTRACT UNIT PRICE FOR EMBEDDED GUARDRAIL ANCHOR SHALL INCLUDE THE CONCRETE ANCHOR. EXCAVATION AND BACKFILLING, OR TERMINAL CONNECTOR, AND ALL INCIDENTIAL HARDWARE AND WORK NECESSARY TO COMPLETE THE INSTALLATION.

THE EMBEDED ANCHOR TRANSITION SHALL EXTEND 50′± BEYOND THE DITCH LINE AND TERMINATE A MINIMUM OF 12 INCHES BELOW GROUND ELEVATION OF THE BACKSLOPE.

BLOCKOUTS WILL NOT BE REQUIRED FOR ANY POST WHICH WILL BE COMPLETELY BELOW GROUND. THE ALIGNMENT OF SUCH POSTS SHALL BE APPROVED BY THE ENGINEER.

SEE OTHER DRAWINGS AND STANDARD SPECIFICATIONS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS NOT SHOWN.

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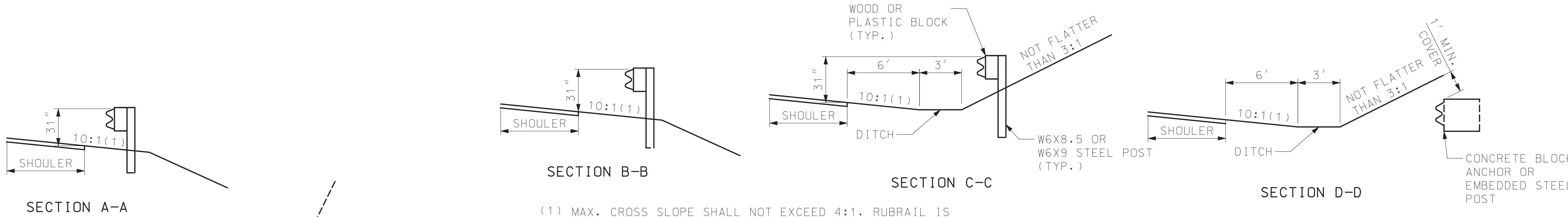
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM (MGS)
TERMINAL ENDS
EMBEDDED AND ROCK FACE
(V-DITCH STEEPER THAN 10:1, 4:1 MAX. FORESLOPE)

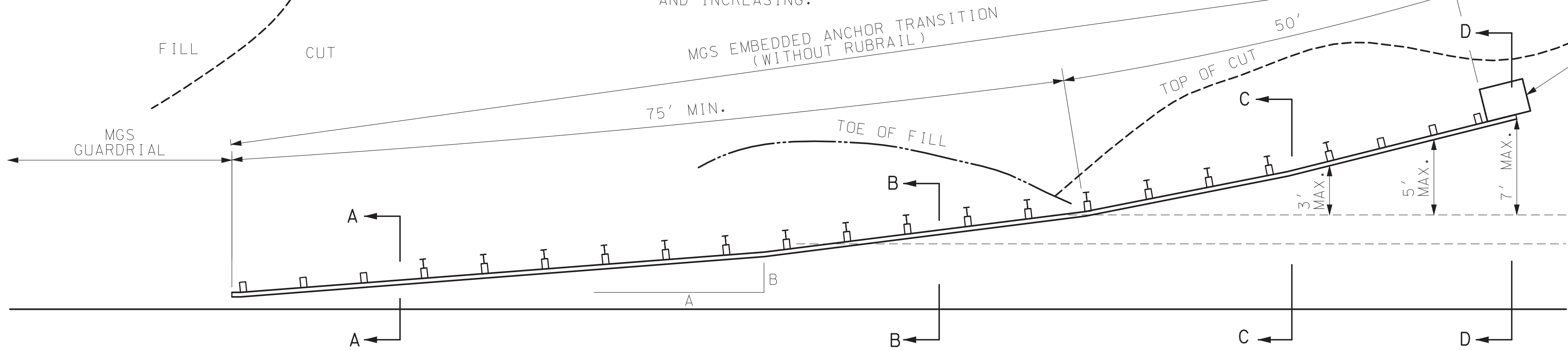
DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021

606.80C

SHEET NO. 4 OF 7

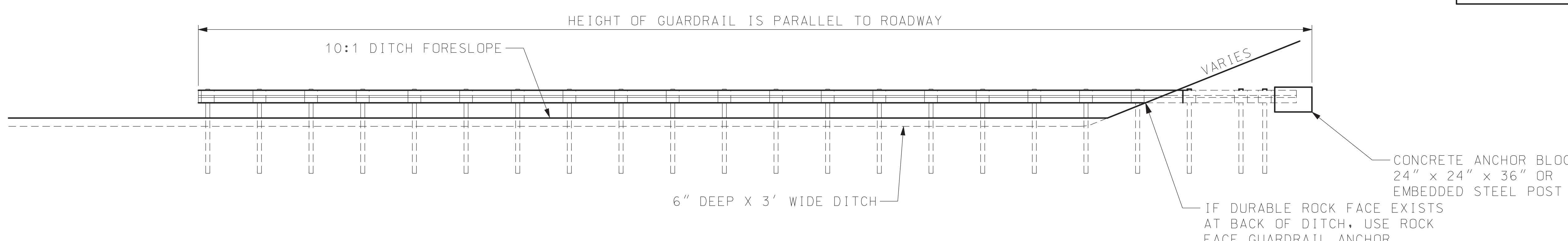


(1) MAX. CROSS SLOPE SHALL NOT EXCEED 4:1. RUBRAIL IS REQUIRED WHEN CROSS SLOPE EXCEEDS 10:1 OR WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.



PLAN VIEW

FLARE RATE	
DESIGN SPEED mph	A:B
70	15:1
60	13:1
55	12:1
50	11:1
45	10:1
40	9:1
30 OR LESS	7:1



ELEVATION
ANCHORED IN BACKSLOPE GUARDRAIL

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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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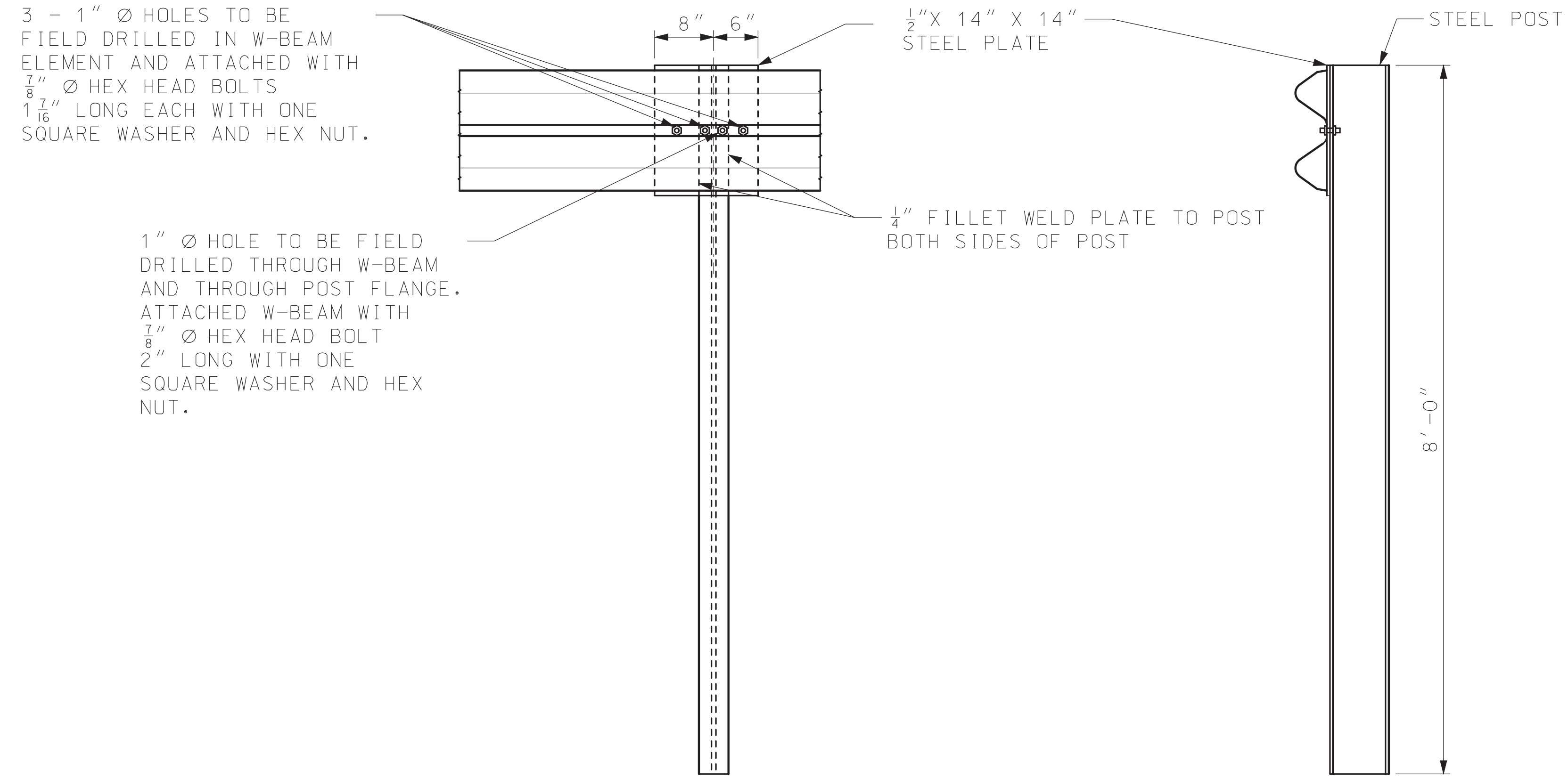
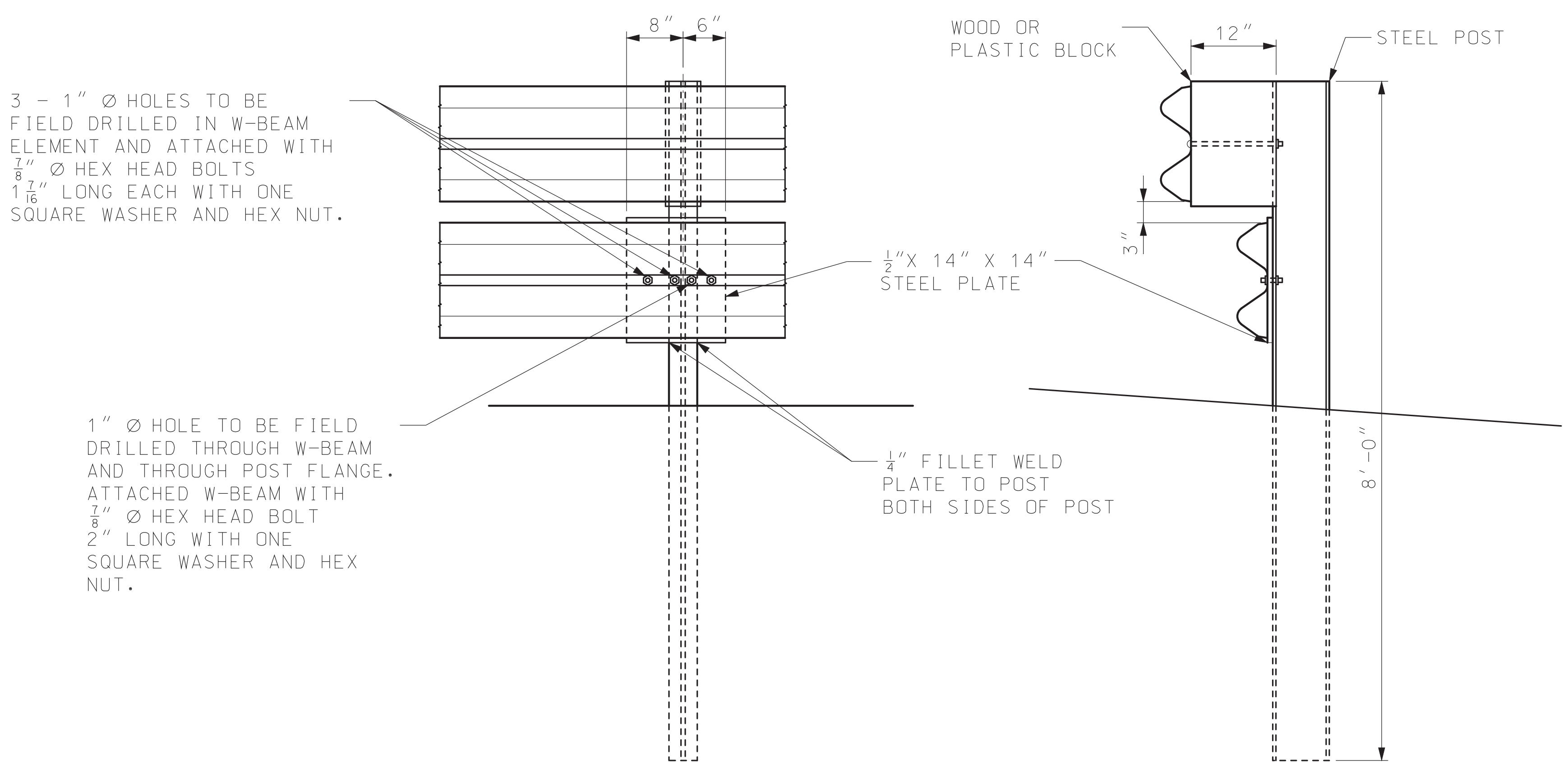
MIDWEST GUARDRAIL SYSTEM
(MGS)
EMBEDED ANCHOR TRANSITION
EMBEDDED TERMINAL ENDS
(FLAT DITCH)

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017
606.80C



EMBEDDED STEEL POST



SPECIAL RUBRAIL TO POST CONNECTION AT POST A

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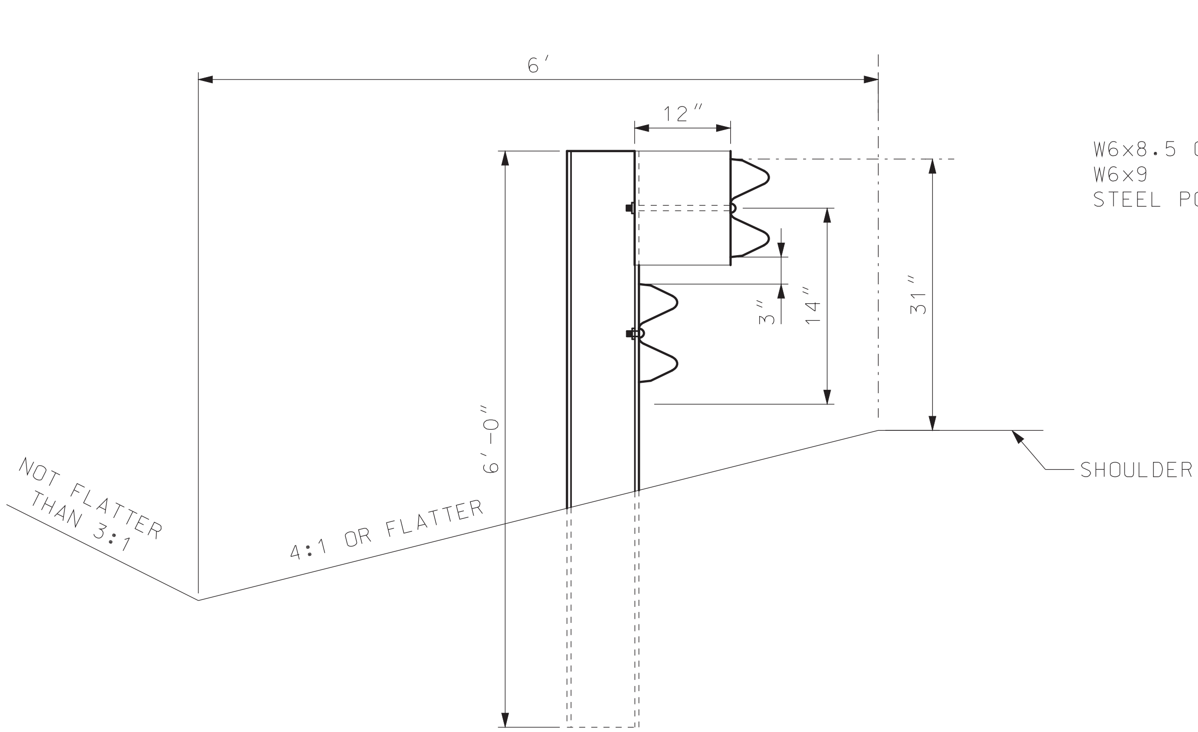
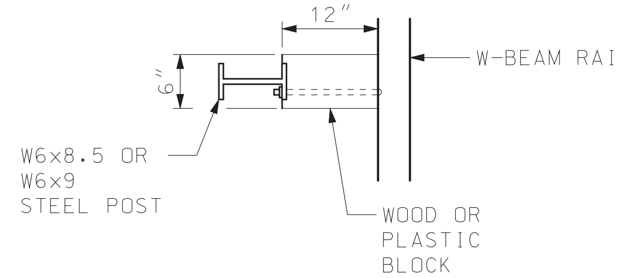
MIDWEST GUARDRAIL SYSTEM
(MGS)
EMBEDDED ANCHOR
TERMINAL ENDS
(STEEL POST OPTION)

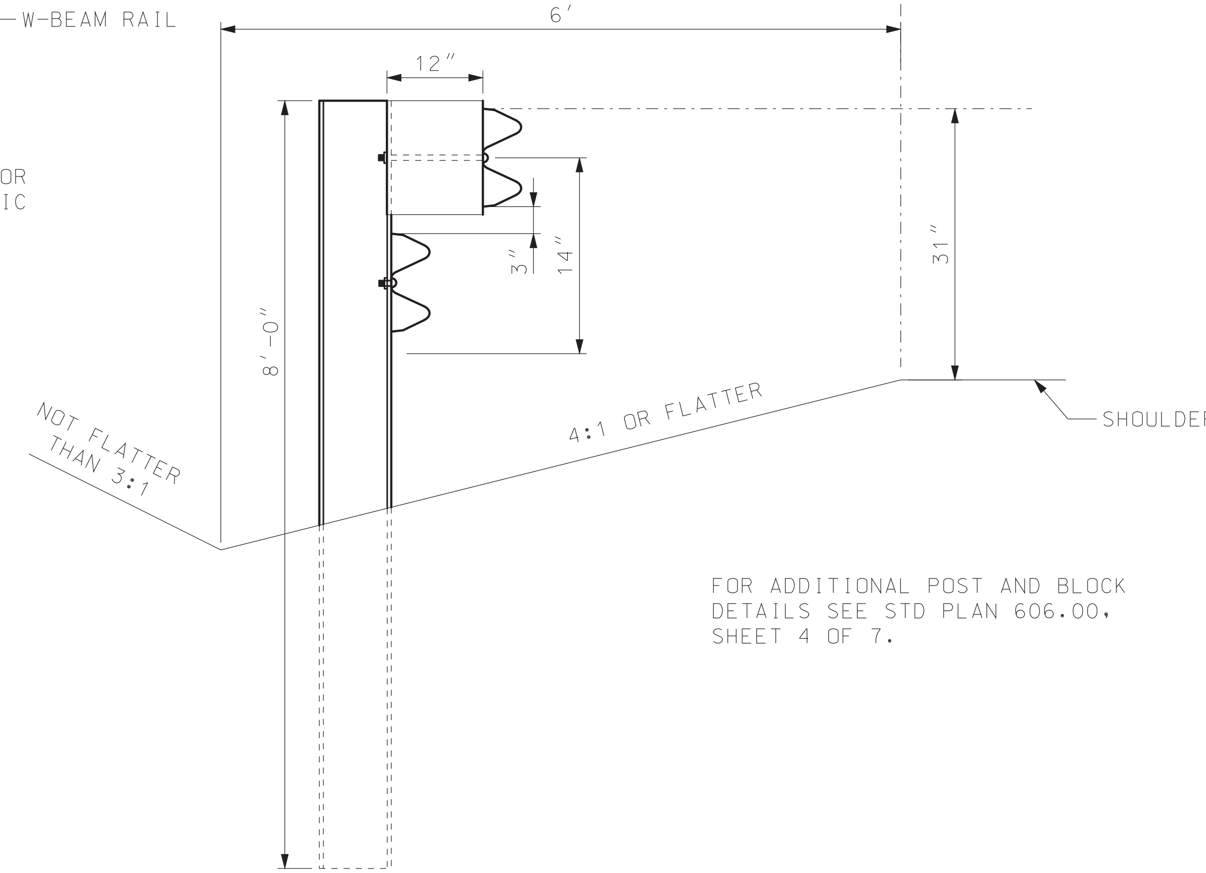
DATE EFFECTIVE:	07/01/2017	606.80C	SHEET NO. 6 OF 7
DATE PREPARED:	5/1/2017		



ELEVATION OF 6' STEEL POST AND BLOCK

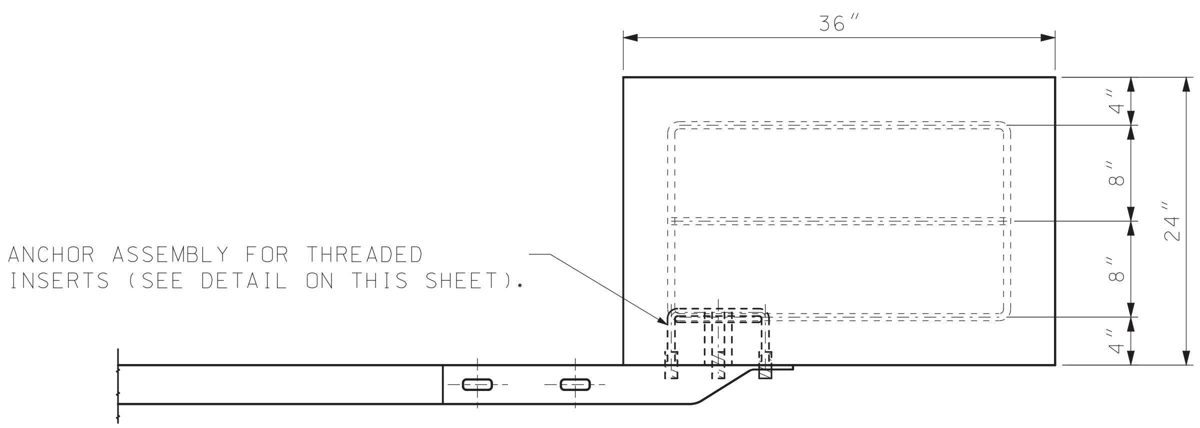


PLAN VIEW

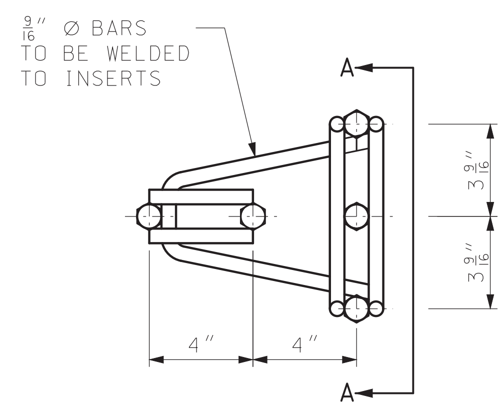


ELEVATION 8' STEEL POST AND BLOCK

FOR ADDITIONAL POST AND BLOCK DETAILS SEE STD PLAN 606.00, SHEET 4 OF 7.

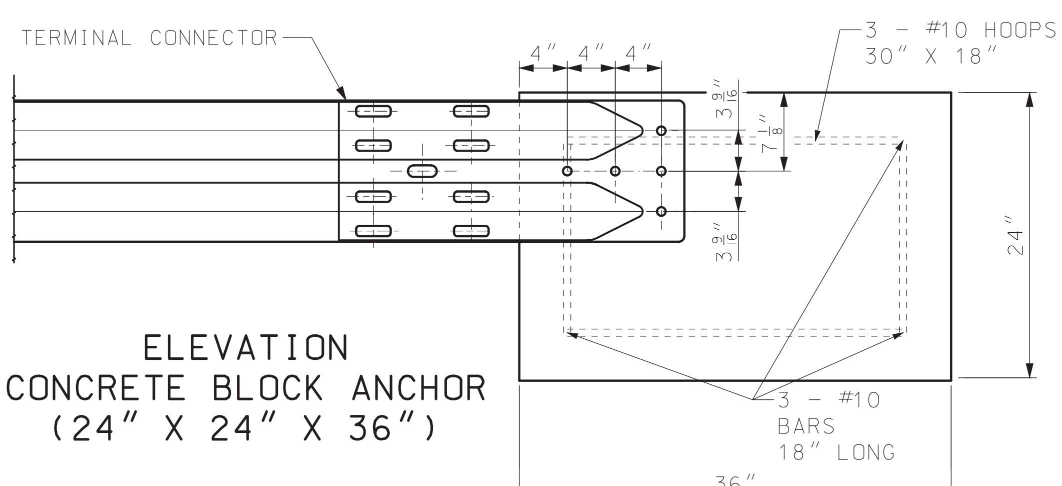


TOP VIEW

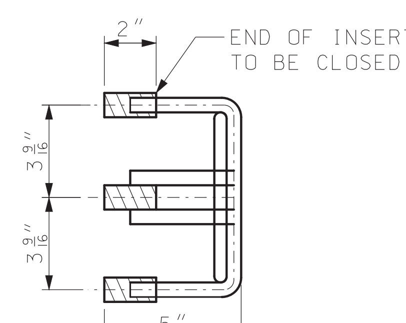


CONCRETE BLOCK ANCHOR ANCHOR ASSEMBLY

THREADED INSERTS FOR 15/16" X 2" GALVANIZED HEX HEAD CAP SCREWS. CAP SCREWS TO BE THREADED A MINIMUM 1 7/8". INSERTS THREADED MINIMUM OF 1 3/4".



ELEVATION CONCRETE BLOCK ANCHOR (24" X 24" X 36")



SECTION A-A

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

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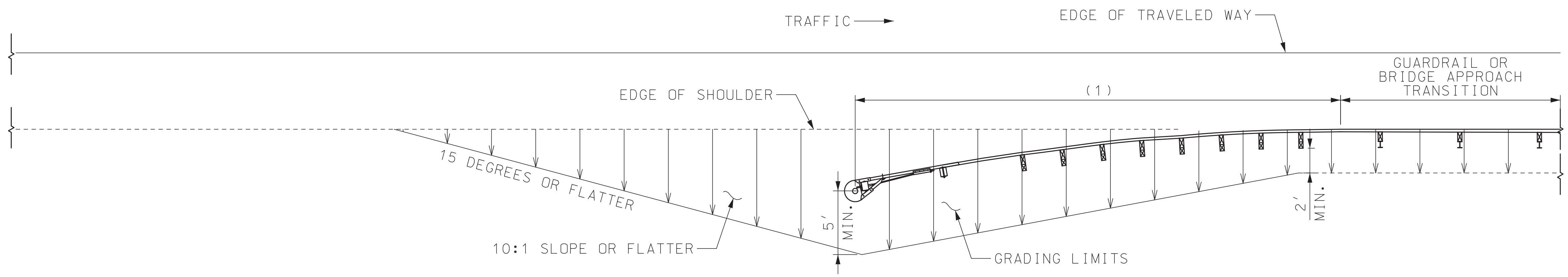
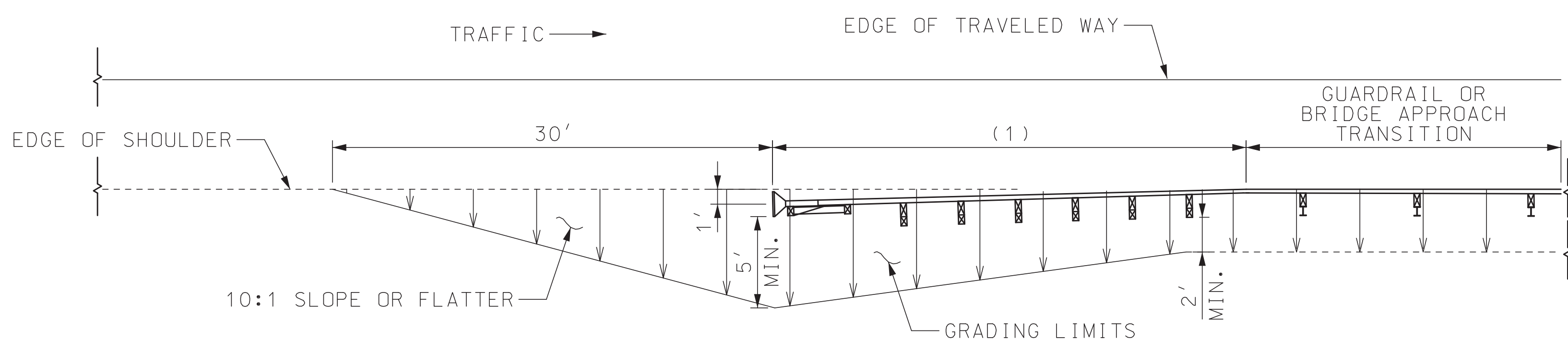
MIDWEST GUARDRAIL SYSTEM (MGS)
EMBEDDED TERMINAL ENDS
GENERAL DETAILS

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

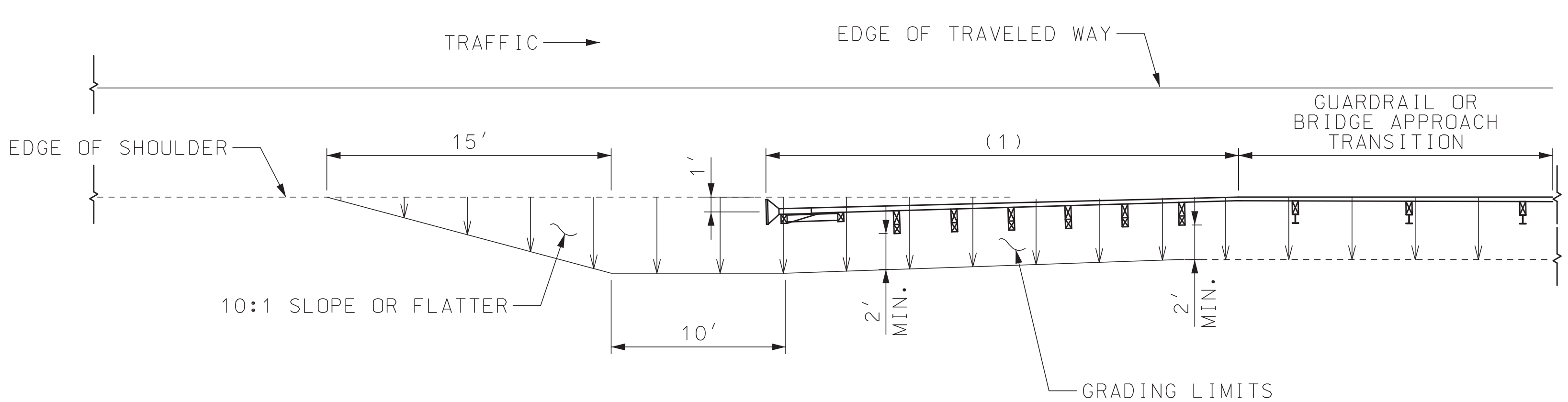
606.80C



GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS



ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS

(1) APPROVED CRASHWORTHY END TERMINAL

GENERAL NOTES:

STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE MASH APPROVED CRASHWORTHY END TERMINAL.

END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED.

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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
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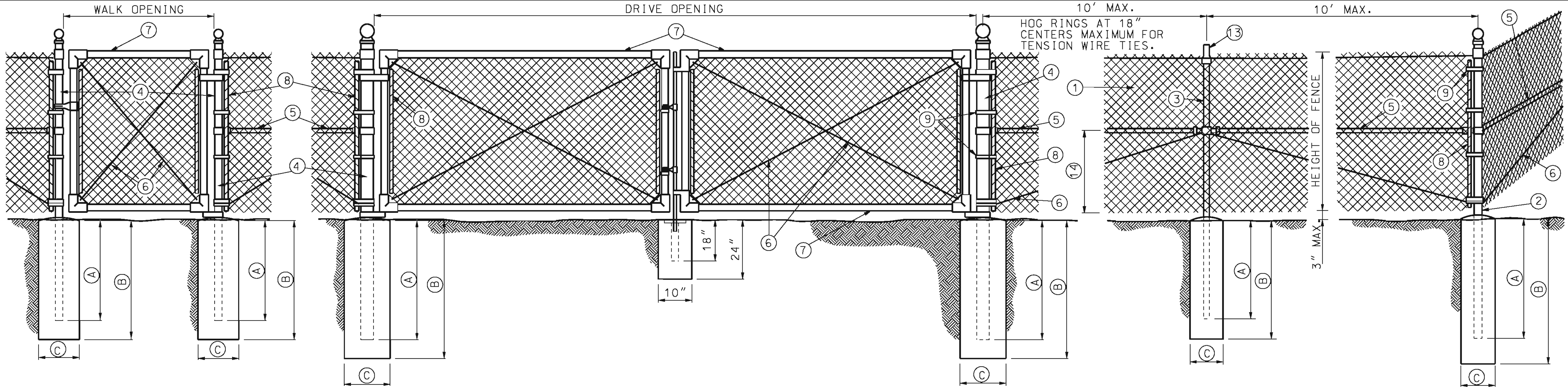
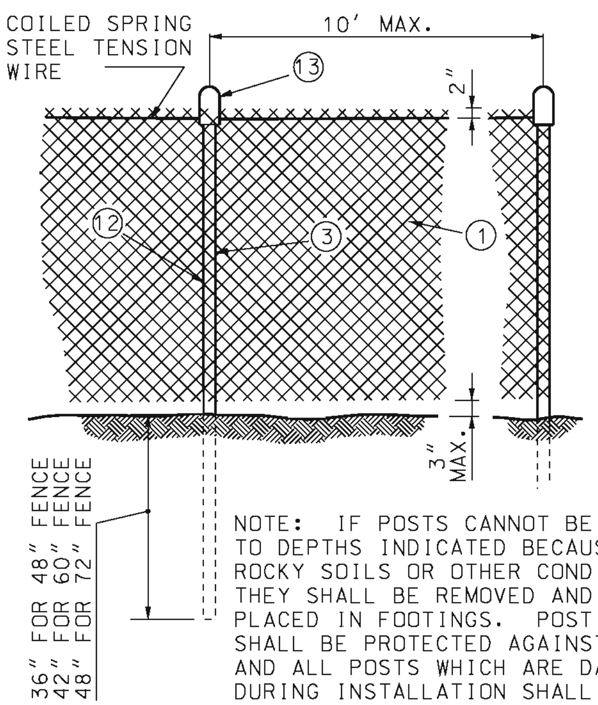
MASH
CRASHWORTHY END TERMINALS
TYPE A
GRADING LIMITS

DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019	606.81B	SHEET NO. 1 OF 1

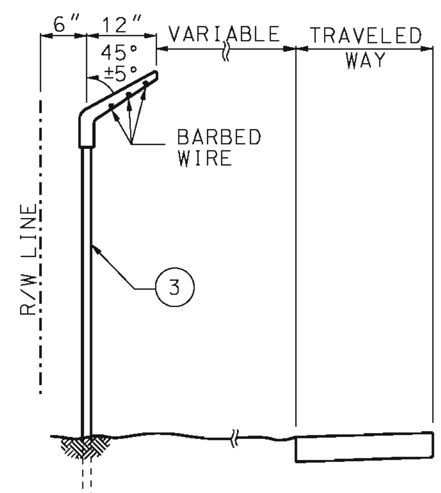
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.





NOTE: IF POSTS CANNOT BE DRIVEN TO DEPTHS INDICATED BECAUSE OF ROCKY SOILS OR OTHER CONDITIONS, THEY SHALL BE REMOVED AND RE-PLACED IN FOOTINGS. POST TOPS SHALL BE PROTECTED AGAINST DAMAGE AND ALL POSTS WHICH ARE DAMAGED DURING INSTALLATION SHALL BE REMOVED AND REPLACED.

ALTERNATE LINE POST ANCHORAGE (DRIVEN)



BARBED WIRE EXTENSION BRACKET

LEGEND

1. FABRIC
2. END, CORNER OR PULL POST
3. LINE POST
4. GATE POST
5. BRACE
6. TRUSS ROD
7. GATE FRAME
8. STRETCHER BAR ¼″ X ¾″ PLATE
9. STRETCHER BAR BAND
10. END OR CORNER CLAMP
11. POST TOPS (OTHER THAN LINE POSTS)
12. FABRIC TIES
13. LINE POST TOPS WITH OR WITHOUT TOP RAILS
14. ONE-HALF FABRIC HEIGHT OR AS RECOMMENDED BY MANUFACTURER

MINIMUM DEPTH FOR SETTING POSTS

DESCRIPTION		HEIGHT OF FENCE 48″ SIZE (IN.)	60″ SIZE (IN.)	72″ SIZE (IN.)
(2) ENDCORNER & PULLPOST	(A)	30″	36″	36″
	(B)	36″	42″	42″
	(C)	10″	12″	12″
(3) LINE POST	(A)	24″	27″	36″
	(B)	30″	36″	42″
	(C)	10″	12″	12″
(4) GATE POST	(A)	30″	36″	36″
	(B)	36″	42″	42″
	(C)	10″	12″	12″

MINIMUM SIZE FOR FENCE HARDWARE

	WIDTH	SIZE (IN.)	LBS/FT.
(2) END CORNER OR PULL POST	N/A	2½ DIA.	5.79
(3) LINE POST	N/A	2″ DIA.	3.65
(4) GATE POST (SINGLE GATE OR 1 LEAF OF DOUBLE)	≤ 6′	2½ DIA.	5.79
	≤ 13′	3½ DIA.	9.10
	≤ 18′	6 DIA.	18.97
	> 18′	8 DIA.	24.70
(5) BRACE	N/A	1¼ DIA.	2.27
(6) TRUSS ROD	N/A	⅜	-
(7) GATE FRAME	N/A	1½ DIA.	2.72

WIRE SIZE AND HEIGHT OF FABRIC

SPECIFIED DIAMETER			HEIGHT OF FABRIC
INCHES	GAGE	MESH INCHES	INCHES
0.120	11	2	36, 42
0.148	9	2	48, 60
0.192	6	2	72, 84

GENERAL NOTES:

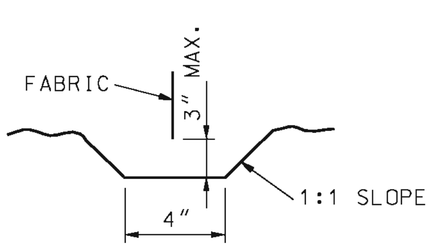
WEIGHTS OF MATERIALS SHOWN IN TABLE ARE FOR ASTM F 1043, GROUP IA. SIZES SHOWN ARE FOR STEEL AND ALUMINUM. EQUIVALENT ASTM F 1043 ALTERNATIVES MAY BE USED.

PULL POSTS SHALL BE USED AT SHARP BREAKS IN VERTICAL GRADE OR AT APPROXIMATE 500′ CENTERS ON STRAIGHT RUNS OR AS DIRECTED BY THE ENGINEER.

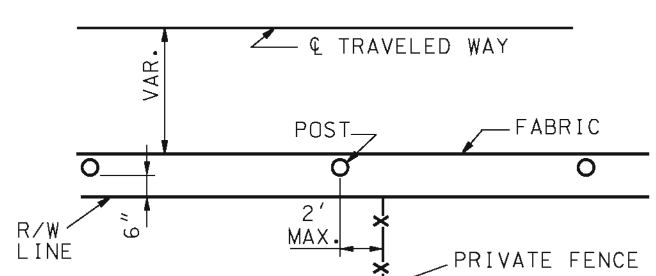
DRILLED HOLES (C) IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 2″ GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

ALL POSTS SHALL HAVE PROVISIONS TO SECURELY HOLD THE TOP TENSION WIRE IN POSITION AND ALLOW FOR REMOVAL AND REPLACEMENT OF A POST WITHOUT DAMAGING THE TOP TENSION WIRE.

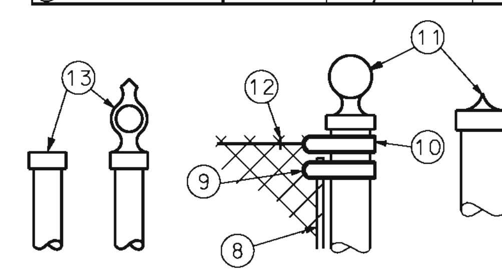
THE MESH SIZE SHALL BE 2 INCHES ±⅛ IN. MEASURED IN EITHER DIRECTION AS THE MINIMUM CLEAR DISTANCE BETWEEN THE WIRES FORMING THE PARALLEL SIDES OF THE MESH.



TYPICAL TRENCH DETAILS



TYPICAL LOCATION



POST TOPS TO BE PRESSURE FITTED OR SCREWED. POST TOPS MAY BE ELIMINATED FOR ALL POSTS EXCEPT PIPE POSTS. IF POST TOPS ARE ELIMINATED, POST LENGTH SHALL BE INCREASED 3″.

POST TOPS

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

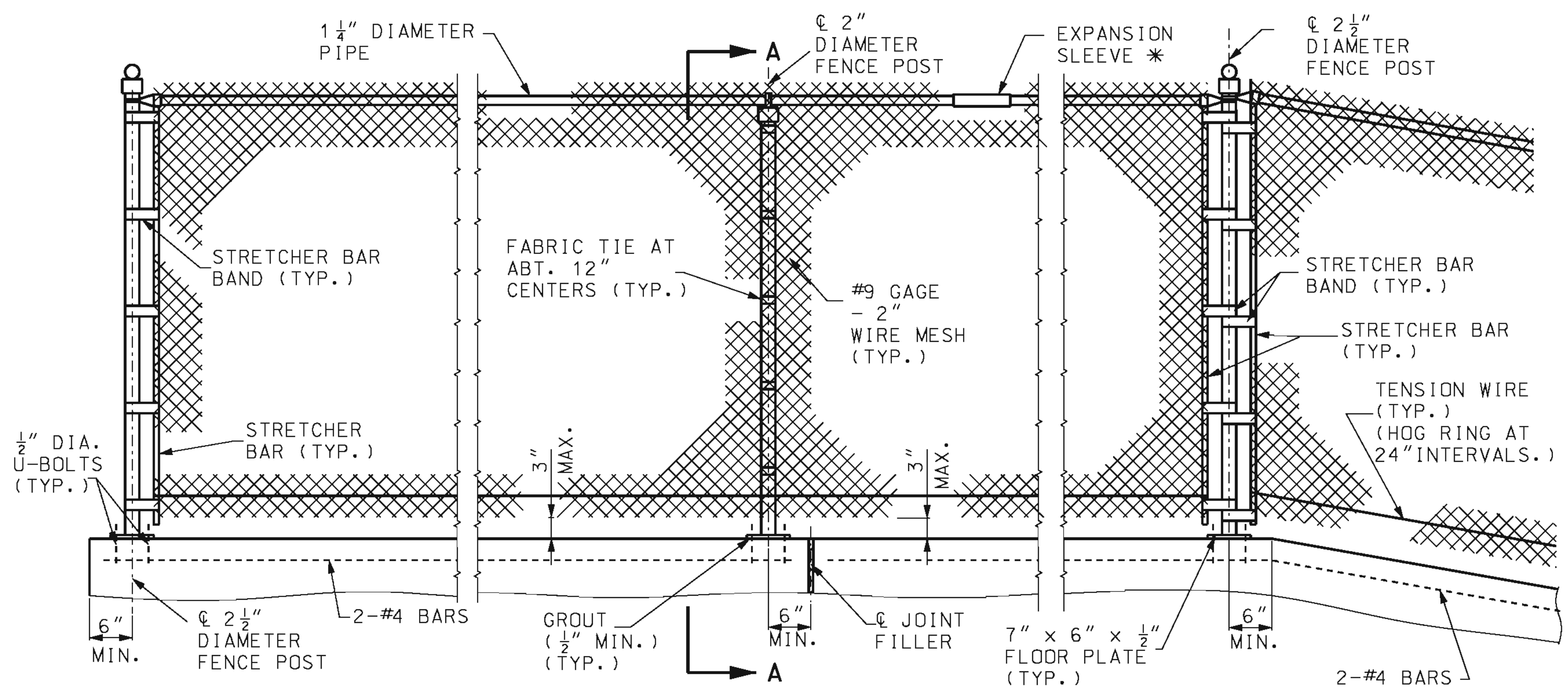
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CHAIN-LINK FENCE

DATE EFFECTIVE: 02/01/2007
DATE PREPARED: 8/21/2009

607.10V

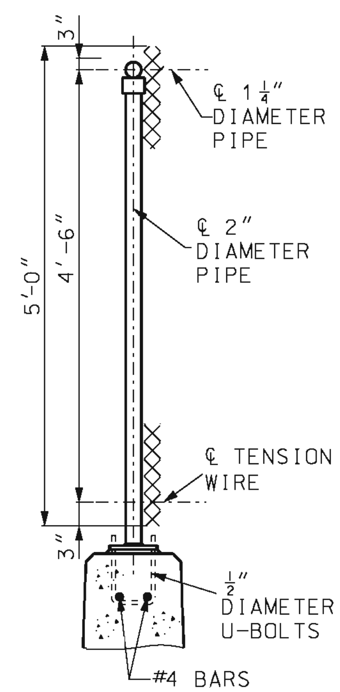
SHEET NO. 1 OF 1



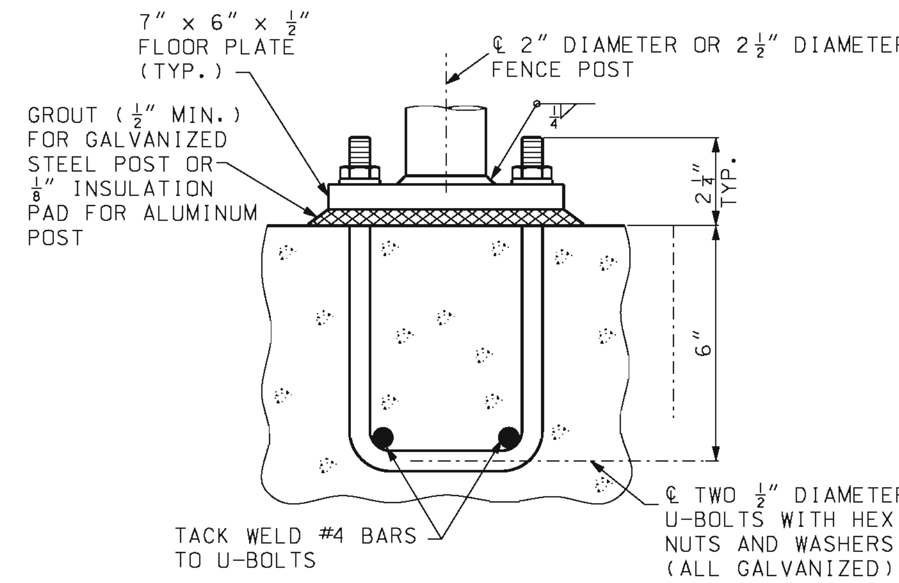
TERMINAL POST   LINE POST   PULL POST

✱ PLACE EXPANSION SLEEVE AT ABOUT 30'-0" CENTERS WITH AT LEAST ONE EXPANSION SLEEVE BETWEEN PULL POSTS.

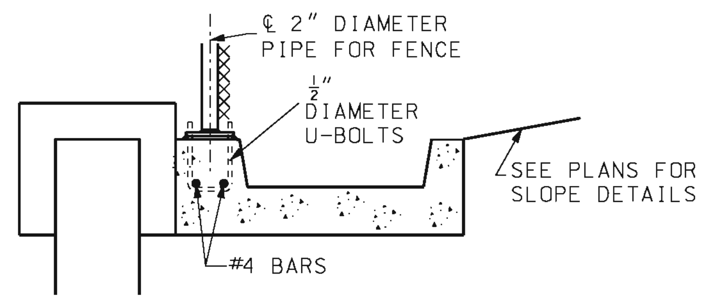
PART ELEVATION (TYPICAL)



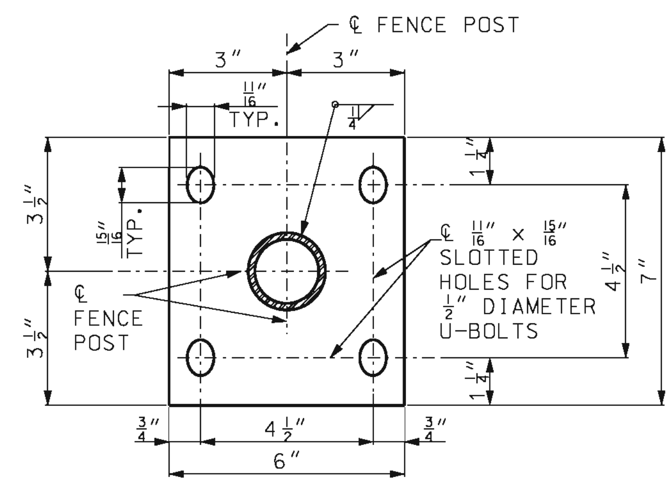
SECTION A-A



TYPICAL FENCE POST CONNECTION



ALTERNATE SECTION A-A FOR MSE WALLS



PLAN OF FLOOR PLATE

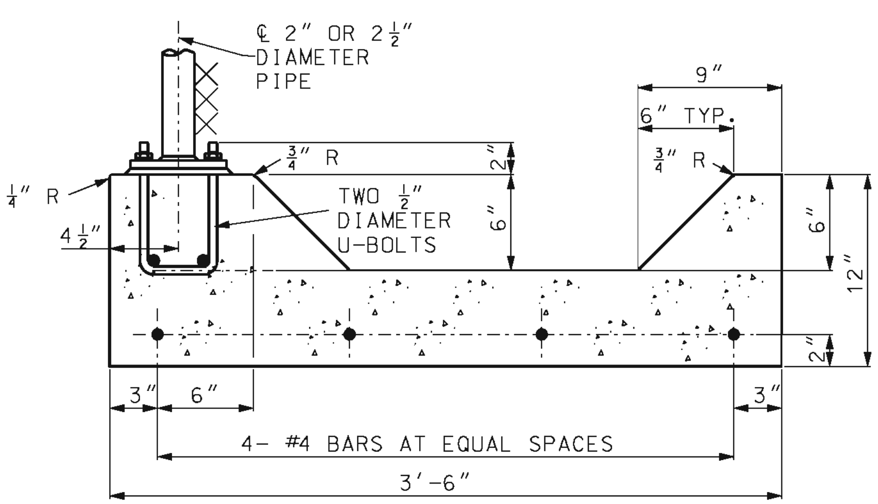
GENERAL NOTES:

PAYMENT FOR U-BOLTS WITH NUTS, WASHERS, AND #4 BARS WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR CHAIN-LINK FENCE (RETAINING WALLS).

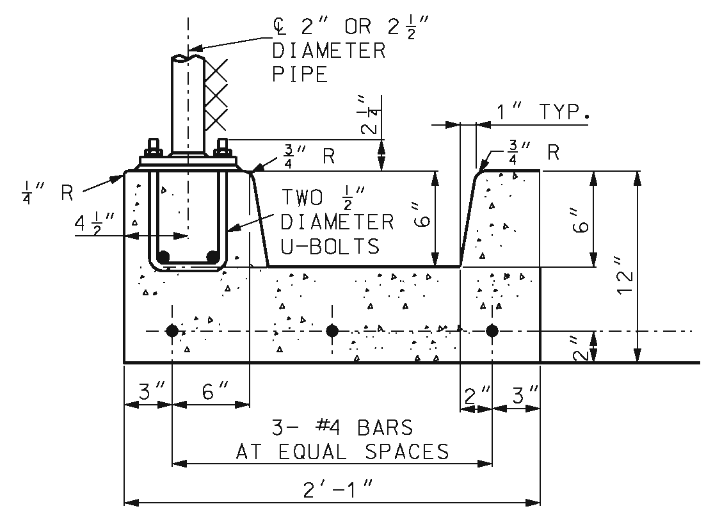
PULL POST SHALL BE USED AT SHARP BREAKS IN VERTICAL GRADE OR AT APPROXIMATE 100'-0" CENTERS ON STRAIGHT RUNS.

THE CHAIN-LINK FENCE SHALL BE IN ACCORDANCE WITH APPLICABLE PARTS OF SEC. 607.

MAXIMUM POST SPACING IN HORIZONTAL DIRECTION SHALL BE 10'-0".



MODIFIED TYPE A GUTTER



MODIFIED TYPE B GUTTER

FENCE CONNECTION FOR MSE WALLS

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CHAIN-LINK FENCE FOR RETAINING WALLS

DATE EFFECTIVE:	06/01/2009	607.11H	SHEET NO.
DATE PREPARED:	4/30/2009		1 OF 1

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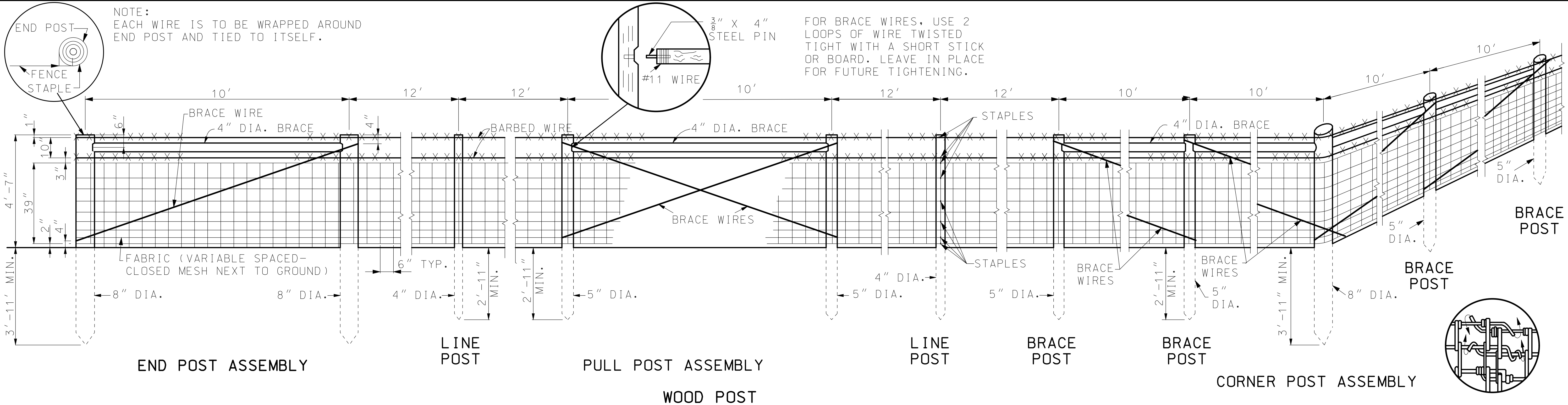
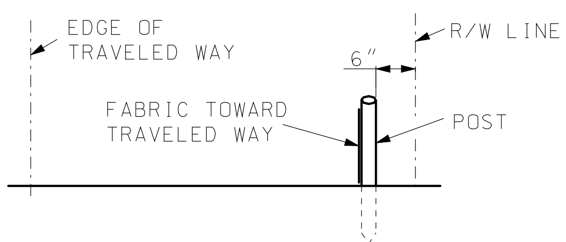
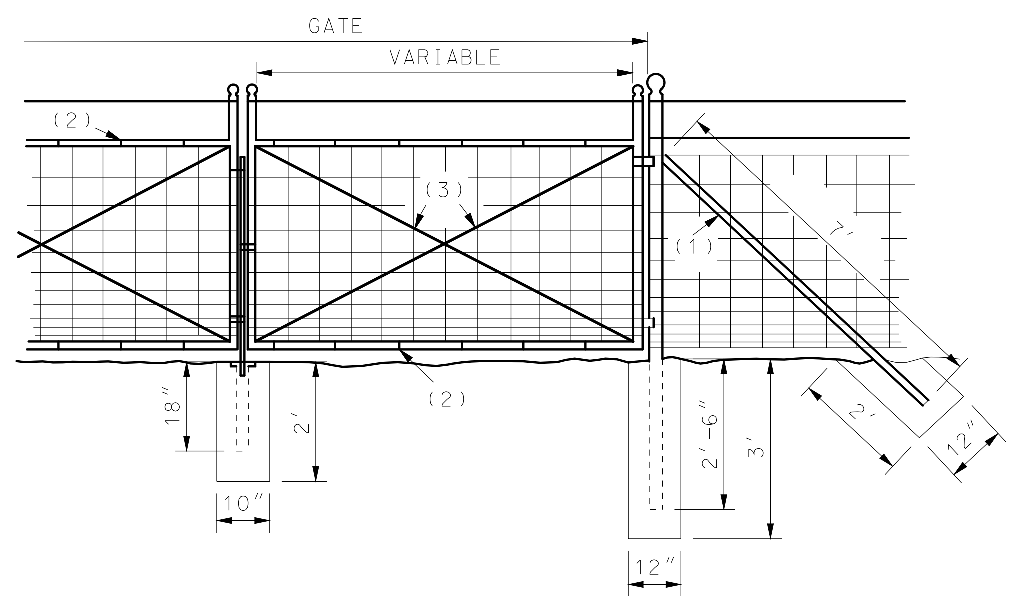




TYPICAL FENCE LOCATION

GATE OPENING	GATE POST SIZE	#/FT.
≤ 6'	2" DIA.	3.65
≤13'	2½" DIA.	5.79
≤18'	3½" DIA.	9.10
>18'	6" DIA.	18.97
GATE FRAME	1½" DIA.	2.72



1. BRACES
2. WIRE TIES
3. 3.8" ADJUSTABLE TRUSS RODS.

GENERAL NOTES:

STEEL LINE POSTS SHALL BE OF AN APPROVED "U", "Y", "T" OR CHANNEL SECTION, NOTCHED OR STUDDED WITH AN ANCHOR PLATE. POST PUNCHED WITH HOLES OR SELF FASTENING LUGS WILL NOT BE PERMITTED.

STAPLES SHALL BE SCREW SHANK TYPE OR EQUIVALENT (1¼" MINIMUM LENGTH).

STRETCHED FABRIC AND BARBED WIRE ON OUTSIDE OF POST ON CORNERS AND CURVES.

ATTACHMENT OF FABRIC TO STEEL LINE POSTS IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATION.

GATES FOR WOVEN WIRE FENCE SHALL BE IN ACCORDANCE WITH SEC 607.20 AND 1043.3.6 OF THE STANDARD SPECIFICATIONS. EXCEPT THE FILLER SHALL BE WOVEN WIRE FABRIC OF THE SAME KIND AS USED FOR THE FENCE.

SINGLE LEAF GATES REQUIRE UP TO 12" OPENING. DOUBLE LEAF GATES REQUIRE OVER 12" OPENING. DIRECTION OF SWING OF GATES SHALL BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

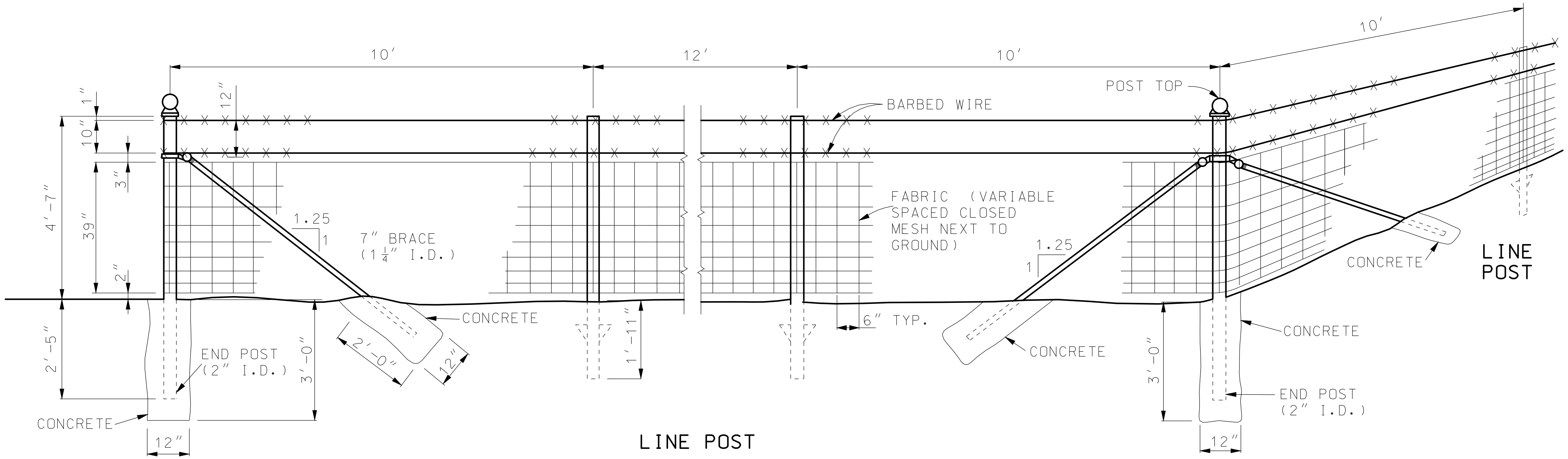
WOVEN WIRE FENCE

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

607.20G

SHEET NO. 1 OF 2

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

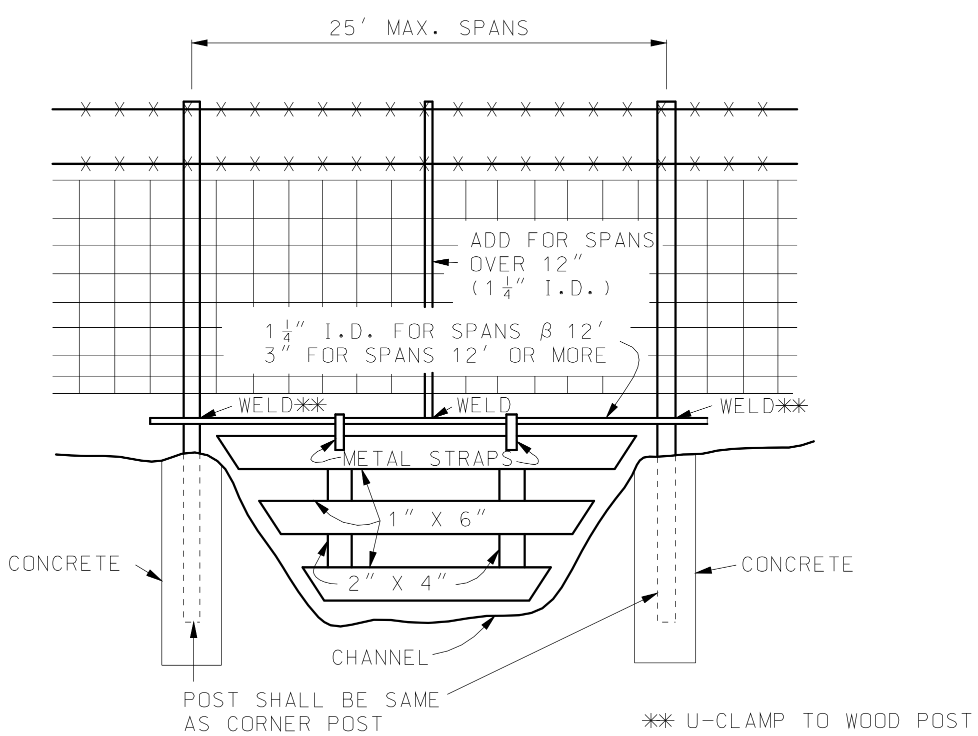


LINE POST

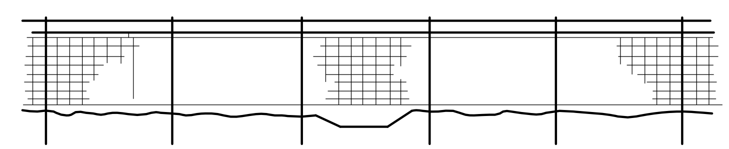
END POST ASSEMBLY

STEEL POST

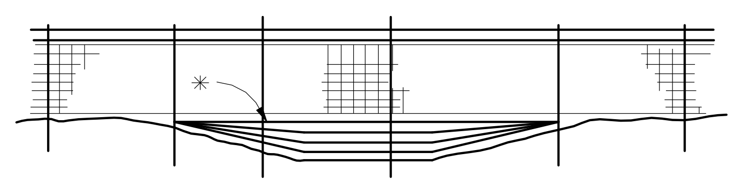
CORNER OR PULL POST ASSEMBLY



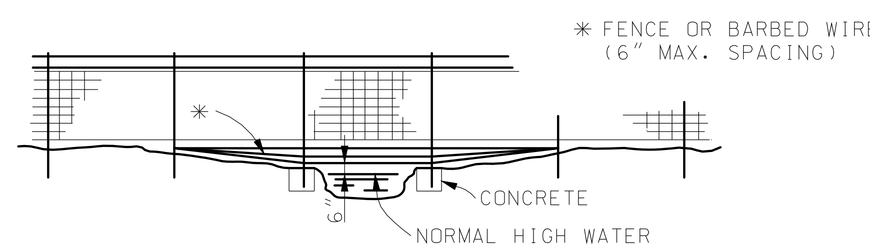
TYPICAL
WATER CROSSING GATE



ROADWAY DITCHES OR SMALL SHALLOW CHANNELS
(SPAN WITH NORMAL LINE POST SPACING)



POORLY DEFINED CHANNELS (SMALL DRAINAGE AREAS)



WELL DEFINED CHANNELS (LARGE DRAINAGE AREAS)

TYPICAL FENCING AT
CHANNEL CROSSING

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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

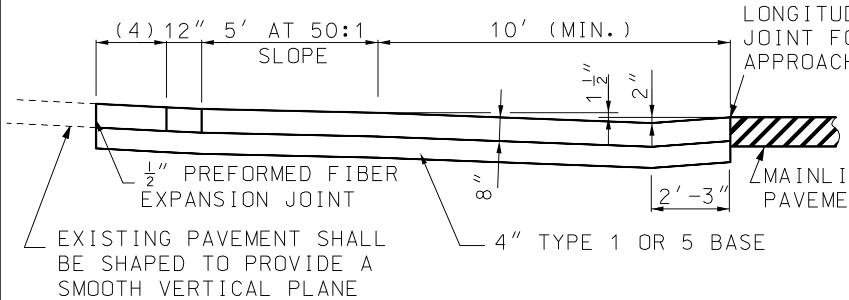
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

WOVEN WIRE FENCE

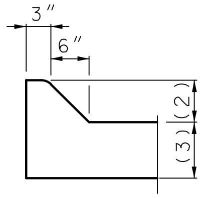
DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

607.20G

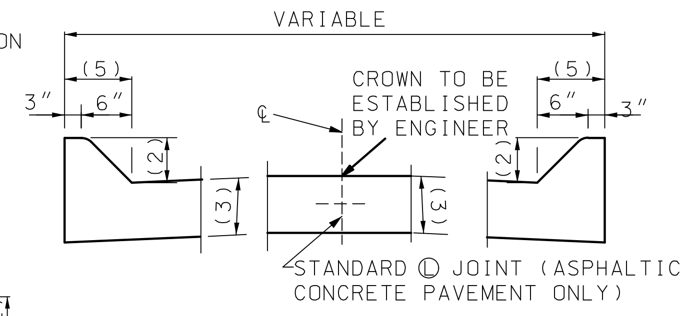
SHEET NO.
2 OF 2



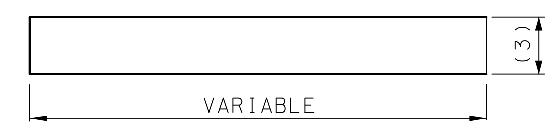
SECTION A-A



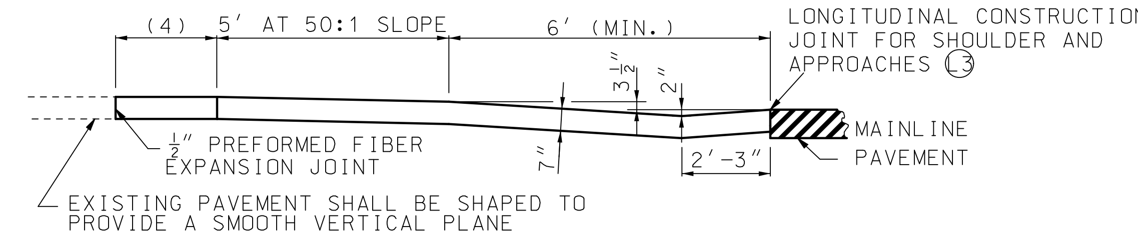
SECTION B-B



SECTION C-C

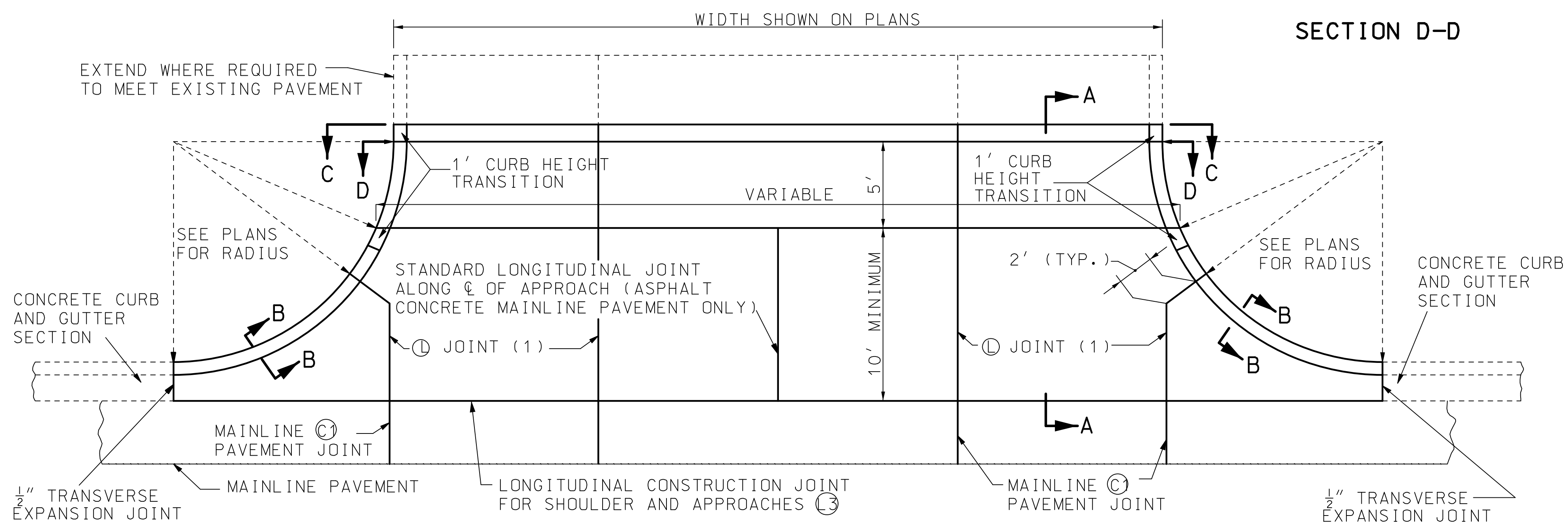


SECTION D-D

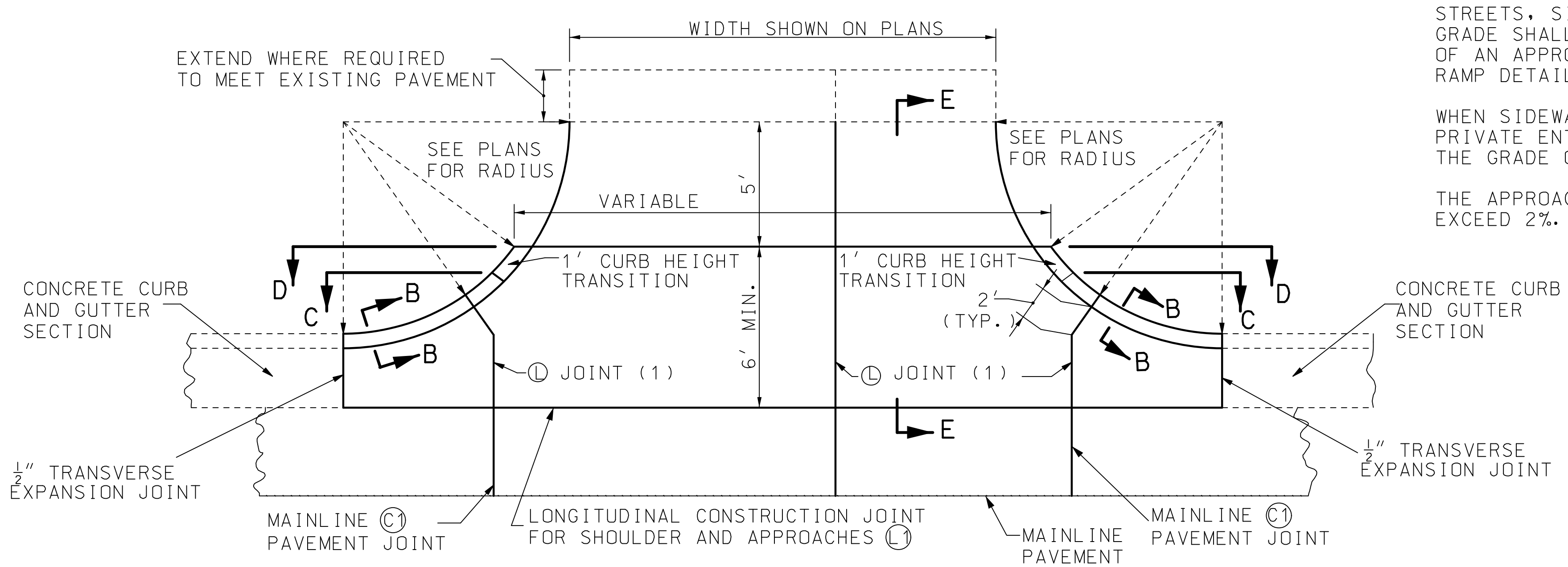


SECTION E-E

(1) THE NUMBER OF ℄ JOINTS SHOWN IN PAVED APPROACH ARE FOR ILLUSTRATIVE PURPOSES ONLY. JOINTS PLACED IN PAVED APPROACHES SHALL MATCH THE C1 PAVEMENT TRANSVERSE MAINLINE PAVEMENT JOINT LOCATION.
(2) 6″ - EXCEPT WHERE VARIED TO MEET EXISTING IMPROVEMENTS.
(3) 8″ NRCCP - FOR STREET, SIDEROAD, ALLEY OR COMMERCIAL APPROACHES. 7″ NRPCCP - FOR PRIVATE APPROACHES.
(4) EXTEND WHERE REQUIRED TO MEET EXISTING PAVEMENT.
(5) VARY TO MEET EXISTING IMPROVEMENTS.



PLAN OF STREET, SIDEROAD, ALLEY OR COMMERCIAL APPROACHES



PLAN OF PRIVATE APPROACHES

GENERAL NOTES:

WHERE PAVED APPROACH MEETS EXISTING CONCRETE PAVEMENT OR SIDEWALK, PLACE ½″ PREFORMED FIBER EXPANSION JOINT, CUT TO TEMPLATE, THROUGH NEW CONCRETE AND 1′ FROM JUNCTION WITH EXISTING CONCRETE, OR ALONG INSIDE EDGE OF SIDEWALK. WHERE PAVED APPROACH MEETS EXISTING BITUMINOUS CONSTRUCTION, OMIT JOINT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF PAVED APPROACHES.

SEE STANDARD PLAN 608.10 FOR CONCRETE CURB RAMPS.

SEE STANDARD PLAN 502.05 FOR JOINT DETAILS.

SEE STANDARD PLAN 609.00 FOR TRANSVERSE EXPANSION JOINT DETAILS.

WHERE DRAINAGE IS NOT TO BE CARRIED ACROSS THE PAVED APPROACH, SECTION A-A SHALL BE MODIFIED TO ELIMINATE THE "DIP" AND SHALL BE CROWNED AS DIRECTED BY THE ENGINEER.

IF SIDEWALKS ARE NOT INCLUDED IN CONSTRUCTION OF PAVED APPROACH, PLACE GROUND COVER, AS SHOWN ON PLANS, BEHIND CURB THROUGH RADIUS. GROUND COVER SHALL CONFORM TO FINISHED GRADING FOR CURB RAMP.

HAND FINISHING PERMITTED ON PAVED APPROACH.

WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF STREETS, SIDEROADS, ALLEYS OR COMMERCIAL ENTRANCES, THE SIDEWALK GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE APPROACH BY WAY OF AN APPROPRIATE RAMP AS SHOWN ON THE PLANS. SEE 608.10 FOR RAMP DETAILS.

WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF PRIVATE ENTRANCES, THE APPROACH GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE SIDEWALK.

THE APPROACH GRADE THROUGH THE LIMITS OF A SIDEWALK SHALL NOT EXCEED 2%.

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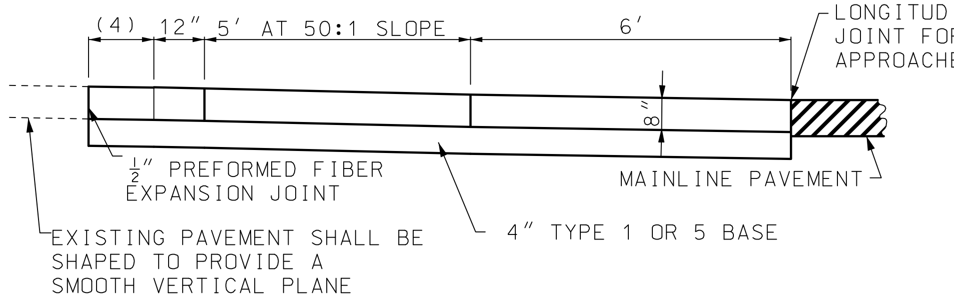
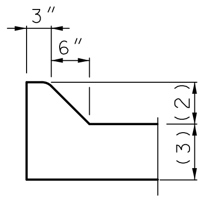
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PAVED APPROACHES
ADJOINING CURB AND GUTTER SECTIONS

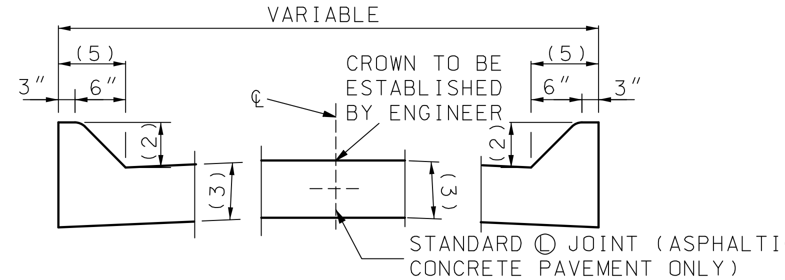
DATE EFFECTIVE:	07/01/2020	608.00K	SHEET NO. 1 OF 2
DATE PREPARED:	4/29/2020		



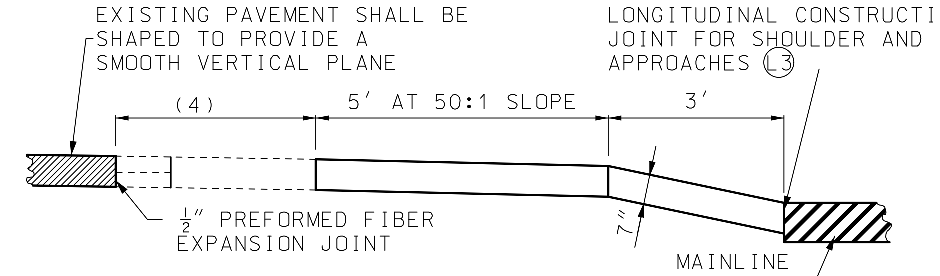
SECTION F-F



SECTION G-G



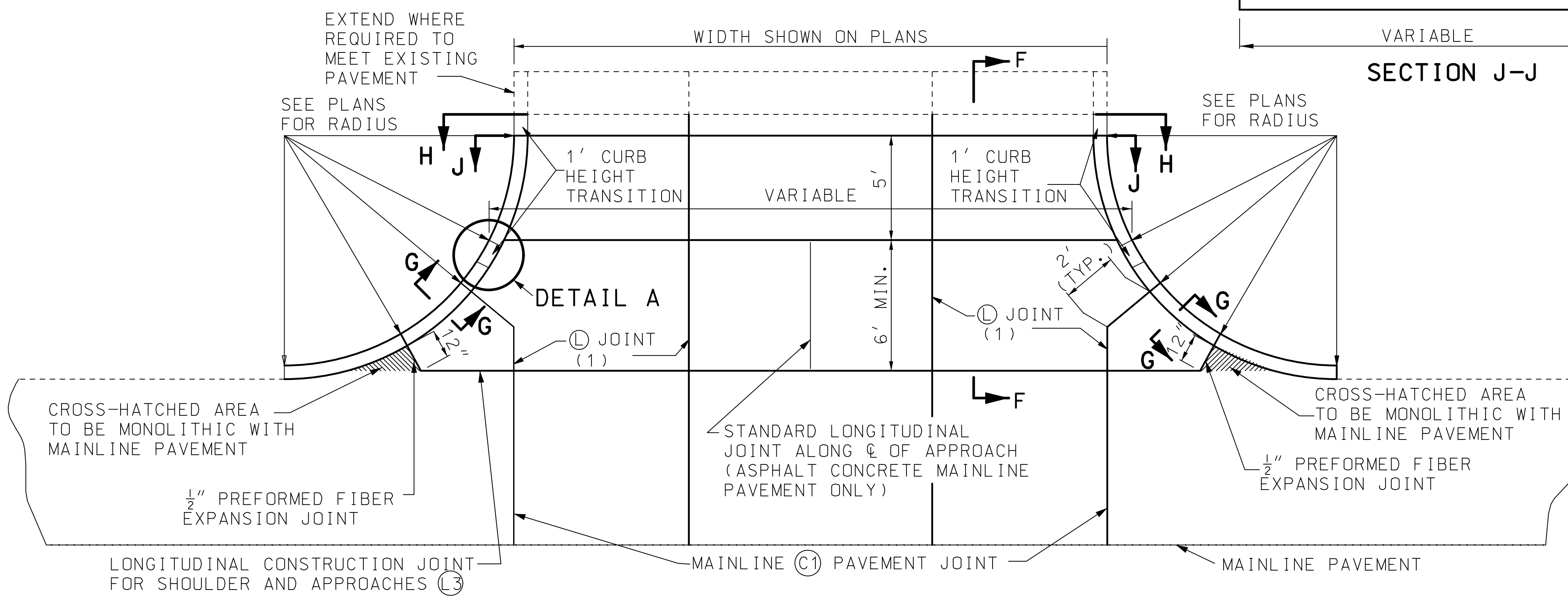
SECTION H-H



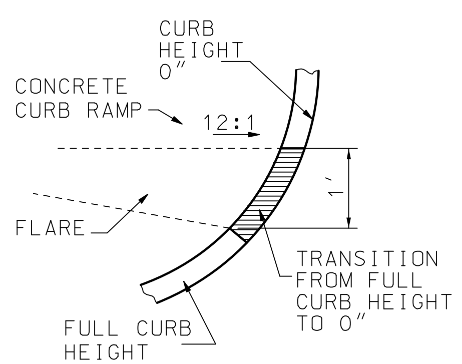
SECTION K-K

SECTION J-J

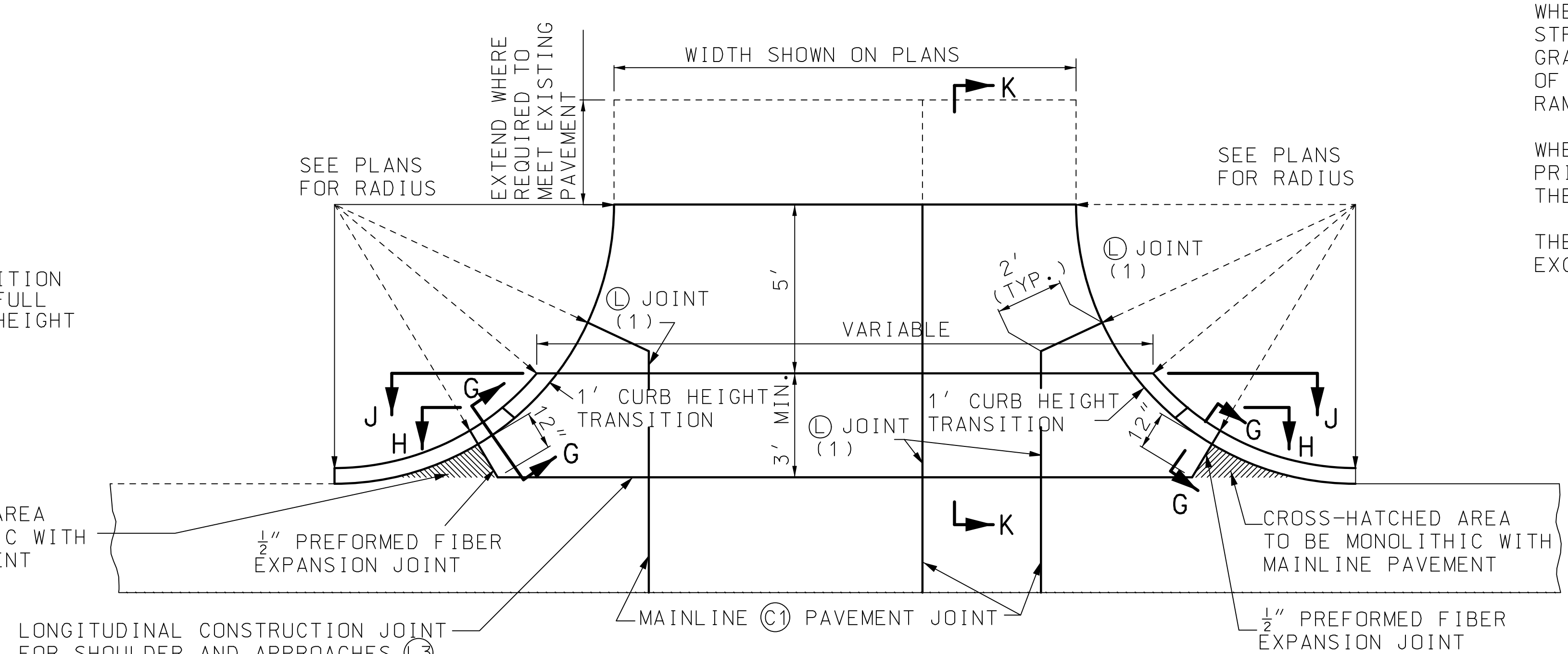
(1) THE NUMBER OF (L) JOINTS SHOWN IN PAVED APPROACH ARE FOR ILLUSTRATIVE PURPOSES ONLY. JOINTS PLACED IN PAVED APPROACHES SHALL MATCH THE (C1) PAVEMENT TRANSVERSE MAINLINE PAVEMENT JOINT LOCATION.
(2) 6" - EXCEPT WHERE VARIED TO MEET EXISTING IMPROVEMENTS.
(3) 8" NRCCP - FOR STREET, SIDEROAD, ALLEY OR COMMERCIAL APPROACHES. 7" NRPCCP - FOR PRIVATE APPROACHES.
(4) EXTEND WHERE REQUIRED TO MEET EXISTING PAVEMENT.
(5) VARY TO MEET EXISTING IMPROVEMENTS.



PLAN OF STREET, SIDEROAD, ALLEY OR COMMERCIAL APPROACHES



DETAIL A



PLAN OF PRIVATE APPROACHES

GENERAL NOTES:

WHERE PAVED APPROACH MEETS EXISTING PCC PAVEMENT OR SIDEWALK, PLACE ½" PREFORMED FIBER EXPANSION JOINT, CUT TO TEMPLATE, THROUGH NEW CONCRETE AND 1' FROM JUNCTION WITH EXISTING CONCRETE, OR ALONG INSIDE EDGE OF SIDEWALK. WHERE PAVED APPROACH MEETS EXISTING BITUMINOUS CONSTRUCTION, OMIT JOINT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF PAVED APPROACHES.

SEE STANDARD PLAN 608.10 FOR CONCRETE CURB RAMPS.

SEE STANDARD PLAN 502.05 FOR JOINT DETAILS.

(SECTION F-F) ELEVATION OF CENTER OF PAVED APPROACH, AT A POINT 6' FROM EDGE OF NORMAL PAVEMENT SHALL NOT VARY MORE THAN 2" FROM ELEVATION OF MAINLINE PAVEMENT AT CENTERLINE OF PAVED APPROACH.

IF SIDEWALKS ARE NOT INCLUDED IN CONSTRUCTION OR PAVED APPROACH, PLACE GROUND COVER, AS SHOWN ON PLANS, BEHIND CURB THROUGH RADIUS. GROUND COVER SHALL CONFORM TO FINISHED GRADING FOR CURB RAMP.

HAND FINISHING PERMITTED ON PAVED APPROACH.

WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF STREETS, SIDEROADS, ALLEYS OR COMMERCIAL ENTRANCES, THE SIDEWALK GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE APPROACH BY WAY OF AN APPROPRIATE RAMP AS SHOWN ON THE PLANS. SEE 608.10 FOR RAMP DETAILS.

WHEN SIDEWALKS ARE PRESENT ADJACENT TO THE PAVED APPROACHES OF PRIVATE ENTRANCES, THE APPROACH GRADE SHALL BE TRANSITIONED TO THE GRADE OF THE SIDEWALK.

THE APPROACH GRADE THROUGH THE LIMITS OF A SIDEWALK SHALL NOT EXCEED 2%.

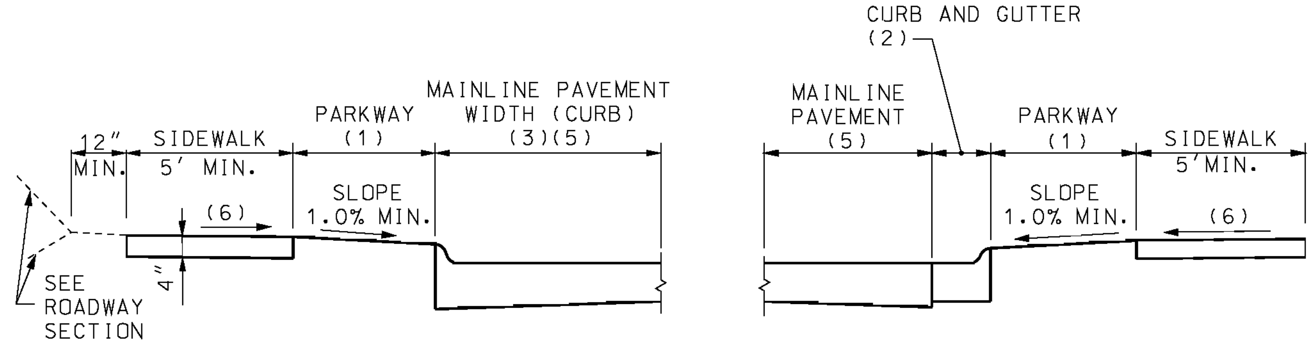
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

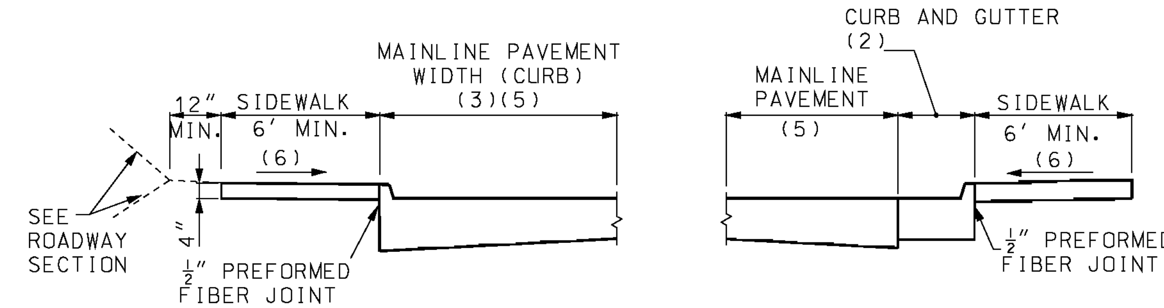
PAVED APPROACHES
NOT ADJOINING CURB AND GUTTER SECTIONS

DATE EFFECTIVE:	07/01/2020	608.00K	SHEET NO. 2 OF 2
DATE PREPARED:	4/29/2020		

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



TYPICAL SIDEWALK WITH PARKWAY 2' OR MORE



TYPICAL SIDEWALK WITH NO PARKWAY

GENERAL NOTES:

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABLILITES ACT - GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY. EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT POND WATER.

WHERE SIDEWALKS ARE LESS THAN 5 FT., 5 FT. X 5 FT. PASSING SPACES EVERY 200 FT. SHALL BE PROVIDED AND ARE PERMITTED TO OVERLAP PEDESTRIAN ACCESS ROUTES.

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

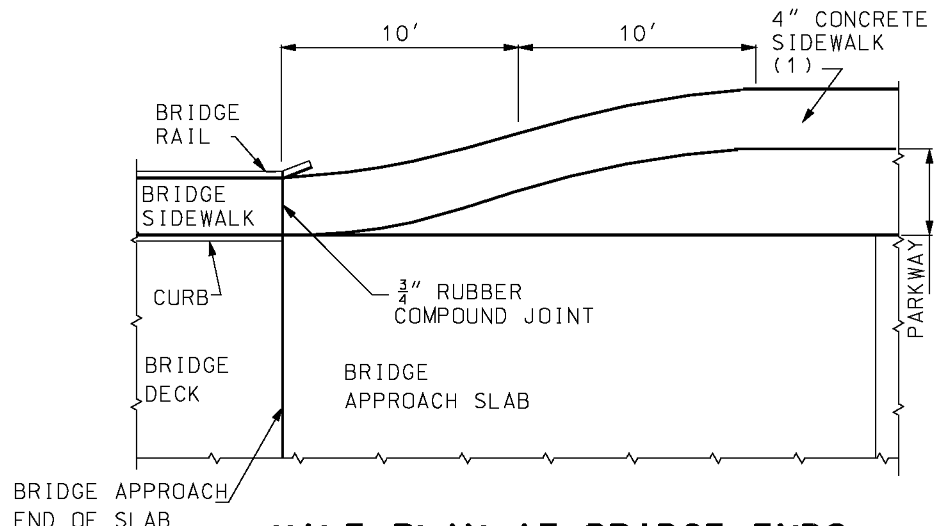
WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE 5.00% MAXIMUM.

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

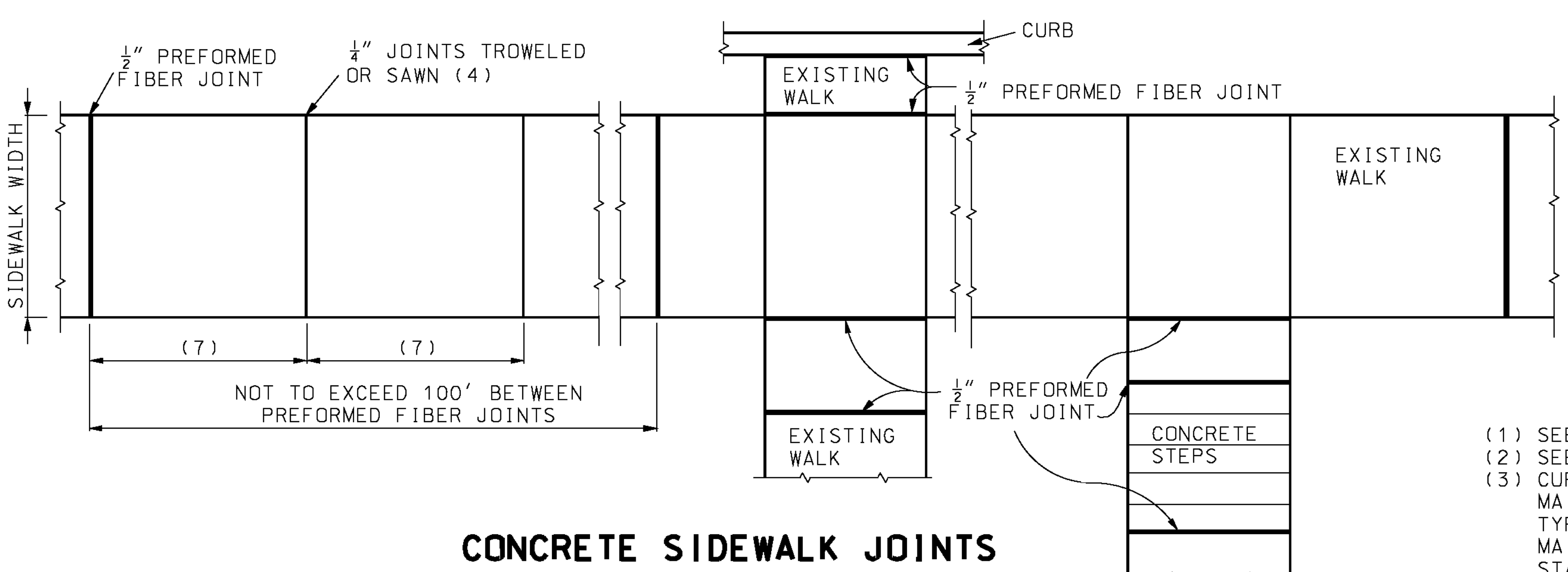
STORMWATER INLETS, SIGNS, POSTS, MANHOLE COVERS, PULL BOXES AND OTHER ACCESS LIDS SHOULD BE AVOIDED WITHIN THE SIDEWALK. IF SUCH A LOCATION IS NECESSARY, THE FEATURE MUST MEET ADA STANDARDS.

THE RUNNING GRADE OF A SIDEWALK SHALL NOT EXCEED 5.0% UNLESS IT IS MATCHING THE GRADE OF THE ADJACENT ROADWAY.

PEDESTRIAN ACCESS ROUTE SHALL CONTINUE ACROSS RESIDENTIAL AND COMMERCIAL ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS.



HALF PLAN AT BRIDGE ENDS



CONCRETE SIDEWALK JOINTS

(1) SEE PLANS FOR WIDTH
(2) SEE STANDARD 608.00
(3) CURB TO BE MONOLITHIC WITH PCC MAINLINE PAVEMENT. CURB TO BE TYPE S WITH ASPHALT CONCRETE MAINLINE PAVEMENT. SEE STANDARD PLAN 609.00.
(4) MIN. ½" DEPTH JOINT.
(5) SEE TYPICAL PAVEMENT SECTION
(6) SLOPE 1.0% (2.0% MAX.)
(7) SPACING EQUAL TO WIDTH OF WALK

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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

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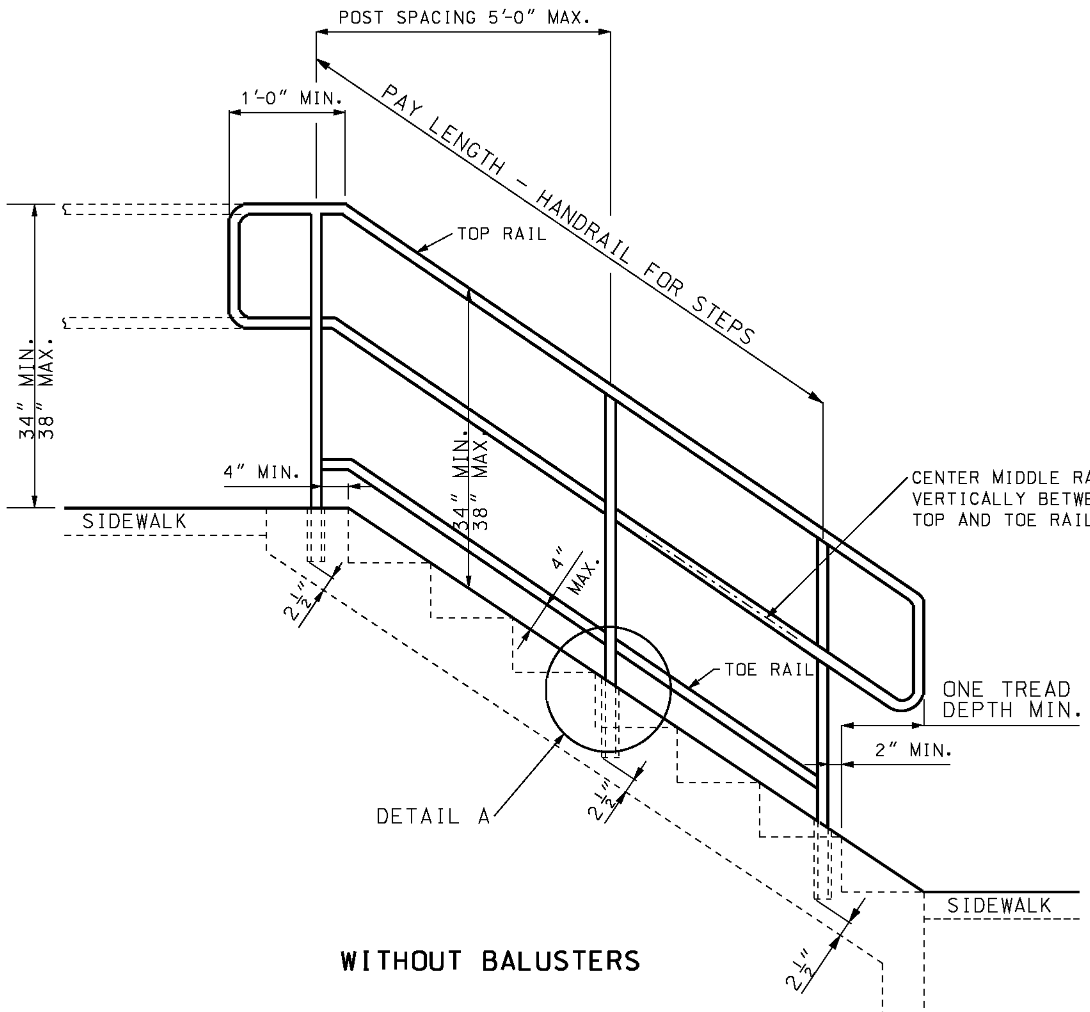
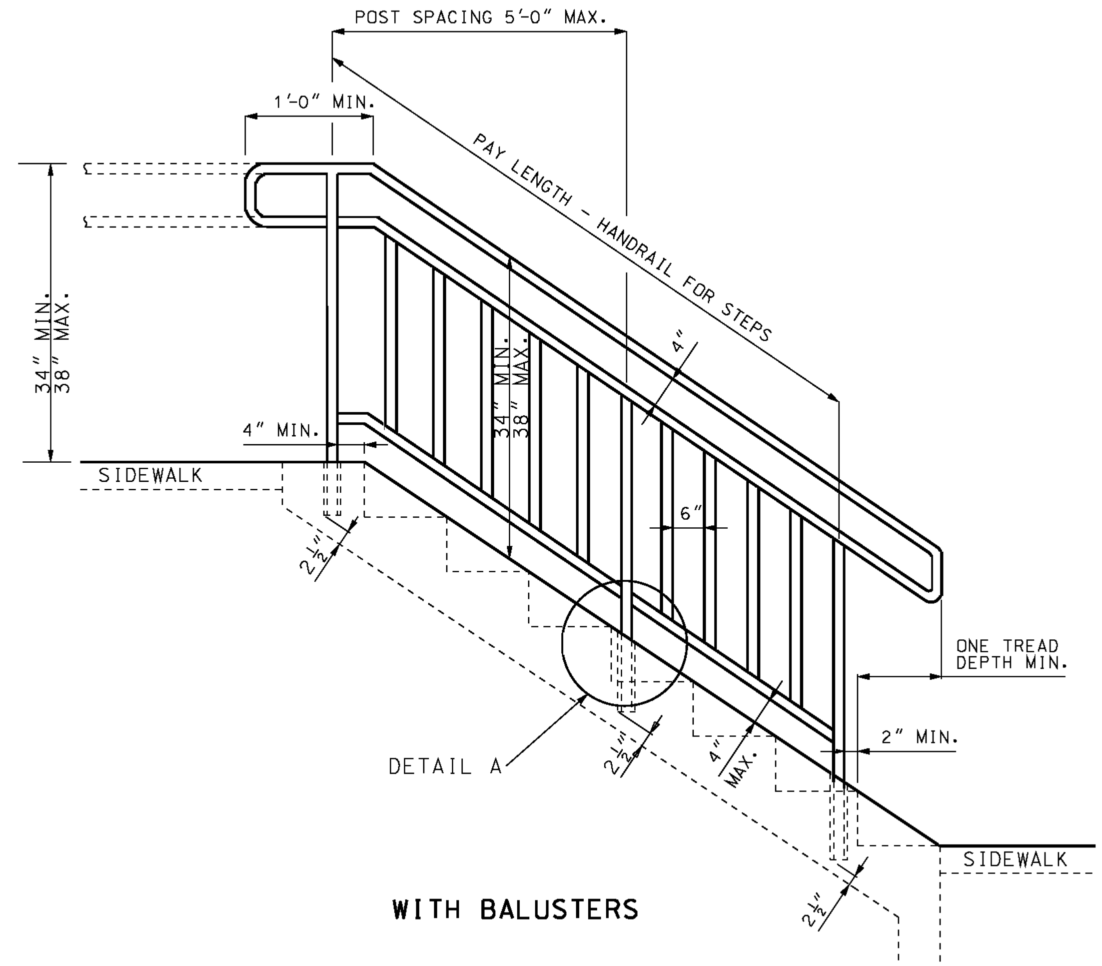
CONCRETE SIDEWALK

DATE EFFECTIVE: 04/01/2015		608.10P	SHEET NO. 1 OF 1
DATE PREPARED: 2/20/2015			



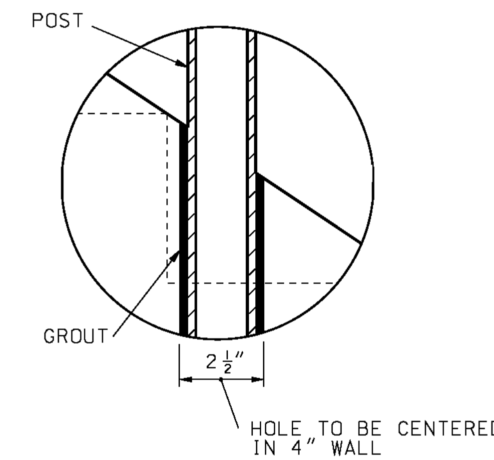
WITHOUT BALUSTERS



WITH BALUSTERS

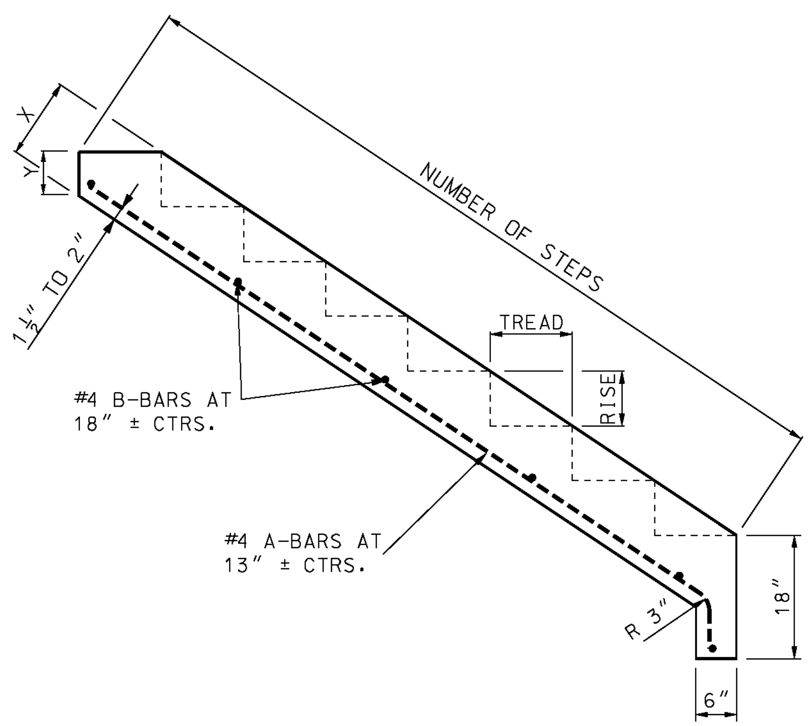
RAILING & POST SPECIFICATIONS			
TYPE	SIZE (DIA.)	WEIGHT (LBS./FT.)	
		ALUM.	STEEL
ROUND	1½"	0.940	2.72
SQUARE	2" X 2"	1.3094	4.31

STEP DIMENSIONS				
SLOPE	TREAD	RISE	X	Y
1:1.5	10½"	7"	10 3/16"	5¼"
1:2	12"	6"	10⅜"	5 9/16"
1:3	14¼"	4¾"	9½"	5¼"

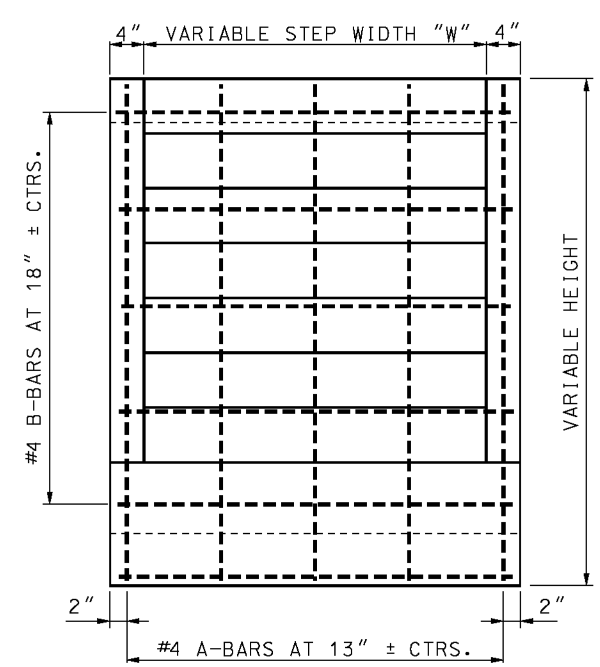


DETAIL A

SAFETY RAIL DETAILS



SIDE ELEVATION



FRONT ELEVATION

STAIRWAY STEP DETAILS

GENERAL NOTES:

STAIRWAY SHALL HAVE SAFETY RAILS AT BOTH SIDES OF ALL STEPS.

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.

ALL RAILING SHALL HAVE A 1/4" WEEP HOLE NEAR ALL INTERSECTING RAILING CONNECTIONS.

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ERIC E. SCHROETER
NUMBER PE-28411
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CONCRETE STAIRS

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

608.20E

SHEET NO. 1 OF 2

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

QUANTITIES FOR CONCRETE STEPS

CONCRETE C.Y. STEEL LB.

$10\frac{1}{2}$" TREAD 1:1.5 SLOPE 7" RISE

W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2'	CONC.	0.20	0.29	0.38	0.47	0.56	0.65	0.74	0.83	0.92	1.01	1.10	1.19	1.28
	STEEL	10	13	16	20	24	28	30	34	38	42	46	48	52
3'	CONC.	0.27	0.39	0.51	0.63	0.75	0.88	1.00	1.12	1.24	1.36	1.48	1.60	1.73
	STEEL	13	18	21	27	32	38	41	46	52	57	63	65	71
4'	CONC.	0.34	0.49	0.64	0.80	0.95	1.10	1.25	1.40	1.56	1.71	1.86	2.01	2.17
	STEEL	17	23	27	34	41	48	52	59	66	73	80	83	90
5'	CONC.	0.41	0.59	0.78	0.96	1.14	1.33	1.51	1.69	1.88	2.06	2.24	2.42	2.61
	STEEL	21	28	33	42	50	59	63	71	80	88	97	101	109
6'	CONC.	0.48	0.70	0.91	1.12	1.34	1.55	1.77	1.98	2.19	2.41	2.62	2.84	3.05
	STEEL	24	33	39	49	59	69	74	84	94	104	114	118	128

12" TREAD 1:2 SLOPE 6" RISE

W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2'	CONC.	0.18	0.26	0.33	0.41	0.49	0.56	0.64	0.72	0.80	0.87	0.95	1.03	1.10
	STEEL	10	12	16	19	23	25	29	33	36	39	42	46	50
3'	CONC.	0.25	0.35	0.45	0.56	0.66	0.76	0.87	0.97	1.07	1.18	1.28	1.38	1.49
	STEEL	13	16	21	26	32	34	39	45	50	53	58	63	68
4'	CONC.	0.31	0.44	0.57	0.70	0.83	0.96	1.09	1.22	1.35	1.48	1.61	1.74	1.87
	STEEL	17	20	27	33	40	44	50	57	63	67	73	81	87
5'	CONC.	0.38	0.53	0.69	0.85	1.00	1.16	1.31	1.47	1.63	1.78	1.94	2.10	2.25
	STEEL	21	25	33	41	49	53	61	69	77	82	89	98	105
6'	CONC.	0.44	0.62	0.81	0.99	1.17	1.36	1.54	1.72	1.90	2.09	2.27	2.45	2.64
	STEEL	24	29	39	48	58	62	71	81	90	96	105	115	124

$14\frac{1}{4}$" TREAD 1:3 SLOPE $4\frac{3}{4}$" RISE

W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2'	CONC.	0.19	0.27	0.35	0.43	0.51	0.59	0.68	0.76	0.84	0.92	1.00	1.08	1.16
	STEEL	10	14	18	21	25	29	33	37	41	43	47	51	55
3'	CONC.	0.26	0.37	0.48	0.59	0.70	0.80	0.91	1.02	1.13	1.24	1.35	1.46	1.56
	STEEL	14	19	25	28	34	39	45	50	56	59	65	70	76
4'	CONC.	0.33	0.47	0.61	0.74	0.88	1.02	1.15	1.29	1.42	1.56	1.70	1.83	1.97
	STEEL	18	25	32	36	43	50	57	64	71	75	82	89	96
5'	CONC.	0.40	0.57	0.73	0.90	1.06	1.22	1.39	1.55	1.72	1.88	2.05	2.21	2.38
	STEEL	22	30	39	44	52	61	69	78	86	91	100	108	117
6'	CONC.	0.47	0.66	0.86	1.05	1.24	1.43	1.63	1.82	2.01	2.21	2.40	2.59	2.78
	STEEL	25	35	45	51	61	71	81	91	101	107	117	127	137

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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

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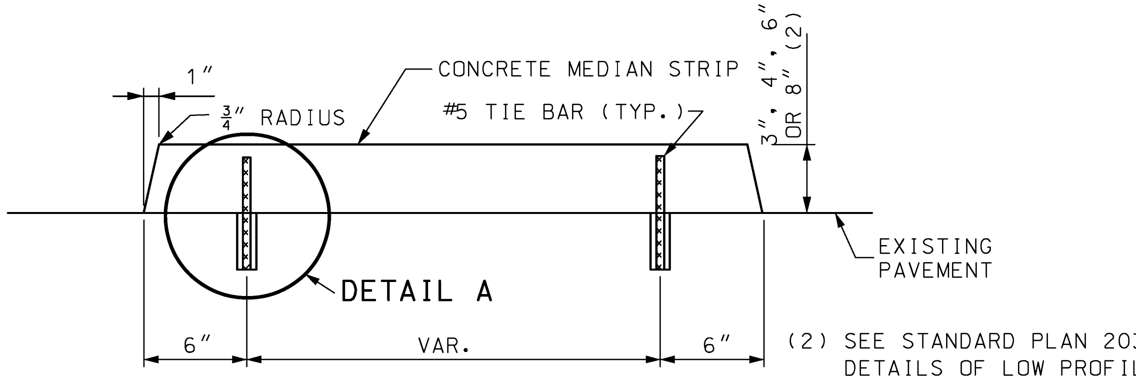
CONCRETE STAIRS

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

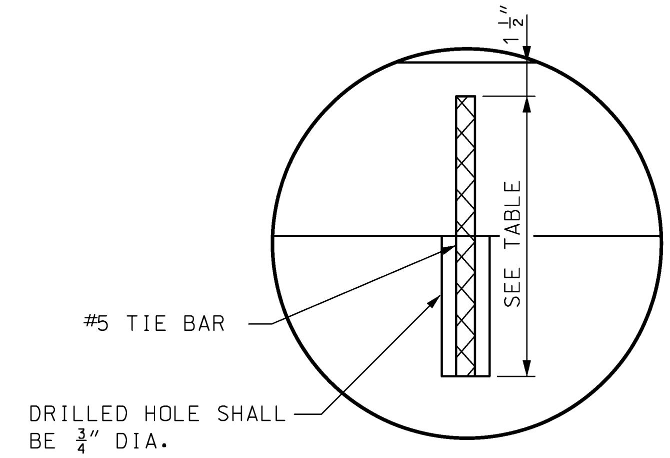
608.20E

SHEET NO. 2 OF 2



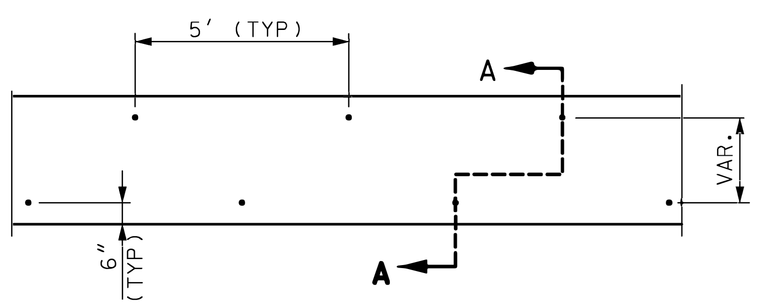
(2) SEE STANDARD PLAN 203.50 FOR DETAILS OF LOW PROFILE ISLAND

SECTION A-A
CONCRETE MEDIAN STRIP

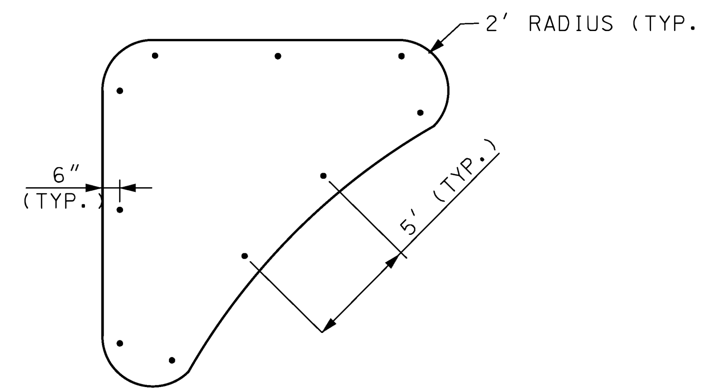


DETAIL A

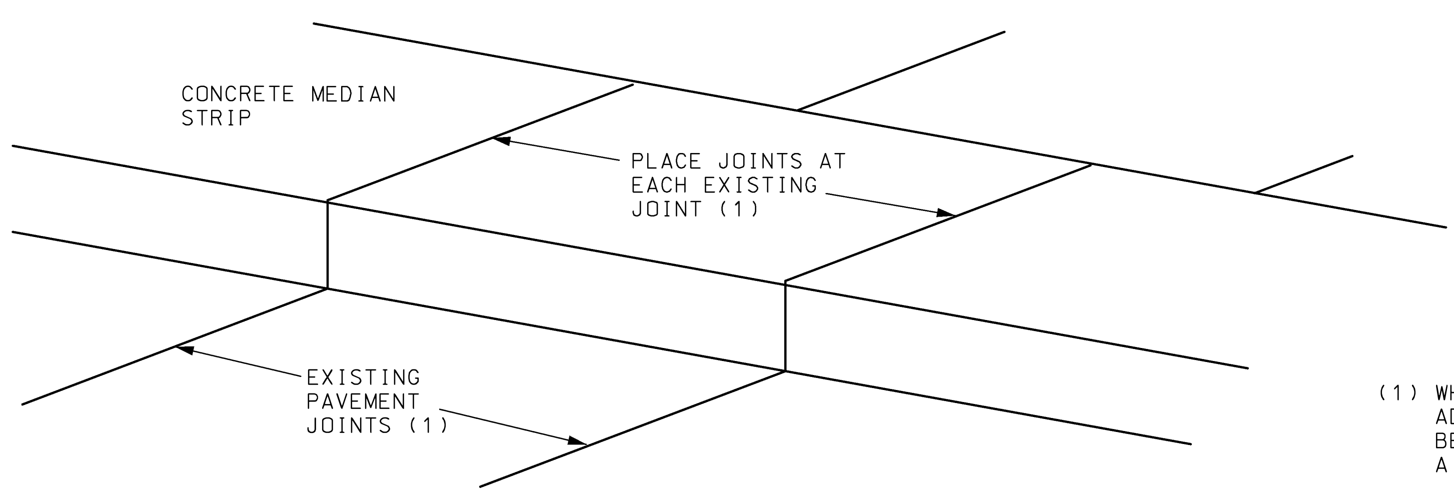
MEDIAN HEIGHT	BAR LENGTH
3″	8″
4″	9″
6″	11″
8″	13″



TIE BAR LOCATIONS FOR CONCRETE MEDIAN STRIP



TIE BAR LOCATIONS FOR CONCRETE MEDIAN STRIP (ISLAND)



(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′.

CONCRETE MEDIAN STRIP JOINT LOCATION

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″.

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TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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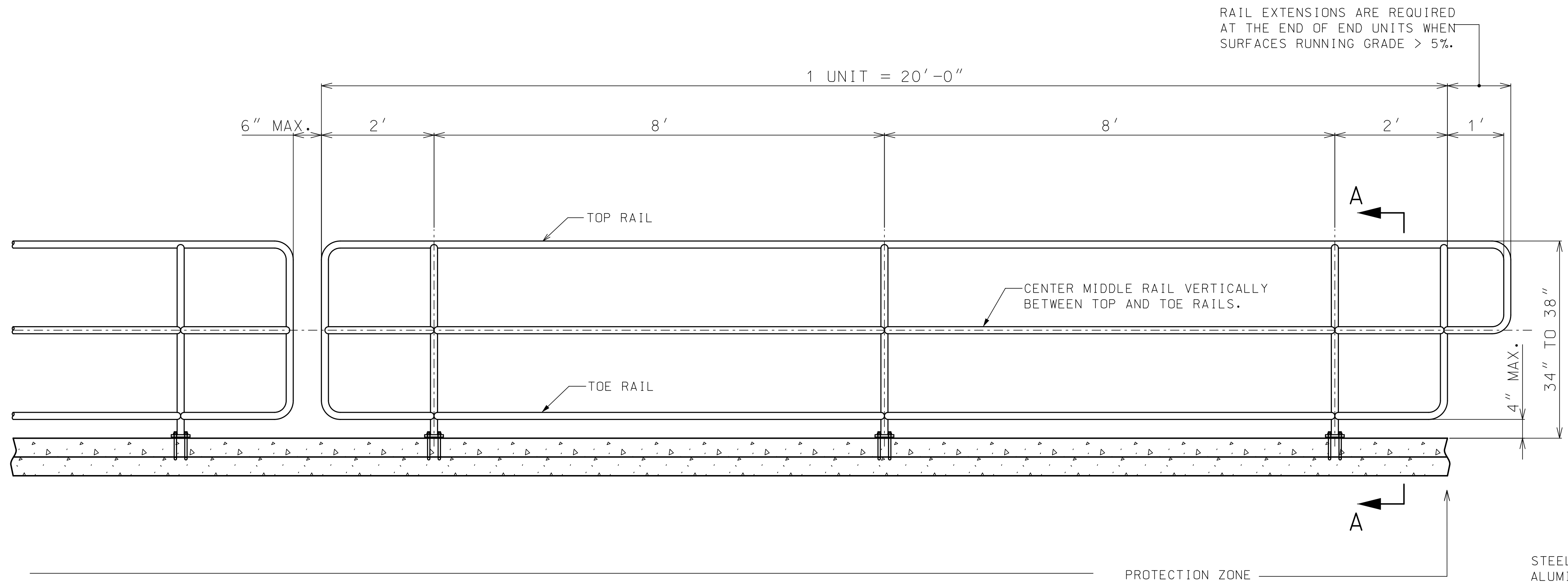
CONCRETE MEDIAN STRIP

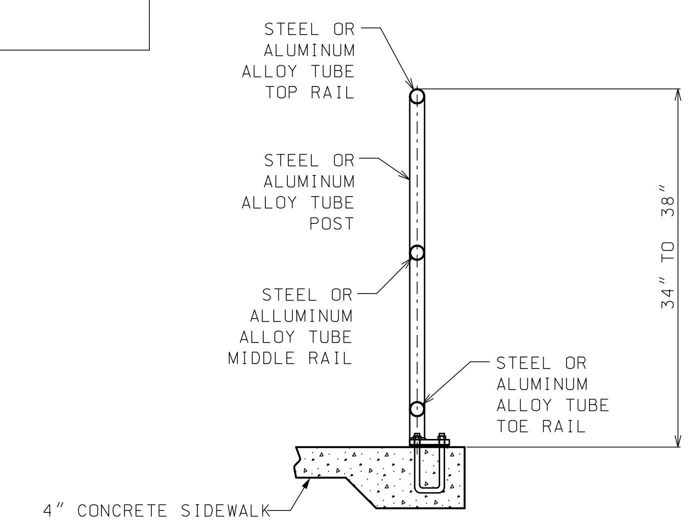
DATE EFFECTIVE: 10/01/2020
DATE PREPARED: 7/21/2020

608.30A

SHEET NO. 1 OF 1

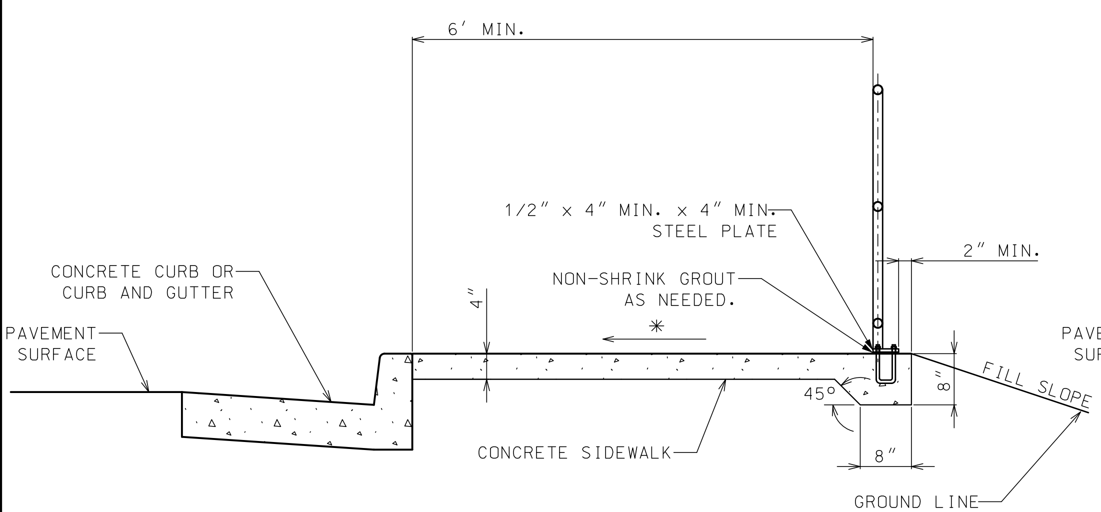


SIDEWALK HANDRAILING WITHOUT BALUSTERS

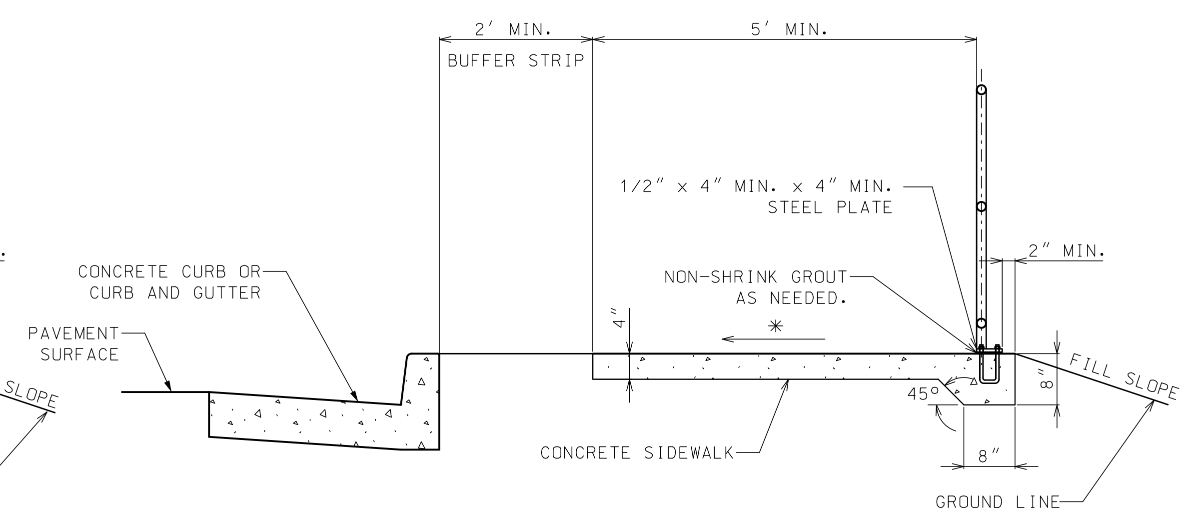


HANDRAILING

✳ CROSS SLOPE: 1.0 % MIN. - 2.0 % MAX.



SIDEWALK WITHOUT BUFFER STRIP (SECTION A-A)



SIDEWALK WITH BUFFER STRIP (SECTION A-A)

FOR GENERAL NOTES AND HANDRAILING REQUIREMENTS ON FILL SLOPES SEE SHEET 3 OF 4

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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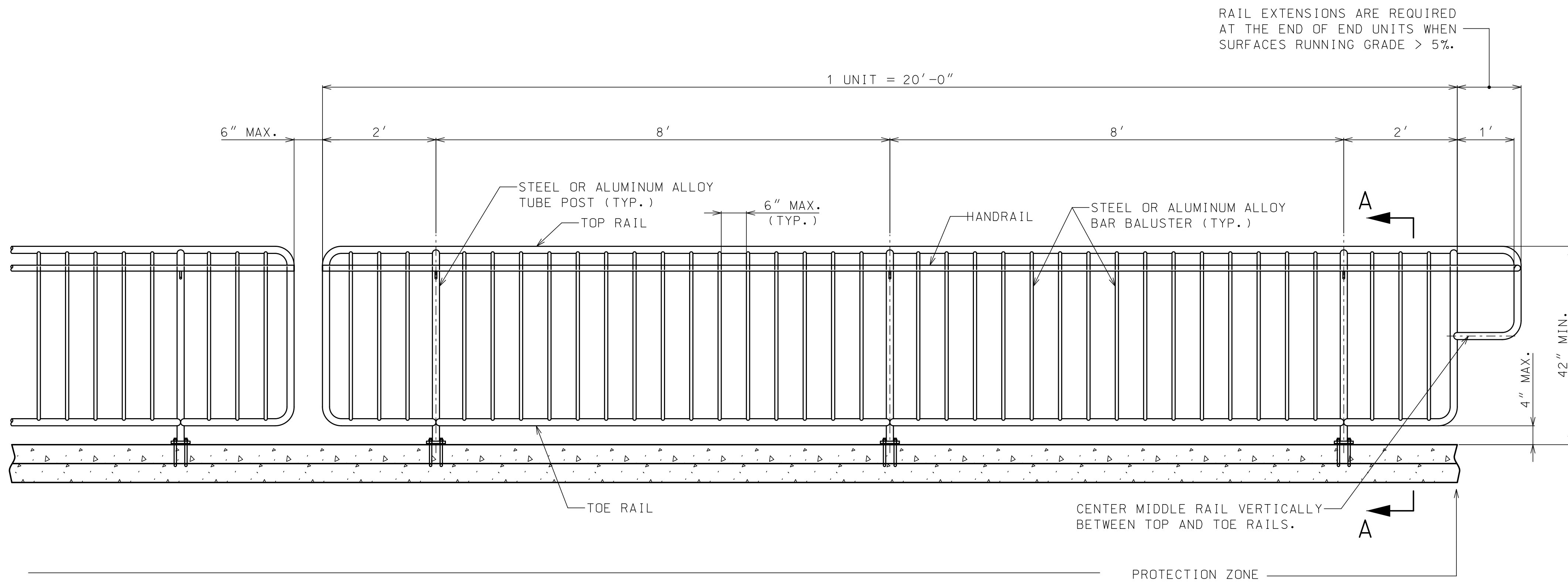
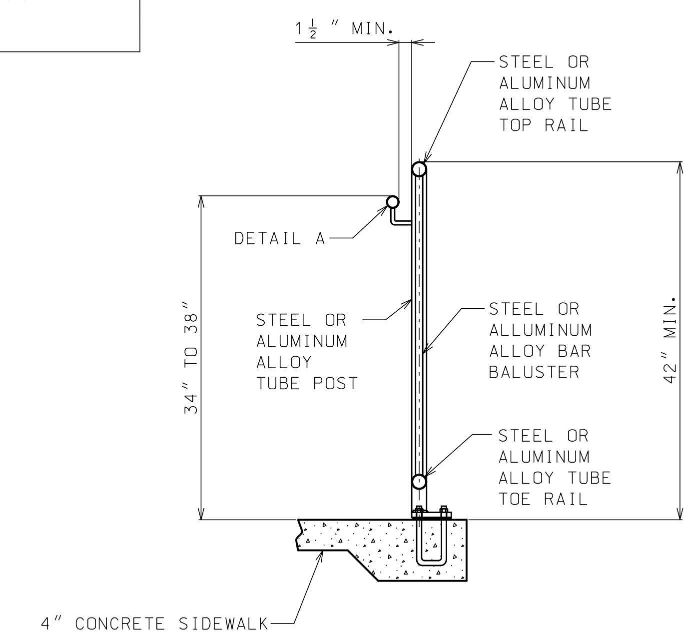
HANDRAILING

DATE EFFECTIVE:	01/01/2021	608.40A	SHEET NO. 1 OF 4
DATE PREPARED:	10/14/2020		

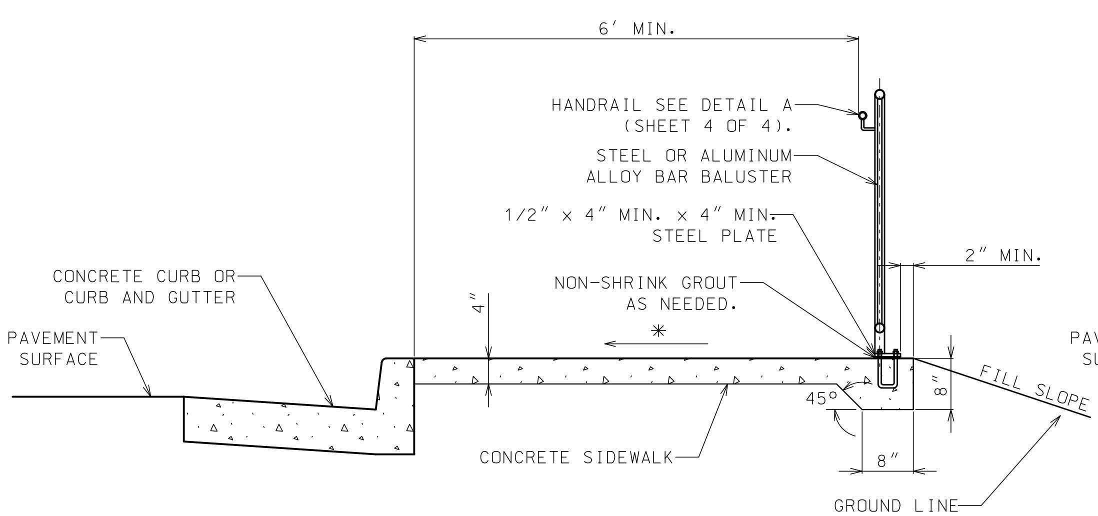


SIDEWALK SAFETY RAIL WITH BALUSTERS AND HANDRAIL

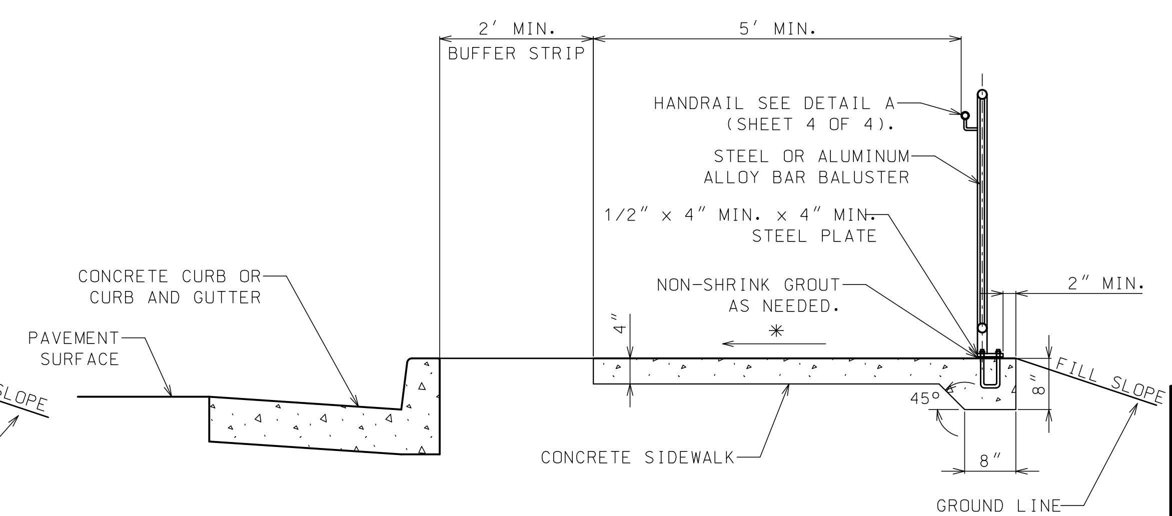


SAFETY RAIL WITH HANDRAIL

✳ CROSS SLOPE: 1.0 % MIN. - 2.0 % MAX.



SIDEWALK WITHOUT BUFFER STRIP
(SECTION A-A)



SIDEWALK WITH BUFFER STRIP
(SECTION A-A)

FOR GENERAL NOTES AND HANDRAIL REQUIREMENTS ON FILL SLOPES SEE SHEET 3 OF 4.

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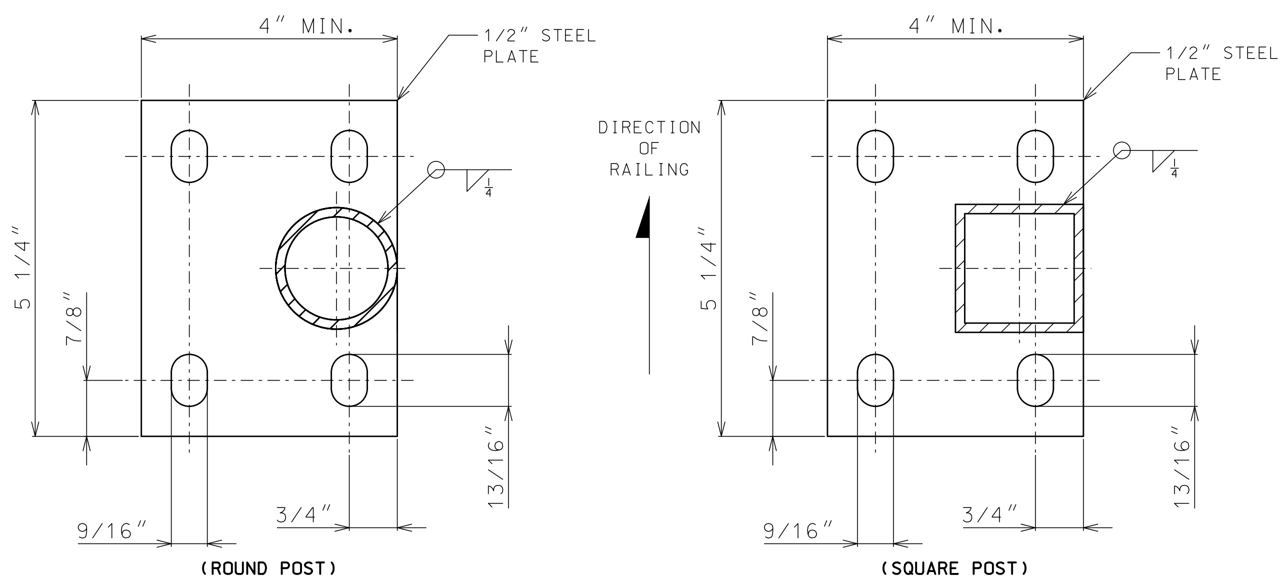
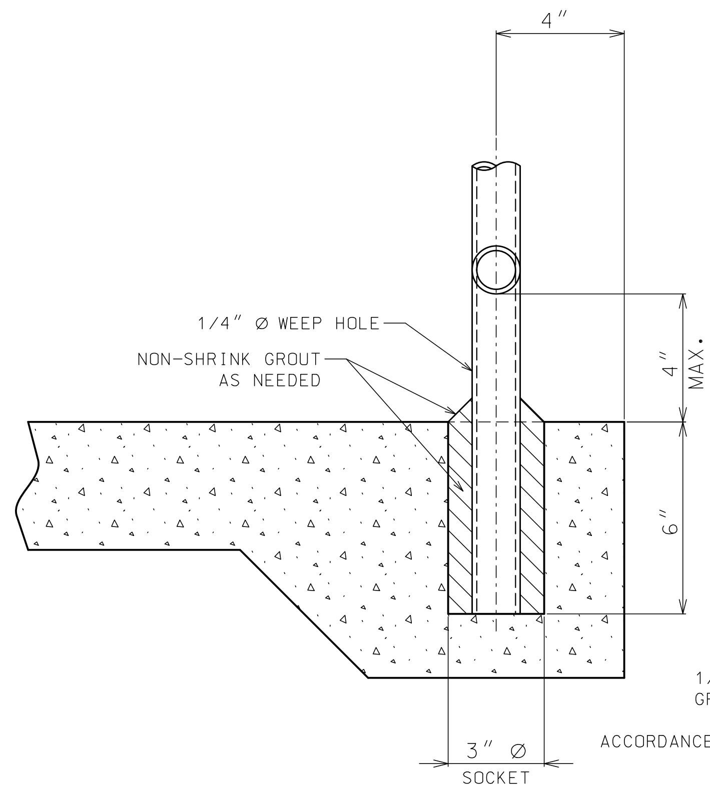
HANDRAILING

DATE EFFECTIVE:	01/01/2021	608.40A	SHEET NO.
DATE PREPARED:	10/14/2020		2 OF 4

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



MOUNTING PLATE DETAIL
(PLAN VIEW)



SOCKET MOUNTING DETAIL

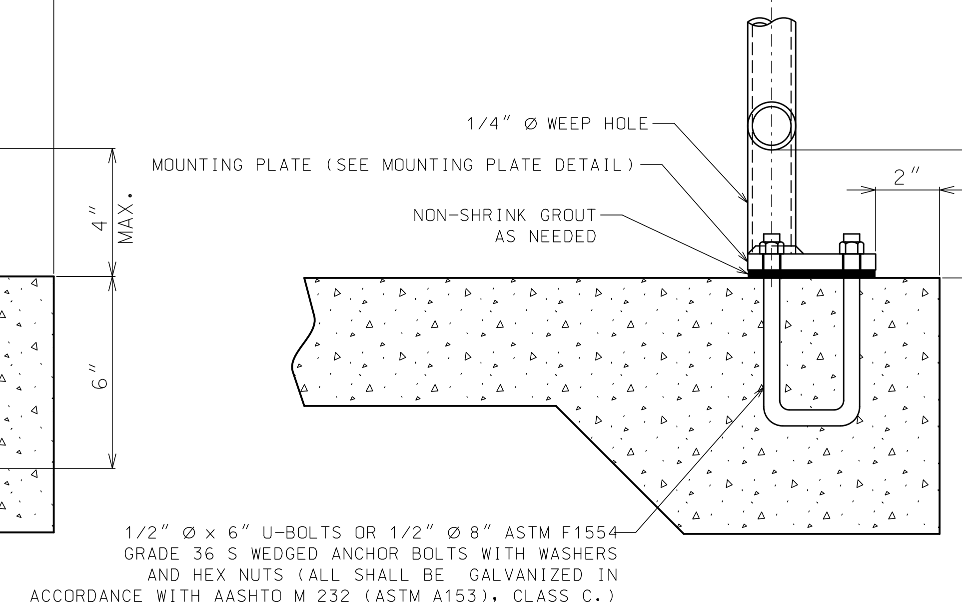


PLATE MOUNTING DETAIL

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 DISABLILITIES 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.	WEIGHT (LBS. / FT.) 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	———

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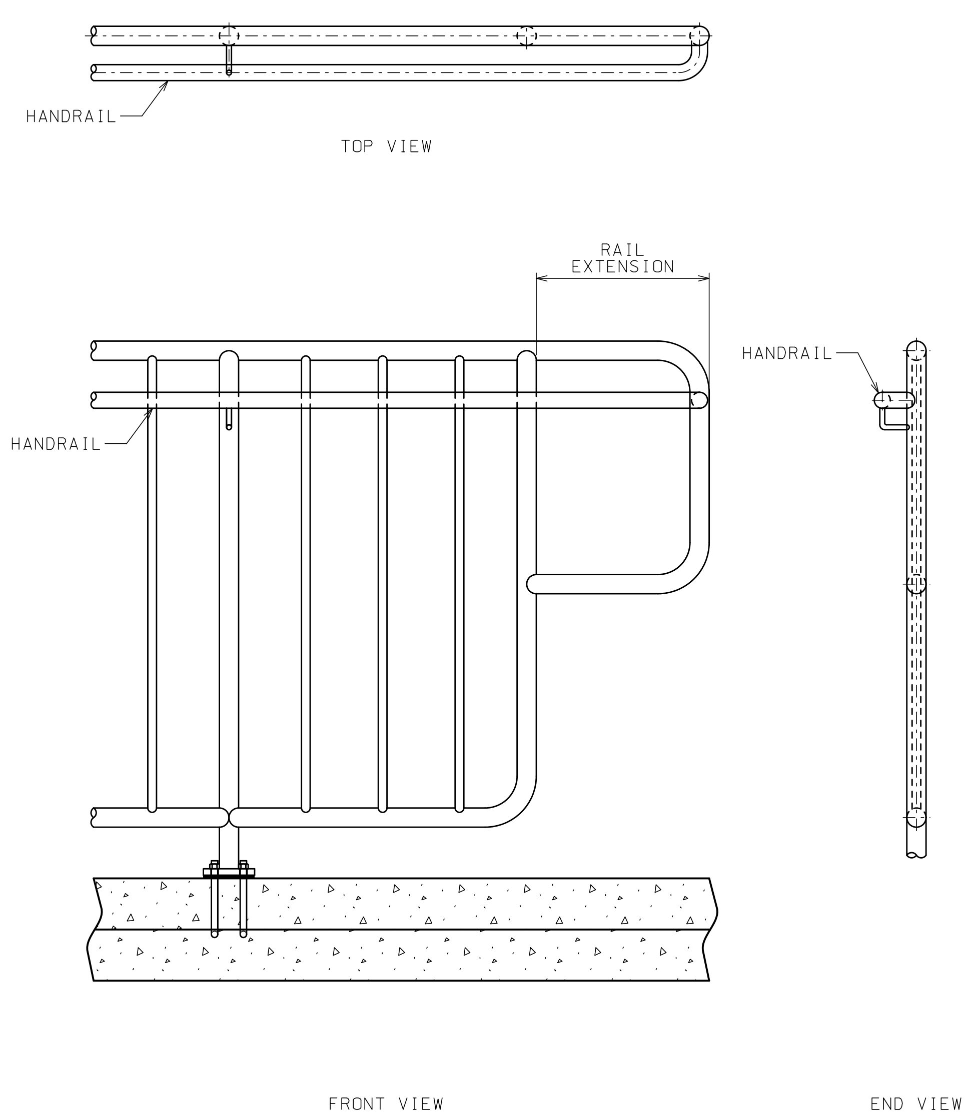
HANDRAILING

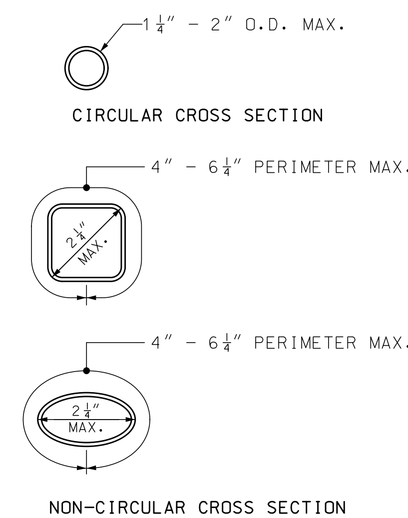
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

608.40A

SHEET NO. 3 OF 4



HANDRAIL AND EXTENSION CONNECTION



HANDRAIL GRIPPING SURFACES

DETAIL A - HANDRAIL

HANDRAIL NOTES:

HANDRAILS SHALL BE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

HANDRAILS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

HANDRAILS SHALL BE AT A CONSISTENT HEIGHT ABOVE WALKING SURFACES.

HANDRAIL GRIPPING SURFACES SHALL BE CONTINUOUS ALONG THEIR LENGTH AND SHALL NOT BE OBSTRUCTED ALONG THEIR TOPS OR SIDES.

THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL NOT BE OBSTRUCTED FOR MORE THAN 20 PERCENT OF THEIR LENGTH.

WHERE HANDRAILS ARE PROVIDED ALONG WALKING SURFACES WITH SLOPES NOT STEEPER THAN 1:20, THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL BE PERMITTED TO BE OBSTRUCTED ALONG THEIR ENTIRE LENGTH WHERE THEY ARE INTEGRAL TO CRASH RAILS OR BUMPER GUARDS.

THE DISTANCE BETWEEN HORIZONTAL PROJECTIONS AND THE BOTTOM OF THE GRIPPING SURFACE SHALL BE PERMITTED TO BE REDUCED BY 1/8" FOR EACH 1/2" OF ADDITIONAL HANDRAIL PERIMETER DIMENSION THAT EXCEEDS 4".

HANDRAIL SURFACES AND ANY SURFACES ADJACENT TO THEM SHALL BE FREE OF SHARP OR ABRASIVE ELEMENTS AND SHALL HAVE ROUNDED EDGES.

HANDRAILS SHALL NOT ROTATE WITHIN THEIR FITTINGS.

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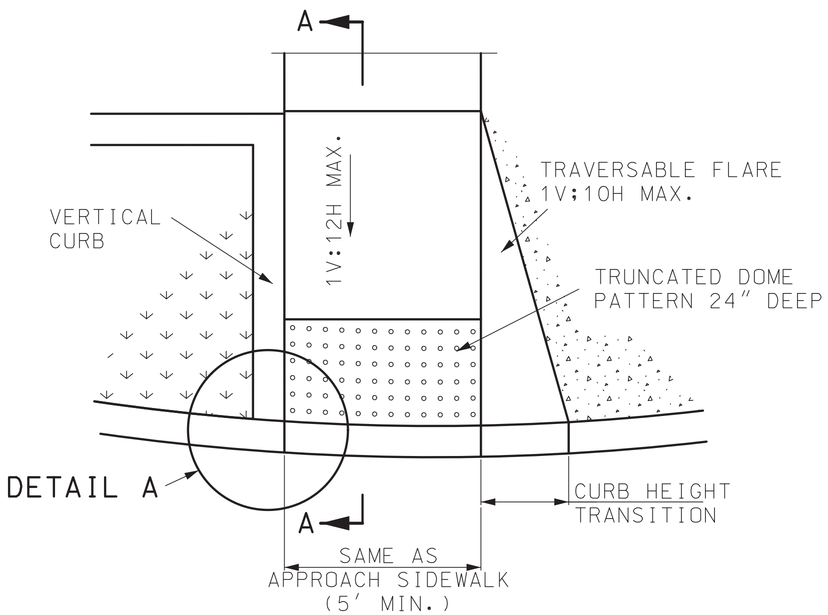
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

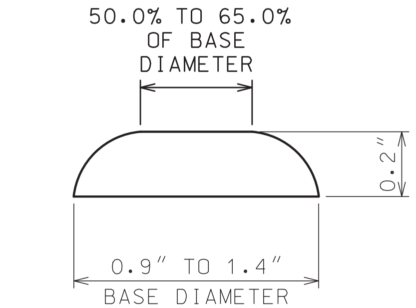
HANDRAILING

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

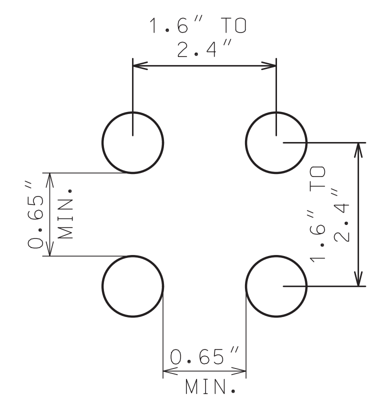
608.40A



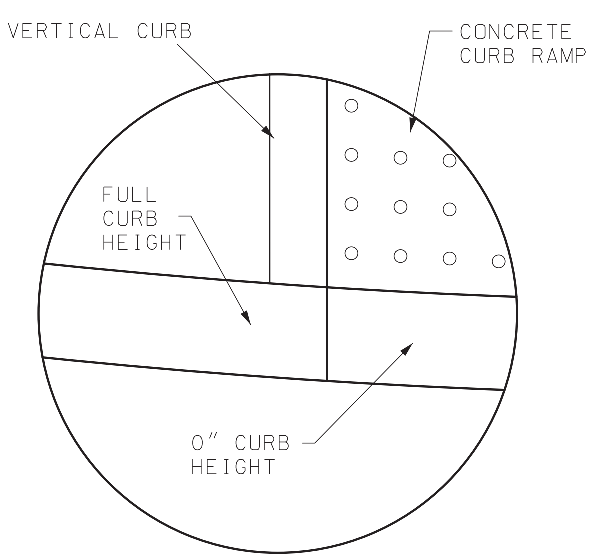
CURB RAMP DETAIL



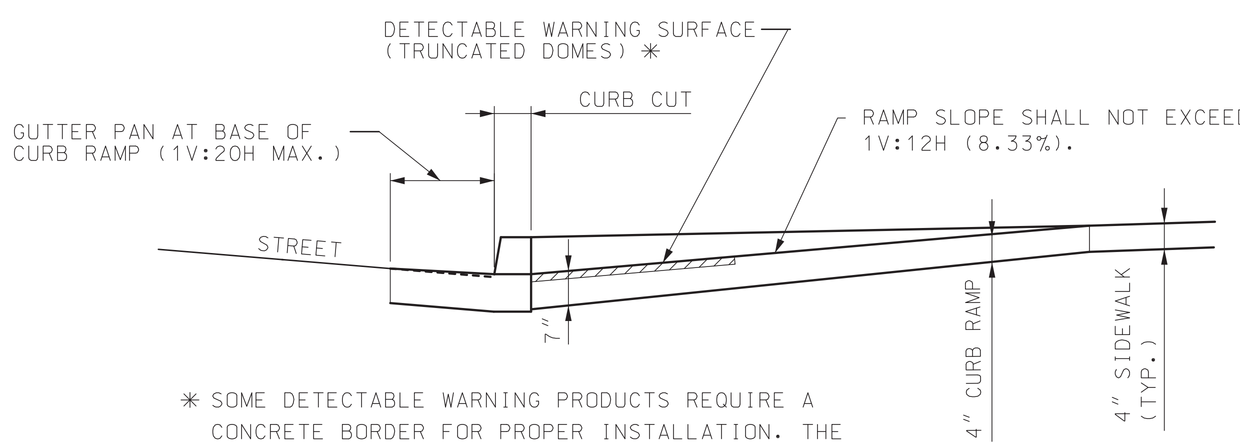
TRUNCATED DOMES CROSS SECTION



TRUNCATED DOMES SPACING



DETAIL A



✱ SOME DETECTABLE WARNING PRODUCTS REQUIRE A CONCRETE BORDER FOR PROPER INSTALLATION. THE CONCRETE BORDER SHALL NOT EXCEED 2" PER SIDE.

SECTION A-A

GENERAL NOTES:

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABILITIES ACT - GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY". EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT POND WATER.

SIDEWALK, RAMP AND LANDING CROSS SLOPES SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDE ROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE 5.00% MAXIMUM.

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

30"x 48" CLEAR SPACE SHALL BE PROVIDED CENTERED ON THE PEDESTRIAN PUSH BUTTON.

BEYOND THE BOTTOM GRADE BREAK OF A CURB RAMP, A CLEAR SPACE 4'MINIMUM BY 4'MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.

SIDE FLARES OF CURB RAMPS, IN THE PATH OF PEDESTRIAN TRAVEL (TRAVERSABLE), SHALL NOT EXCEED A SLOPE OF 1V:10H. SIDE FLARES OUTSIDE THE PEDESTRIAN PATH (NONTRAVERSABLE) MAY BE VERTICAL.

TRANSITION FROM SIDEWALK OR CURB RAMP TO GUTTER TO ROADWAY SHALL BE FLUSH.

DETECTABLE WARNING SURFACES (TRUNCATED DOMES) SHALL BE PREFORMED AND INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS. STAMPED CONCRETE WILL NOT BE ACCEPTED.

THE DETECTABLE WARNING SURFACE SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT. TRUNCATED DOMES SHALL SPAN THE FULL WIDTH OF THE RAMP OR LANDING 24" DEEP.

DETECTABLE WARNING SURFACES SHALL BE ALIGNED PERPENDICULAR OR RADIAL TO THE BREAK BETWEEN THE RAMP, LANDING OR BLENDED TRANSITION, AND THE STREET.

WHERE THE BOTTOM GRADE BREAK OF A CURB RAMP IS LESS THAN 5' FROM THE BACK OF CURB, DETECTABLE WARNINGS SHALL BE LOCATED ON THE RAMP SURFACE AT THE BACK OF THE CURB. WHERE THE GRADE BREAK IS GREATER THAN 5' FROM THE BACK OF CURB, THE DETECTABLE WARNING SHALL BE LOCATED ON THE LOWER LANDING.

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TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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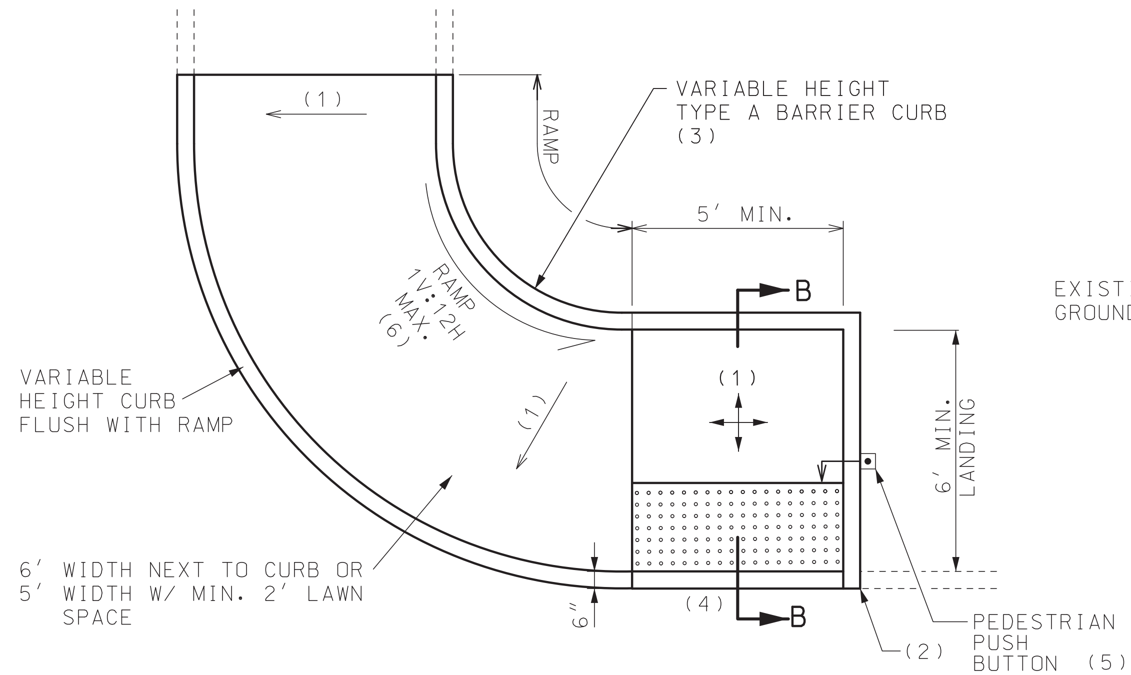
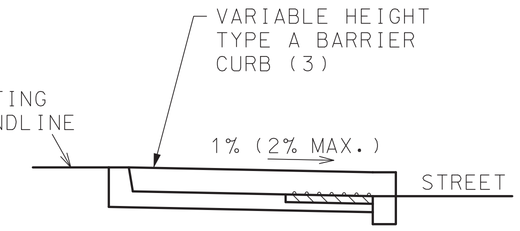
CURB RAMPS

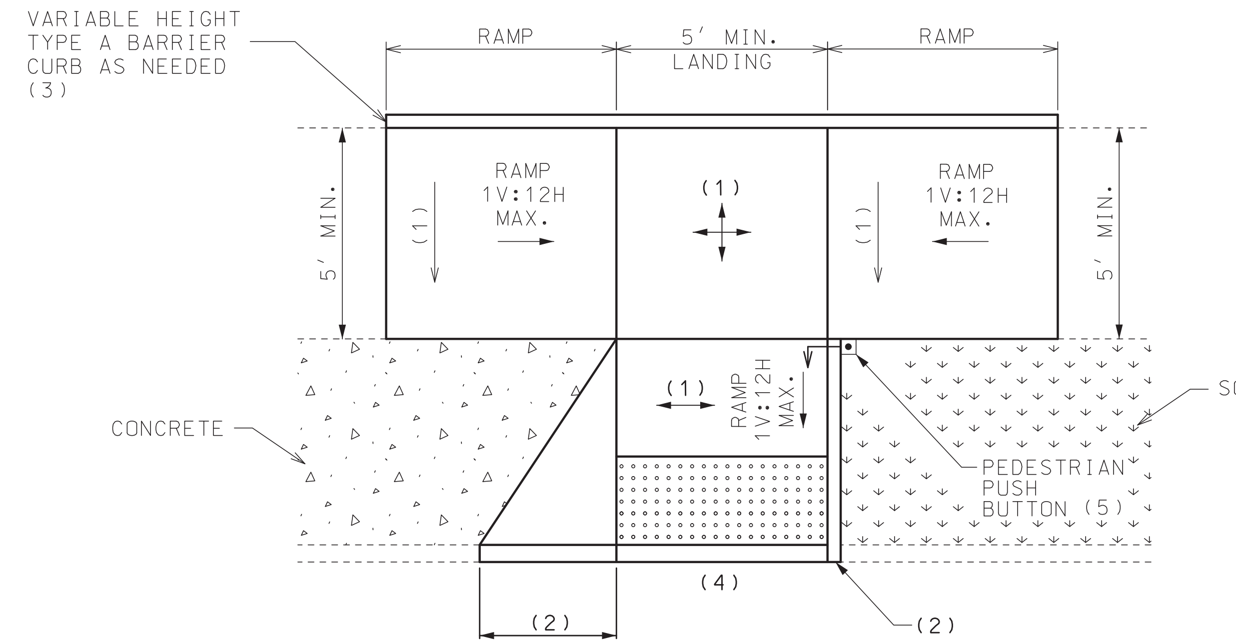
DATE EFFECTIVE:	01/01/2023	608.50A	SHEET NO.
DATE PREPARED:	10/6/2022		1 of 4



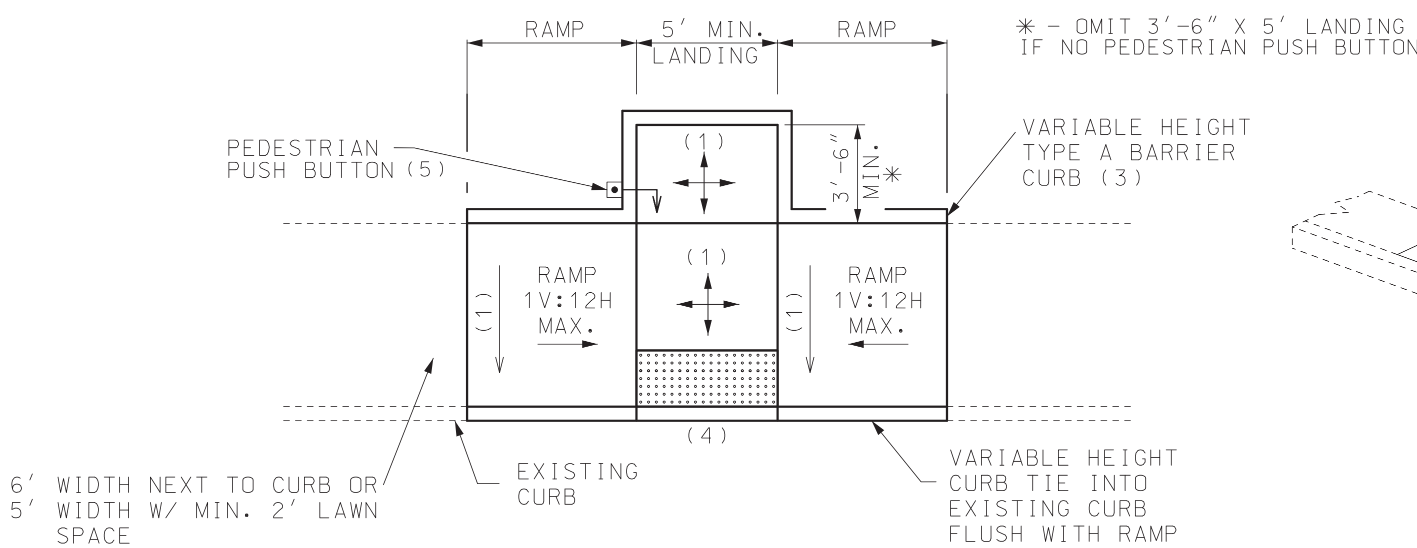
TYPE 1 PARALLEL



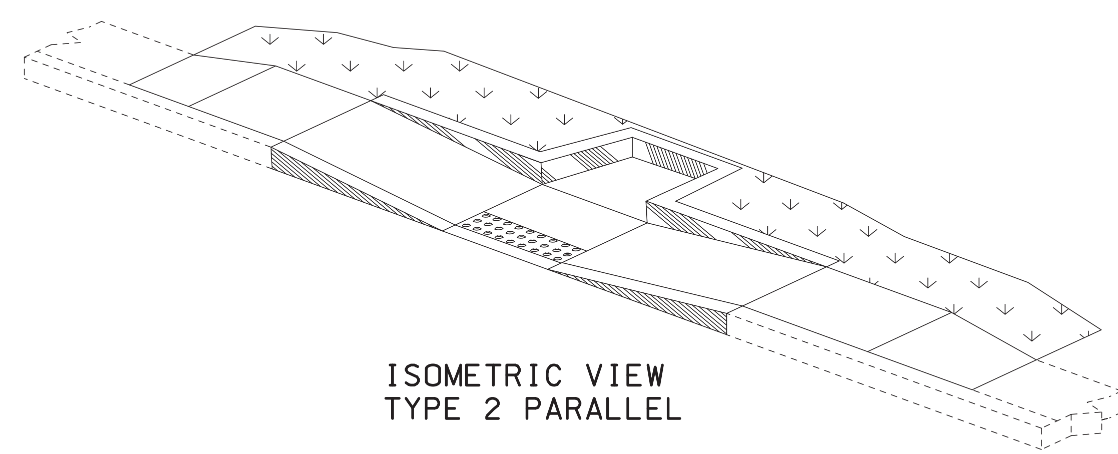
SECTION B-B



COMPOUND PERPENDICULAR



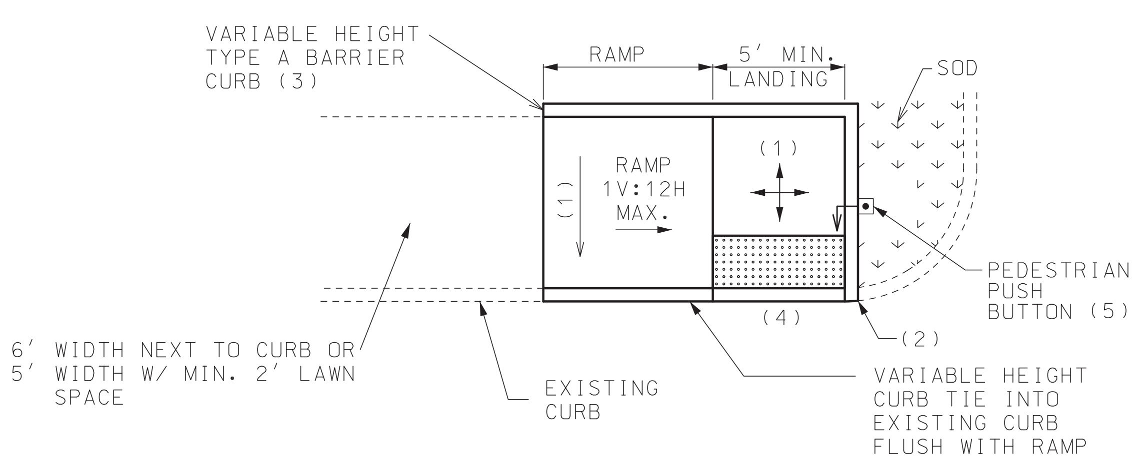
TYPE 2 PARALLEL



ISOMETRIC VIEW
TYPE 2 PARALLEL

GENERAL NOTES:

(1) 1.0% (2.0% MAX.) CROSS SLOPE OR ROAD GRADE EXCEPTION.
(2) VARIABLE HEIGHT VERTICAL CURB. IF TRAVERSABLE USE A MAXIMUM 1V:10H FLARE MEASURED PARALLEL TO THE CURB LINE.
(3) HEIGHT VARIES TO MEET EXISTING GROUND.
(4) THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMP RUNS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 5% MAXIMUM.
(5) THE FACE OF PEDESTRIAN PUSH BUTTONS SHALL BE OFFSET 0" FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.
(6) ENSURE THAT THE INSIDE EDGE OF CURVED RAMPS MAINTAIN AN 8.3% (1V:12H) MAXIMUM SLOPE.



TYPE 3 PARALLEL

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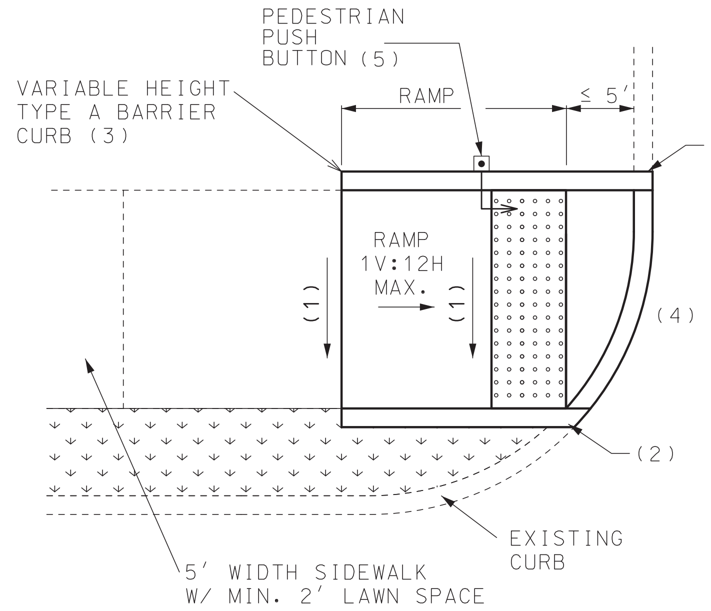
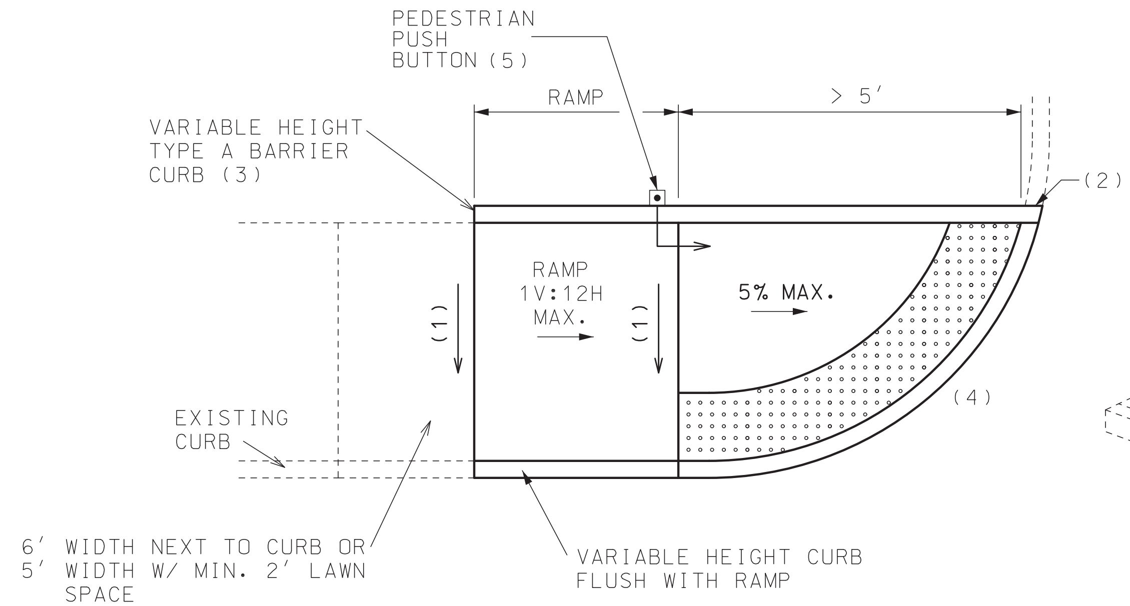
CURB RAMPS

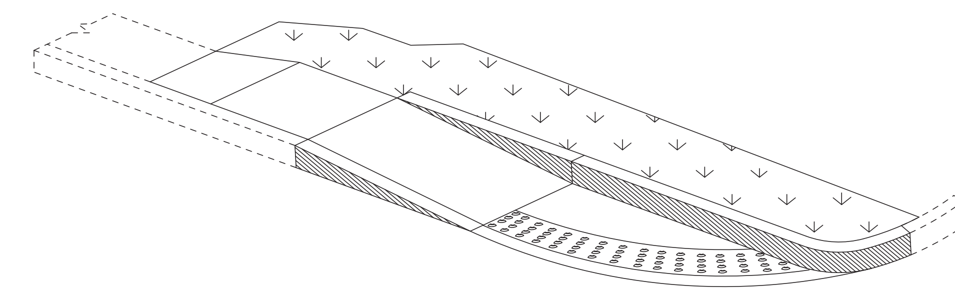
DATE EFFECTIVE:	01/01/2023	608.50A	SHEET NO. 2 of 4
DATE PREPARED:	10/6/2022		



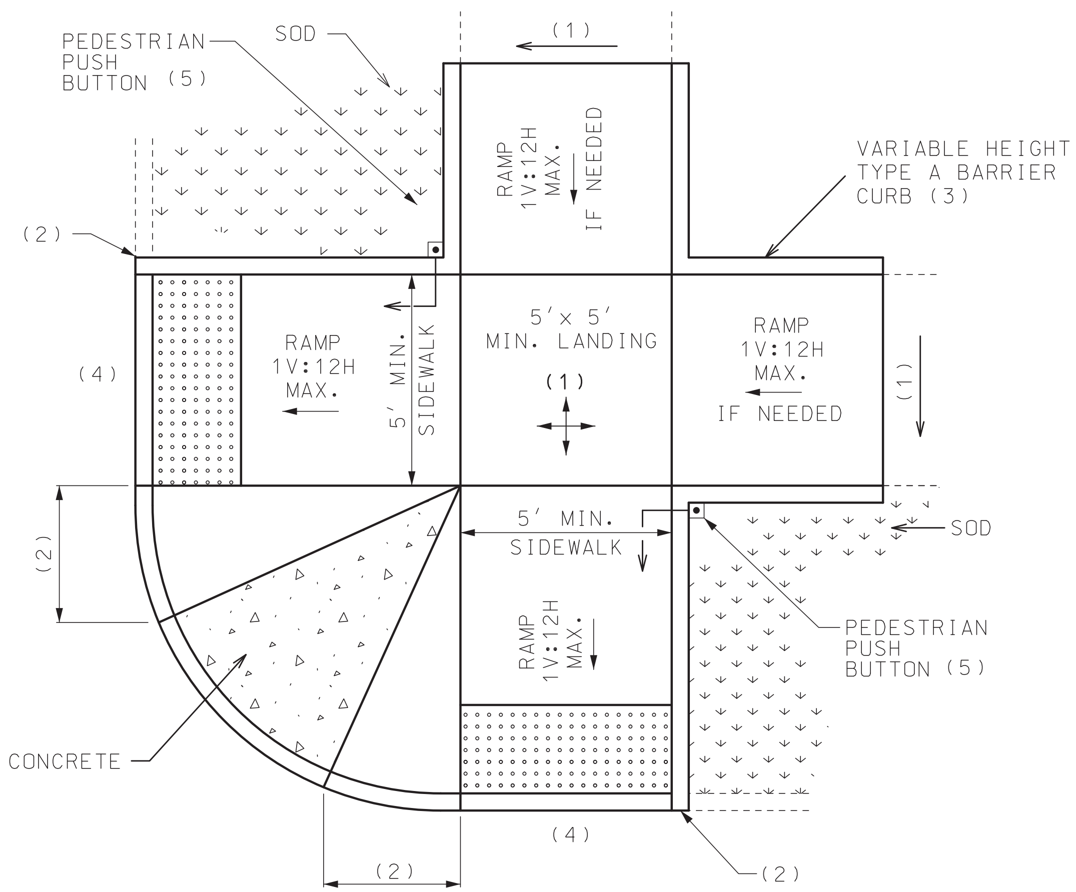
SMALL RADIUS PERPENDICULAR



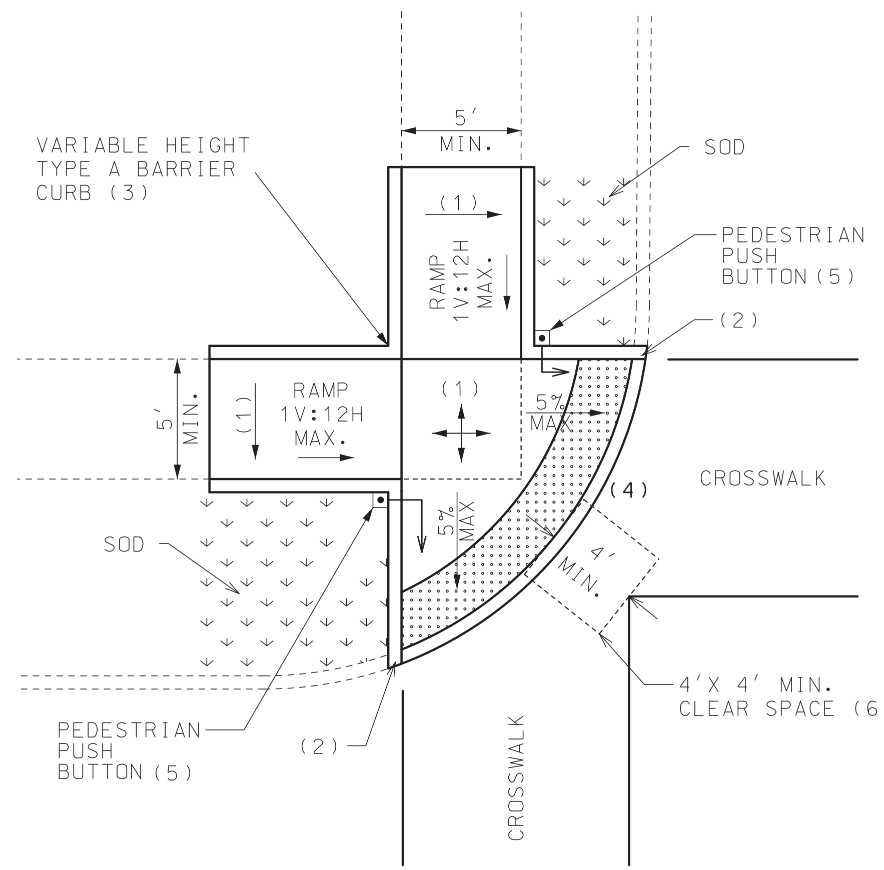
LARGE RADIUS PERPENDICULAR



ISOMETRIC VIEW
LARGE RADIUS PERPENDICULAR



DUAL PERPENDICULAR



BLENDED TRANSITION

GENERAL NOTES:

(1) 1.0% MINIMUM, 2.0% MAXIMUM CROSS SLOPE.
(2) VARIABLE HEIGHT VERTICAL CURB. IF TRAVERSABLE USE A MAX. 1V:10H FLARE MEASURED PARALLEL TO THE CURB LINE.
(3) HEIGHT VARIES TO MEET EXISTING GROUND.
(4) THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMP RUNS,BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 5% MAXIMUM.
(5) THE FACE OF PEDESTRIAN PUSH BUTTONS SHALL BE OFFSET 0" FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.
(6) BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE 4'X 4' MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.

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CURB RAMPS

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DATE PREPARED:	10/6/2022		

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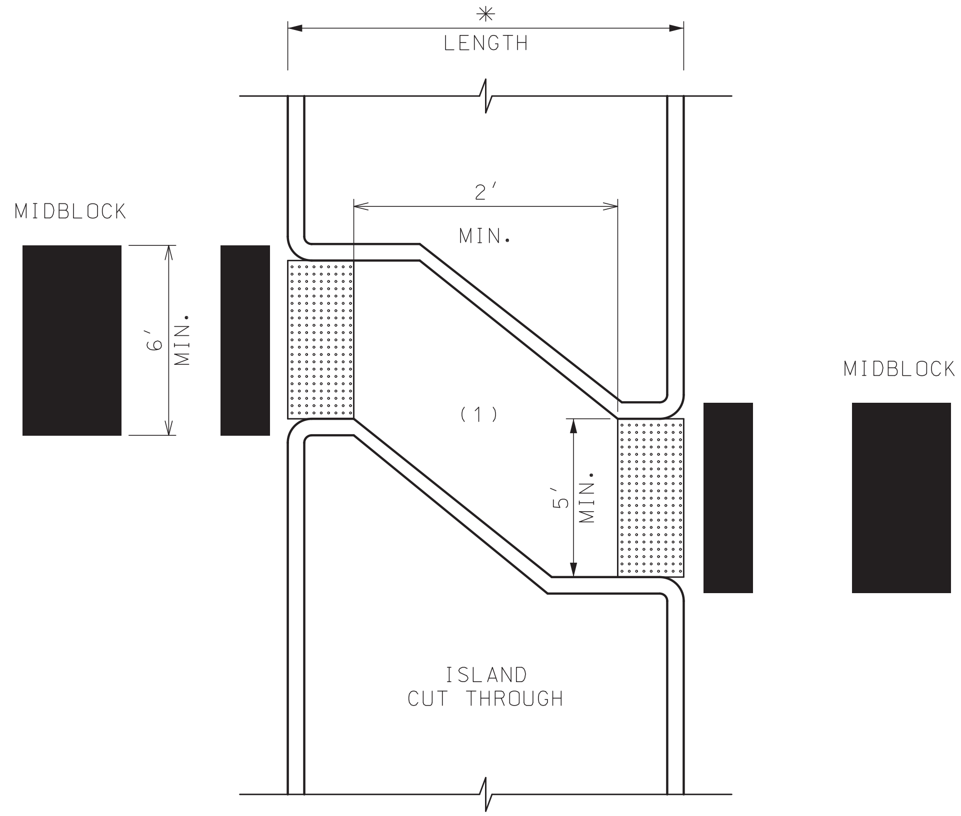
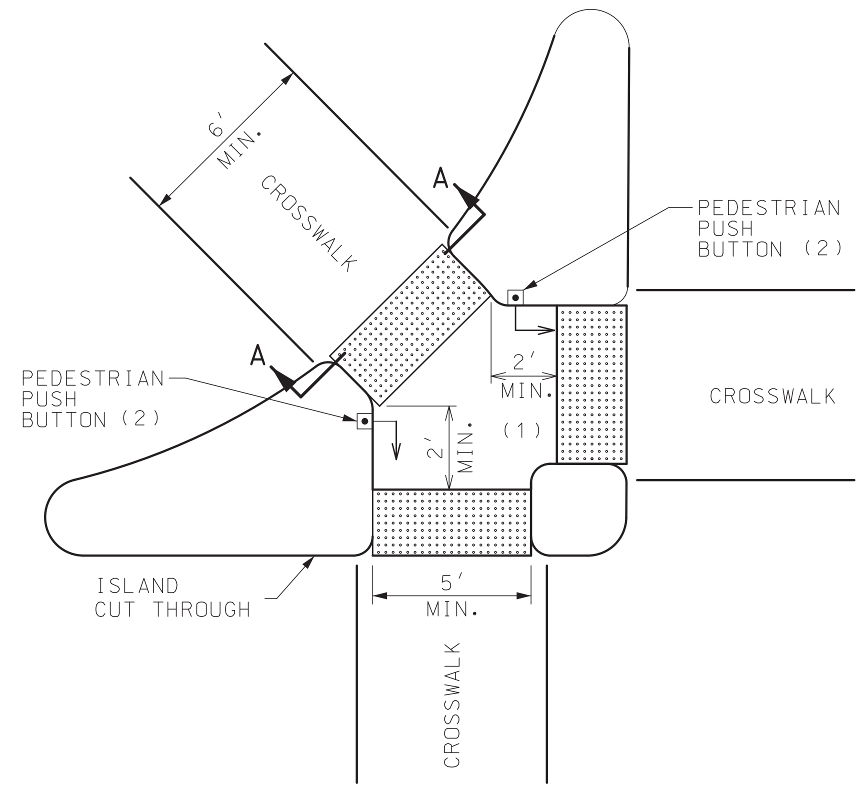
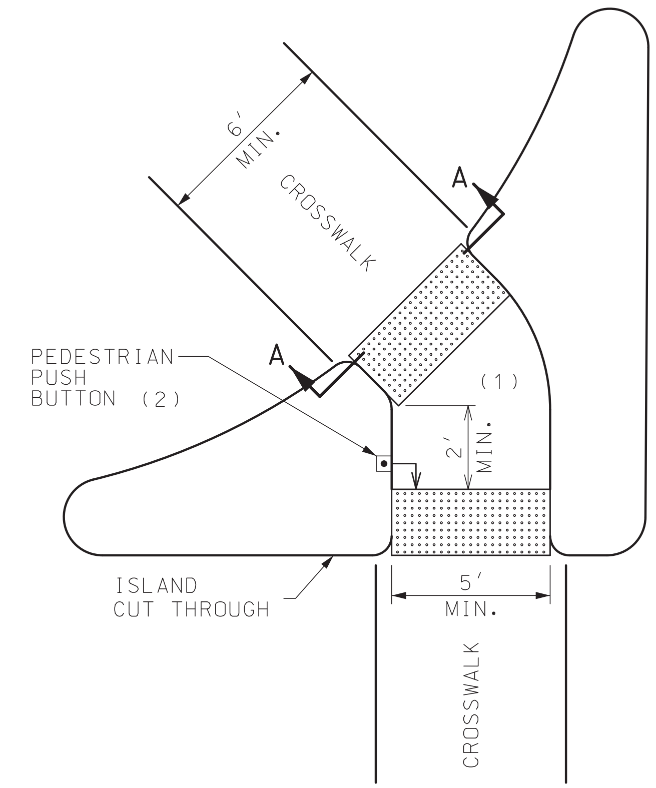
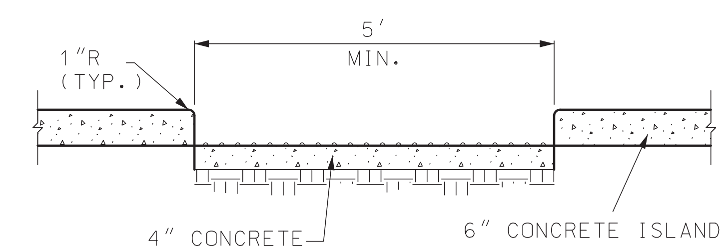




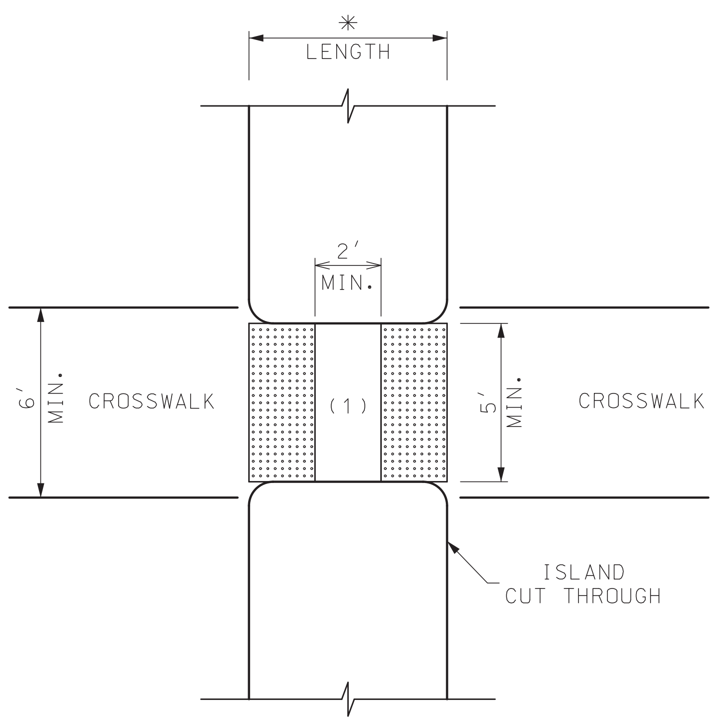


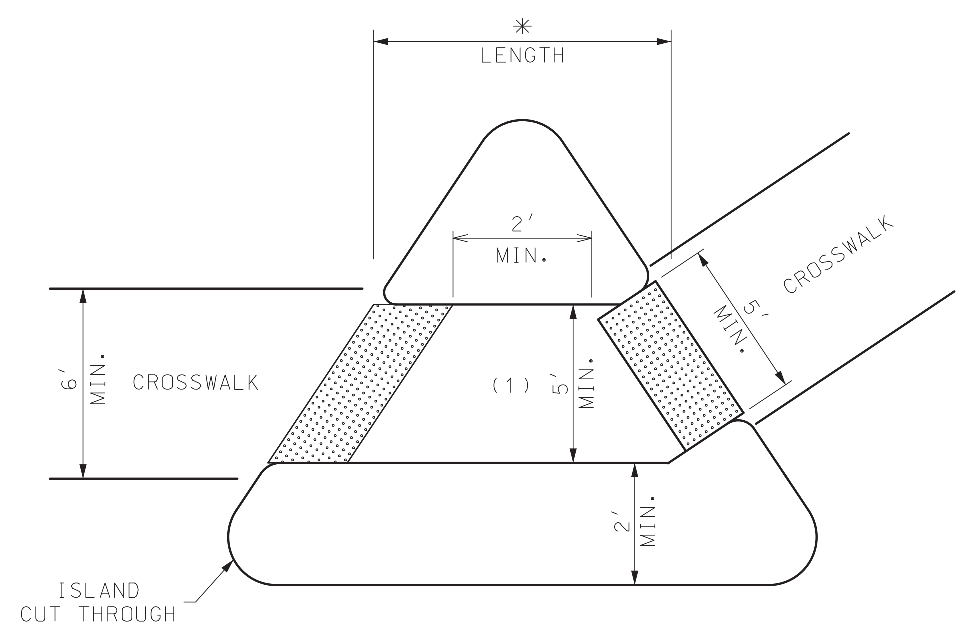


SECTION A-A
ISLAND CUT THROUGH TYPICAL

RAMP OR CUT-THROUGH DEPENDING ON ISLAND WIDTH. IF RAMPED, PROVIDE 4′ MINIMUM LANDING AND SLOPE RAMPS AT 1V:12H MAX.

RAMP MUST BE CONSTRUCTED TO DRAIN TO THE OUTSIDE.





ISLAND CUT THROUGHS

(1) DETECTABLE WARNING SURFACES SHALL BE PLACED AT THE EDGES OF THE PEDESTRIAN ISLAND AND SHALL BE SEPARATED BY 2′ MIN. LENGTH OF SURFACE WITHOUT DETECTABLE WARNINGS.

(2) PEDESTRIAN PUSH BUTTONS SHALL BE OFFSET 0″ FOR FRONT APPROACH AND 10″ MAX. FOR SIDE APPROACH TO THE CURB FACE.

✳ DETECTABLE WARNING SURFACES SHALL BE OMITTED IF LENGTH IS < 6′, BECAUSE REFUGE SPACE IS DEEMED TOO SMALL.

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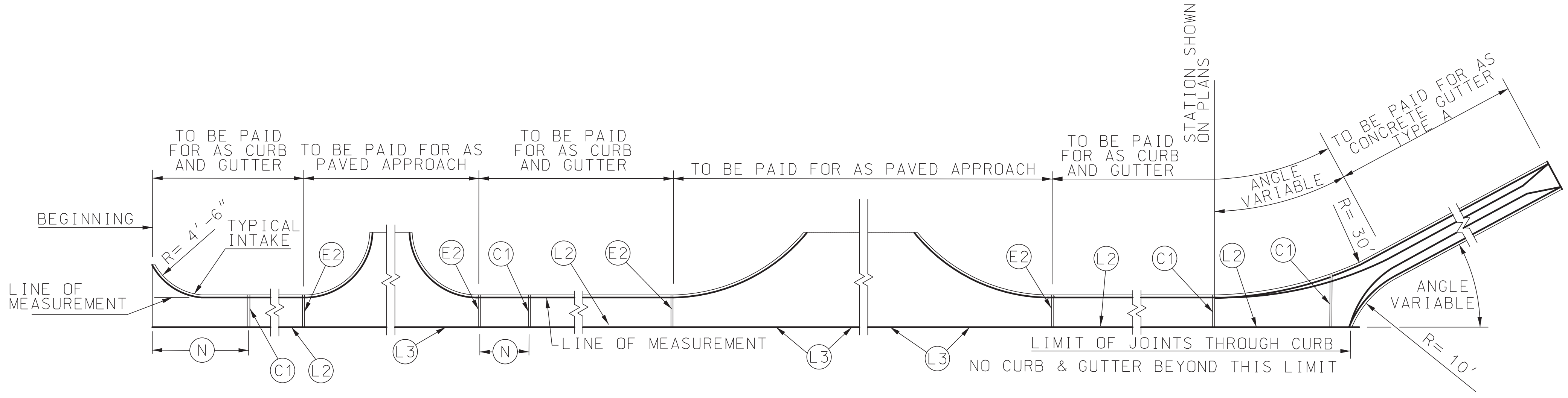
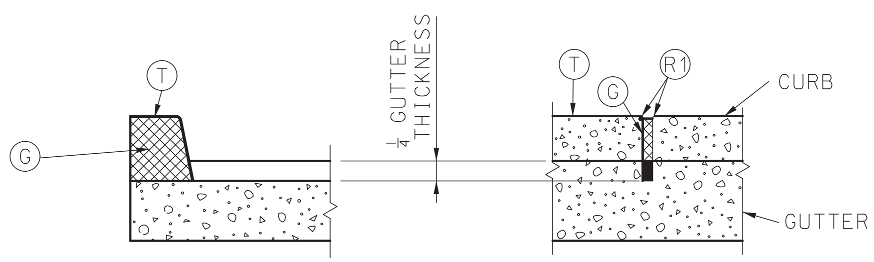
CURB RAMPS

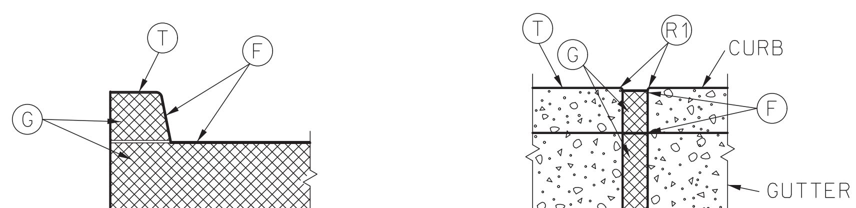
DATE EFFECTIVE:	01/01/2023	608.50A	SHEET NO. 4 of 4
DATE PREPARED:	10/6/2022		



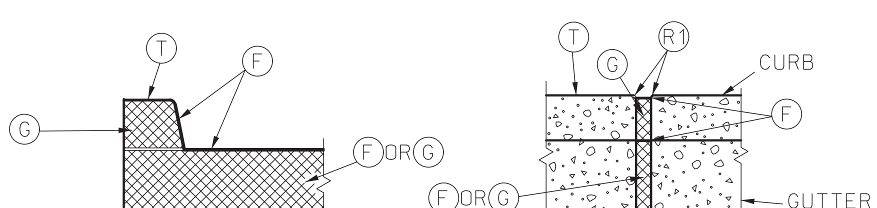
PLAN OF MEASUREMENT OF CURB & GUTTER AND JOINT PLAN



C1 JOINT



E1 JOINT



E2 JOINT

LEGEND

C1 ⅛" MAXIMUM WIDTH TRANSVERSE CONTRACTION JOINT (PREFORMED OR SAWED).

E1 2" TRANSVERSE EXPANSION JOINT (PREFORMED OR SAWED).

E2 ½" TRANSVERSE EXPANSION JOINT (PREFORMED OR SAWED).

F FILLER FOR JOINTS - HOT POURED.

G PREFORMED JOINT FILLER MATERIAL.

L2 LONGITUDINAL JOINT WITH TIE BARS.

L3 LONGITUDINAL JOINT WITHOUT TIE BARS.

N NOT LESS THAN 10' OR MORE THAN 30'.

T TOP OF CURB.

R1 ROUND TO ¼" RADIUS (EXCEPT FOR SAWED JOINTS).

GENERAL NOTES:

A MINIMUM 4" TYPE 1 OR 5 AGGREGATE BASE SHALL BE PLACED BENEATH ALL CURB AND GUTTER SECTIONS AND INCLUDED WITHIN THE MAINLINE BASE PAY LIMITS.

WHEN CURBS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, CURB HEIGHT SHALL BE 4 INCH BARRIER CURB, AS SHOWN ON STANDARD PLAN 606.00.

CURB, GUTTER AND CURB AND CUTTER CONSTRUCTED ALONG AND ATTACHED TO CONCRETE PAVEMENT OR BASE SHALL HAVE:

1. JOINT C1 ONE-QUARTER DEPTH OF CURB AND GUTTER THICKNESS AS A CONTINUATION OF EACH CONTRACTION JOINT IN THE BASE OR PAVEMENT.
2. JOINT E1 AS CONTINUATION OF 2" EXPANSION JOINT E IN THE CONCRETE BASE OR PAVEMENT SHALL EXTEND AND CONTINUE THROUGH THE CURB, CUTTER AND CURB AND GUTTER.
3. JOINT E2 THROUGH CURB AND CURB AND CUTTER AT THE BEGINNING AND END OF EACH PAVED APPROACH.

CURB, CURB AND GUTTER AND GUTTER CONSTRUCTED APART OR SEPARATED FROM CONCRETE BASE OR PAVEMENT OR AS A FORM FOR ASPHALTIC CONCRETE PAVEMENT SHALL HAVE A JOINT E2 ENTIRELY THROUGH THE CURB, CURB AND GUTTER AND GUTTER, AT THE BEGINNING AND END OF EACH "PAVED APPROACH" AND A JOINT C1 TO ¼ DEPTH OF CURB AND GUTTER THICKNESS AT INTERVALS OF 30 FEET BETWEEN APPROACHES.

JOINTS E1 AND E2 THROUGH CURB SHALL BE FILLED WITH PREFORMED FILLER MATERIAL AND SEALED WITH HOT POURED FILLER FOR JOINTS.

JOINT E1 IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH HOT FILLER MATERIAL.

JOINT E2 IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH FILLER OR FILLED WITH HOT POURED FILLER.

PREFORMED FILLER MATERIAL SHALL BE PLACED TO PROVIDE 1" HOT POURED FILLER FOR JOINTS.

THE BARRIER CLASS CURBS MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6 FEET OR LESS. THE R2 WILL BE REQUIRED.

WHERE A SIDEWALK INTERSECTS A CURB. THE SIDEWALK SHALL BE RAMPED NO STEEPER THAN 12:1 SLOPE TO PROVIDED ACCESS FOR WHEELCHAIR ACROSS APPROACHES.

PRECAST TYPE A AND B GUTTER ARE ONLY ALLOWED WHEN CONSTRUCTABILITY ISSUES MAKE CAST IN PLACE NOT PRACTICAL. PRECAST IS ONLY ALLOWED WITH THE APPROVAL OF THE ENGINEER. WHEN ALLOWED BY THE ENGINEER, TYPES A AND B GUTTER MAY BE PRECAST TO CONFORM TO THE DIMENSIONS SHOWN. THE PRECASTER SHALL SUBMIT SHOP DRAWINGS INDICATING THE SECTION LENGTH, SECTION CONNECTION, AND PROPOSED JOINT SEALING SYSTEM. WHEN PRECAST SECTIONS CANNOT CONFORM TO ANY VERTICAL OR HORIZONTAL CURVE THEN CAST IN PLACE IS THE ONLY OPTION. A COMBINATION OF CAST IN PLACE AND PRECAST GUTTER MAY BE PERMITTED.

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NUMBER PE-30042
PROFESSIONAL ENGINEER
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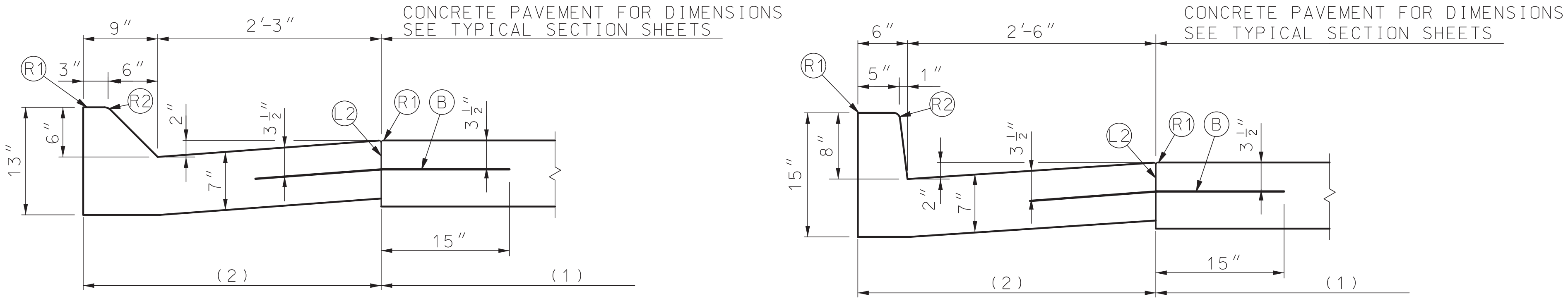
CONCRETE CURB, CURB AND GUTTER AND GUTTER

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

609.00Q

SHEET NO. 1 OF 2

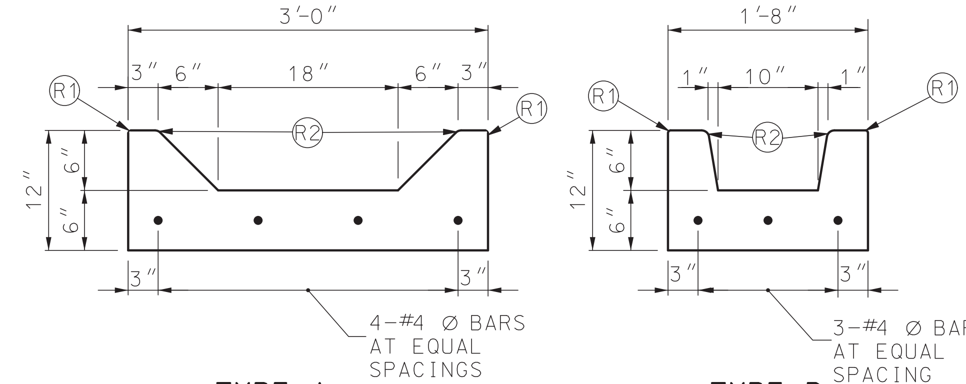
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPE A
(MOUNTABLE)

TYPE B
(BARRIER)

CURB & GUTTER

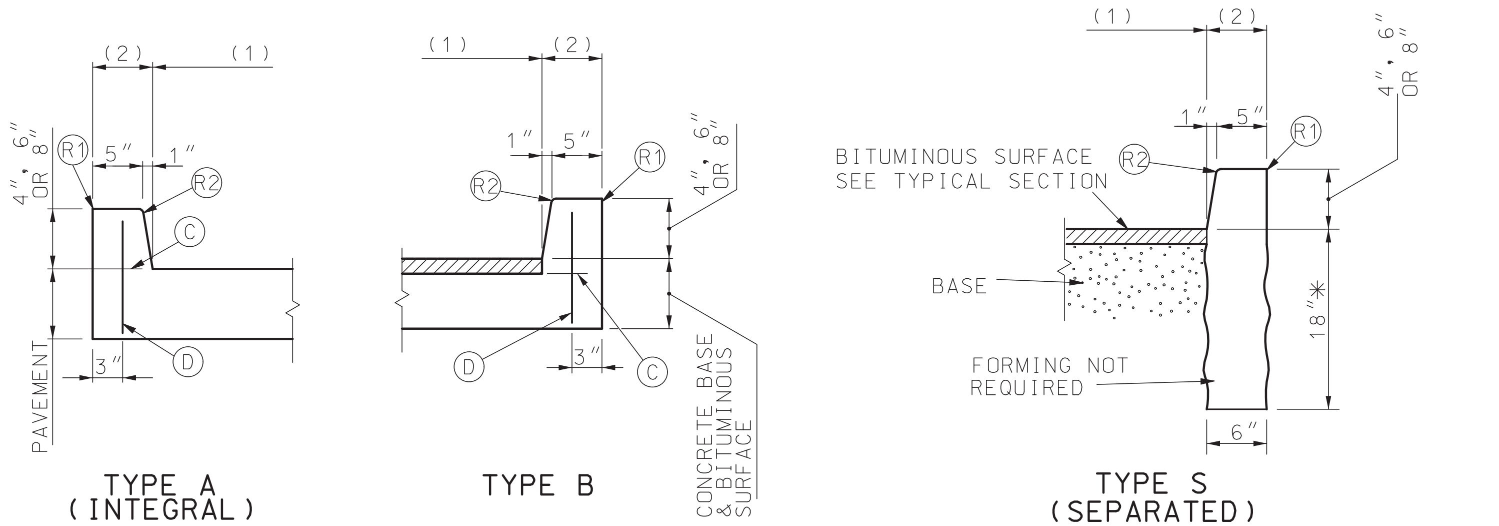


TYPE A

TYPE B

GUTTERS

SEE STANDARD PLAN 607.11 FOR MODIFIED TYPE A AND B GUTTERS



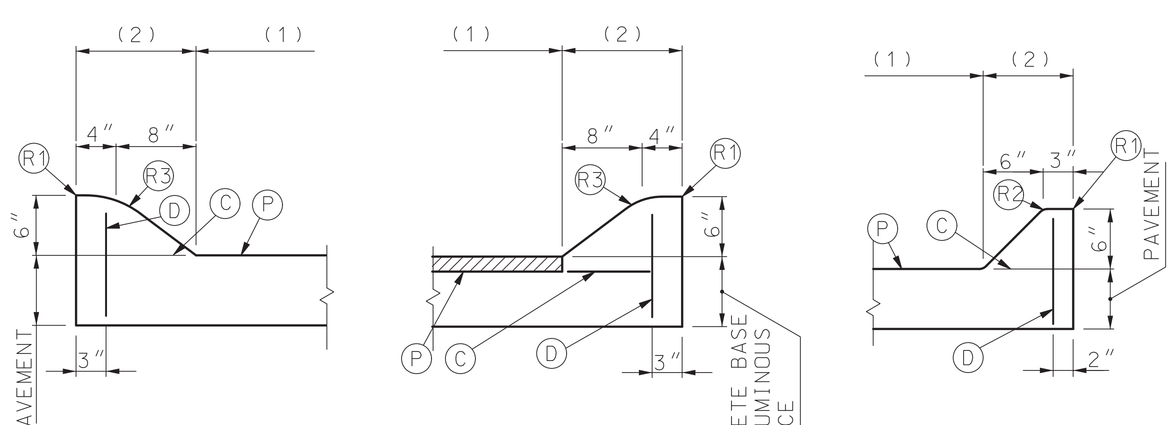
TYPE A
(INTEGRAL)

TYPE B

TYPE S
(SEPARATED)

* DEPTH MAY BE REDUCED IF KEYED 6″ IN ROCK

BARRIER CURBS

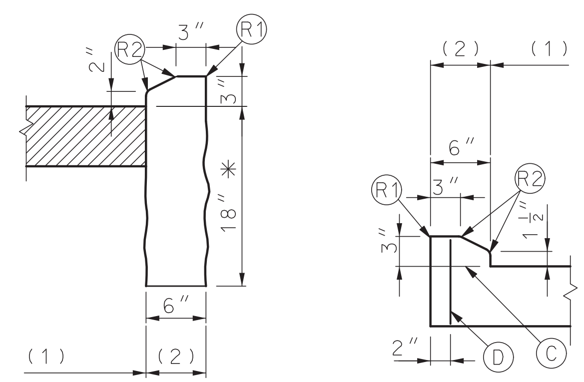


TYPE M
(INTEGRAL)

TYPE N
(INTEGRAL)

TYPE O
(INTEGRAL)

MOUNTABLE CURBS



TYPE F
(SEPARATED)

TYPE E
(INTEGRAL)

BEGINNING AND ENDING OF INTRODUCED LOW PROFILE CURB SHALL UTILIZE CURB HEIGHT RUNOUT FORM 0 INCHES TO 3 INCHES IN 5 FEET. PAYMENT LENGTH SHALL INCLUDE TAPERS.

* DEPTH MAY BE REDUCED IF KEYED 6″ IN ROCK.

LOW PROFILE CURB

LEGEND

- (B) TIE BARS - 30″ X #5 Ø AT 30″ CTRS.
- (C) PERMISSIBLE CONSTRUCTION JOINT. IF CONSTRUCTED IN THIS MANNER TIE BARS MUST BE USED.
- (D) #4 Ø TIE BAR AT 24″ CENTERS LENGTH OF THE TIE BARS EQUALS THICKNESS OF PAVEMENT PLUS HEIGHT OF CURB, LESS 3 INCHES.
- (L2) LONGITUDINAL JOINT WITH TIE BARS.
- (P) TOP OF PAVEMENT OR CONCRETE BASE.
- (R1) ROUND TO ¼″ RADIUS (EXCEPT FOR SAWED JOINTS).
- (R2) ROUND TO ¾″ RADIUS.
- (R3) CONSTRUCT TO 9″ RADIUS.
- (1) PAY LIMIT FOR PAVEMENT
- (2) PAY LIMIT FOR CURB, OR CURB & GUTTER.

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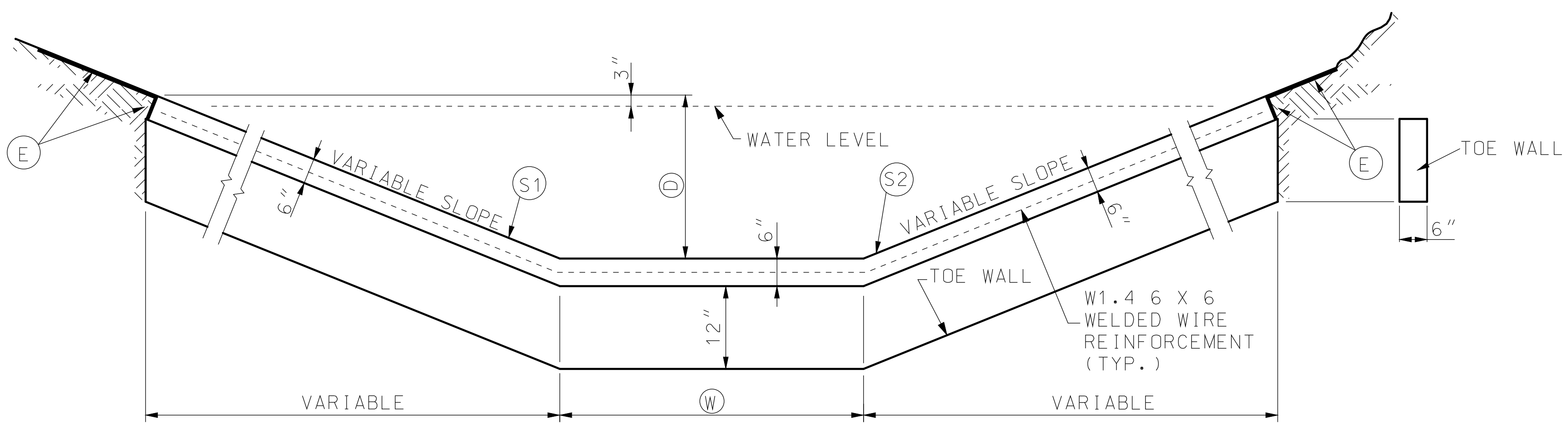
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE CURB, CURB AND GUTTER AND GUTTER

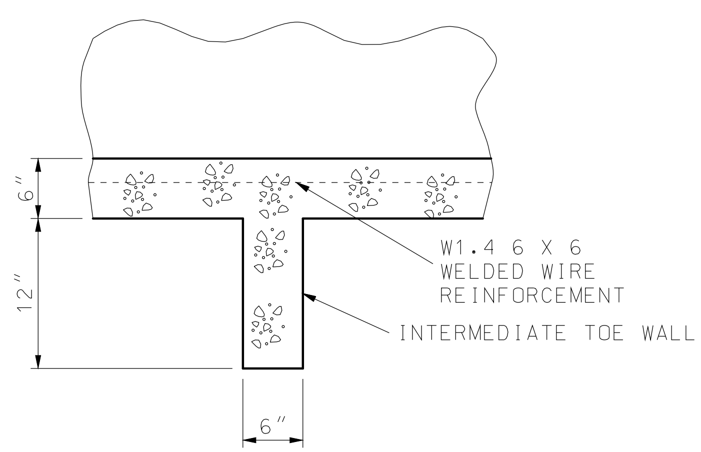
DATE EFFECTIVE:	10/01/2022	609.00Q	SHEET NO. 2 OF 2
DATE PREPARED:	7/19/2022		



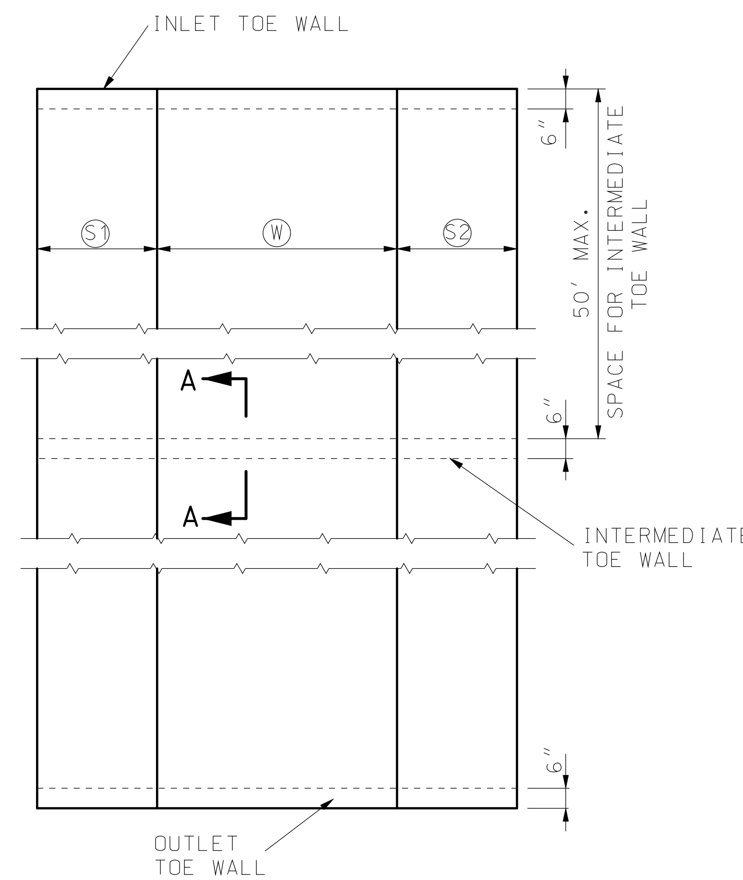
SECTION THROUGH DITCH
(SHOWING TOE WALL)

LEGEND

- (D) VERTICAL PAVED DITCH HEIGHT.
- (E) SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MAT, IF REQUIRED.
- (S1) THE WIDTH OF THE STEEPER SIDEWALL OF ALL DITCHES.
- (S2) THE WIDTH OF THE FLATTER SIDEWALL OF ALL DITCHES.
- (W) THE WIDTH OF THE BOTTOM OF A FLAT BOTTOM DITCH



SECTION A-A



PLAN

GENERAL NOTES:

STEEL WELDED WIRE REINFORCEMENT SHALL BE IN ACCORDANCE WITH SEC 1036.3.3.

SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MATS SHALL BE USED ALONG THE SIDES IF SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

TOE WALLS SHALL BE CONSTRUCTED AT INLET AND OUTLET ENDS OF PAVED DITCHES AND AT 50' MAXIMUM SPACING FOR INTERMEDIATE TOE WALLS.

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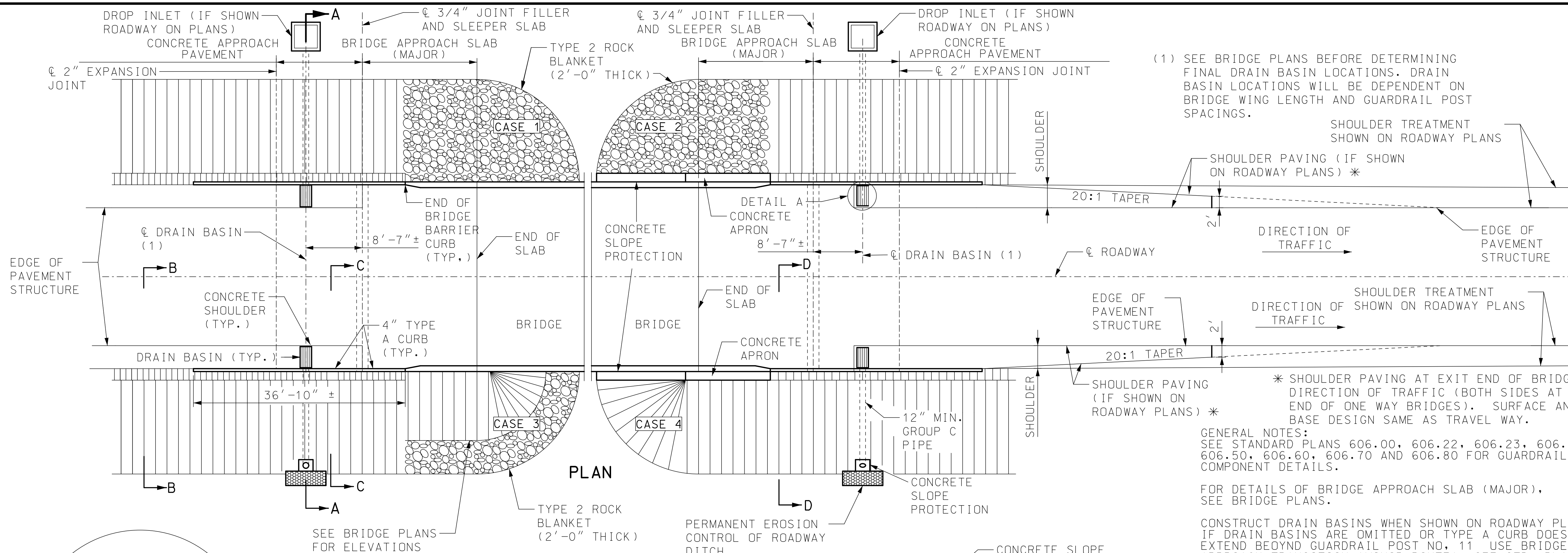
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER
PE-28411
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PAVED DITCHES

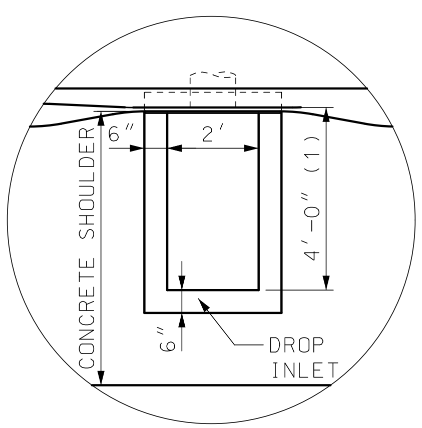
DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016	609.15D	SHEET NO. 1 OF 1

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



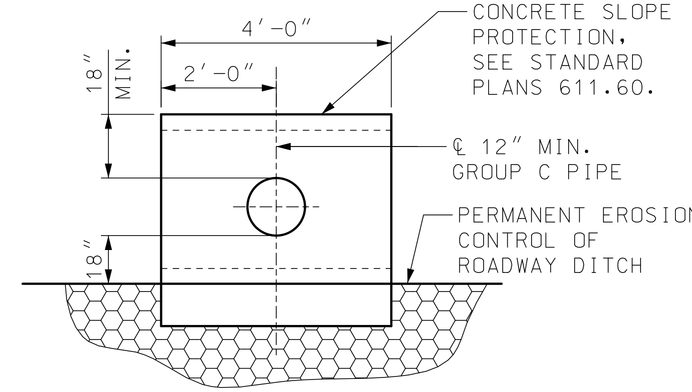
(1) SEE BRIDGE PLANS BEFORE DETERMINING FINAL DRAIN BASIN LOCATIONS. DRAIN BASIN LOCATIONS WILL BE DEPENDENT ON BRIDGE WING LENGTH AND GUARDRAIL POST SPACINGS.

✻ SHOULDER PAVING AT EXIT END OF BRIDGE IN DIRECTION OF TRAFFIC (BOTH SIDES AT EXIT END OF ONE WAY BRIDGES). SURFACE AND BASE DESIGN SAME AS TRAVEL WAY.

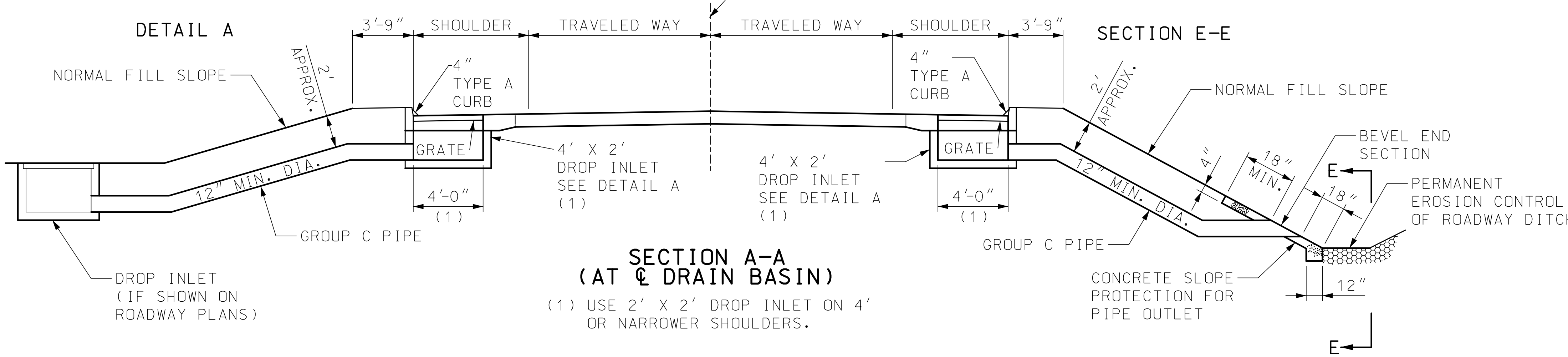


DETAIL A

CASE	FILL SLOPE PROTECTION
1	ROCK BLANKET FILL SLOPE
2	ROCK BLANKET FILL SLOPE WITH CONCRETE SLOPE PROTECTION
3	FILL SLOPE WITH PARTIAL ROCK BLANKET
4	FILL SLOPE WITH CONCRETE SLOPE PROTECTION



SECTION E-E



SECTION A-A
(AT ℄ DRAIN BASIN)

(1) USE 2′ X 2′ DROP INLET ON 4′ OR NARROWER SHOULDERS.

GENERAL NOTES:

SEE STANDARD PLANS 606.00, 606.22, 606.23, 606.30 606.50, 606.60, 606.70 AND 606.80 FOR GUARDRAIL COMPONENT DETAILS.

FOR DETAILS OF BRIDGE APPROACH SLAB (MAJOR), SEE BRIDGE PLANS.

CONSTRUCT DRAIN BASINS WHEN SHOWN ON ROADWAY PLANS. IF DRAIN BASINS ARE OMITTED OR TYPE A CURB DOES NOT EXTEND BEOYND GUARDRAIL POST NO. 11 USE BRIDGE APPROACH TRANSITION (MINOR ROUTE), SEE STD. PLAN 606.60 SHEET 2 OF 6.

TYPE A CURB IS TO BE CONSTRUCTED TO THE END OF THE BRIDGE APPROACH TRANSITION WHEN DRAIN BASINS ARE REQUIRED. SEE STANDARD PLANS 609.00 FOR TYPE A CURB.

SEE STANDARD PLANS 504.00 FOR DETAILS OF CONCRETE APPROACH PAVEMENT.

FOR DETAILS OF GRATES AND BEARING PLATES FOR DROP INLET, SEE STANDARD PLANS 614.10 AND 614.11.

FOR DETAILS OF DROP INLET FOR ROADWAY SURFACE, SEE STANDARD PLANS 731.10. USE TYPE A DROP INLET AND USE DEPTH OF DROP INLET AS SHOWN ON ROADWAY PLANS.

PAYMENT FOR DROP INLET, GRATE, GROUP C PIPE, CONCRETE SLOPE PROTECTION AT PIPE OUTLETS, MATERIAL AND INSTALLATION WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR DRAIN BASIN PER EACH.

FOR DETAILS OF SECTION B-B, C-C AND D-D, SEE SHEET 2 OF 3.

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JEFFERSON CITY, MO 65102
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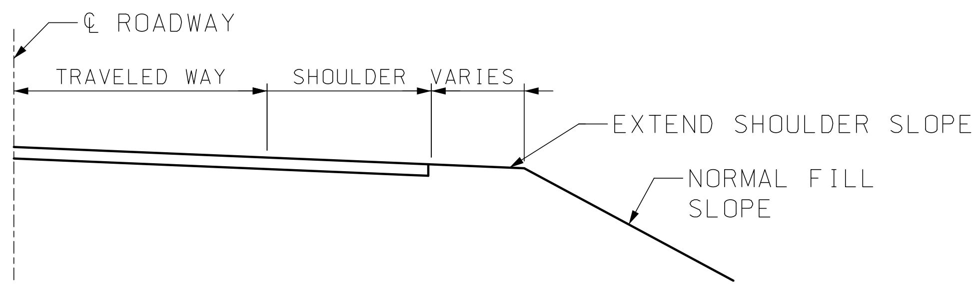
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DRAIN BASIN, SHOULDER PAVING AND FILL SLOPES AT BRIDGE ENDS (MAJOR ROUTE)

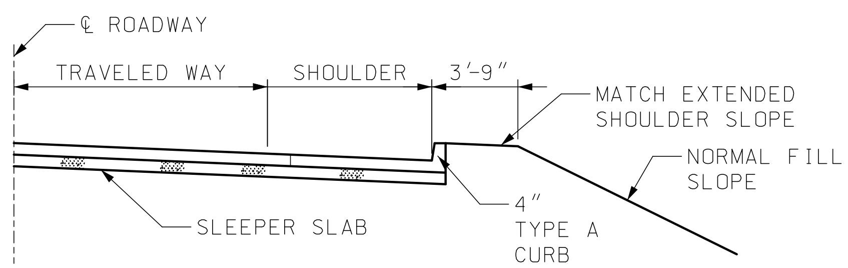
DATE EFFECTIVE: 01/01/2022
DATE PREPARED: 10/21/2021

609.40S

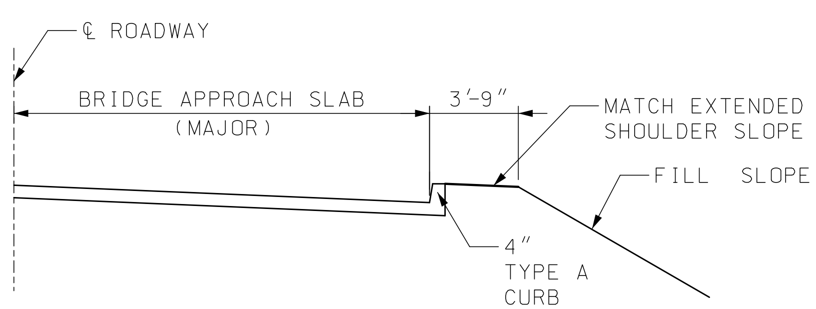
SHEET NO. 1 OF 3



SECTION B-B

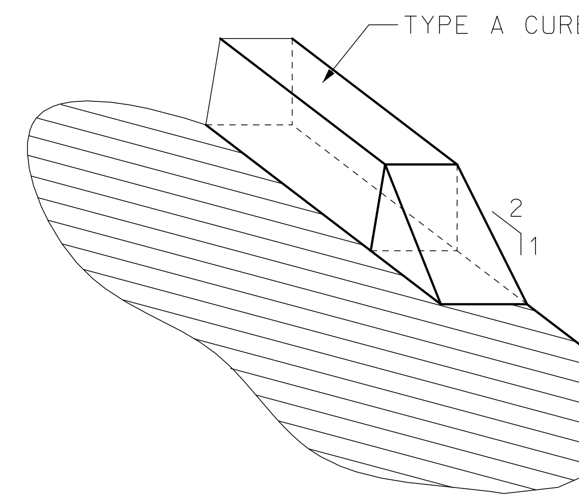


SECTION C-C



SECTION D-D

NOTE: FOR DETAILS NOT SHOWN,
SEE OTHER SECTIONS.



TYPE A CURB
TRANSITION DETAIL

GENERAL NOTE:

FOR LOCATION OF SEC. B-B, C-C AND D-D, SEE
SHEET 1 OF 3.

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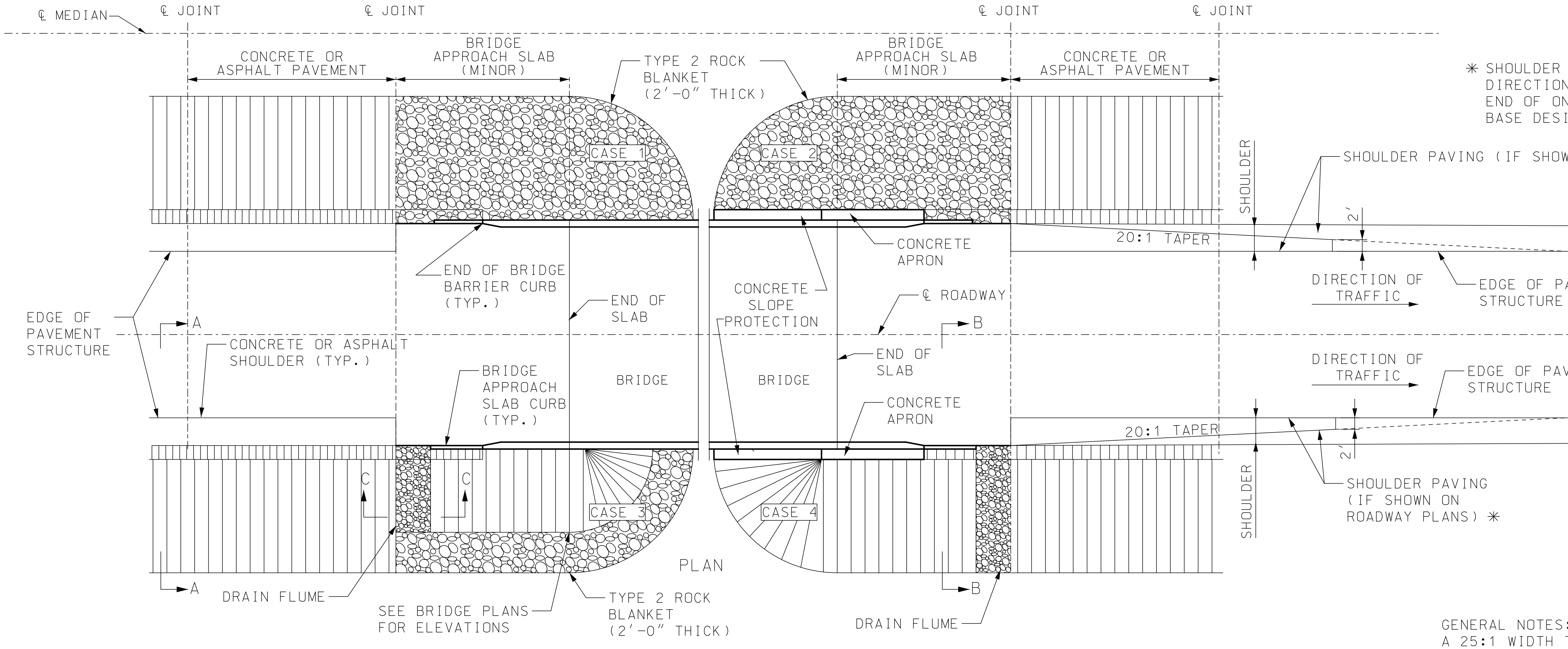
STATE OF MISSOURI
TRAVIS D.
KOESTNER
NUMBER
PE-30042
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

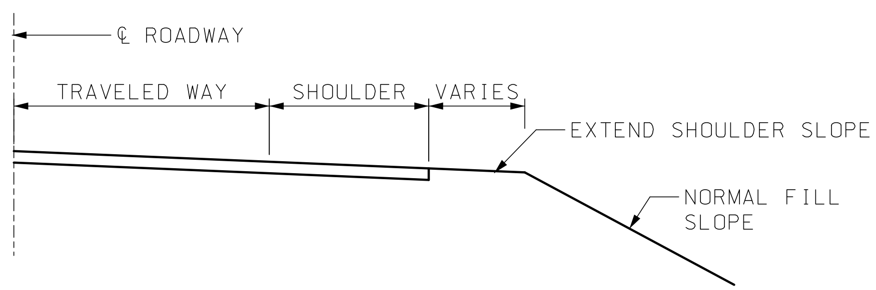
DRAIN BASIN, SHOULDER
PAVING AND FILL
SLOPE AT BRIDGE ENDS
(MAJOR ROUTE)

DATE EFFECTIVE: 10/01/2021 DATE PREPARED: 7/13/2021	609.40S	SHEET NO. 2 OF 3

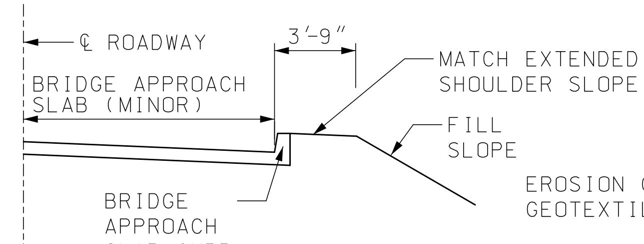


✳ SHOULDER PAVING AT EXIT END OF BRIDGE IN DIRECTION OF TRAFFIC (BOTH SIDES AT EXIT END OF ONE WAY BRIDGES). SURFACE AND BASE DESIGN SAME AS TRAVEL WAY.

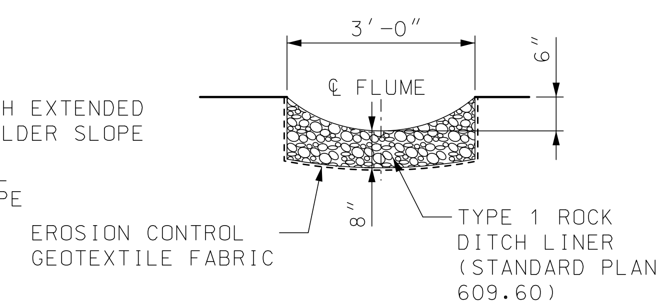
CASE	FILL SLOPE PROTECTION
1	ROCK BLANKET FILL SLOPE
2	ROCK BLANKET FILL SLOPE WITH CONCRETE SLOPE PROTECTION
3	FILL SLOPE WITH PARTIAL ROCK BLANKET
4	FILL SLOPE WITH CONCRETE SLOPE PROTECTION



SECTION A-A



SECTION B-B



SECTION C-C

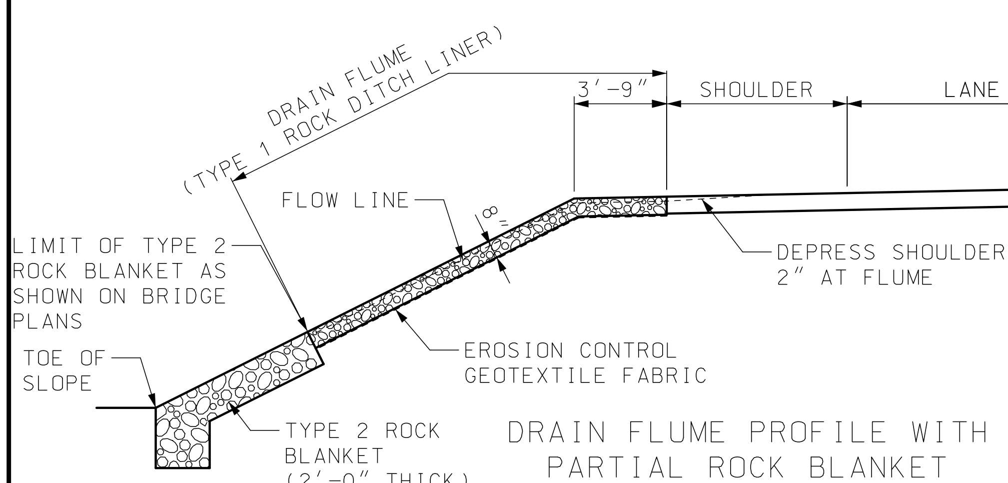
GENERAL NOTES:
A 25:1 WIDTH TAPER MUST BE PROVIDED IMMEDIATELY BEYOND THE LIMITS OF CURB AS SHOWN IN ORDER TO TRANSITION ROADWAY WIDTH TO WIDTH BETWEEN GUARDRAIL FACES ON PAVEMENT.

SEE STANDARD PLANS 606.00, 606.22, 606.23, 606.30, 606.50, 606.60, 606.70 AND 606.80 FOR DETAILS OF GUARDRAILS AND BRIDGE ANCHOR SECTIONS.

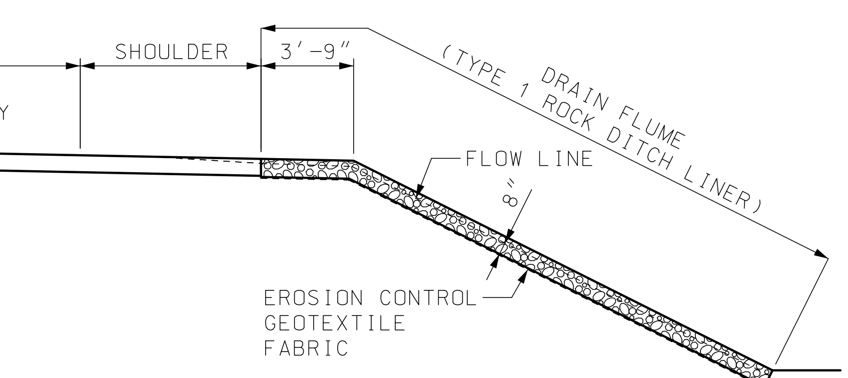
FOR DETAILS OF BRIDGE APPROACH SLAB (MINOR ROAD), SEE BRIDGE PLANS.

CONSTRUCT DRAIN FLUMES AND OR FILL SLOPE PROTECTION WHEN SHOWN ON ROADWAY PLANS.

PAYMENT FOR FURNISHING ALL MATERIALS, LABOR AND EXCAVATION NECESSARY TO CONSTRUCT THE DRAIN FLUMES, INCLUDING THE PERMANENT EROSION CONTROL GEOTEXTILE, COMPLETE-IN-PLACE, WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR TYPE 1 ROCK DITCH LINER.



DRAIN FLUME PROFILE WITH PARTIAL ROCK BLANKET



DRAIN FLUME PROFILE WITHOUT ROCK BLANKET

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

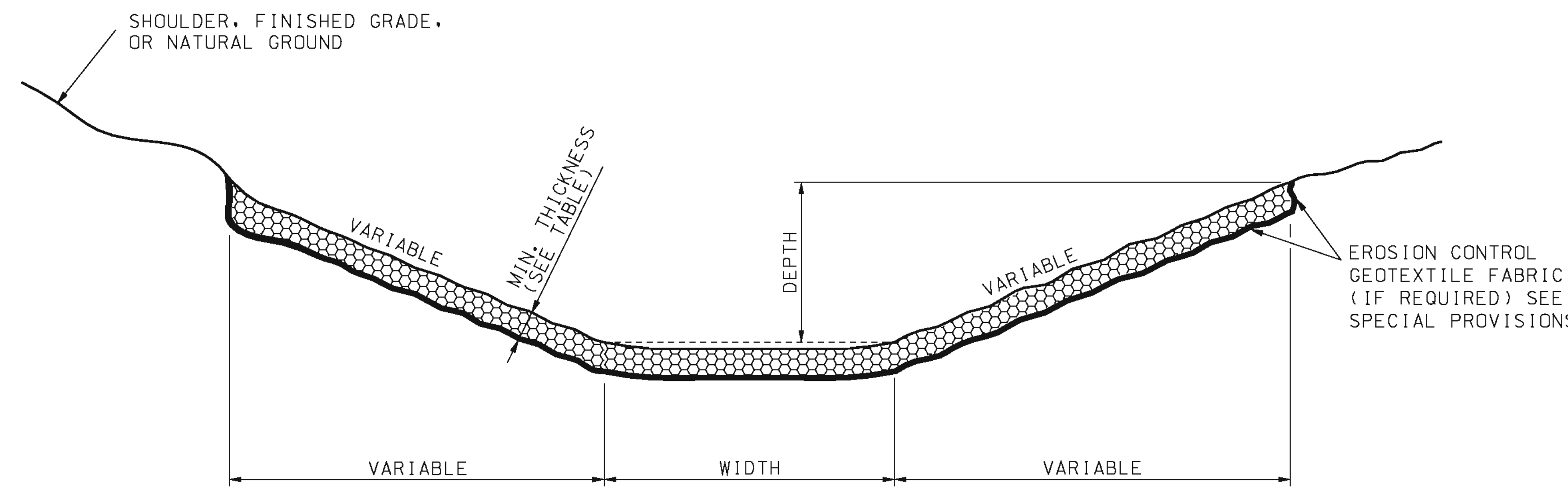
DRAIN FLUME, SHOULDER PAVING AND FILL SLOPES AT BRIDGE ENDS
(MINOR AND LOW VOLUME ROUTES)

DATE EFFECTIVE: 01/01/2022
DATE PREPARED: 10/21/2021

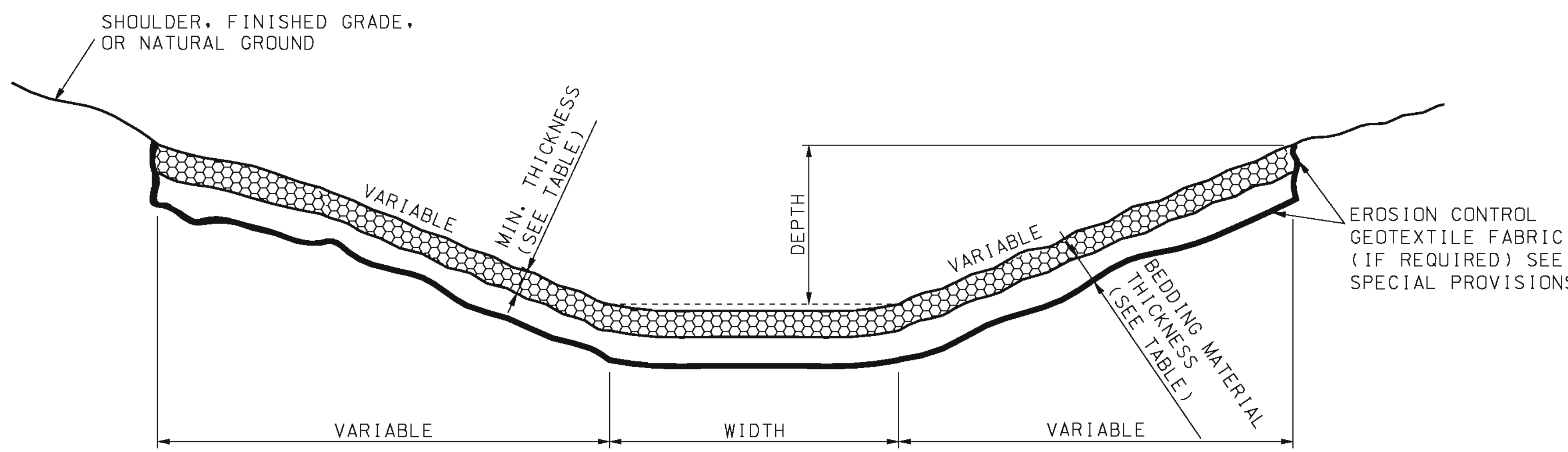
609.40S

SHEET NO. 3 OF 3

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



FLAT BOTTOM DITCH
WITHOUT BEDDING MATERIAL



FLAT BOTTOM DITCH
WITH BEDDING MATERIAL

TYPICAL DITCH LINER DETAILS

TYPE	ROCK DITCH LINER MIN. THICKNESS	BEDDING MATERIAL MIN. THICKNESS
1	8″	--
2	12″	--
3	22″	8″
4	30″	12″

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

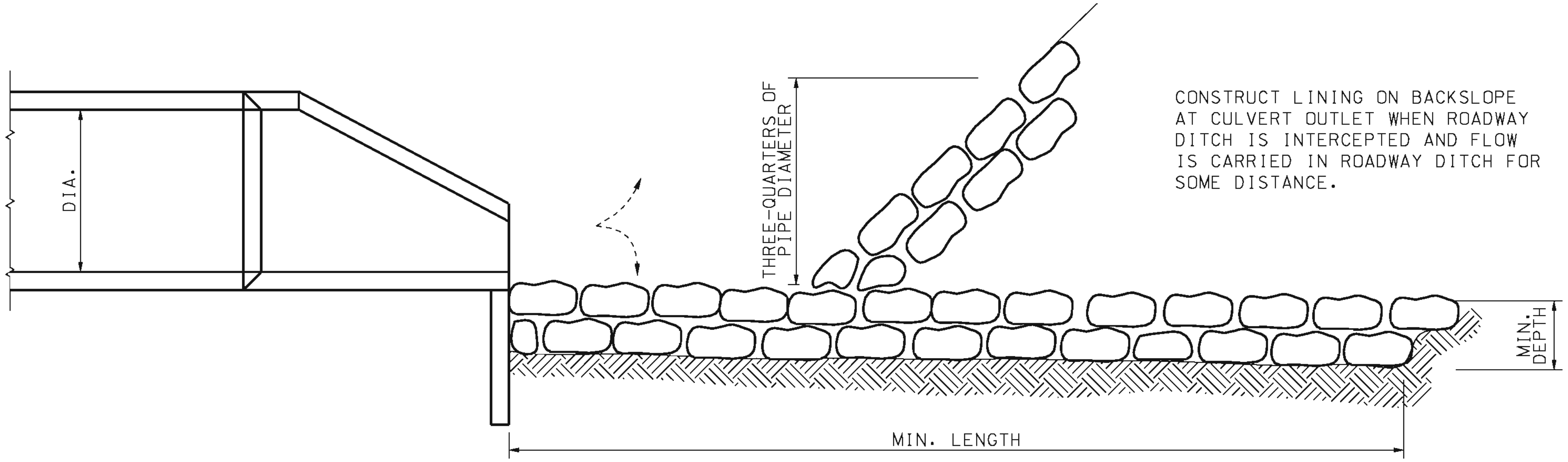
ROCK DITCH LINER

DATE EFFECTIVE: 03/01/1993
DATE PREPARED: 8/21/2009

609.60C

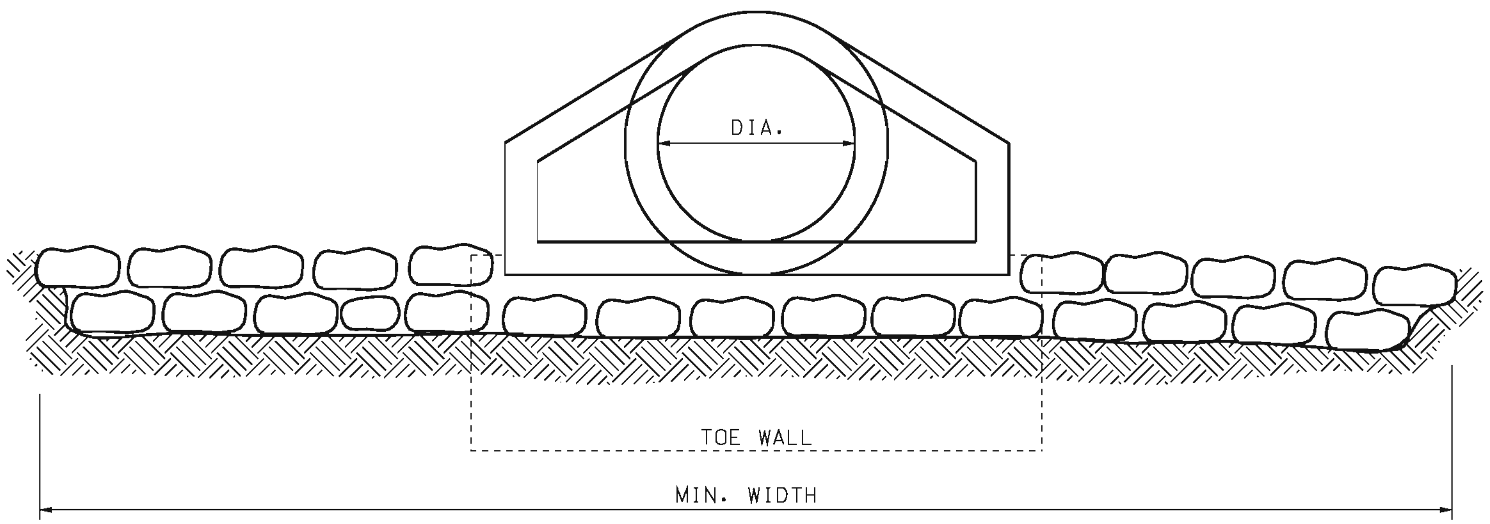
SHEET NO.
1 OF 1

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

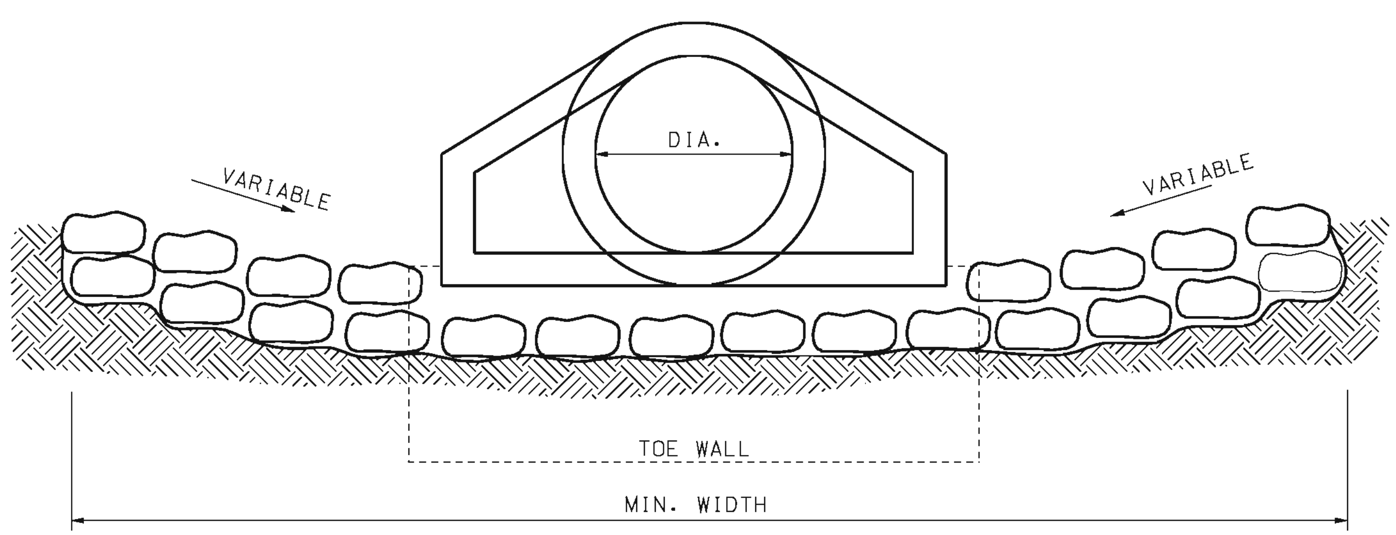


CONSTRUCT LINING ON BACKSLOPE AT CULVERT OUTLET WHEN ROADWAY DITCH IS INTERCEPTED AND FLOW IS CARRIED IN ROADWAY DITCH FOR SOME DISTANCE.

SIDE VIEW



END VIEW



END VIEW (ALTERNATE METHOD)

ROCK LINING FOR CULVERT OUTLETS

CULVERT SIZE, DIA (IN.)	MINIMUN DEPTH AND WIDTH (FT.)	MINIMUM LENGHT (FT.)	ROCK LINING (CU.YD.)	EQUIVALENT PIPE ARCH CULVERT (APPROX.)	EQUIVALENT CONCRETE BOX CULVERT (APPROX.)
18	1 X 4	12	2		
24	1 X 6	14	3		2′ X 1½′
30	1 X 7	16	4	B-5	2′ X 2′
36	1.5 X 9	18	9	B-6	3′ X 2′
42	2 X 10	20	15	B-7	3′ X 3′
48	2 X 12	20	18	B-8	4′ X 3′
54	2 X 13.5	22	22	B-9	4′ X 4′
60	2 X 15	25	28	B-10	5′ X 4′
66	2 X 18	25	33	B-11	5′ X 5′
72	2 X 20	30	44	B-12	5′ X 6′
84	2.5 X 25	35	81		6′ X 6′
96	2.5 X 30	40	111		7′ X 7′
108	3 X 32	40	142		8′ X 8′

GENERAL NOTES:

THE DIMENSIONS SHOWN IN THE TABLE CAN BE APPLIED TO BOX OR ARCH CULVERTS OF EQUIVALENT WATERWAY AREA.

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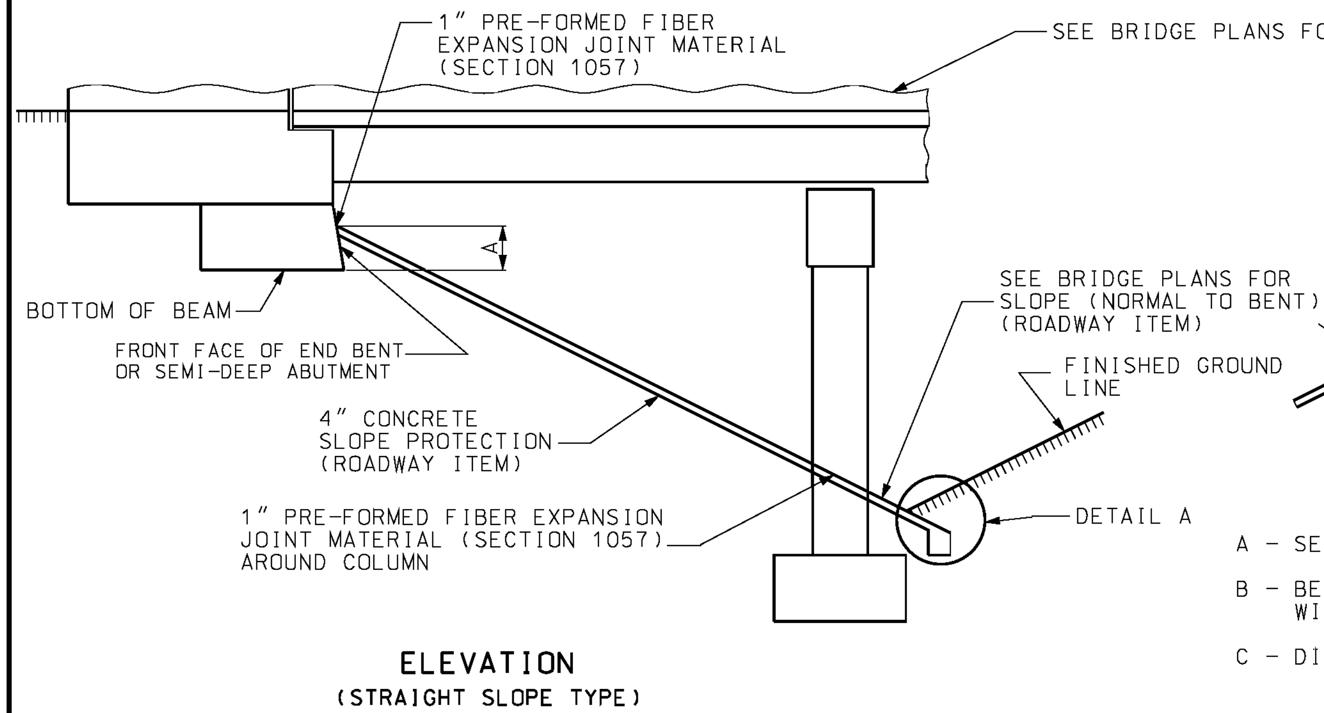
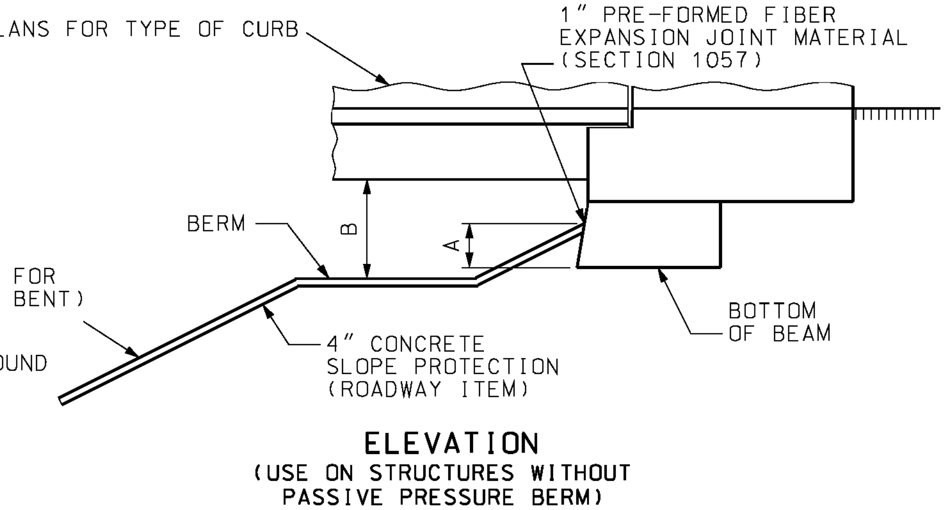
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

ROCK LINING FOR CULVERT OUTLET

DATE EFFECTIVE: 10/01/1981
DATE PREPARED: 8/21/2009
609.70C



ELEVATION
(STRAIGHT SLOPE TYPE)

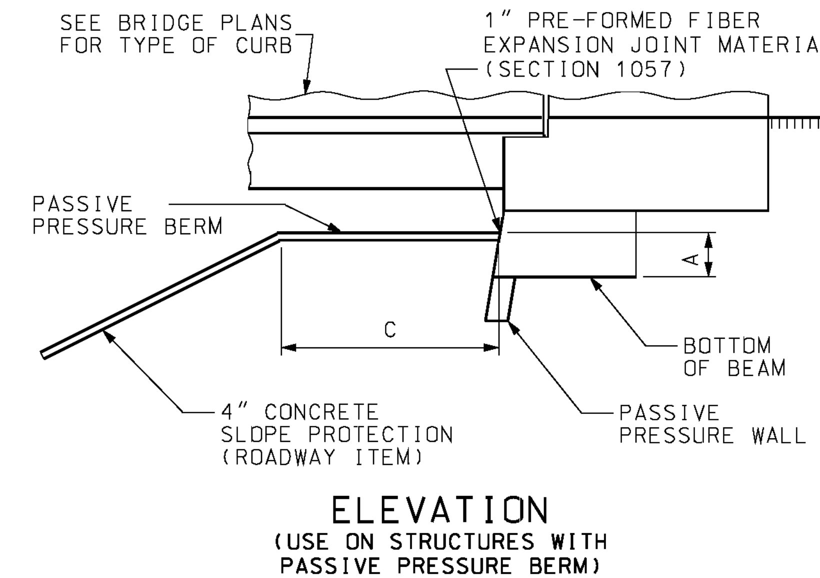


ELEVATION
(USE ON STRUCTURES WITHOUT PASSIVE PRESSURE BERM)

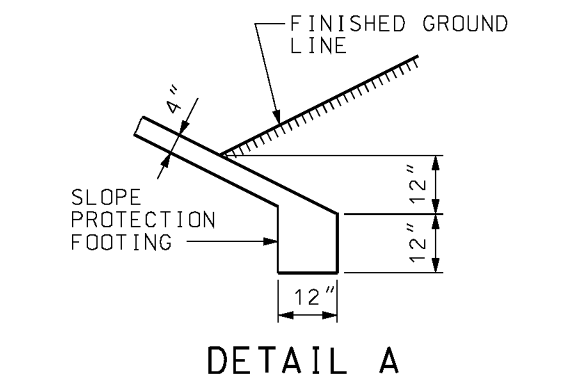
A - SEE BRIDGE PLANS

B - BERM SHALL BE CONSTRUCTED TO ELEVATION SHOWN ON PLANS WITH A MINIMUM OF 4'-0" BELOW BOTTOM OF SUPERSTRUCTURE.

C - DIMENSION OF BERM (SEE BRIDGE PLANS).



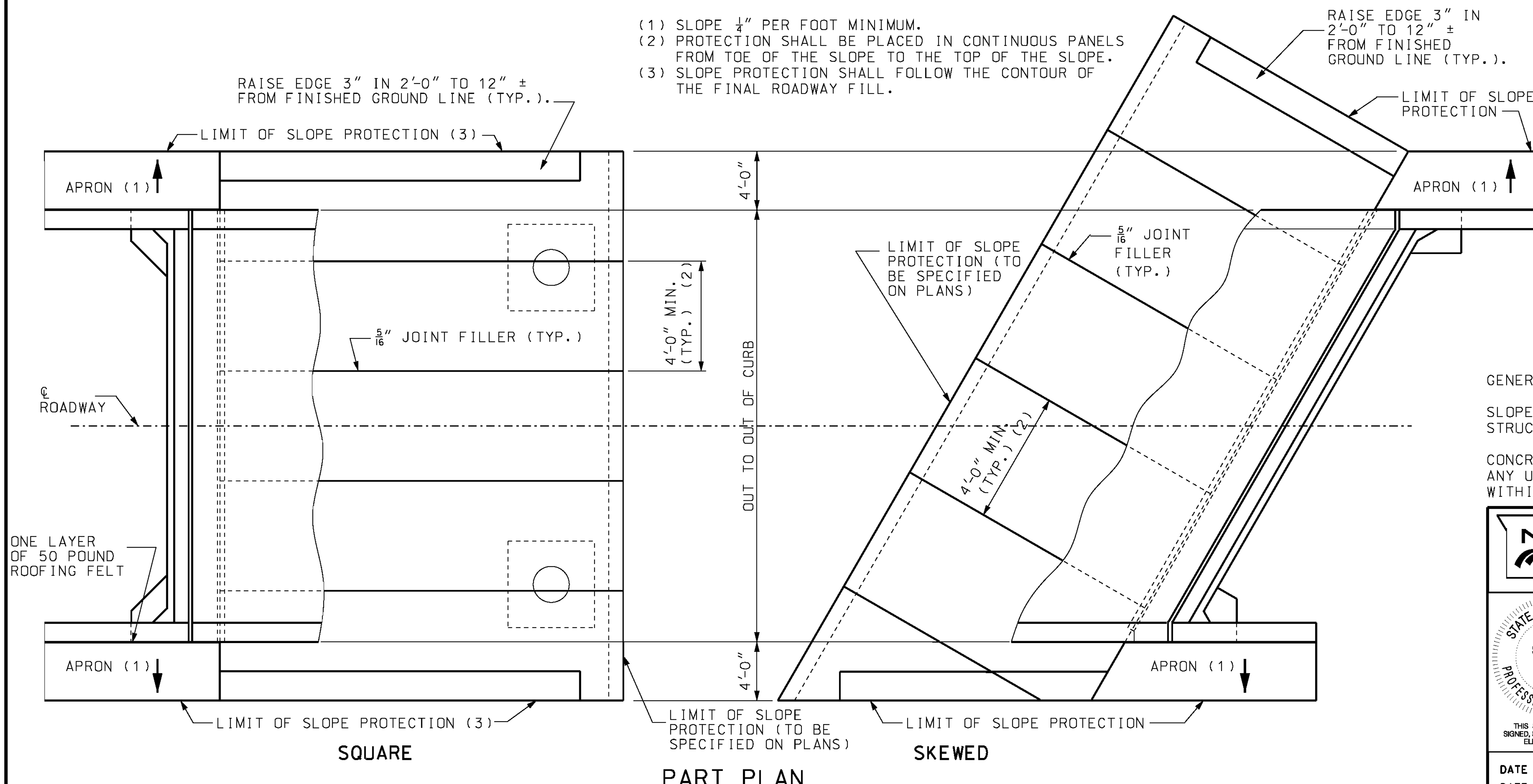
ELEVATION
(USE ON STRUCTURES WITH PASSIVE PRESSURE BERM)



DETAIL A

NOTE:
IF SLOPE PROTECTION FOOTING FALLS ON OR AROUND OTHER FOOTINGS, ONE LAYER OF 50# ROOFING FELT SHALLBE PLACED BETWEEN CONTACT SURFACES OF FOOTINGS.

(1) SLOPE ¼" PER FOOT MINIMUM.
(2) PROTECTION SHALL BE PLACED IN CONTINUOUS PANELS FROM TOE OF THE SLOPE TO THE TOP OF THE SLOPE.
(3) SLOPE PROTECTION SHALL FOLLOW THE CONTOUR OF THE FINAL ROADWAY FILL.



PART PLAN

GENERAL NOTES:

SLOPE PROTECTION SHALL BE MADE CONTINUOUS BETWEEN STRUCTURES WHEN MEDIAN IS 60' OR LESS.

CONCRETE SLOPE PROTECTION SHALL BE FORMED AROUND ANY UNDISTURBED ROCK THAT IS PERMITTED TO REMAIN WITHIN THE SLOPE PROTECTION AREA.

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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

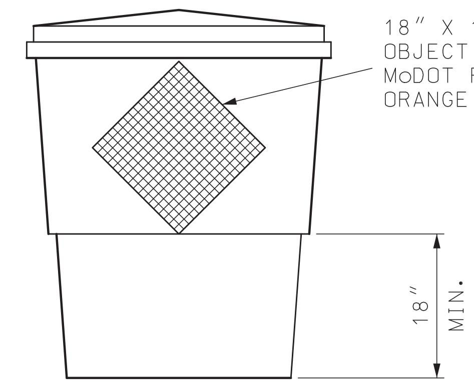
CONCRETE SLOPE PROTECTION

DATE EFFECTIVE:	07/01/2015	611.60R	SHEET NO. 1 OF 1
DATE PREPARED:	5/29/2015		

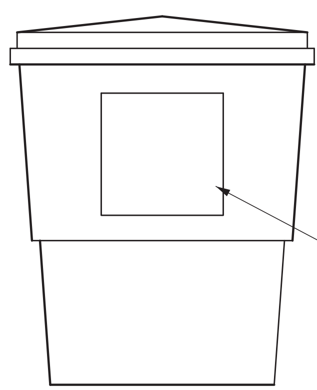
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

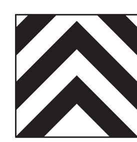
ATTENUATOR LAYOUT:

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

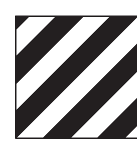


TYPE I OBJECT MARKER PLACEMENT FOR TEMPORARY INSTALLATIONS





TRAFFIC PASSING
TO BOTH LEFT AND RIGHT



TRAFFIC PASSING TO LEFT
FLIP FOR TRAFFIC TO RIGHT

TYPE 3 OBJECT MARKER PLACEMENT FOR PERMANENT INSTALLATIONS

GENERAL NOTES:

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

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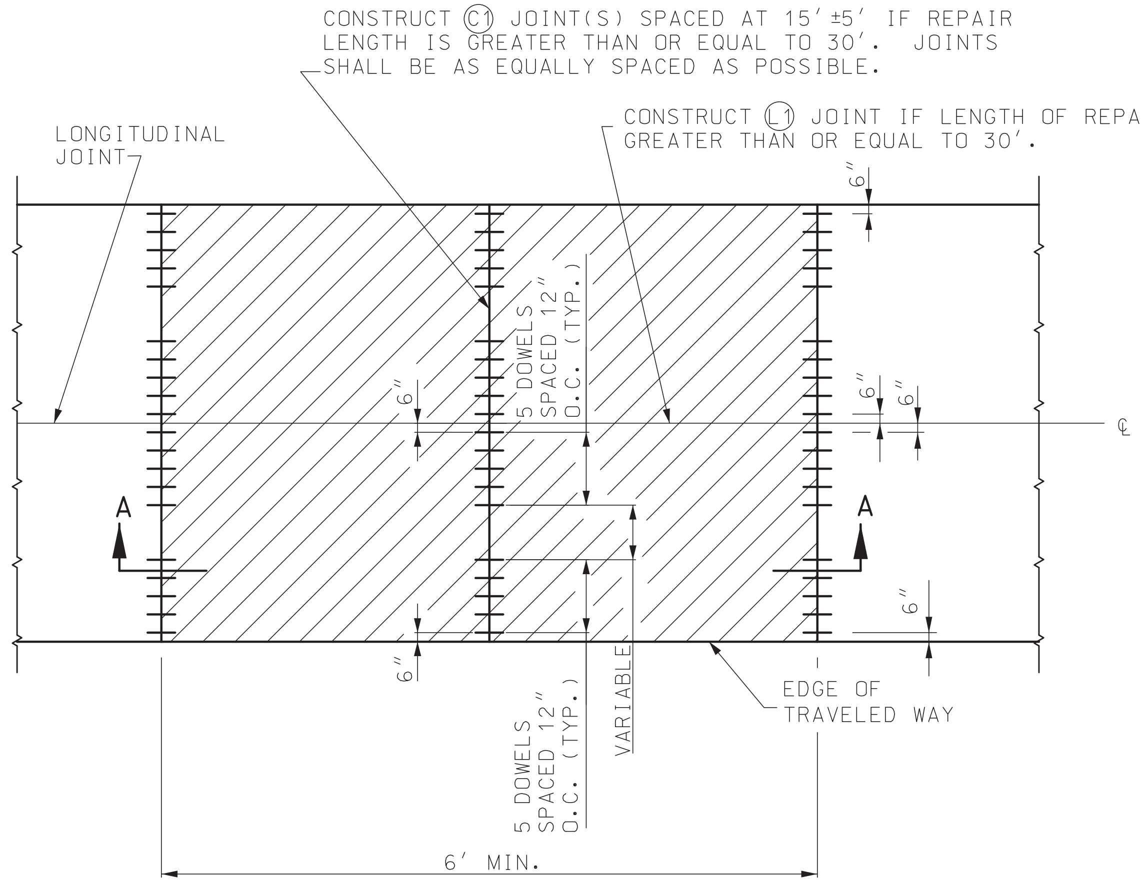
ERIC E. SCHROETER
NUMBER
PE-28411
PROFESSIONAL ENGINEER

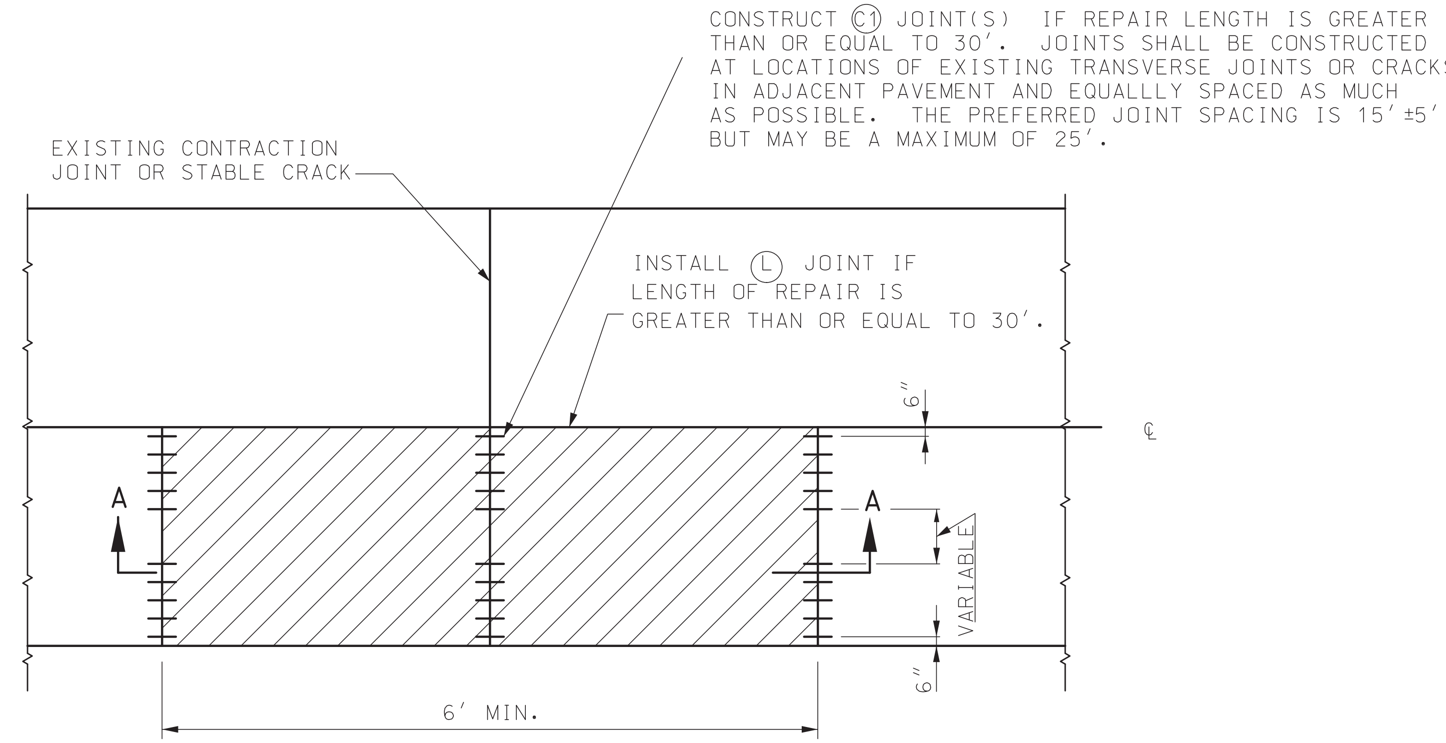
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SAND FILLED IMPACT ATTENUATORS

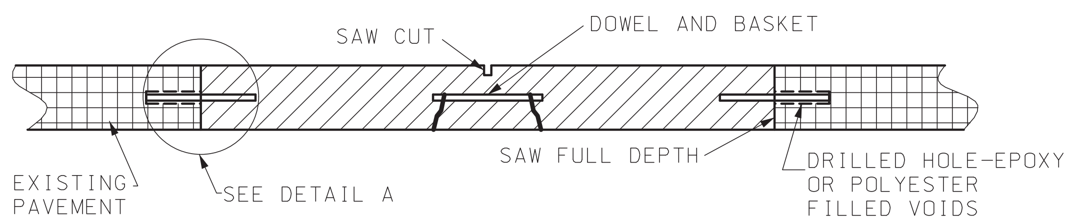
DATE EFFECTIVE:	10/01/2018	612.20E	SHEET NO.
DATE PREPARED:	7/31/2018		1 OF 1



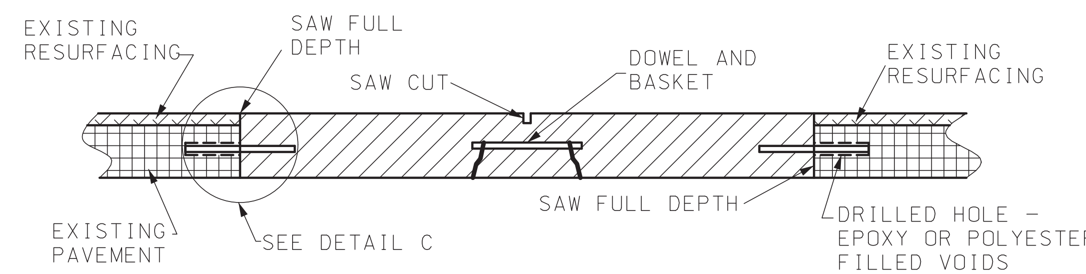
TWO OR MORE LANES



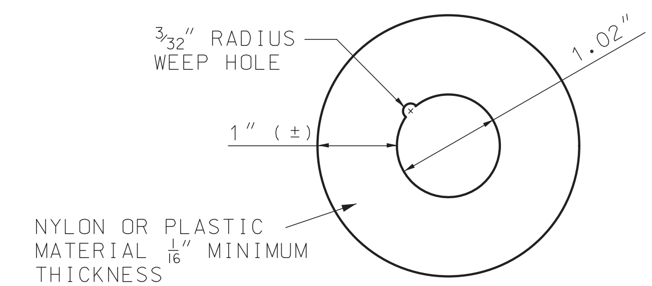
ONE LANE



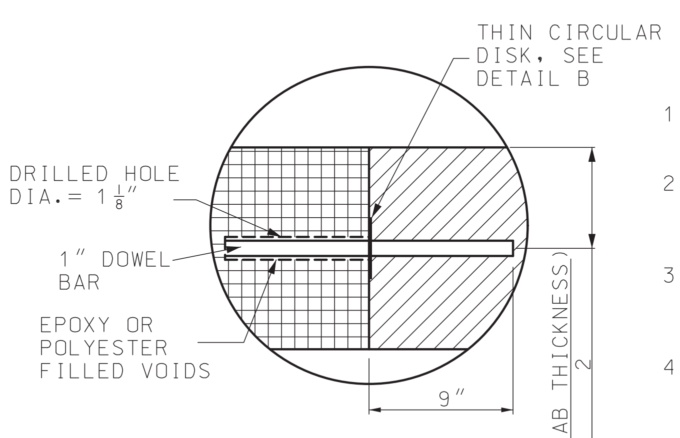
SECTION A-A



SECTION A-A ALTERNATE WITH ASPHALT OVERLAY

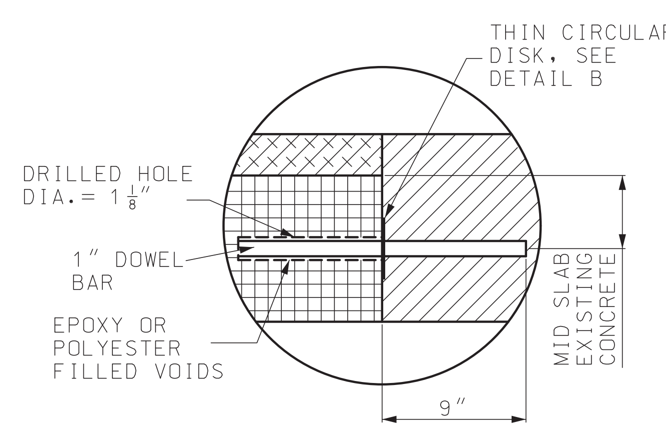


DETAIL B
THIN CIRCULAR DISK



DETAIL A

1. SMOOTH EPOXY COATED DOWELS SHALL BE USED IN ALL FULL DEPTH PAVEMENT REPAIR TRANSVERSE JOINTS.
2. THE ANCHORING MATERIAL (EPOXY OR POLYESTER) SHALL BE PLACED TO THE BACK OF THE PREDRILLED HOLE BEFORE INSERTING THE DOWEL BAR.
3. THE DOWEL IS INSERTED INTO THE HOLE WITH A TWISTING MOTION SO THAT THE MATERIAL IN THE BACK OF THE HOLE IS FORCED UP AND AROUND THE BAR.
4. EXPOSED END OF DOWEL SHALL BE COATED WITH A THIN UNIFORM COAT OF GRAPHITE GREASE. DOWEL BASKET ASSEMBLIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD PLAN 502.10. IN LIEU OF GRAPHITE GREASE, THE DOWEL BAR BASKET SUPPLIER MAY PROVIDE COMPLETED BASKET UNITS PRE-DIPPED IN AN APPROVED BONDBREAKER.
5. REPAIR ONLY ONE LANE AT A TIME.



DETAIL C

GENERAL NOTES:

ALL SAW CUTS SHALL BE MADE WITH A DIAMOND SAW EXCEPT THE CENTER RELIEF CUT.

FOR DETAILS OF TYPE C, L AND L1 JOINTS. SEE STANDARD PLAN 502.05.

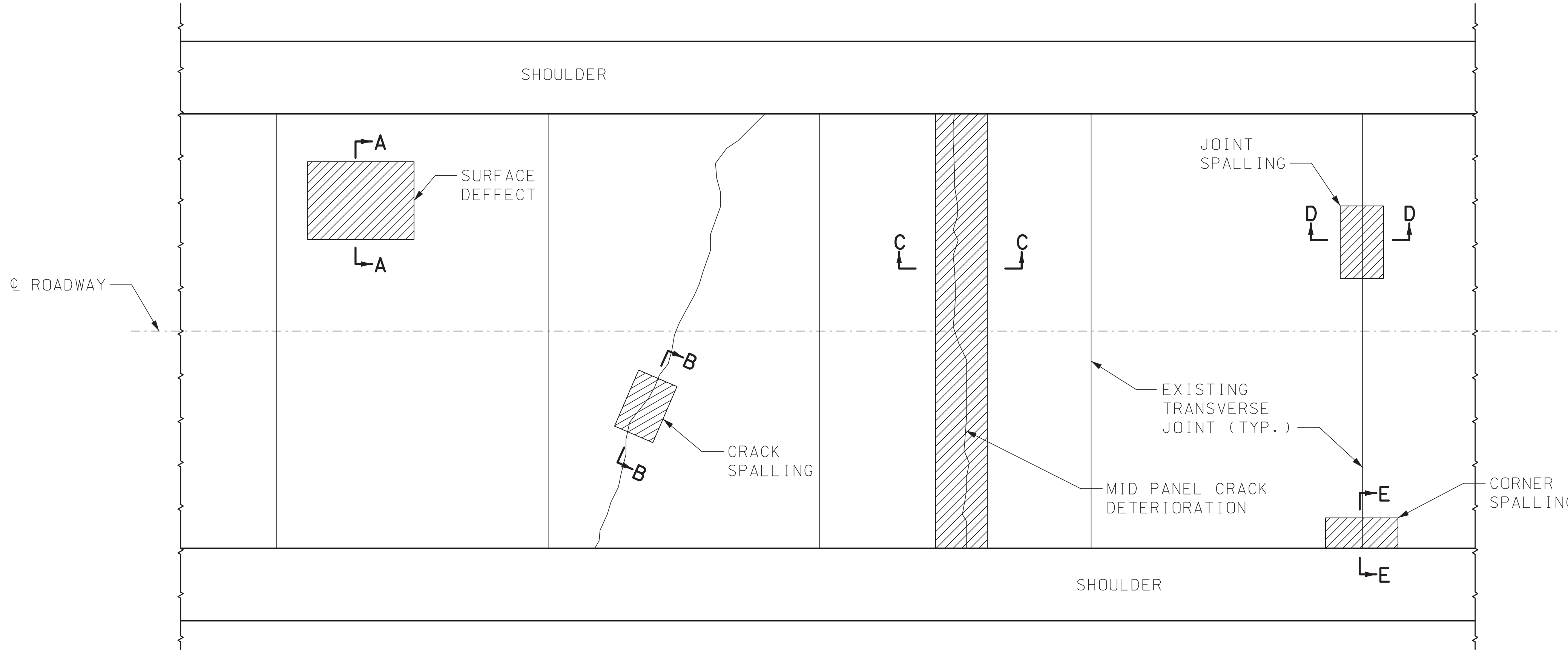
NON-REINFORCED AND REINFORCED PORTLAND CEMENT CONCRETE

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.

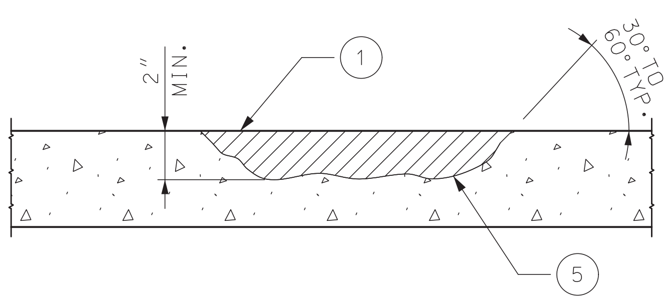
PAVEMENT REPAIR
FULL DEPTH

DATE EFFECTIVE:	01/01/2020	613.00T	SHEET NO. 1 OF 4
DATE PREPARED:	10/17/2019		

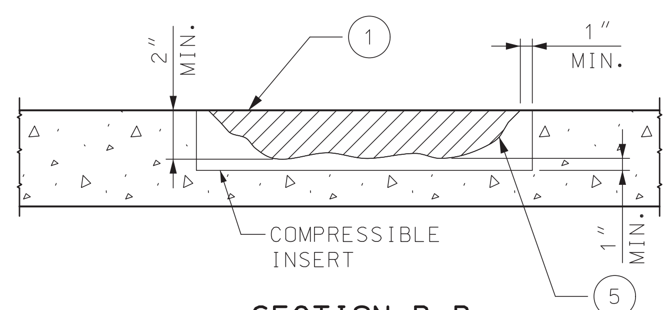


PLAN VIEW

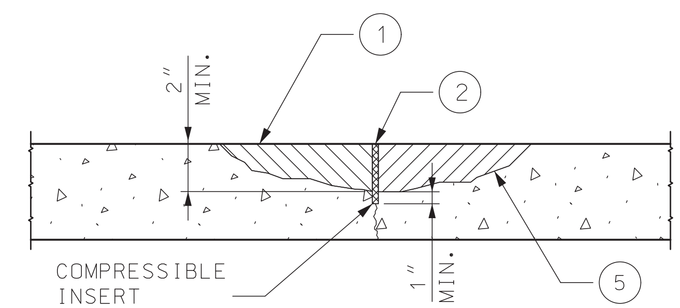
1. REMOVE ALL CONCRETE, TO LIMITS SHOWN, TO MAX. OF $\frac{1}{2}$ THE PAVEMENT DEPTH OR TOP OF DOWELS BY MILLING.
2. PLACE COMPRESSIBLE INSERT IN JOINT OR CRACK. INSERT SHALL BE THICKNESS OF JOINT OR CRACK WIDTH, BUT NOT LESS THAN $\frac{1}{4}$".
3. CHIP VERTICAL REPAIR EDGES AT APPROXIMATE 1:1 SLOPE.
4. PLACE $\frac{1}{8}$" MIN. COMPRESSIBLE INSERT ADJACENT TO LONGITUDINAL LANE OR SHOULDER JOINT.
5. EXPOSED SURFACE SHALL BE CLEANED BY SANDBLASTING OR SHOTBLASTING.
6. EXPOSED SURFACE OF DOWEL BARS SHALL BE COATED WITH AN APPROVED BONDBREAKER.



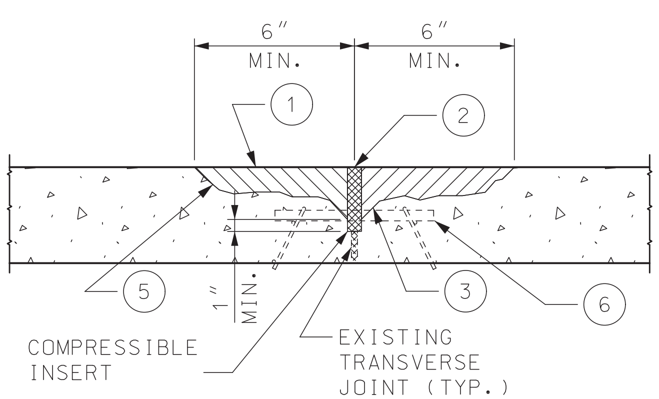
SECTION A-A



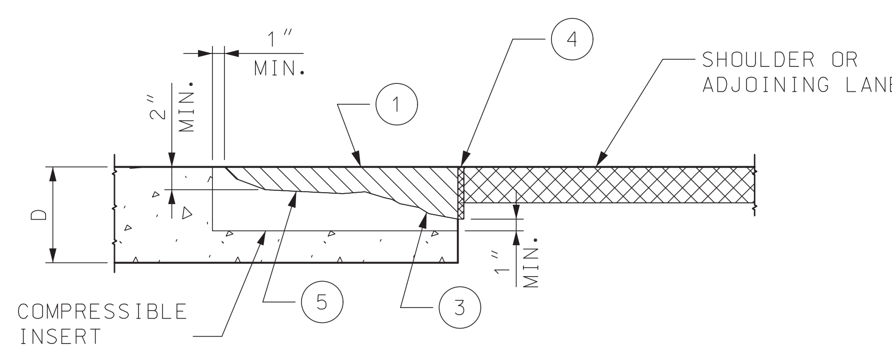
SECTION B-B



SECTION C-C



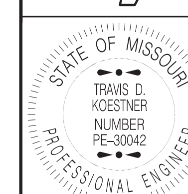
SECTION D-D



SECTION E-E

AREA TO BE REMOVED

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



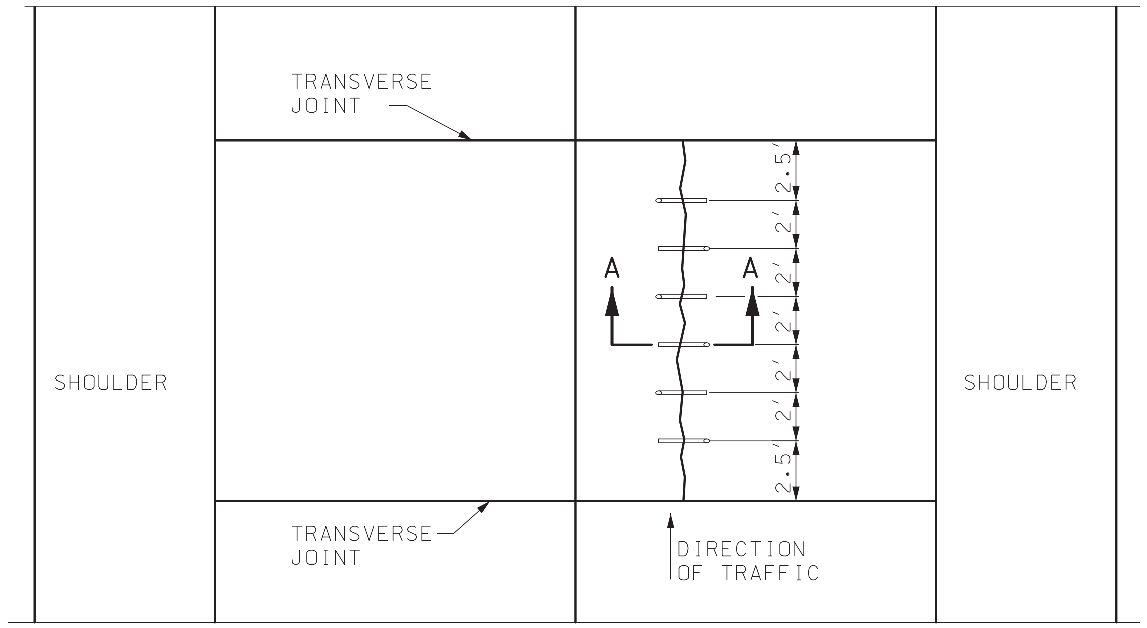
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PAVEMENT REPAIR

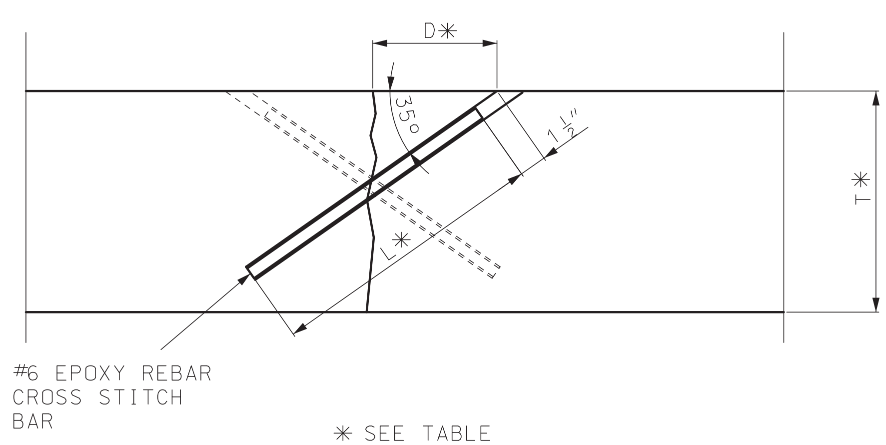
PARTIAL DEPTH CLASS A

DATE EFFECTIVE:	01/01/2020	613.00T	SHEET NO.
DATE PREPARED:	10/17/2019		2 OF 4

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



CROSS STITCHING PLAN



✳ SEE TABLE

T	SLAB THICKNESS (IN)	8	9	10	11	12
D	DISTANCE TO HOLE (IN)	$5\frac{3}{4}$	$6\frac{1}{2}$	$7\frac{1}{4}$	$8\frac{1}{2}$	$8\frac{1}{2}$
L	LENGTH OF BAR (IN)	$8\frac{1}{2}$	11	$12\frac{1}{2}$	14	16

SECTION A-A

GENERAL NOTES:

AT EACH REPAIR LOCATION, HOLES SHALL BE DRILLED AT 35° ANGLES TO THE PAVEMENT SURFACE, PERPENDICULAR TO THE CRACK. THE DRILL BIT DIAMETER SHALL NOT EXCEED $1\frac{1}{8}''$.

DRILLING SHALL ALTERNATE BACK AND FORTH ON EITHER SIDE OF THE LONGITUDINAL JOINT FROM HOLE TO HOLE.

DRILLED HOLES SHALL NOT PENETRATE THROUGH THE SLAB BOTTOM.

DRILLED HOLES SHALL BE CLEANED OF LOOSE DEBRIS AND DUST. EPOXY OR POLYESTER BONDING AGENTS FOR DOWELS, MEETING THE MATERIAL REQUIREMENTS OF SECTION 1039, SHALL BE INJECTED OR POURED INTO EACH HOLE. A CROSS-STITCH BAR SHALL BE INSERTED IN EACH HOLE SUCH THAT THE EPOXY MATERIAL IS EVENLY DISTRIBUTED AROUND THE BAR AND EXTRUDING FROM THE SURFACE OPENING. EACH BAR SHALL BE INSERTED FAR ENOUGH TO ALLOW $1\frac{1}{2}''$ OF COVER AS SHOWN IN THE PROFILE DETAIL.

THE SURFACE SHALL HAVE ALL EXCESS EPOXY REMOVED AND HAVE A FLUSH FINISH.

GENERAL NOTES:

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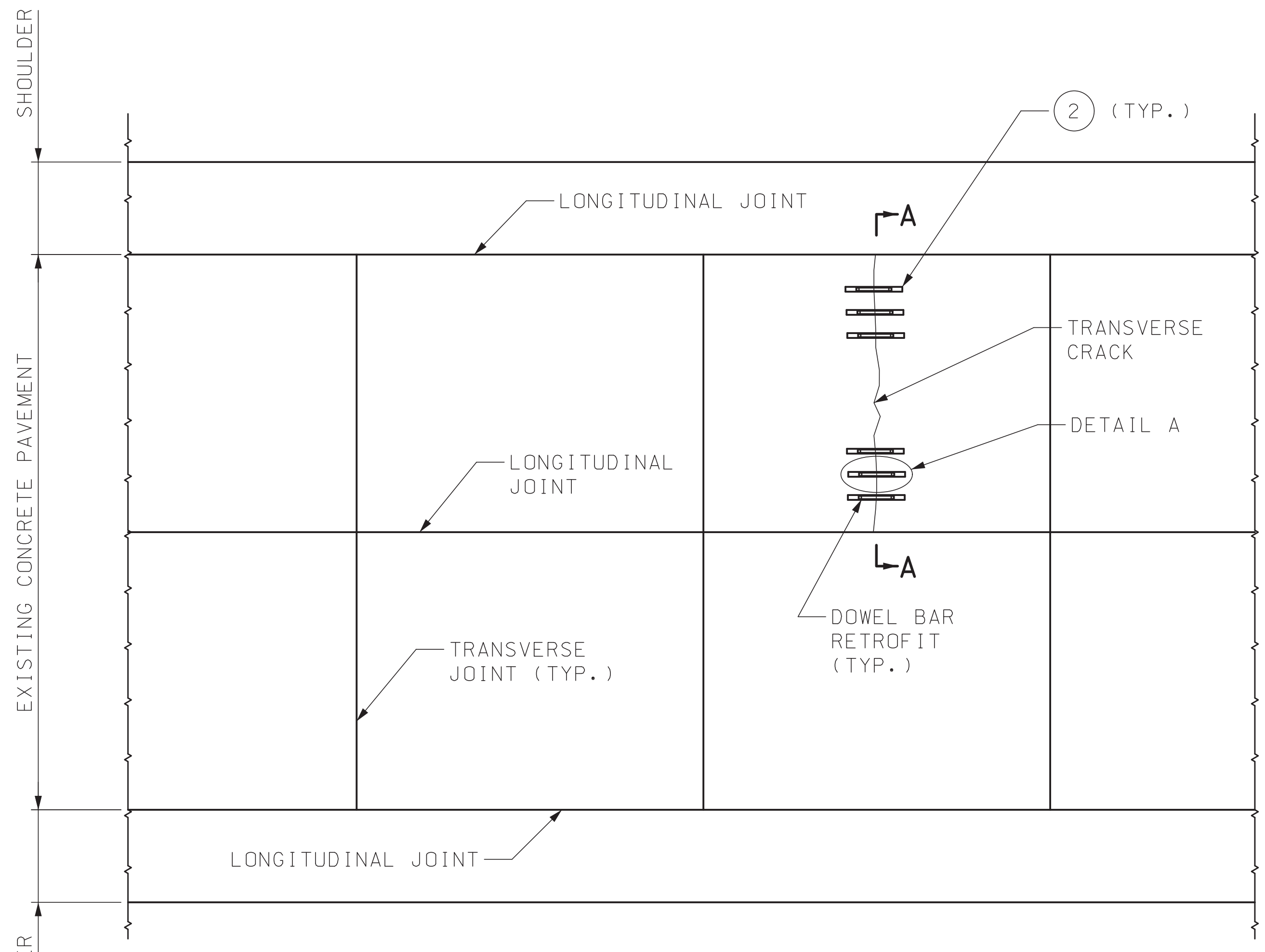
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

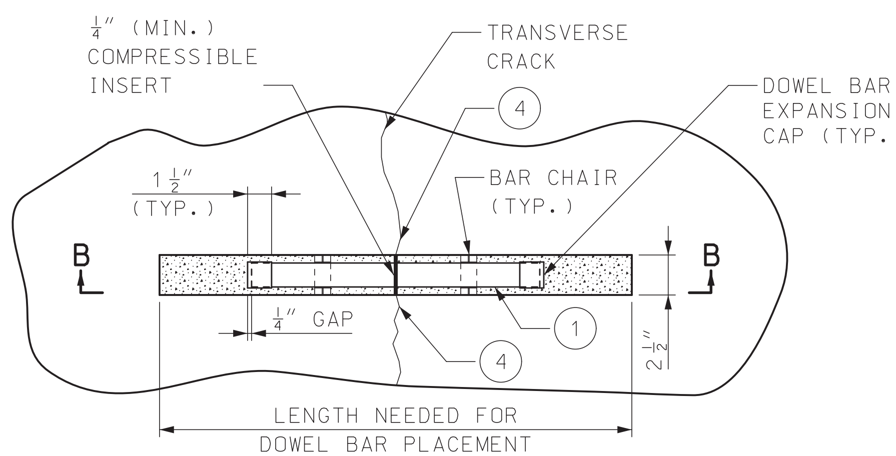
PAVEMENT REPAIR

CROSS STITCHING

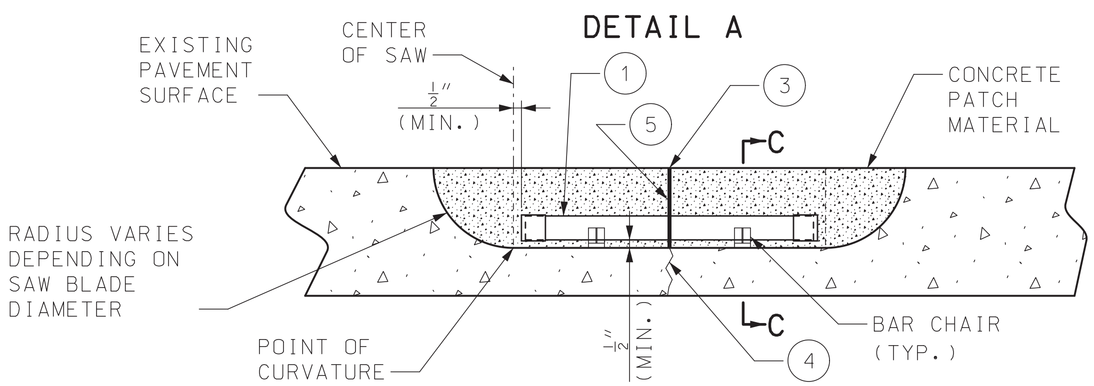
DATE EFFECTIVE: 01/01/2020
DATE PREPARED: 10/17/2019
613.00T



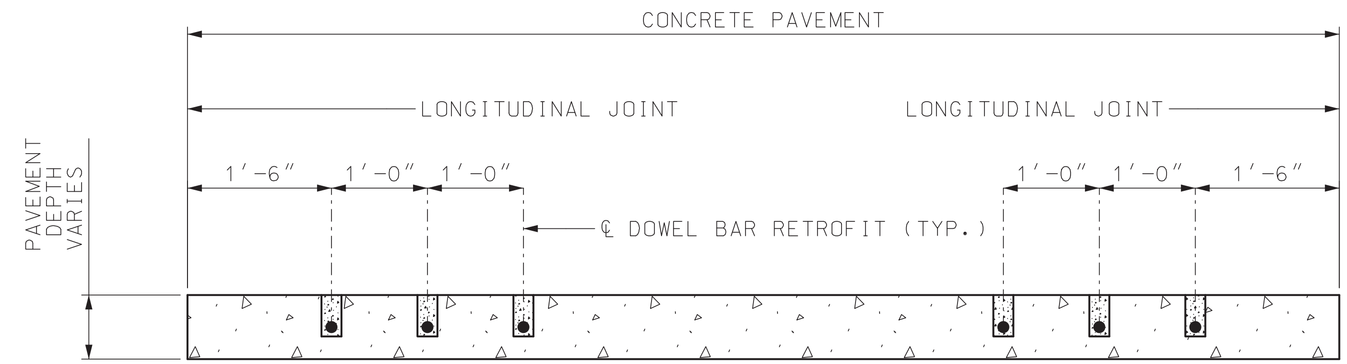
PLAN VIEW



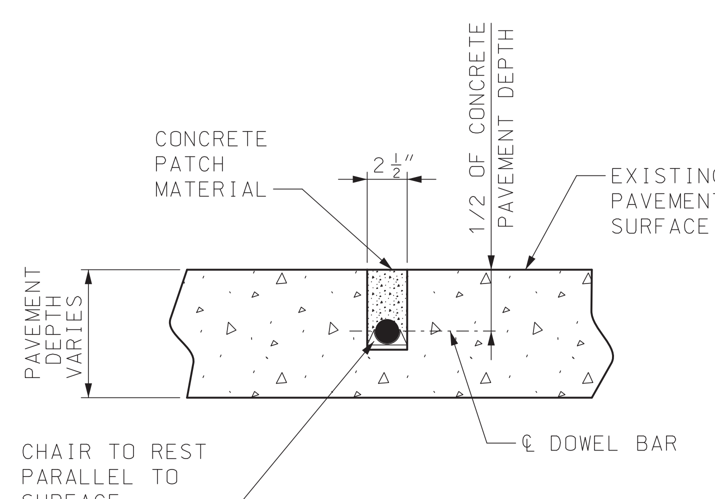
DETAIL A



SECTION B-B



SECTION A-A



SECTION C-C

1. 1½" DIAMETER DOWEL BAR X 18" LENGTH.
2. DOWEL BAR SLOTS SHALL BE PARALLEL TO ROADWAY.
3. TOP OF COMPRESSIBLE INSERT SHALL BE FLUSH WITH PAVEMENT SURFACE.
4. CRACK PERIMETER IN SLOT SHALL BE SEALED WITH SILICONE.
5. COMPRESSIBLE INSERT SHALL BE PLACED AT MIDDLE OF DOWEL BAR.

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

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JEFFERSON CITY, MO 65102
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NUMBER PE-30042
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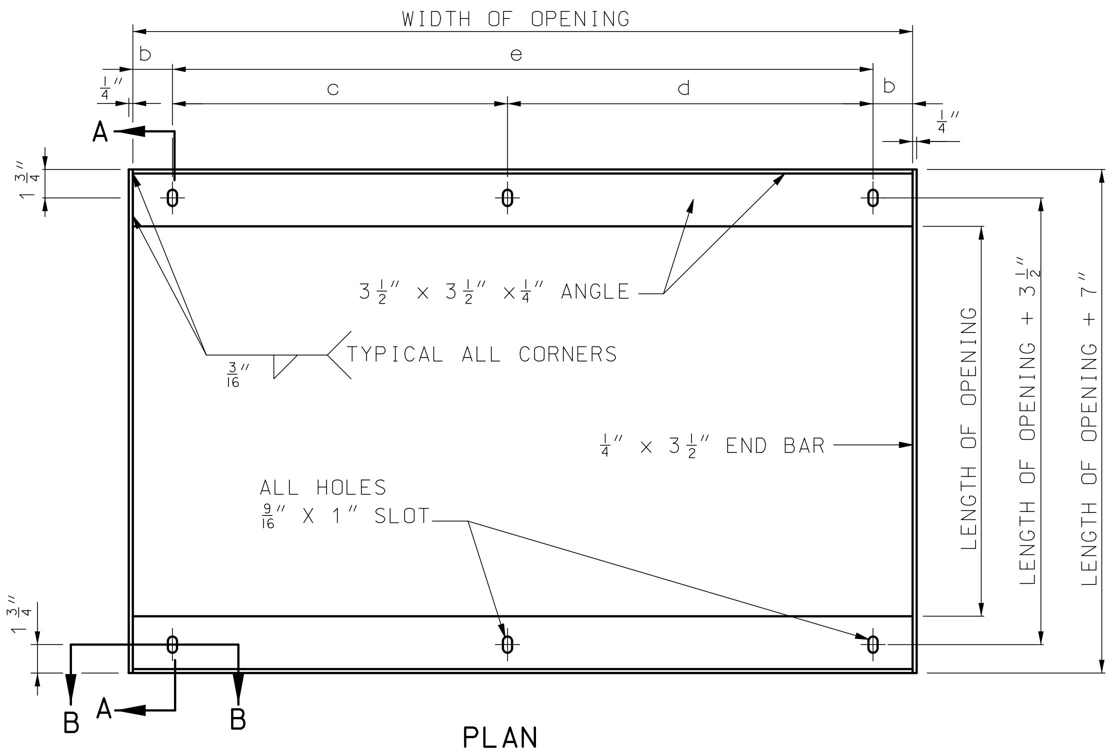
PAVEMENT REPAIR

DOWEL BAR RETROFIT

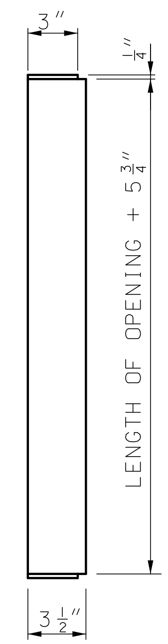
DATE EFFECTIVE: 01/01/2020
DATE PREPARED: 10/17/2019

613.00T

SHEET NO. 4 OF 4



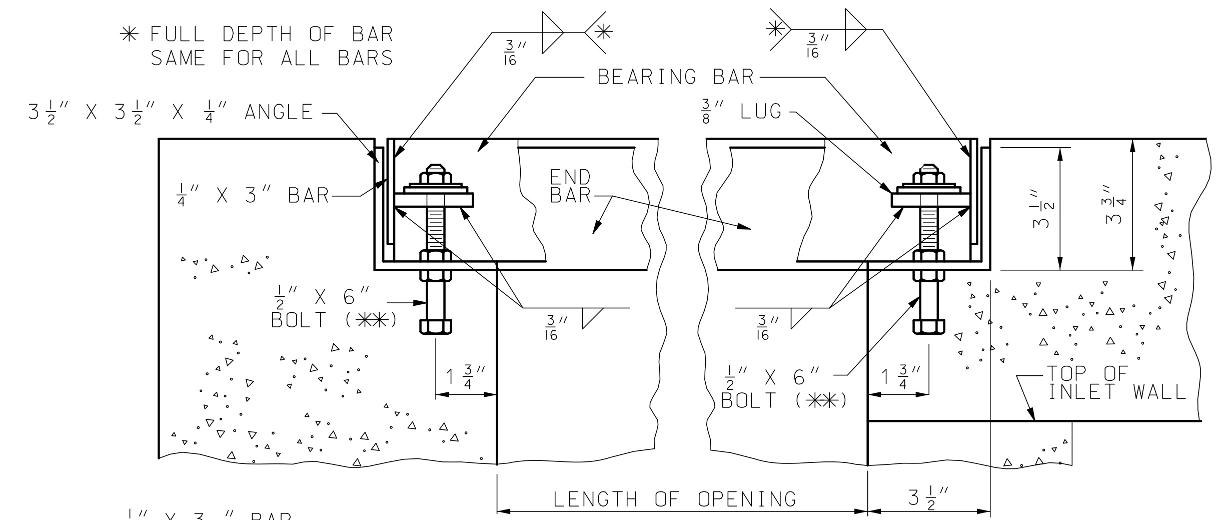
PLAN
BEARING PLATE



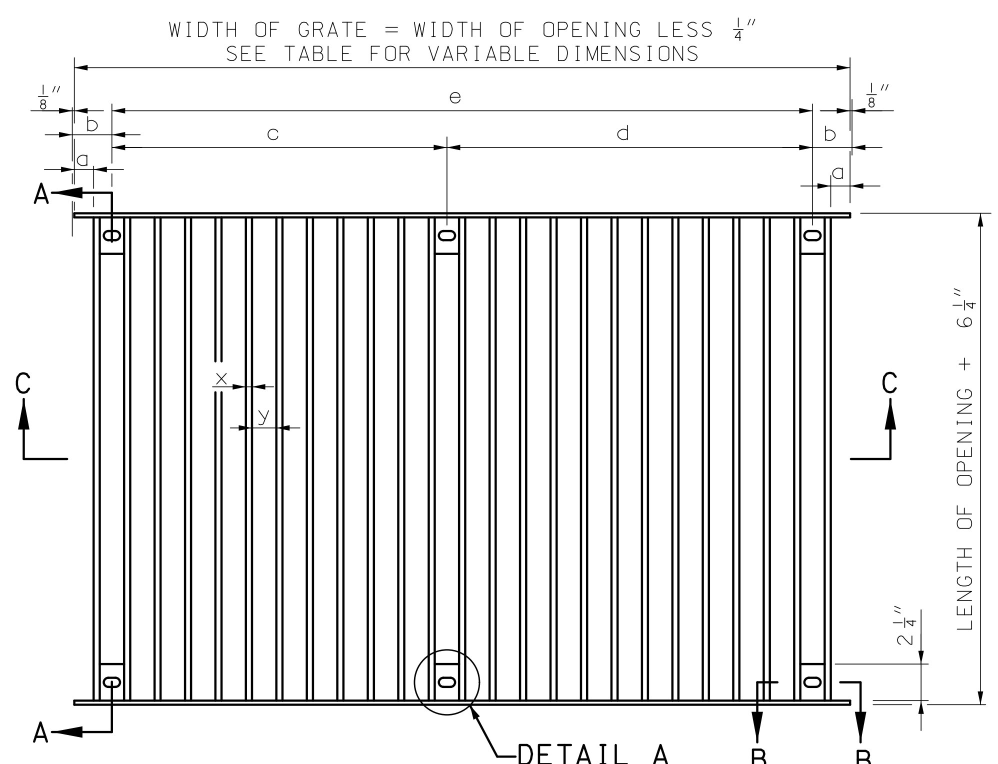
END VIEW OF BEARING BAR

WEIGHT AND DIMENSIONS DATA													
OPENING		WEIGHT (1) LBS.	BEARING BARS				DIMENSIONS					REMARKS
WIDTH	LENGTH		x	y	LENGTH	NUMBER	a	b	c	d	e	
3'-0"	2'-0"	190	3/8"	3"	2'-5 3/4"	11	13/16"	2 13/16"			2'-6 3/8"	USE WITH TYPE S-1 INLETS AND TYPE S HEADWALLS
3'-0"	3'-0"	330	5/8"	3"	3'-5 3/4"	10	1 1/4"	3 1/2"			2'-5"	
5'-0"	2'-0"	300	3/8"	3"	2'-5 3/4"	18	1"	3"	2'-3"	2'-3"		
5'-0"	3'-0"	550	5/8"	3"	3'-5 3/4"	17	9/16"	2 13/16"	2'-1 3/8"	2'-5"		
3'-1"	2'-1"	200	3/8"	3"	2'-6 3/4"	11	1 5/16"	3 5/16"			2'-6 3/8"	USE WITH TYPE S-2 AND TYPE S-3 INLETS ONLY
3'-1"	3'-1"	340	5/8"	3"	3'-6 3/4"	10	1 3/4"	4"			2'-5"	
5'-1"	2'-1"	310	3/8"	3"	2'-6 3/4"	18	1 1/2"	3 1/2"	2'-3"	2'-3"		
5'-1"	3'-1"	560	5/8"	3"	3'-6 3/4"	17	1 1/16"	3 5/16"	2'-1 3/8"	2'-5"		

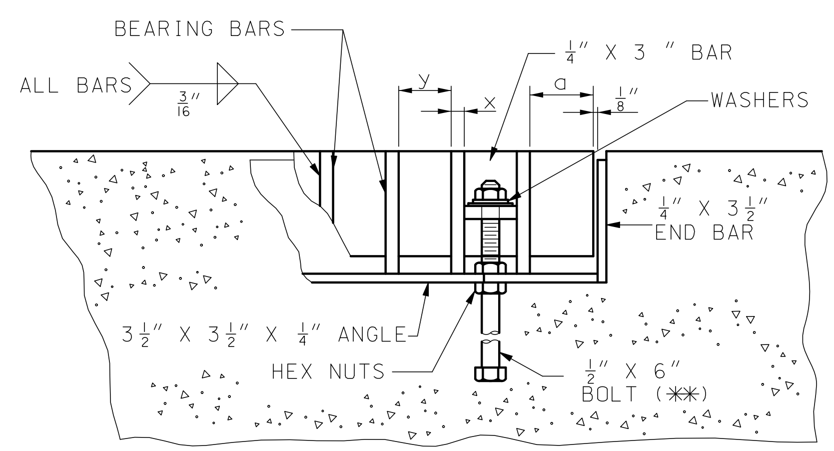
(1) THE WEIGHT OF THE GRATE AND BEARING PLATE INCLUDES THE BOLTS, NUTS, AND WASHERS AND SHALL BE AS SHOWN WITH A TOLERANCE OF 5 PERCENT.



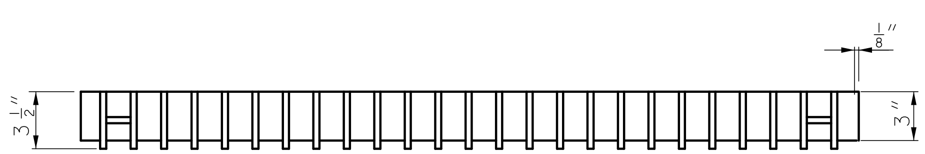
SECTION A-A



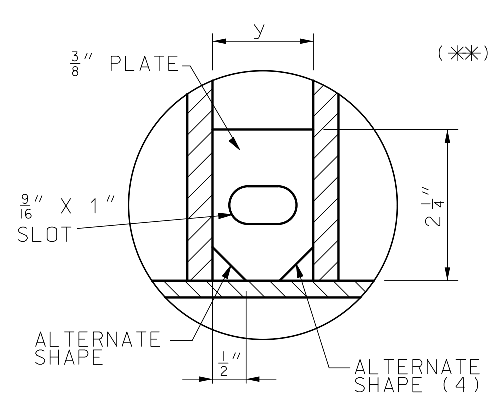
PLAN



SECTION B-B



SECTION C-C
GRATE



DETAIL A

(**) 1/2" DIA. ASTM F1554, GRADE 36 ANCHOR BOLTS.

(4) OTHER ALTERNATE SHAPES ARE ALLOWED, UPON APPROVAL, PROVIDED 4 LINEAR INCHES WELD IS MAINTAINED SYMETRICALLY AROUND THE PLATE AND THE NOMINAL DIMENSIONS OF THE PLATE AND SLOT ARE MAINTAINED.

GENERAL NOTES:

WHEN BOLTS ARE CUT IN THE FIELD, THREADS MUST BE CLEANED TO PERMIT THE FINAL NUT TO RUN FREELY ON THE BOLT.

THE WELDING REQUIREMENTS SHOWN ON THIS DRAWING ARE FOR PAINTED GRATES AND BEARING PLATES. IF GALVANIZED, ALL TIGHTLY CONTACTING SURFACES SHALL BE COMPLETELY SEALED, ON ALL SIDES BY WELDING, PRIOR TO GALVANIZING.

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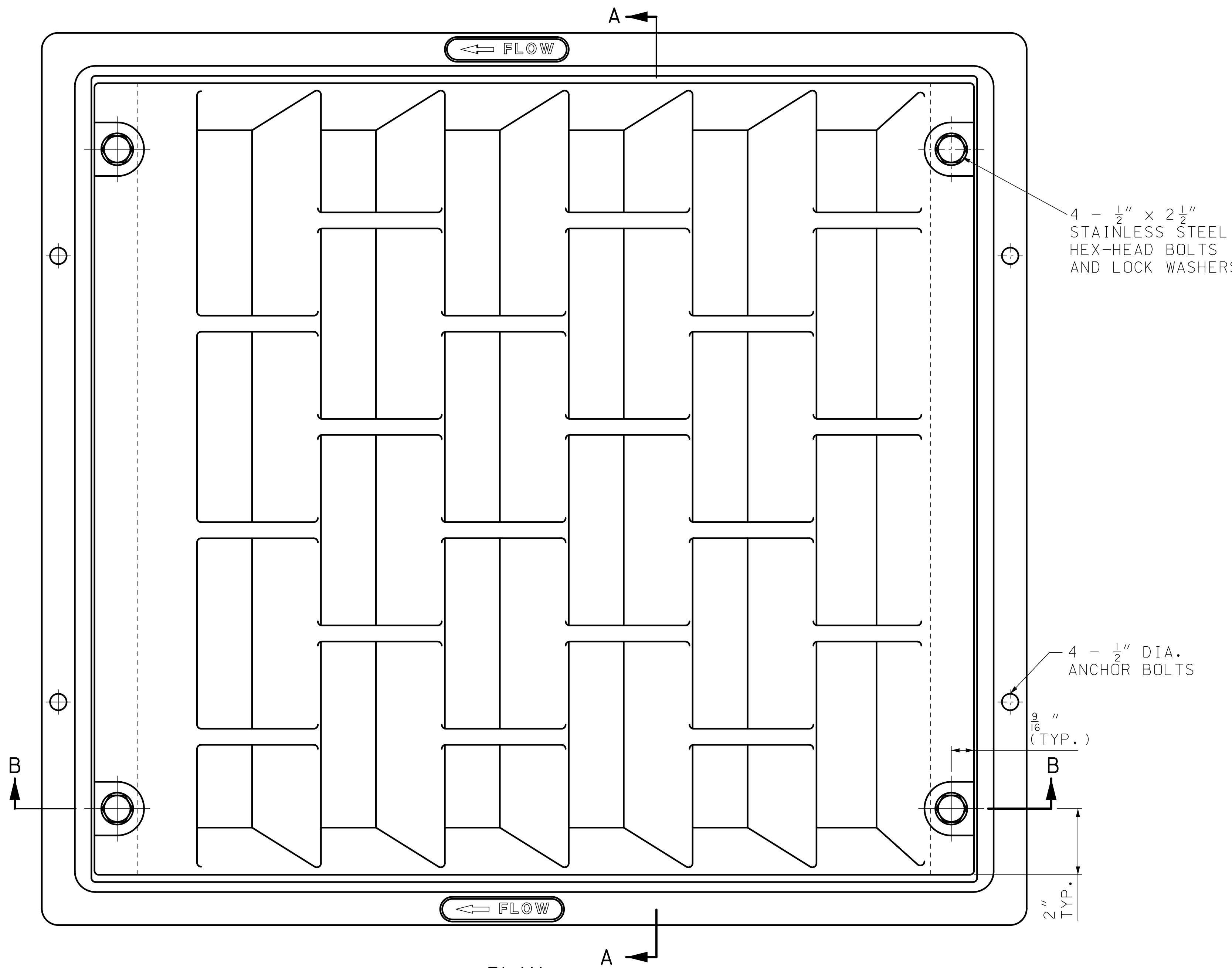
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

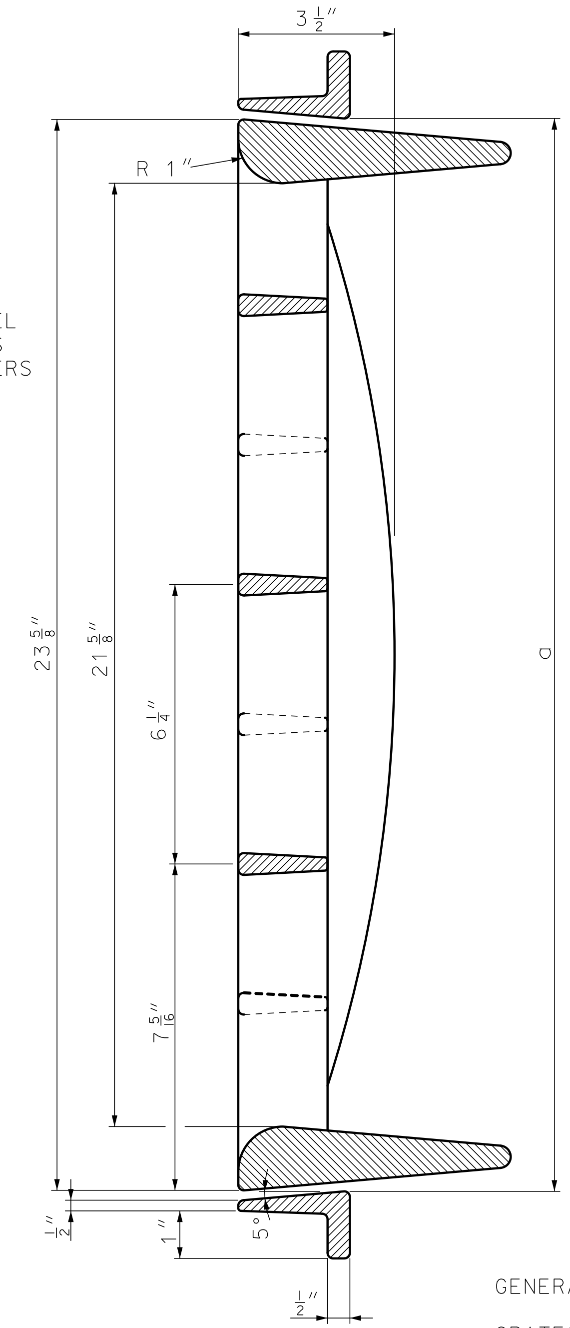
GRATES AND BEARING PLATES

DATE EFFECTIVE: 10/01/2021
DATE PREPARED: 7/13/2021

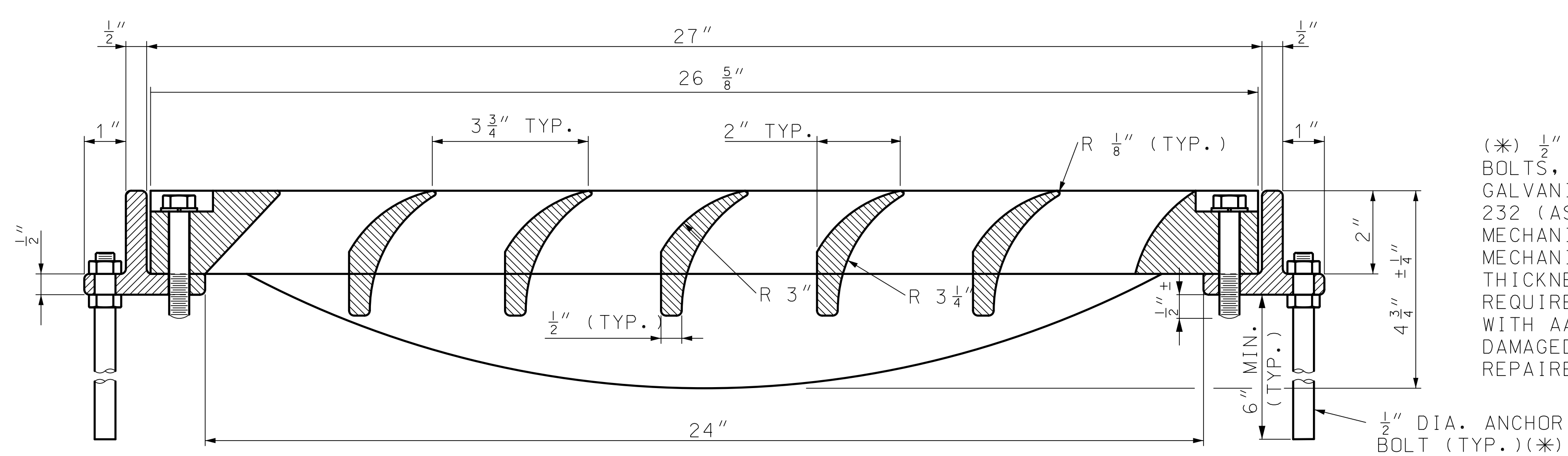
614.10U



PLAN



SECTION A-A



SECTION B-B

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 $\frac{1}{2}''$ DIA. BOLTS WITHOUT WASHERS BEFORE CONCRETE POUR TO FORM $\frac{1}{2}''$± BOLT EXTENSION INTO CONCRETE BELOW FRAME. LUBRICATE EXPOSED THREADS.

AFTER CONCRETE HARDENS SUFFICIENTLY, FINAL INSTALLATION SHALL REMOVE AND REINSTALL $\frac{1}{2}''$ DIA. BOLTS AND LOCK WASHERS THROUGH GRATE AND FRAME. TORQUE $\frac{1}{2}''$ DIA. BOLTS TO 35-40 FT. LB. APPLY THREAD ADHESIVE TO ALL $\frac{1}{2}''$ 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.

(✱) $\frac{1}{2}''$ 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 SPELTER COATING SHALL BE REPAIRED IN ACCORDANCE WITH SEC 1081.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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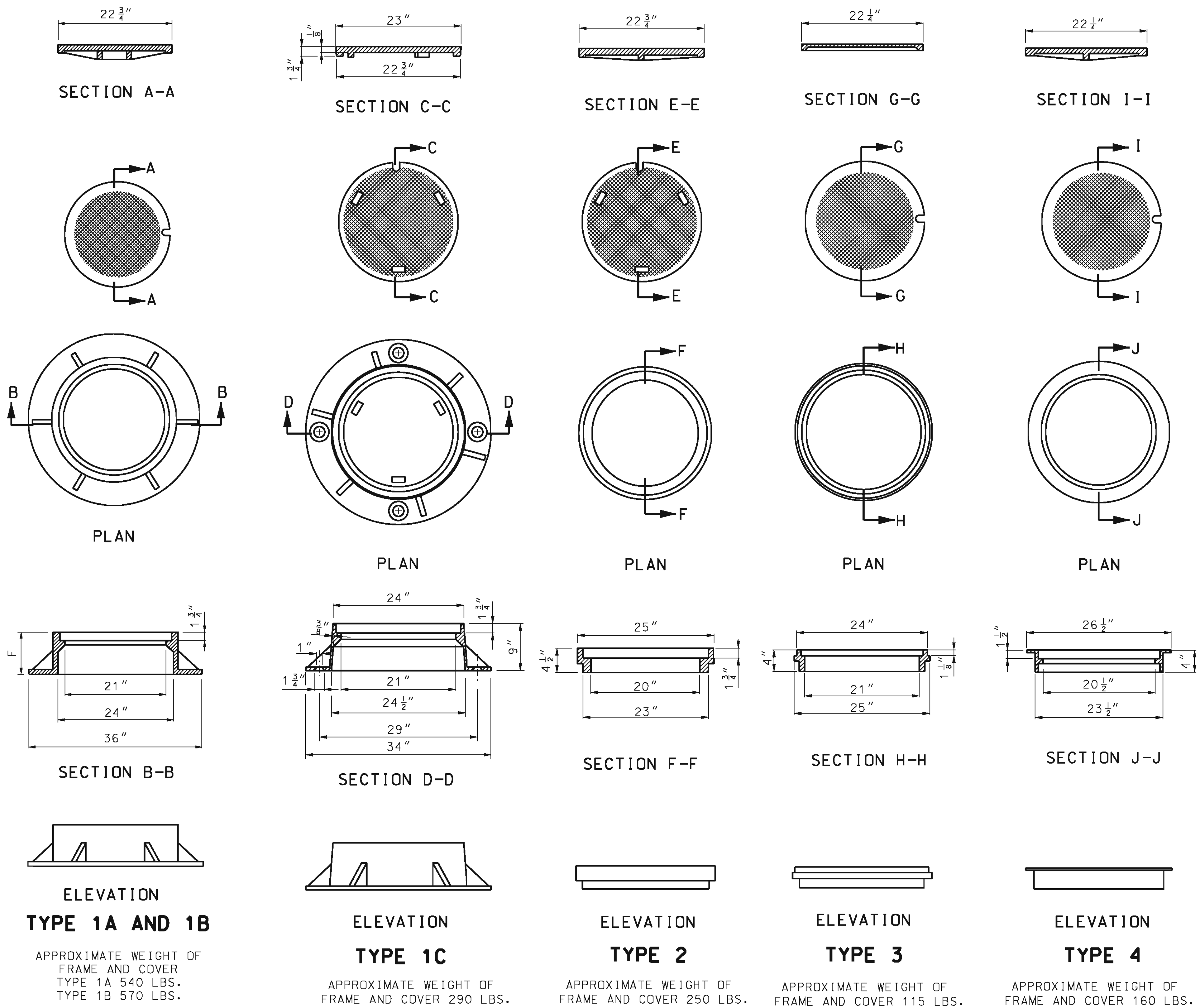
CURVED VANE GRATE AND FRAME

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

614.11D

SHEET NO. 1 OF 1



GENERAL NOTES:

TYPE 1A:
WHEN "P" (PAVEMENT THICKNESS) IS 8" USE MANHOLE FRAME WITH 9" HEIGHT (F) APPROXIMATE WEIGHT OF FRAME AND COVER, 540 LBS., CLASS 35 CASTING.

TYPE 1B:
WHEN "P" (PAVEMENT THICKNESS) IS 9" OR 10", USE MANHOLE FRAME WITH 10" HEIGHT (F) APPROXIMATE WEIGHT OF FRAME AND COVER, 570 LBS., CLASS 35 CASTING.

TYPE1C:
TYPE 1C MANHOLE FRAME AND COVER WILL BE ACCEPTED AS AN ALTERNATE TO TYPE 1A OR TYPE 1B. APPROXIMATE WEIGHT OF FRAME AND COVER, 290 LBS..

FOR "P" GREATER THAN 10" ADJUSTING RINGS COMBINED WITH MANHOLE FRAMES WITH "F" EQUAL TO 9" OR 10" SHALL BE USED TO MATCH THE PAVEMENT THICKNESS.

THE PRICE BID FOR MANHOLE FRAME AND COVER SHALL INCLUDE THE NUMBER OF ADJUSTING RINGS REQUIRED TO MATCH PAVEMENT THICKNESS.

WHEN SPECIFIED, USE A LOCK TYPE FRAME AND COVER WITH A MINIMUM OF 3 LOCK BLOCKS AND BOLTS.

MANHOLE ADJUSTING RINGS SHALL BE SECURED TO EITHER THE FRAME OR PAVEMENT TO PREVENT MOVEMENT UNDER TRAFFIC.

A CHECKERED DESIGN TOP SHALL BE FURNISHED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

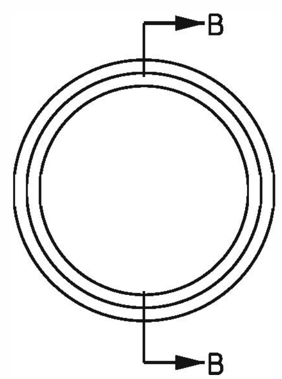
MANHOLE FRAMES AND COVERS

DATE EFFECTIVE: 03/01/1996
DATE PREPARED: 8/21/2009

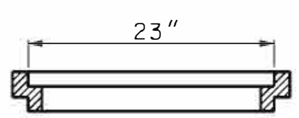
614.30E

SHEET NO. 1 OF 2

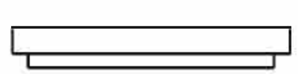
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN



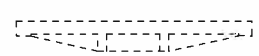
SECTION B-B



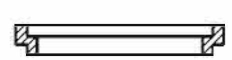
ELEVATION

ADJUSTING RING

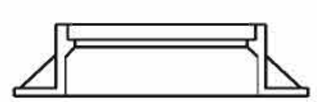
SOLID OR ADJUSTABLE



COVER

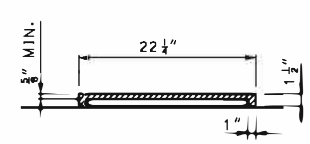


ADJUSTING RING

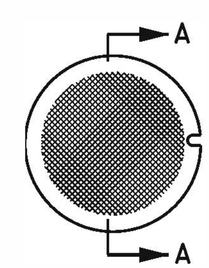


FRAME

INSTALLATION DETAILS



SECTION A-A



APPROXIMATE WEIGHT OF FRAME AND COVER 150 LBS.

ALTERNATE TYPE 4 COVER

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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

MANHOLE FRAMES AND COVERS

DATE EFFECTIVE: 03/01/1996
DATE PREPARED: 8/21/2009

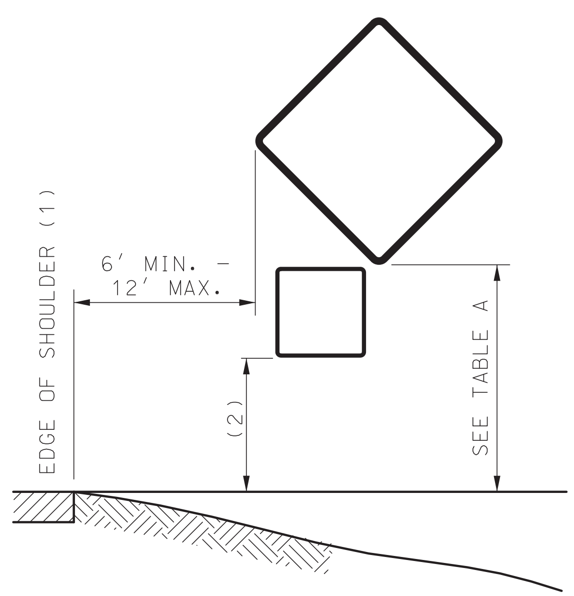
614.30E

SHEET NO. 2 OF 2

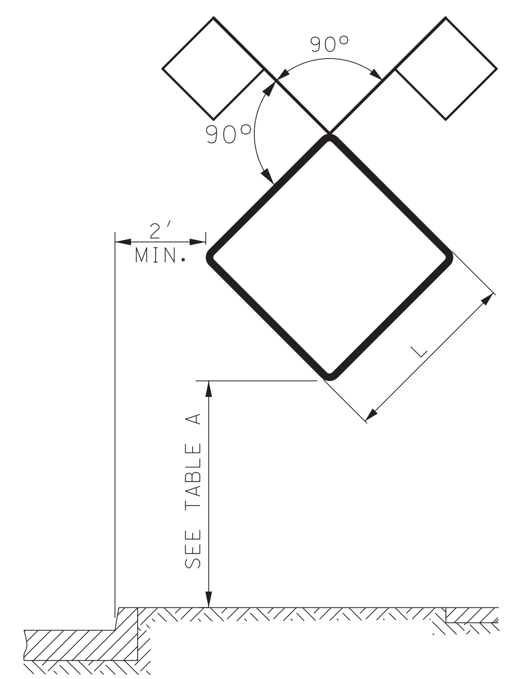
TABLE A
WORK ZONE SIGN MOUNTING REQUIREMENTS

TYPE	SIGN SUPPORT	SIGN SUBSTRATE	MINIMUM MOUNTING HEIGHT(3)	USAGE LIMITATIONS	COMMENTS
POST	PERFORATED SQUARE STEEL TUBE U-CHANNEL WOOD	RIGID	5′ RURAL UNDIVIDED HIGHWAYS 7′ RURAL DIVIDED HIGHWAYS 7′ URBAN HIGHWAYS	NONE	POSTS SHALL BE FREE OF ANY BRACING AND EXTEND NO FURTHER ABOVE THE SIGN EXCEPT AS NEEDED FOR WARNING LIGHT ATTACHMENT. FOR DETAILS OF POST INSTALLATION DETAILS SEE SHEET NO. 2 OF 9. GALVANIZATION OF POSTS WILL NOT BE REQUIRED.
TYPE 1 PORTABLE	SKID FOLD-UP STAND	RIGID	5′ RURAL UNDIVIDED HIGHWAYS 7′ RURAL DIVIDED HIGHWAYS 7′ URBAN HIGHWAYS	PERMITTED ONLY WHERE POST MOUNTING IS NOT FEASIBLE.	SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 OR MASH 2016 TL-3 AND MAY BE PLACED ADJACENT TO OR WITHIN THE ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF DESIGNATED TRAVELED WAY, IS MAINTAINED.
TYPE 2 PORTABLE	EASEL FOLD-UP STAND SELF-DRIVING POST TYPE III MOVABLE BARRICADE SKID	FLEXIBLE RIGID	12″(4)	PERMITTED FOR PROGRESSIVE WORK SUCH AS ASPHALT OVERLAYS. PERMITTED FOR STATIONARY WORK EXPECTED TO BE COMPLETED IN 3 DAYS OR LESS. PERMITTED FOR INTERMEDIATE/DIS-CONTINUOUS STATIONARY WORK THAT MAY EXCEED 3 DAYS IN TOTALITY, AS APPROVED BY THE ENGINEER.(5) WHERE SIGNS ARE OBSCURED BY OTHER OBJECTS (I.E., TRAFFIC CONTROL DEVICES, PARKED VEHICLES, BARRIERS, VEGETATION, ETC.) OR INSTALLED ON MULTI-LANE UNDIVIDED FACILITIES OR MULTILANE DIVIDED FACILITIES WITH 3 OR MORE LANES IN ONE DIRECTION, MOUNTING HEIGHTS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS.	SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 OR MASH 2016 TL-3 AND MAY BE PLACED ADJACENT TO OR WITHIN THE ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF DESIGNATED TRAVELED WAY, IS MAINTAINED.
BARRIER	CONCRETE TRAFFIC BARRIER GUARDRAIL	FLEXIBLE RIGID	5′ RURAL UNDIVIDED HIGHWAYS 7′ RURAL DIVIDED HIGHWAYS 7′ URBAN HIGHWAYS	PERMITTED ONLY WHERE LONGITUDINAL BARRIER IS PRESENT.	SYSTEMS SHALL PROVIDE POSITIVE CON-NECTION TO THE BARRIER AND MINIMIZE POTENTIAL FOR VEHICLE SNAGGING.
VEHICLE	PAVEMENT MARKING EQUIPMENT PILOT CAR PROTECTIVE VEHICLE	FLEXIBLE RIGID	48″ (6)	PERMITTED ONLY IN PILOT CAR OR MOVING OPERATIONS.	

(3) MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF THE PAVEMENT.
(4) MOUNTING HEIGHTS FOR REGULATORY AND GUIDE SIGNS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS.
(5) SIGNS MOUNTED ON TYPE III BARRICADES, GORE EXIT SIGN, AND SIGNS FOR CROSSWALK/ SIDEWALK CLOSURES MAY BE LEFT IN PLACE FOR MORE THAN 3 DAYS.
(6) DEVIATIONS AS APPROVED BY THE ENGINEER.



(1) EDGE OF TRAVELED WAY WHERE THERE IS NO PAVED OR STABILIZED SHOULDER.
(2) ONE-FOOT LESS THAN MOUNTING HEIGHT NOTED IN TABLE A.



HEIGHT AND LATERAL LOCATIONS FOR POST AND PORTABLE SIGN MOUNTING

GENERAL NOTES:

LONGITUDINAL SPACING OF SIGNS SHOWN IN THE PLANS ARE PREFERRED MINIMUMS, BUT MAY BE ADJUSTED TO MEET EXISTING FIELD CONDITIONS WITH APPROVAL FROM THE ENGINEER.

SIGNS SHALL NOT BE MOUNTED IN OR ON CHANNELIZERS.

ALL POSTS AND SIGNS SHALL BE INSTALLED AND MAINTAINED IN A PLUMB POSITION.

CONSTRUCTION SIGNS SHALL NOT BE LOCATED ON SIDEWALKS, BICYCLE LANES, OR AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE TRAFFIC.

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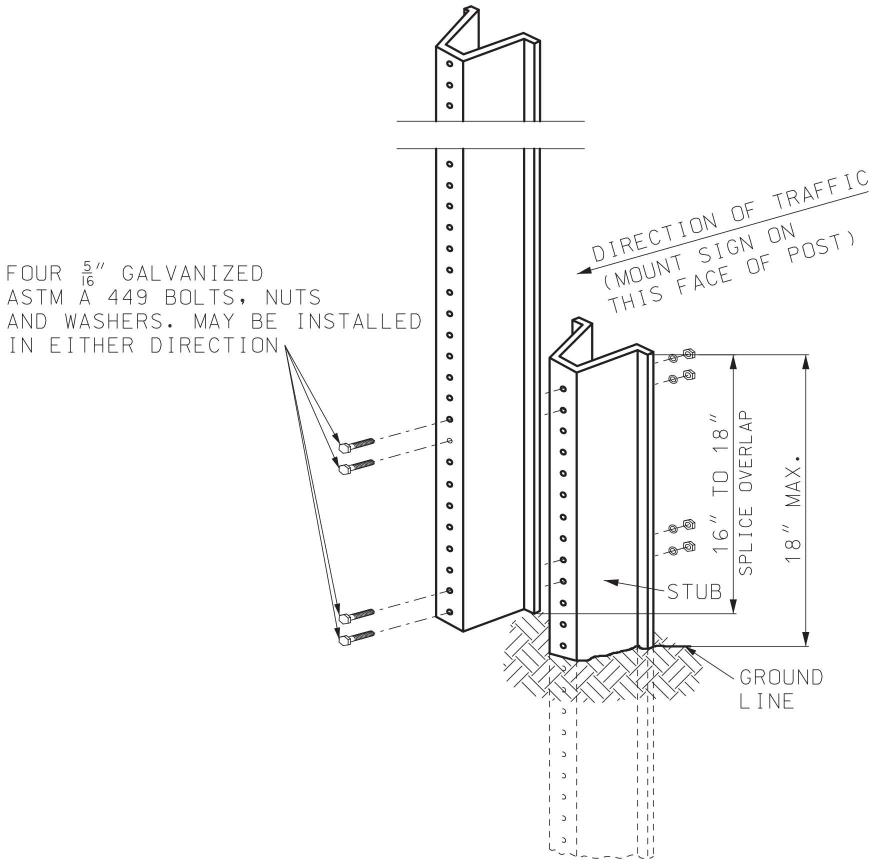
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TEMPORARY
TRAFFIC CONTROL DEVICES
SIGN MOUNTING REQUIREMENTS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/13/2023

616.10BB

SHEET NO.



U-CHANNEL POST DETAIL

USE OF SPLICE IS OPTIONAL.

SPLICE OVERLAP SHALL BE POSITION ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.

✳ IF A PLAQUE IS USED, NEITHER THE SIGN NOR PLAQUE SHALL BE POSITIONED WITHIN THE SPLICE OVERLAP AREA.

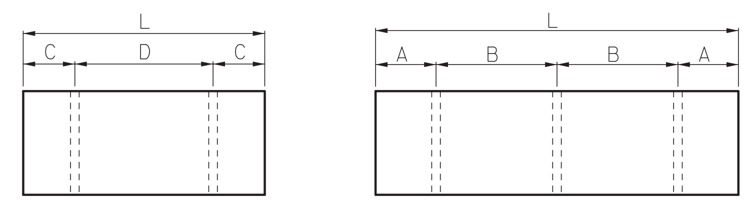
ONLY ONE SPLICE WILL BE ALLOWED PER POST.

POST TYPE

SIGN AREA (SQ.FT.)	U-CHANNEL	WOOD	PERFORATED SQUARE STEEL TUBING
≤ 10	1 - 3.0 LB./FT.✳	1 - 4" X 4"✳	1 - 2" 12 GA.✳
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4" 1 - 4" X 6"✳	2 - 2" 12 GA. 1 - 2½" 12 GA.
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"	3 - 2" 12 GA.✳✳
> 24 ≤ 32	3 - 3.0 LB./FT.	2 - 4" X 6"	N/A
> 30 ≤ 50	N/A	2 - 6" X 6"	N/A

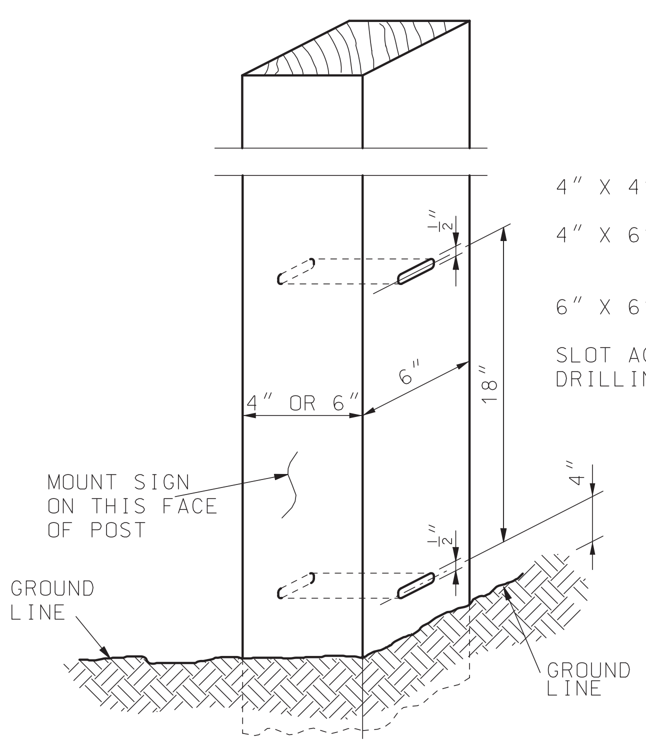
✳ SIGNS GREATER THAN 4 FEET IN WIDTH, EXCEPT DIAMOND SHAPE SIGNS, REQUIRE TWO POSTS.

✳✳ REQUIRES SLIP BASE PER MANUFACTURER'S RECOMMENDATION.



A = 1/6(L)   C = 1/5(L)
B = 1/3(L)   D = 3/5(L)

POST SPACING



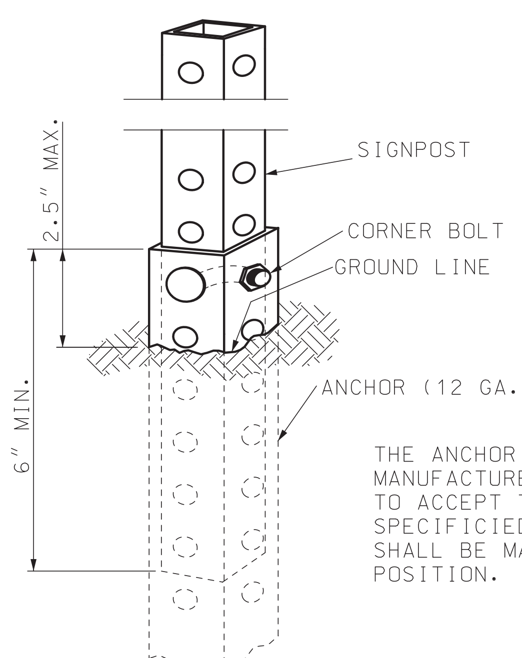
4" X 4" WOOD POST - NO SLOTS OR HOLES REQUIRED

4" X 6" WOOD POST - 1½" X ½" SLOT ON 6" SIDE OR 1½" DIA. HOLE ON 6" SIDE

6" X 6" WOOD POST - 2" X ½" SLOT OR 2" DIA. HOLE

SLOT ACROSS NEUTRAL AXIS FORMED BY SUCCESSIVE DRILLING WITH ½" BIT.

WOOD POST DETAIL



THE SIGN POST MAY BE ATTACHED TO THE ANCHOR WITH A CORNER BOLT OR STRAIGHT BOLT PER MANUFACTURER'S SPECIFICATION.

THE ANCHOR SHALL BE SIZED AS PER MANUFACTURER'S RECOMMENDATIONS TO ACCEPT THE POST SIZE SPECIFICIED. THE SIGN ASSEMBLY SHALL BE MAINTAINED IN A PLUMB POSITION.

PERFORATED SQUARE STEEL TUBE POST DETAIL

GENERAL NOTES:

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET.

SIGN INSTALLATION DETAILS SHOWN SHALL APPLY TO ALL POSTS IN A MULTI-POST INSTALLATION.

AT THE ENGINEERS DISCRETION A FLUORESCENT PAINT SHALL BE APPLIED HEAVILY TO BOTH SIDES OF U-CHANNEL POST STUB FOR A LENGTH OF AT LEAST 6 INCHES BELOW THE TOP OF THE STUB.

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

TEMPORARY TRAFFIC CONTROL DEVICES POST INSTALLATION DETAILS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/13/2023

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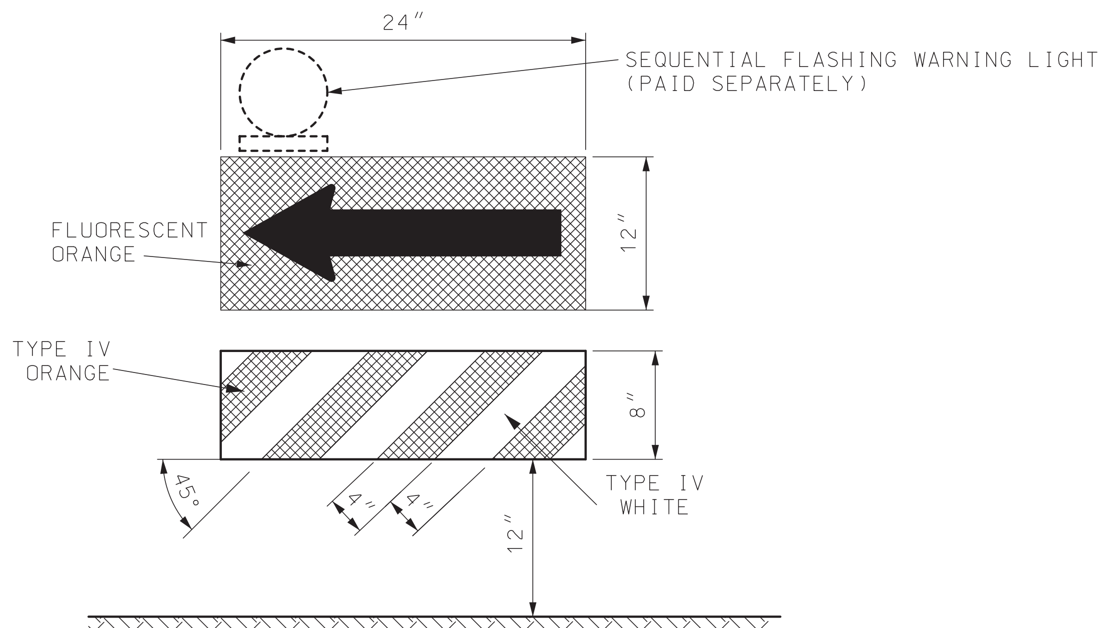
SHEET NO. 2 OF 9

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

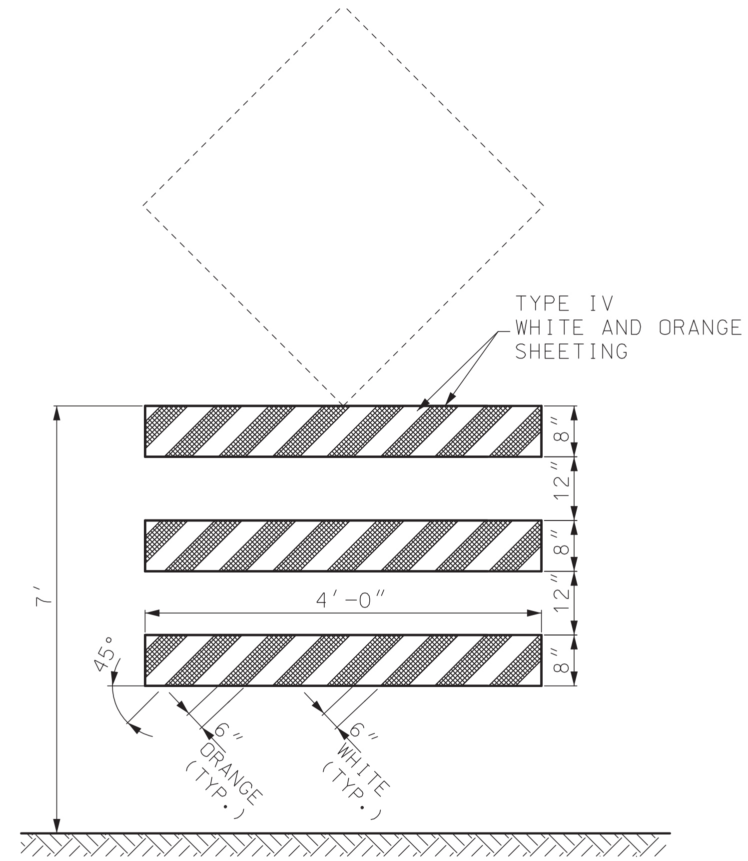


DIRECTION INDICATOR BARRICADE

VERTICAL DIMENSIONS DO NOT INCLUDE PROJECTIONS DESIGNED FOR EASE OF HANDLING.

DIRECTION INDICATOR BARRICADES SHALL NOT BE USED IN SHIFTING TAPERS UNLESS SHOWN ON THE PLANS.

THE PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.



ADVANCE WARNING RAIL SYSTEM

MAXIMUM WEIGHT OF SIGN SHALL NOT EXCEED 25 LBS.

THE SIGN AND RAIL SYSTEM MAY BE MOUNTED AS TWO SEPARATE CRASHWORTHY DEVICES. THE RAIL SYSTEM SHALL BE LOCATED DIRECTLY IN FRONT OF THE SIGN WITH 7 TO 10 FEET SEPARATING THE TWO DEVICES.

WHERE MARKING IS NOT PROVIDED ON THE BACKSIDE, STRIPS OF 3″ WIDE MODOT TYPE 7 ORANGE SHEETING MAY BE APPLIED TO THE ENDS OF EACH RAIL TO HELP DELINEATE THE DEVICE.

WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.4.

GENERAL NOTES:

WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.

BALLAST FOR TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUFACTURERS' RECOMMENDATION FOR FIELD CONDITIONS WHEN APPLICABLE.

SEQUENTIAL FLASHING WARNING LIGHTS SHALL BE IN ACCORDANCE WITH SEC 1063.5.

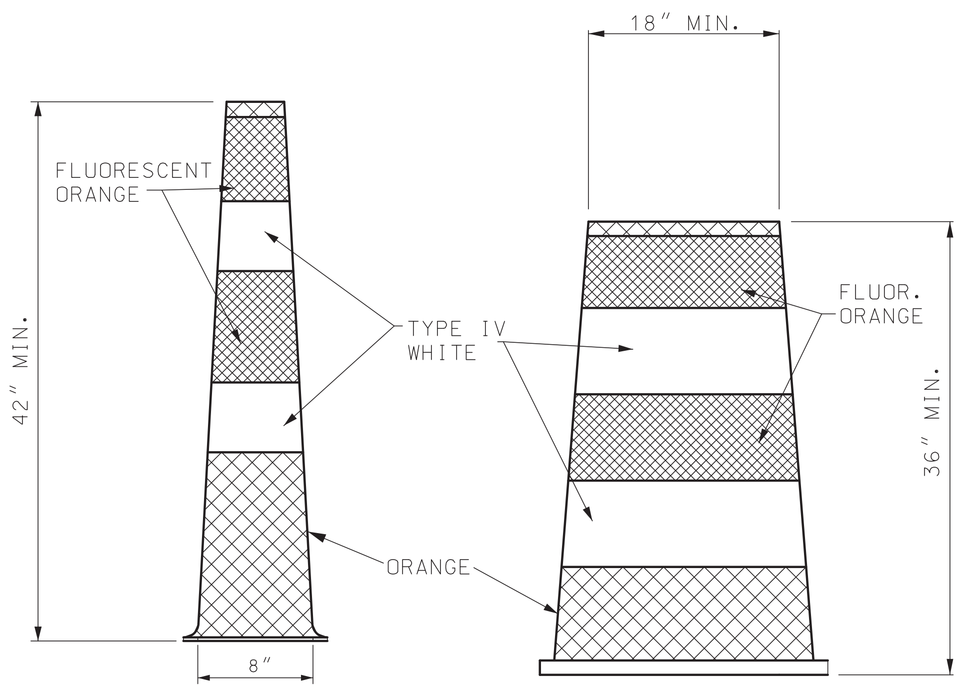
UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DRUM-LIKE CHANNELIZERS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONGITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA WHERE NO RAMPS, INTERSECTIONS OR LIMITED LATERAL CLEARANCE EXISTS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DIRECTION INDICATOR BARRICADES IN LIEU OF TRIM-LINE CHANNELIZERS IN MERGING TAPERS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE VERTICAL PANELS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONGITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE CONES IN LIEU OF TRIM-LINE CHANNELIZERS DURING DAYTIME OPERATIONS ON MINOR ROUTES.

PANEL AND RAIL MARKINGS FOR TRAFFIC DELINEATION SHALL SLOPE DOWNWARD TOWARD THE INTENDED DIRECTION OF TRAVEL. ILLUSTRATIONS SHOWN ARE FOR INSTANCES WHERE TRAFFIC MOVES TO THE LEFT, REVERSE CONFIGURATIONS SHALL BE USED FOR TRAFFIC MOVEMENTS TO THE RIGHT. MARKINGS SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR PANEL, OR MAY BE APPLIED TO BOTH THE FRONT AND BACK PROVIDING THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.

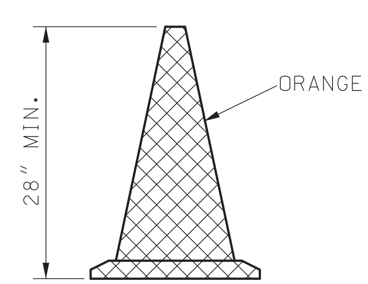


TRIM-LINE DRUM-LIKE

CHANNELIZERS

WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.3.

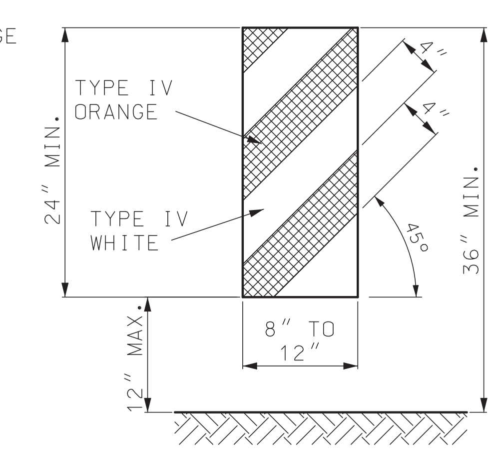
STRIPES ON TRIM-LINE CHANNELIZERS SHALL BE 6″ TO 8″.
STRIPES ON DRUM-LIKE CHANNELIZERS SHALL BE 4″ TO 6″.



CONE

CONES SHALL MAINTAIN THEIR SHAPE UPON EXPOSURE TO NORMAL WORK CONDITIONS.

CONES SHALL BE USED DURING DAYLIGHT HOURS ONLY.



VERTICAL PANEL

VERTICAL PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.

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NUMBER PE-30042
PROFESSIONAL ENGINEER
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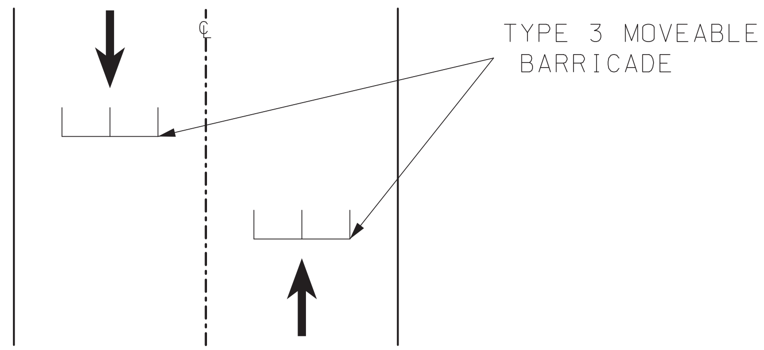
TEMPORARY
TRAFFIC CONTROL DEVICES
CHANNELIZERS AND DIRECTION INDICATOR BARRICADE

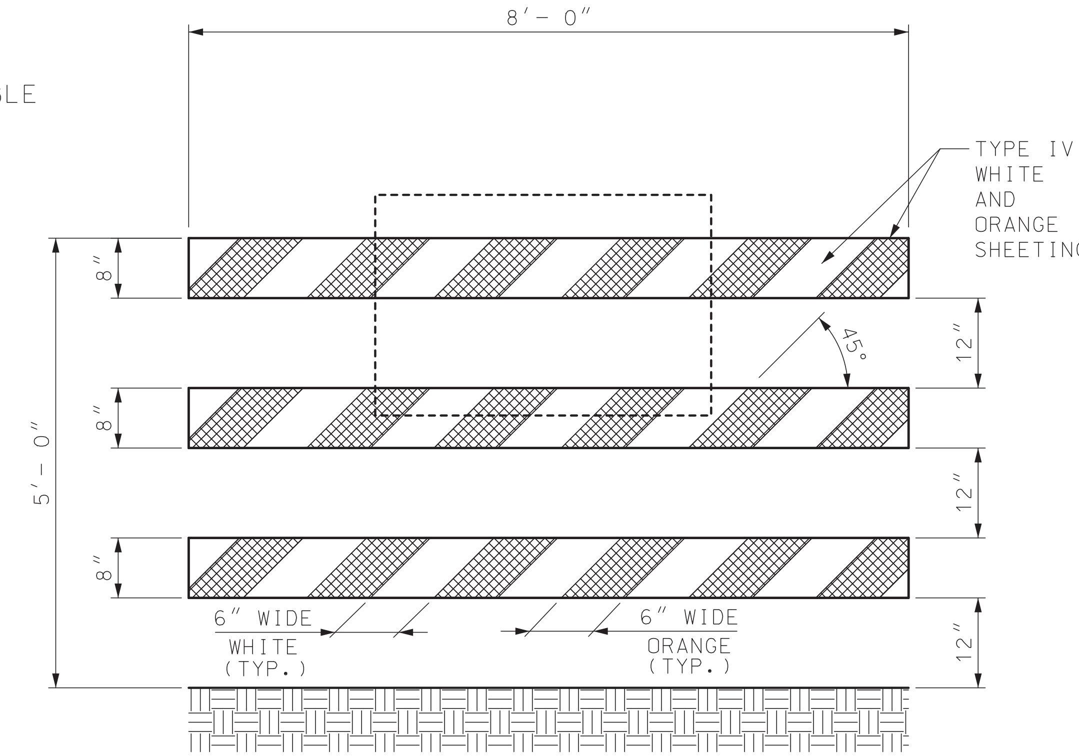
DATE EFFECTIVE:	4/1/2023	616.10BB	SHEET NO.
DATE PREPARED:	1/13/2023		3 OF 9

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

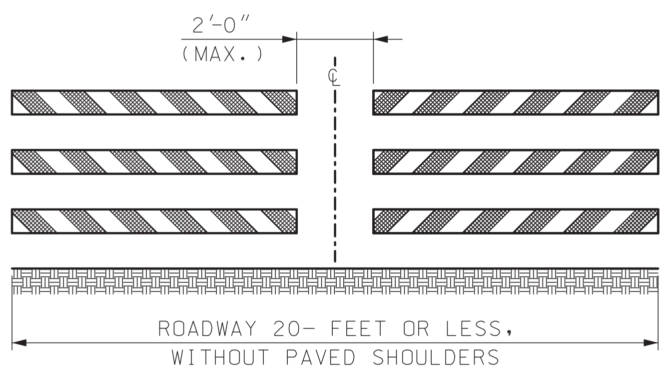


RETROREFLECTIVE MARKING ON TYPE 3 BARRICADES SHALL BE ON BOTH SIDES OF EACH RAIL AND DIRECT TRAFFIC MOVEMENT APPROPRIATELY TO ALLOW VEHICLES TO PASS THROUGH

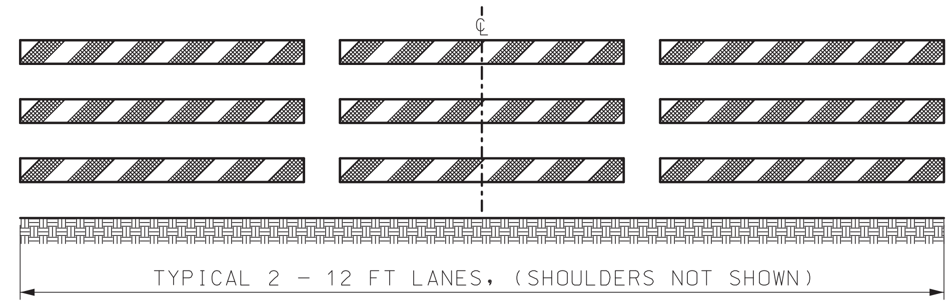
SOFT CLOSURE
PLAN VIEW



EXAMPLE 1

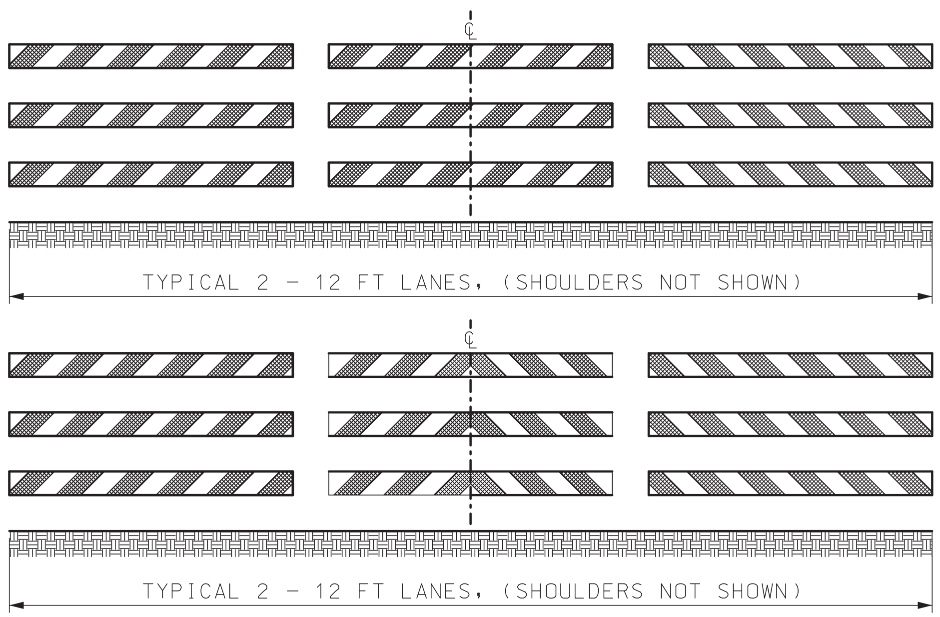


EXAMPLE 2

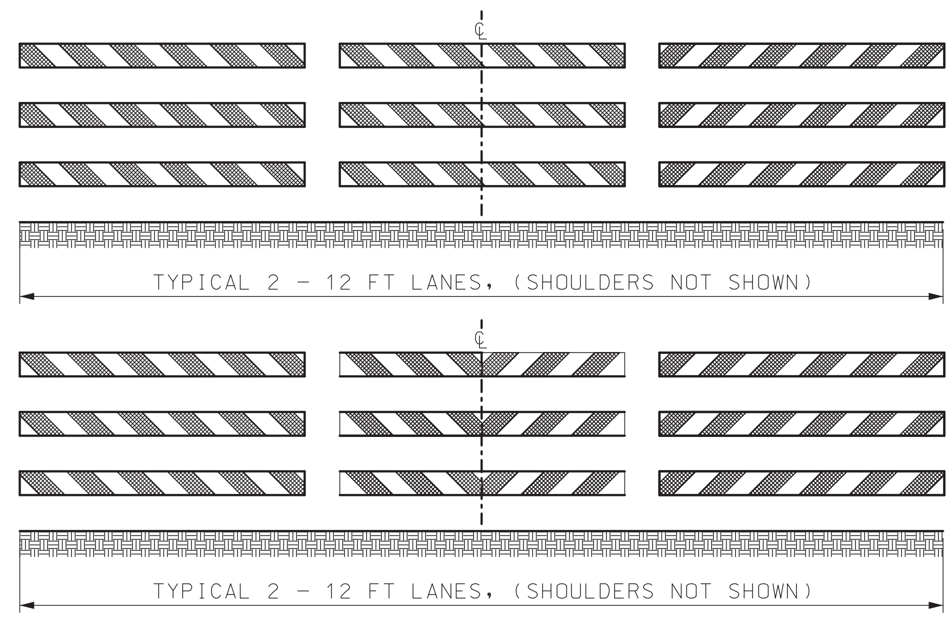


EXAMPLE SHOWS STRIPES SLOPING TO DIRECT VEHICULAR MOVEMENT TOWARD THE LEFT

EXAMPLE 3



EXAMPLE 4



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.

IF SIGNS 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 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 104.2.7.4.

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.

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TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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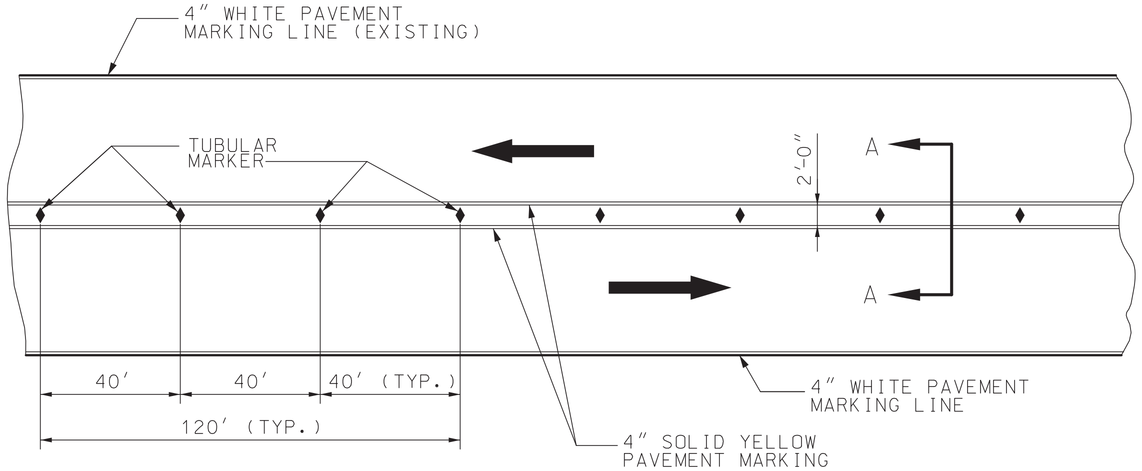
TEMPORARY
TRAFFIC CONTROL DEVICES

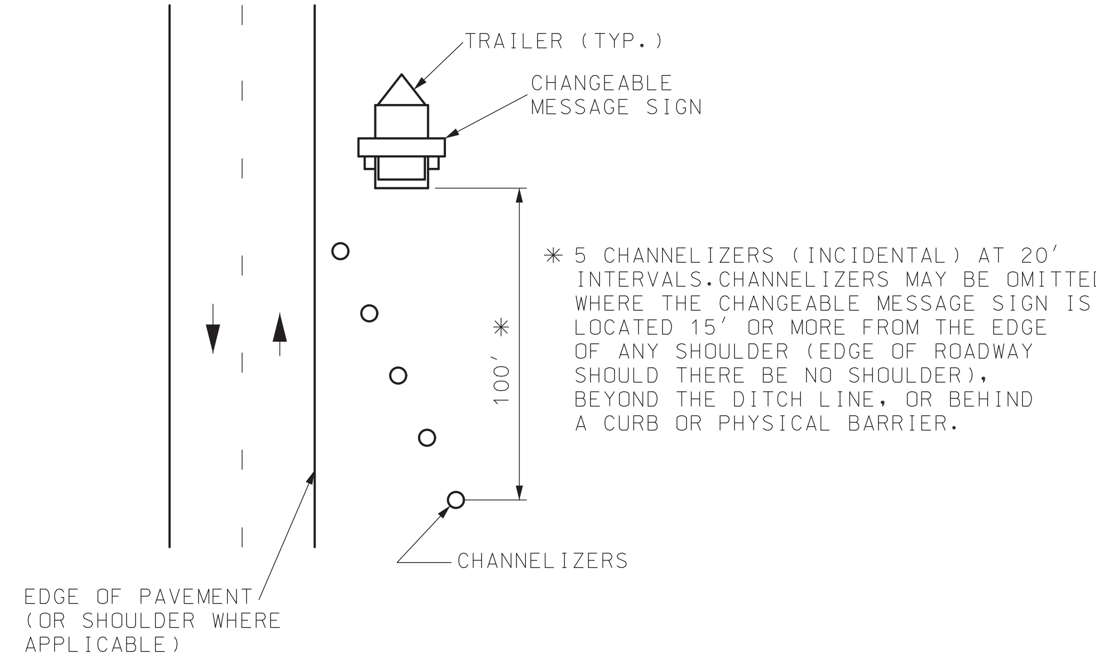
TYPE 3 MOVABLE BARRICADE

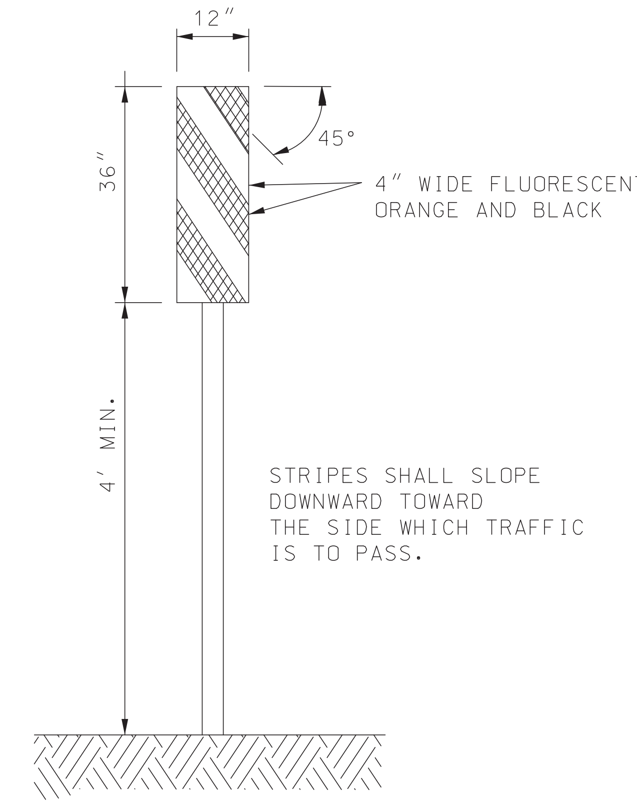
DATE EFFECTIVE:	4/1/2023	616.10BB	SHEET NO.
DATE PREPARED:	1/13/2023		4 OF 9



TWO LANE / TWO WAY TRAFFIC DELINEATION PLAN FOR DIVIDED HIGHWAY

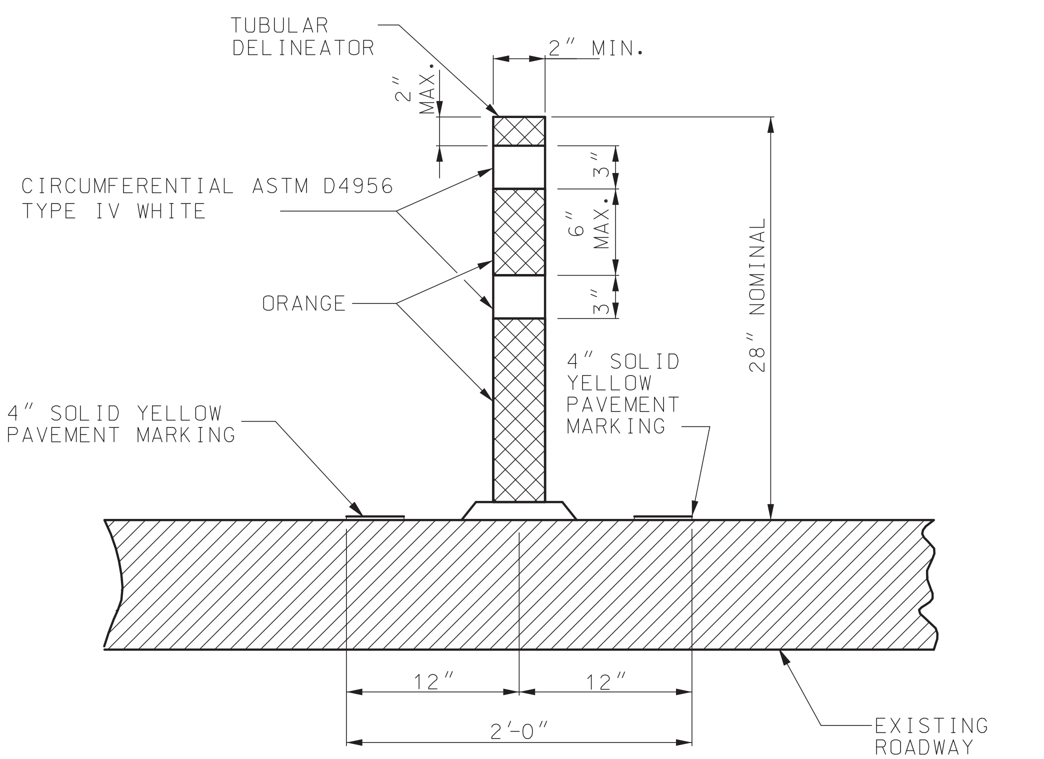
IF RAISED PAVEMENT MARKERS ARE PRESENT, THE LENSES SHALL BE REMOVED OR COVERED TO THE SATISFACTION OF THE ENGINEER.





TYPE 3 OBJECT MARKERS

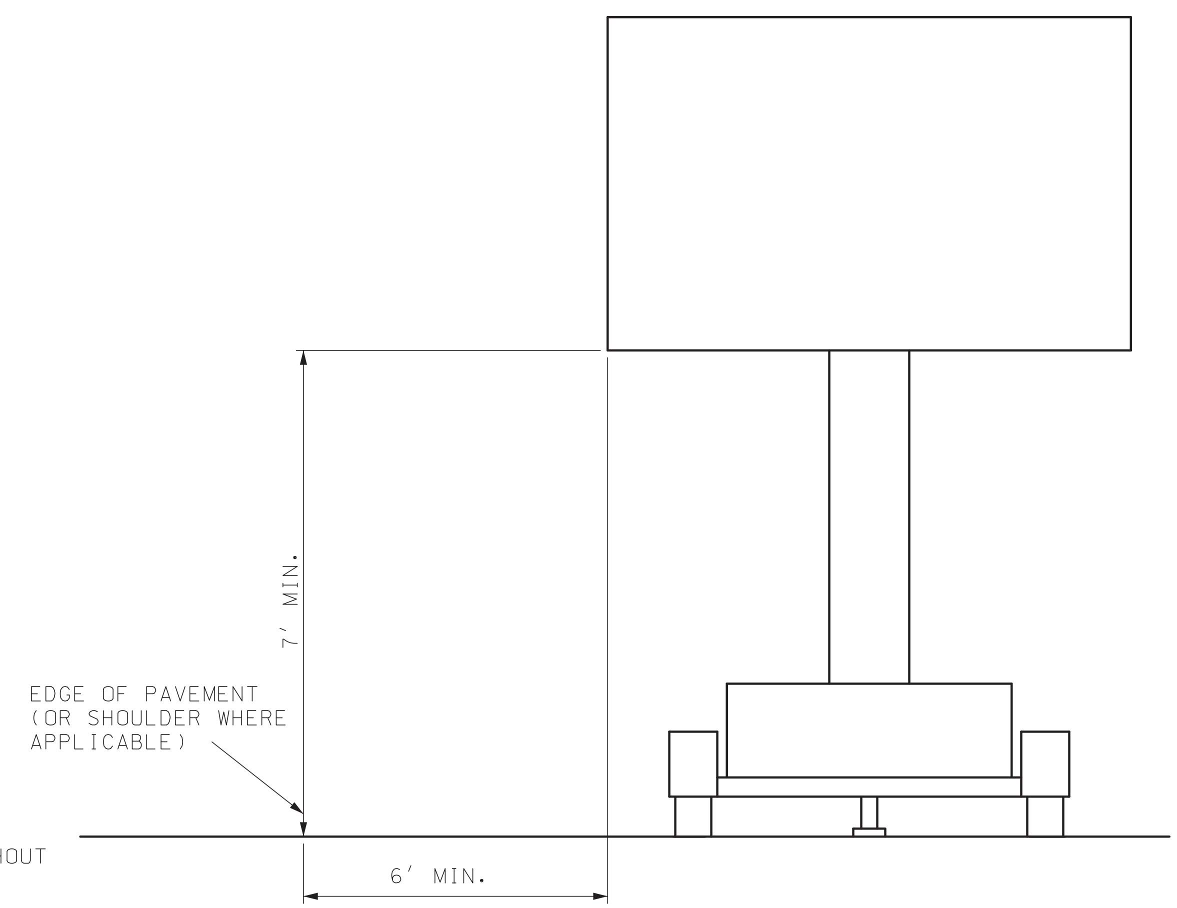
FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.



SECTION A-A TUBULAR DELINEATOR DETAIL

AN ADHESIVE, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, SHALL BE USED TO APPLY THE TUBULAR DELINEATOR TO THE ROADWAY SURFACE. THE ADHESIVE SHALL PERMIT EASY REMOVAL OF THE TUBULAR DELINEATOR WITHOUT DAMAGE TO THE ROADWAY SURFACE.

REFLECTIVE SHEETING APPLIED TO TUBULAR DELINEATORS SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.



CHANGEABLE MESSAGE SIGN

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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TEMPORARY TRAFFIC CONTROL DEVICES

DATE EFFECTIVE:	4/1/2023	616.10BB	SHEET NO. 5 OF 9
DATE PREPARED:	1/13/2023		

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

SIGN	SIZE (IN.)	AREA (SQ. FT.)	SHEETING	COLOR SYM. LEG. BRD.	COLOR BACK-GROUND	DESIGNATION (6)	DESCRIPTION
							WARNING SIGNS
W01-1L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TURN (SYMBOL LEFT ARROW)
W01-1R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TURN (SYMBOL RIGHT ARROW)
W01-2L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	CURVE (SYMBOL LEFT ARROW)
W01-2R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	CURVE (SYMBOL RIGHT ARROW)
W01-3L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE TURN (SYMBOL LEFT ARROW)
W01-3R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE TURN (SYMBOL RIGHT ARROW)
W01-4L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE CURVE (SYMBOL LEFT ARROW)
W01-4R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE CURVE (SYMBOL RIGHT ARROW)
W01-4bL	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (2)
W01-4bR	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (2)
W01-4cL	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRIPLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (2)
W01-4cR	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRIPLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (2)
W01-6	60X30	12.50	ASTM 9 OR 11	BK	FL. OR	SHF	HORIZONTAL ARROW (SYMBOL)
W01-6a	72X36	18.00	ASTM 9 OR 11	BK	FL. OR	SHF	HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE) (1)
W01-7	60X30	12.50	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL)
W01-7a	72X36	18.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE)(1)
W01-8	18X24	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	CHEVRON (SYMBOL)
W01-8a	30X36	7.50	ASTM 9 OR 11	BK	FL. OR	SHF	CHEVRON (SYMBOL FOR DIVIDED HIGHWAYS)
W03-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	STOP AHEAD (SYMBOL)
W03-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	YIELD AHEAD (SYMBOL)
W03-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SIGNAL AHEAD (SYMBOL)
W03-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BE PREPARED TO STOP
W03-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SPEED LIMIT AHEAD
W04-1L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (SYMBOL FROM LEFT)
W04-1R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (SYMBOL FROM RIGHT)
W04-1a(L)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (ARROW SYMBOL) (3)
W04-1a(R)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (ARROW SYMBOL) (3)
W05-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD/BRIDGE/RAMP NARROWS (4)
W05-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ONE LANE BRIDGE
W05-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	NARROW LANES (3)
W06-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIVIDED HIGHWAY (SYMBOL)
W06-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIVIDED HIGHWAY END (SYMBOL)
W06-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TWO WAY TRAFFIC (SYMBOL)
W07-3a	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	NEXT XX MILES (PLAQUE)
W08-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BUMP
W08-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIP
W08-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	PAVEMENT ENDS
W08-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SOFT SHOULDER
W08-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SLIPPERY WHEN WET (SYMBOL)
W08-6	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRUCK CROSSING WITH FLAGS
W08-6c	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRUCK ENTRANCE (3)
W08-7a	36X36	9.00	ASTM 9 OR 11	BK	FL. OR	SHF	FRESH OIL/LOOSE GRAVEL (3)
W08-9	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW SHOULDER
W08-11	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	UNEVEN LANES
W08-12	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	NO CENTER LINE
W08-15	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	GROOVED PAVEMENT
W08-15p	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	MOTORCYCLE (PLAQUE)
W08-17(L)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP-OFF (SYMBOL LEFT)
W08-17(R)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP OFF (SYMBOL RIGHT)
W08-17p	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP-OFF (PLAQUE)
W10-1	42 RND.	9.62	ASTM 9 OR 11	BK	FL. YL	SHF	RAILROAD CROSSING
W012-1	24X24	4.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE DOWN ARROW (SYMBOL)
W012-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE (SYMBOL)
W012-2x	24X18	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE (PLAQUE) (3)
W012-2a	84X24	14.00	ASTM 9 OR 11	BK	FL. OR	SHF	OVERHEAD LOW CLEARANCE (FEET AND INCHES) (3)
W012-4	120X60	50.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE XX FT XX IN XX MILES AHEAD (3)
W012-5	120X60	50.00	ASTM 9 OR 11	BK	FL. OR	SHF	WIDTH RESTRICTION XX FT XX IN XX MILES AHEAD (3)
W013-1	30X30	6.25	ASTM 9 OR 11	BK	FL. OR	SHF	ADVISORY SPEED (PLAQUE)
W016-2	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	XXX FEET (PLAQUE)
W016-3	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	X MILE (PLAQUE)
W020-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD/BRIDGE/RAMP WORK AHEAD (4)
W020-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR AHEAD
W020-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD CLOSED AHEAD
W020-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ONE LANE ROAD AHEAD
W020-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/CENTER/LEFT LANE CLOSED AHEAD (4)

(1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

(2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA FOR SIGN DEPICTION. ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

(3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

(4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.

(5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.

(6) SHF AND SH DESIGNATIONS, REFER TO STD. 903.02 SHEET 1 OF 8.

GENERAL NOTES:

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.

SIGN DIMENSIONS SHOWN ARE MINIMUM. NO ADDITIONAL PAYMENT WILL BE MADE IF CONTRACTORS USE LARGER SIGNS.

NO ADDITIONAL PAYMENT WILL BE MADE FOR PLATES.

ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.

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.

TEMPORARY
TRAFFIC CONTROL DEVICES
WARNING SIGNS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/13/2023

616.10BB

SIGN	SIZE (IN.)	AREA (SQ. FT.)	SHEETING	COLOR SYM. LEG. BRD.	COLOR BACK-GROUND	DESIGNATION (6)	DESCRIPTION	
WARNING SIGNS CONT.								
W020-5a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	2 RIGHT/CENTER/LEFT LANES CLOSED AHEAD	(4)
W020-6a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/CENTER/LEFT LANE CLOSED	(3)(4)
W020-7	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	FLAGGER (SYMBOL) WITH FLAGS	
W021-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER WORK/SHOULDER WORK AHEAD	(3)
W021-5a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/LEFT SHOULDER CLOSED	(4)
W021-5b	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT/LEFT SHOULDER CLOSED AHEAD	(4)
W022-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BLASTING ZONE AHEAD	
W022-2	42X36	10.50	ASTM 9 OR 11	BK	FL. OR	SHF	TURN OFF 2-WAY RADIO AND PHONE	
W022-3	42X36	10.50	ASTM 9 OR 11	BK	FL. OR	SHF	END BLASTING ZONE	
G022-1	15X21	2.19	ASTM 9 OR 11	BK	FL. OR	SHF	WET PAINT (ARROW PIVOTS)	(3)
GUIDE SIGNS								
E05-1	36X48	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	GORE EXIT	(3)
E05-2	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	EXIT OPEN	(3)
E05-2a	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	EXIT CLOSED	
G020-1	60X24	10.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD WORK NEXT XX MILES	
G020-2	48X24	8.00	ASTM 9 OR 11	BK	FL. OR	SHF	END ROAD WORK	
G020-4	36X18	4.50	ASTM 9 OR 11	BK	FL. OR	SHF	PILOT CAR FOLLOW ME - REAR VEHICLE MOUNT SIGN	
G020-4a	42X30	8.75	ASTM 9 OR 11	BK	FL. OR	SHF	PILOT CAR IN USE WAIT & FOLLOW - STATE ROUTE SIGN	
G020-4a	18X12	1.50	ASTM 9 OR 11	BK	FL. OR	SHF	PILOT CAR IN USE WAIT & FOLLOW - NON-STATE ROUTE SIGN	
G020-5aP	36X24	6.00	ASTM 9 OR 11	BK	FL. OR	SHF	WORK ZONE (PLAQUE)	(3)(5)
M04-8a	24X18	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	END DETOUR	
M04-9L	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (LEFT ARROW)	
M04-9R	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (RIGHT ARROW)	
M04-9P	48X12	4.00	ASTM 9 OR 11	BK	FL. OR	SHF	STREET NAME (PLAQUE)	
M04-10L	48X18	6.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (ARROW LEFT)	
M04-10R	48X18	6.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (ARROW RIGHT)	
REGULATORY SIGNS								
R1-1	48X48	13.25	ASTM 4	WH	RD	SH	STOP	
R1-2	48 TRI.	6.93	ASTM 4	RD	WH	SH	YIELD	
R1-2a	36X36	9.00	ASTM 4	BK	WH	SH	TO ONCOMING TRAFFIC (PLAQUE)	
R1-3p	30X12	2.50	ASTM 4	WH	RD	SH	ALL WAY (PLAQUE)	
R2-1	36X48	12.00	ASTM 4	BK	WH	SH	SPEED LIMIT XX	
R3-1	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO RIGHT TURN (SYMBOL)	
R3-2	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO LEFT TURN (SYMBOL)	
R3-3	36X36	9.00	ASTM 4	BK	WH	SH	NO TURNS	
R3-4	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO U-TURN (SYMBOL)	
R3-7L	30X30	6.25	ASTM 4	BK	WH	SH	LEFT LANE MUST TURN LEFT	
R3-7R	30X30	6.25	ASTM 4	BK	WH	SH	RIGHT LANE MUST TURN RIGHT	
R4-1	36X48	12.00	ASTM 4	BK	WH	SH	DO NOT PASS	
R4-2	36X48	12.00	ASTM 4	BK	WH	SH	PASS WITH CARE	
R4-7a	36X48	12.00	ASTM 4	BK	WH	SH	KEEP RIGHT (HORIZONTAL ARROW)	
R4-8a	36X48	12.00	ASTM 4	BK	WH	SH	KEEP LEFT (HORIZONTAL ARROW)	
R5-1	30X30	6.25	ASTM 4	RD	WH	SH	DO NOT ENTER	
R5-1a	36X24	6.00	ASTM 4	WH	RD	SH	WRONG WAY	
R6-1L	54X18	6.75	ASTM 4	BK	WH	SH	ONE WAY ARROW (LEFT)	
R6-1R	54X18	6.75	ASTM 4	BK	WH	SH	ONE WAY ARROW (RIGHT)	
R6-2L	24X30	5.00	ASTM 4	BK	WH	SH	ONE WAY (LEFT)	
R6-2R	24X30	5.00	ASTM 4	BK	WH	SH	ONE WAY (RIGHT)	
R9-9	24X12	2.00	ASTM 4	BK	WH	SH	SIDEWALK CLOSED	
R9-11L	24X18	3.00	ASTM 4	BK	WH	SH	SIDEWALK CLOSED AHEAD, (ARROW RIGHT) CROSS HERE	
R9-11R	24X18	3.00	ASTM 4	BK	WH	SH	SIDEWALK CLOSED AHEAD, (ARROW LEFT) CROSS HERE	
R10-6	24X36	6.00	ASTM 4	BK	WH	SH	STOP HERE ON RED (45° ARROW)	
R11-2	48X30	10.00	ASTM 4	BK	WH	SH	ROAD CLOSED	
R11-3a	60X30	12.50	ASTM 4	BK	WH	SH	ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY	
R11-4	60X30	12.50	ASTM 4	BK	WH	SH	ROAD CLOSED TO THRU TRAFFIC	
CONST-3A	60X48	20.00	ASTM 4	BK	WH/ FL. OR	SH	FINE SIGN	(3)
CONST-3X	56X12	4.67	ASTM 4	BK	WH	SH	SPEEDING/PASSING (PLATE)	(3)
MISCELLANEOUS SIGNS								
CONST-5	48X36	12.00	ASTM 4	WH	BL	SH	POINT OF PRESENCE	
CONST-5	96X48	32.00	ASTM 4	WH	BL	SH	POINT OF PRESENCE	
CONST-7	72X36	18.00	ASTM 4	WH/BK	BL/FL.OR	SH	RATE OUR WORK ZONE	
CONST-7	48X24	8.00	ASTM 4	WH/BK	BL/FL.OR	SH	RATE OUR WORK ZONE	
CONST-8	48X36	12.00	ASTM 9 OR 11	BK	FL.OR	SHF	WORK ZONE NO PHONE ZONE	

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(2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA FOR SIGN DEPICTION. ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

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(4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.

(5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.

(6) SHF AND SH DESIGNATIONS, REFER TO STD. 903.02 SHEET 1 OF 8.

GENERAL NOTES:

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.

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

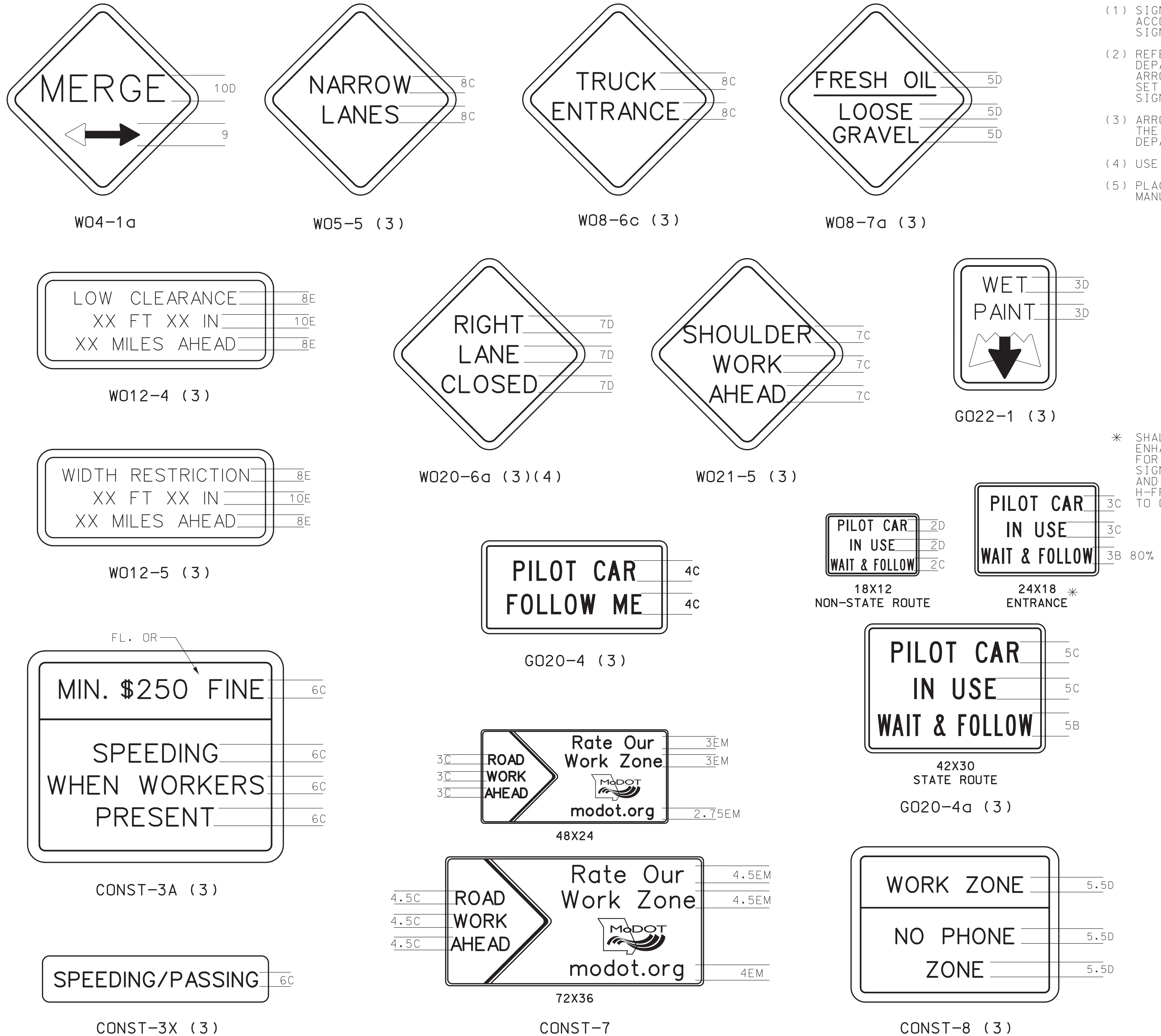
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TEMPORARY TRAFFIC CONTROL DEVICES
WARNING, GUIDE AND REGULATORY SIGNS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/13/2023

616.10BB

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



(1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

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(4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.

(5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.

✳ SHALL ONLY BE USED AT PRIVATE AND COMMERCIAL ENTRANCES TO ENHANCE THE WORK ZONE SIGNING AND WILL NOT BE PERMITTED FOR USE ON INTERSECTING STATE, COUNTY OR CITY ROADS. SIGN SHALL BE PRINTED ON 4MM CORRUGATED PLASTIC OR SIMILAR AND SUPPORTED WITH A 10"X30" 9-GAUGE GALVANIZED STEEL H-FRAME OR SIMILAR. COST OF SIGNS AND STANDS IS INCIDENTAL TO OTHER TRAFFIC CONTROL ITEMS.

GENERAL NOTES:

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LETTER DIMENSIONS SHALL BE AS SHOWN.

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STATE OF MISSOURI
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TEMPORARY TRAFFIC CONTROL DEVICES

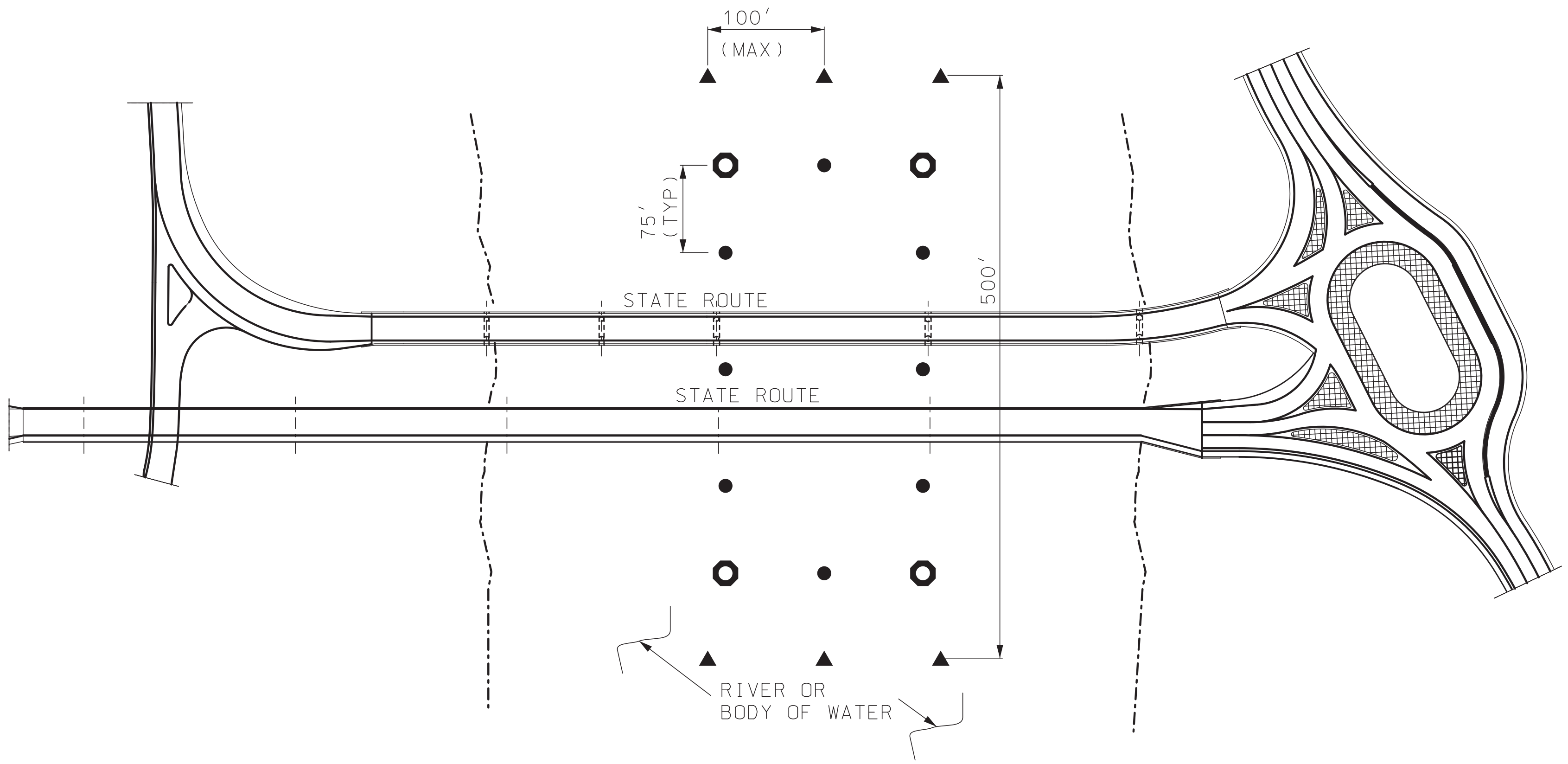
DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/18/2023

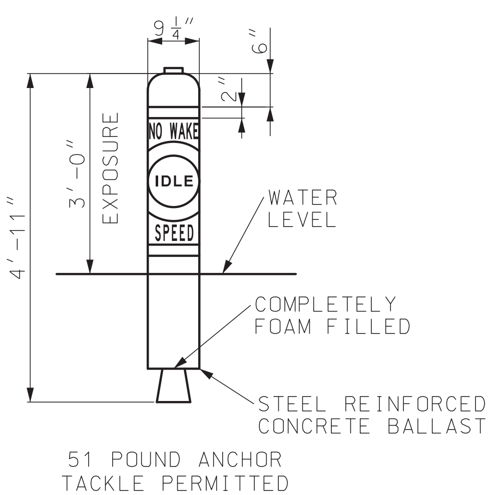
616.10BB

SHEET NO. 8 OF 9

LEGEND

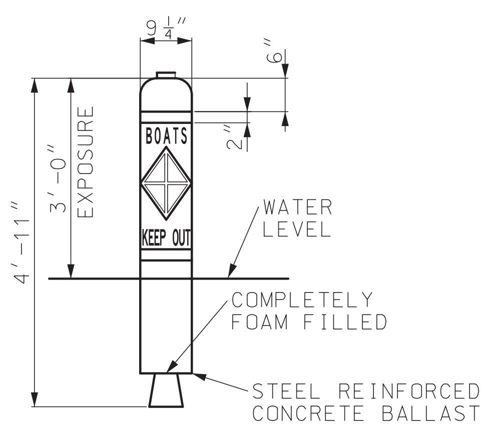
- BOATS KEEP OUT (SIGN)
- BOATS KEEP OUT (BUOY)
- NO WAKE (BUOY)





RESTRICTED AREA BUOY

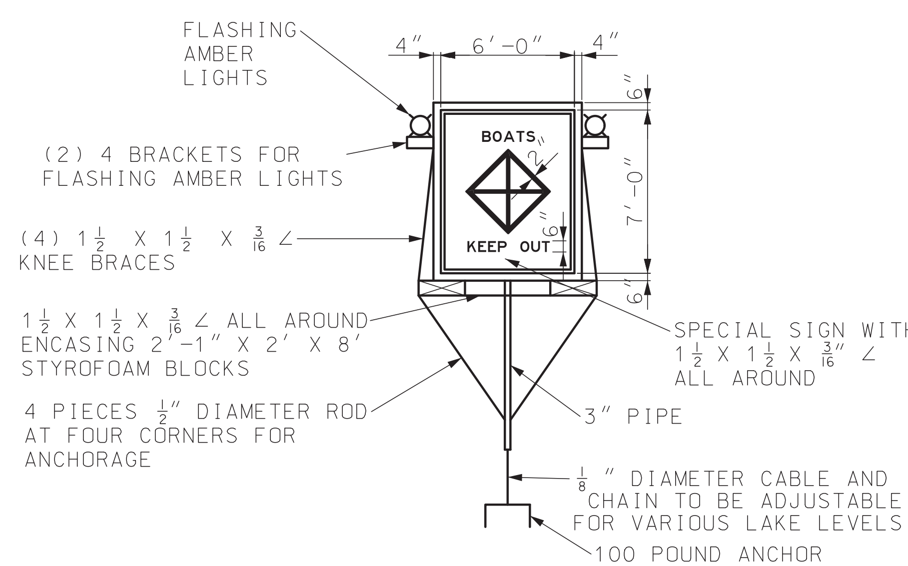
("NO WAKE")
(6 REQUIRED - ROADWAY ITEM)



51 POUND ANCHOR
TACKLE PERMITTED

CONTROLLED AREA BUOY

("BOATS KEEP OUT")
(8 REQUIRED - ROADWAY ITEM)



SPECIAL SIGN ASSEMBLY

("BOATS KEEP OUT")
(4 REQUIRED - ROADWAY ITEM)

GENERAL NOTES:

INFORMATION SHOWN IS SCHEMATIC ONLY. FINAL LOCATION AND NUMBER OF SIGNS AND BUOYS IS SUBJECT TO APPROVAL OF MISSOURI STATE WATER PATROL

THE DETAILS SHOWN ARE FOR BIDDING PURPOSES ONLY. ALL MATERIALS AND LABOR NECESSARY TO INSTALL AND REMOVE

SIGNS SHALL BE INCIDENTAL TO OTHER ITEMS

THE CONTRACTOR IS RESPONSIBLE FOR BUOY MAINTENANCE THROUGHOUT CONSTRUCTION AND FOR DETERMINING ANTICIPATED WATER LEVELS DURING CONSTRUCTION. EACH SIGN AND BUOY SHALL BE ANCHORED TO BOTTOM OF LAKE.

SIGNS SHALL BE DOUBLE FACED

EACH SIGN SHALL BE EQUIPPED WITH TWO (2) FLASHING LIGHT UNITS WITH AMBER LENS. FLASHING LIGHT UNITS SHALL BE FURNISHED AND MAINTAINED BY THE CONTRACTOR

ALL LETTERING TO BE BLACK IN COLOR IN BLOCK FORM.

FOR OTHER INFORMATION AND LOCATION OF SIGNS AND BUOYS SEE SPECIAL PROVISIONS.

SCHEMATIC SHOWN IS FOR ONE NAVIGATIONAL SPAN. FOR WORK ON OTHER SPANS MOVE APPROPRIATE SIGNS WITH NO DIRECT PAY

COLOR:
- BACKGROUND - WHITE
- LEGEND - BLACK
- 2" REFLECTIVE BAND AND SYMBOL - INTERNATIONAL ORANGE

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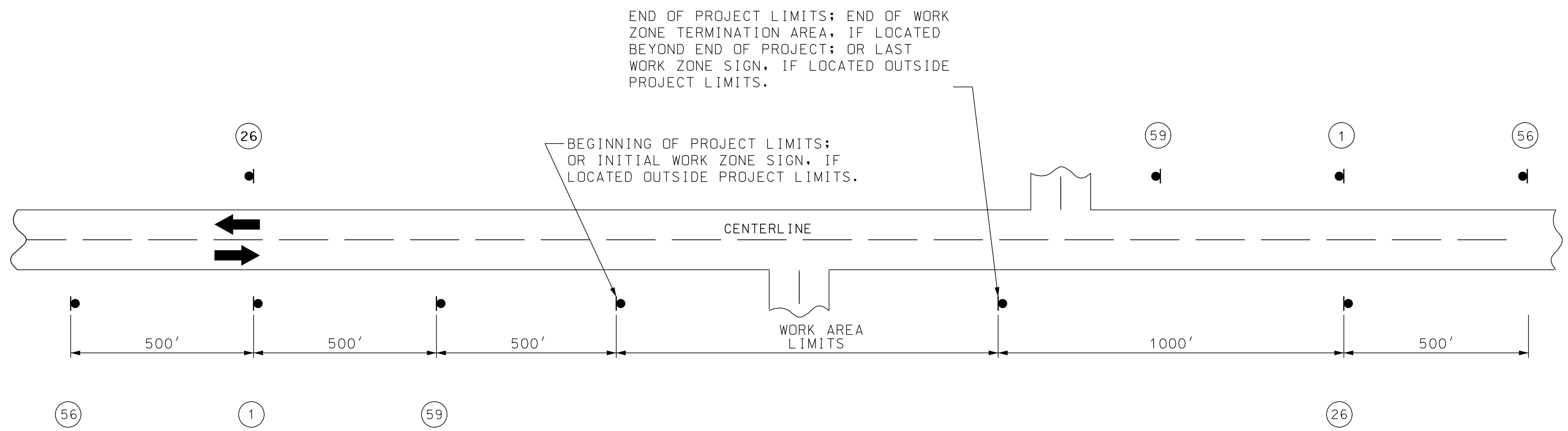
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TEMPORARY
TRAFFIC CONTROL DEVICES

TRAFFIC CONTROL
FOR WATERWAYS

DATE EFFECTIVE:	4/1/2023	616.10BB	SHEET NO. 9 OF 9
DATE PREPARED:	1/13/2023		

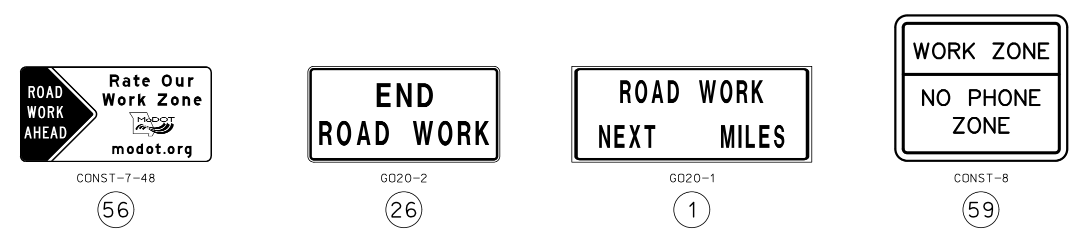


NOTES:

SIGN (1) AND (26) ARE ONLY USED ON PROJECT LENGTHS 2 MILES OR GREATER.

PROVIDE SIGNS IN EACH DIRECTION ON TWO-WAY HIGHWAY.

DISTANCE MAY BE ADJUSTED ACCORDING TO FIELD CONDITIONS.



THIS TEMPORARY TRAFFIC CONTROL IS FOR USE ON THE FOLLOWING PAVEMENT TREATMENT PROJECTS AND IS NOT INTENDED FOR USE WHEN ADDITIONAL CONSTRUCTION ITEMS SUCH AS SHOULDER WIDENING, PIPE REPLACEMENT OR EXTENSIONS, GUARDRAIL CONSTRUCTION OR REPAIR, AND/OR SIGN INSTALLATIONS ARE PART OF THE PROJECT:

- ASPHALTIC RESURFACING (SECTIONS 401 AND 402)
- SEAL COAT
- SCRUB SEAL/SAND SEAL

NOT TO SCALE

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.

TEMPORARY TRAFFIC CONTROL PLANS

PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021

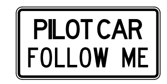
616.20

SHEET NO. 1 OF 5

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

W20-1

(2)



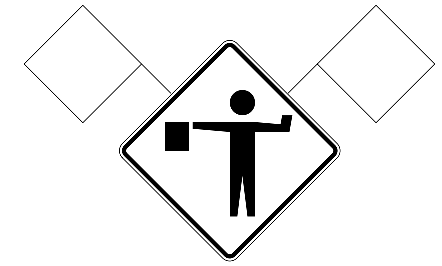
G20-4

(53)

SIGN 53, "PILOT CAR FOLLOW ME" SHALL BE THE CONTRACTOR'S RESPONSIBILITY WHEN IN USE DURING OPERATION.

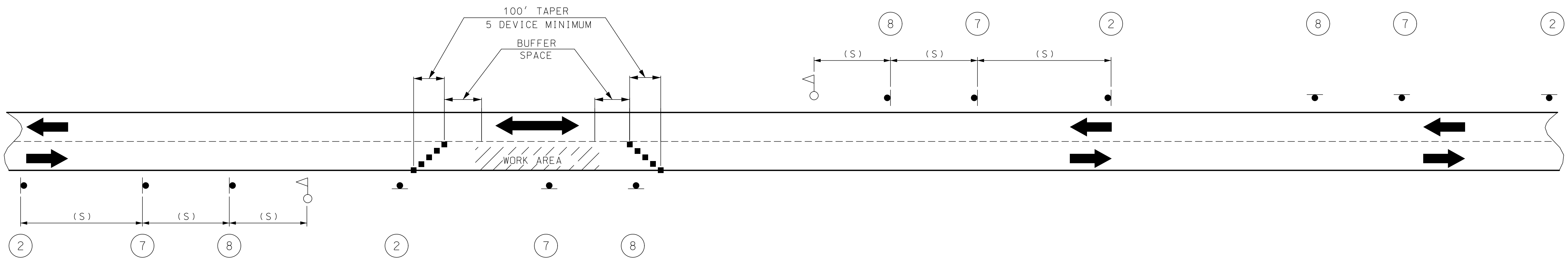
W20-4

(7)



W20-7a

(8)



SET 1 — ACTIVE

SET 2 — INACTIVE

SET 3 — ACTIVE

SET 4 — INACTIVE

PERMANENT POSTED SPEED LIMIT (MPH)	BUFFER SPACE LENGTH (FT)
0 - 35	280
40 - 45	400
50 - 55	560
60 - 70	840

NOTES:

DAYLIGHT FLAGGING OPERATIONS ONLY.

CHANNELIZING DEVICES LOCATED DOWNSTREAM OF THE ONE-LANE, TWO-WAY TAPER ARE OPTIONAL. THESE DEVICES SHOULD BE ELIMINATED WHEN THEIR USE WILL REDUCE THE USABLE LANE WIDTH, INCLUDING ANY ACCEPTABLE SHOULDERS, TO LESS THAN 10' OR WILL SIGNIFICANTLY AFFECT THE RESURFACING OPERATION.

SIGN SETS 1 AND 3 ARE ACTIVE AND (I.E., SIGNS FACE ONCOMING TRAFFIC) SIGN SETS 2 AND 4 ARE INACTIVE (I.E., SIGNS DO NOT FACE EITHER DIRECTION OF TRAFFIC) WHEN THE RESURFACING OPERATION IS LOCATED BETWEEN SIGN SETS 1 AND 3.

WHEN SIGN SETS 2 AND 4 ARE ACTIVE, SIGN SETS 1 AND 3 BECOME INACTIVE AND ARE ADVANCED TO BECOME SETS 2 AND 4 WITH SIGN LEGENDS TURNED AWAY FROM BOTH DIRECTIONS OF TRAFFIC. WHEN THE RESURFACING OPERATION ADVANCES TO BETWEEN SIGN SETS 2 AND 4, SIGN SETS 2 AND 4 BECOME ACTIVE (I.E., NEW SIGN SETS 1 AND 3) AND SIGN SETS 1 AND 3 ADVANCED IN THE DIRECTION OF THE OPERATION (I.E., NEW SIGN SETS 2 AND 4).

WHEN TEMPORARY RUMBLE STRIPS ARE USED, REFER TO EPG FIGURE 616.6.87.1 FOR DISTANCES AND SPACING.

■ - CHANNELIZERS

- FLAGGER

SPEED	SIGN SPACING (FT.) (1)
PERMANENT POSTED (MPH)	NON-DIVIDED HIGHWAYS (S)
0-35	200
40-45	350
50-55	500
60-70	1000

NOTES:

(1) SPACING BETWEEN SIGNS, BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER OR SIGNED CONDITION.

SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.

NOT TO SCALE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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TEMPORARY TRAFFIC CONTROL PLANS

PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 5/12/2021

616.20

SHEET NO. 2 OF 5

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

SPEED	SIGN SPACING (FT.)
PERMANENT POSTED (MPH)	NON-DIVIDED HIGHWAYS (S)
0-35	200
40-45	350
50-55	500
60-70	1000

DISTANCE MAY BE ADJUSTED ACCORDING TO FIELD CONDITIONS.

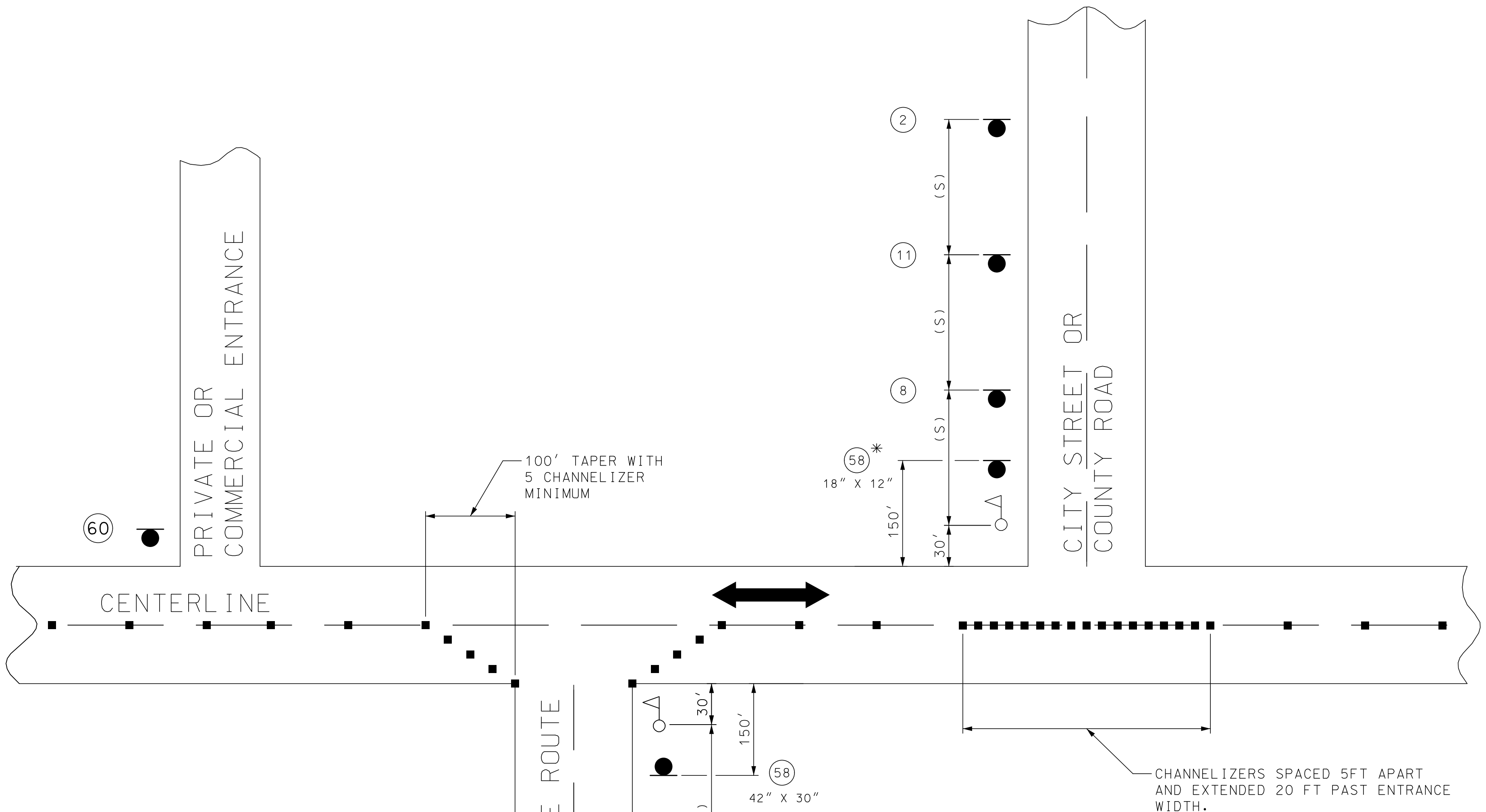
NOTES:
WARNING SIGNS SHALL BE ERECTED AT EACH INTERSECTION WITH ANOTHER STATE HIGHWAY WITHIN THE WORK ZONE.

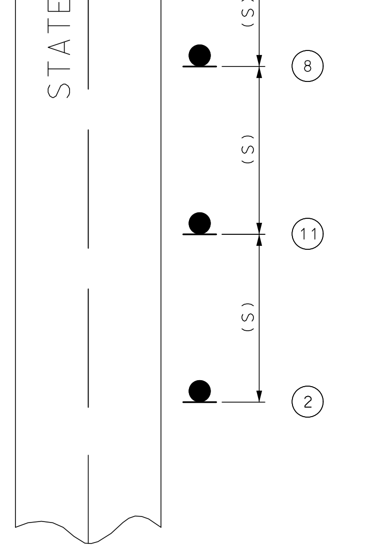
ADDITIONAL WARNING SIGNS SHALL BE ERECTED AT OTHER INTERSECTIONS WITHIN THE WORK ZONE, AS DIRECTED BY THE ENGINEER.

■ - CHANNELIZERS (AS SPECIFIED)

- FLAGGER

NOT TO SCALE





SHALL BE USED ON ALL INTERSECTIONS.

* THE SMALLER 18" X 12" SIGN 58 IS USED ON ALL OTHER NON-STATE ROUTES (CITY STREETS, COUNTY ROADS, ETC.).

SHALL ONLY BE USED AT PRIVATE AND COMMERCIAL ENTRANCES. SEE SPECIAL PROVISIONS.

SIDE ROADS ENTERING WORK ZONES

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STATE OF MISSOURI
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TEMPORARY TRAFFIC CONTROL PLANS

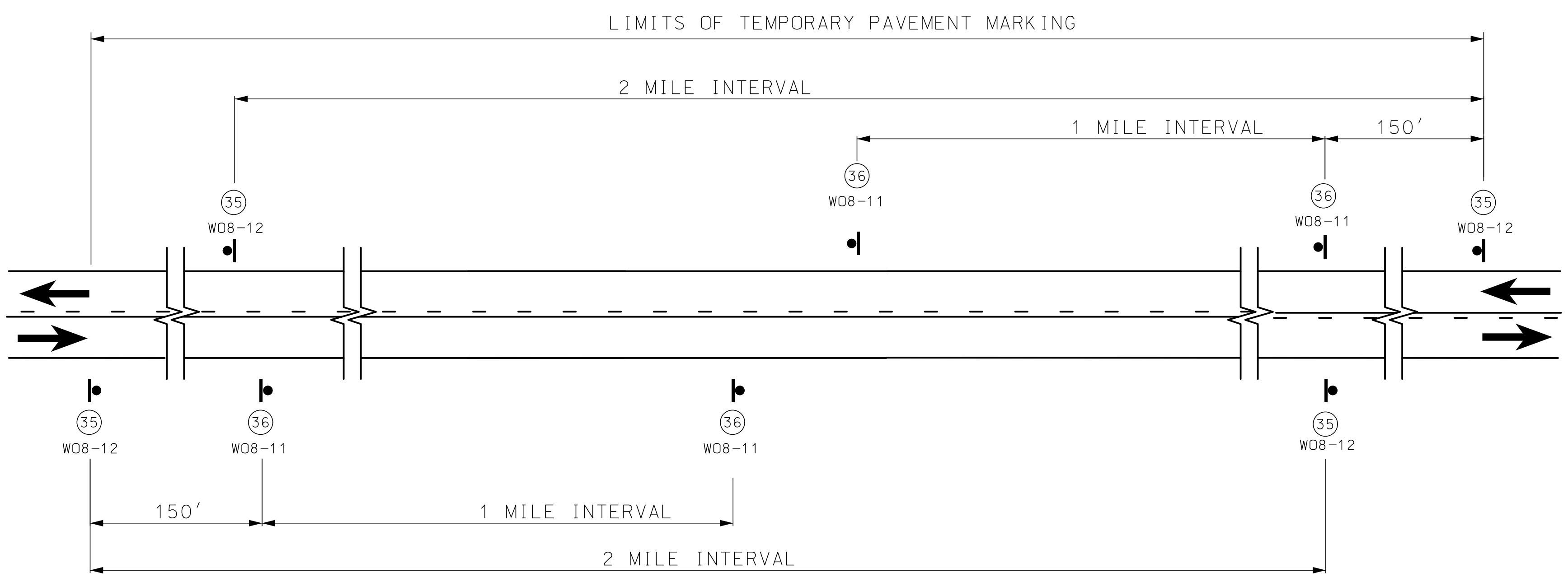
PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021

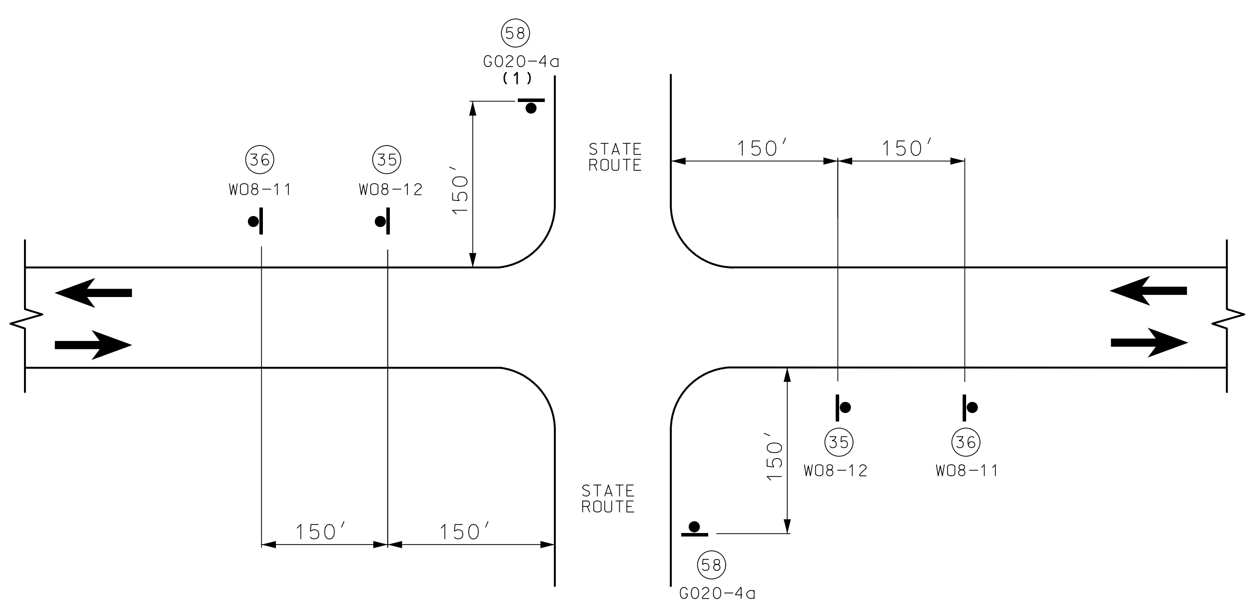
616.20

SHEET NO. 3 OF 5

NOT TO SCALE



SIGN SPACING AND TEMPORARY STRIPING FOR MAINLINE



SIGN SPACING AT STATE ROUTE INTERSECTIONS
SHOWING TEMPORARY STRIPING FOR MAINLINE

NOTES:

SIGN (35) AND TEMPORARY RAISED PAVEMENT MARKING (SEE STANDARD PLAN 620.10) INSTALLED WHERE CENTERLINE STRIPING HAS BEEN COVERED OR REMOVED. SIGNS ARE TO REMAIN IN PLACE UNTIL THE PERMANENT CENTERLINE PAVEMENT MARKINGS ARE IN PLACE. SIGNS SHALL BE COVERED OR REMOVED WHEN PAVEMENT CENTERLINE MARKING HAS BEEN INSTALLED.

SIGN (35) IS PLACED AT APPROXIMATELY TWO-MILE INTERVALS AND AT STATE ROUTE JUNCTIONS. WHEN THE INSTALLATION AT A JUNCTION IS WITHIN ONE-EIGHTH MILE OF THE NORMAL MAINLINE SIGN (35), THE LATTER MAY BE ELIMINATED.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLAN 616.10 AND 903.03.

SEE STANDARD PLAN 620.10 FOR ALL TEMPORARY PAVEMENT MARKING.

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TEMPORARY TRAFFIC CONTROL PLANS

PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021

616.20

NOT TO SCALE

NOTES:

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY PROVIDE ADDITIONAL PROTECTIVE TRUCK EQUIPPED WITH PROPER WARNING DEVICES.

PROTECTIVE TRUCK AND WORK VEHICLES SHALL DISPLAY HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING, OR STROBE LIGHTS.

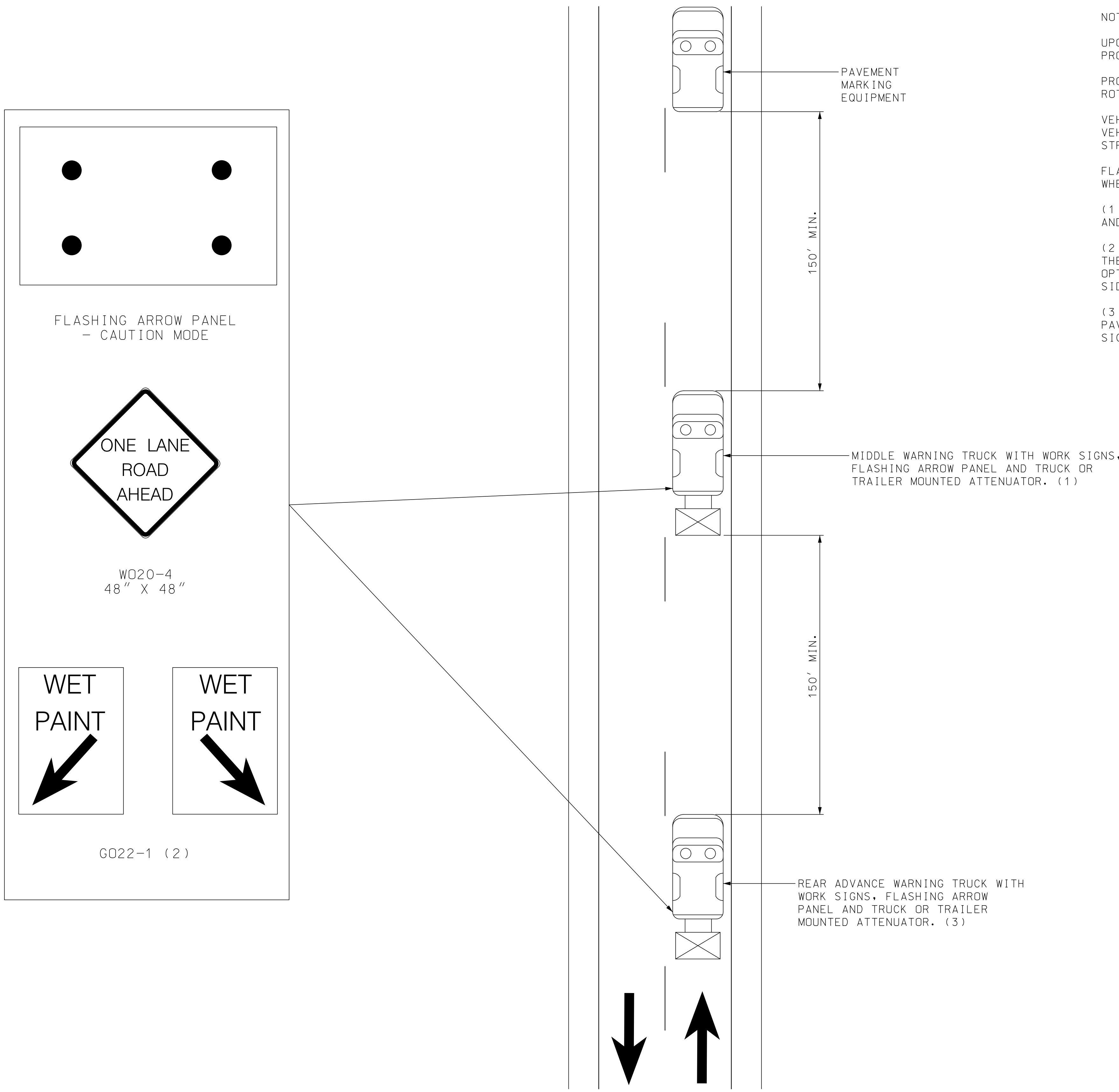
VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING, OR STROPE LIGHTS.

FLASHING ARROW PANELS SHALL BE INCIDENTAL TO TRUCK MOUNTED ATTENUATORS, WHEREVER USED. NO ADDITIONAL PAYMENT SHALL BE MADE.

(1) TRUCK IS OPTIONAL ON TWO-LANE UNDIVIDED HIGHWAYS IF SIGNING AND ARROW BOARD IS MOUNTED ON THE PAVEMENT MARKING EQUIPMENT.

(2) WET PAINT SIGNS ARE INSTALLED TO INDICATE THE SIDE IN WHICH THE PAVEMENT MARKING MATERIAL IS BEING APPLIED. AT THE CONTRACTOR'S OPTION, A FRONT FACING WET PAINT SIGN MAY BE INSTALLED ON THE LEFT SIDE OF THE PAVEMENT MARKING EQUIPMENT.

(3) REAR ADVANCE WARNING TRUCK IS POSITIONED AT THE NO TRACK POINT OF THE PAVEMENT MARKING MATERIAL, OR VERTICAL OR HORIZONTAL CURVES THAT RESTRICT SIGHT DISTANCE, OR SPACING SHOWN.



CENTERLINE/EDGELINE STRIPING ON TWO-LANE HIGHWAYS

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TEMPORARY TRAFFIC CONTROL PLANS

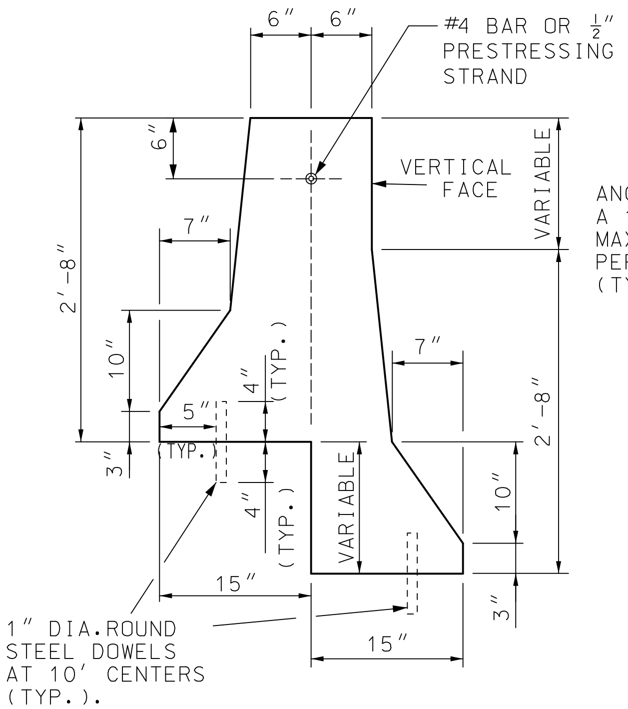
PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021

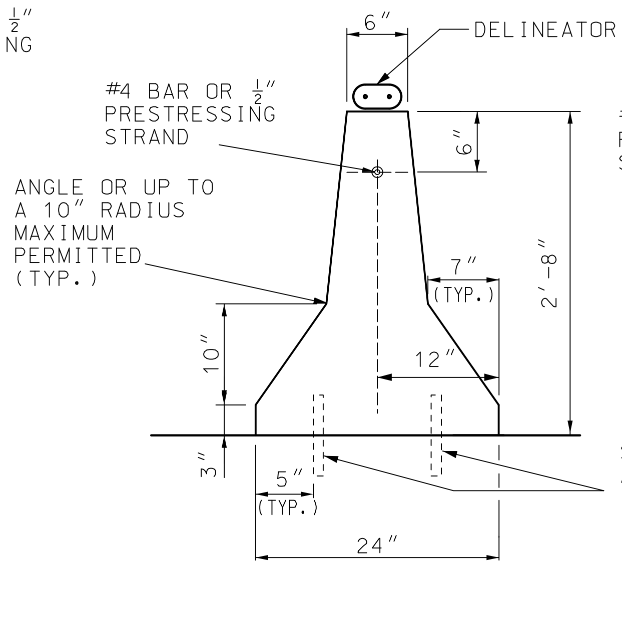
616.20

SHEET NO. 5 OF 5

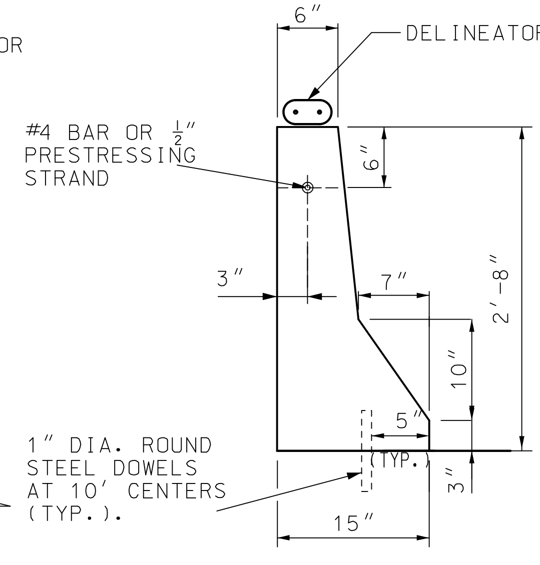
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



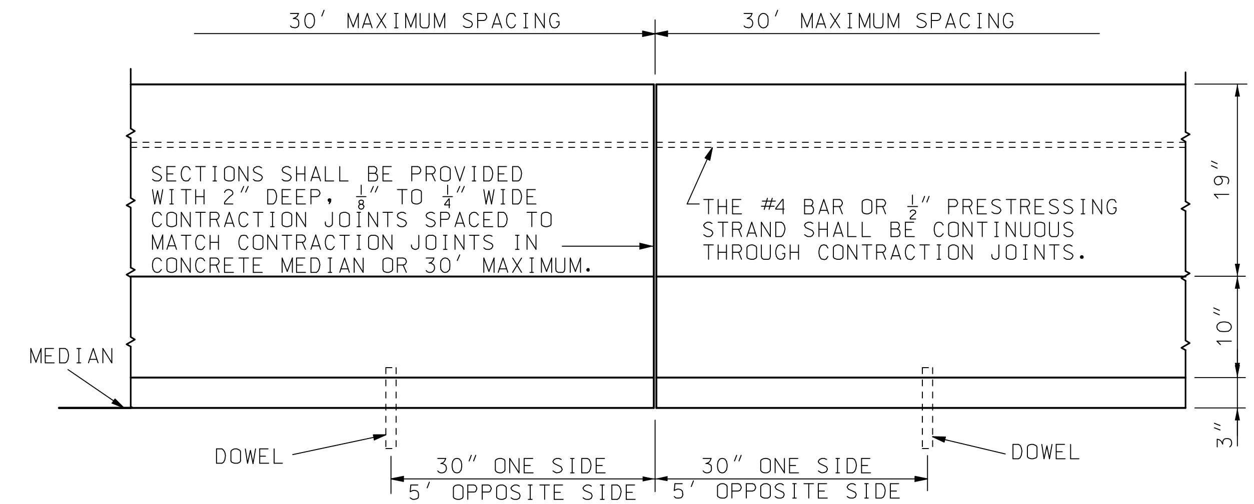
TYPICAL VIEW
BARRIER FOR
STEPPED PAVEMENT

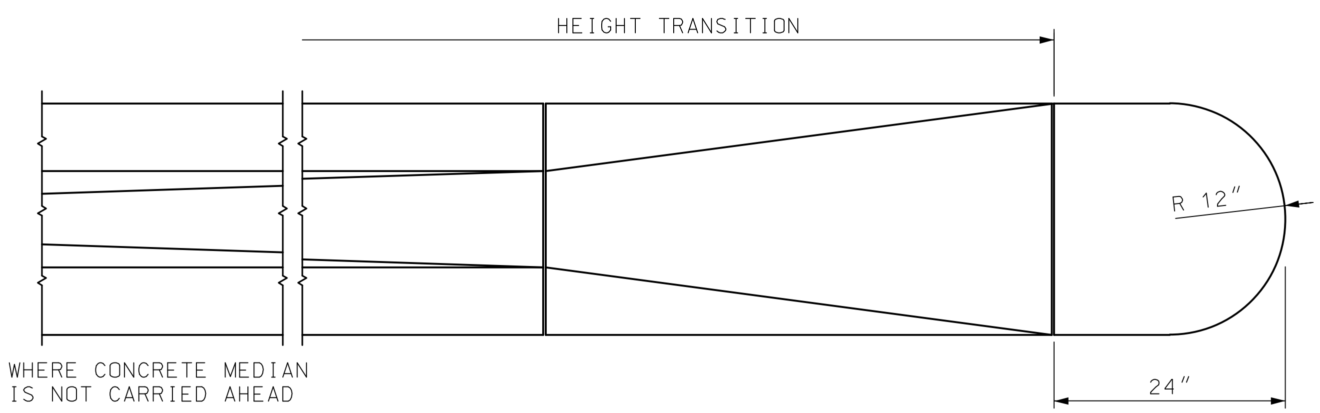


TYPICAL VIEW
TYPE A - TWO TRAFFIC FACES

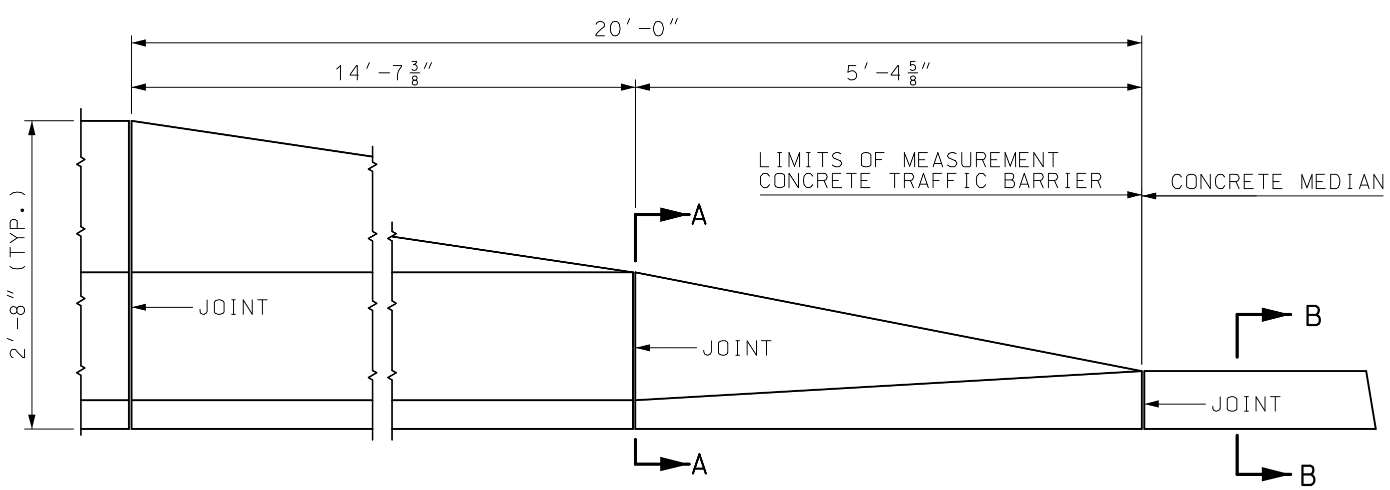


TYPICAL VIEW
TYPE B - ONE TRAFFIC FACE

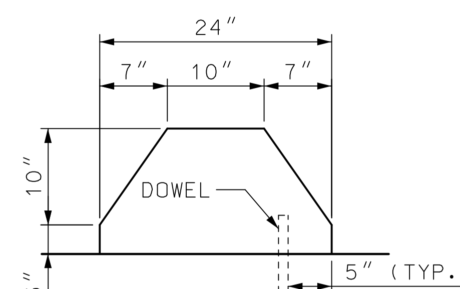




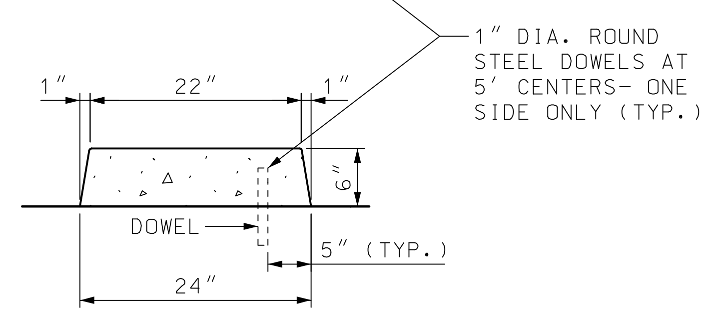
PLAN



ELEVATION
BARRIER HEIGHT TRANSITION



SECTION A-A



SECTION B-B

GENERAL NOTES:

HEIGHT TRANSITIONS SHALL NOT BE USED IN LOCATIONS WHERE THE POSTED SPEED IS GREATER THAN 35 MPH.

ALL TOP AND END EDGES SHALL BE CHAMFERED ¾ INCH.

EXPANSION JOINTS SHALL BE PROVIDED IN THE BARRIER TO MATCH EXPANSION JOINTS IN PAVEMENT.

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.

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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

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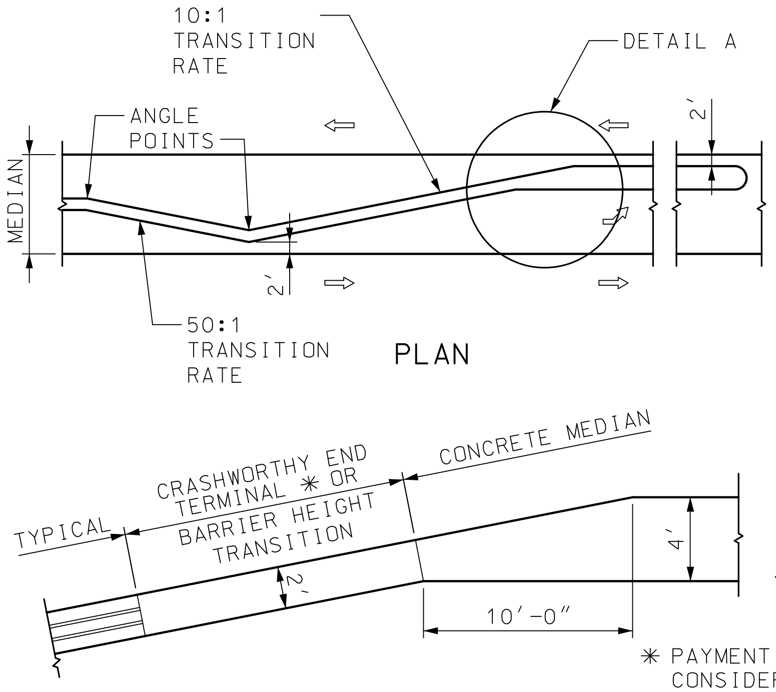
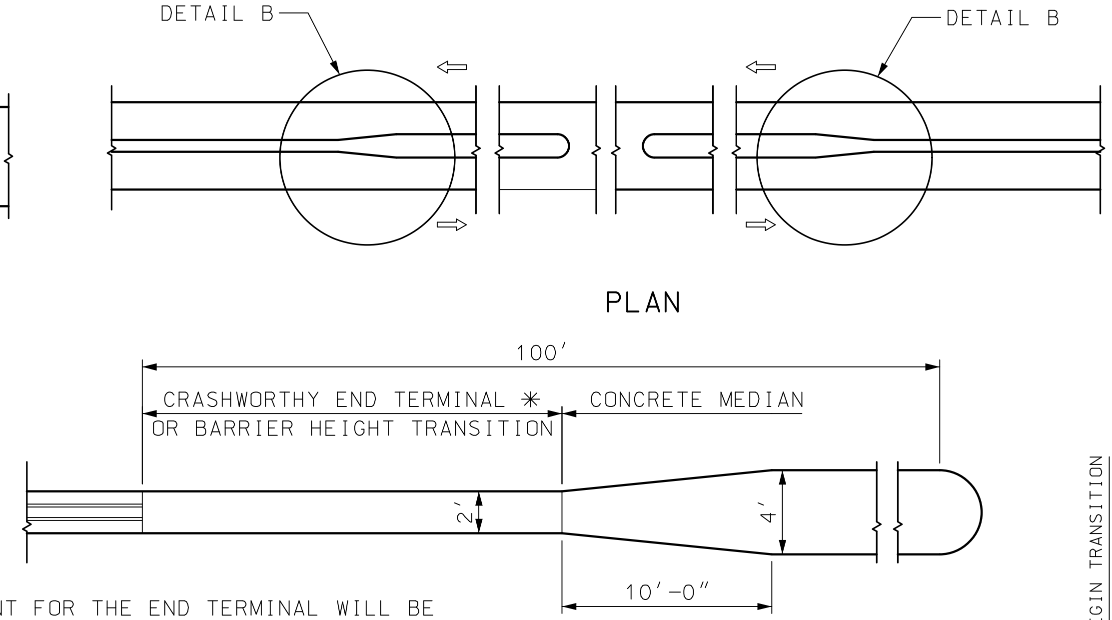
PERMANENT CONCRETE TRAFFIC BARRIER

TYPE A AND B

DATE EFFECTIVE:	10/01/2020	617.10M	SHEET NO. 1 OF 11
DATE PREPARED:	7/21/2020		

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

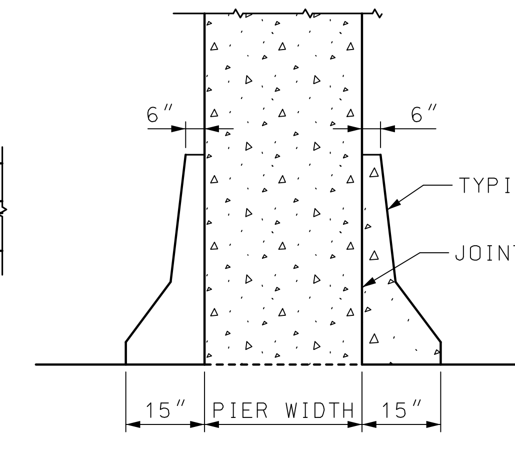




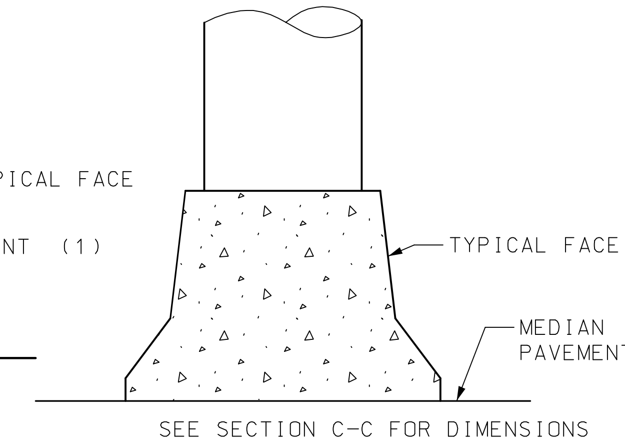
✳ PAYMENT FOR THE END TERMINAL WILL BE CONSIDERED FULL COMPENSATION FOR END TERMINAL, BACKUP ASSEMBLIES, AND OTHER ITEMS NECESSARY FOR PROPER INSTALLATION AS REQUIRED BY THE MANUFACTURER.

DETAIL A
LEFT TURN LANE TRANSITION

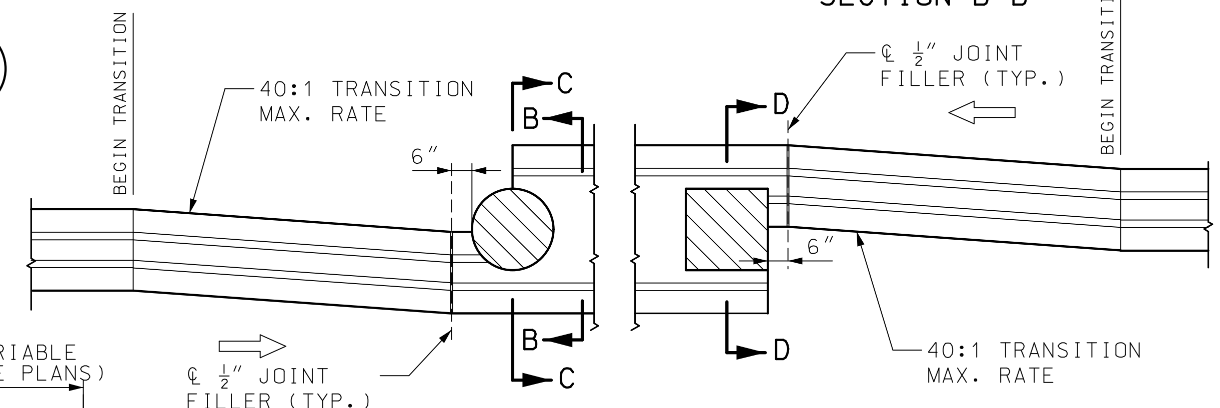
DETAIL B
MEDIAN OPENING TRANSITION



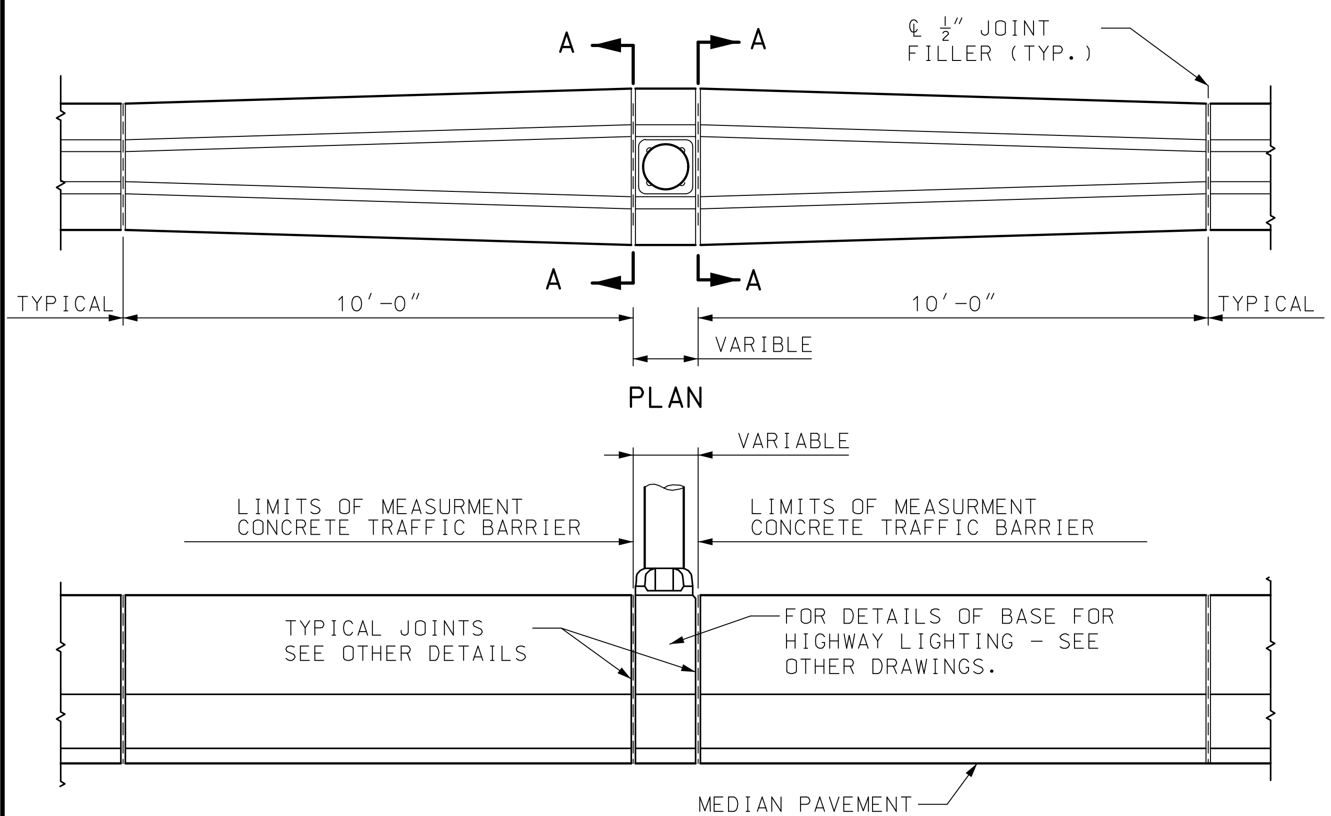
SECTION C-C



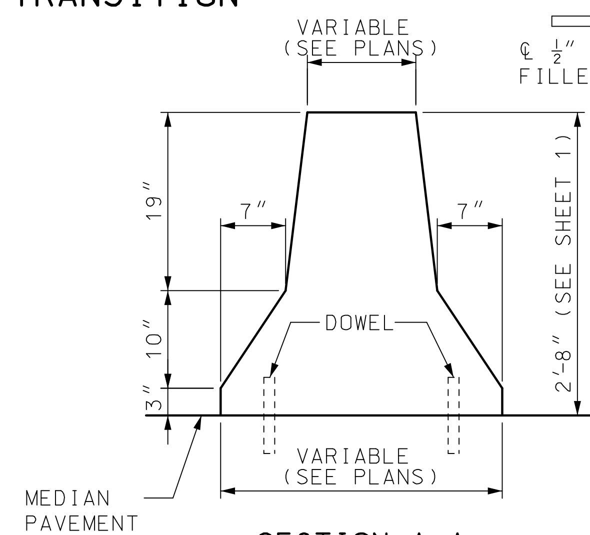
SECTION B-B



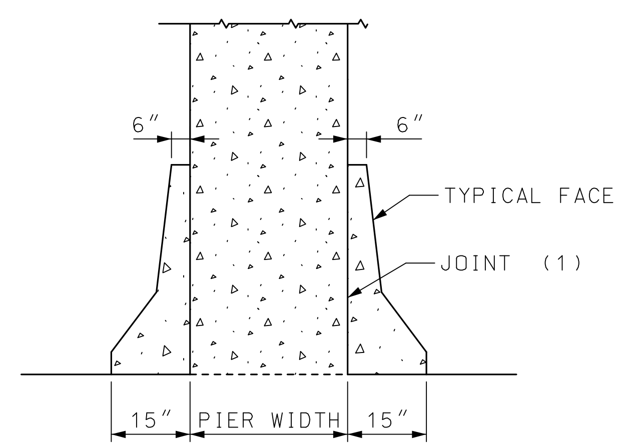
PLAN
TRANSITION DETAILS FOR PIER PROTECTION



ELEVATION
TRANSITION DETAILS FOR MEDIAN LIGHTING



SECTION A-A



SECTION D-D

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

GENERAL NOTES:

FOR DETAILS AND LOCATION OF DOWELS, SEE SHEET 1.

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

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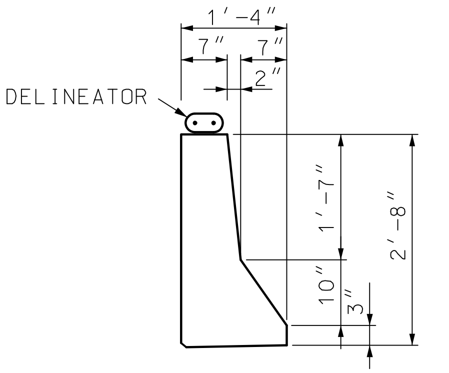
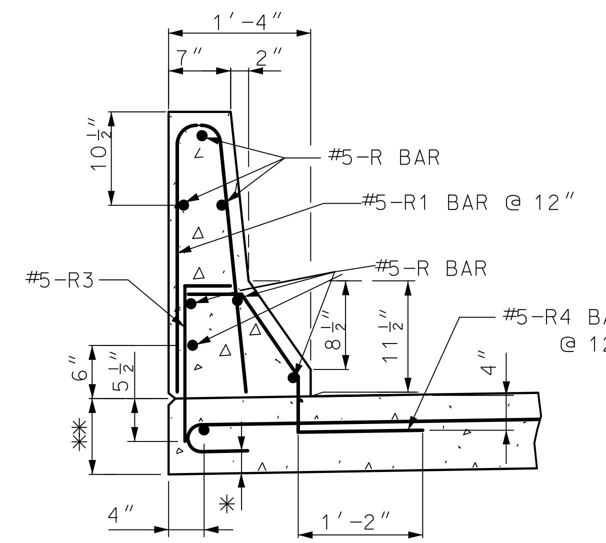
PERMANENT CONCRETE TRAFFIC BARRIER
TYPE A AND B

DATE EFFECTIVE:	10/01/2020	617.10M	SHEET NO. 2 OF 11
DATE PREPARED:	7/21/2020		

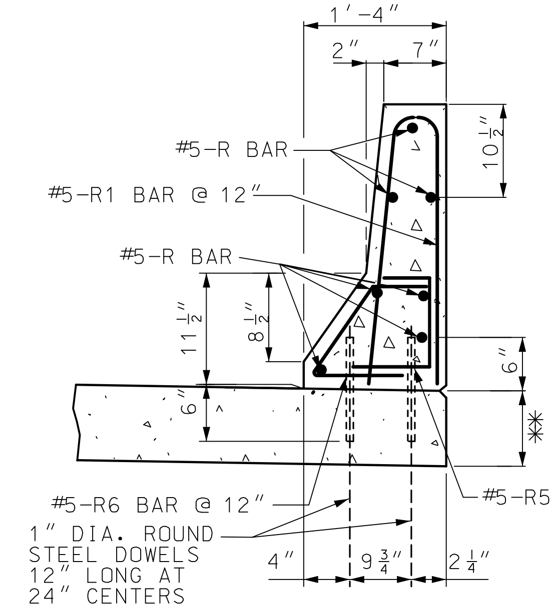


TYPE B (MODIFIED) TYPICAL SECTION

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"



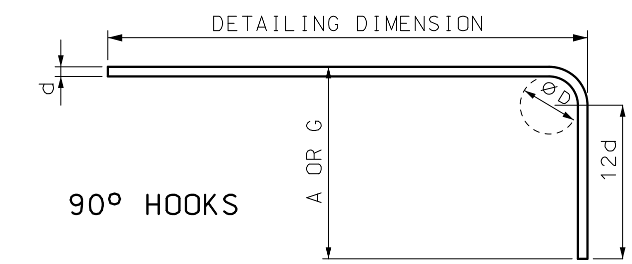
PART SECTION THROUGH UPPER BARRIER



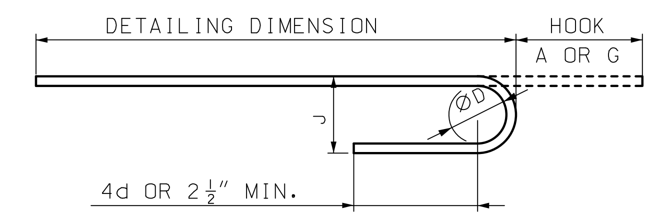
PART SECTION THROUGH LOWER BARRIER

END HOOK DIMENSIONS				
BAR SIZE	D (IN.)	ALL GRADES		
		180° HOOKS		90° HOOKS
		A OR G	J	A OR G
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"

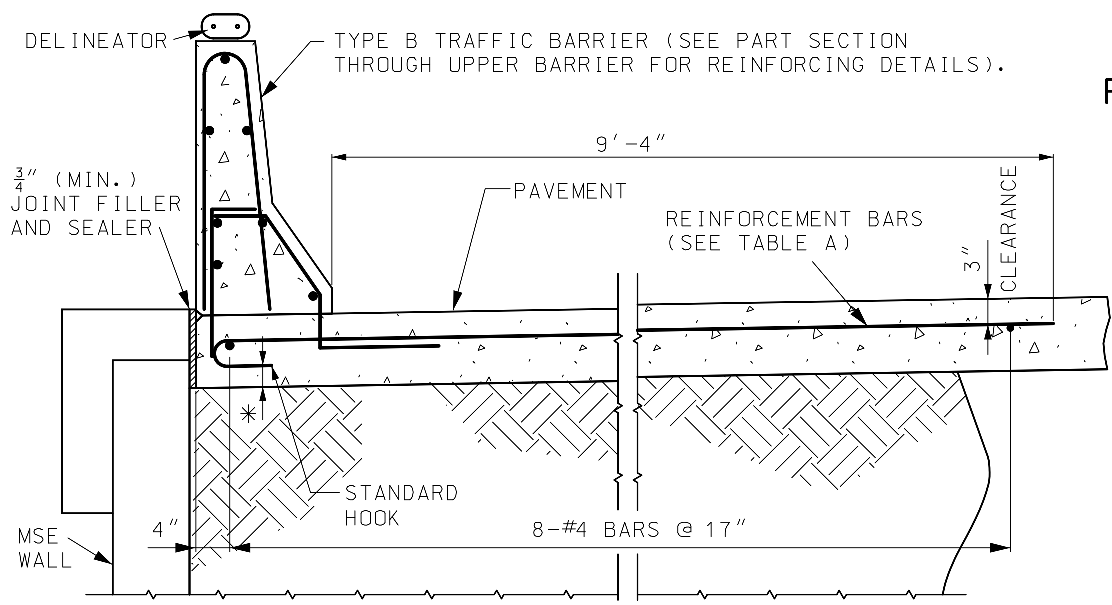
ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.



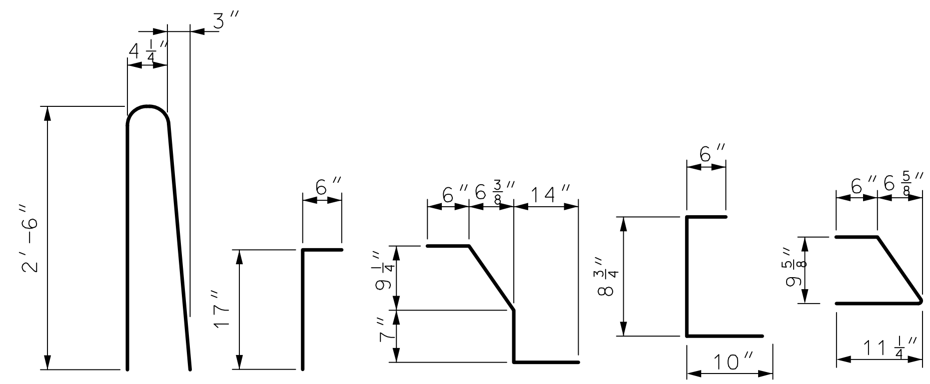
90° HOOKS



180° HOOKS



TYPE B TRAFFIC BARRIER ON TOP OF MSE WALL



#5-R1 #5-R3 #5-R4 #5-R5 #5-R6

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.

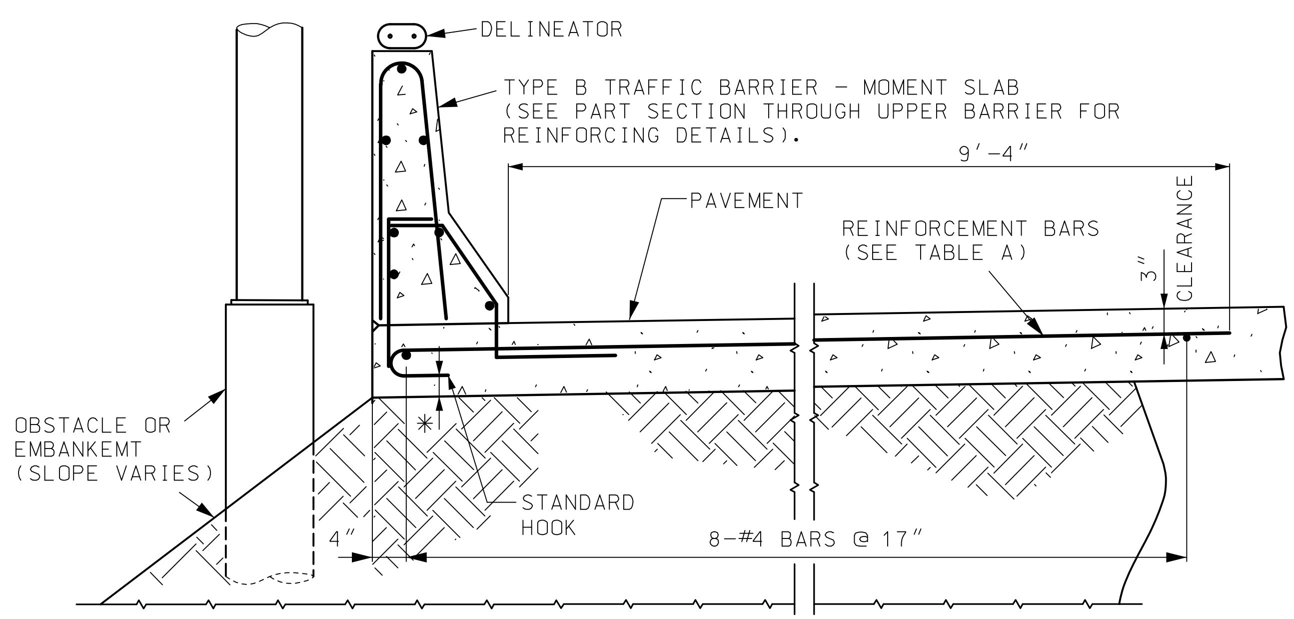
TYPE B (MODIFIED) SHALL BE USED ONLY AT LOCATIONS SHOWN IN PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

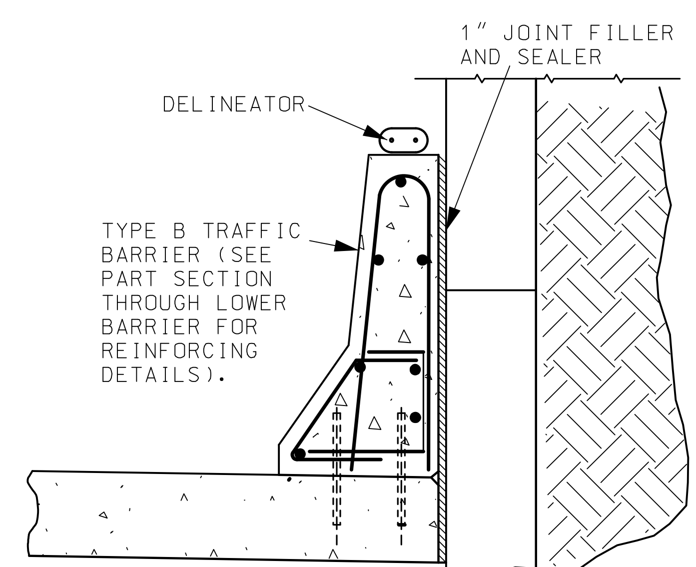
#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

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

** SEE ROADWAY PAVEMENT DESIGN.



TYPE B TRAFFIC BARRIER - MOMENT SLAB**



TYPE B TRAFFIC BARRIER AT THE SIDE OF MSE WALL

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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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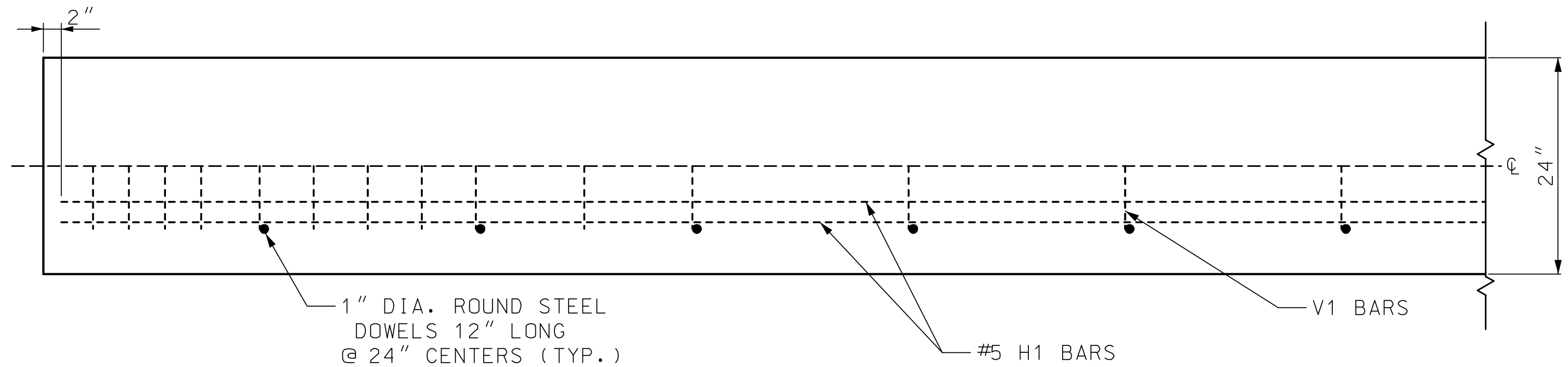
PERMANENT CONCRETE TRAFFIC BARRIER
AT MSE WALL OR MOMENT SLAB TYPE B MODIFIED

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

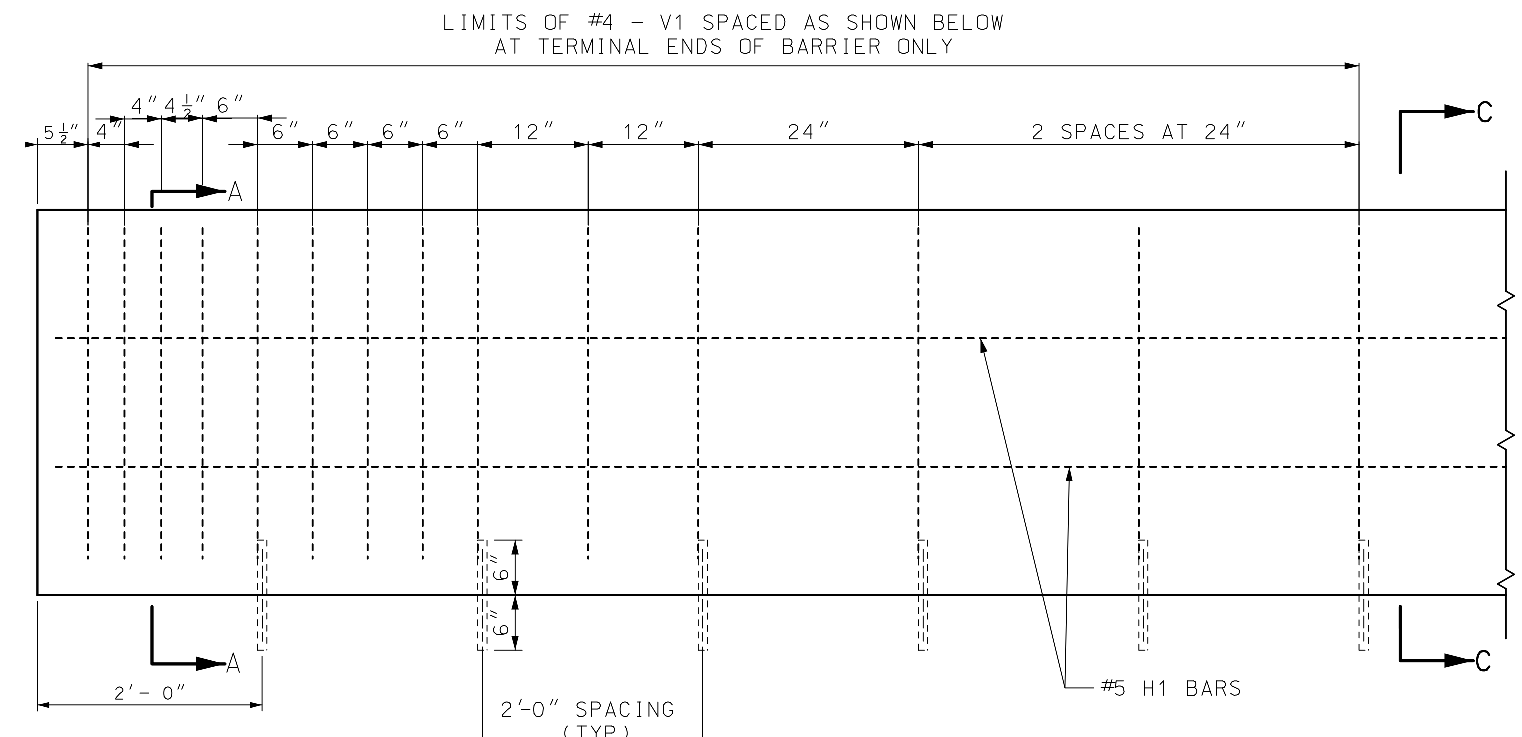
617.10M

SHEET NO. 3 OF 11

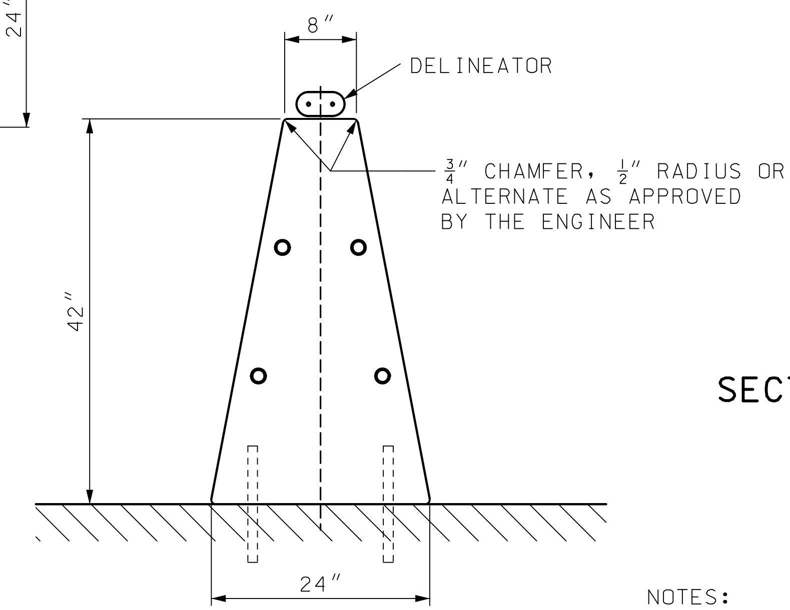
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



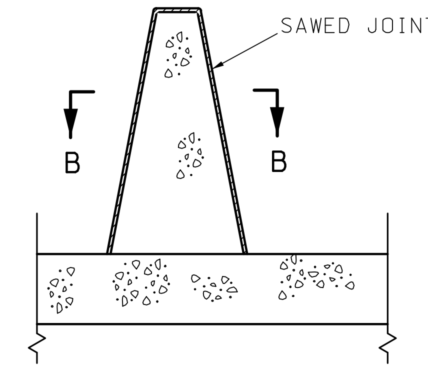
PLAN VIEW
(SYMMETRICAL ABOUT CENTERLINE)



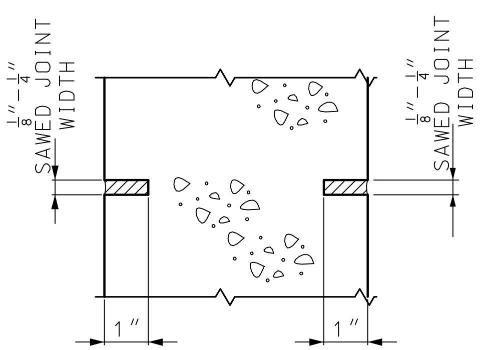
ELEVATION



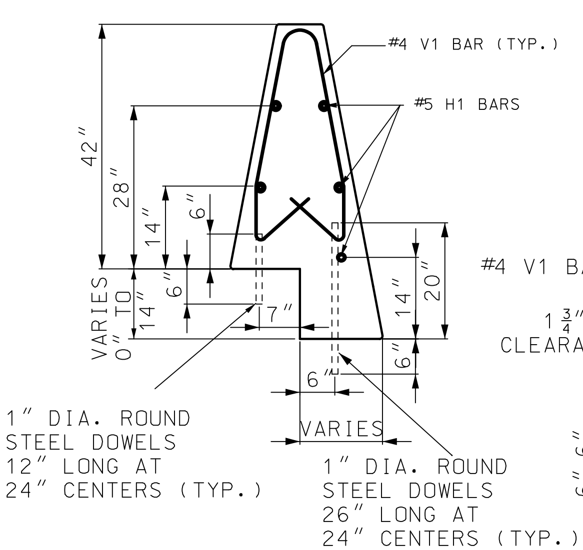
TYPE C
TYPICAL SECTION



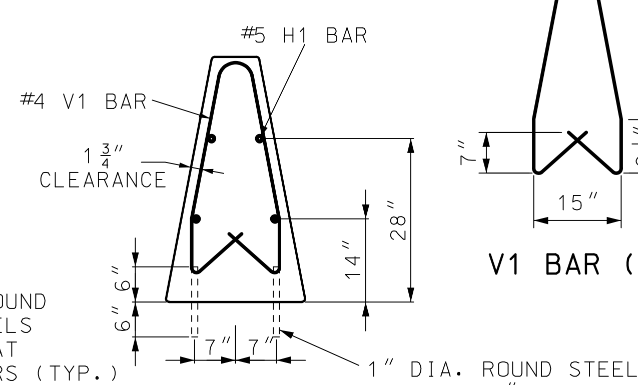
SECTION THROUGH SAWED JOINT



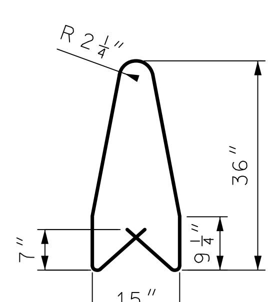
SECTION B-B



SECTION A-A
(STEPPED PAVEMENT)

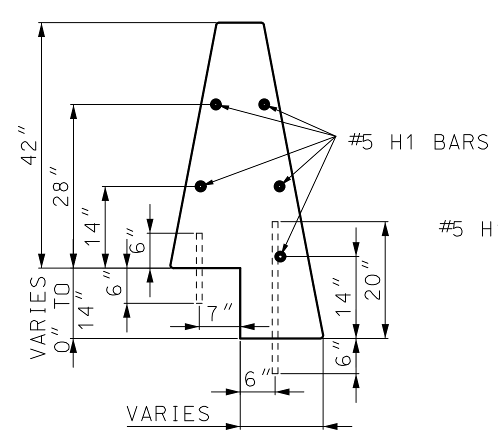


SECTION A-A
(NORMAL PAVEMENT)

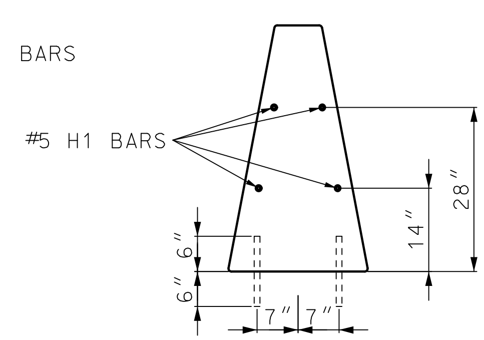


V1 BAR (#4)

REINFORCING DETAILS



SECTION C-C
(STEPPED PAVEMENT)



SECTION C-C
(NORMAL PAVEMENT)

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 ±½ 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 1¾" 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.

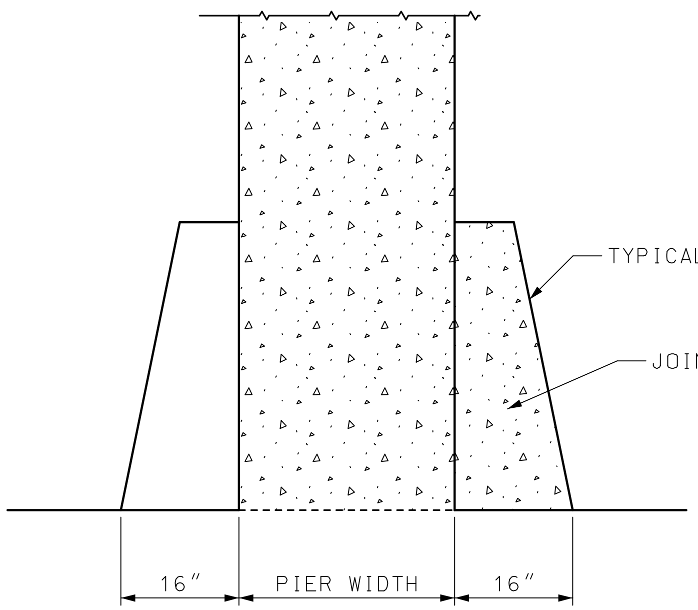
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

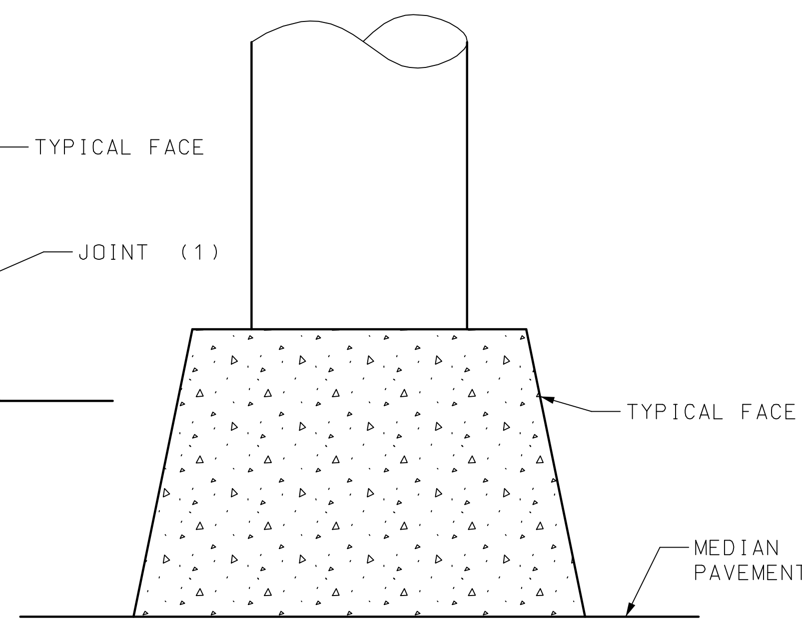
PERMANENT CONCRETE TRAFFIC BARRIER
TYPE C

DATE EFFECTIVE:	10/01/2020	617.10M	SHEET NO.
DATE PREPARED:	7/21/2020		4 OF 11

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

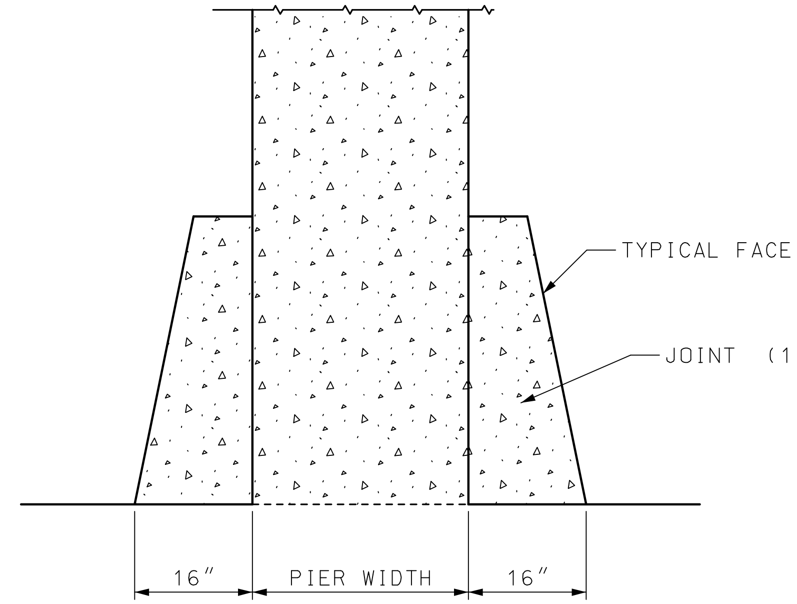


SECTION A–A

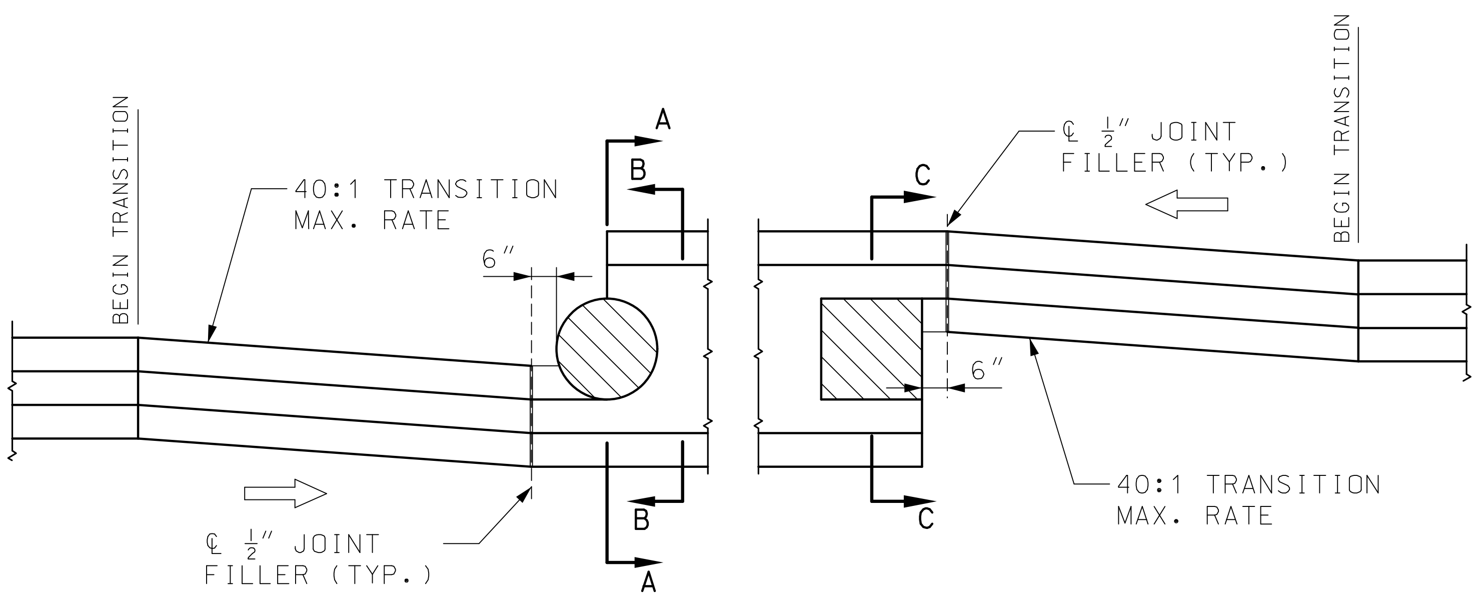


SEE SECTION C–C FOR DIMENSIONS

SECTION B–B



SECTION C–C



PLAN

TRANSITION DETAILS FOR PIER PROTECTION

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

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

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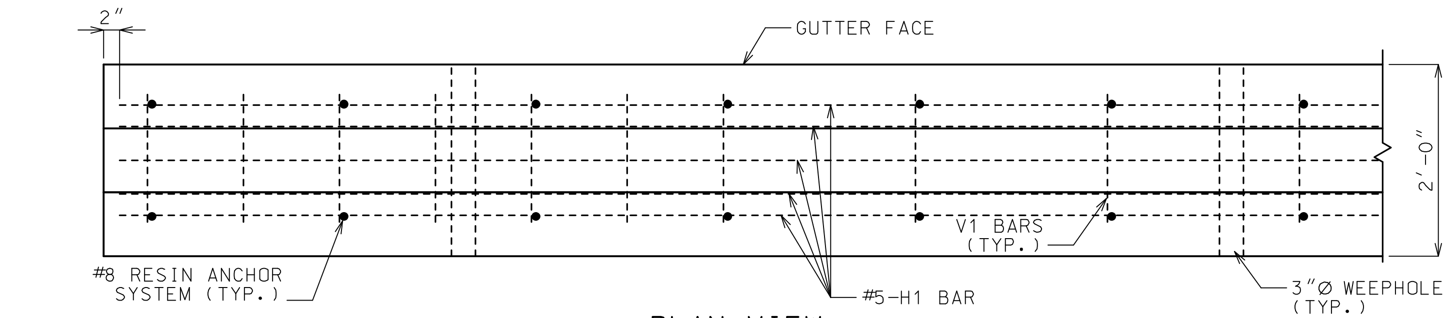
PERMANENT CONCRETE TRAFFIC BARRIER
TYPE C

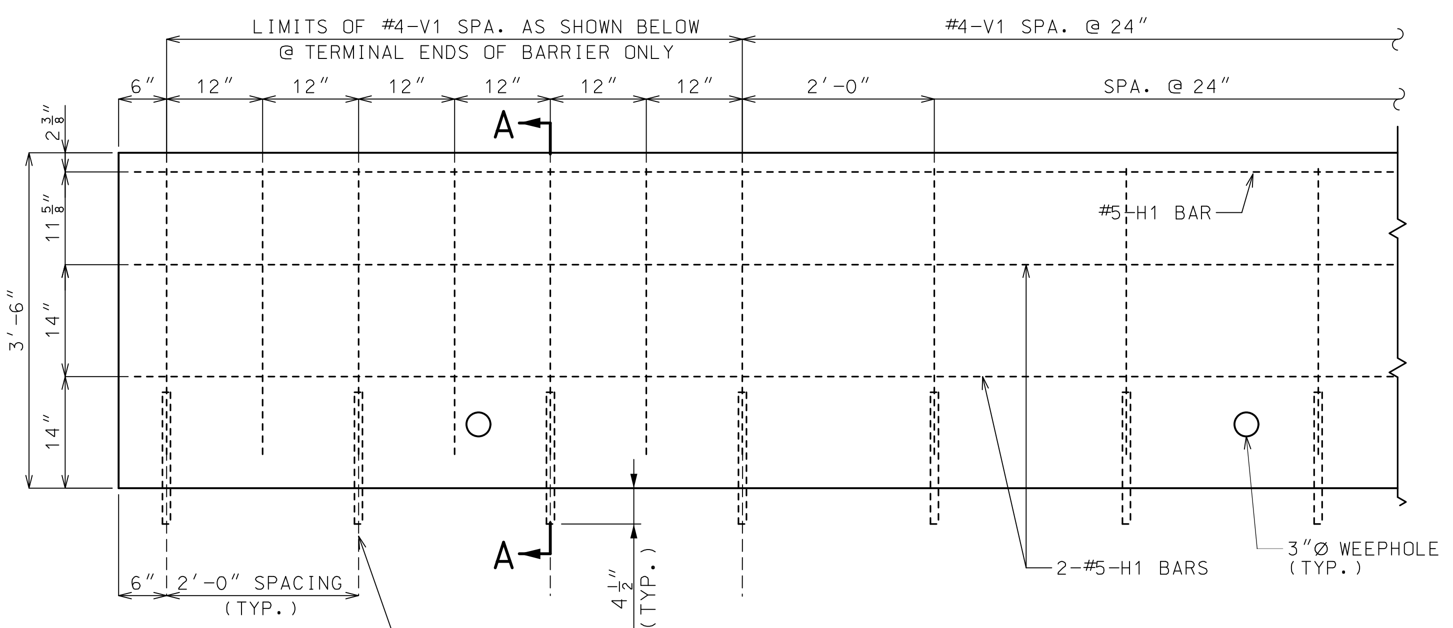
DATE EFFECTIVE: 10/01/2020
DATE PREPARED: 7/21/2020

617.10M

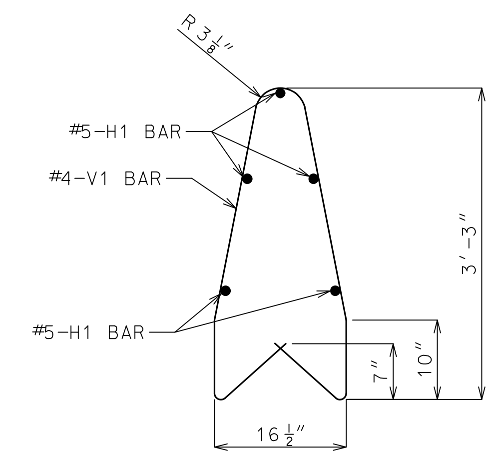
SHEET NO.
5 OF 11



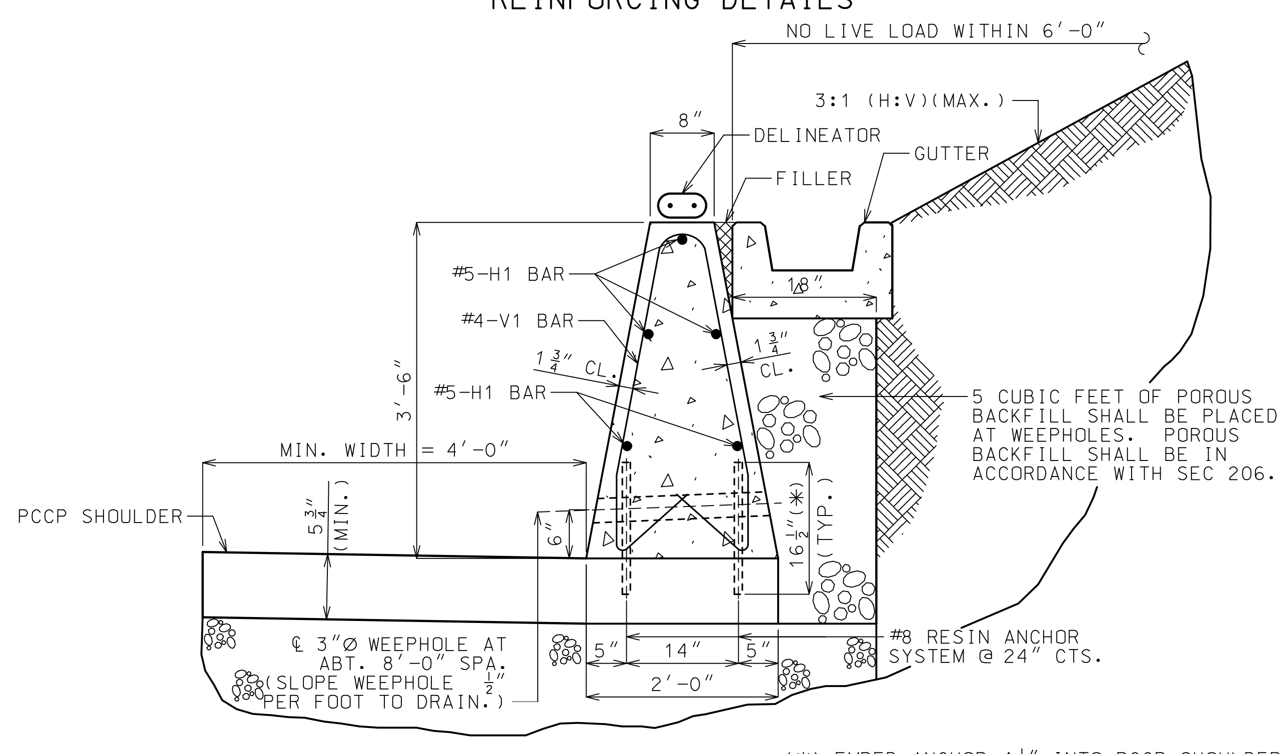
PLAN VIEW
NOTE: GUTTER NOT SHOWN FOR CLARITY.



ELEVATION
REINFORCING DETAILS



PART SECTION OF
#4-V1 BAR



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

SECTION A-A
(FOR SLOPING AND NONSLOPING BACKSLOPE)

GENERAL NOTES:

CONCRETE SHALL BE CLASS B F'C = 4,000 PSI.

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

ANGLE OF INTERNAL FRICTION, ΦF ≥ 27° 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 REINFORCING STEEL WILL BE POSITIONED ±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.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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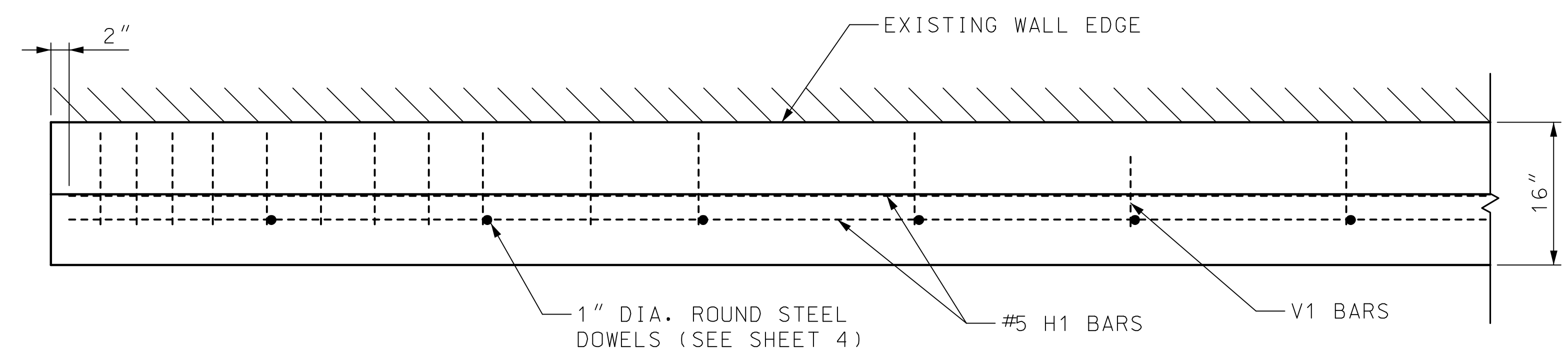
PERMANENT CONCRETE TRAFFIC BARRIER

TYPE C AS RETAINING WALL

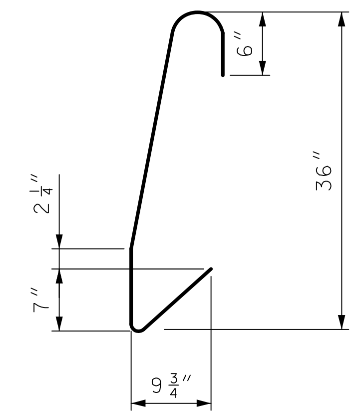
DATE EFFECTIVE: 10/01/2020
DATE PREPARED: 7/21/2020

617.10M

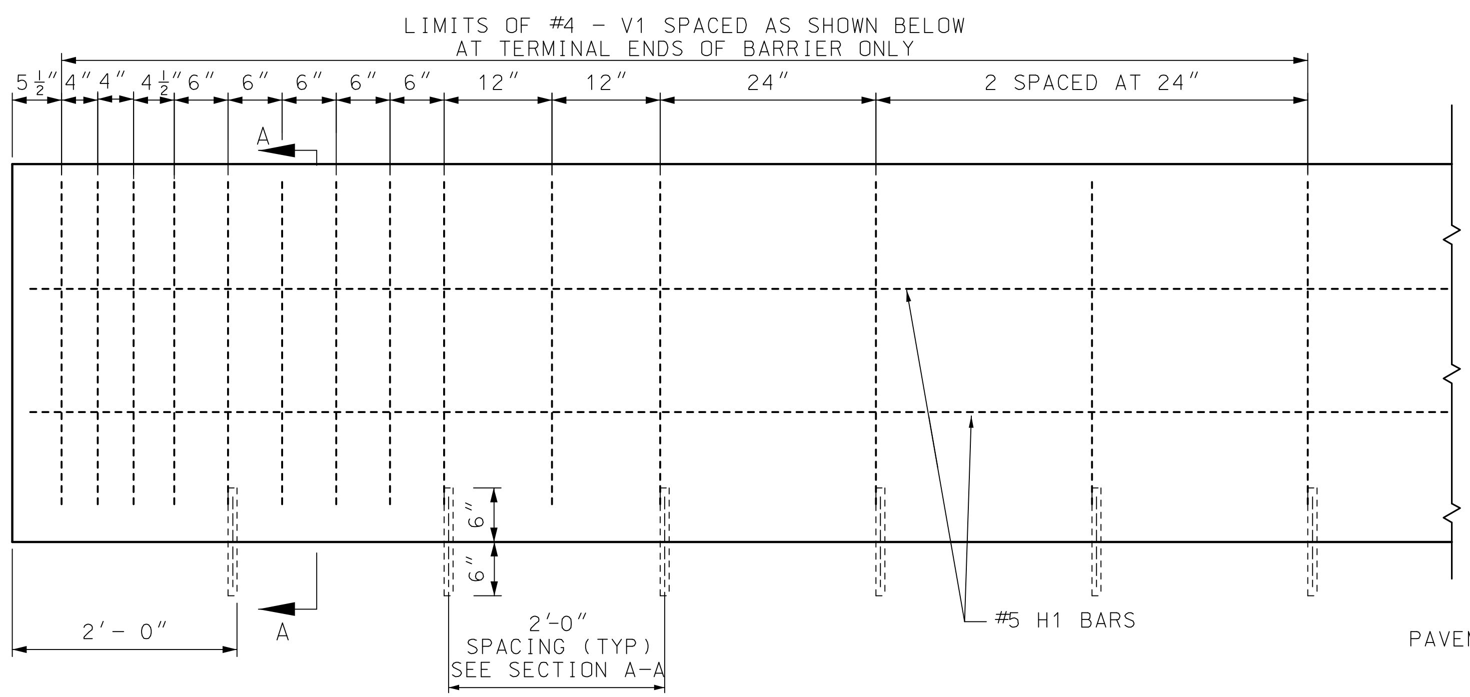
SHEET NO. 6 OF 11



PLAN VIEW

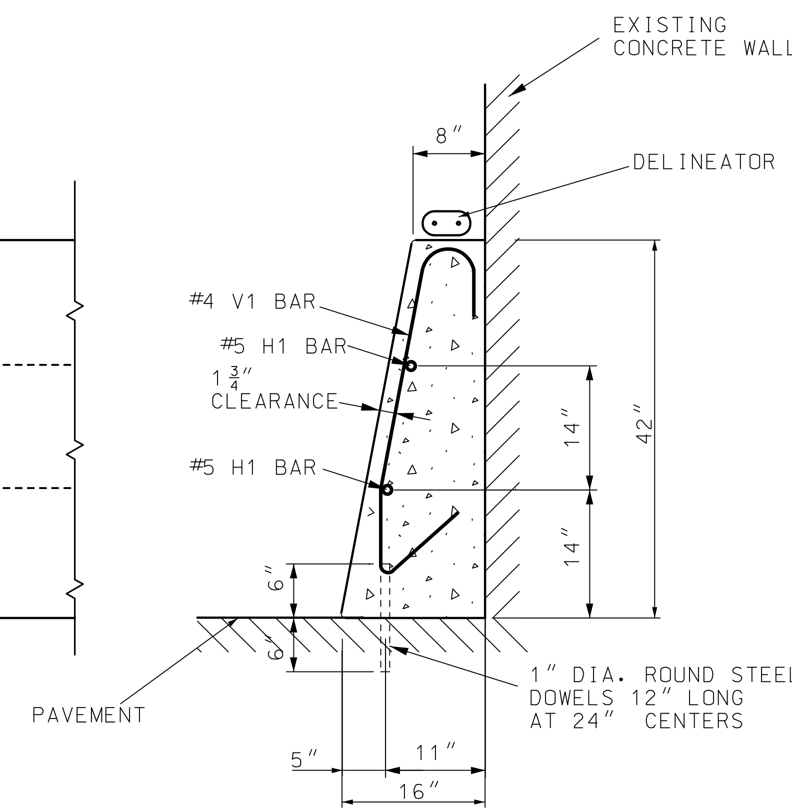


V1 BAR (#4)



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 ± $\frac{1}{2}$ 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)

STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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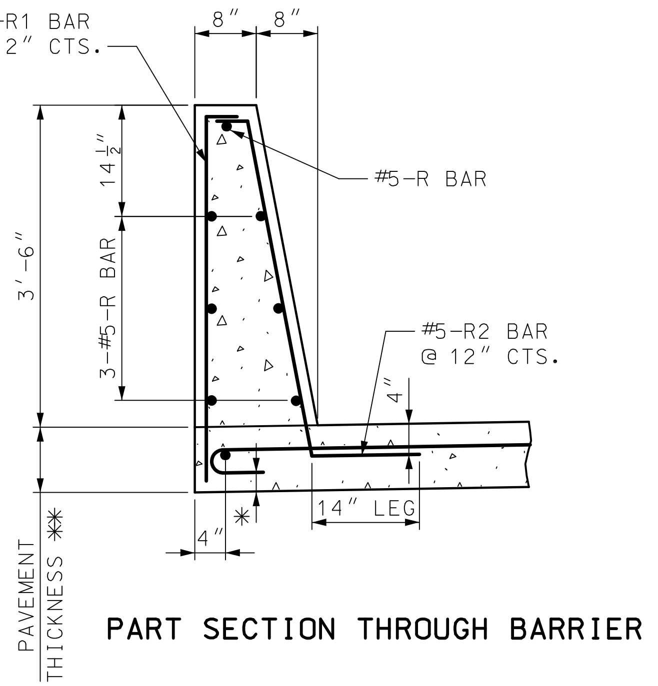
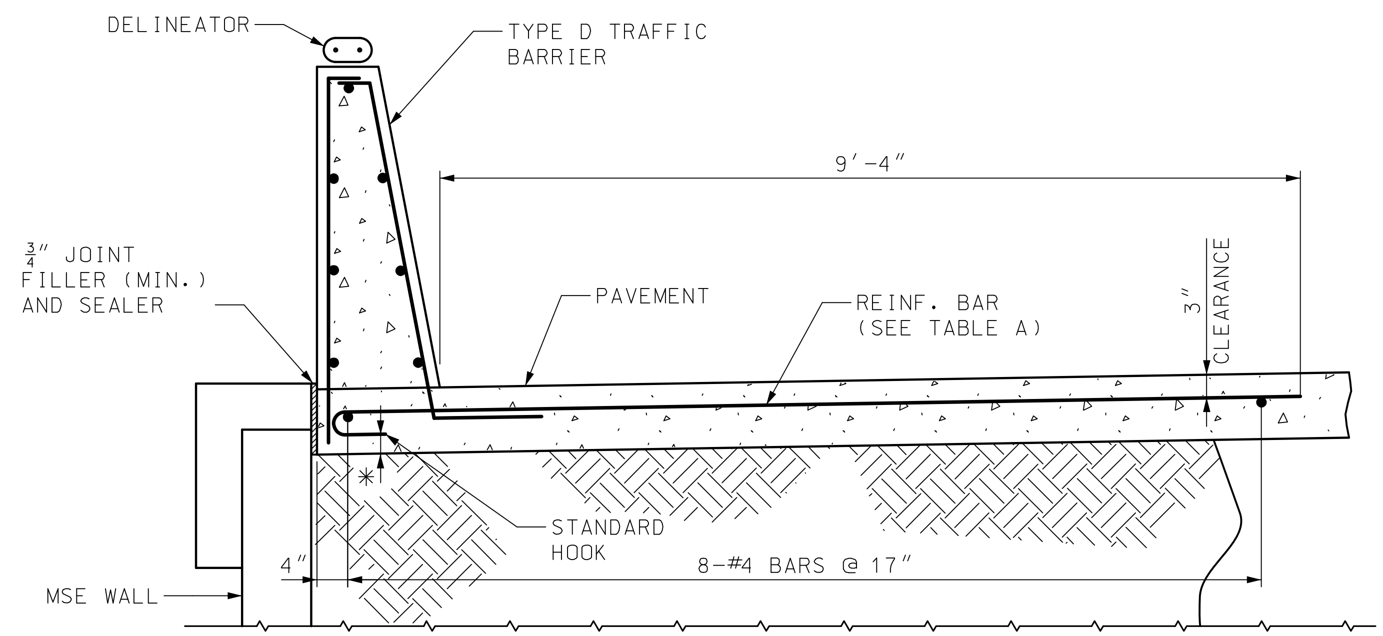
PERMANENT CONCRETE TRAFFIC BARRIER
TYPE D

DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020	617.10M	SHEET NO. 7 OF 11

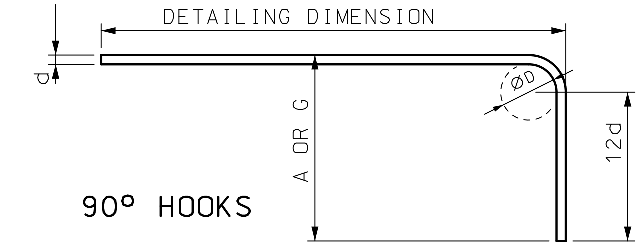


PART SECTION THROUGH BARRIER

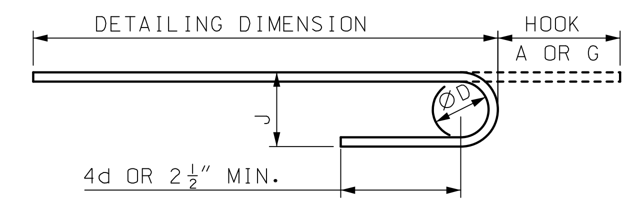


TYPE D (MSE WALL) TRAFFIC BARRIER ON TOP OF MSE WALL

END HOOK DIMENSIONS				
BAR SIZE	D	ALL GRADES		
		180° HOOKS		90° HOOKS
	(IN.)	A OR G	J	A OR G
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	12"



90° HOOKS



180° HOOKS

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

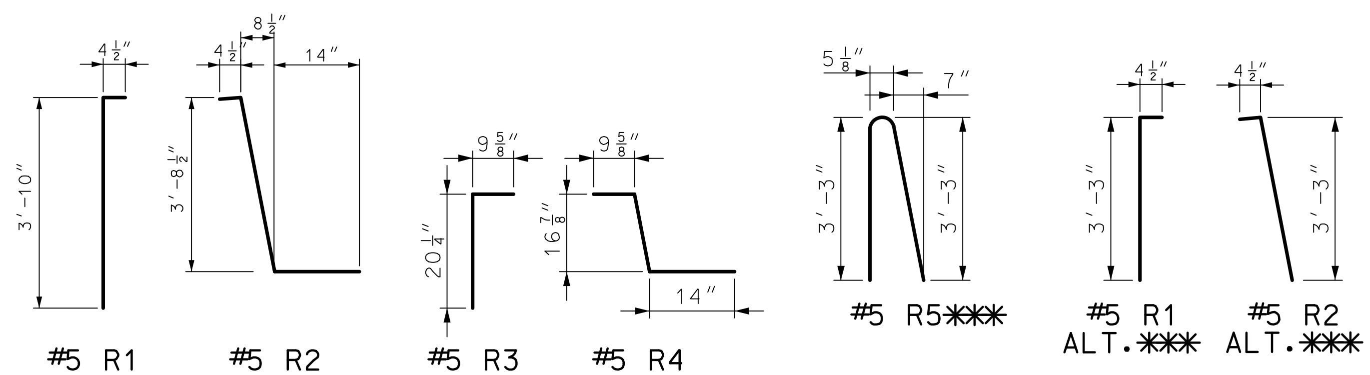


TABLE A TRANSVERSE PAVEMENT REINFORCEMENT	
PAVEMENT THICKNESS ✱✱	BAR SIZE & SPACING
8"	#5 @ 4"✱
9"	#5 @ 5"✱
10"	#5 @ 6"
11"	#5 @ 7"
12"	#6 @ 12"
≥ 13"	#6 @ 12"

NOTES:

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.

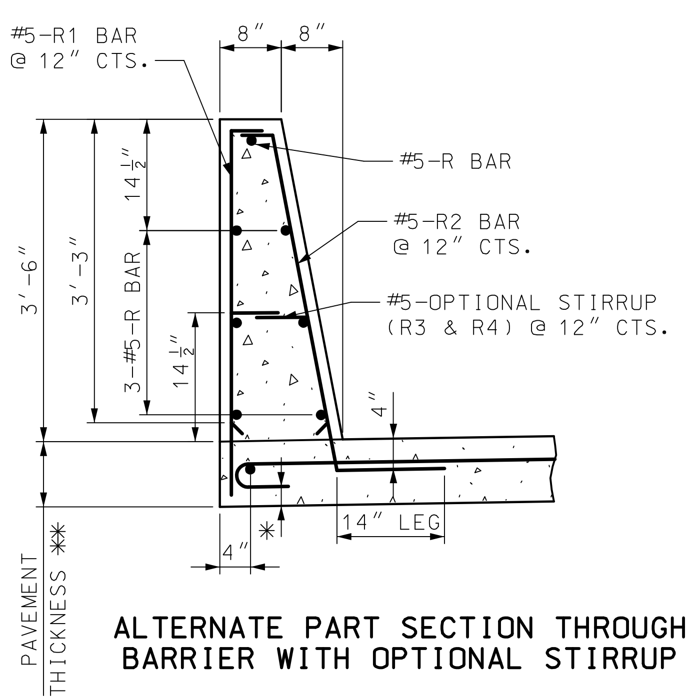
NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.

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

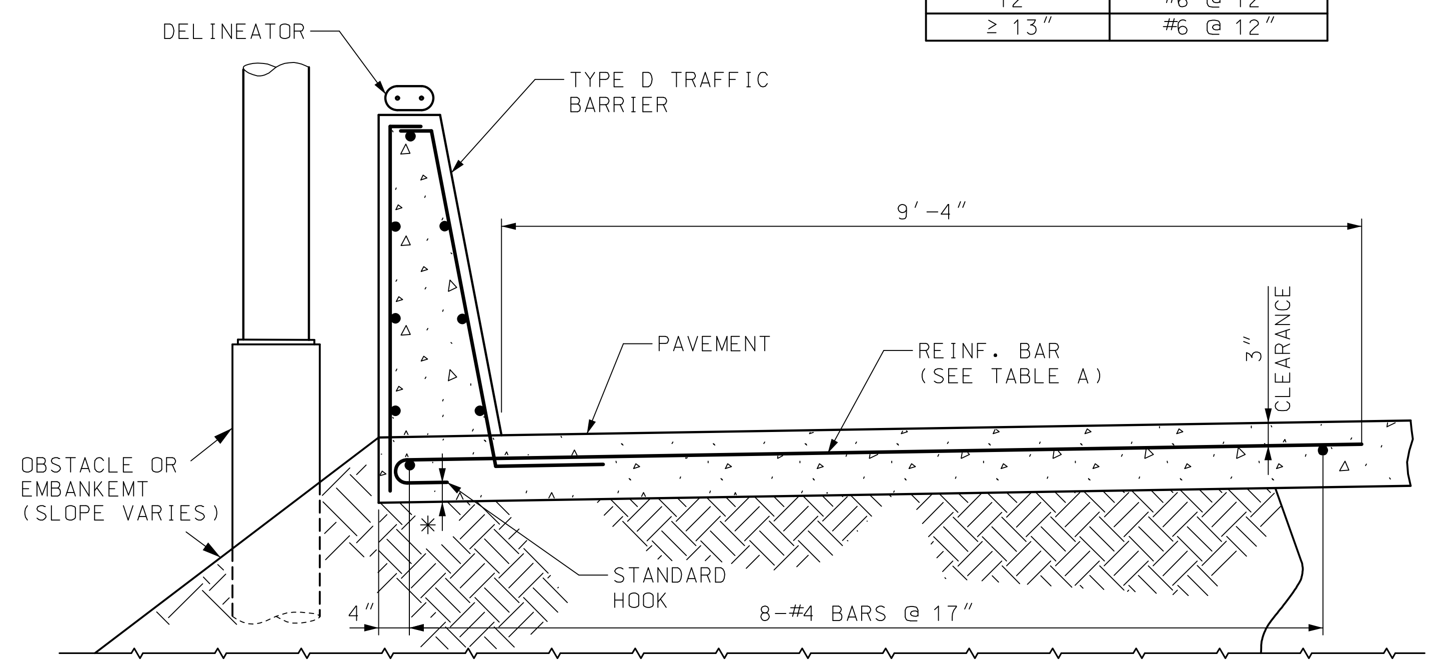
✱ TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1½" MINIMUM CLEARANCE.

✱✱ 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✱✱

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.

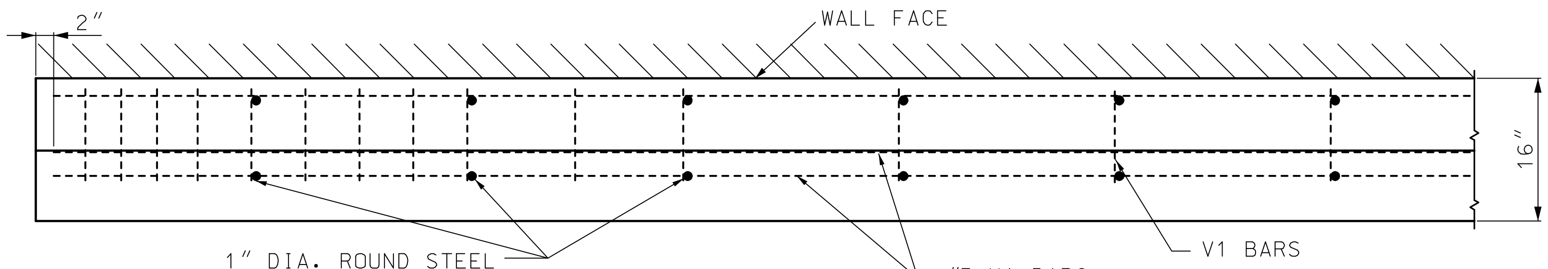
PERMANENT CONCRETE TRAFFIC BARRIER
TYPE D ATOP MSE WALL AND MOMENT SLAB

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

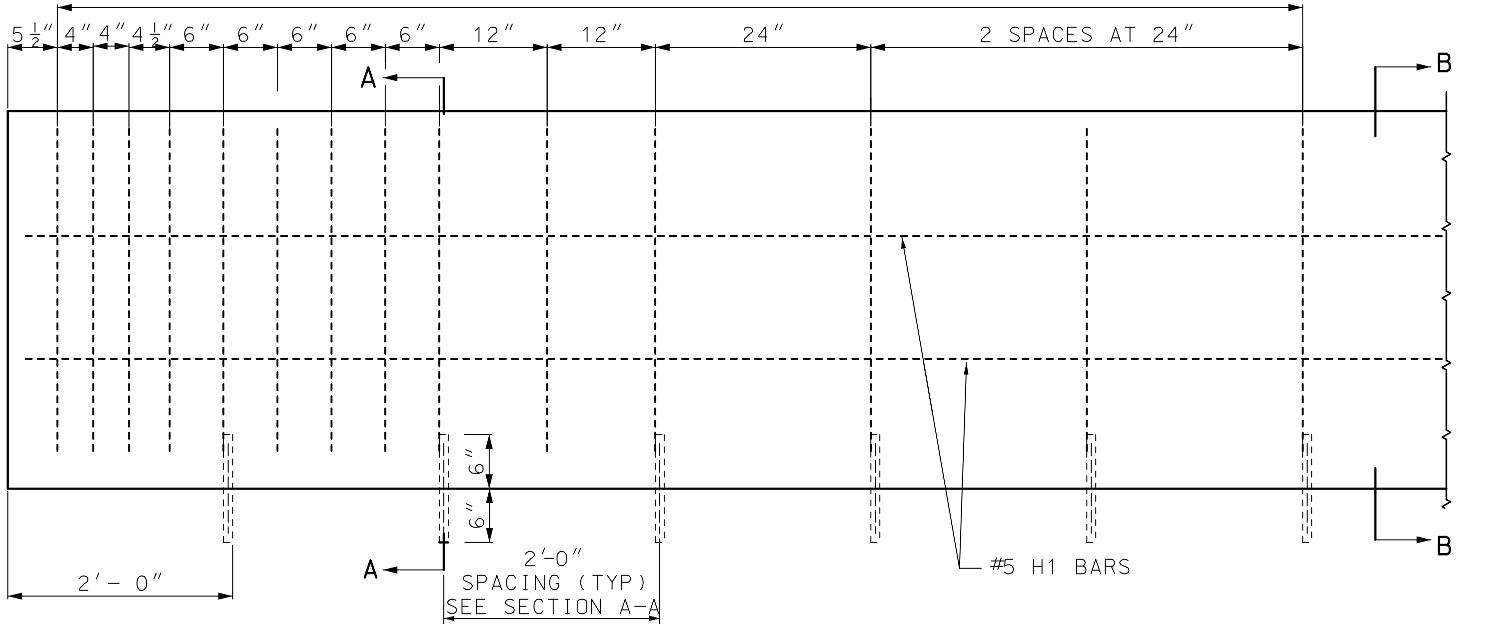
617.10M

SHEET NO. 8 OF 11

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

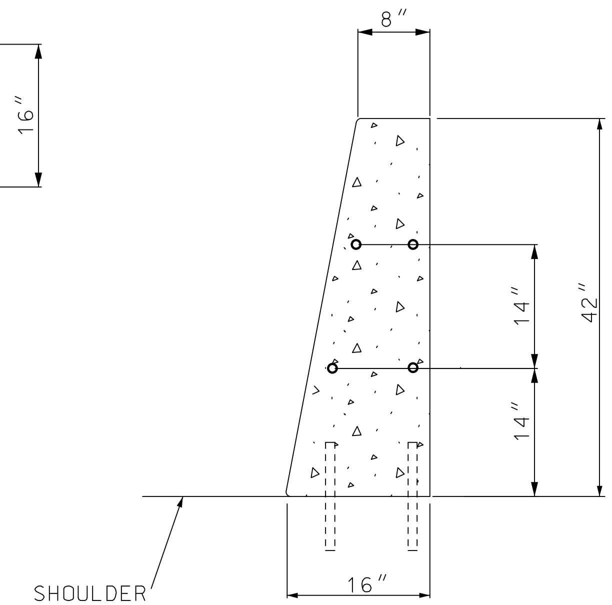


PLAN VIEW

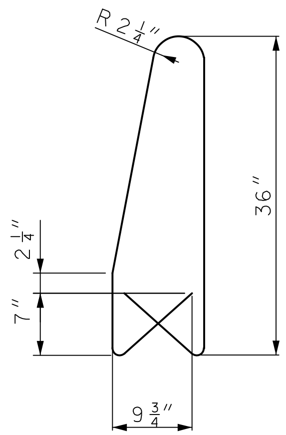


ELEVATION

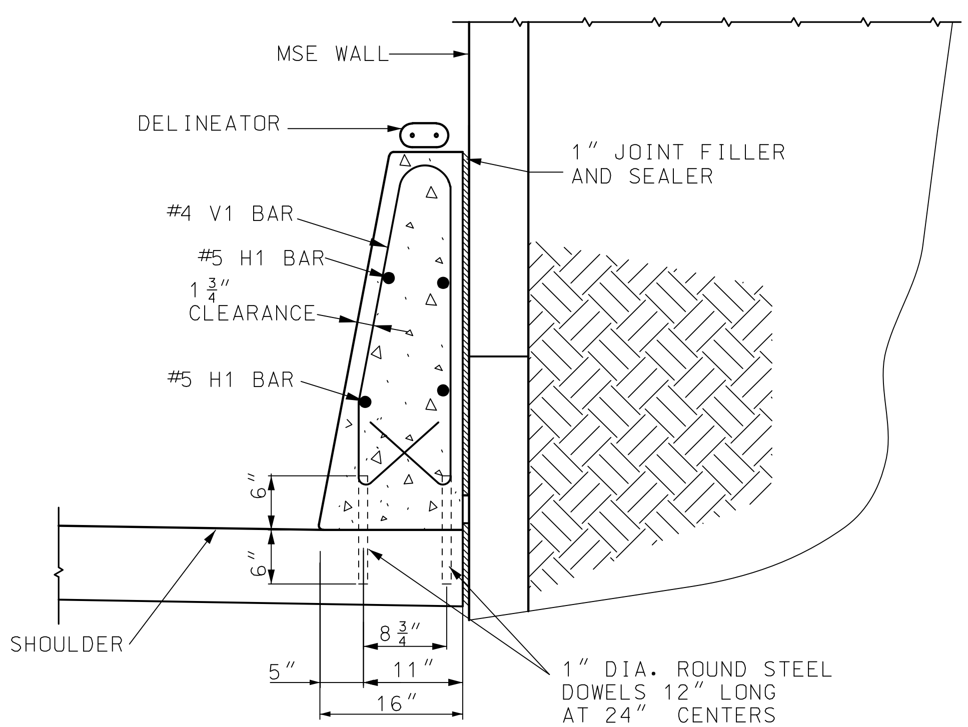
REINFORCING DETAILS



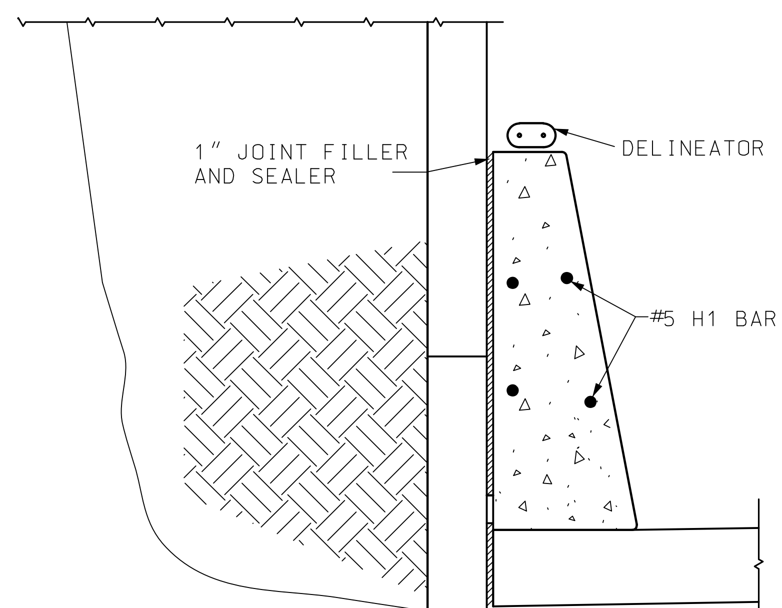
TYPE D TYPICAL SECTION



V1 BAR (#4)



SECTION A-A



SECTION B-B

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 1½", UNLESS OTHERWISE SHOWN.

ANY METHOD DEVISED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED ± ½ 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.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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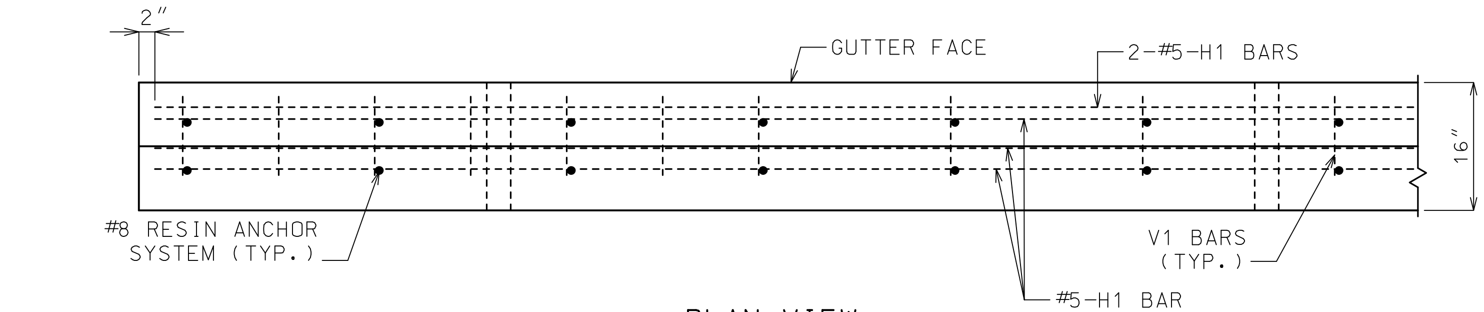
PERMANENT CONCRETE TRAFFIC BARRIER
TYPE D BESIDE MSE WALL

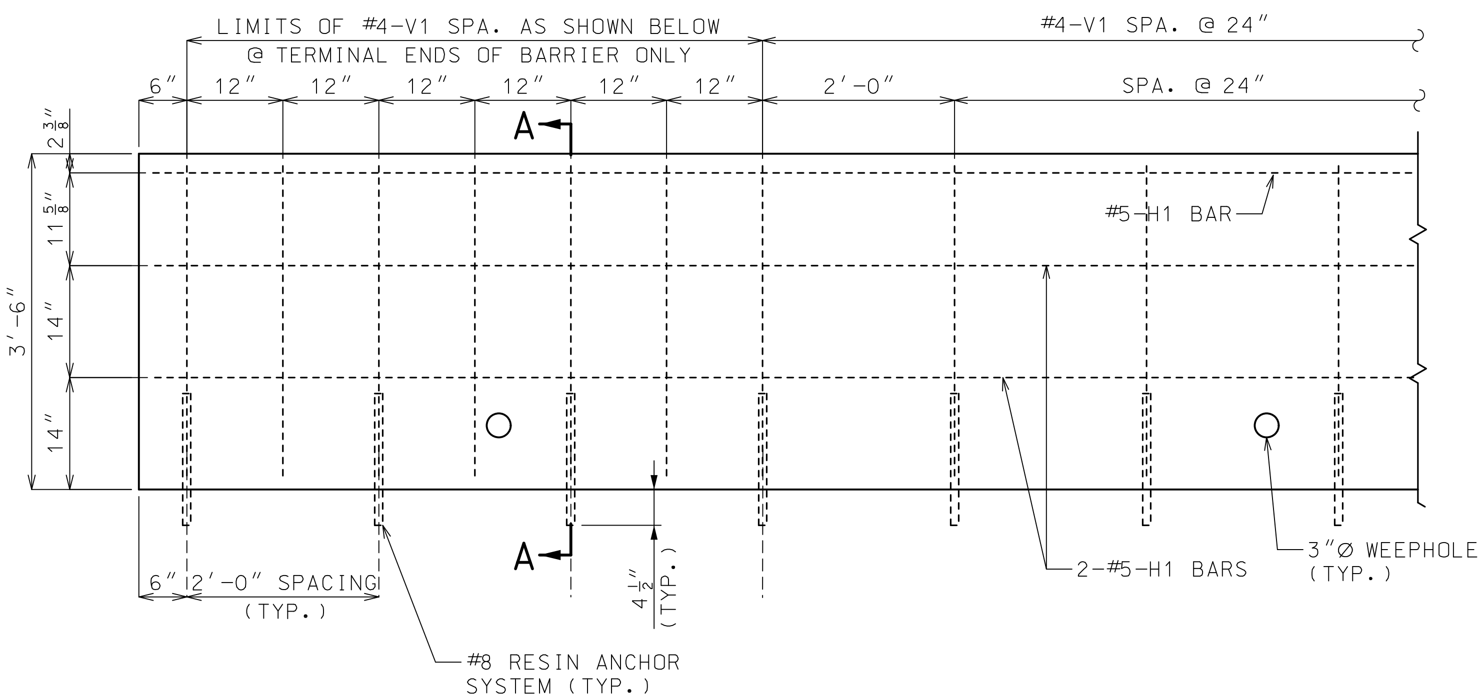
DATE EFFECTIVE: 10/01/2020
DATE PREPARED: 7/21/2020

617.10M

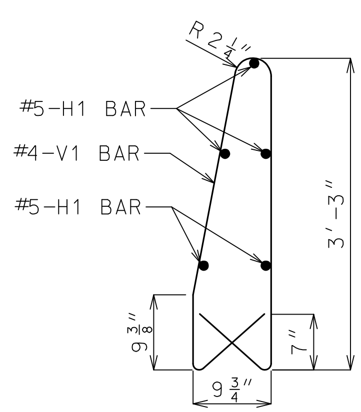


PLAN VIEW

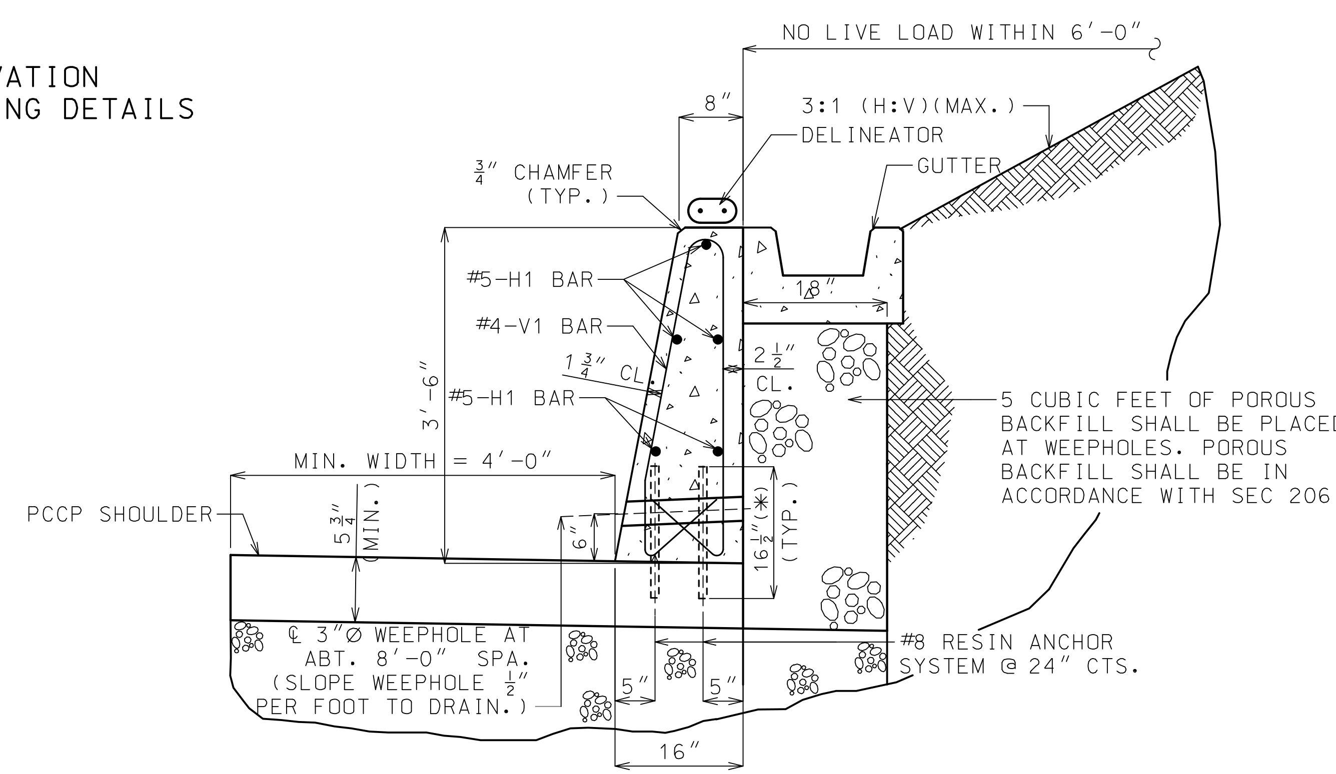
NOTE: GUTTER NOT SHOWN FOR CLARITY.



ELEVATION
REINFORCING DETAILS



PART SECTION OF
#4-V1 BAR



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

SECTION A-A
(FOR SLOPING AND NONSLOPING BACKSLOPE)

GENERAL NOTES:

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

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

ANGLE OF INTERNAL FRICTION, ϕf ≥ 30° 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 ±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.

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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER
PE-30042
PROFESSIONAL ENGINEER
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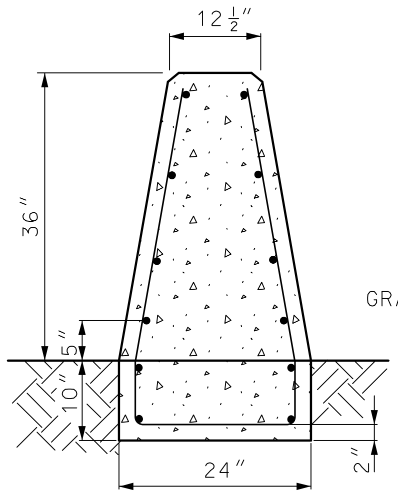
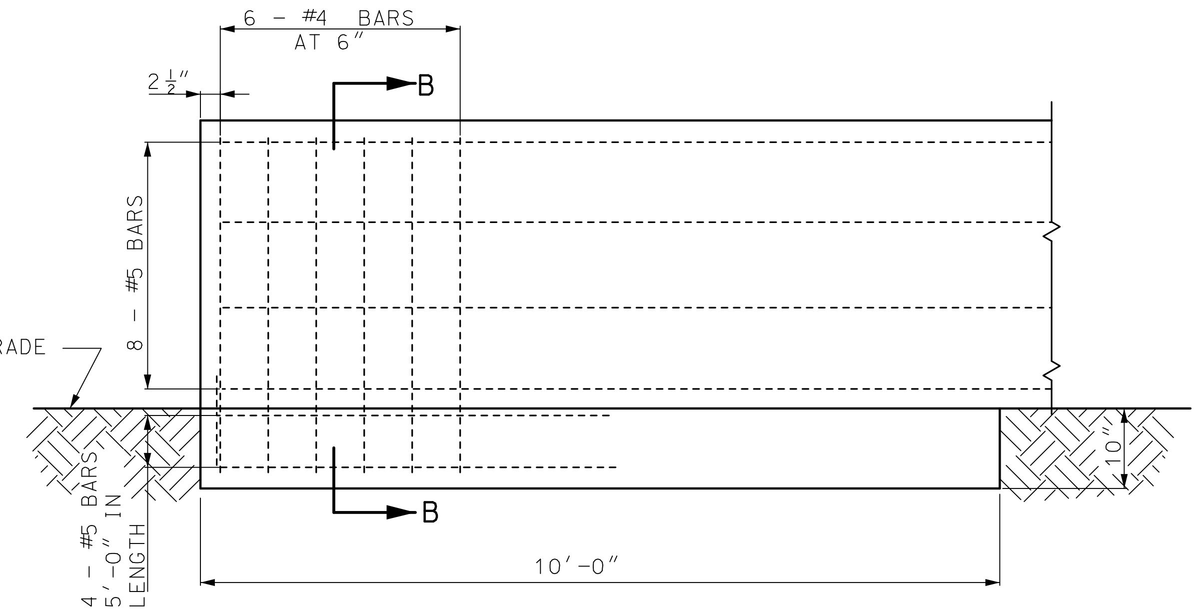
PERMANENT CONCRETE TRAFFIC BARRIER
TYPE D AS RETAINING WALL

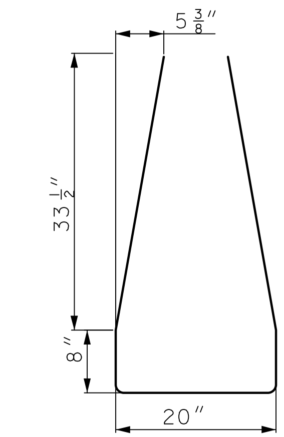
DATE EFFECTIVE:	10/01/2020	617.10M	SHEET NO. 10 OF 11
DATE PREPARED:	7/21/2020		



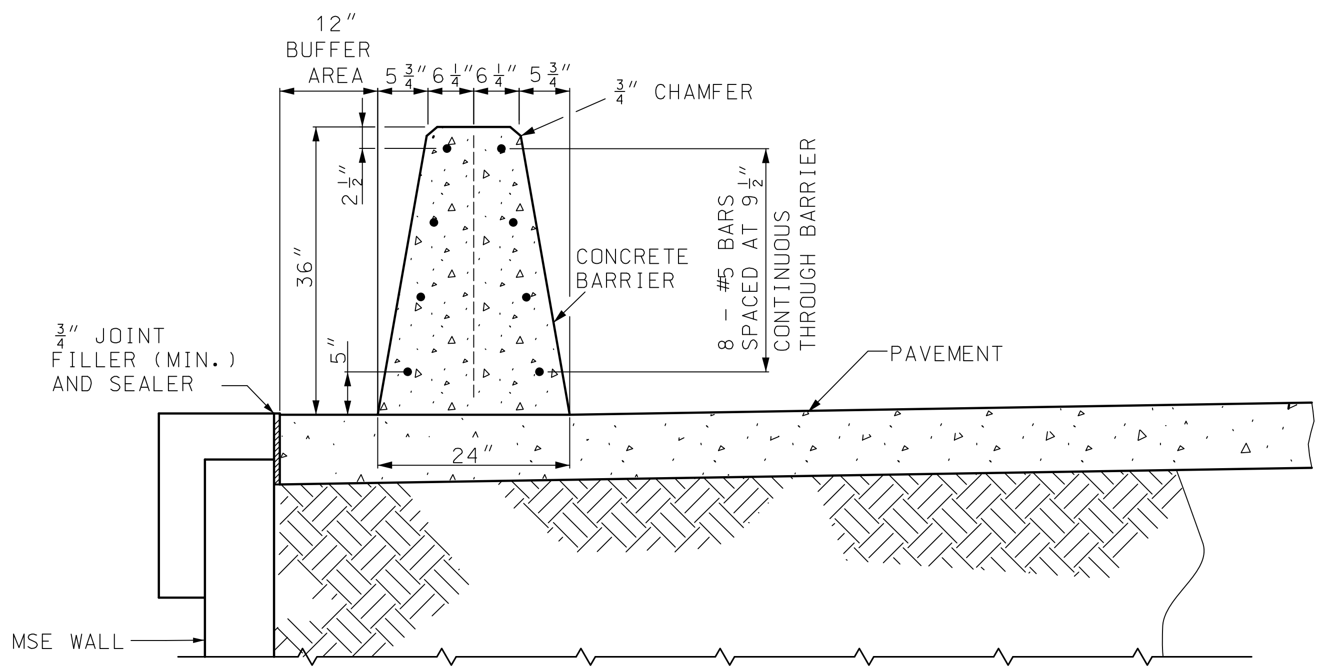
SECTION B-B



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.

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

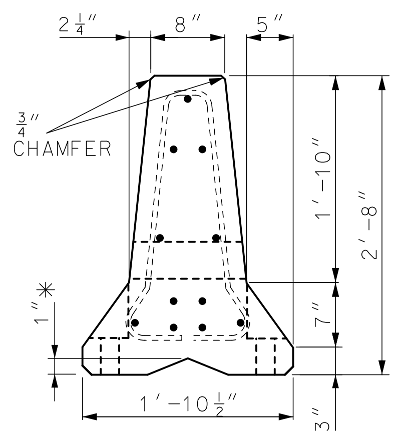
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER
PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PERMANENT CONCRETE TRAFFIC BARRIER

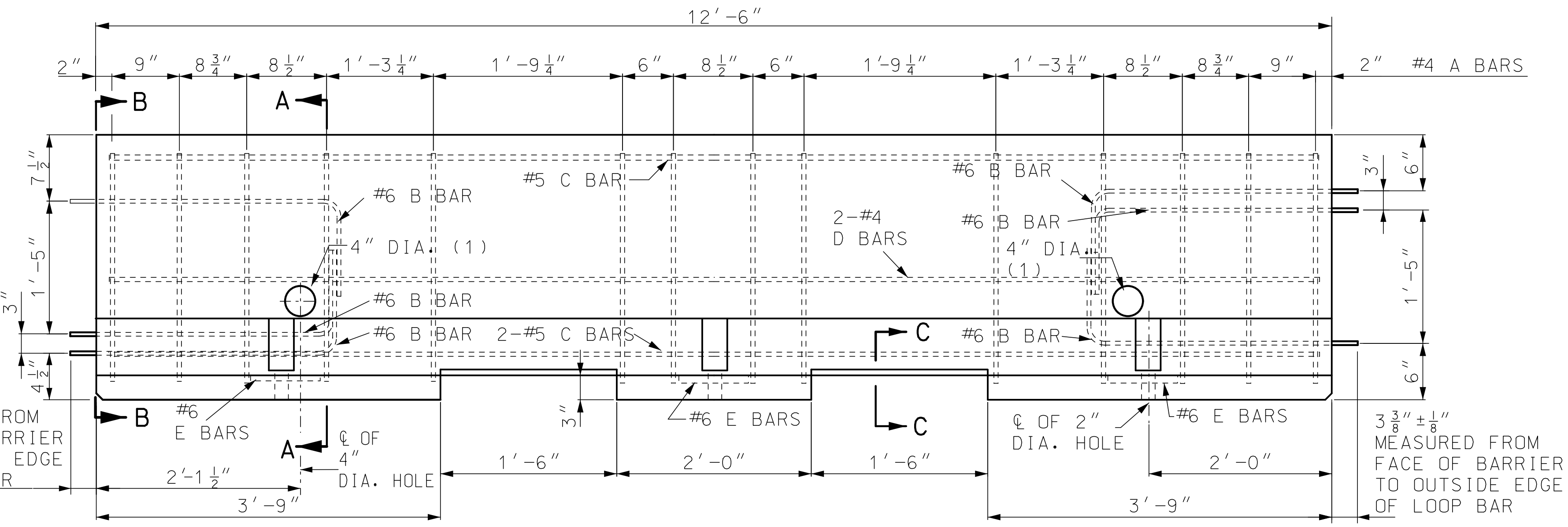
TYPE E ATOP MSE WALL

DATE EFFECTIVE:	10/01/2020	617.10M	SHEET NO.
DATE PREPARED:	7/21/2020		11 OF 11

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

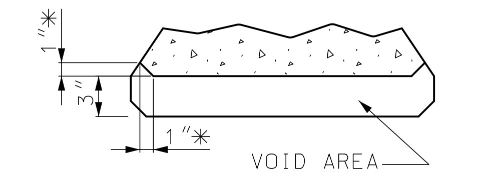


SECTION B-B
✱ V-NOTCH OPTIONAL

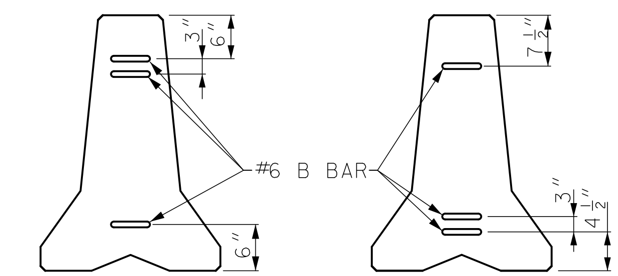


ELEVATION VIEW

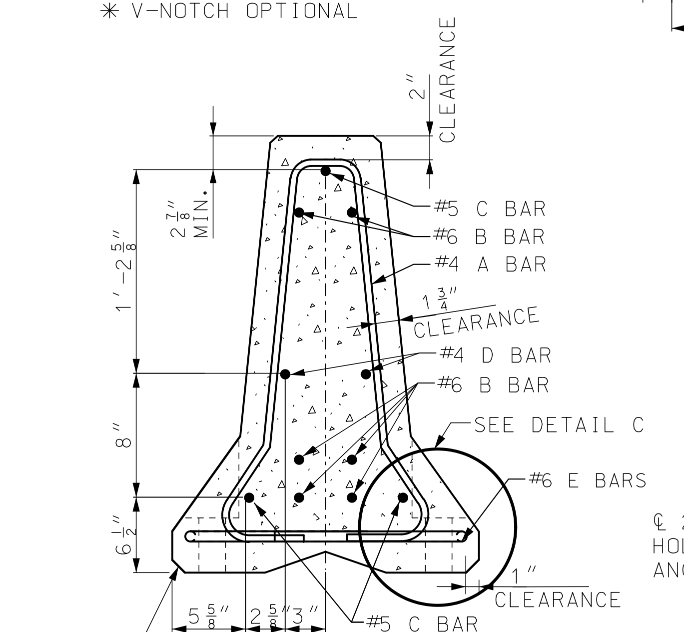
(1) 4 INCH DIAMETER - 11 GAUGE STEEL ROUND MECHANICAL TUBING SLEEVE. THESE HOLES ARE OPTIONAL.



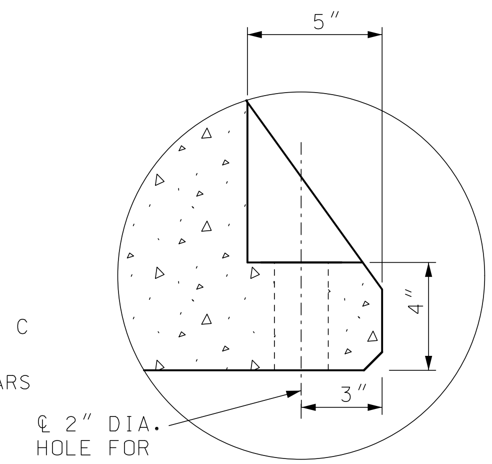
PART SECTION C-C
LIFTING SLOT DETAIL
✱ RADIUS EDGER TO PREVENT SPALLING



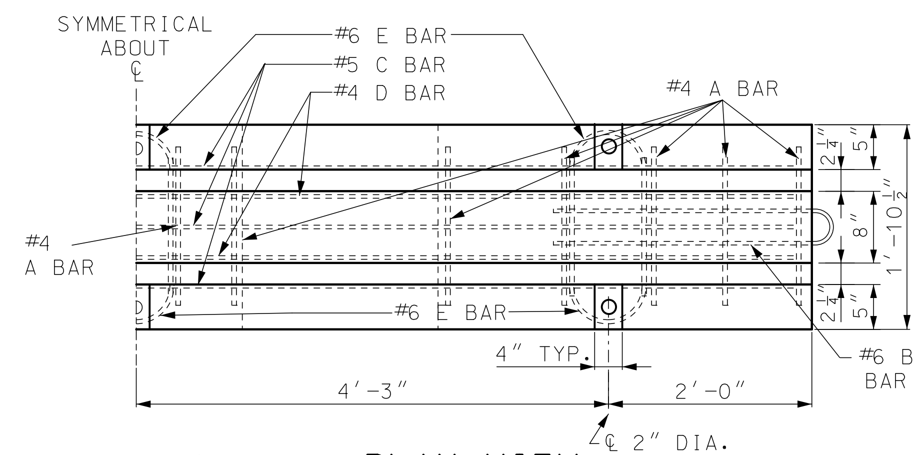
ALTERNATING END VIEWS FOR BARRIER LOOP CONNECTION



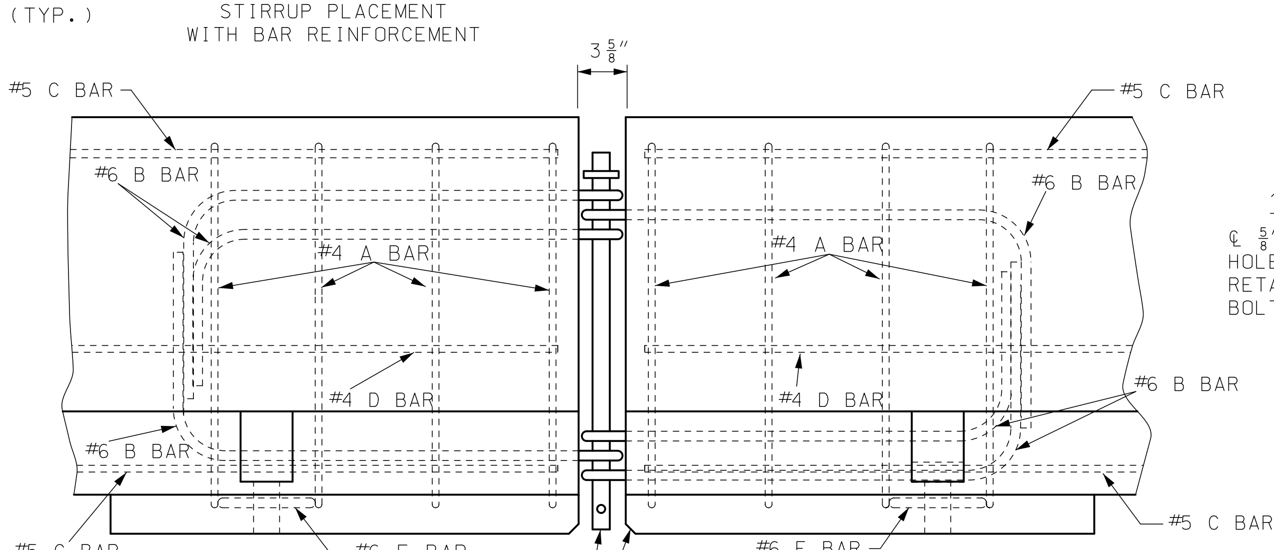
SECTION A-A
STIRRUP PLACEMENT WITH BAR REINFORCEMENT



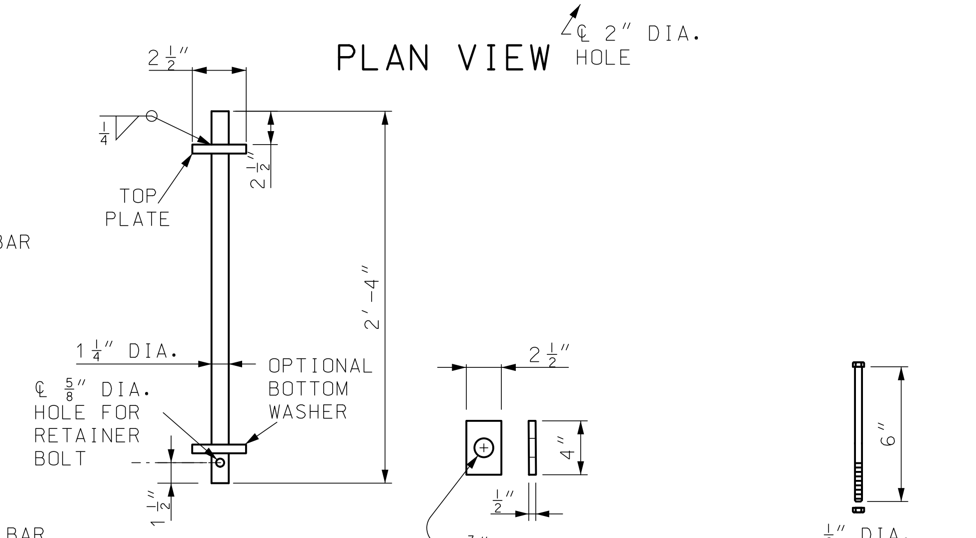
DETAIL C



PLAN VIEW



DETAILS OF BARRIER CONNECTION



ROD 1 1/4" DIA.
CONNECTION ROD (A36)

TOP PLATE & BOTTOM WASHER (A36)

RETAINER BOLT AND NUT (SAE GRADE 8)

NOTE: RETAINER BOLT AND BOTTOM WASHER AT CONTRACTOR'S OPTION.

DETAIL A
CONNECTION ROD ASSEMBLY

GENERAL NOTES:

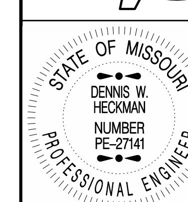
ALL REINFORCING SHALL MEET REQUIREMENTS OF CRSI EXCEPT WHERE SHOWN ON PLANS.

REINFORCING STEEL CLEARANCE TO EDGE OF CONCRETE SHALL BE 1 3/4" UNLESS OTHERWISE SHOWN.

AT NO TIME SHALL THE BARRIERS BE LIFTED OR MOVED BY USE OF THE LOOP BARS.

THE SECTION FURNISHED SHALL COMPLY WITH DIMENSIONS SHOWN, AS APPROVED BY THE ENGINEER.

SEE SHEET 3 FOR DELINEATOR DETAILS.



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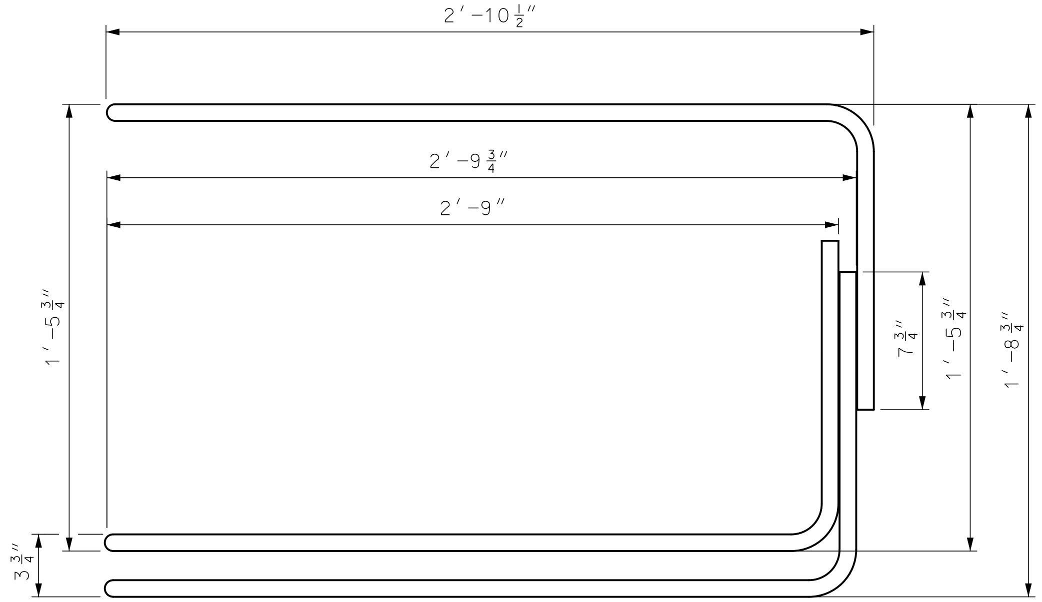
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

TEMPORARY CONCRETE TRAFFIC BARRIER
TYPE F

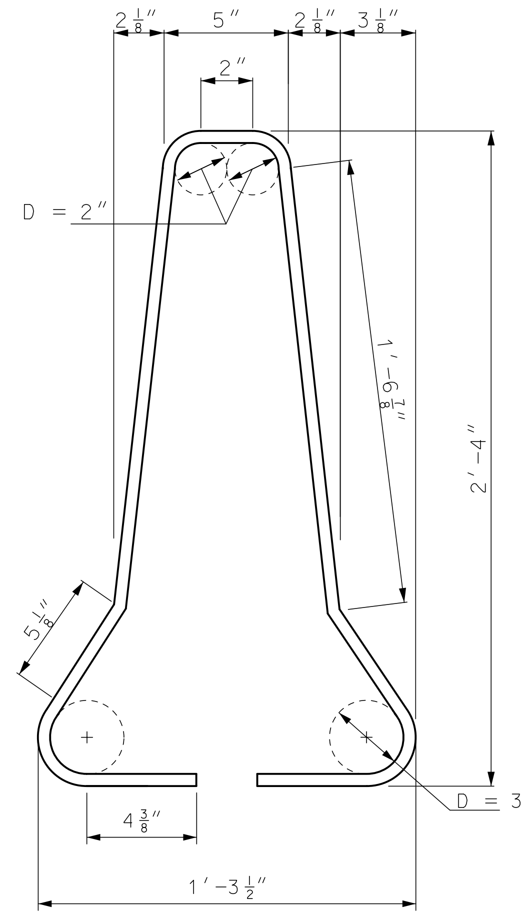
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

617.20F

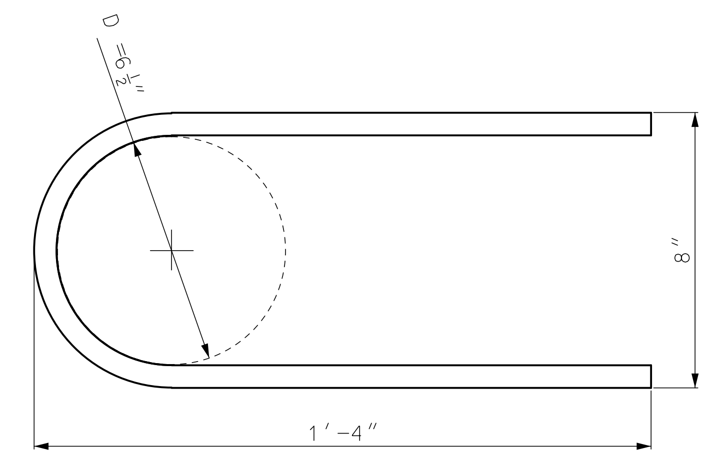
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



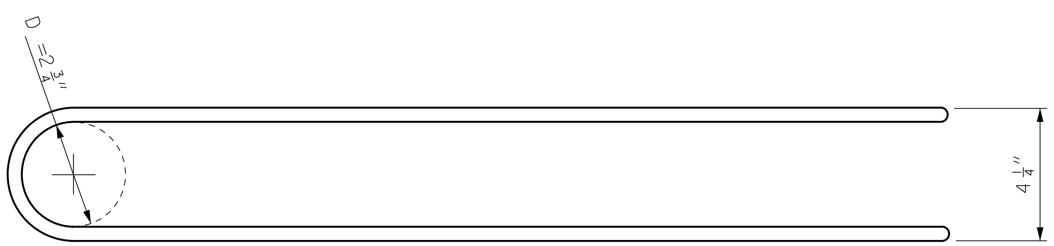
#6 B BAR ELEVATION



#4 A BARS



#6 E BAR



#6 B BAR PLAN

REINFORCING BARS
PER 12′- 6″ BARRIER SECTION

MARK	BAR SIZE	NO. OF BARS	SHAPE OF EACH	LENGTH EACH (NOM.)	WEIGHT
A	4	14		6′-5″	60.8 lbs
C	5	3		12′-2″	38.1 lbs
D	4	2		12′-2″	16.3 lbs
E	6	6		2′-11″	26.3 lbs
LOOP ASSEMBLY					
B	6	6		7′-10″	70.5 lbs

CONCRETE VOLUME 1.3 CU YDS APPROXIMATE WEIGHT 5601 LBS.

GENERAL NOTE:

DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE NOTED.

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1-888-ASK-MODOT (1-888-275-6636)

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

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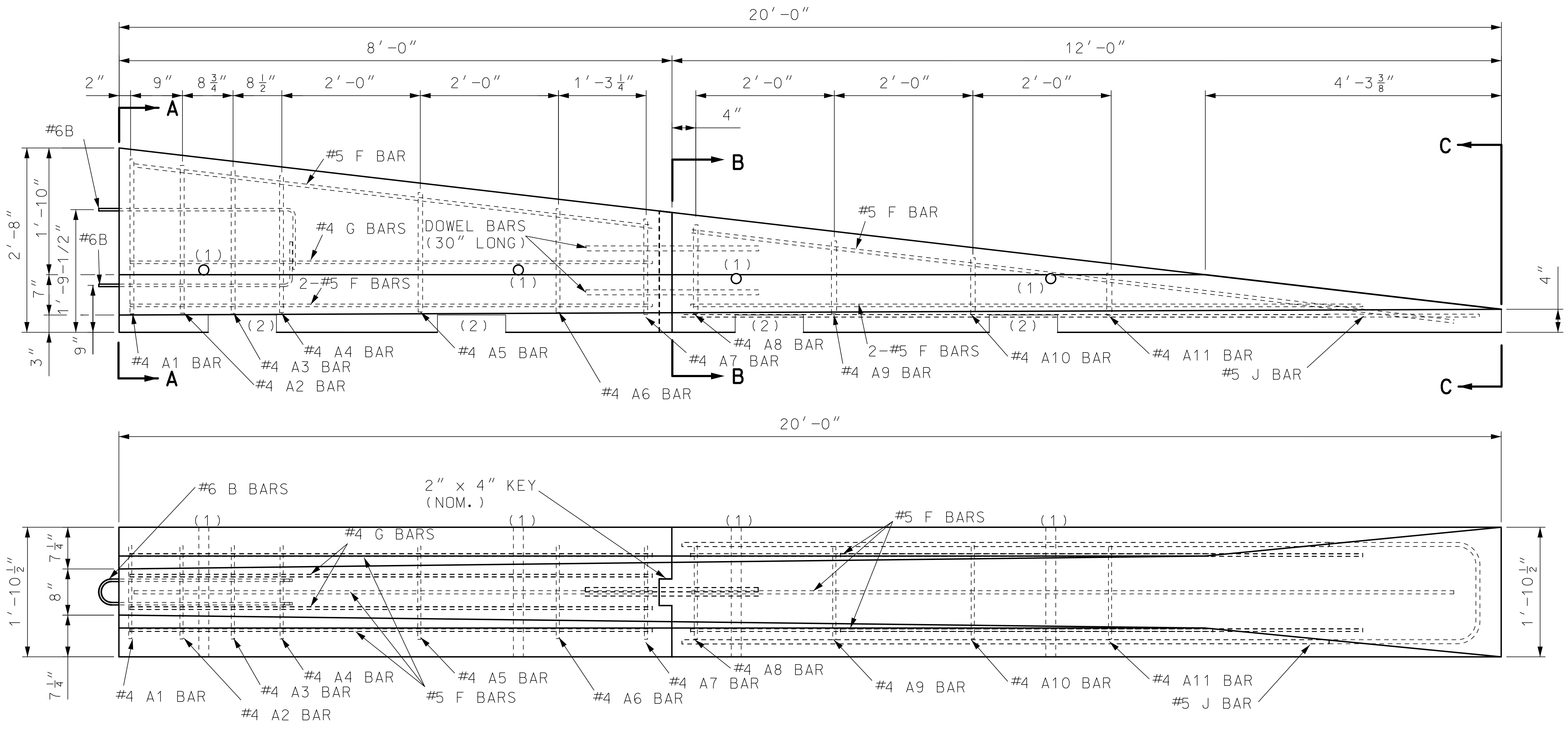
TEMPORARY CONCRETE TRAFFIC BARRIER
TYPE F

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

617.20F

SHEET NO.
2 OF 8

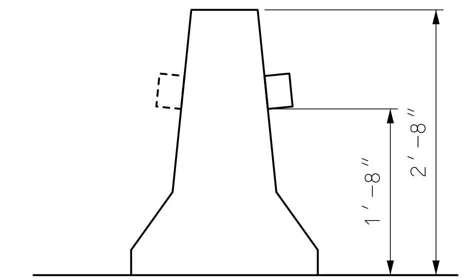


PRECAST BARRIER HEIGHT TRANSITION

(TEMPORARY INSTALLATIONS ONLY)

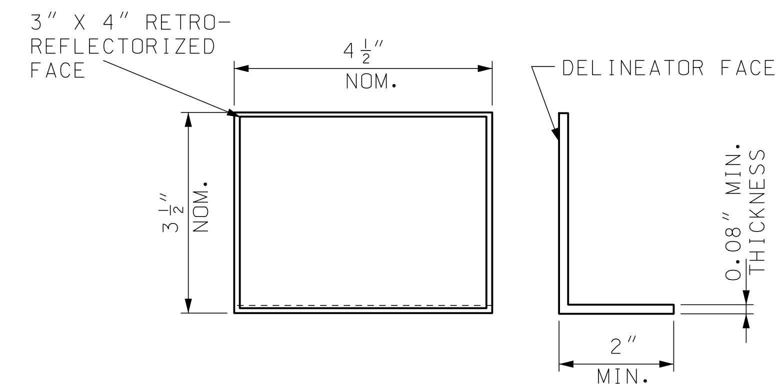
(1) OPTIONAL 4 INCH DIAMETER, 11 GUAGE STEEL ROUND MECHANICAL TUBING SLEEVE FOR LIFT HOLE ALLOWED. THE LOCATION OF THE HOLE MAY VARY TO ACCOMMODATE THE DIFFERING WEIGHT DISTRIBUTIONS OF TRANSITION SECTIONS.

(2) 3" X 1'-0" SLOTS FOR LIFTING - TWO PER SECTION. LOCATION TO BE DETERMINED BY CONTRACTOR.



TRAFFIC BARRIER DELINEATORS

REFLECTIVE SHEETING APPLIED TO TRAFFIC BARRIER DELINEATORS SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.



DELINEATOR

GENERAL NOTES:

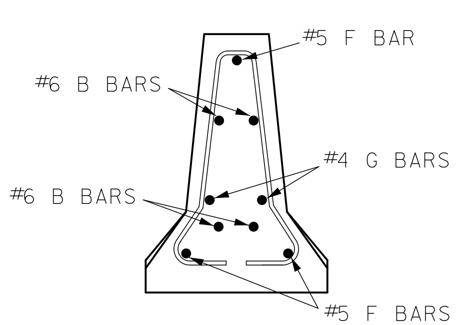
REINFORCING STEEL CLEARANCE TO EDGE OF CONCRETE SHALL BE $1\frac{3}{4}$" UNLESS OTHERWISE SHOWN.

HEIGHT TRANSITIONS SHALL NOT BE USED ON INTERSTATE ROUTES OR IN LOCATIONS WHERE THE POSTED SPEED PRIOR TO CONSTRUCTION IS GREATER THAN 35 MPH.

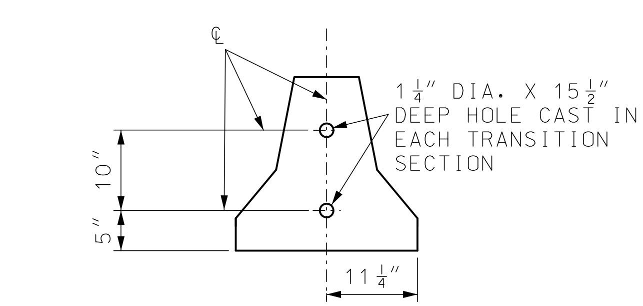
AT NO TIME SHALL THE BARRIERS BE LIFTED OR MOVED BY USE OF THE LOOP BARS.

RETAINER BOLT AND NUT MUST BE USED WITH TRANSITION BARRIER.

AT THE OPTION OF THE CONTRACTOR, HEIGHT TRANSITIONS MAY BE MANUFACTURED IN ONE SECTION. THE PLANS FOR REINFORCEMENT ACROSS JOINT SHALL BE APPROVED BY THE ENGINEER PRIOR TO MANUFACTURE.

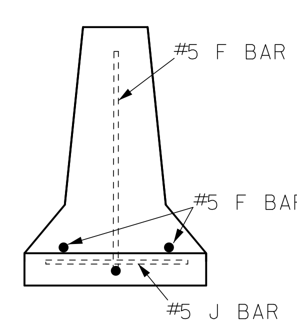


SECTION A-A



SECTION B-B

NOTE: SECTIONS TO BE CONNECTED WITH TWO- 1" DIA. BARS OR #8 REINFORCING BARS 30" LONG IN $1\frac{1}{4}$" DIA. HOLES AS SHOWN.



SECTION C-C

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
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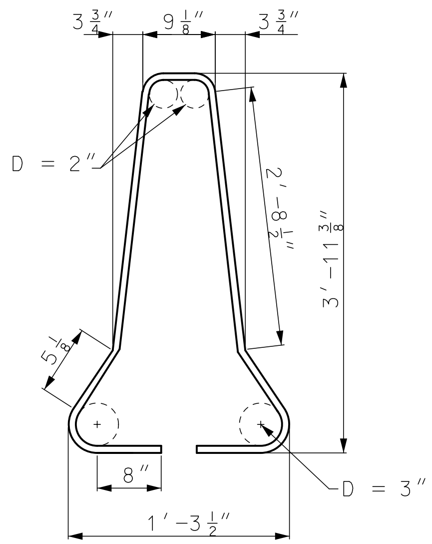
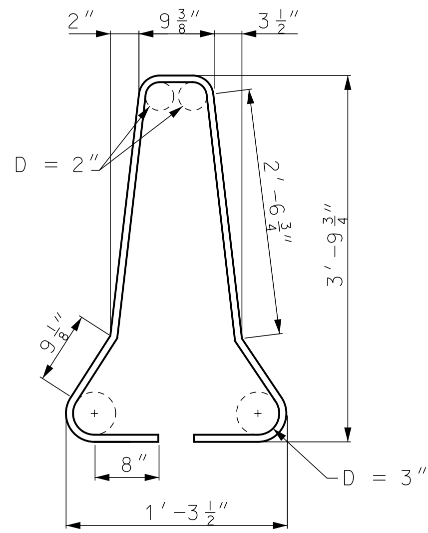
TEMPORARY CONCRETE TRAFFIC BARRIER

TYPE F HEIGHT TRANSITIONS

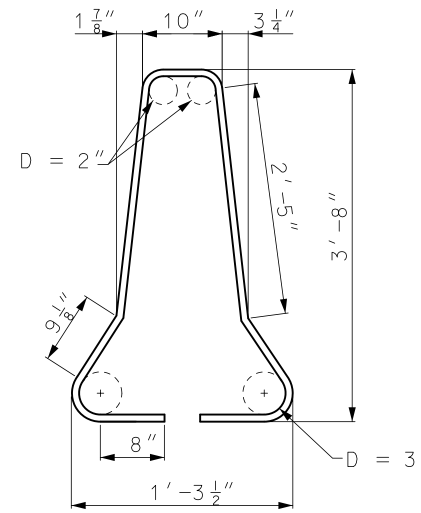
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020
617.20F



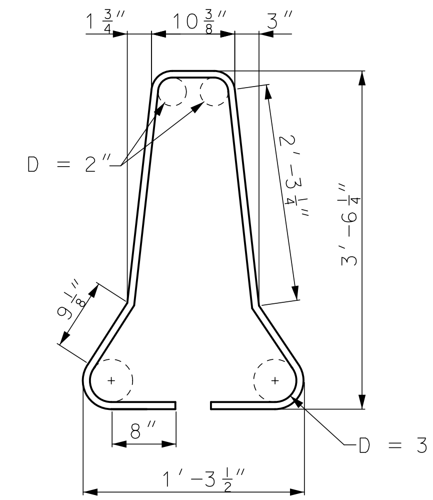
#4 A1 BAR



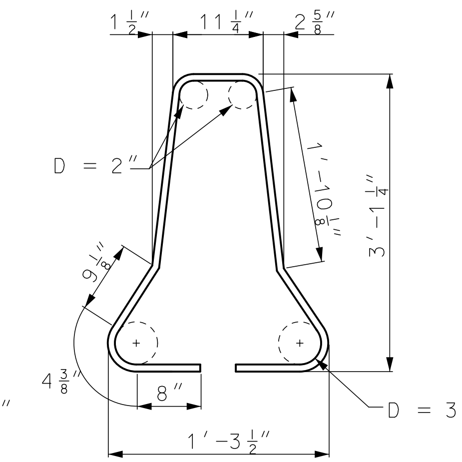
#4 A2 BAR



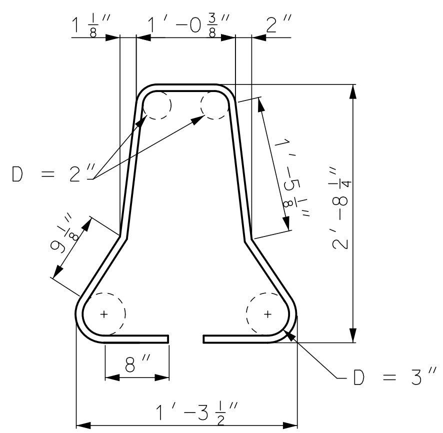
#4 A3 BAR



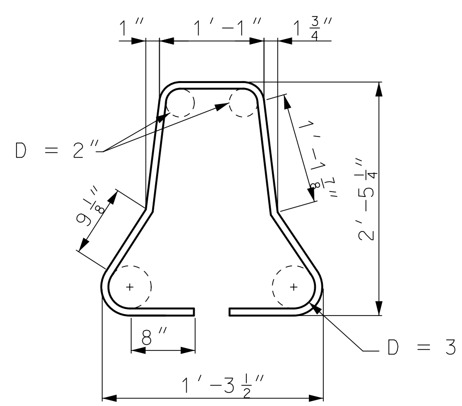
#4 A4 BAR



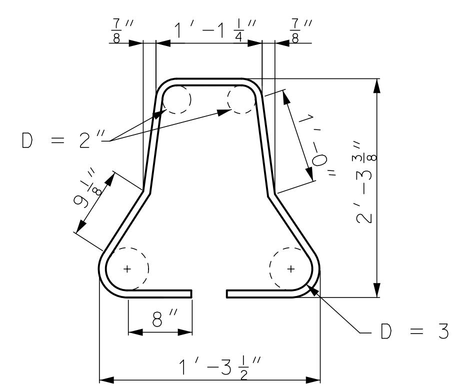
#4 A5 BAR



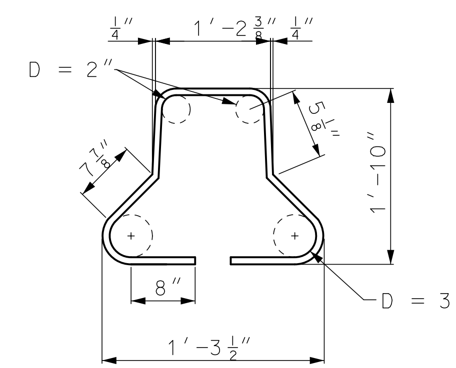
#4 A6 BAR



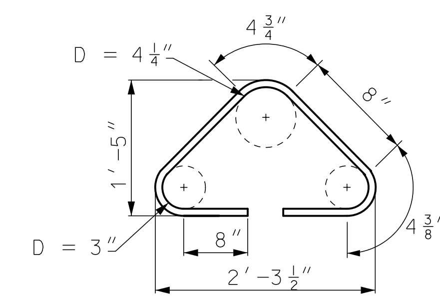
#4 A7 BAR



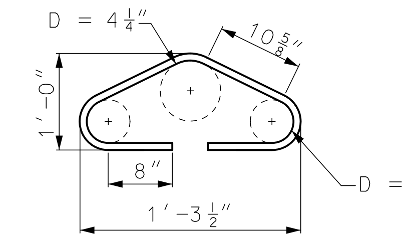
#4 A8 BAR



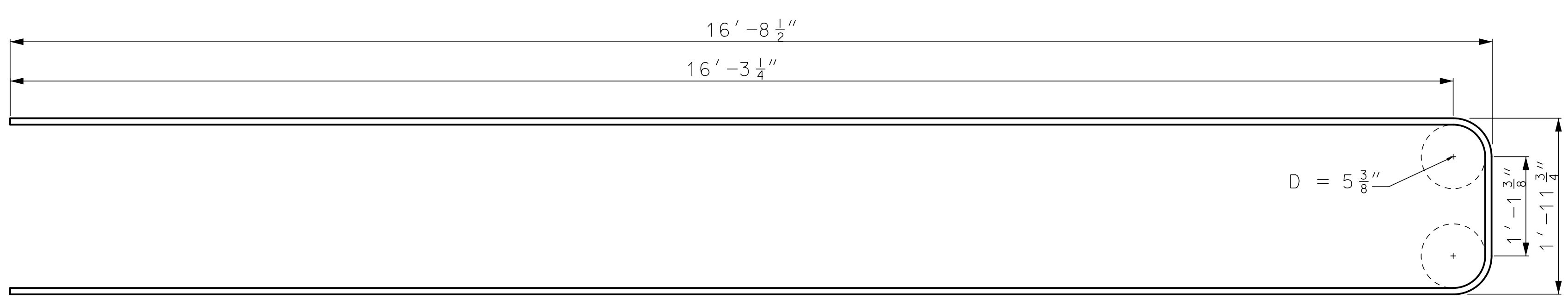
#4 A9 BAR



#4 A10 BAR



#4 A11 BAR



#5 J BAR

NOTE: FOR DETAILS OF B BARS, SEE SHEET 2 OF 6.

GENERAL NOTES:

DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE NOTED.

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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

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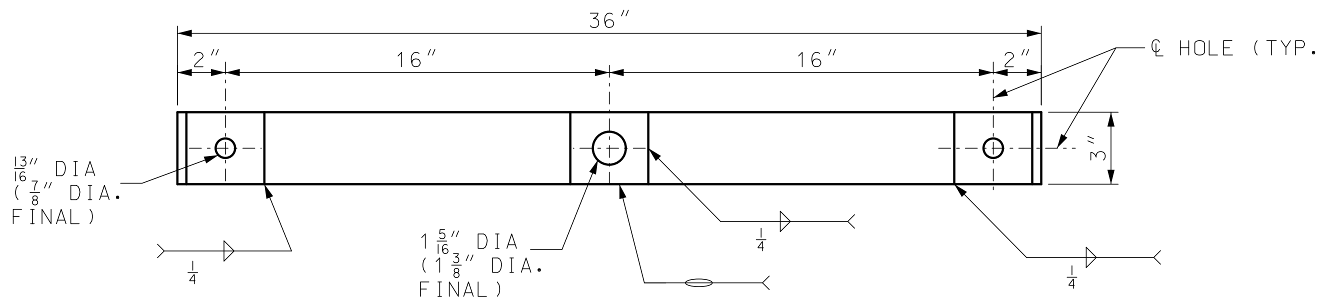
TEMPORARY CONCRETE TRAFFIC BARRIER

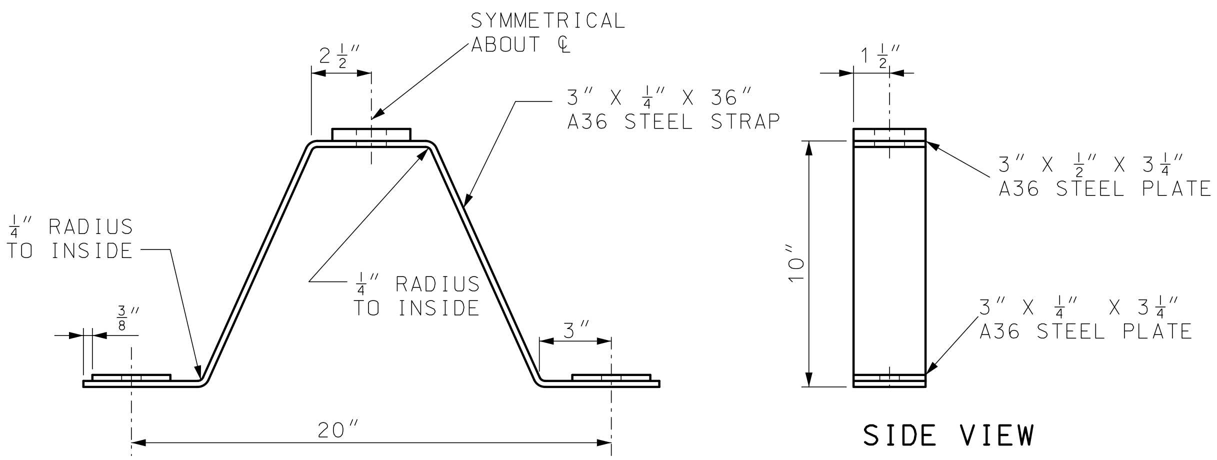
TYPE F HEIGHT TRANSITIONS

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

617.20F



PLAN OF TIE-DOWN STRAP



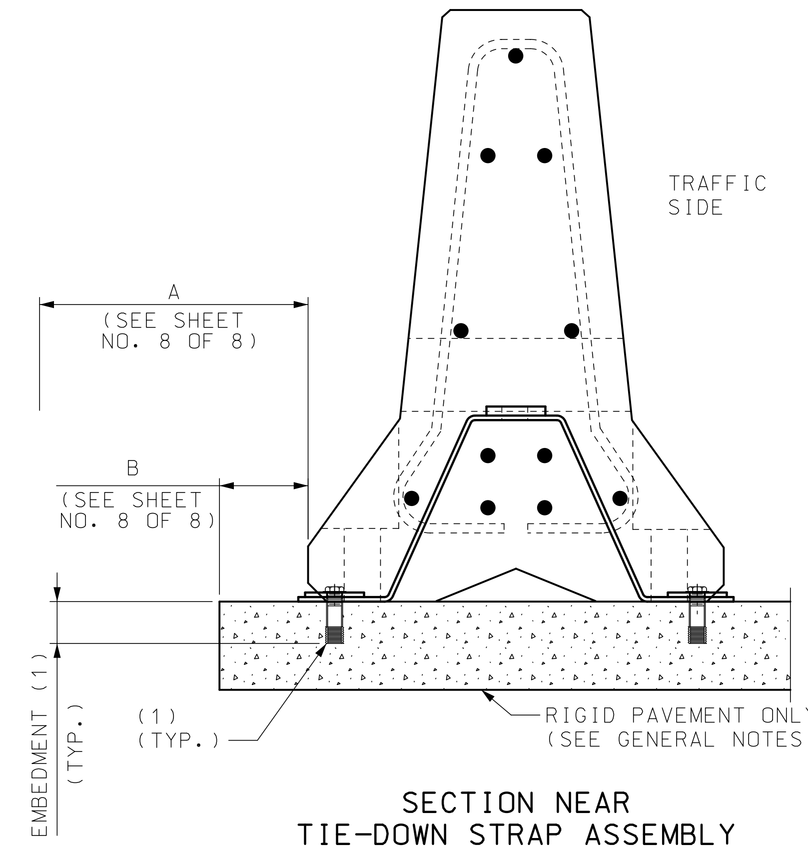
DETAILS OF TYPE F TEMPORARY BARRIER TIE-DOWN STRAP

(1) TIE-DOWN STRAP ANCHOR SHALL BE ONE OF THE FOLLOWING:

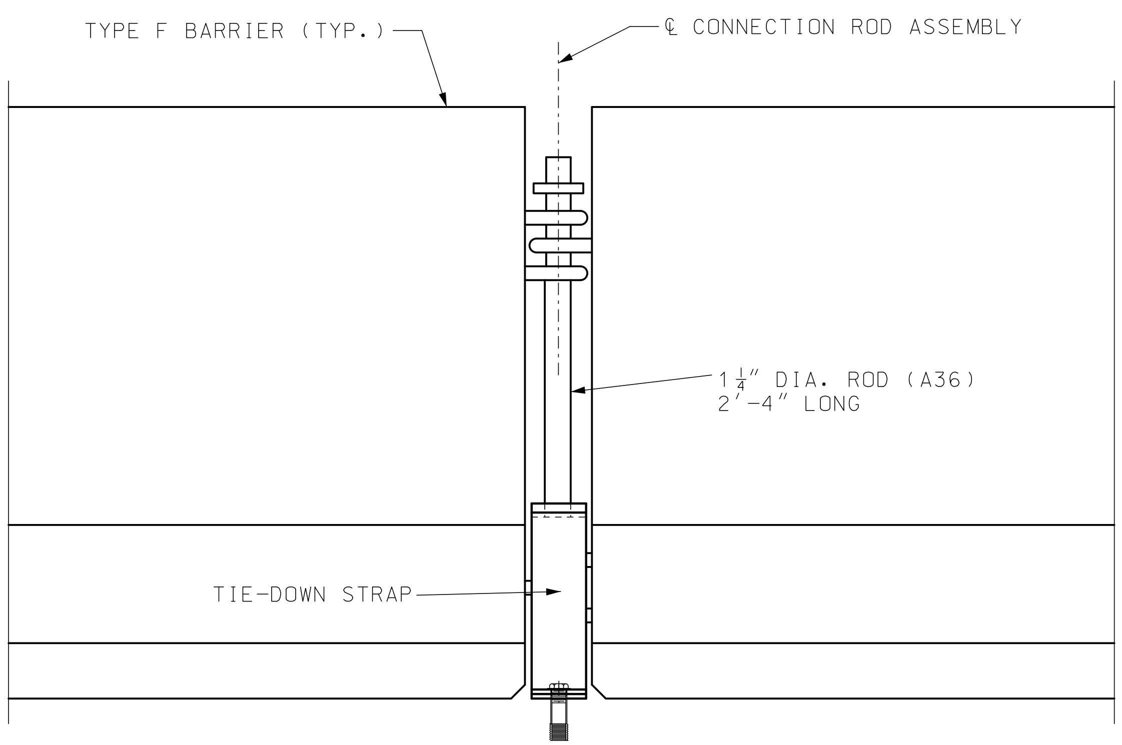
$\frac{3}{4}$″ DROP IN ANCHOR WITH A $3\frac{1}{4}$″ EMBEDMENT AND $\frac{3}{4}$″ DIA. X $1\frac{3}{4}$″ LONG GRADE 5 BOLT.

RED HEAD LARGE DIAMETER TAPCON (LDT) $\frac{3}{4}$″ X $4\frac{1}{2}$″ LONG WITH A 4″ EMBEDMENT.

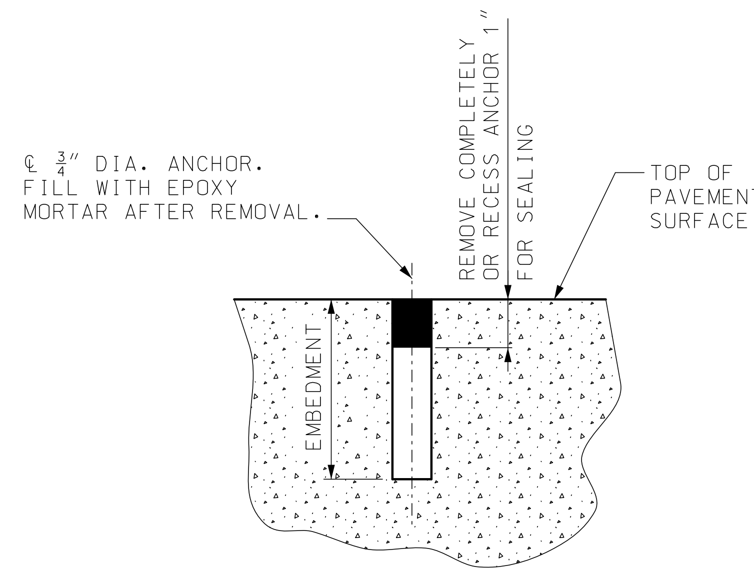
SIMPSON TITEN HD $\frac{3}{4}$″ DIA. X 5″ LONG WITH A $4\frac{1}{2}$″ EMBEDMENT.



SECTION NEAR
TIE-DOWN STRAP ASSEMBLY



PART ELEVATION OF BARRIER



DETAIL SHOWING SEALING OF HOLES
AFTER REMOVAL OF TIE-DOWN BOLTS

GENERAL NOTES:

TIE-DOWN STRAP SYSTEMS ARE ONLY APPLICABLE ON RIGID PAVEMENTS.

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

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

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

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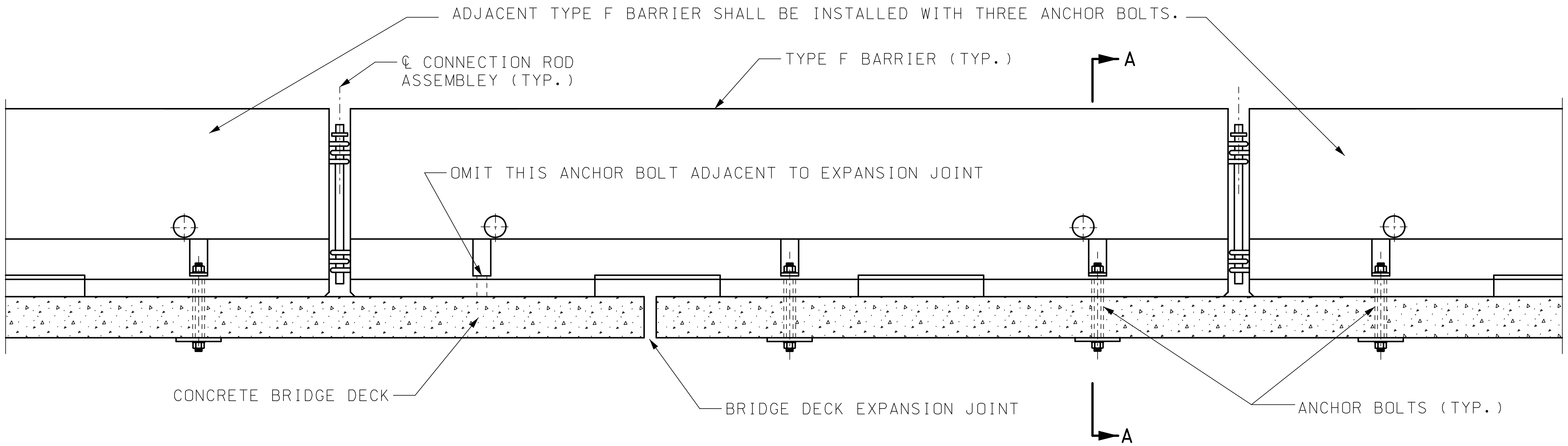
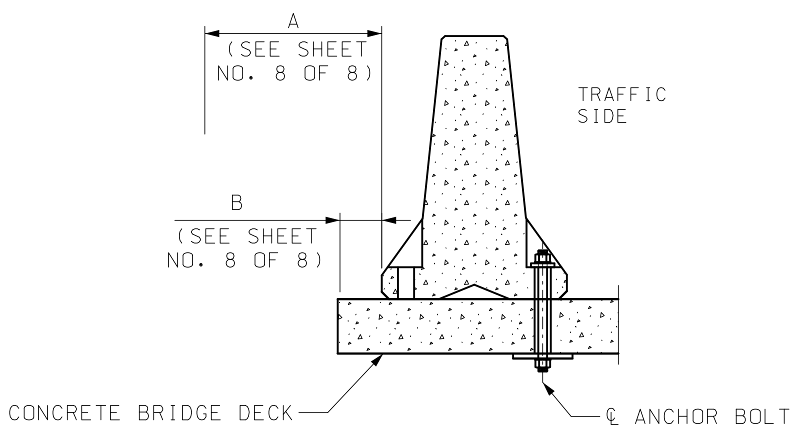
TEMPORARY CONCRETE TRAFFIC BARRIER
ANCHORED
(TIE-DOWN STRAP SYSTEM)

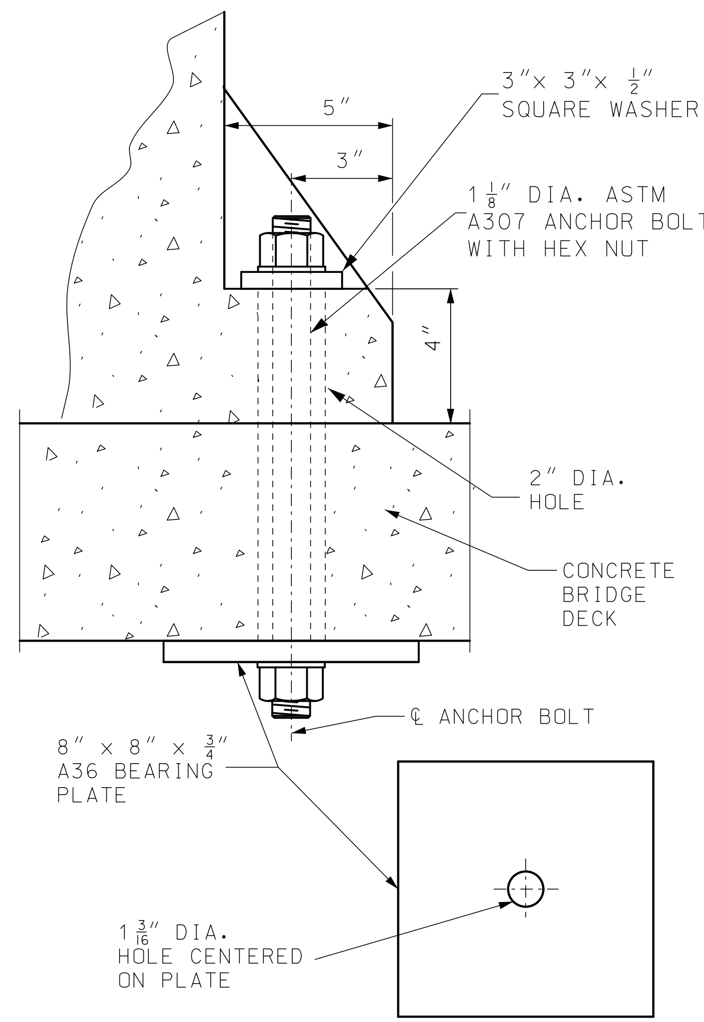
DATE EFFECTIVE:	01/01/2021	617.20F	SHEET NO.
DATE PREPARED:	10/14/2020		5 OF 8



BOLT THROUGH DECK AT THERMAL EXPANSION JOINTS



SECTION A-A



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.

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DENNIS W. HECKMAN
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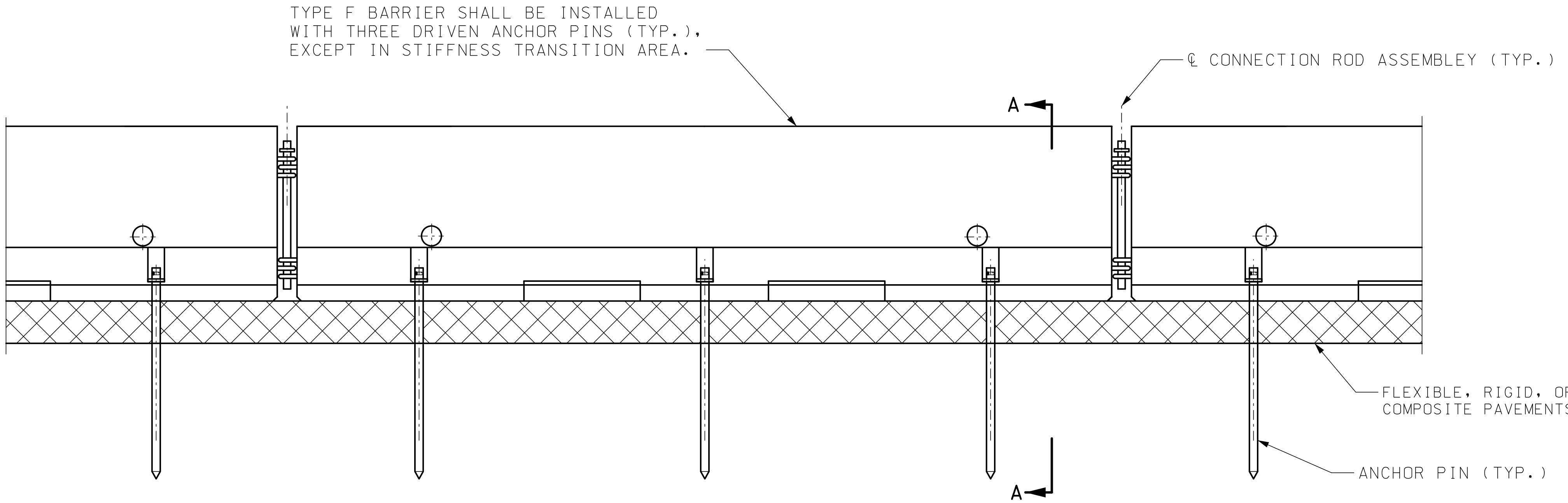
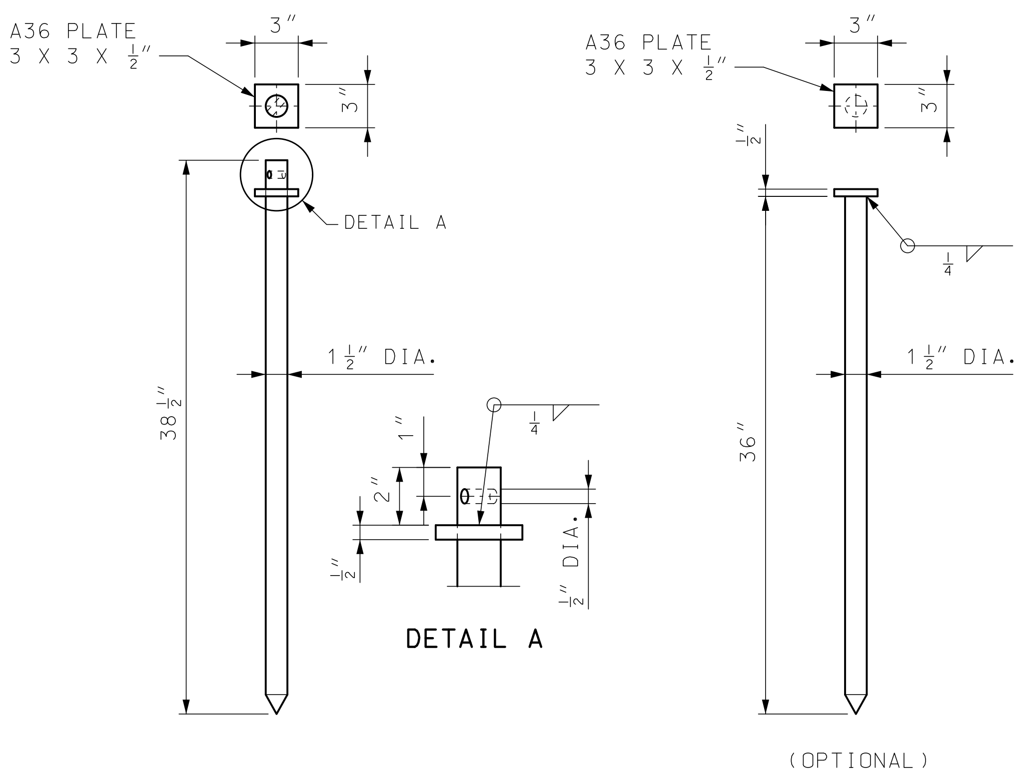
TEMPORARY CONCRETE TRAFFIC BARRIER
ANCHORED
(BOLT SYSTEM)

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

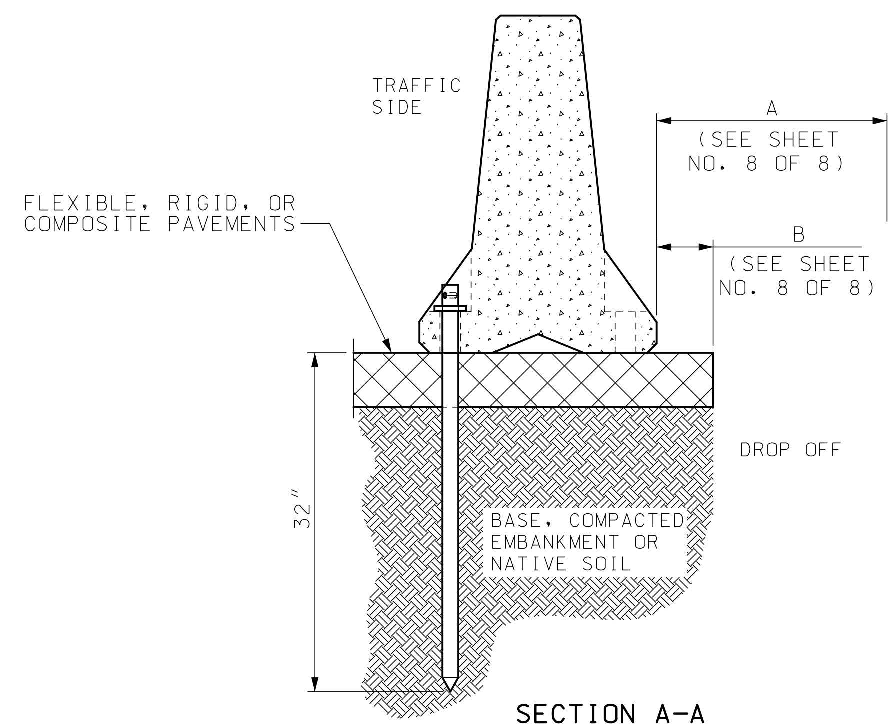
617.20F



ELEVATION OF BARRIER WITH ANCHOR PINS



DRIVEN ANCHOR PIN (A36)



SECTION A-A

GENERAL NOTES:

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

WHERE EXISTING FLEXIBLE PAVEMENT OR RIGID PAVEMENT IS NOT PRESENT A 2" THICK X 30" WIDE MINIMUM ASPHALT PAD SHALL BE CONSTRUCTED.

COST OF FURNISHING AND INSTALLING THE ASPHALT PAD COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

AFTER REMOVAL OF ANCHOR PINS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.

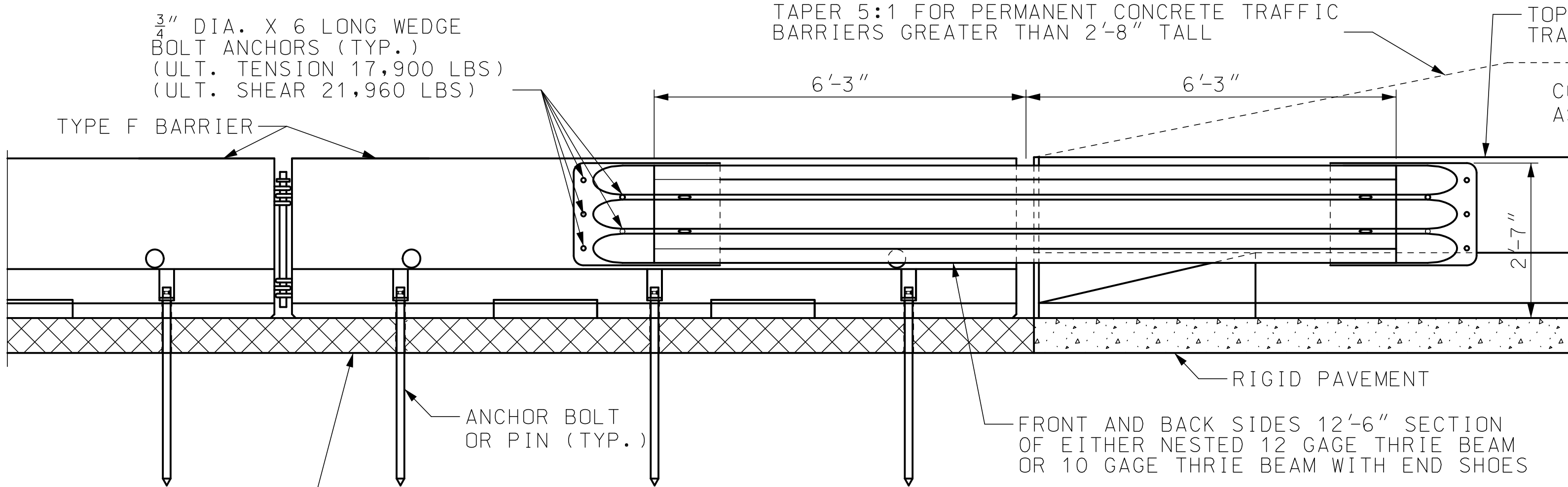
MoDOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

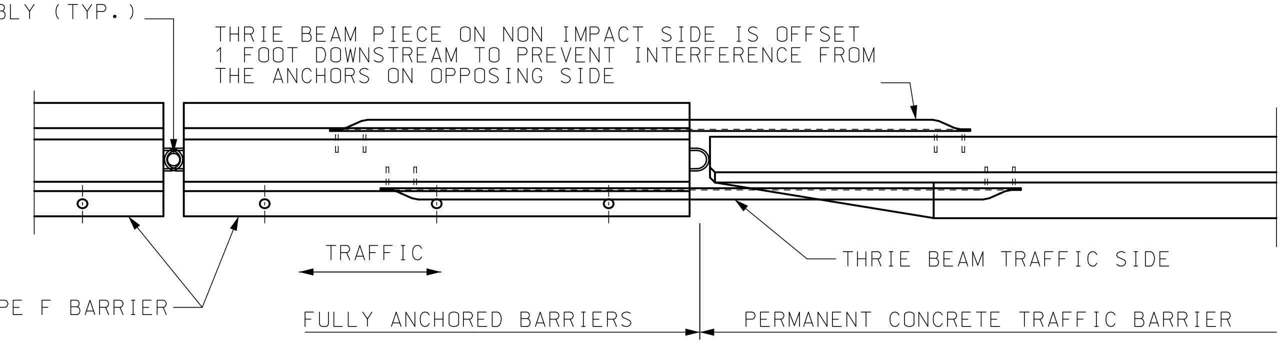
TEMPORARY CONCRETE TRAFFIC BARRIER

ANCHORED
(PIN SYSTEM)

DATE EFFECTIVE:	01/01/2021	617.20F	SHEET NO. 7 OF 8
DATE PREPARED:	10/14/2020		

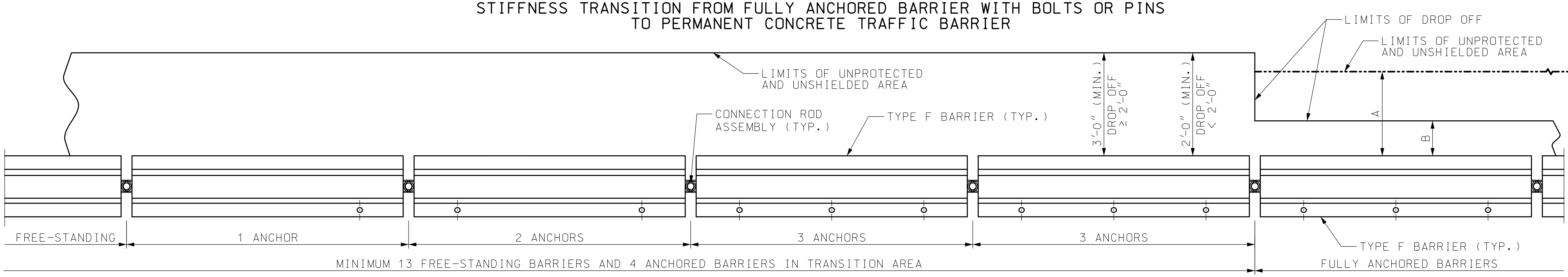


PART ELEVATION OF BARRIER

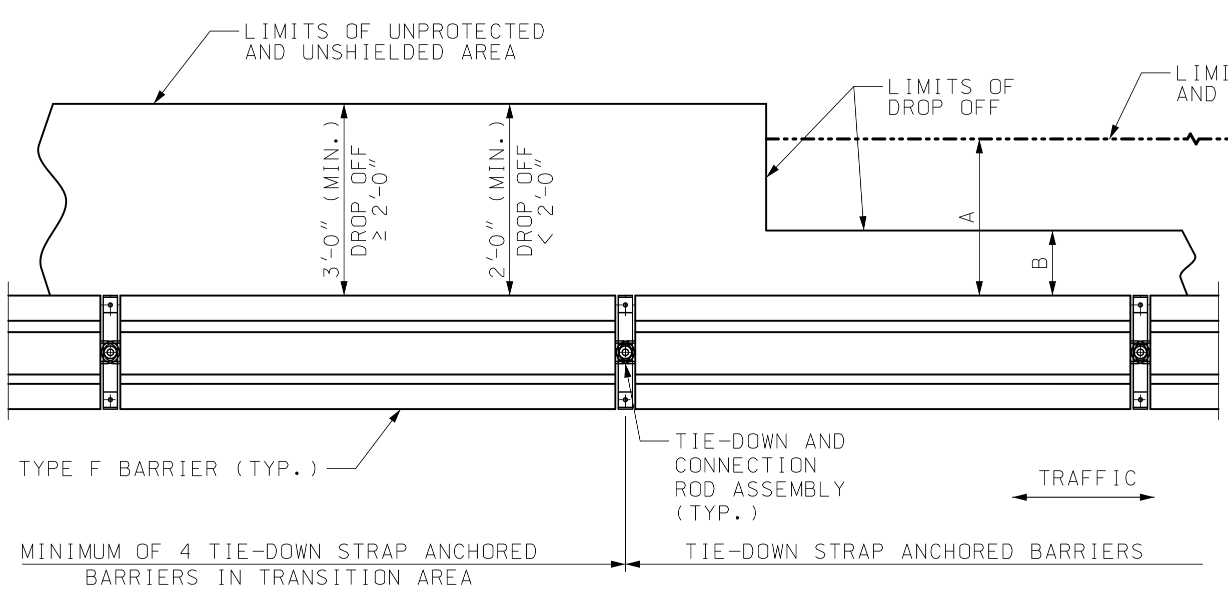


PART PLAN OF BARRIER

STIFFNESS TRANSITION FROM FULLY ANCHORED BARRIER WITH BOLTS OR PINS TO PERMANENT CONCRETE TRAFFIC BARRIER



PLAN OF STIFFNESS TRANSITION FROM FREE-STANDING BARRIERS TO FULLY ANCHORED BARRIER WITH BOLTS OR PINS



STIFFNESS TRANSITION FOR BARRIER ANCHORED WITH TIE-DOWN STRAPS

(13 FREE-STANDING BARRIERS NOT REQUIRED)

LIMITS OF UNPROTECTED AND UNSHIELDED AREA	
6" ≤ A < 2'	ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS
2' ≤ A < 3'	ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS
A ≥ 3'	NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS

EDGE OF DROP OFF	
1" ≤ B < 6"	ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS
6" ≤ B < 2'	ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS
B ≥ 2'	NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS

NOTE: TEMPORARY CONCRETE TRAFFIC BARRIER MUST MEET BOTH A AND B DIMENSIONS, UNLESS OTHERWISE SHOWN ON PLANS.

GENERAL NOTES:

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

COST OF FURNISHING AND INSTALLING THE ANCHOR BOLT SYSTEM, ANCHOR PINS SYSTEM, TIE-DOWN STRAP SYSTEM AND THRIE BEAM COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

ALL TYPE F BARRIERS SHALL BE CONNECTED TO ADJACENT TYPE F BARRIERS WITH CONNECTION ROD ASSEMBLY, AND PULLED TIGHT DURING INSTALLATION TO REMOVE SLACK TO PROVIDE LONGITUDINAL TENSION DURING IMPACT.

AFTER REMOVAL OF ANCHORS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

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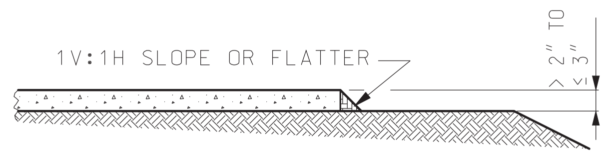
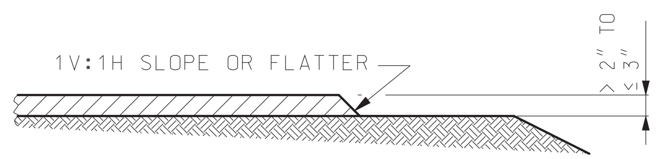
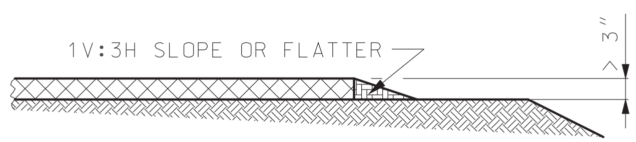
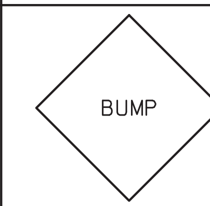
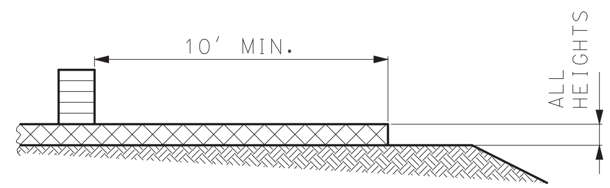
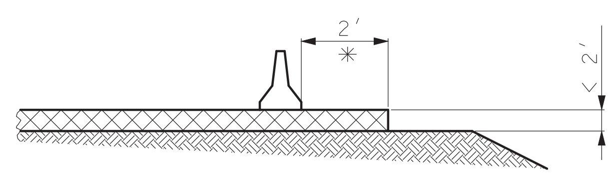
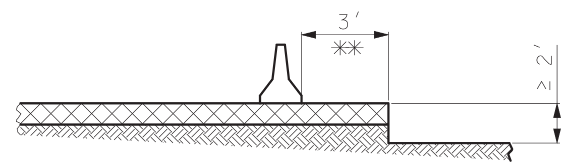
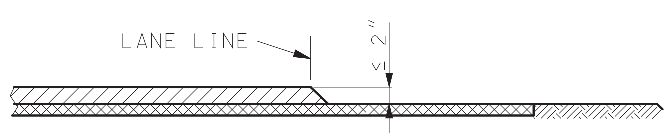
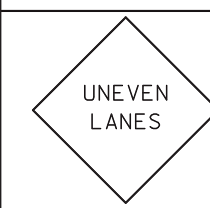
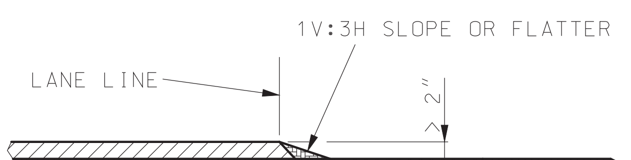
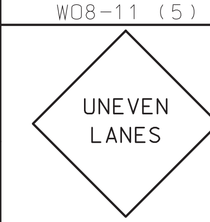
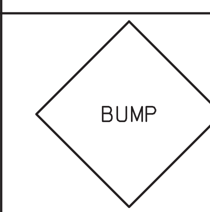
TEMPORARY CONCRETE TRAFFIC BARRIER

STIFFNESS TRANSITION

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

617.20F

	CROSS SECTION	CONDITION: DIFFERENTIAL	CONDITION: TIME	TREATMENT	SIGN: MAINLINE (1)	SIGN: SIDE ROAD (2)
EDGE DROP-OFF		PAVEMENT EDGE DIFFERENTIAL > 2" TO ≤ 3"	NON-WORKING HOURS	WEDGE SLOPE TO 1V:1H OR FLATTER	 W08-17 (3)(4) W08-17p (6)	NO SIGNS REQUIRED
			WORKING HOURS	NO EDGE TREATMENT REQUIRED		
EDGE DROP-OFF		PAVEMENT EDGE DIFFERENTIAL > 2" TO ≤ 3"	NON-WORKING HOURS	WEDGE SLOPE TO 1V:1H OR FLATTER	 W08-17 (3)(4) W08-17p (6)	NO SIGNS REQUIRED
			WORKING HOURS	NO EDGE TREATMENT REQUIRED		
EDGE DROP-OFF		PAVEMENT EDGE DIFFERENTIAL > 3"	NON-WORKING HOURS	WEDGE SLOPE TO 1V:3H OR FLATTER	 W08-17 (3)(4) W08-17p (6)	 W08-1 (3)
			WORKING HOURS	DELINEATE DIFFERENTIAL WITH CHANNELIZERS		
EDGE DROP-OFF	  * FOR DISTANCES LESS THAN 2', SEE STANDARD PLAN 617.20.  ** FOR DISTANCES LESS THAN 3', SEE STANDARD PLAN 617.20.	ANY PAVEMENT EDGE OR LANE LINE DIFFERENTIAL	NON-WORKING AND WORKING HOURS WHERE PLANS REQUIRE ADJACENT LANE CLOSURE WITH CHANNELIZATION OR PARTIAL LANE CLOSURE WITH BARRIER.	NO EDGE TREATMENT REQUIRED	NO SIGNS REQUIRED	NO SIGNS REQUIRED
LANE DIFFERENTIAL		LANE LINE DIFFERENTIAL ≤ 2"	NON-WORKING AND WORKING HOURS	NO EDGE TREATMENT REQUIRED	 W08-11 (5)	NO SIGNS REQUIRED
LANE DIFFERENTIAL		LANE LINE DIFFERENTIAL > 2"	NON-WORKING AND WORKING HOURS WHERE LANES OPEN TO TRAFFIC	WEDGE SLOPE TO 1V:3H OR FLATTER	 W08-11 (5)	 W08-1
			NON-WORKING AND WORKING HOURS WHERE LANE CLOSED TO TRAFFIC	DELINEATE DIFFERENTIAL WITH CHANNELIZERS		

(1) SIGNS SHALL BE SPACED AT APPROXIMATELY ONE MILE INTERVALS AND LOCATED WITHIN 150 FT. BEYOND ANY STATE ROADS. WHEN A SIGN PLACED AT THE ONE MILE INTERVAL FALLS WITHIN 1/2 MILE OF A SIGN PLACED AFTER AN INTERSECTION, THE SIGN PLACED AT THE 1/2 MILE INTERVAL MAY BE OMITTED. WHEN SHOULDER DROP-OFF SIGNS WITH UNEVEN LANES ARE BOTH SPECIFIED, ALTERNATING SIGN MESSAGES SHALL BE USED AT 1 MILE SPACINGS.

(2) ON SIDE ROADS WITH POSTED SPEED OF 45 MPH OR GREATER, SIGNS SHALL BE PLACED 150 FT. IN ADVANCE OF INTERSECTION WITH MAINLINE.

(3) SIGNS SHALL BE LOCATED ON THE SIDE OF THE ROADWAY WHERE THE PAVEMENT EDGE DIFFERENTIAL EXISTS.

(4) SIGNS TO REMAIN VISIBLE UNTIL SHOULDER SHAPING IS COMPLETE.

(5) SIGNS SHALL BE LOCATED ON RIGHT SIDE OF NON-DIVIDED HIGHWAYS AND ON BOTH SIDES OF DIVIDED HIGHWAYS WHERE A LANE LINE DIFFERENTIAL EXISTS.

(6) WHEN THE SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.

LEGEND

- RIGID PAVEMENT
- FLEXIBLE PAVEMENT
- ALL PAVEMENT TYPES

GENERAL NOTES:

SIGNS SHALL BE VISIBLE TO TRAFFIC ONLY WHEN AND WHERE CONDITIONS EXIST.

FOR ADDITIONAL SIGN SPACING AND DETAILS SEE STANDARD PLAN 620.10.

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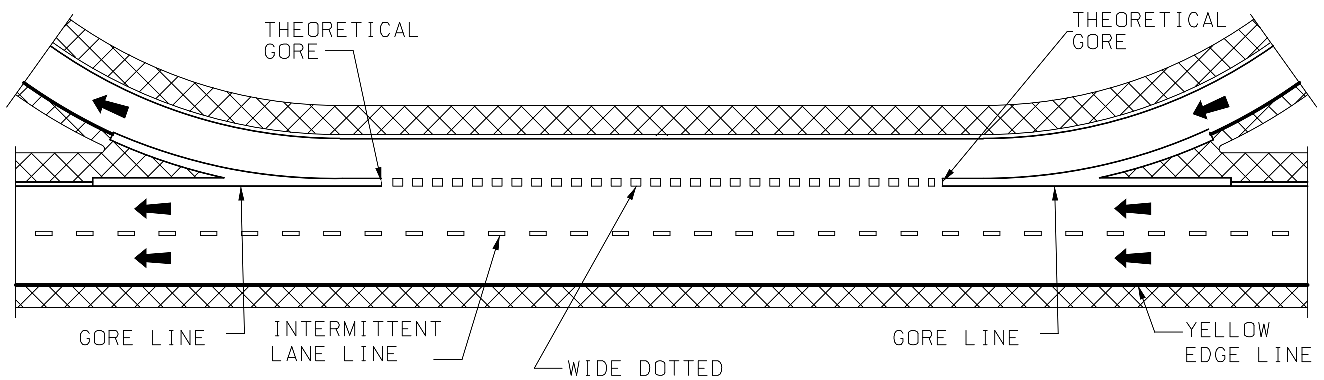
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

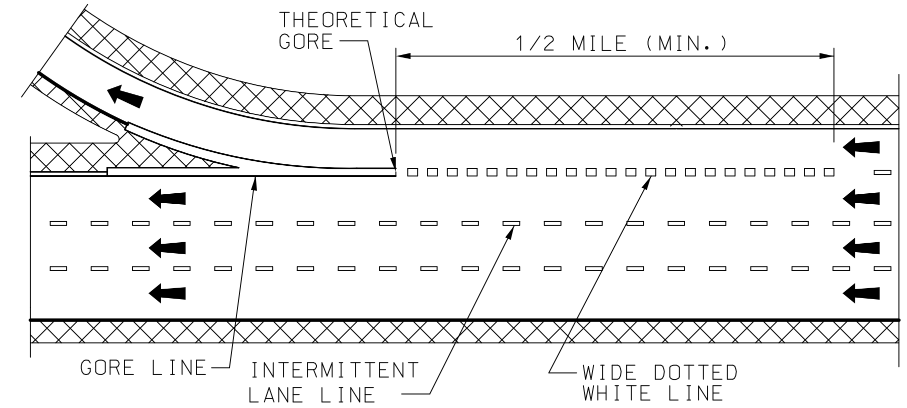
PAVEMENT EDGE TREATMENT

DATE EFFECTIVE: 10/01/2017
DATE PREPARED: 8/8/2017

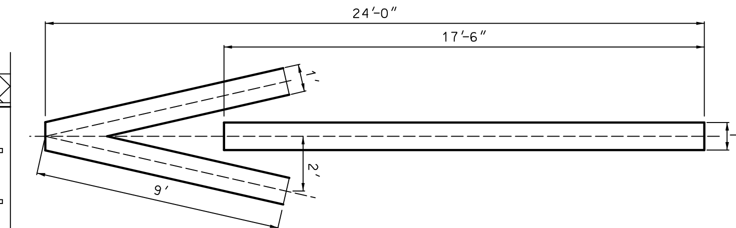
619.10J

SHEET NO. 1 OF 1





AUXILIARY LANE MARKING



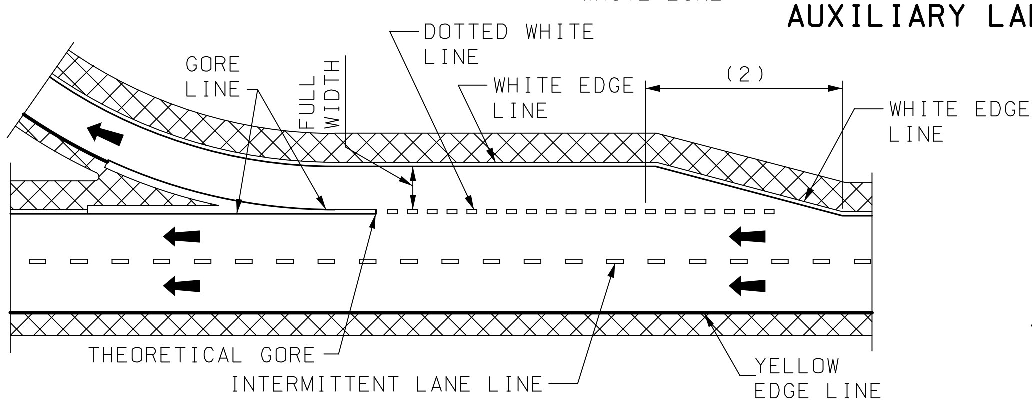
FIRST ARROW 25' FROM CROSSROAD OR STOP LINE.

MAXIMUM 3 ARROWS AT 100' INTERVALS.

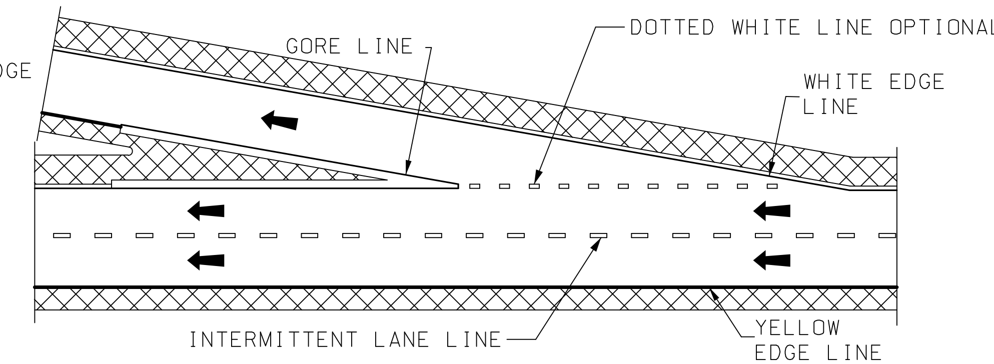
ON MULTI-LANE RAMP USE ARROW IN EACH LANE.

WRONG WAY ARROWS ARE NOT USED WHEN RAMP HAS LANE USE CONTROL ARROWS.

OFF RAMP WRONG WAY ARROW



PARALLEL LANE

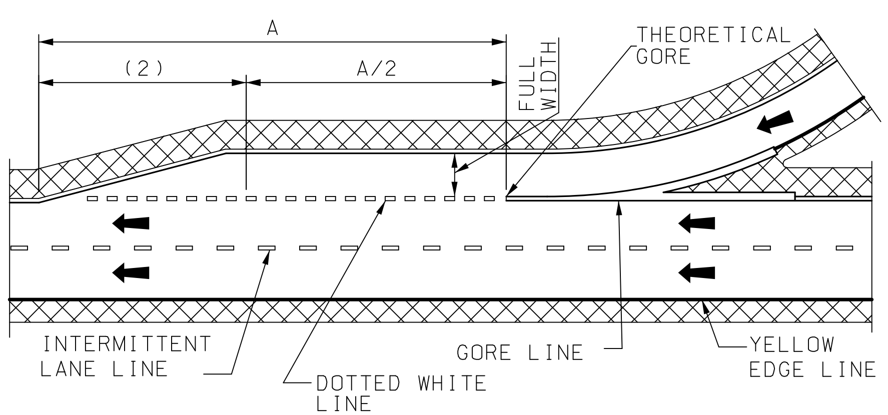


TAPERED LANE

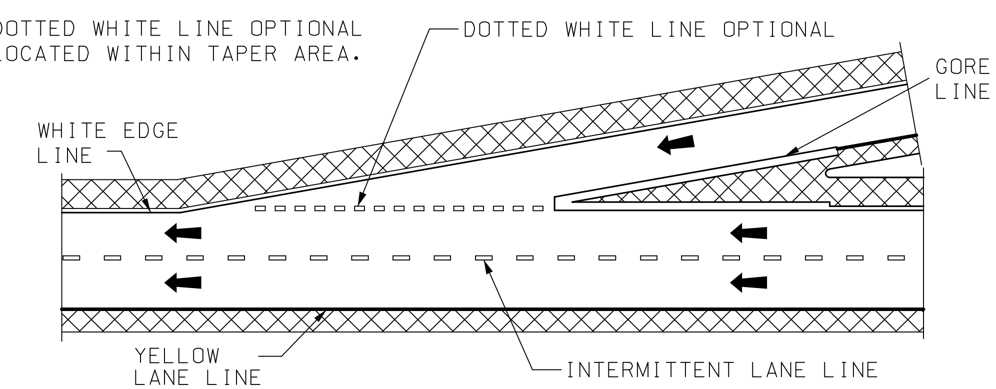
EXIT RAMP MARKING

A = LENGTH OF ACCERLERATION LANE PLUS TAPER.

(2) DOTTED WHITE LINE OPTIONAL LOCATED WITHIN TAPER AREA.



PARALLEL LANE

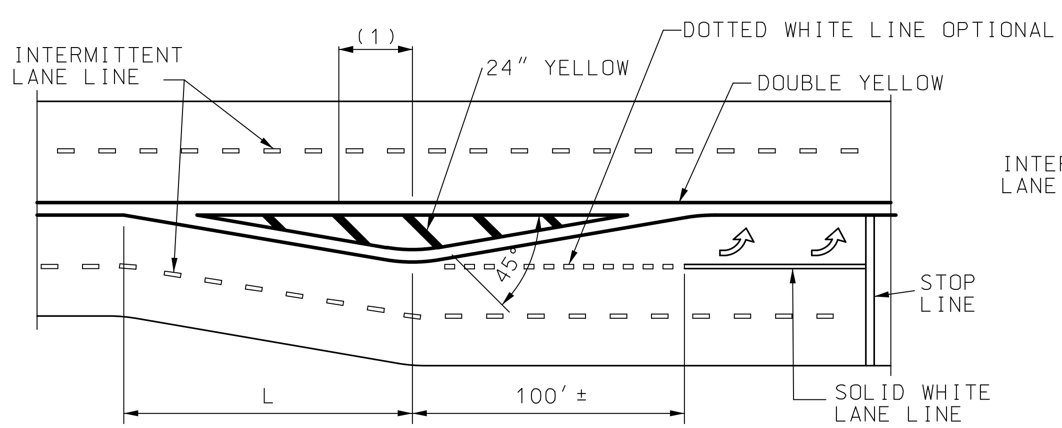


TAPERED LANE

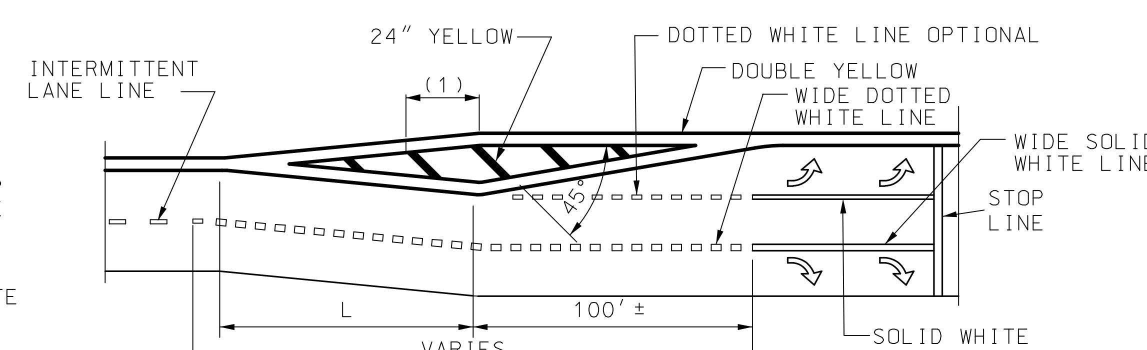
ENTRANCE RAMP MARKING

L = LENGTH OF TAPER IN FEET.

(1) 50' (TYP.) SPACE BETWEEN BARS. A MINIMUM OF 3 BARS ARE REQUIRED. IF NECESSARY, THE DISTANCE BETWEEN THE BARS SHALL BE DECREASED TO INSTALL 3 BARS.



MEDIAN ISLAND MARKING



LANE DROP MARKING

GENERAL NOTES:

DOTTED LINES SHALL BE 3 FEET IN LENGTH SEPARATED BY 9 FOOT GAPS.

REFER TO THE STANDARD PLAN 626.00 WHEN INSTALLING PAVEMENT MARKINGS OVER RUMBLE STRIPS.

WIDE LINES ARE TWICE THE WIDTH OF NORMAL LINES.

LANE LINES SHALL BE AN INTERMITTENT OR SOLID WHITE.

INTERMITTENT LINES SHALL BE 10 FEET IN LENGTH SEPARATED BY 30 FOOT GAPS.

EDGELINES SHALL BE CONTINUOUS SOLID WHITE OR YELLOW LINES. RIGHT SIDE EDGELINES SHALL BE SOLID WHITE. MEDIAN OR LEFT SIDE EDGELINES ON DIVIDED HIGHWAYS AND ON THE LEFT SIDE OF RAMPS SHALL BE SOLID YELLOW. EDGELINES SHALL BE CONTINUOUS ACROSS DRIVEWAYS AND MINOR INTERSECTING ROADS.

"NO PASSING" LINES SHALL BE CONTINUOUS SOLID YELLOW.

"NO PASSING" LINES SHALL BE PLACED AS SHOWN IN "LINE DETAIL". "NO PASSING" LINES ON A TWO-LANE, TWO-WAY HIGHWAY WHEN PASSING IS PROHIBITED IN EACH DIRECTION SHALL BE PLACED 4 INCHES APART AND THE INTERMITTENT CENTERLINE SHALL BE OMITTED.

STOP LINES SHALL BE A SOLID WHITE TRANSVERSE LINE 24 INCHES WIDE, LOCATED AT LEAST 4 FEET FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY.

CROSSWALK LINES SHALL BE SOLID WHITE TRANSVERSE LINES 6 INCHES WIDE AT LEAST 6 FEET APART. CROSSWALK LINES ON THE INTERSECTION SIDE OF THE CROSSWALK SHALL MEET AT THE CURB.

GORE LINES SHALL BE A SOLID WHITE LINE WITH A WIDTH TWICE THAT OF THE EDGELINE.

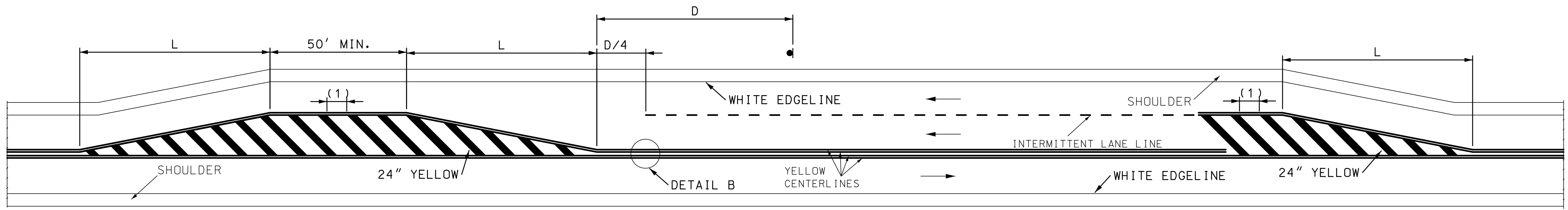
ARROWS AND WORD SYMBOLS SHALL BE SOLID WHITE.

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

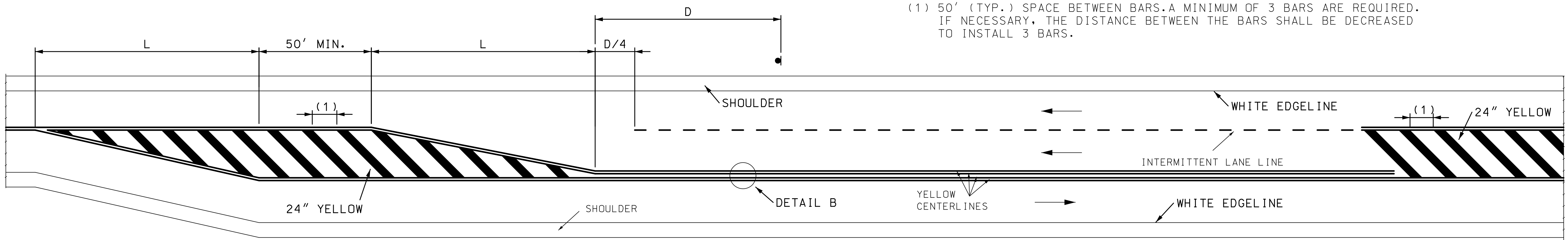
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PAVEMENT MARKING

DATE EFFECTIVE: 04/01/2022 DATE PREPARED: 1/19/2022	620.00N	SHEET NO. 1 OF 6



(1) 50′ (TYP.) SPACE BETWEEN BARS.A MINIMUM OF 3 BARS ARE REQUIRED. IF NECESSARY, THE DISTANCE BETWEEN THE BARS SHALL BE DECREASED TO INSTALL 3 BARS.



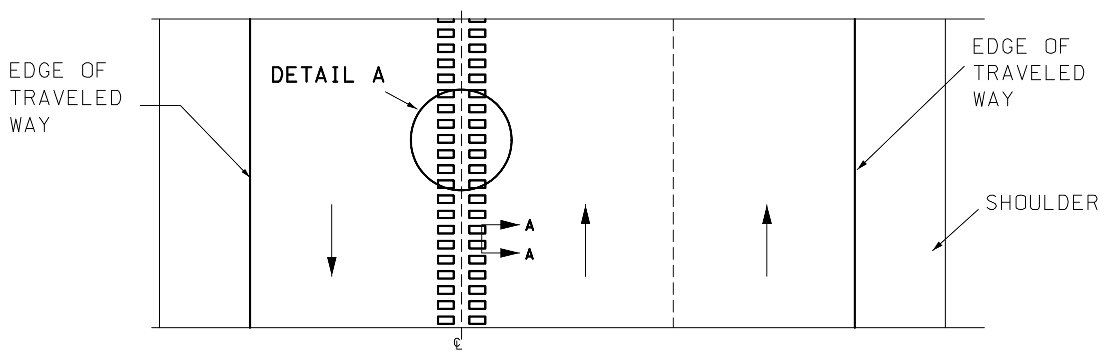
L = S x W WHEN POSTED SPEED 45 MPH OR GREATER OR WS^2 /60 WHEN POSTED SPEED IS 40 MPH OR LESS. EXTEND DISTANCE (L) AS REQUIRED BY SIGHT DISTANCE CONDITIONS.

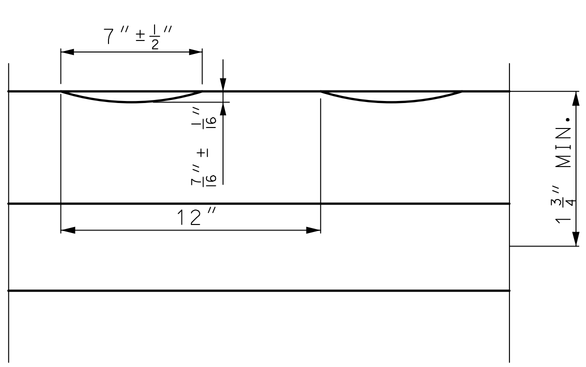
L = LENGTH OF TAPER IN FEET.

S = POSTED OR 85 PERCENTILE SPEED IN MPH.

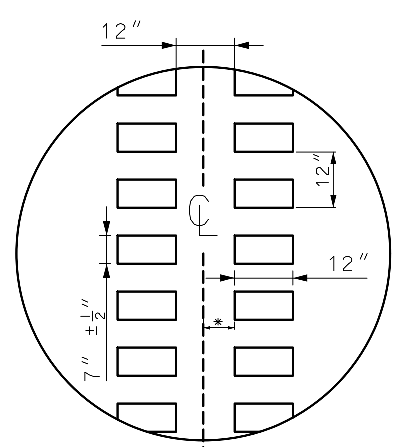
W = OFFSET DISTANCE IN FEET.

D = WARNING SIGN SPACING MEASURED FROM BEGINNING OF THE TAPER TO WARNING SIGN "LANE ENDS MERGE RIGHT"



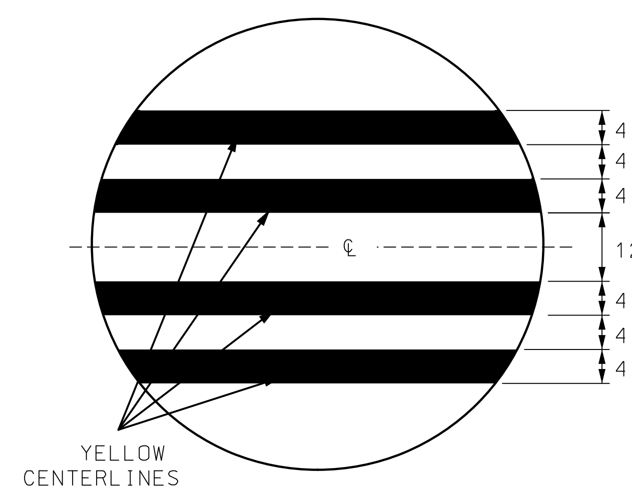


SECTION A-A



DETAIL A

✱ = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.



DETAIL B

GENERAL NOTES:

INTERMITTENT LINES SHALL BE 10 FEET IN LENGTH SEPARATED BY 30 FOOT GAPS.

RIGHT SIDE EDGELINES SHALL BE SOLID WHITE. EDGELINES SHALL BE CONTINUOUS ACROSS DRIVEWAYS AND MINOR INTERSECTING ROADS.

CENTERLINE RUMBLE STRIPS ON PASSING ROADWAYS SHALL FOLLOW PAVEMENT STRIPING THROUGH TRANSITIONS. SEE CONTRACT PLANS FOR STRIPING DETAILS.

RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.

ALL RUMBLE STRIPS SHALL BE MILLED.

CENTERLINE RUMBLE STRIPS SHALL BE CONTINUOUS THROUGH CONNECTIONS OF SIDEROADS WITH NO LEFT TURN LANES.

DISCONTINUE CENTERLINE RUMBLE STRIPS THROUGH THE LIMITS OF ALL LEFT TURN LANES. INCLUDING ANY LANE TAPER SECTIONS.

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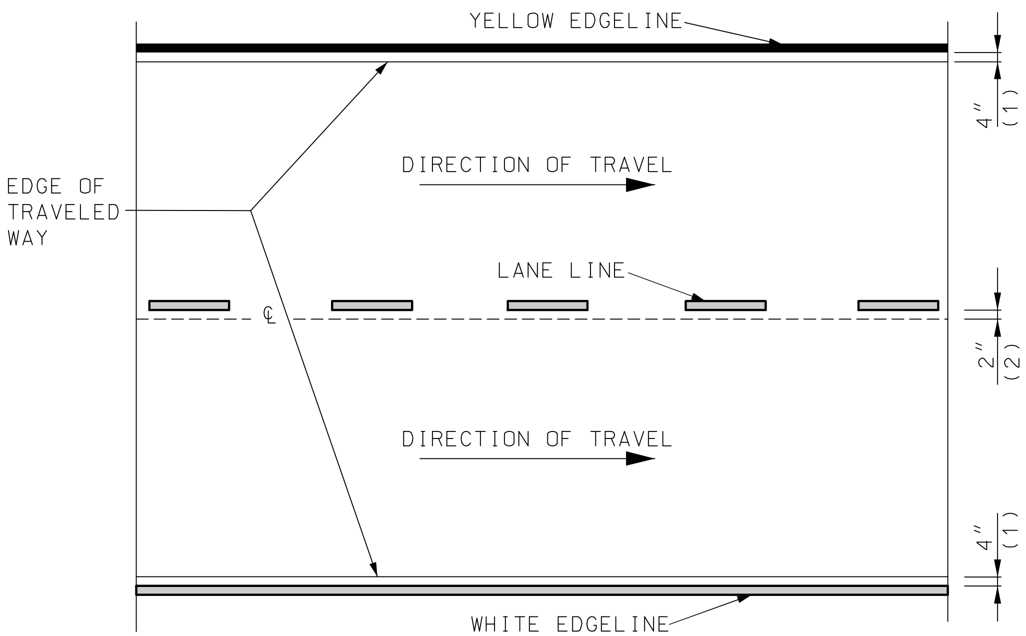
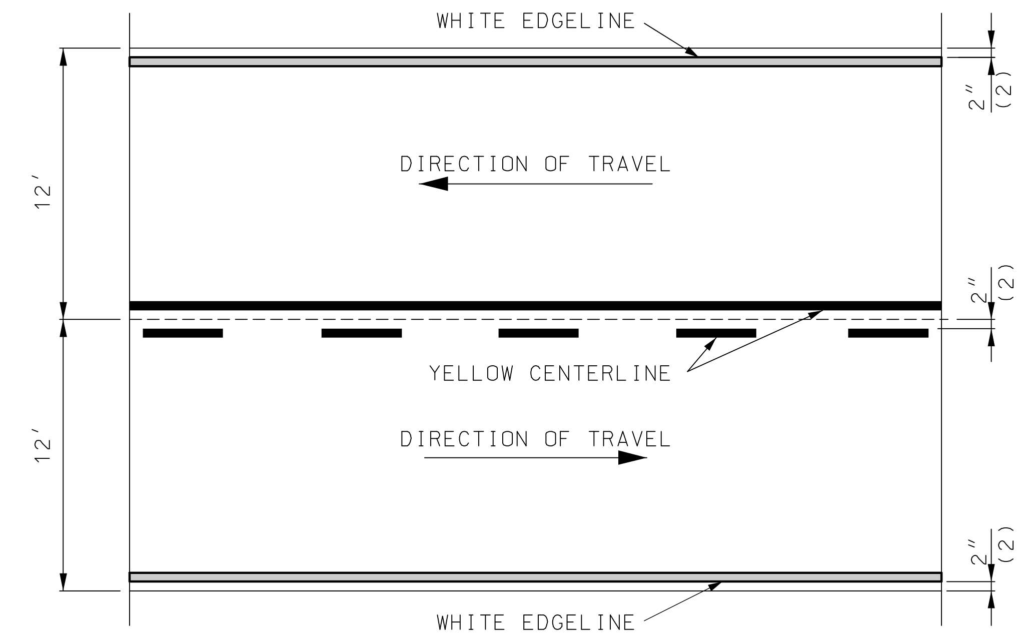
PAVEMENT MARKING

ALTERNATE PASSING LANE

DATE EFFECTIVE:	04/01/2022	620.00N	SHEET NO.
DATE PREPARED:	1/19/2022		2 OF 6

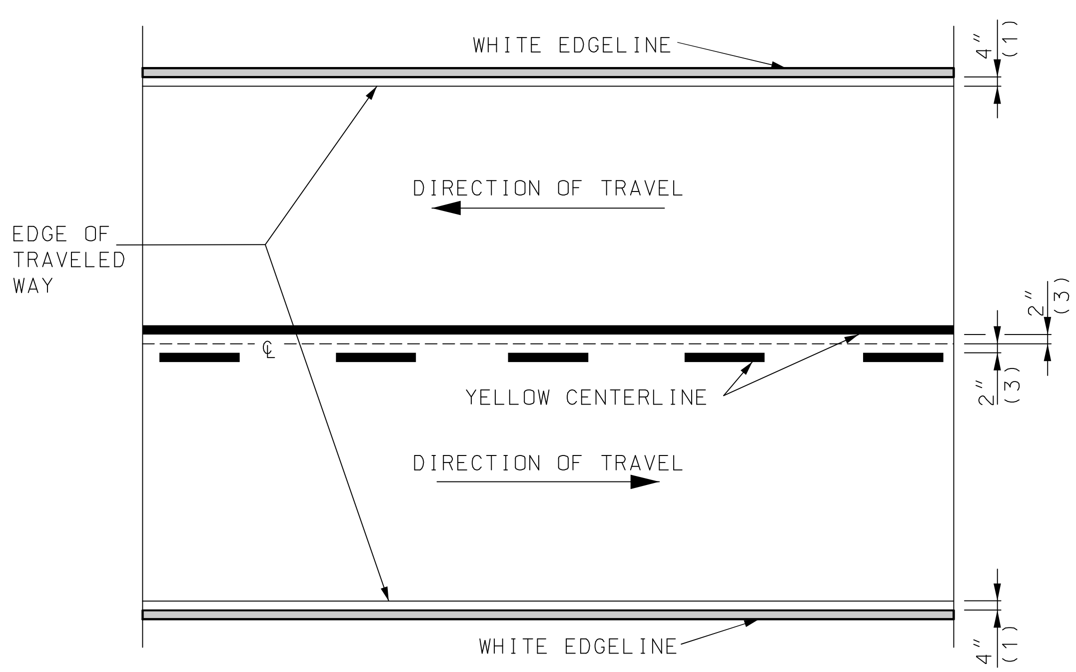


DIVIDED PAVEMENT



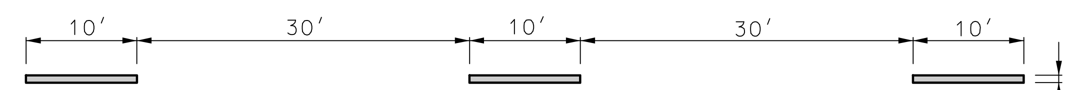
TWO-LANE TWO-WAY

TYPICAL STRIPING OFFSETS
WITHOUT RUMBLE STRIPES

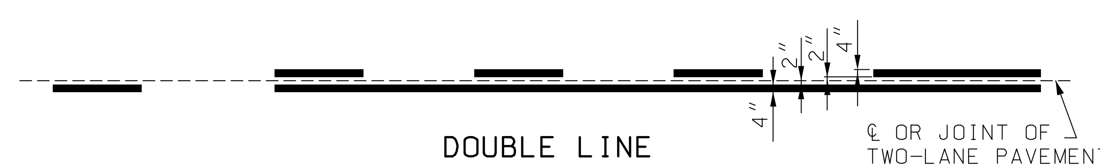


TWO-LANE TWO-WAY

TYPICAL STRIPING OFFSETS
FOR RUMBLE STRIPES



INTERMITTENT LINE



DOUBLE LINE

LINE DETAIL

LEGEND
- WHITE LINE
- YELLOW LINE

(1) OFFSET FROM EDGE OF TRAVELED WAY (TYP.)
(2) OFFSET FROM JOINT (TYP.)
(3) OFFSET FROM CENTERLINE (TYP.)

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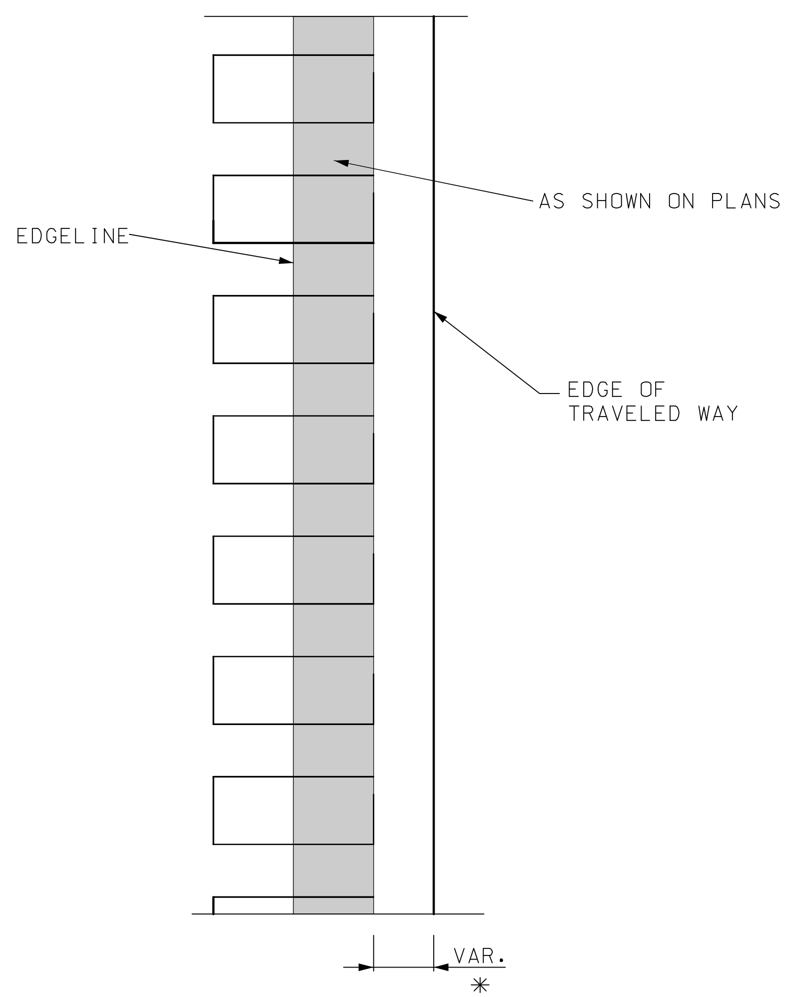
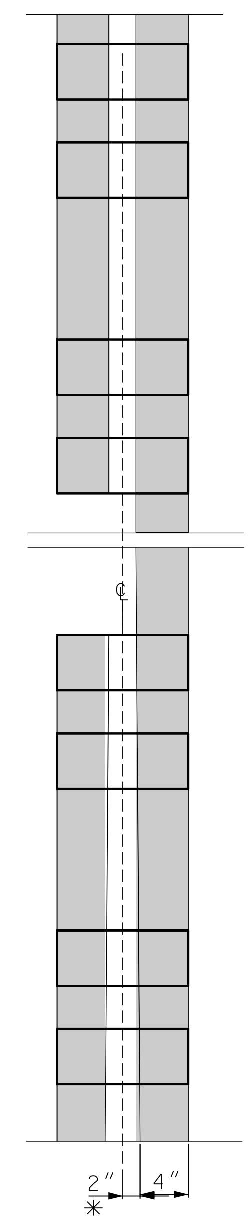
PAVEMENT MARKING

DATE EFFECTIVE:	04/01/2022	620.00N	SHEET NO. 3 OF 6
DATE PREPARED:	1/19/2022		



FOR SHOULDERS



2 WAY 2 LANE
(SEE TYPICAL STRIPING
FOR RUMBLESTRIPS)

* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.

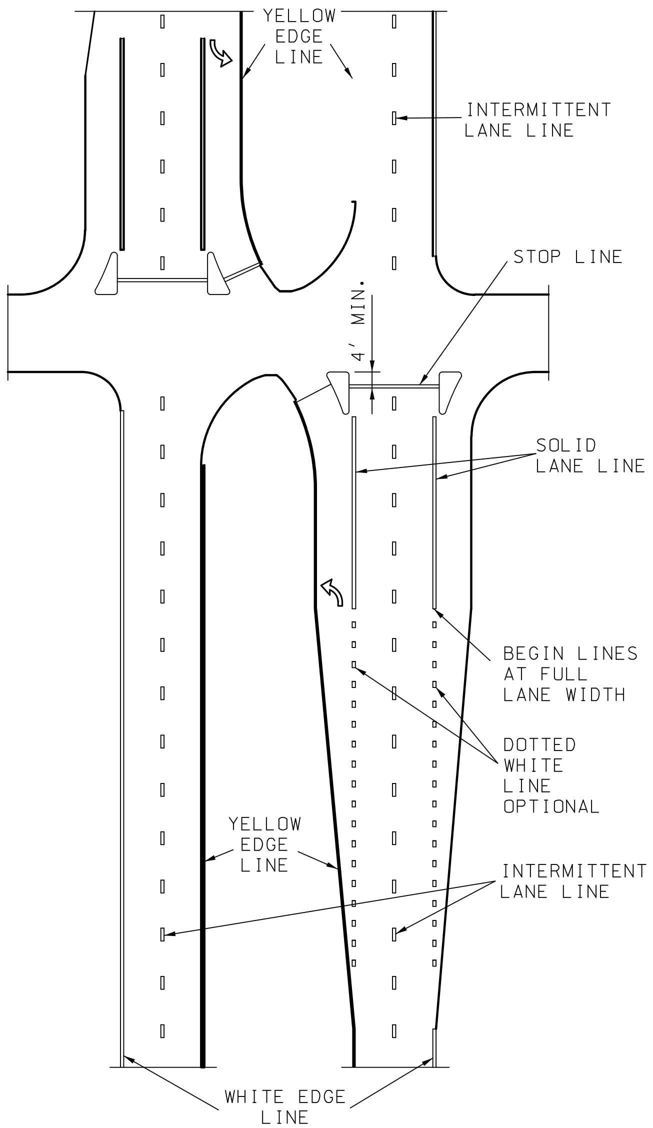
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

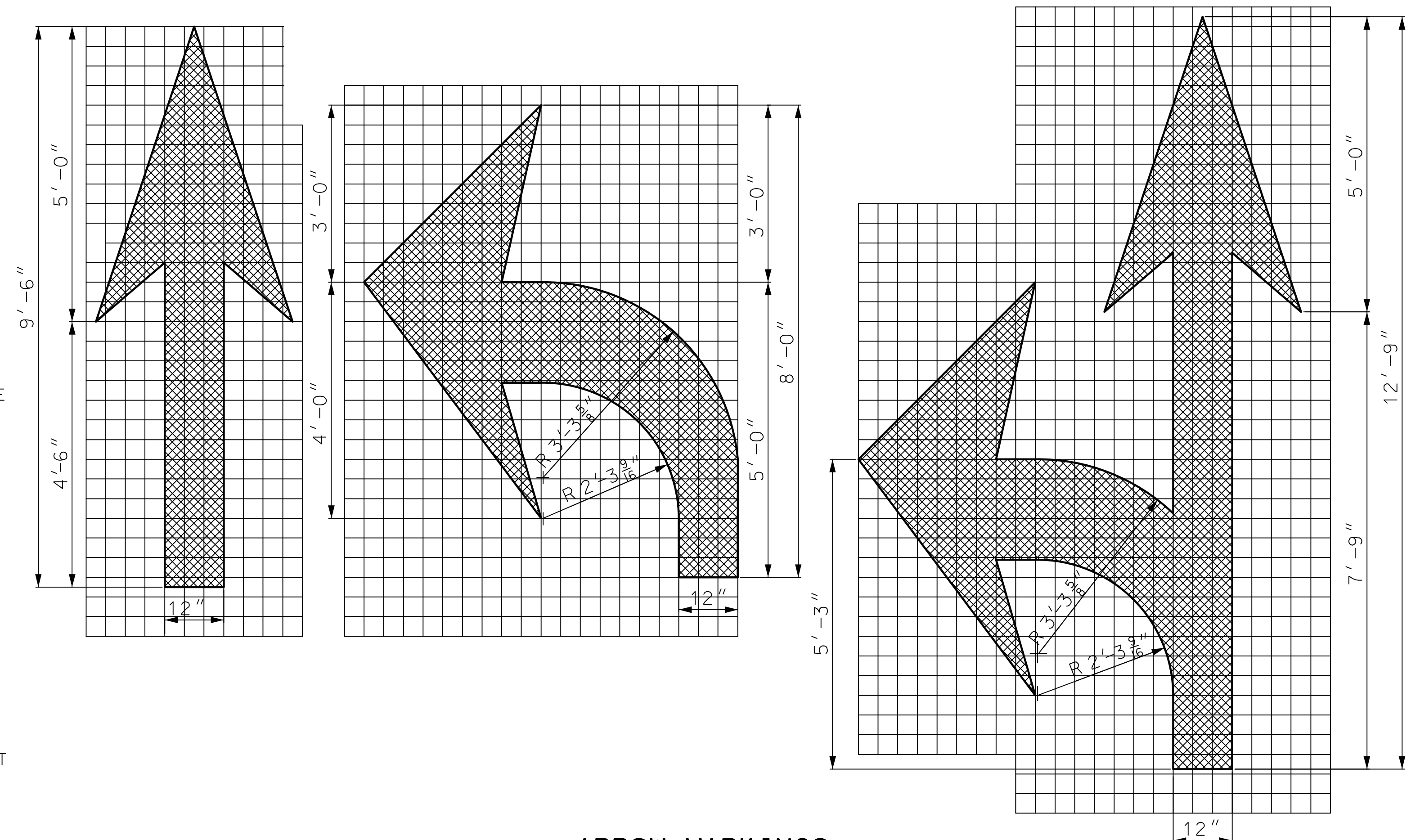
PAVEMENT MARKING
STRIPING THROUGH
RUMBLE STRIPS

DATE EFFECTIVE: 04/01/2022 DATE PREPARED: 1/19/2022	620.00N	SHEET NO. 4 OF 6

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

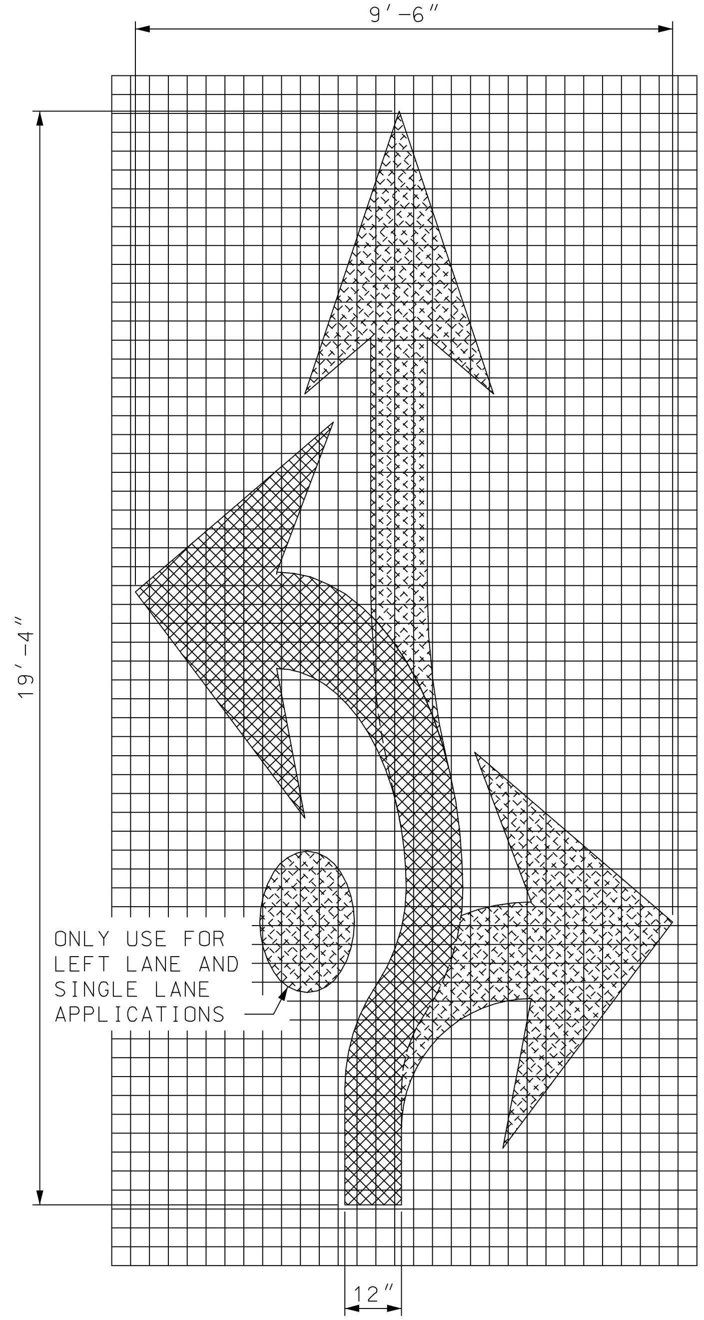


SIGNALIZED GRADE
INTERSECTION MARKING

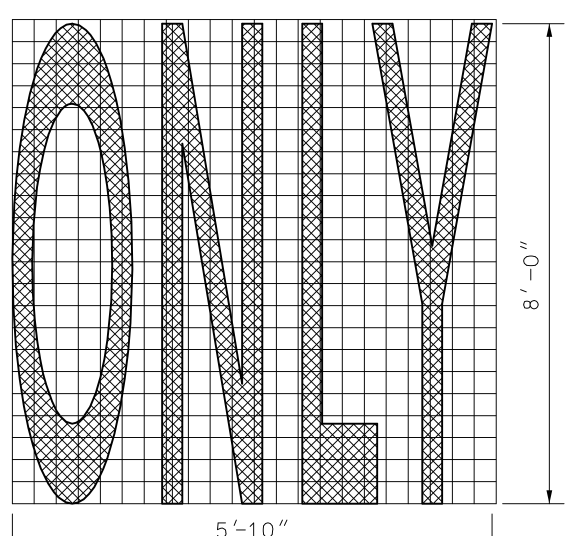


ARROW MARKINGS

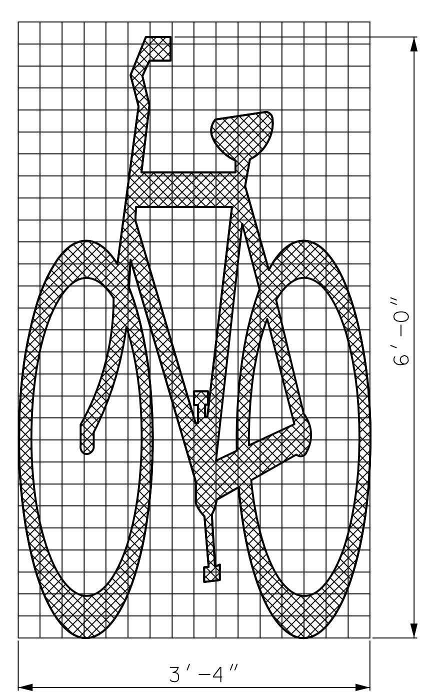
TWO LANE USE CONTROL ARROWS FOR FIRST 200 FEET
WITH ONE ADDITIONAL ARROW EVERY 400 FEET OF
MANDATORY MOVEMENT LANE. FIRST ARROW 75 FEET
FROM STOP LINE.



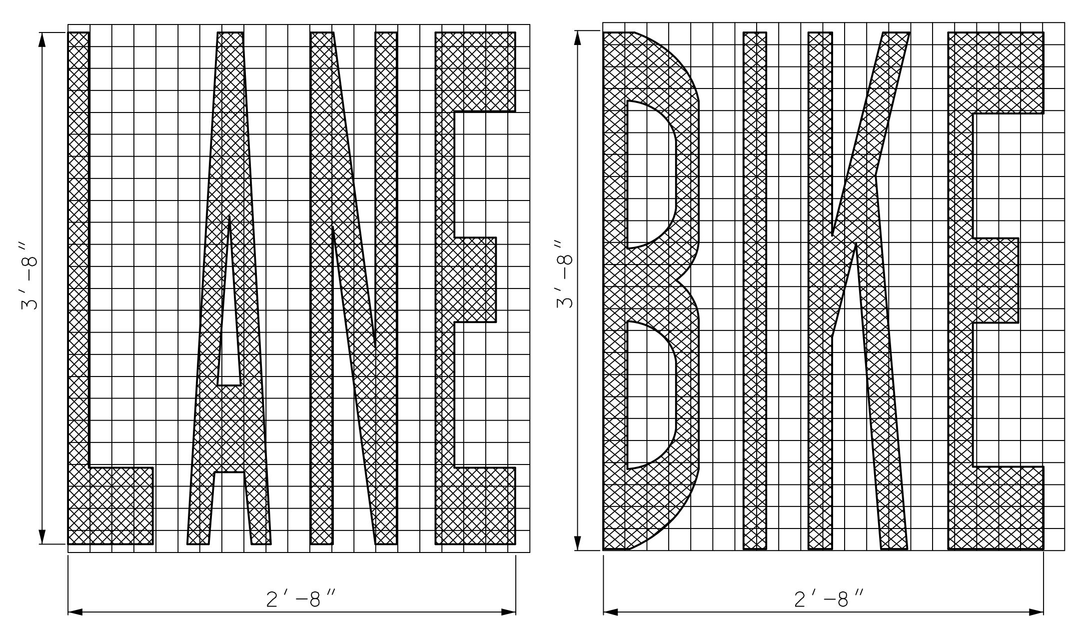
FISH-HOOK ARROW
ROUNDABOUT APPROACH
MARKINGS



WORD MARKING
ELONGATED WORD & SYMBOL



BICYCLE SYMBOL



WORD MARKING
ELONGATED WORD & SYMBOL

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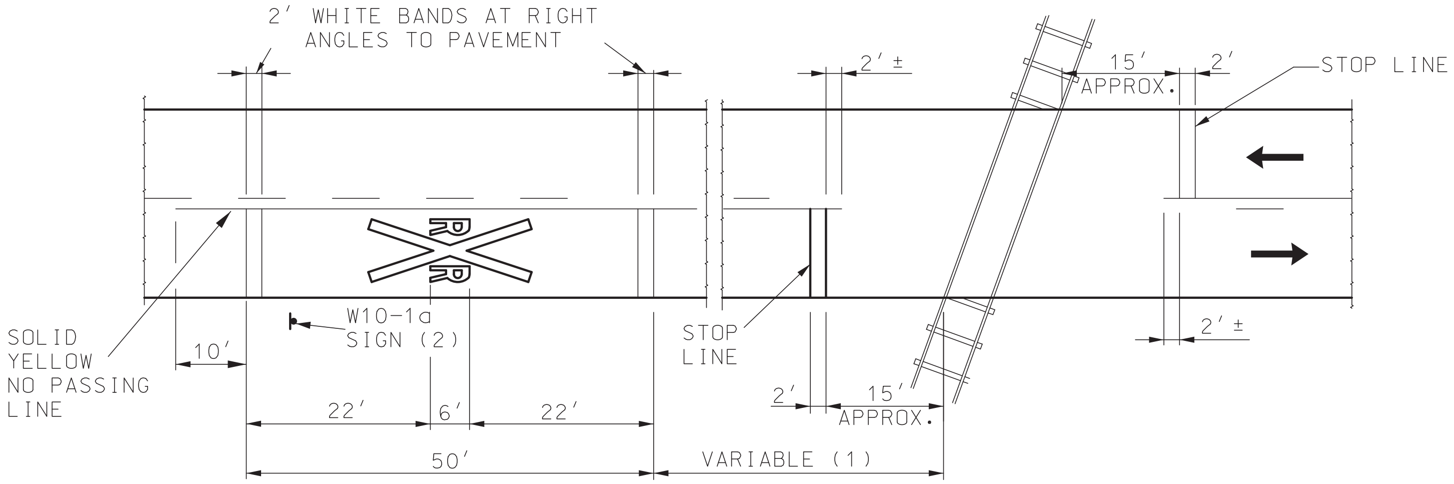
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PAVEMENT MARKING

DATE EFFECTIVE: 04/01/2022 DATE PREPARED: 1/19/2022	620.00N	SHEET NO. 5 OF 6

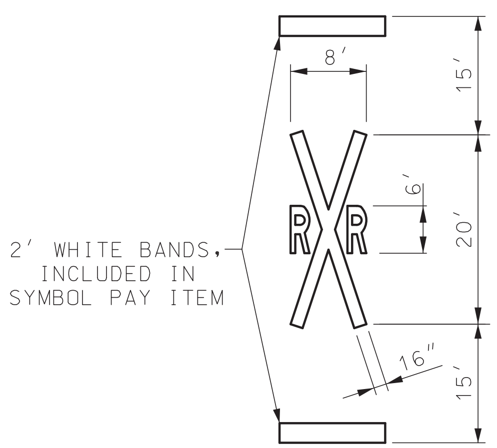
1. STOP LINES SHALL BE PLACED 90° TO THE ROADWAY.
2. IF RAILROAD GATE IS PRESENT THE STOP LINE SHALL BE 8′ FROM GATE.



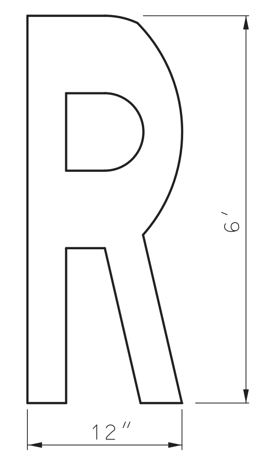
PAVEMENT DETAIL

(1) THE DISTANCE FROM THE RAILROAD CROSSING MARKING TO THE NEAREST TRACK WILL VARY ACCORDING TO THE APPROACH SPEED AND THE SIGHT DISTANCE OF THE VEHICULAR TRAFFIC APPROACHING, BUT SHALL BE NO LESS THAN 50 FEET.
A THREE-LANE ROADWAY SHALL BE MARKED WITH A CENTERLINE FOR TWO-LANE APPROACH OPERATION ON THE APPROACH TO A CROSSING. ON MULTI-LANE ROADWAYS THE TRANSVERSE BANDS SHALL EXTEND ACROSS ALL APPROACH LANES, AND INDIVIDUAL "R X R" SYMBOLS SHALL BE USED IN EACH APPROACH LANE.

(2) PLACEMENT OF W10-1a SIGN BY OTHERS.

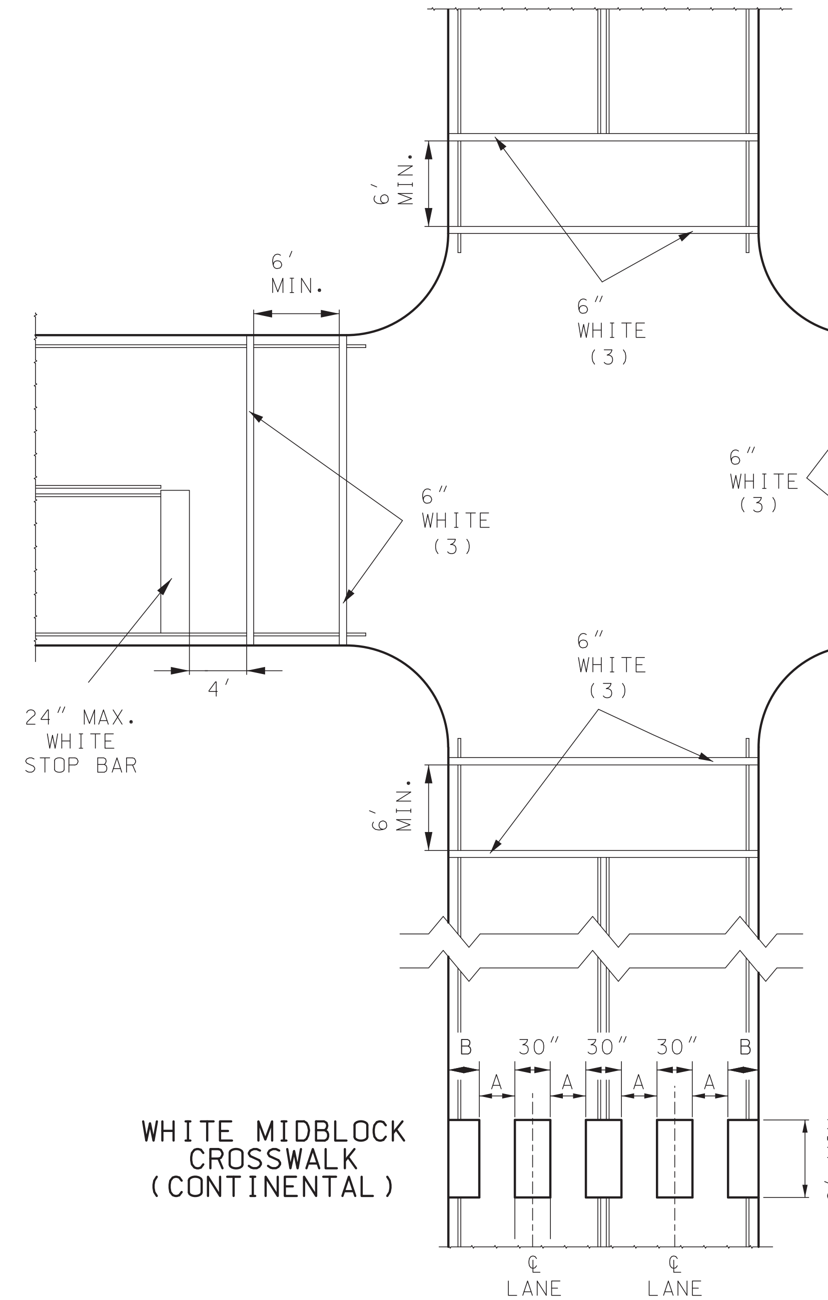


SYMBOL DETAIL



LETTER DETAIL

RAILROAD GRADE CROSSING

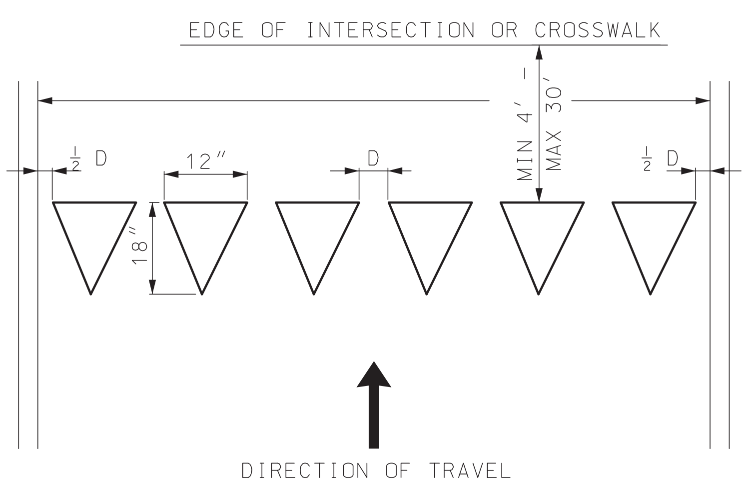


(3) 6″ CROSS WALK LINE SHALL EXTEND TO THE FACE OF THE CURB

A VARIABLE BASED ON THE ACTUAL LANE WIDTH

B VARIES BASED ON DISTANCE TO THE CURB, BUT SHALL NOT EXCEED 30″. IF SHOULDERS EXIST THE PATTERN SHALL BE EXTENDED TO THE CURB FACE ADDING ADDITIONAL BLOCKS IF NEEDED

PEDESTRIAN CROSSWALKS



D = 3″ TO 12″

TRIANGLES SHALL BE UNIFORMLY SPACED AND COVER THE COMPLETE WIDTH OF THE TRAVEL LANE. SPACING SHALL BE ADJUSTED SO THERE ARE NO PARTIAL TRIANGLES WITHIN THE YIELD MARKING.

WHITE YIELD LINE TRIANGLES

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TRAVIS D. KOESTNER
NUMBER PE-30042
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PAVEMENT MARKING

DATE EFFECTIVE:	10/01/2022	620.00N	SHEET NO.
DATE PREPARED:	7/19/2022		6 OF 6

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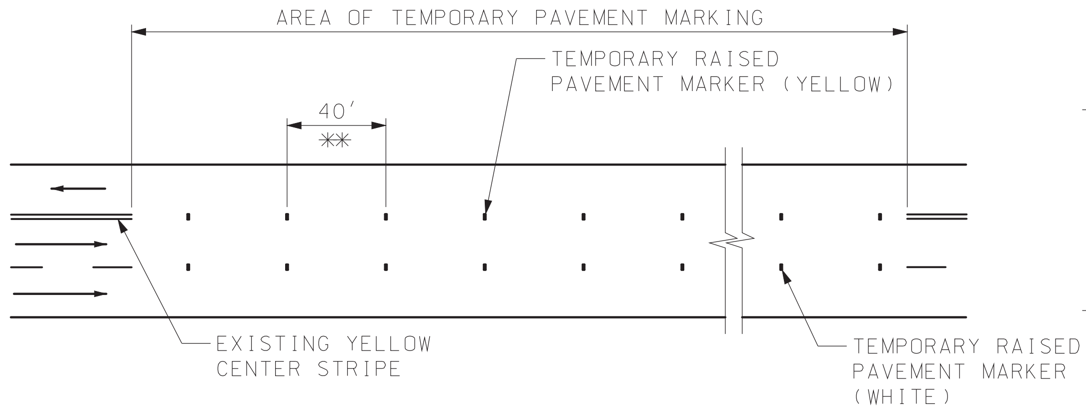
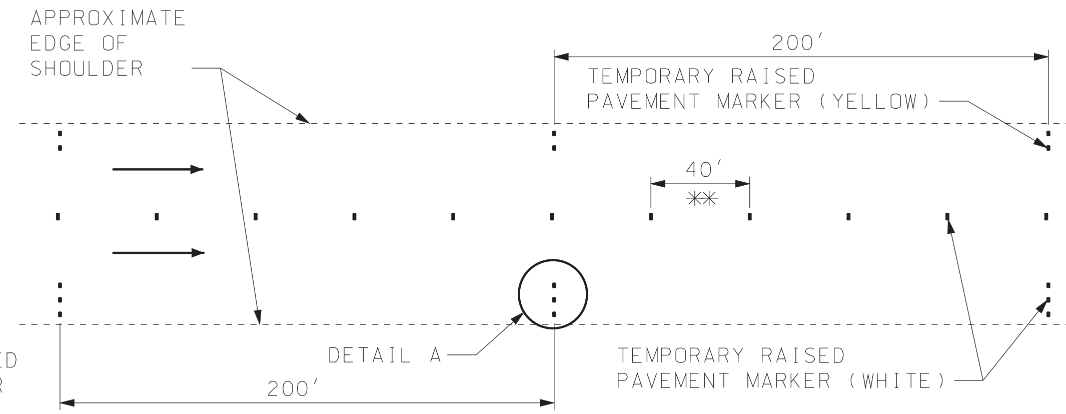
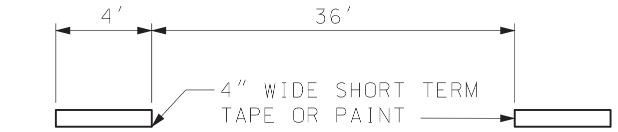


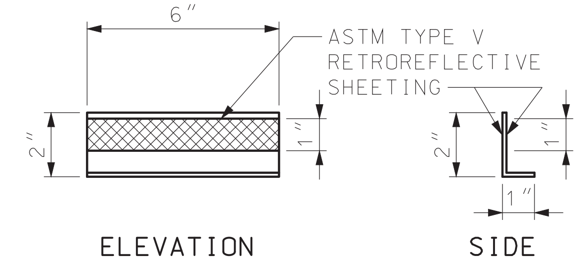
TWO-WAY MARKING WITH DOUBLE YELLOW
PROHIBITTED PASSING MARKING SECTION



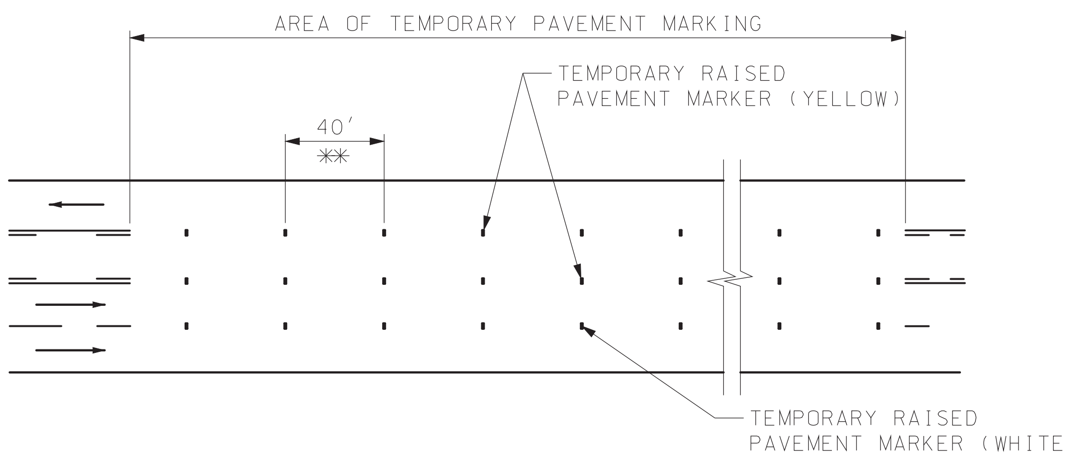
EDGE LINES AND LANE LINES
ON MULTILANE DIVIDED SECTIONS



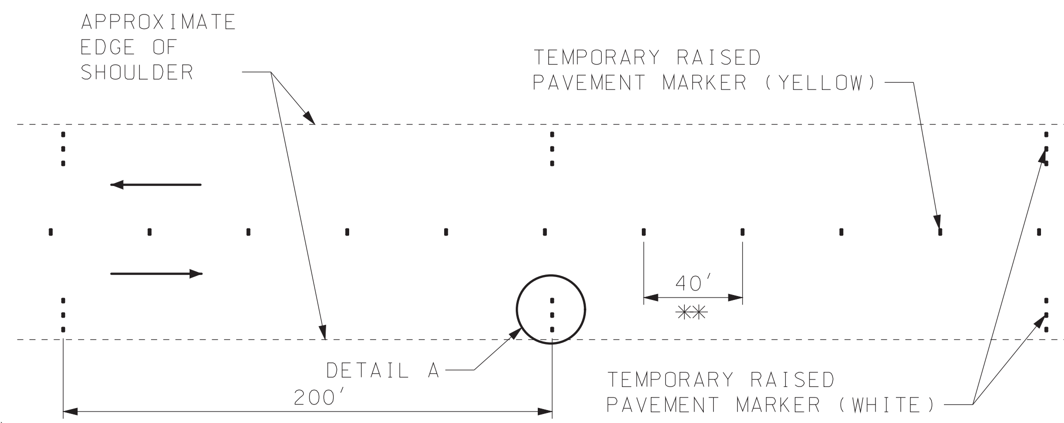
✳✳ OPTIONAL TEMPORARY PAVEMENT
MARKING DETAIL FOR
INTERMEDIATE LIFTS



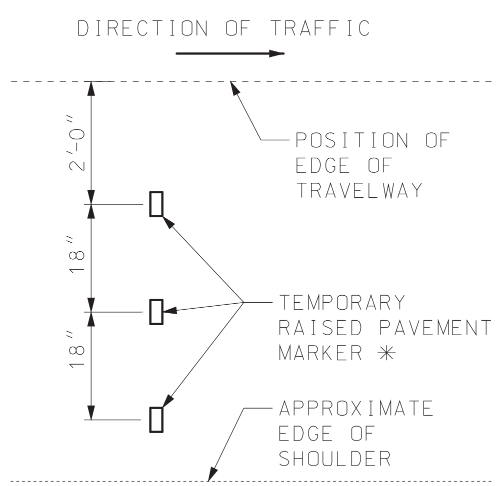
TYPICAL TEMPORARY RAISED
PAVEMENT MARKER DETAIL



TWO-WAY WITH LEFT-TURN
LANE MARKING SECTION

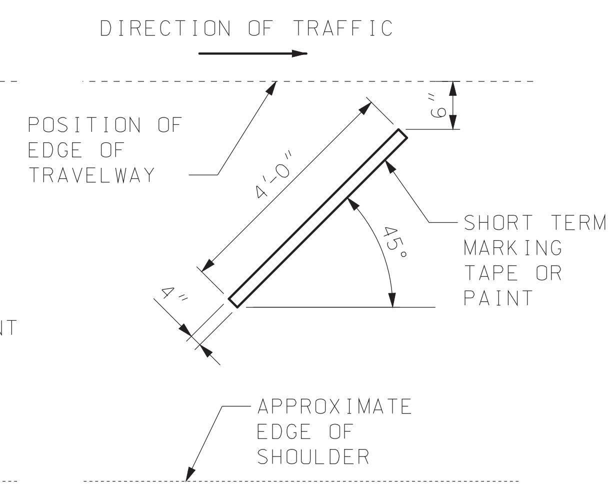


EDGE LINES AND CENTERLINE
ON TWO-WAY SECTIONS
WITH PAVED SHOULDERS GREATER THAN 4 FEET WIDE

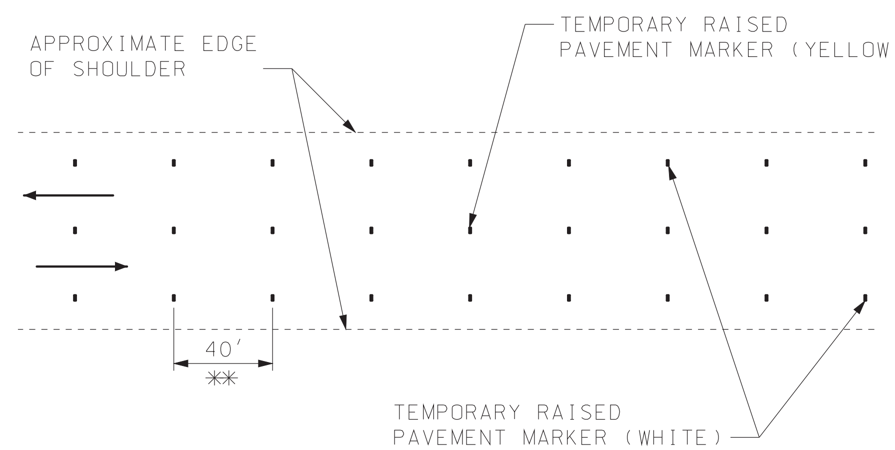


DETAIL A

✳ THREE TEMPORARY RAISED PAVEMENT MARKERS SHALL BE USED IF SHOULDER IS 6′OR WIDER. OTHERWISE, USE TWO TEMPORARY RAISED PAVEMENT MARKERS.



OPTIONAL DETAIL A
FOR INTERMEDIATE LIFT



EDGE LINES AND CENTERLINE
ON TWO-WAY SECTIONS WITH
PAVED SHOULDERS 4 FEET WIDE OR LESS,
AGGREGATE OR EARTH SHOULDERS
OR NO SHOULDERS

GENERAL NOTES:

TEMPORARY PAVEMENT MARKING IS REQUIRED WHEN 200 CONSECUTIVE LINEAR FEET OR MORE OF PERMANENT PAVEMENT MARKING HAS BEEN OBLITERATED, OR AS DIRECTED BY THE ENGINEER.

TEMPORARY RAISED PAVEMENT MARKERS (TRPMS), OR THE OPTIONAL 4″X 4′ SHORT TERM TAPE OR PAINT, WHEN ALLOWED, SHALL BE MAINTAINED IN PLACE AND RETROREFLECTIVE UNTIL THE PERMANENT PAVEMENT MARKINGS ARE INSTALLED. MISSING OR NON-REFLECTIVE MARKINGS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE COMMISSION WHEN 10% OR MORE ARE DEFICIENT WITHIN ONE MILE OR WHEN 4 OR MORE CONSECUTIVE MARKINGS ARE DEFICIENT.

FOR INTERMEDIATE LIFTS, 4″X 4′ SHORT TERM TAPE OR TEMPORARY PAINT MAY BE USED IN LIEU OF TRPMS.

TRPMS USED ON INTERMEDIATE LIFTS SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEXT LIFT.

ALL TEMPORARY MARKINGS SHALL BE REMOVED BY THE CONTRACTOR AFTER INSTALLATION OF PERMANENT MARKINGS, EXCEPT WHEN PERMANENT MARKINGS ARE TO BE INSTALLED BY OTHERS.

TEMPORARY TAPE SHALL NOT BE USED FOR TEMPORARY MARKING ON THE FINAL SURFACE EXCEPT WHEN SPECIFIED IN THE PLANS.

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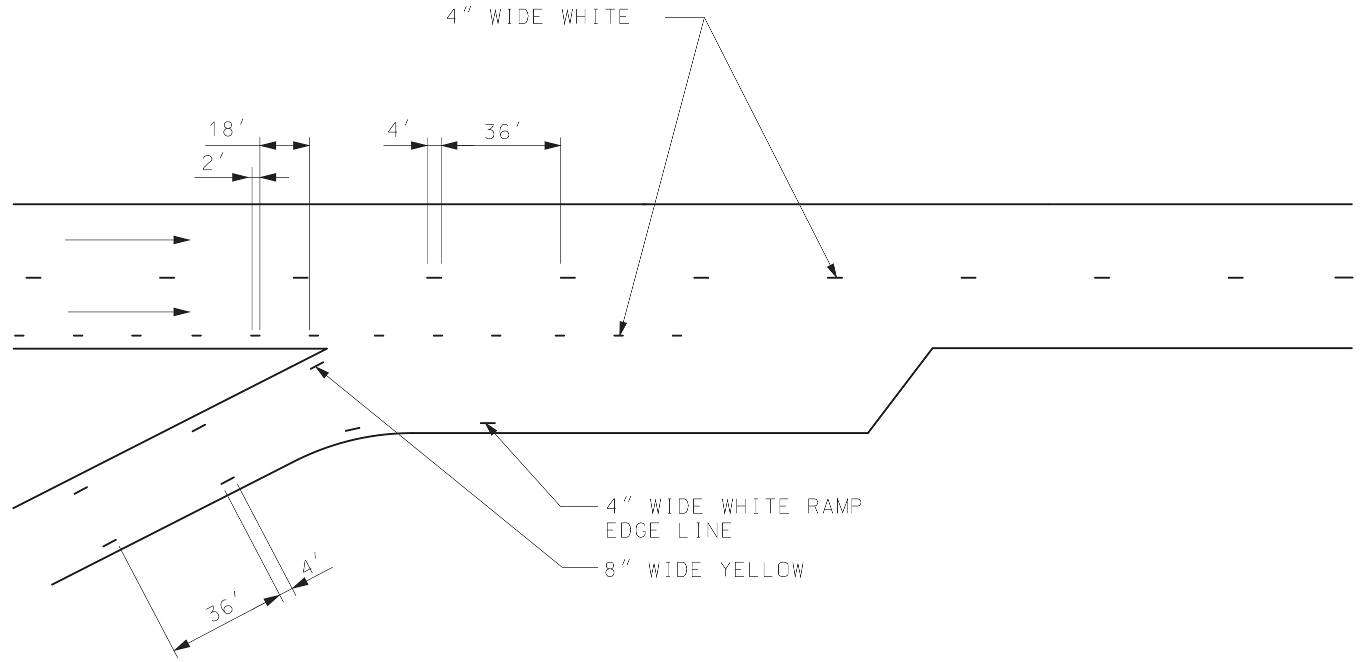
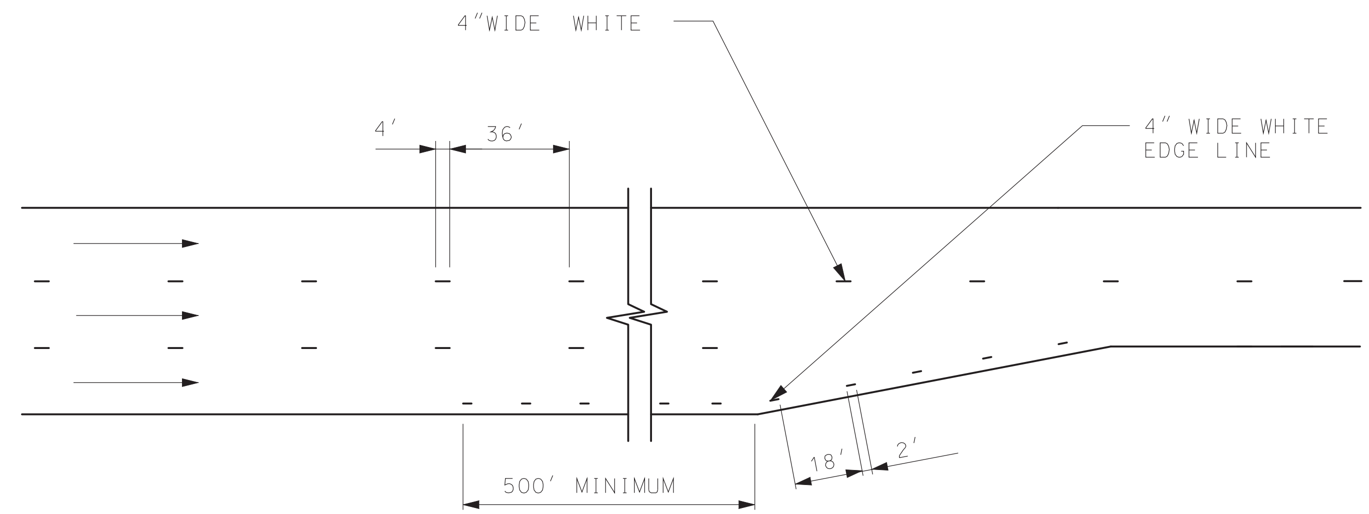
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TEMPORARY PAVEMENT MARKING
TEMPORARY PAVEMENT MARKING

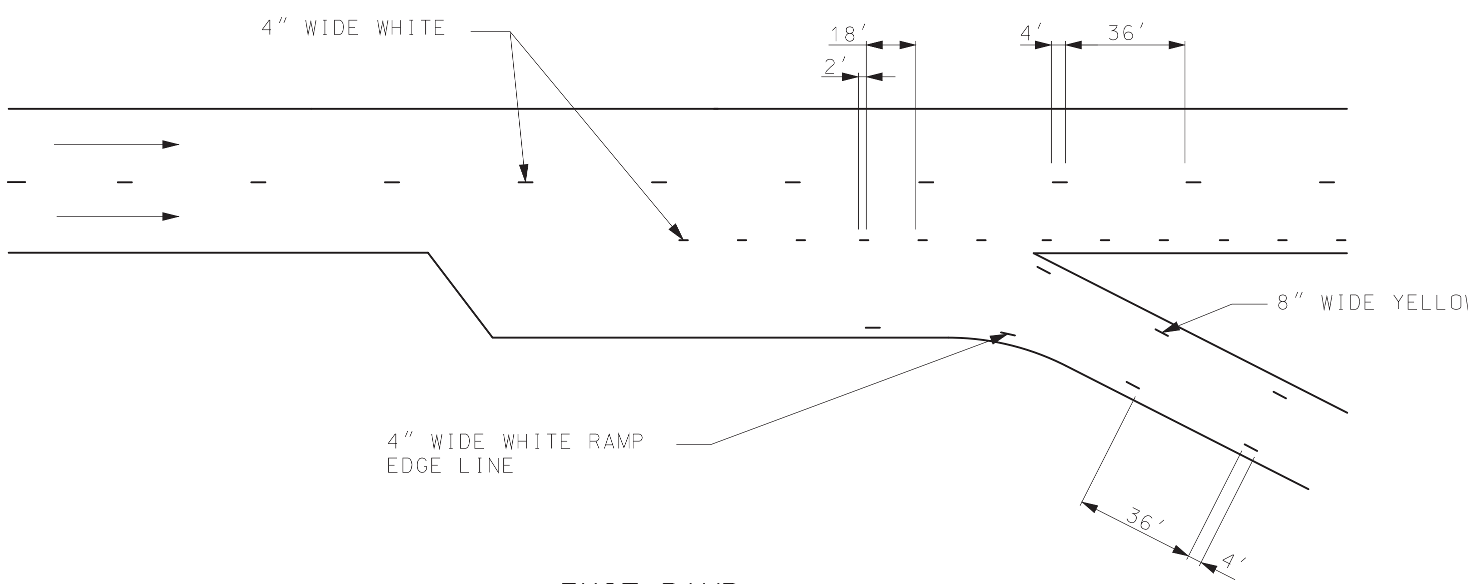
DATE EFFECTIVE:	07/01/2017	620.10G	SHEET NO.
DATE PREPARED:	5/1/2017		1 OF 5



ENTRANCE RAMP



LANE TRANSITION



EXIT RAMP

GENERAL NOTES:

TEMPORARY PAVEMENT MARKING IN INTERSECTIONS, RAMPS GORES AND OTHER TRANSITION AREAS USE AN INTERMITTENT MARKING OF 2 FEET LONG AT A CYCLE OF 20 FEET.

LIMITS OF TEPORARY GORE MARKING ARE THE SAME AS THE EXISTING GORE LINES.

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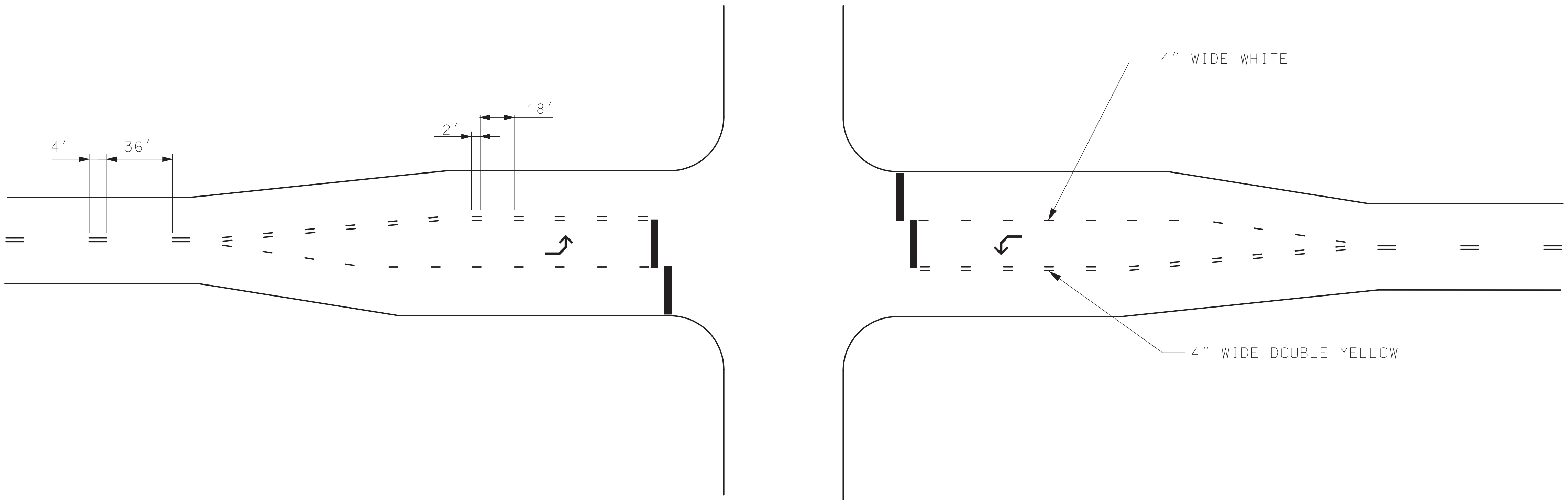
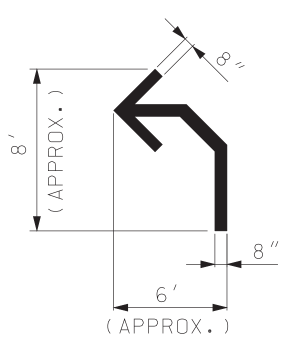
TEMPORARY PAVEMENT MARKING LANE TRANSITION AND RAMP AREAS

DATE EFFECTIVE:	07/01/2017	620.10G	SHEET NO. 2 OF 5
DATE PREPARED:	5/1/2017		

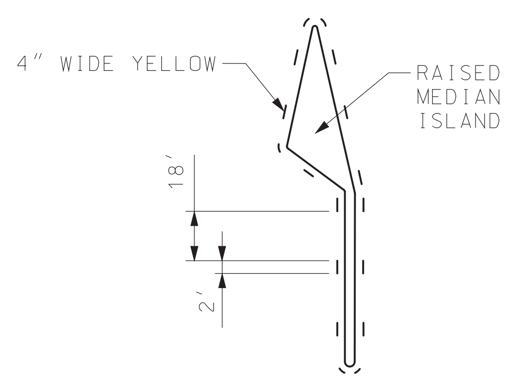


PLAN VIEW

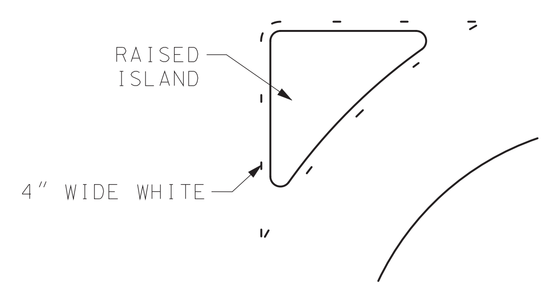
TEMPORARY STOP BAR DETAIL (WHITE)



TEMPORARY ARROW DETAIL (WHITE)



RAISED DIVISIONAL ISLAND



RAISED CHANNELIZING ISLAND

GENERAL NOTES:

TEMPORARY ARROWS AND STOP BARS ARE REQUIRED WHEN GOEMETRIC MODIFICATIONS DURING CONSTRUCTION CREATE LANE CONFIGURATIONS DIFFERENT THAN EXISTING, OR THE EXISTING PAVEMENT MARKING INCLUDES THEM.

YELLOW AND WHITE TEMPORARY MARKING AROUND ISLANDS ONLY REQUIRED WHEN THE ISLAND CURB IS NOT PAINTED.

TEMPORARY PAVEMENT MARKING IN INTERSECTIONS, RAMP GORES AND OTHER TRANSITION AREAS USE AN INTERMITTENT MARKING 2' LONG AT A CYCLE OF 20'.

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ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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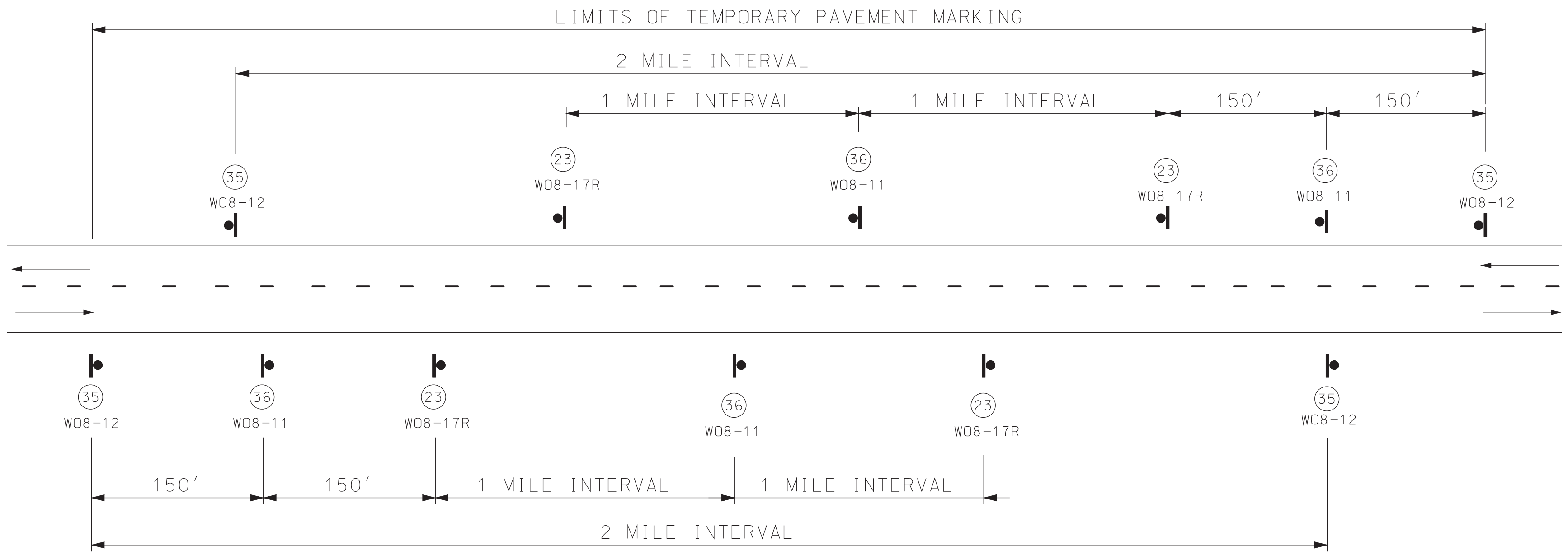
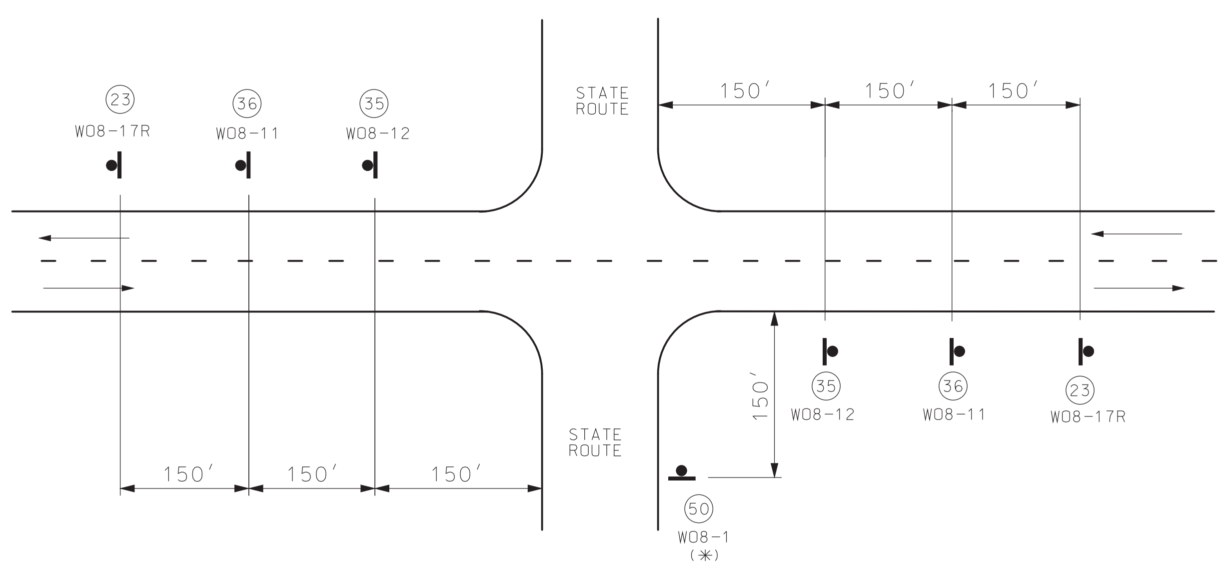
TEMPORARY PAVEMENT MARKING
INTERSECTIONS

DATE EFFECTIVE:	07/01/2017	620.10G	SHEET NO. 3 OF 5
DATE PREPARED:	5/1/2017		



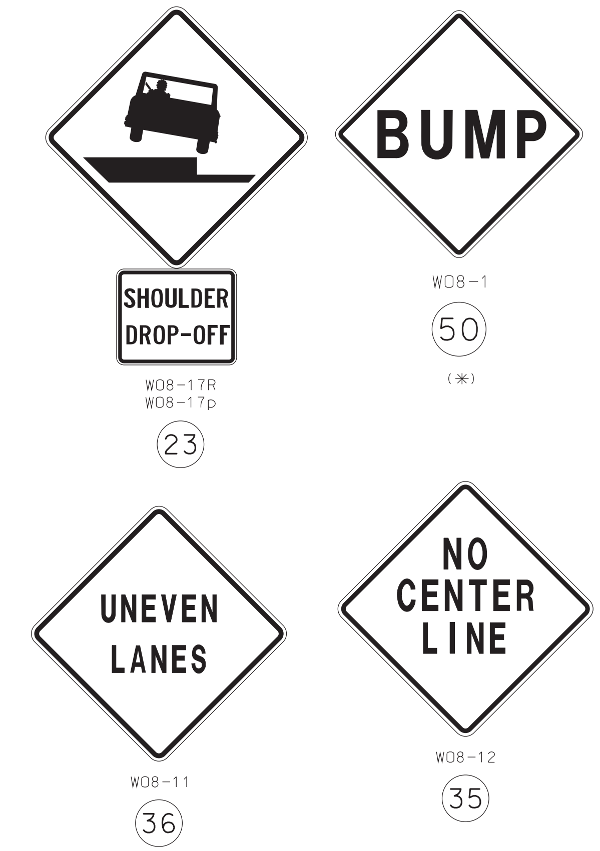
SIGN SPACING FOR MAINLINE

(DETAIL SHOWN IS BASED ON A PROJECT MEETING ALL CONDITIONS: NO CENTER STRIPE, UNEVEN LANES, SHOULDER DROP-OFF AND BUMP.)
WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGNS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXIST.
IF ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF), THE SIGN SPACING SHALL BE AT 1 MILE INTERVALS.



SIGN SPACING AT STATE ROUTE INTERSECTIONS

(*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



GENERAL NOTES:

FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

SIGN (35) AND TEMPORARY PAVEMENT MARKING INSTALLED WHERE CENTERLINE STRIPING HAS BEEN COVERED OR REMOVED. SIGNS ARE TO REMAIN IN PLACE UNTIL THE PERMANENT CENTERLINE PAVEMENT MARKINGS ARE IN PLACE. SIGNS SHALL BE COVERED OR REMOVED WHEN PAVEMENT CENTERLINE MARKING HAS BEEN INSTALLED.

SIGN (35) IS PLACED AT APPROXIMATELY TWO-MILE INTERVALS AND AT STATE ROUTE JUNCTIONS. WHEN THE INSTALLATION AT A JUNCTION IS WITHIN ONE-EIGHTH MILE OF THE NORMAL MAINLINE SIGN (35), THE LATTER MAY BE ELIMINATED.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLAN 616.10 AND 903.03.

WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.

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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

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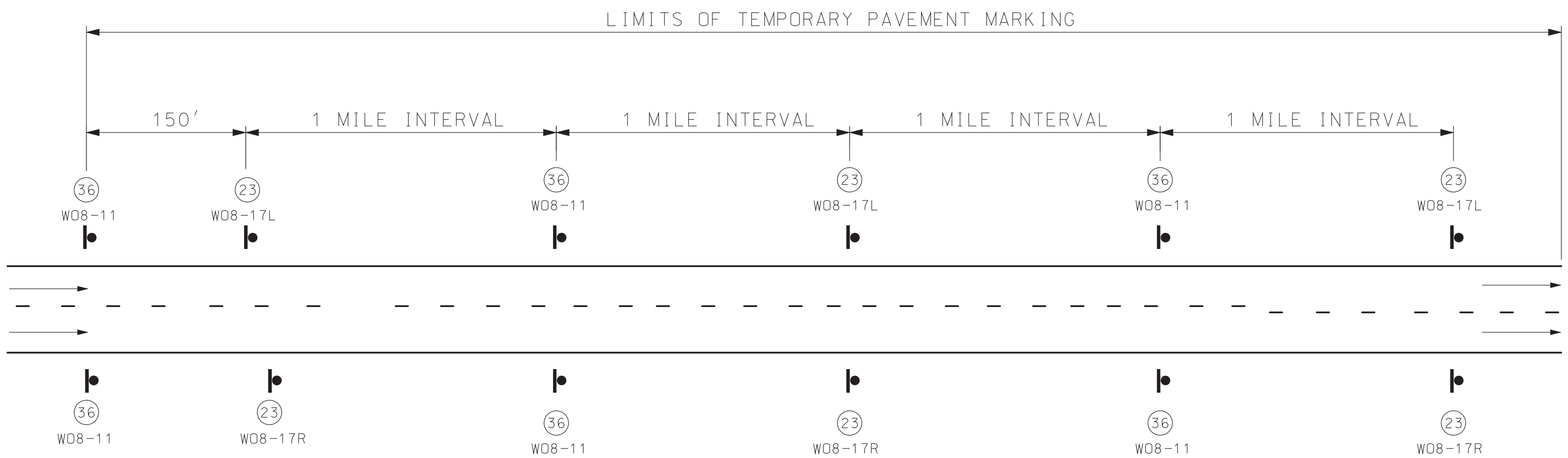
TEMPORARY PAVEMENT MARKING

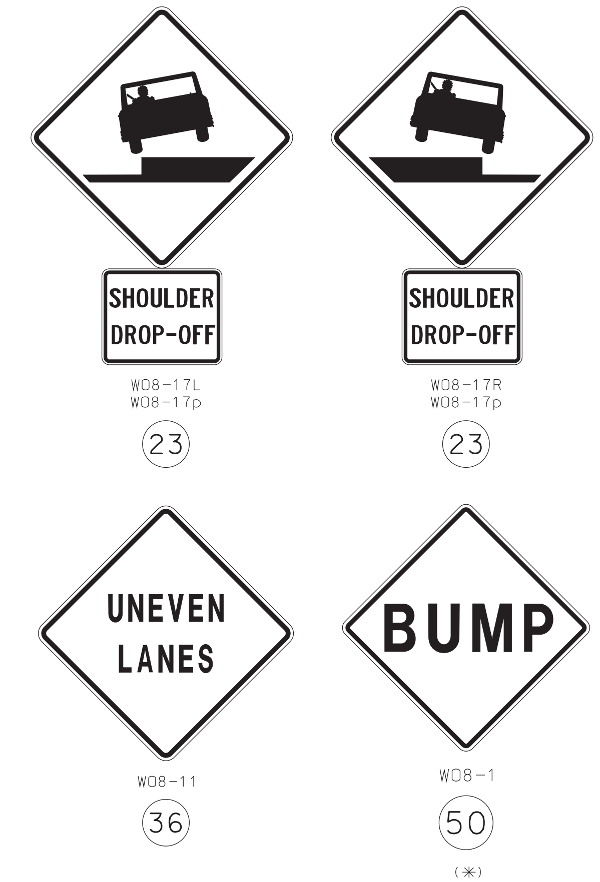
TWO-LANE TWO-WAY HIGHWAY

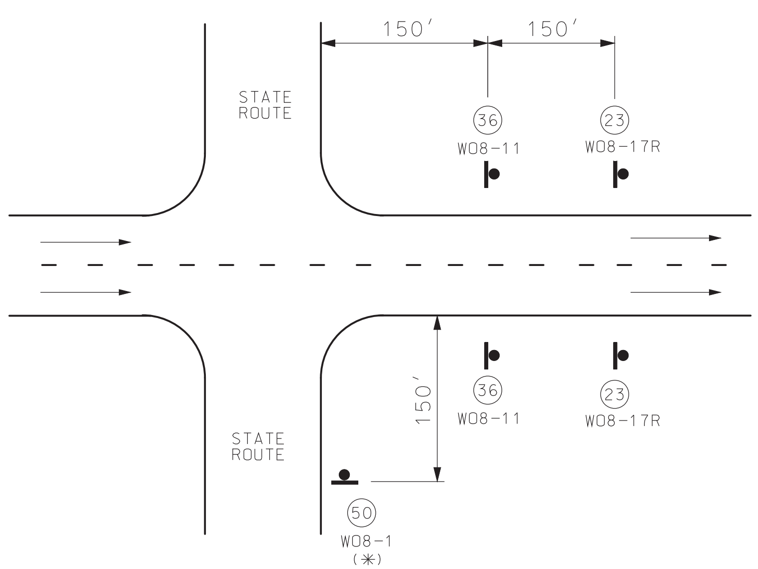
DATE EFFECTIVE:	07/01/2017	620.10G	SHEET NO.
DATE PREPARED:	5/1/2017		4 OF 5



SIGN SPACING FOR DIVIDED OR MULTI-LANE HIGHWAY

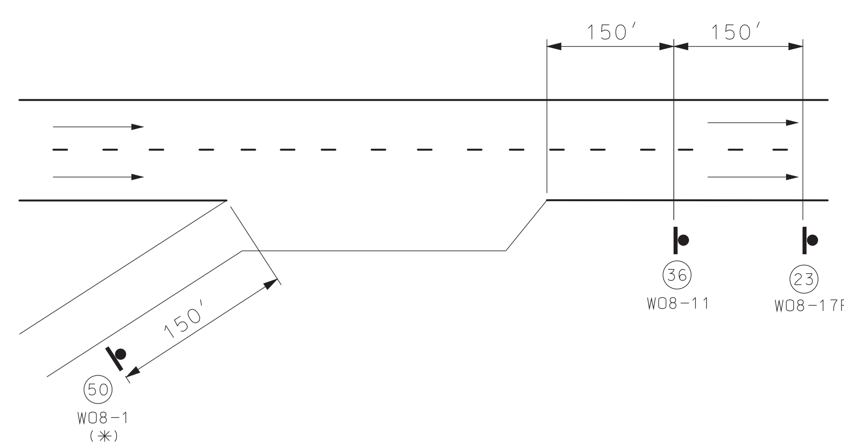
(DETAIL SHOWN IS BASED ON A PROJECT MEETING CONDITIONS OF UNEVEN LANES AND SHOULDER DROP-OFF.)
WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGNS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXISTS.
WHEN ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF), SIGN SPACING SHALL BE AT 1 MILE INTERVALS





SIGN SPACING AT STATE ROUTE INTERSECTIONS

(✳) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



SIGN SPACING AT RAMPS

(✳) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.

GENERAL NOTES:

FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLANS 616.10 AND 903.03.

WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

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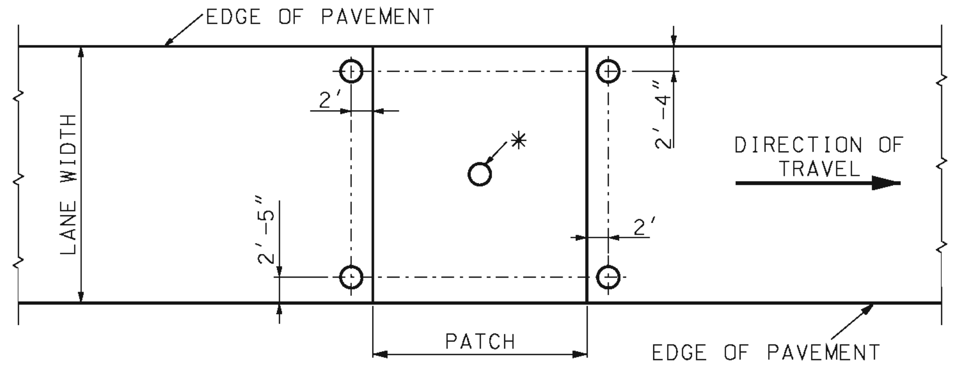
TEMPORARY PAVEMENT MARKING
DIVIDED AND MULTI-LANE HIGHWAYS

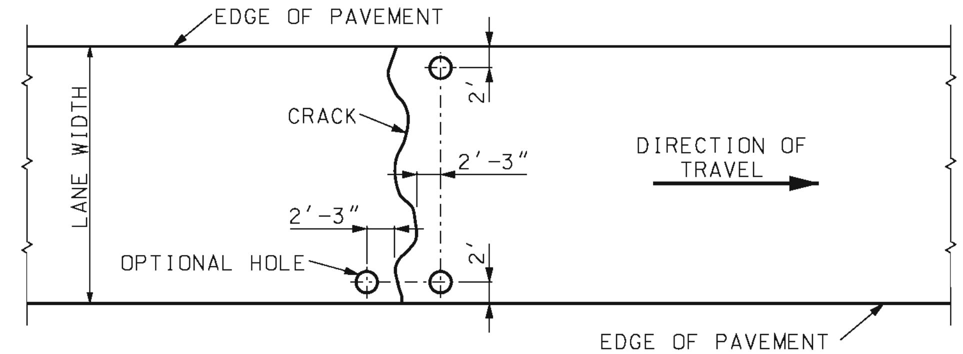
DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

620.10G

SHEET NO.
5 OF 5

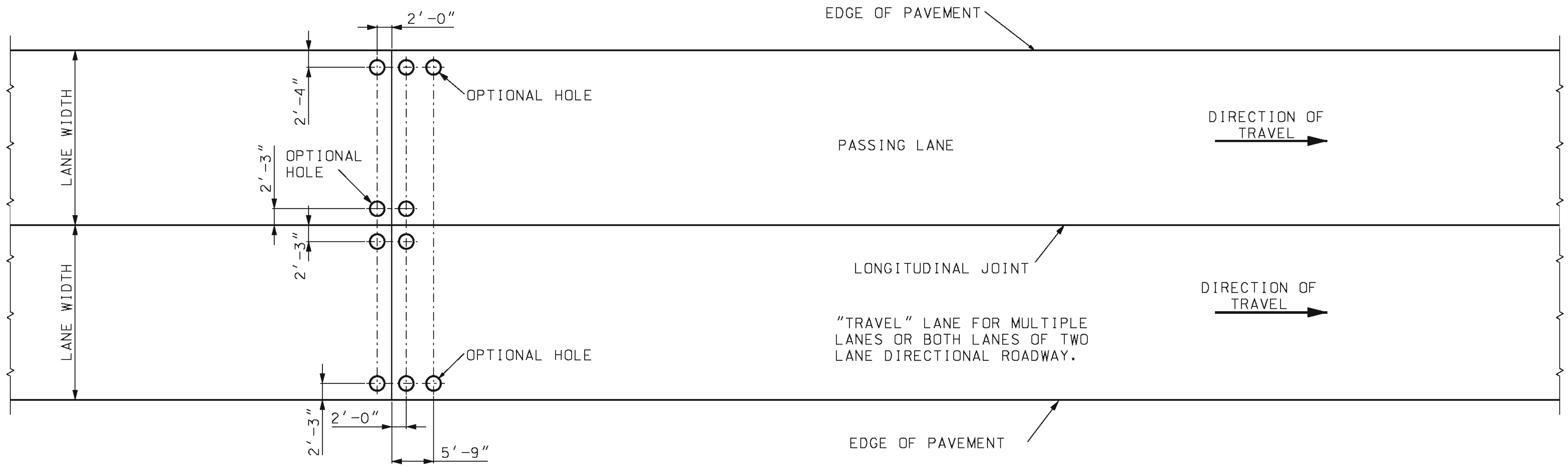


PATCH



CRACK

* THIS HOLE SHOULD ONLY BE USED ON PATCHES EXISTING PRIOR TO CONSTRUCTION. THE HOLE SHOULD BE LOCATED CLOSE TO THE CENTER OF THE PATCH. BY USING THIS HOLE, THE TWO HOLES LOCATED AT THE SHOULDER COULD BE ELIMINATED.



JOINT

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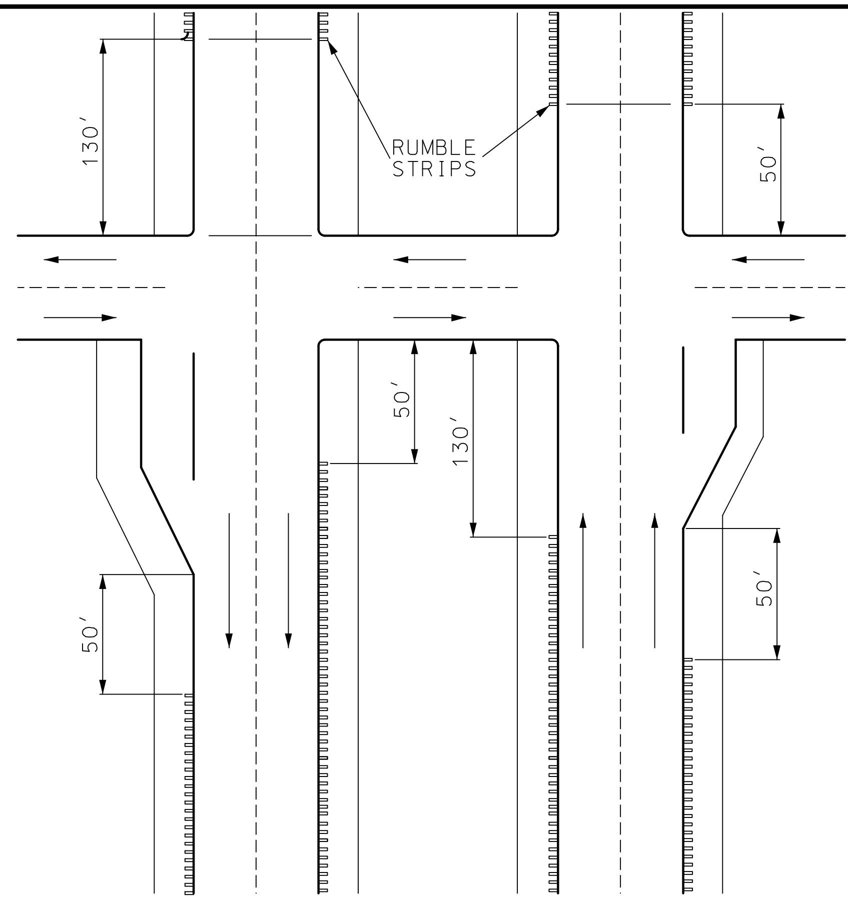
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

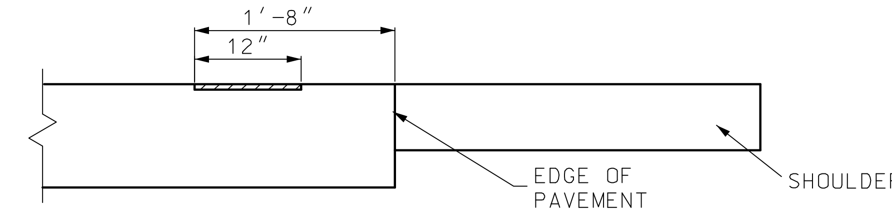
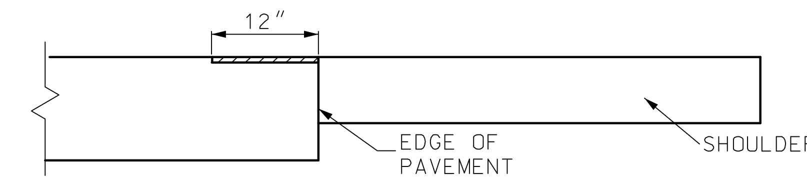
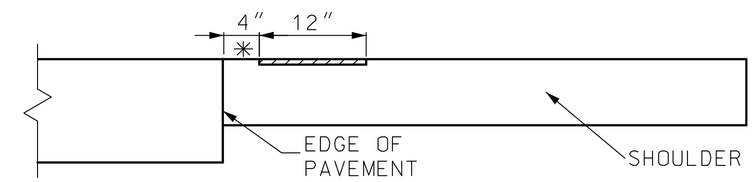
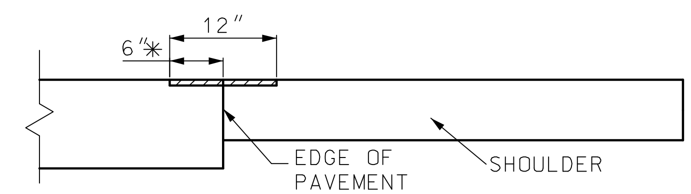
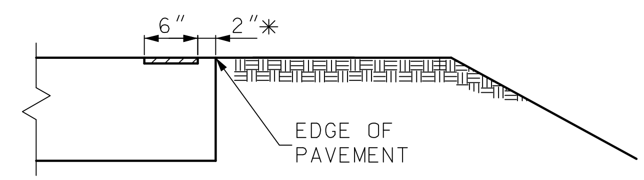
HOLE PATTERN FOR PAVEMENT SLAB STABILIZATION

DATE EFFECTIVE:	10/01/1998	625.00	SHEET NO. 1 OF 1
DATE PREPARED:	8/21/2009		

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



EXPRESSWAY DIVIDED

14′ PAVEMENT STRUCTURES, ALL SHOULDER TYPES	
13′ PAVEMENT STRUCTURES, ALL SHOULDER TYPES	
PAVEMENT STRUCTURES ≤ 12′ WITH A2 SHOULDER	
PAVEMENT STRUCTURES ≤ 12′ WITH A3 SHOULDER	
PAVEMENT STRUCTURES ≤ 12′ WITH EARTH OR AGGREGATE SHOULDERS	

* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.

GENERAL NOTES:

SEE STANDARD PLAN 620.00 FOR PAVEMENT MARKING.

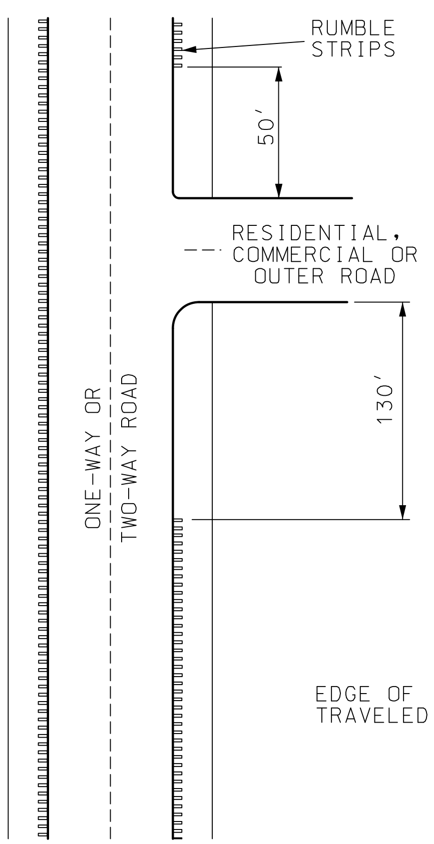
RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.

ALL RUMBLE STRIPS SHALL BE MILLED.

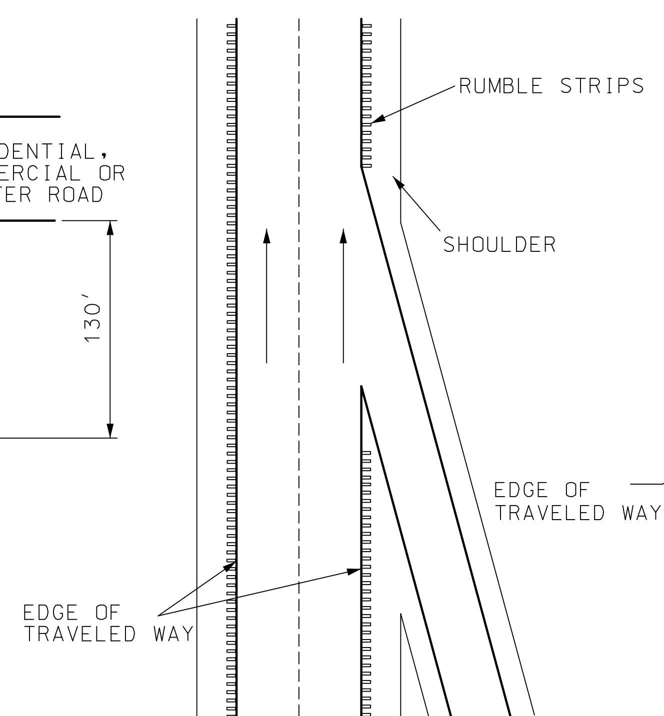
RUMBLE STRIPS SHALL NOT BE MILLED ONTO TRANSVERSE JOINTS.

FOR CONCRETE PAVEMENT WITH 15′ JOINT SPACING, AT LEAST TWELVE RUMBLE STRIPS SHALL BE MILLED PER PANEL.

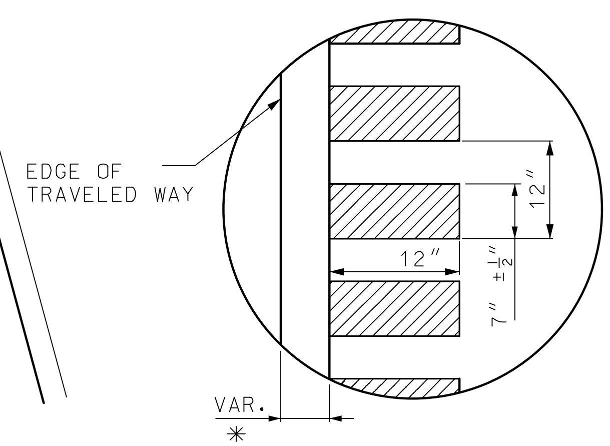
RUMBLE STRIPS SHALL BE OMITTED IF SHOULDERS ARE LESS THAN 2′ WIDE.



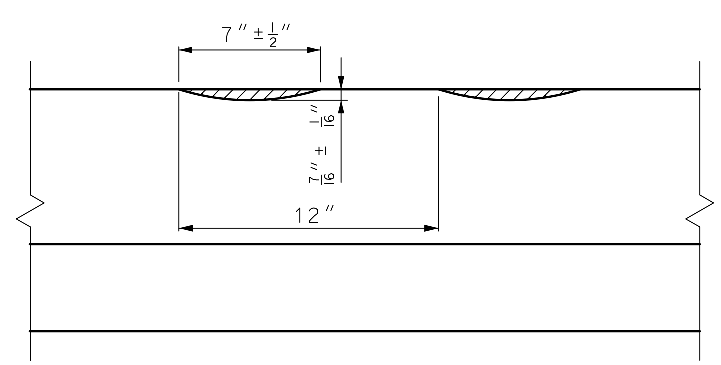
INTERSECTIONS



ACCELERATION LANE SHOWN
ACCELERATION OR DECELERATION LANE



RUMBLE STRIP PLAN VIEW



RUMBLE STRIP CROSS SECTION VIEW

RUMBLE STRIP LAYOUTS

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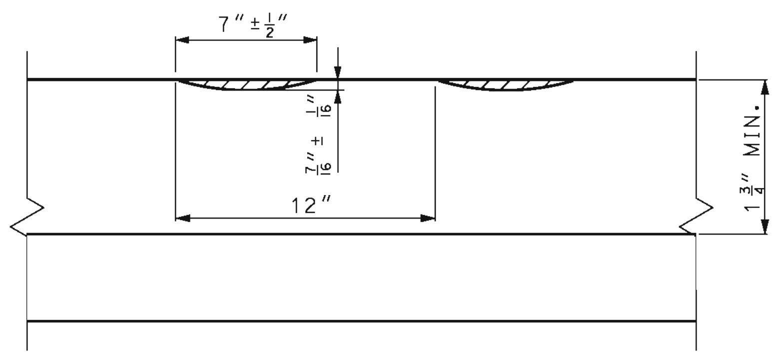
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

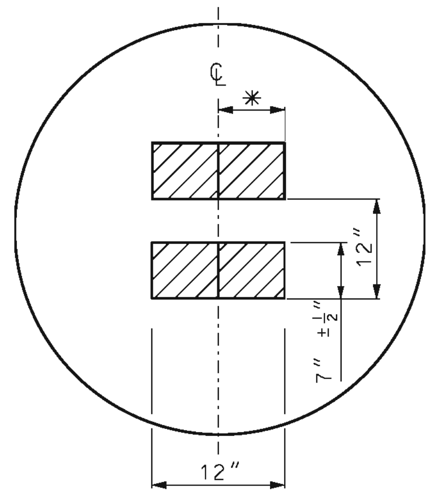
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

RUMBLE STRIPS
SHOULDER

DATE EFFECTIVE: 07/01/2022 DATE PREPARED: 3/9/2022	626.00H	SHEET NO. 1 OF 2

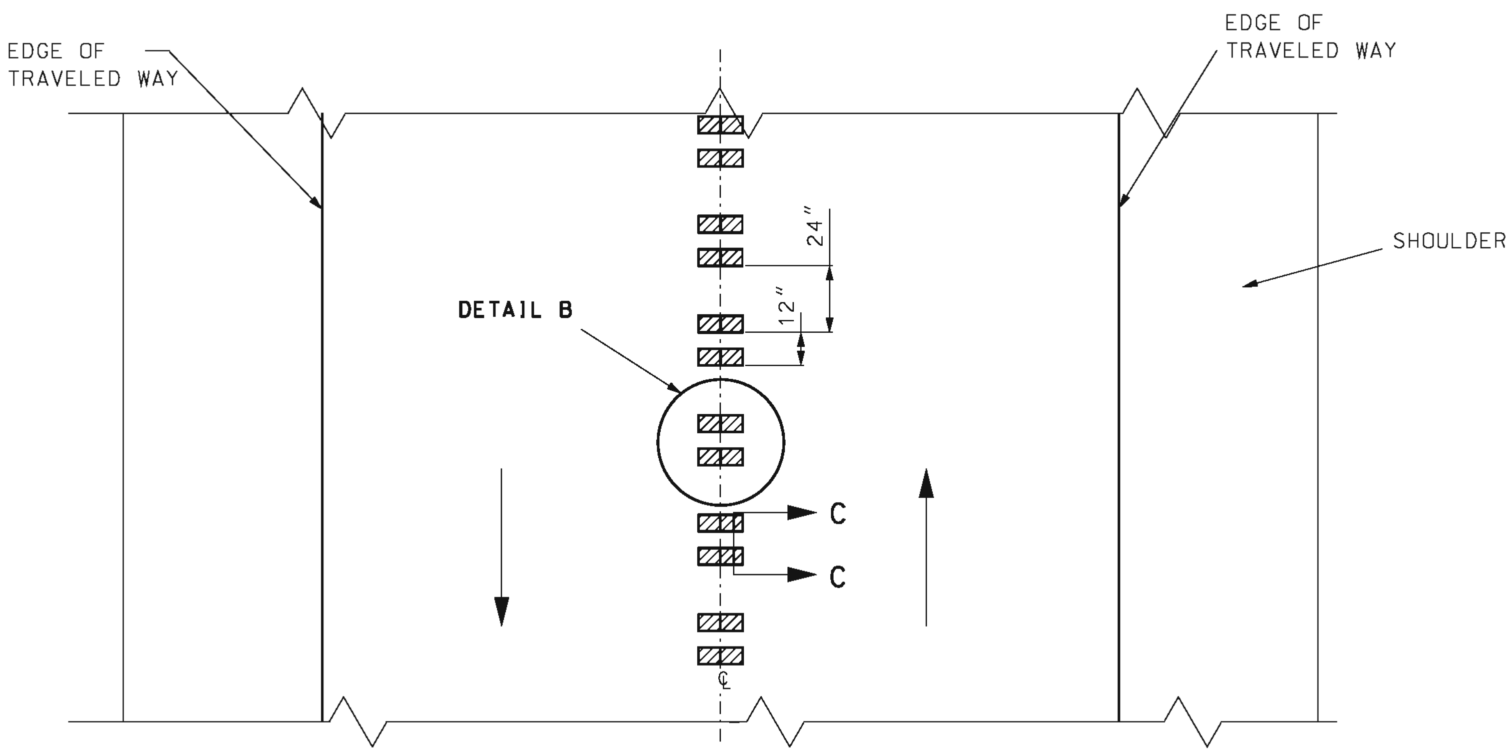


SECTION C-C



DETAIL B

* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.



TWO-WAY ROAD

GENERAL NOTES:

SEE STANDARD PLAN 620.00 FOR PAVEMENT MARKING.

RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.

ALL RUMBLE STRIPS SHALL BE MILLED.

CENTERLINE RUMBLE STRIPS SHALL BE CONTINUOUS THROUGH CONNECTIONS OF SIDEROADS WITH NO LEFT TURN LANES.

DISCONTINUE CENTERLINE RUMBLE STRIPS THROUGH THE LIMITS OF ALL LEFT TURN LANES, INCLUDING ANY LANE TAPER SECTIONS.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

RUMBLE STRIPS
CENTERLINE

DATE EFFECTIVE: 04/01/2009
DATE PREPARED: 2/20/2009

626.00H

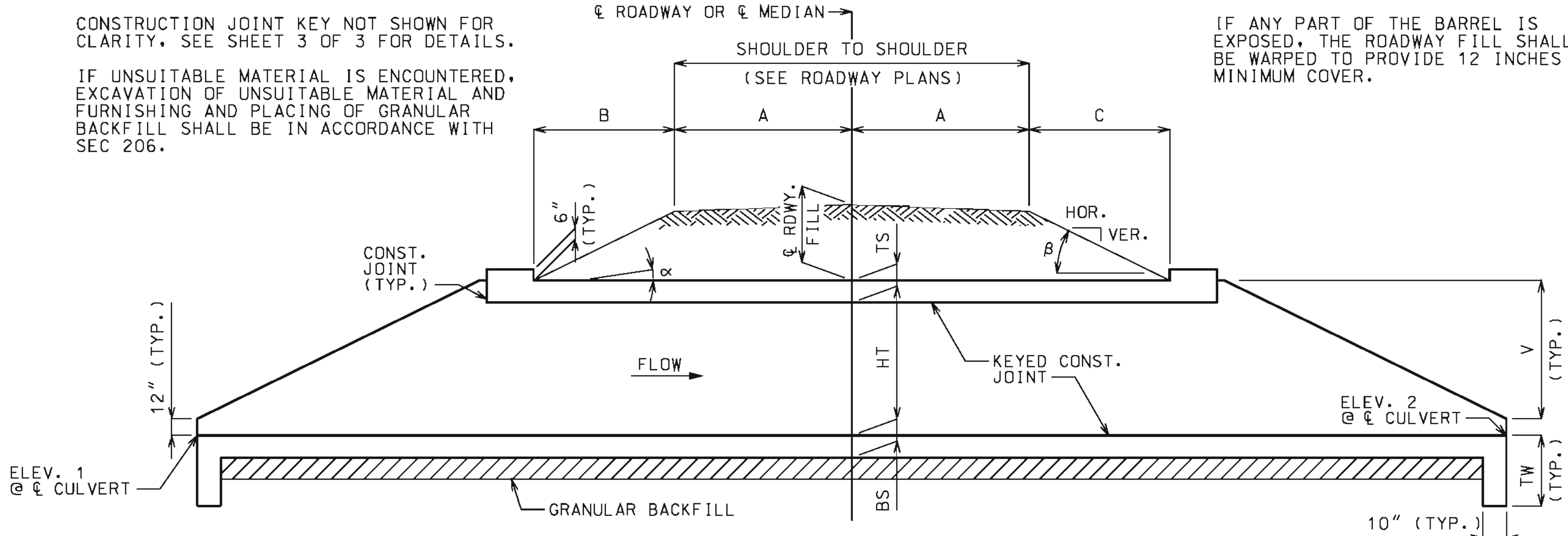
SHEET NO. 2 OF 2

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

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.

EQUATIONS FOR COMPUTING ∝, β, B AND C

$\propto$ = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\text{ARCTAN}\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W}\right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\text{ARCTAN}\left(\frac{\text{VER.}}{\text{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) - A(\tan\propto)}{\tan\beta + \tan\propto}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) + A(\tan\propto)}{\tan\beta - \tan\propto}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ℄ ROADWAY OR ℄ MEDIAN.

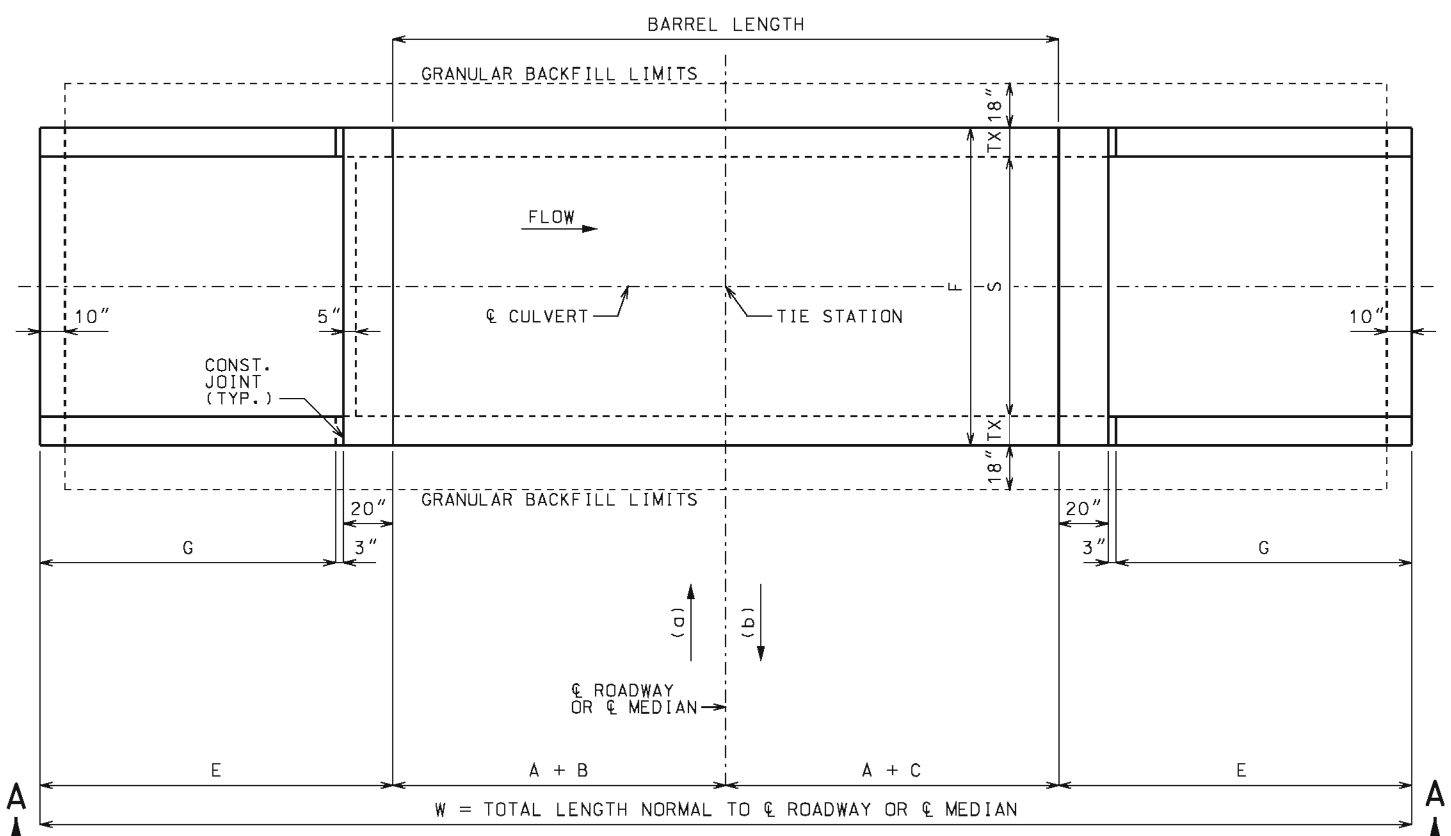
THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ℄ ROADWAY OR ℄ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ℄ ROADWAY OR ℄ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ℄ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ℄ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION
∝	SEE EQUATIONS
β	SEE EQUATIONS
B	SEE EQUATIONS
C	SEE EQUATIONS
E	G + 23"
F	S + 2TX
G	2V
V	HT + TS - 12"
W	2A + B + C + 2E
TW	MAX{3'-4" OR (BS + 12")}



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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) fy = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

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

CONCRETE SINGLE BOX CULVERT

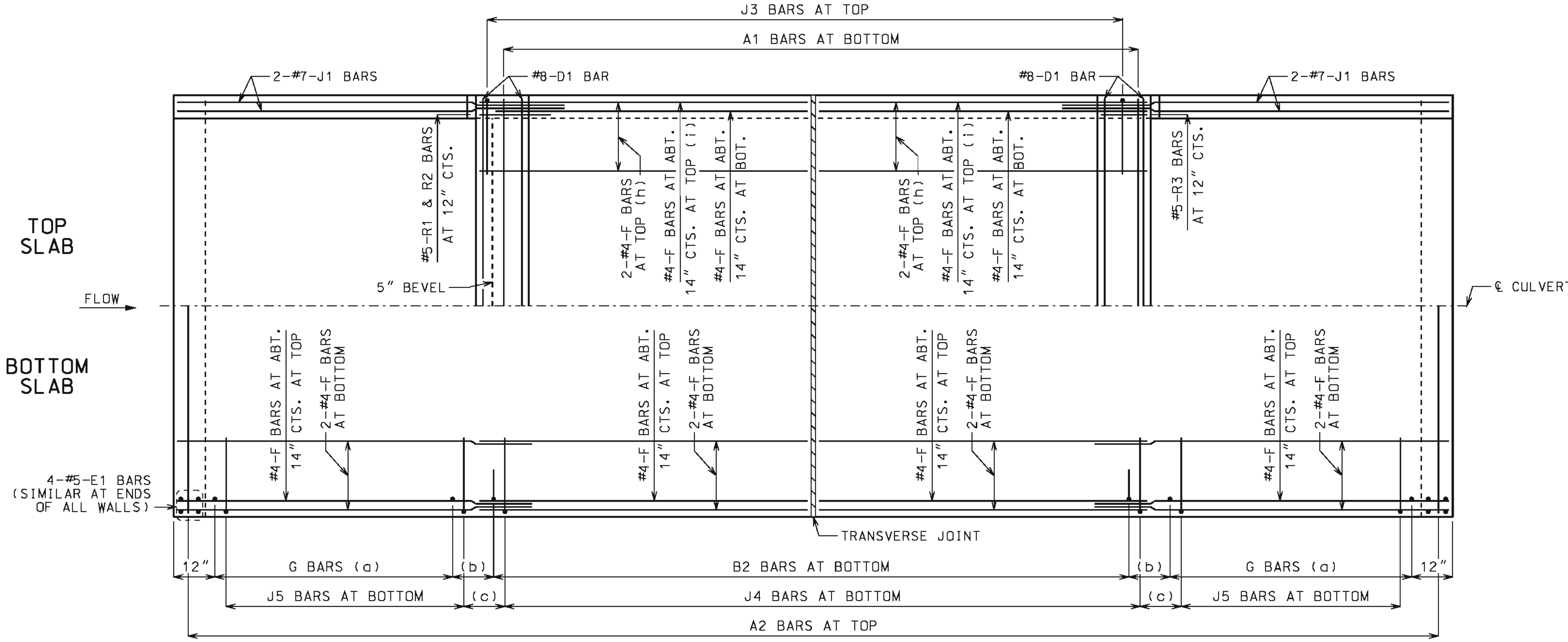
SKEW: SQUARED
WINGS: STRAIGHT

LAYOUT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

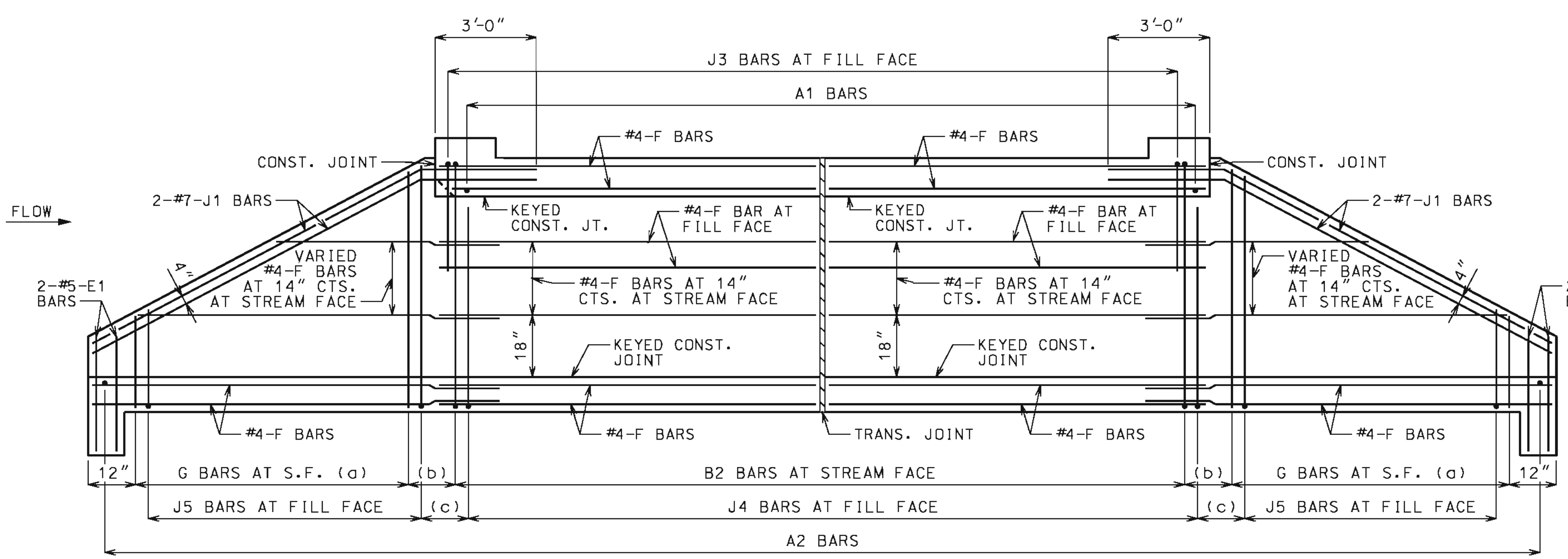
703.10J

SHEET NO. 1 OF 3



HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT ℄ CULVERT.



ELEVATION

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) NOT SPECIFIED ON THIS SHEET

(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

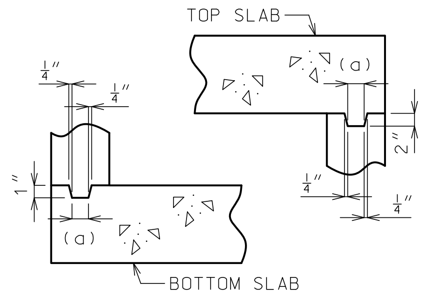
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE SINGLE BOX CULVERT

SKEW: SQUARED
WINGS: STRAIGHT

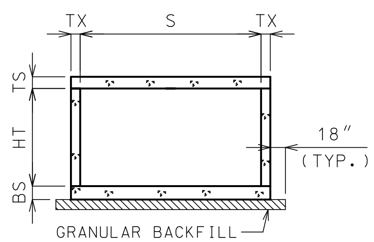
REINFORCEMENT

DATE EFFECTIVE:	07/01/2015	703.10J	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

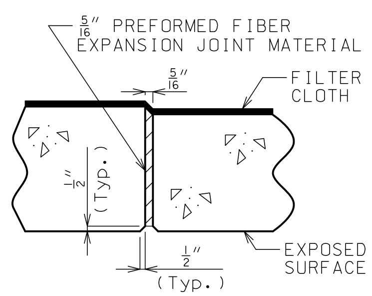


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



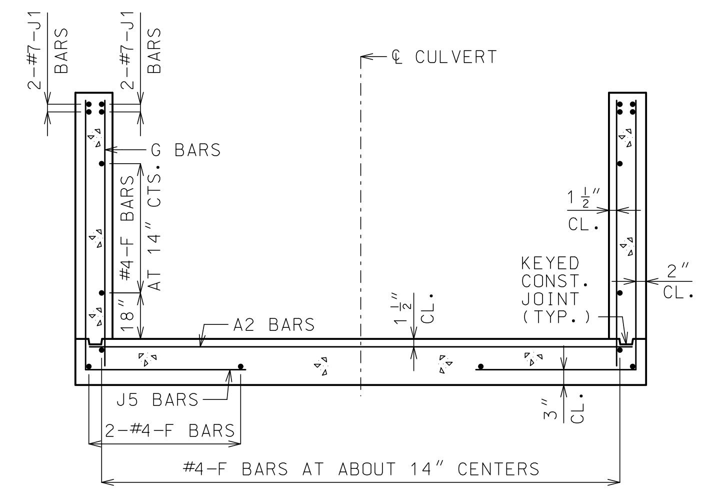
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



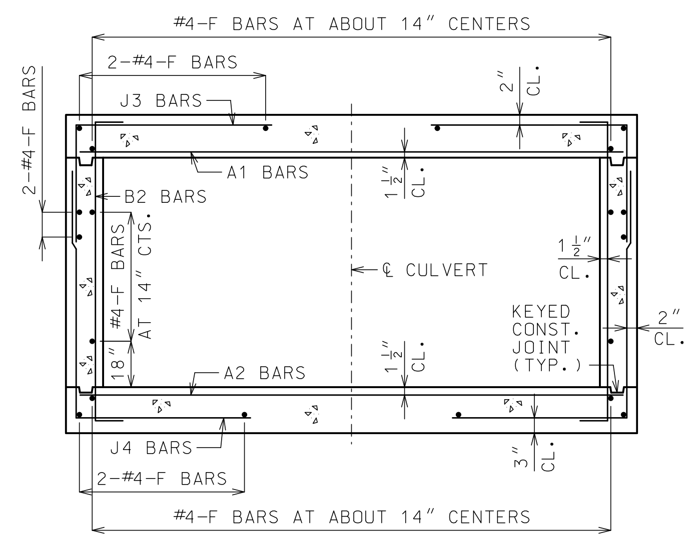
TRANSVERSE JOINT THRU BARREL

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.

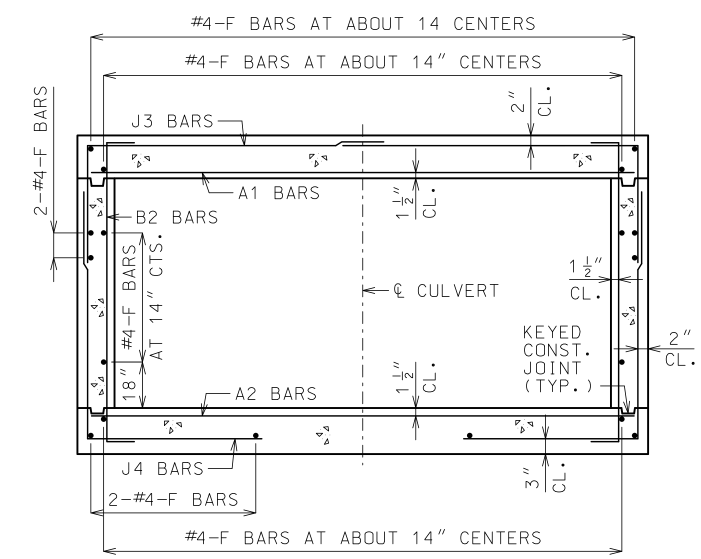


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



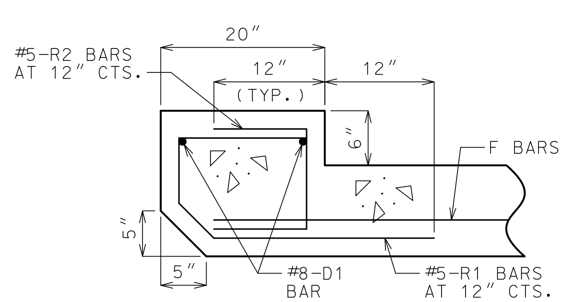
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"

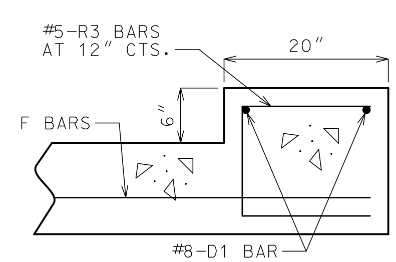


BARREL REINFORCEMENT

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.

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 1½".

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

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE
SINGLE BOX CULVERT

SKEW: SQUARED
WINGS: STRAIGHT

SECTIONS

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

703.10J

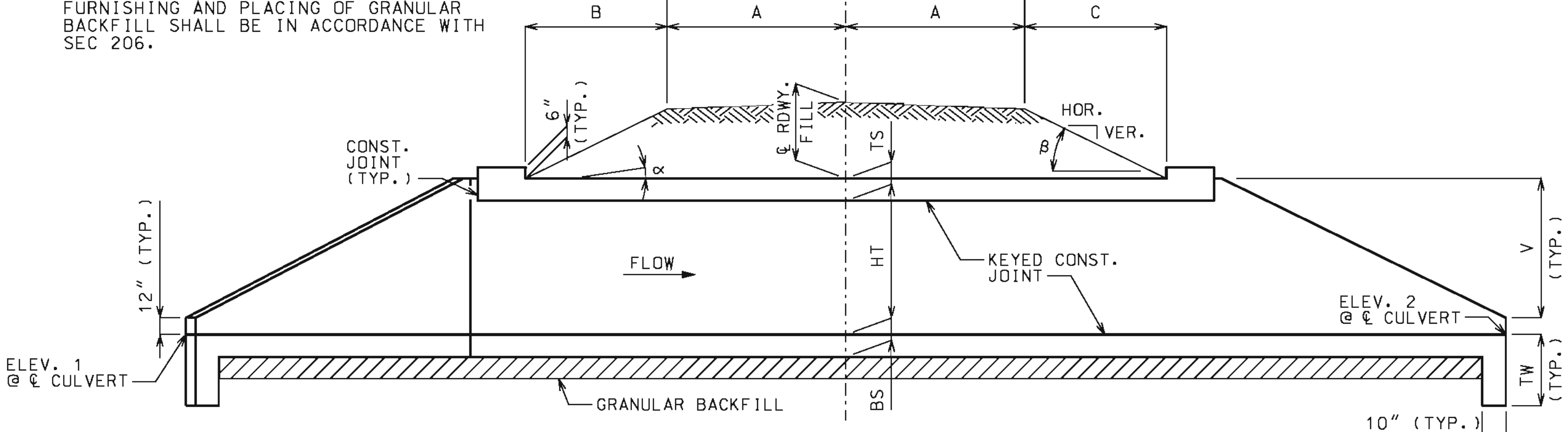
SHEET NO. 3 OF 3

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

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.

EQUATIONS FOR COMPUTING α, β, B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = ARCTAN$\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W}\right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = ARCTAN$\left(\frac{\text{VER.}}{\text{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) - A(\tan\alpha)}{\tan\beta + \tan\alpha}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) + A(\tan\alpha)}{\tan\beta - \tan\alpha}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ℄ ROADWAY OR ℄ MEDIAN.

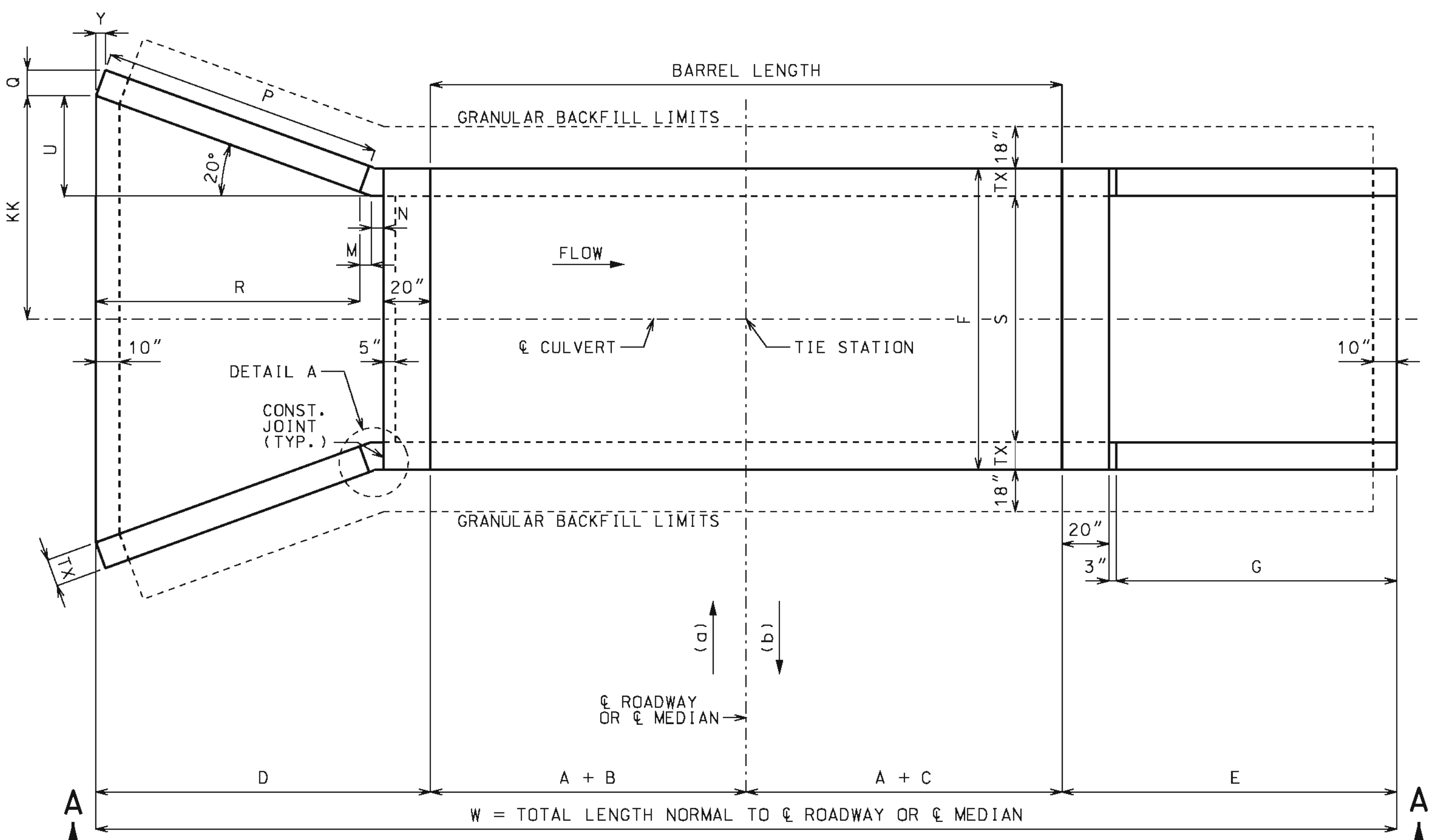
THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ℄ ROADWAY OR ℄ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ℄ ROADWAY OR ℄ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ℄ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ℄ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

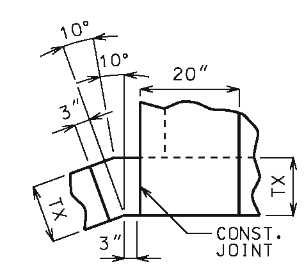
LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION
α	SEE EQUATIONS	P	2V(SEC 20°)
β	SEE EQUATIONS	Q	TX(COS 20°)
B	SEE EQUATIONS	R	P(COS 20°)
C	SEE EQUATIONS	U	(R + M)(TAN 20°)
D	R + M + N + 20"	V	HT + TS − 12"
E	G + 23"	W	2A + B + C + D + E
F	S + 2TX	Y	TX(SIN 20°)
G	2V	KK	S/2 + U
M	N(COS 20°)	TW	MAX{3'-4" OR (BS + 12")}
N	3" + TX(TAN 10°)		



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.



DETAIL A

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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) fy = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

MoDOT
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.

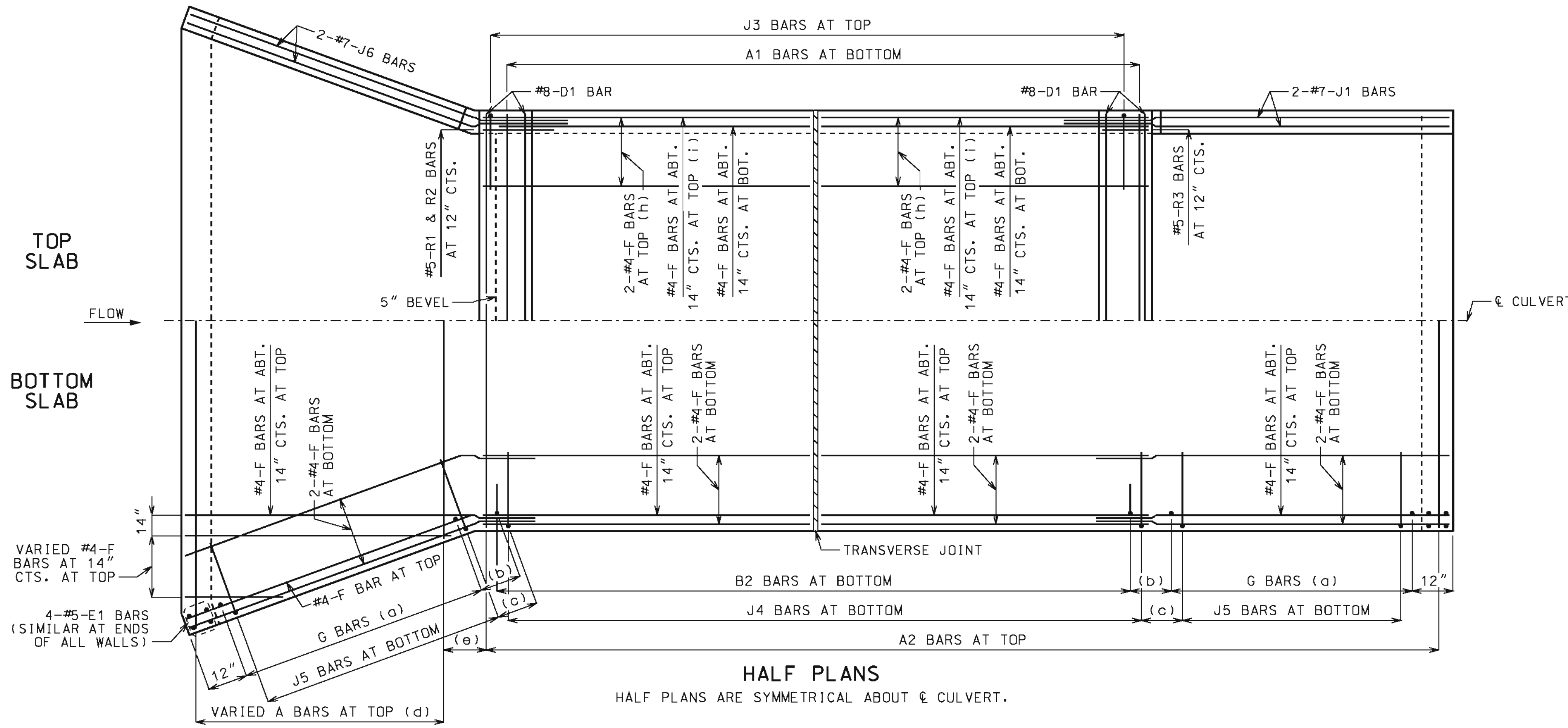
CONCRETE SINGLE BOX CULVERT

SKEW: SQUARED
WINGS: FLARED

LAYOUT

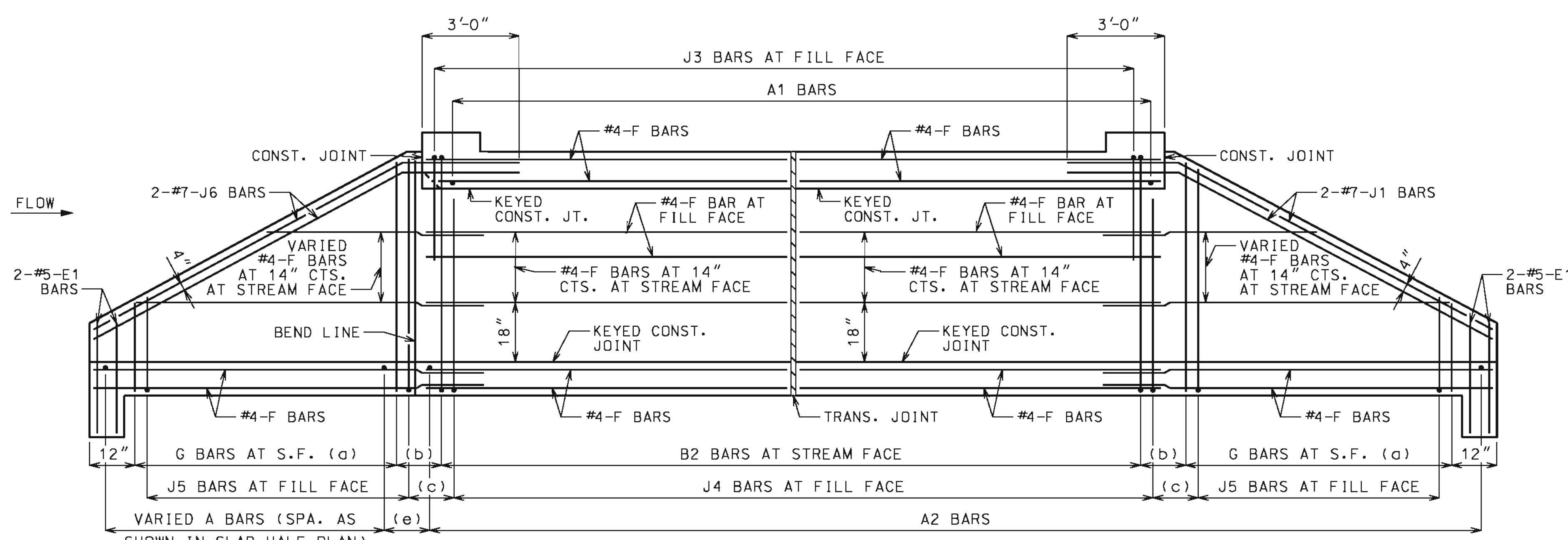
DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

703.11J



HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT ℄ CULVERT.



DEVELOPED ELEVATION

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS B2 BARS

(e) A2 BAR SPACING

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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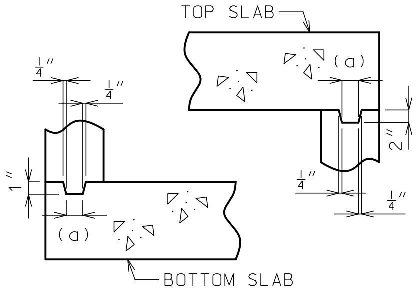
CONCRETE SINGLE BOX CULVERT

SKEW: SQUARED
WINGS: FLARED

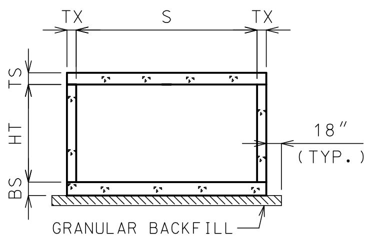
REINFORCEMENT

DATE EFFECTIVE:	07/01/2015	703.11J	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

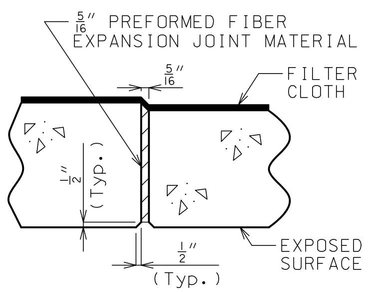


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



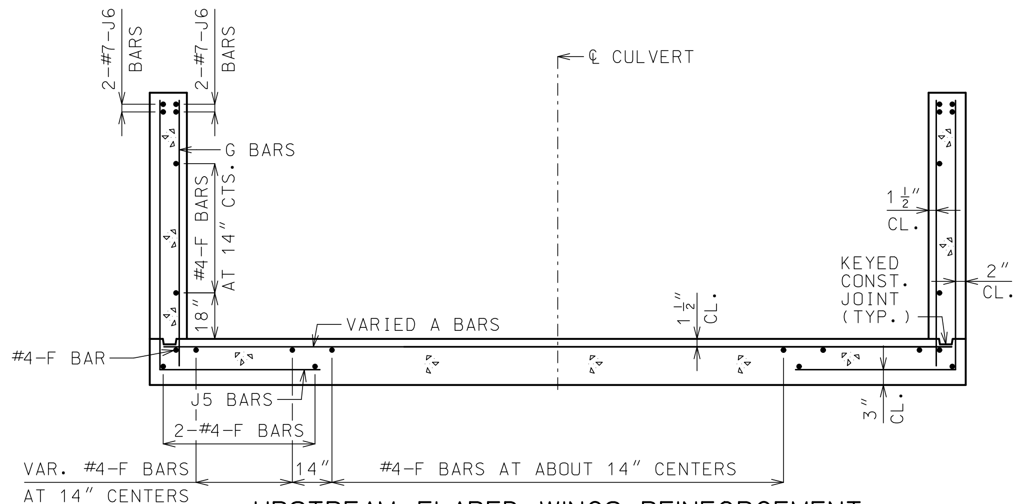
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



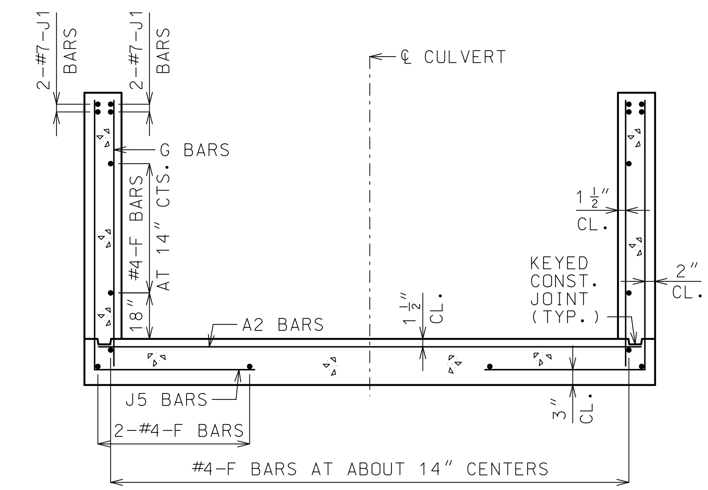
TRANSVERSE JOINT THRU BARREL

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.

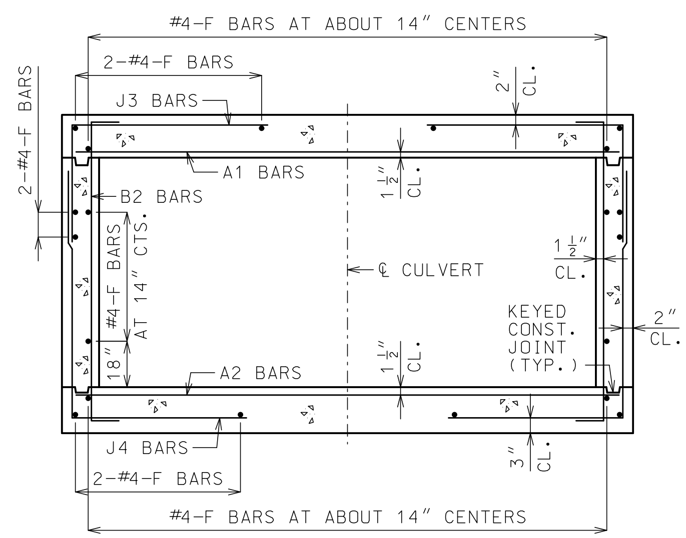
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED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



UPSTREAM FLARED WINGS REINFORCEMENT

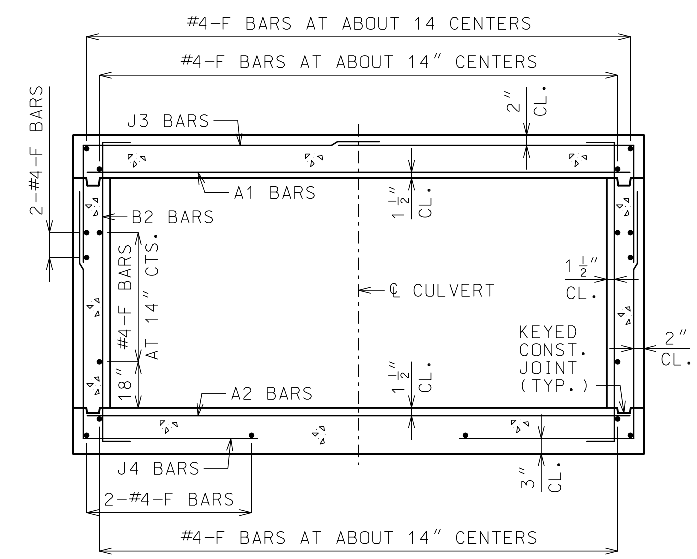


DOWNSTREAM WINGS REINFORCEMENT



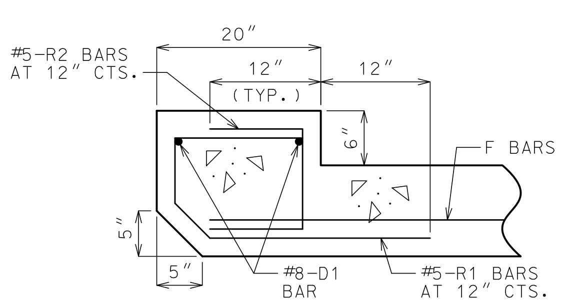
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2′-0″

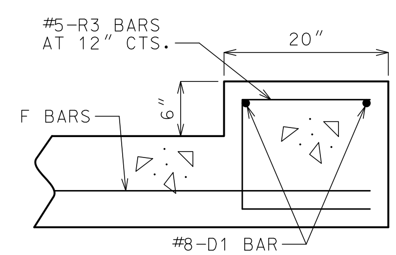


BARREL REINFORCEMENT

FOR DESIGN FILLS 2′-0″ OR LESS



UPSTREAM HEADWALL REINFORCEMENT



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.

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 1½″.

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NUMBER PE-27141
PROFESSIONAL ENGINEER
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CONCRETE SINGLE BOX CULVERT

SKEW: SQUARED
WINGS: FLARED

SECTIONS

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

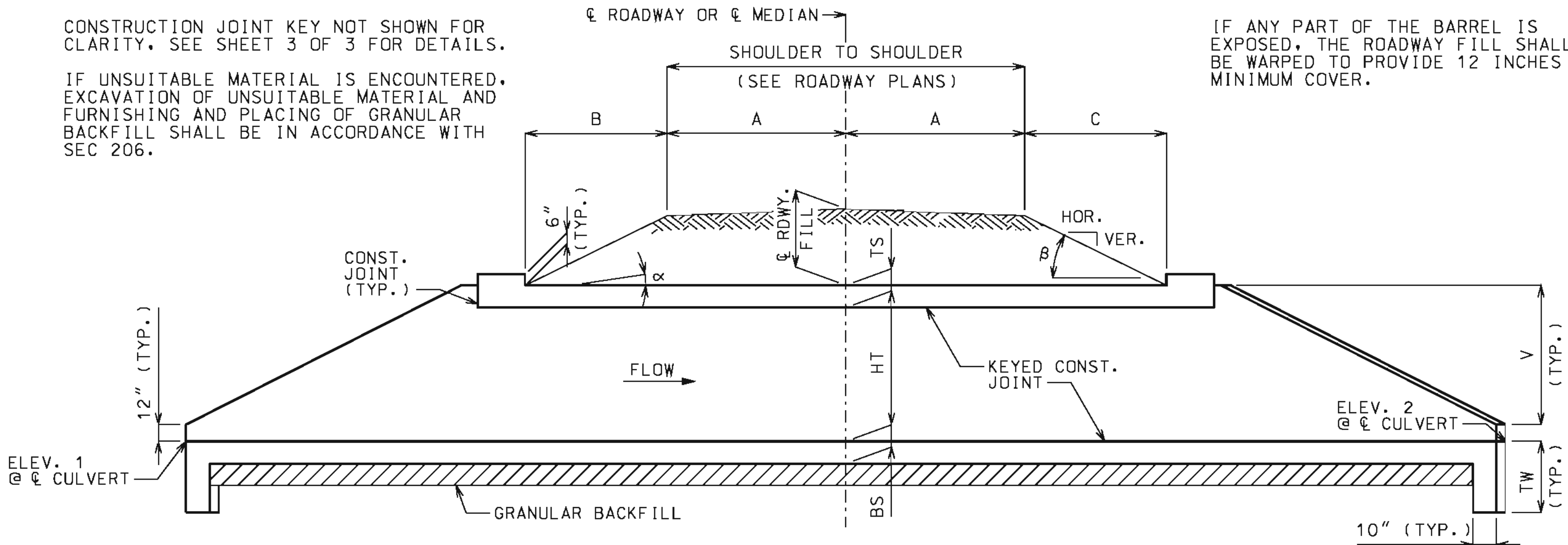
703.11J

SHEET NO. 3 OF 3

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

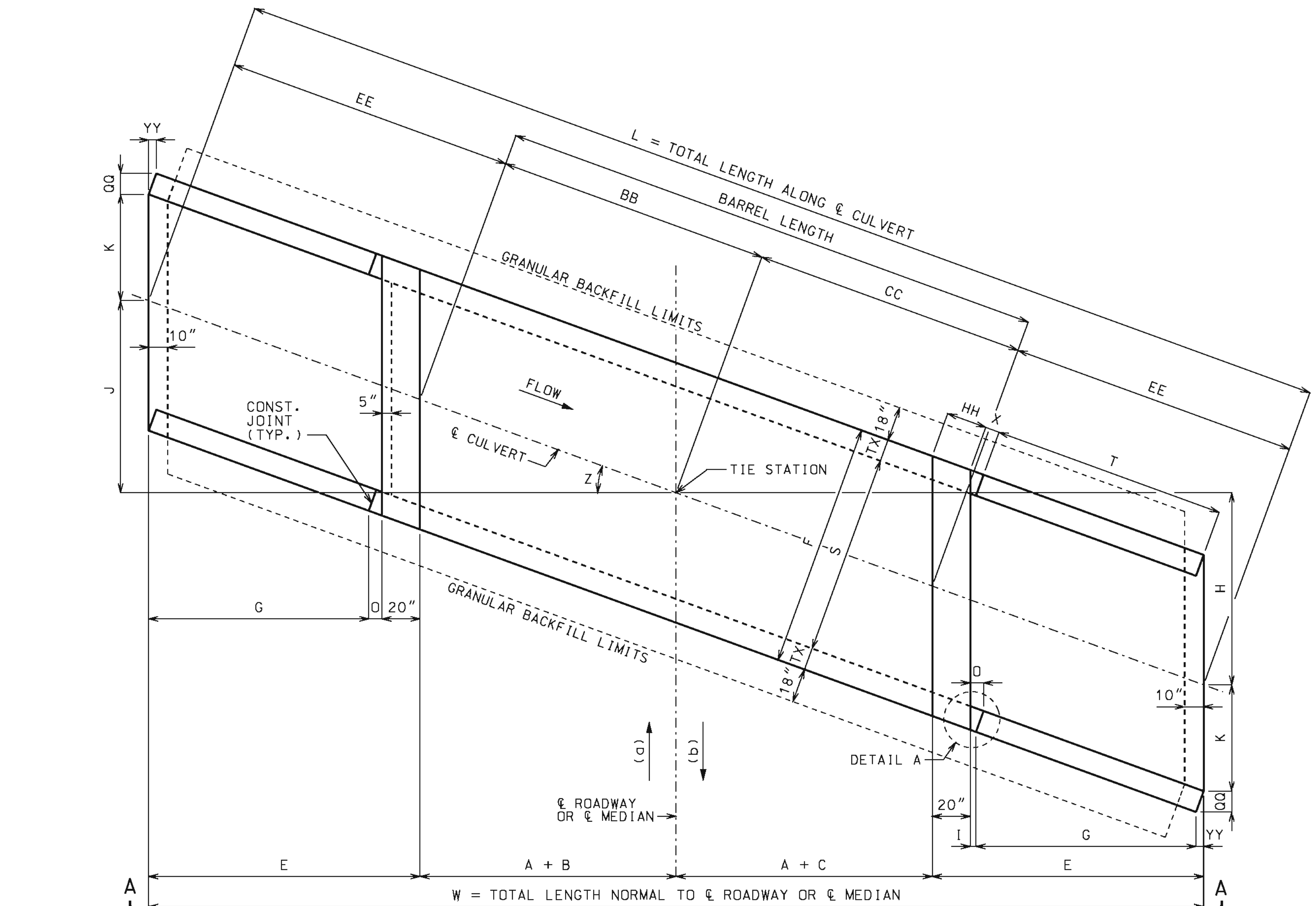
IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



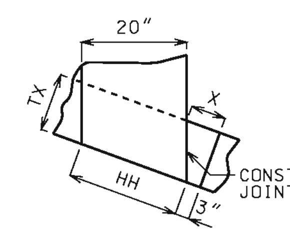
GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.



DETAIL A

EQUATIONS FOR COMPUTING α, β, B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\text{ARCTAN}\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W}\right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\text{ARCTAN}\left(\frac{\text{VER.}}{\text{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) - A(\tan\alpha)}{\tan\beta + \tan\alpha}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) + A(\tan\alpha)}{\tan\beta - \tan\alpha}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ℄ ROADWAY OR ℄ MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ℄ ROADWAY OR ℄ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ℄ ROADWAY OR ℄ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ℄ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ℄ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION
α	SEE EQUATIONS	T	G(SEC Z)
β	SEE EQUATIONS	V	HT + TS − 12"
B	SEE EQUATIONS	W	2A + B + C + 2E
C	SEE EQUATIONS	X	3" + TX(TAN Z)
E	G + O + 20"	Z	SKEW ANGLE
F	S + 2TX	BB	(A + B)(SEC Z)
G	2V	CC	(A + C)(SEC Z)
H	(A + C + E)(TAN Z)	EE	E(SEC Z)
I	3"(COS Z)	HH	20"(SEC Z)
J	(A + B + E)(TAN Z)	QQ	TX(COS Z)
K	S(SEC Z)/2	YY	TX(SIN Z)
L	2EE + BB + CC	TW	MAX{3'-4" OR (BS + 12")}
O	I + YY		

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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) fy = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

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DENNIS W. HECKMAN
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CONCRETE SINGLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

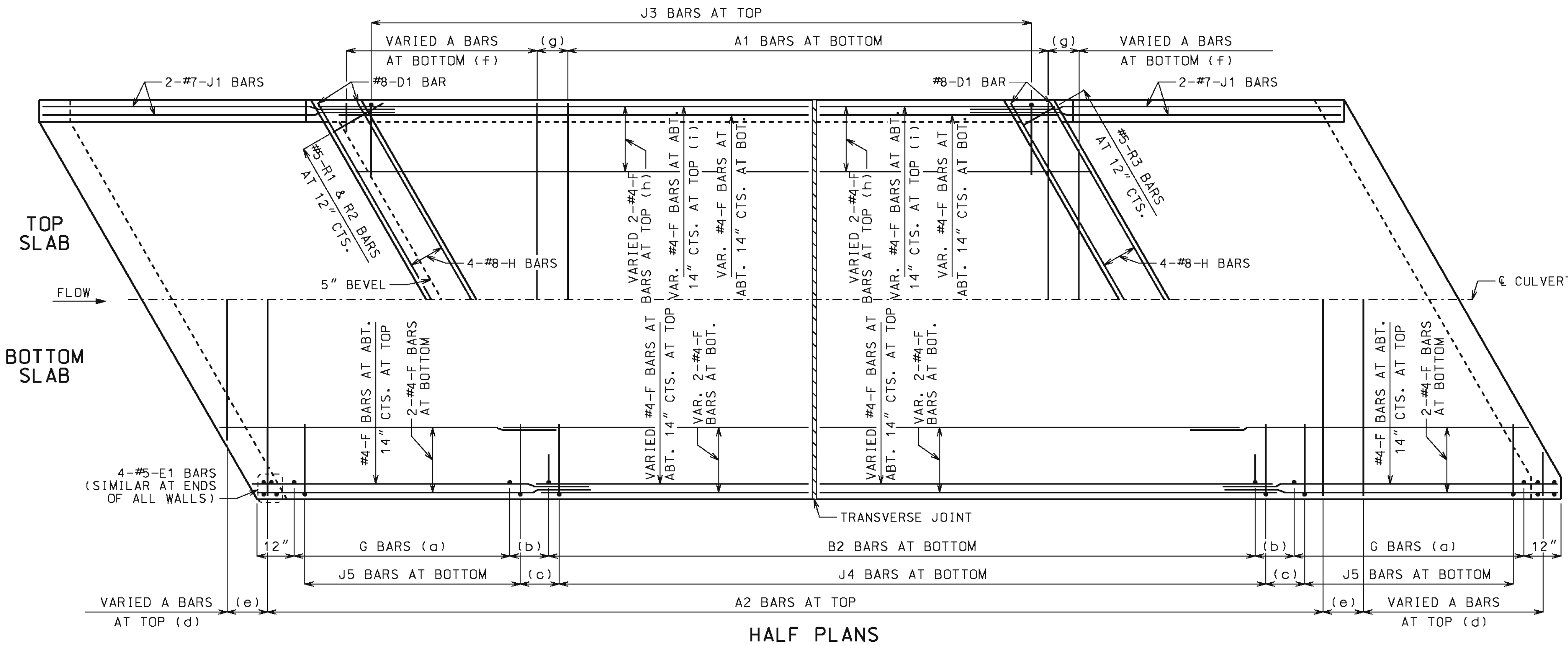
LAYOUT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

703.12J

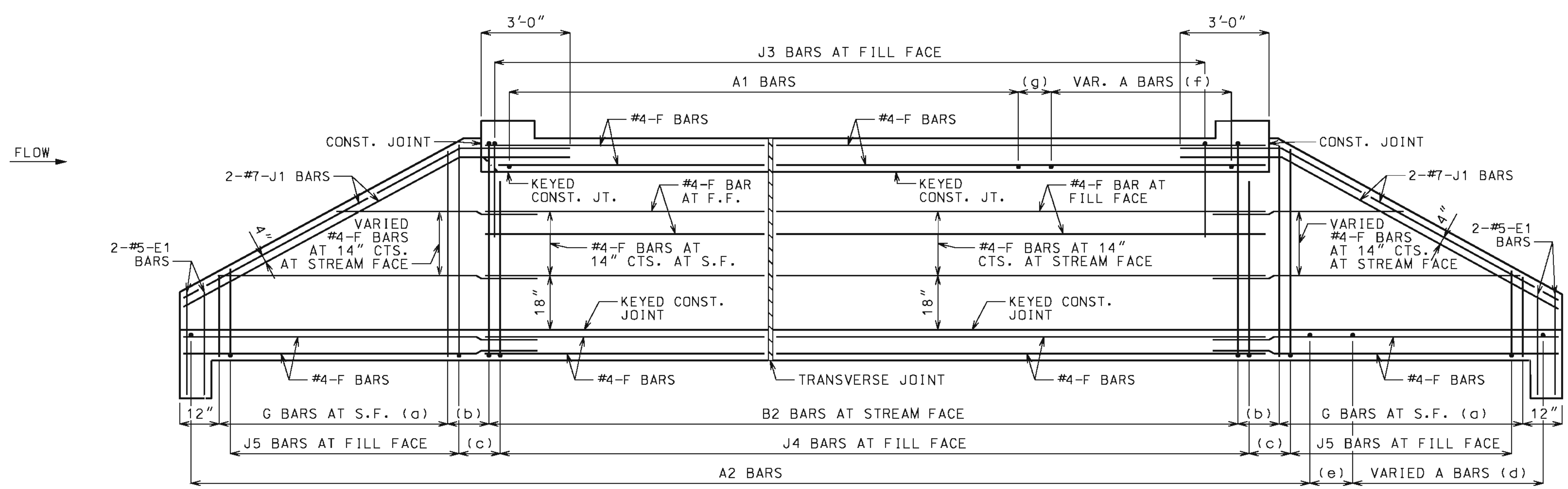
SHEET NO. 1 OF 3

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



HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT ℄ CULVERT.



ELEVATION

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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CONCRETE SINGLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

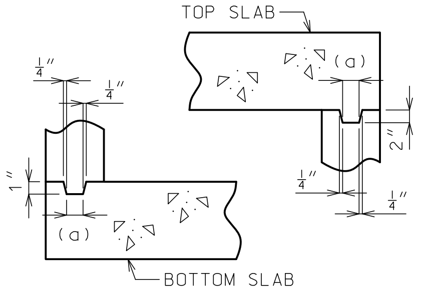
REINFORCEMENT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

703.12J

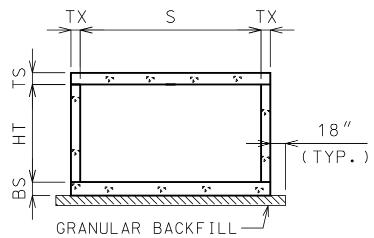
SHEET NO. 2 OF 3

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

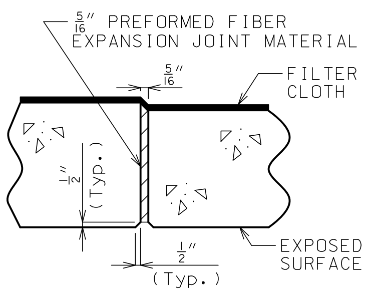


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



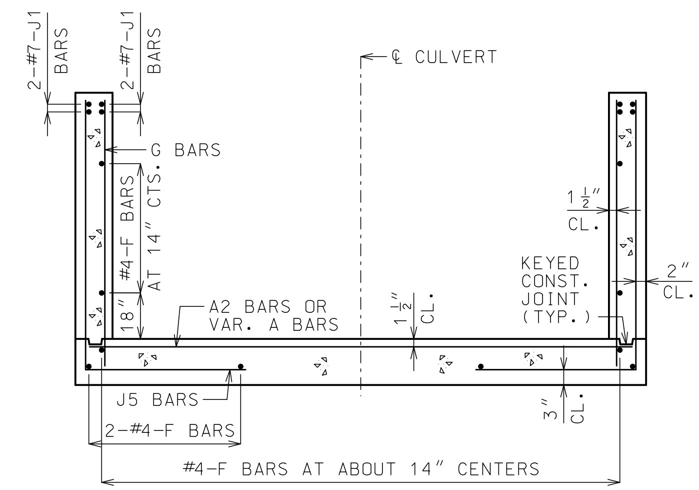
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



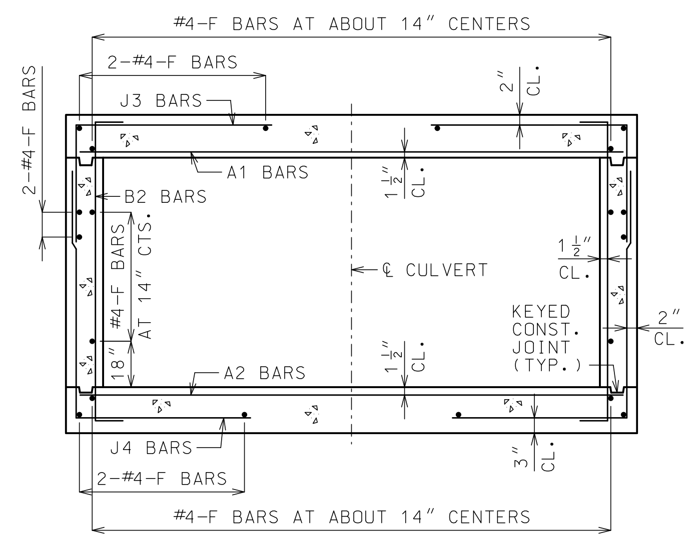
TRANSVERSE JOINT THRU BARREL

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.

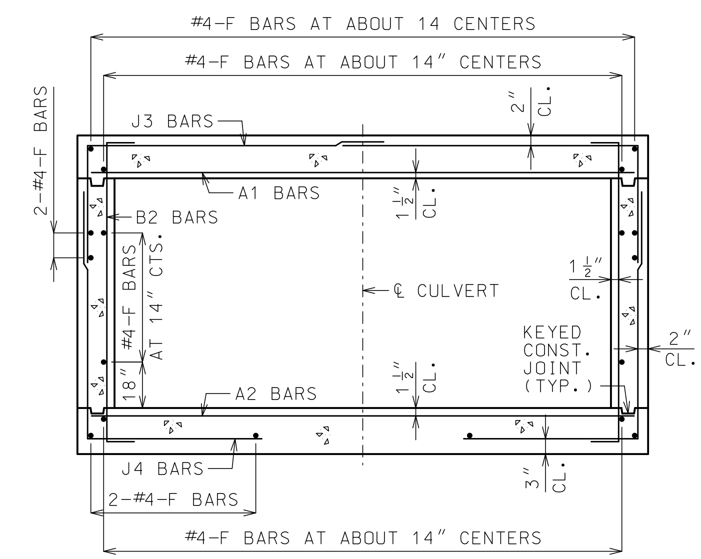


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



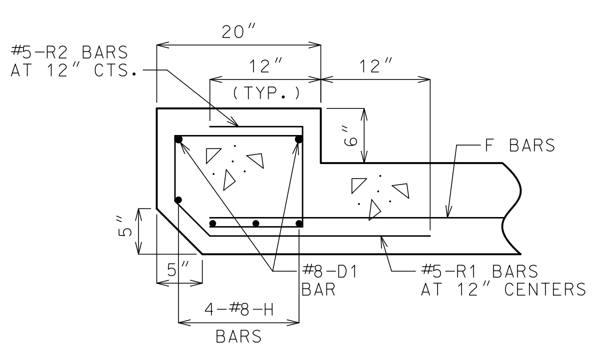
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"

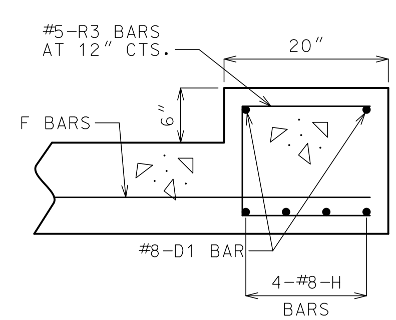


BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT



DOWNSTREAM HEADWALL REINFORCEMENT

GENERAL NOTES:

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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".

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CONCRETE SINGLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

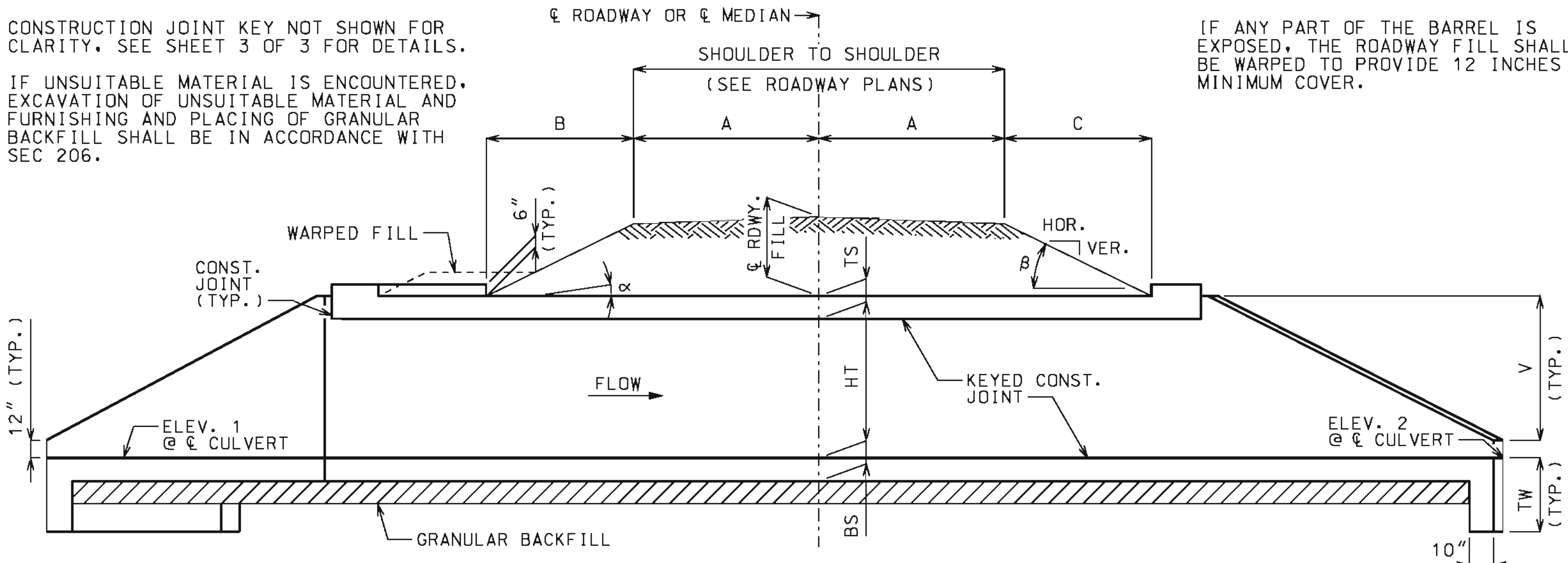
SECTIONS

DATE EFFECTIVE:	01/01/2021	703.12J	SHEET NO.
DATE PREPARED:	10/14/2020		3 OF 3

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

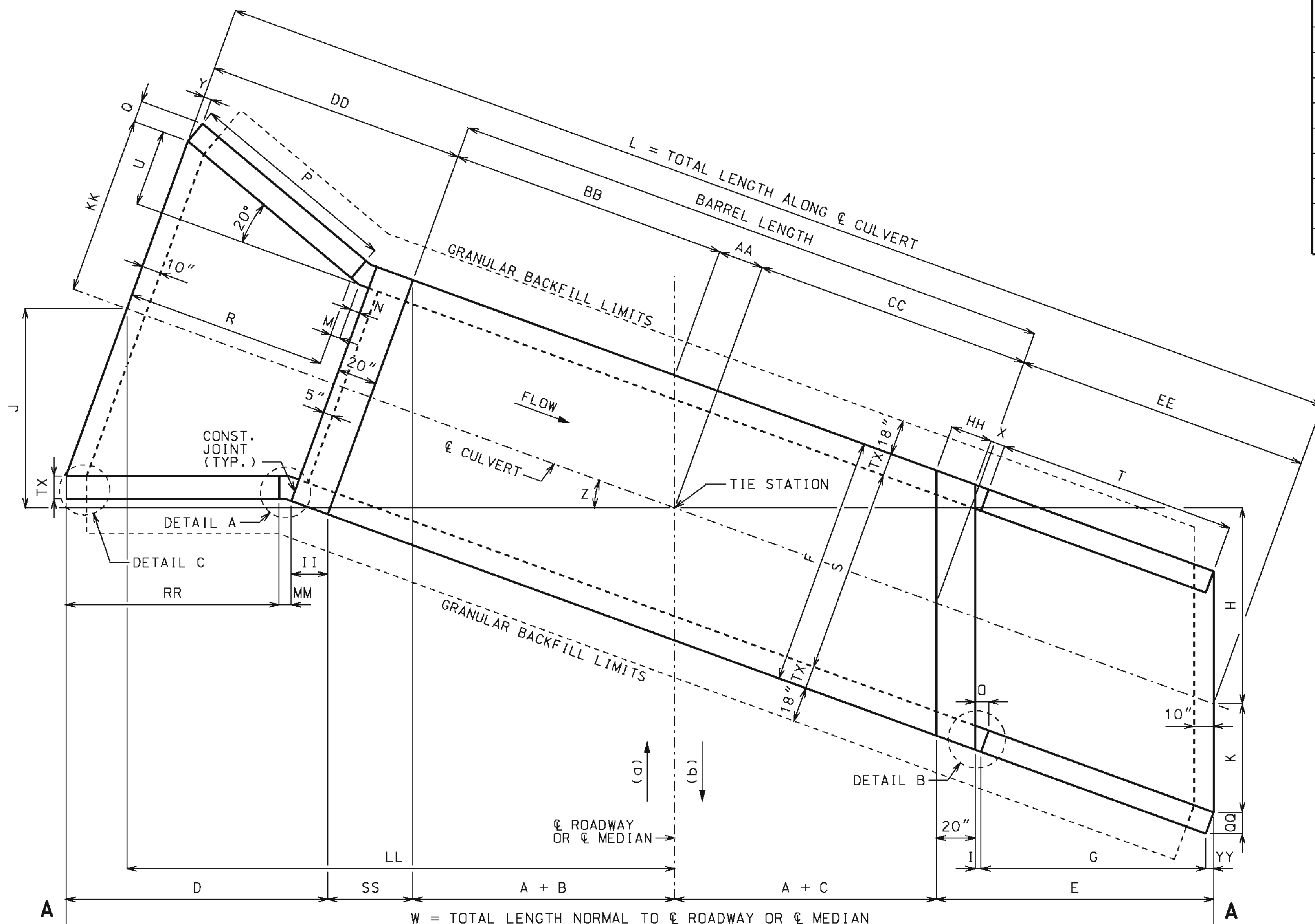
IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING α, β, B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\mathrm{ARCTAN}\left(\frac{\mathrm{ELEV.\ 1 - ELEV.\ 2}}{\mathrm{LL+A+C+E}}\right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\mathrm{ARCTAN}\left(\frac{\mathrm{VER.}}{\mathrm{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + \mathrm{A(CS)} - \mathrm{A(TAN}\alpha)}{\mathrm{TAN}\beta + \mathrm{TAN}\alpha}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + \mathrm{A(CS)} + \mathrm{A(TAN}\alpha)}{\mathrm{TAN}\beta - \mathrm{TAN}\alpha}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ℄ ROADWAY OR ℄ MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ℄ ROADWAY OR ℄ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ℄ ROADWAY OR ℄ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ℄ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ℄ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION	VARIABLE	DIMENSION
α	SEE EQUATIONS	N	3" + TX(TAN 10°)	CC	(A + C)(SEC Z)
β	SEE EQUATIONS	O	I + YY	DD	R + M + N + 20"
B	SEE EQUATIONS	P	2V[SEC(Z + 20°)]	EE	E(SEC Z)
C	SEE EQUATIONS	Q	TX(COS 20°)	HH	20"(SEC Z)
D	Z ≥ 20°: II + MM + RR	R	P(COS 20°)	II	20"(COS Z)
	Z < 20°: II + MM + RR + TT	T	G(SEC Z)	KK	S/2 + U
E	G + O + 20"	U	(R + M)(TAN 20°)	LL	(AA + BB + DD)(COS Z)
F	S + 2TX	V	HT + TS − 12"	MM	3"[COS Z + COS(Z − 20°)]
G	2V	W	2A + B + C + D + E + SS	QQ	TX(COS Z)
H	(A + C + E)(TAN Z)	X	3" + TX(TAN Z)	RR	P[COS (Z − 20°)]
I	3"(COS Z)	Y	TX(SIN 20°)	SS	F(SIN Z)
J	(AA + BB + DD)(SIN Z)	Z	SKEW ANGLE	TT	TX[SIN(20° − Z)]
K	S(SEC Z)/2	AA	F(TAN Z)/2	YY	TX(SIN Z)
L	AA + BB + CC + DD + EE	BB	(A + B)(SEC Z)	TW	MAX{3'-4" OR (BS + 12")}
M	N(COS 20°)				

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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.)

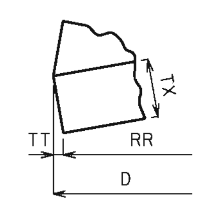
DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4,000 PSI
REINFORCING STEEL (GRADE 60) fy = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

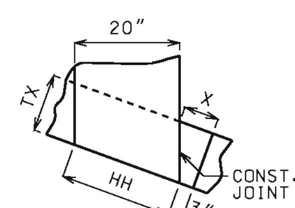
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

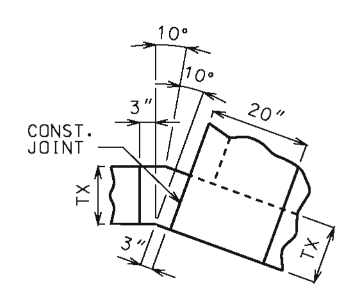


DETAIL C

For Z < 20°



DETAIL B



DETAIL A

MoDOT

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 SINGLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

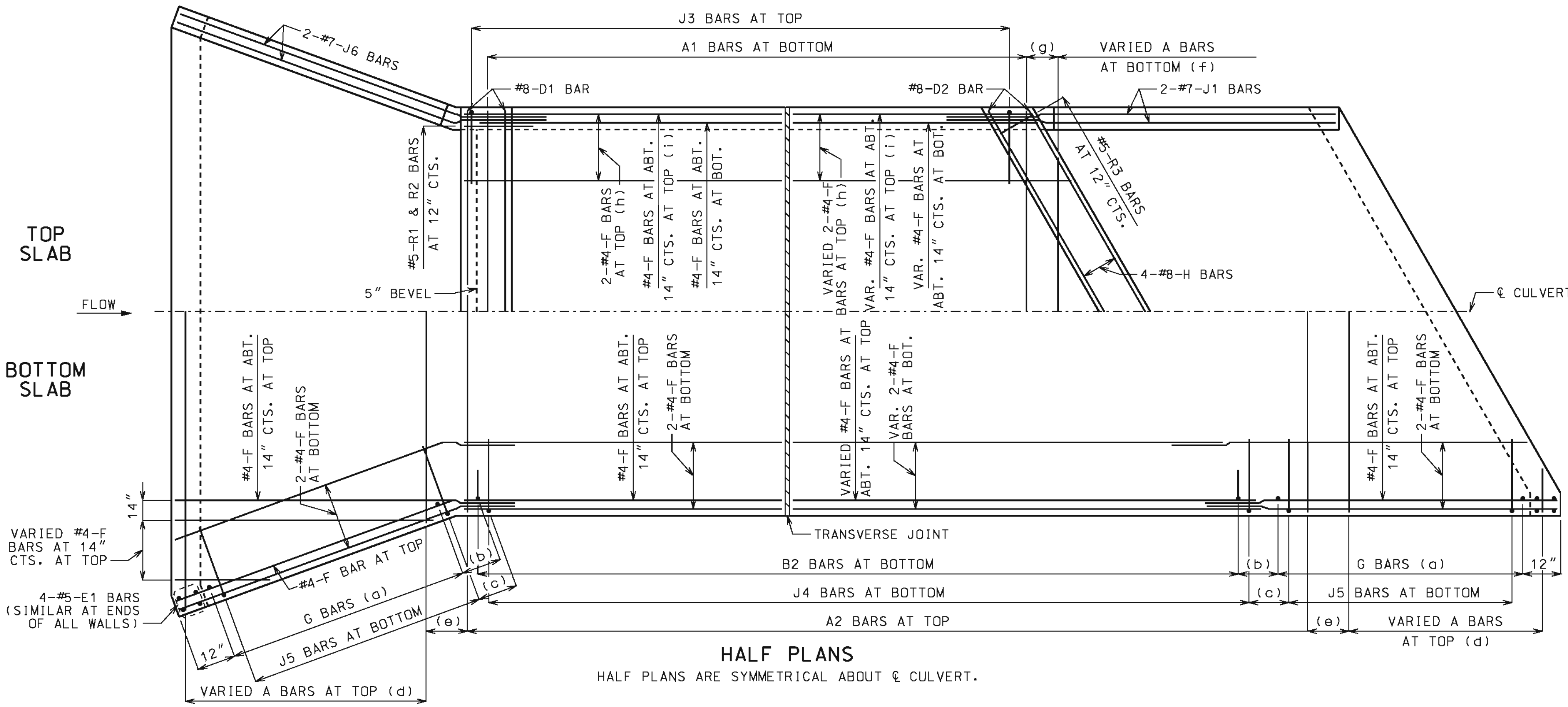
LAYOUT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

703.13J

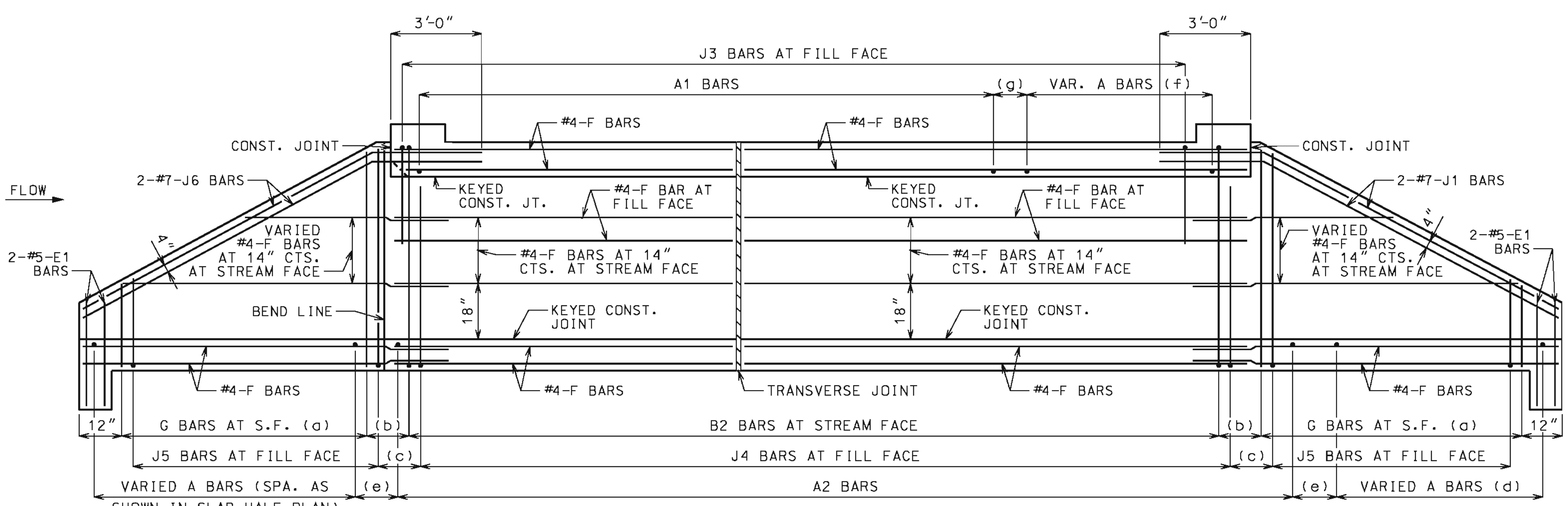
SHEET NO. 1 OF 3

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



HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT ℄ CULVERT.



DEVELOPED ELEVATION

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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PROFESSIONAL ENGINEER

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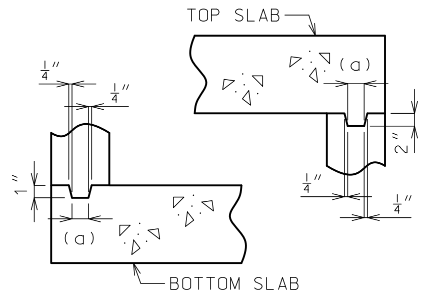
CONCRETE SINGLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

REINFORCEMENT

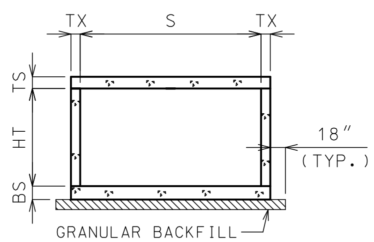
DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

703.13J

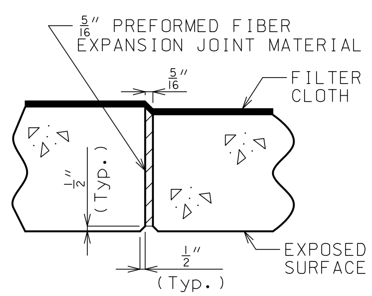


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



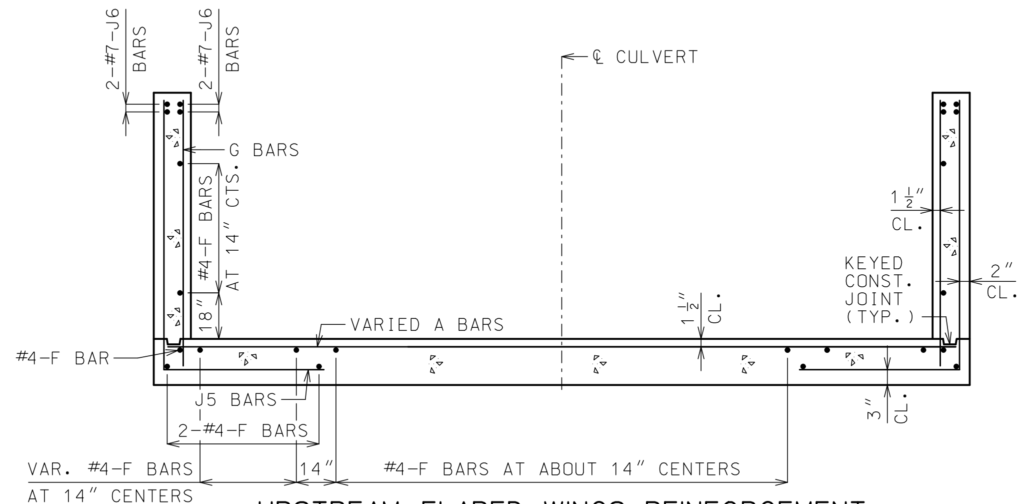
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



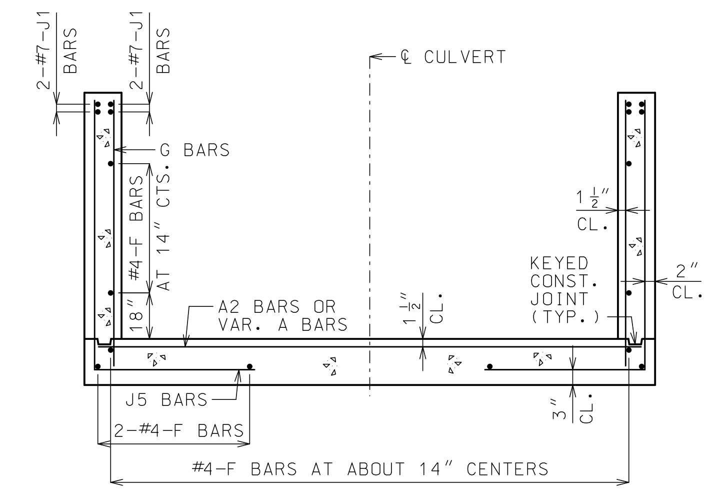
TRANSVERSE JOINT THRU BARREL

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.

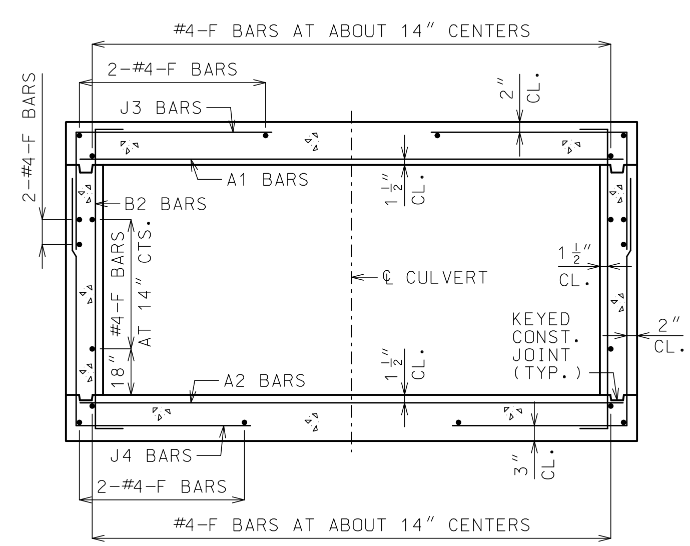
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED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



UPSTREAM FLARED WINGS REINFORCEMENT

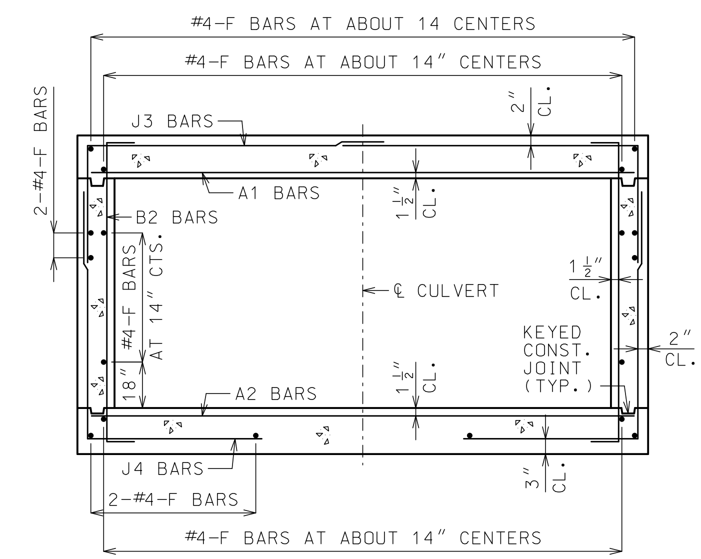


DOWNSTREAM WINGS REINFORCEMENT



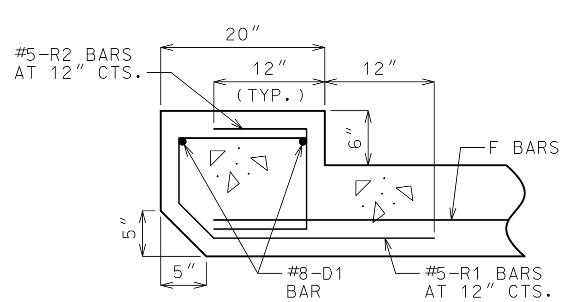
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"

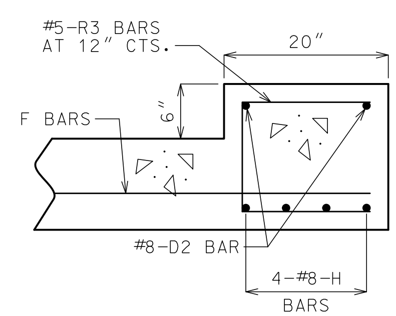


BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT



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.

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".

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

CONCRETE SINGLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

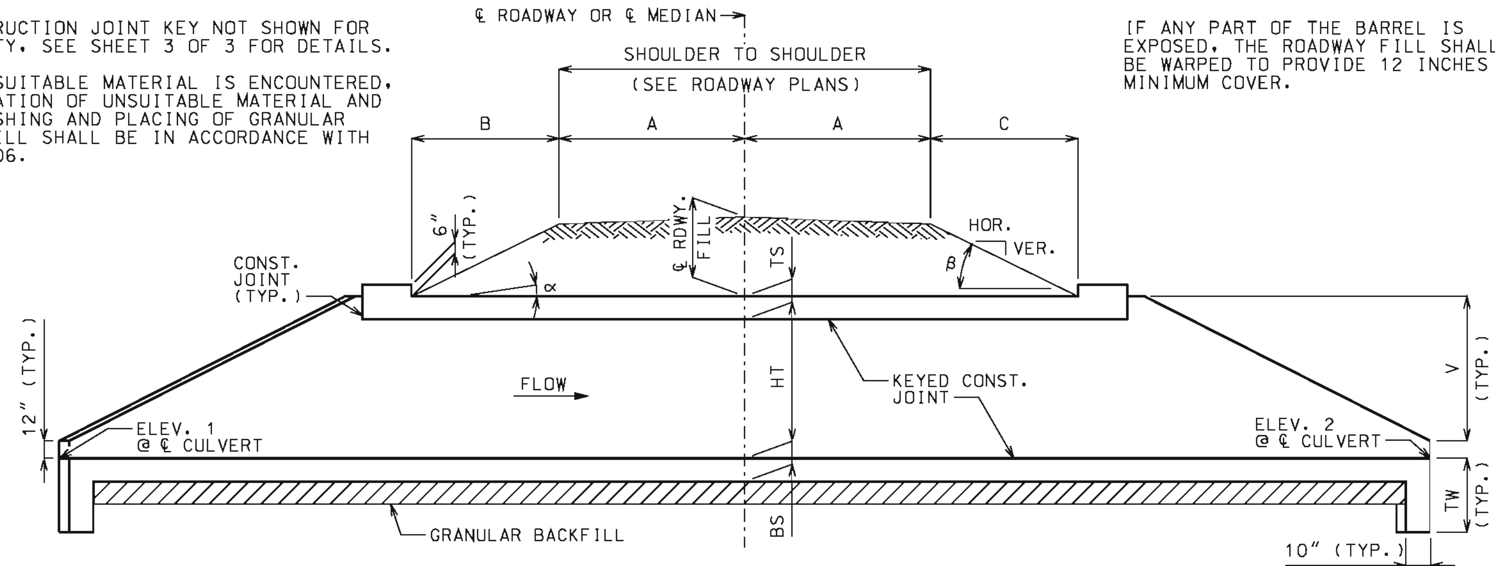
SECTIONS

DATE EFFECTIVE:	01/01/2021	703.13J	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.

EQUATIONS FOR COMPUTING ∝, β, B AND C

∝ = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\mathrm{ARCTAN}\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W}\right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\mathrm{ARCTAN}\left(\frac{\text{VER.}}{\text{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) - A(\tan\alpha)}{\tan\beta + \tan\alpha}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) + A(\tan\alpha)}{\tan\beta - \tan\alpha}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ℄ ROADWAY OR ℄ MEDIAN.

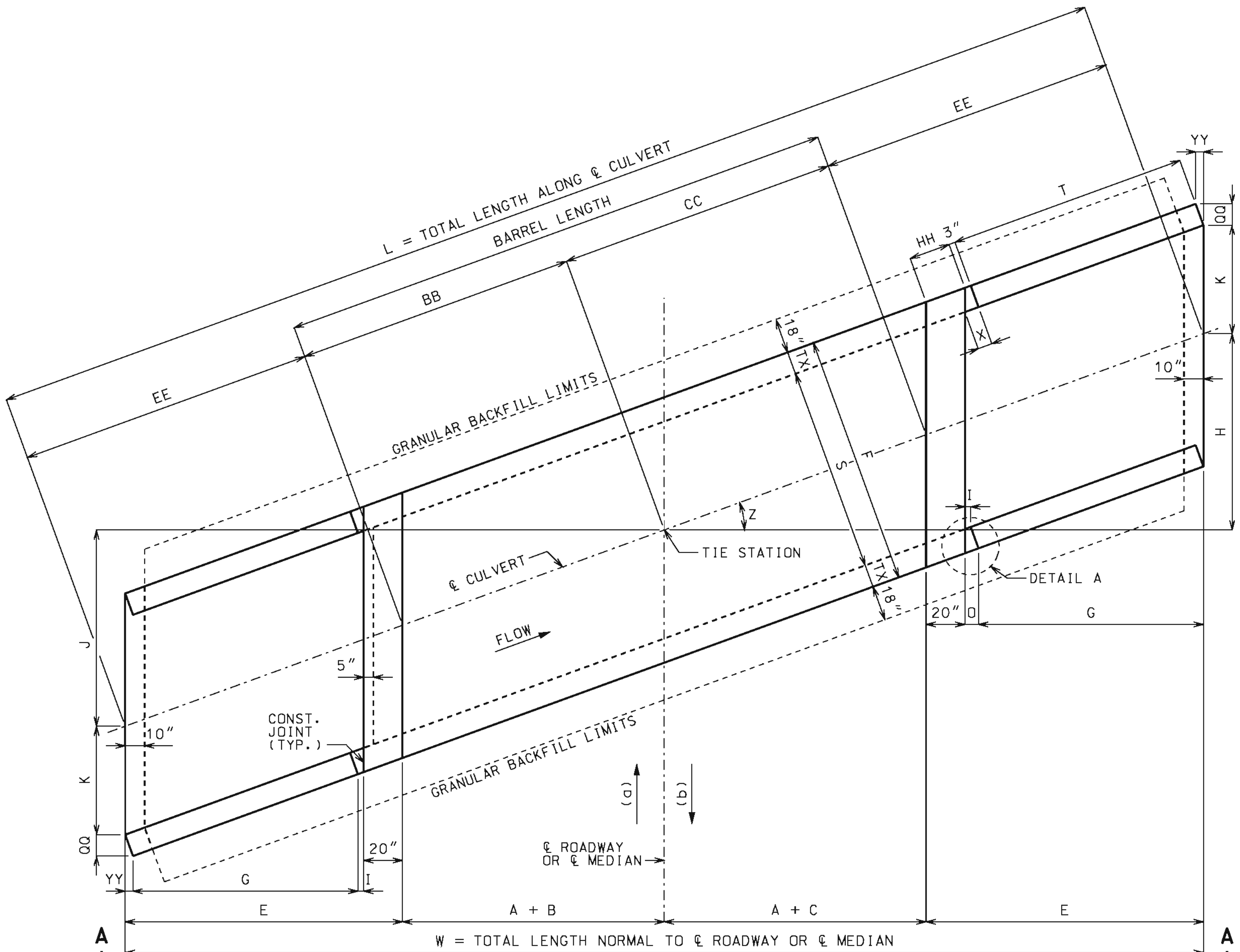
THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ℄ ROADWAY OR ℄ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ℄ ROADWAY OR ℄ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ℄ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ℄ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

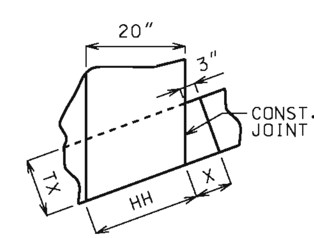
LAYOUT DIMENSIONS

VARIABLE	DIMENSION	VARIABLE	DIMENSION
∝	SEE EQUATIONS	T	G(SEC Z)
β	SEE EQUATIONS	V	HT + TS − 12"
B	SEE EQUATIONS	W	2A + B + C + 2E
C	SEE EQUATIONS	X	3" + TX(TAN Z)
E	G + O + 20"	Z	SKEW ANGLE
F	S + 2TX	BB	(A + B)(SEC Z)
G	2V	CC	(A + C)(SEC Z)
H	(A + C + E)(TAN Z)	EE	E(SEC Z)
I	3"(COS Z)	HH	20"(SEC Z)
J	(A + B + E)(TAN Z)	QQ	TX(COS Z)
K	S(SEC Z)/2	YY	TX(SIN Z)
L	2EE + BB + CC	TW	MAX{3'-4" OR (BS + 12")}
O	I + YY		



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.



DETAIL A

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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) fy = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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JEFFERSON CITY, MO 65102
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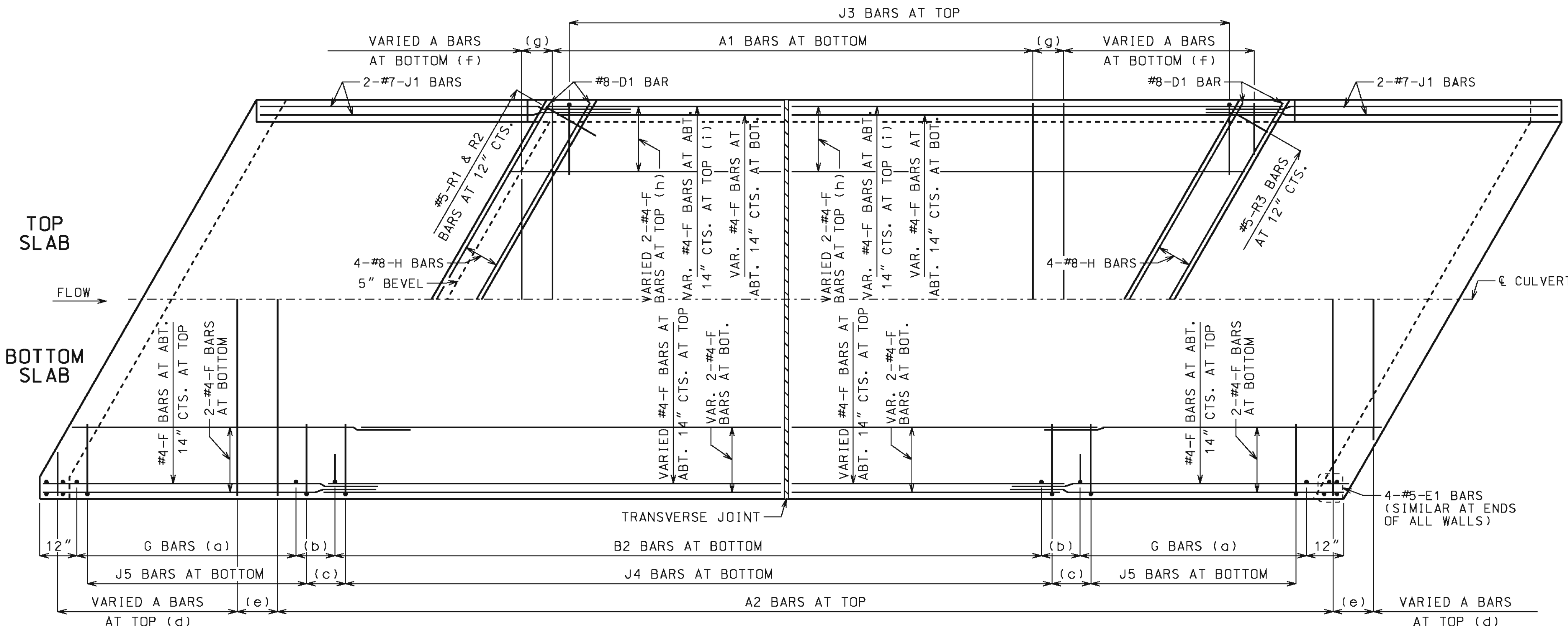
STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

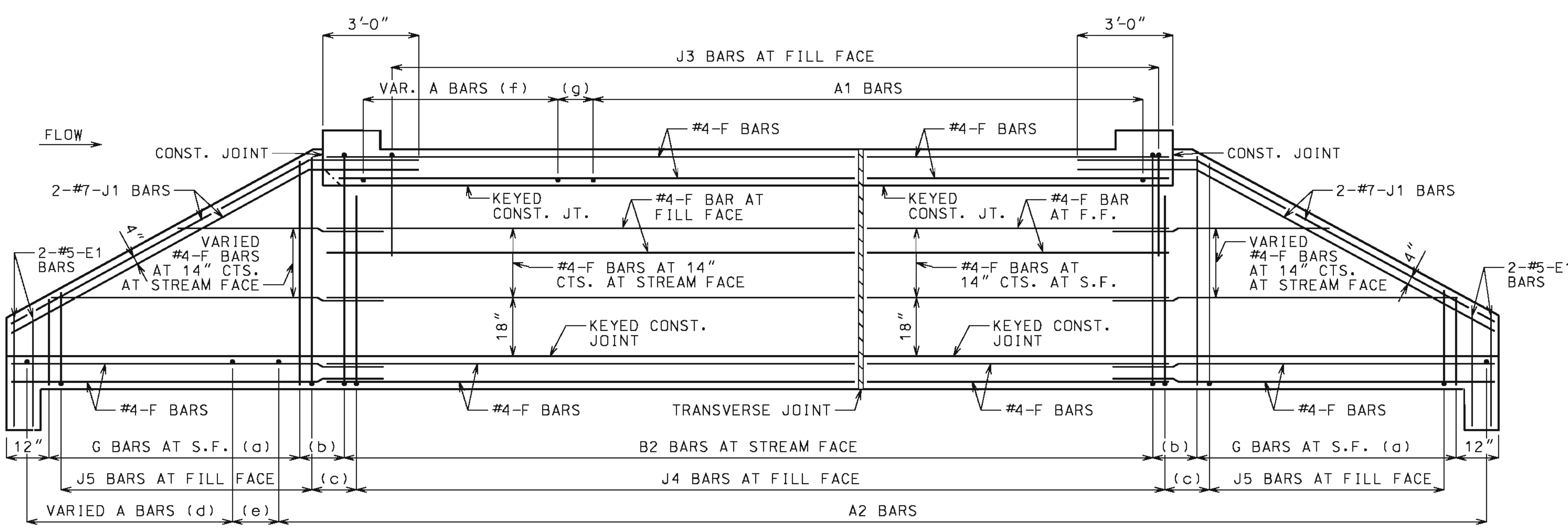
LAYOUT

DATE EFFECTIVE: 07/01/2015		703.14J	SHEET NO. 1 OF 3
DATE PREPARED: 5/13/2015			



HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT ℄ CULVERT.



ELEVATION

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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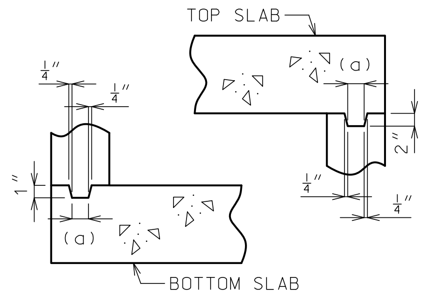
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

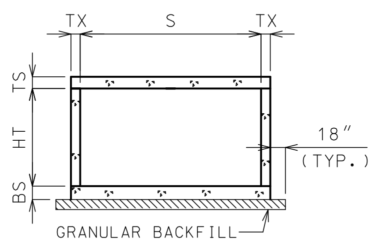
REINFORCEMENT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015
703.14J

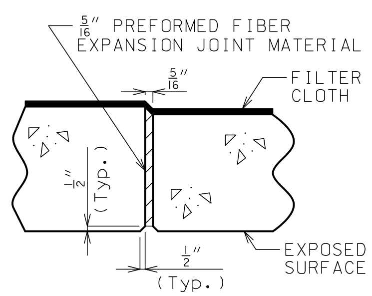


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



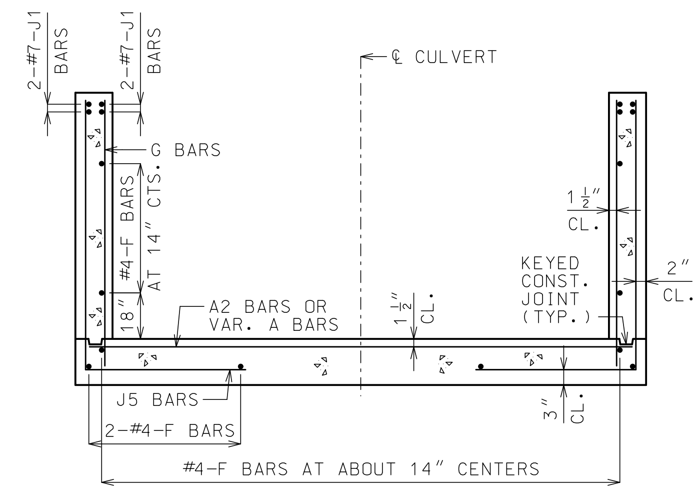
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



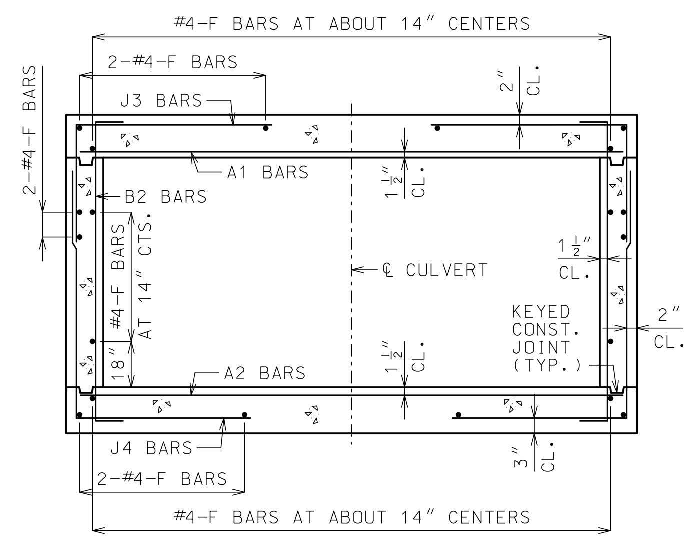
TRANSVERSE JOINT THRU BARREL

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.

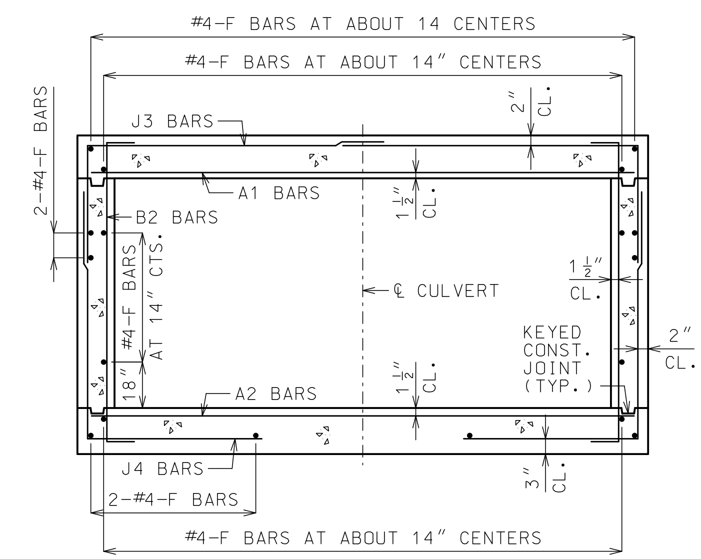


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



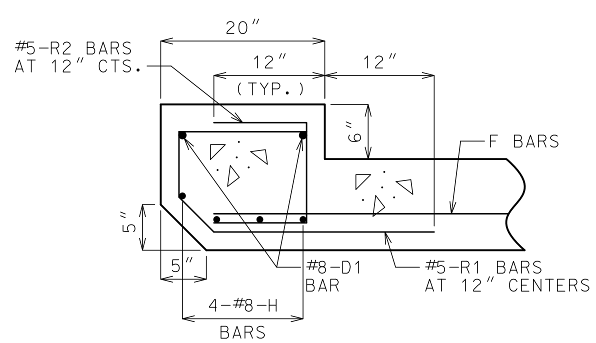
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"

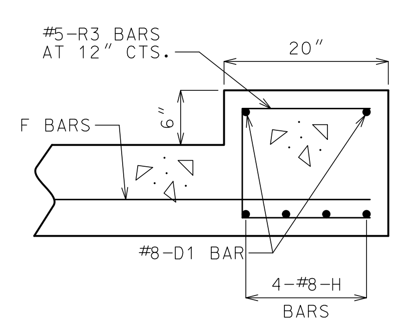


BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT



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.

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".

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

SECTIONS

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

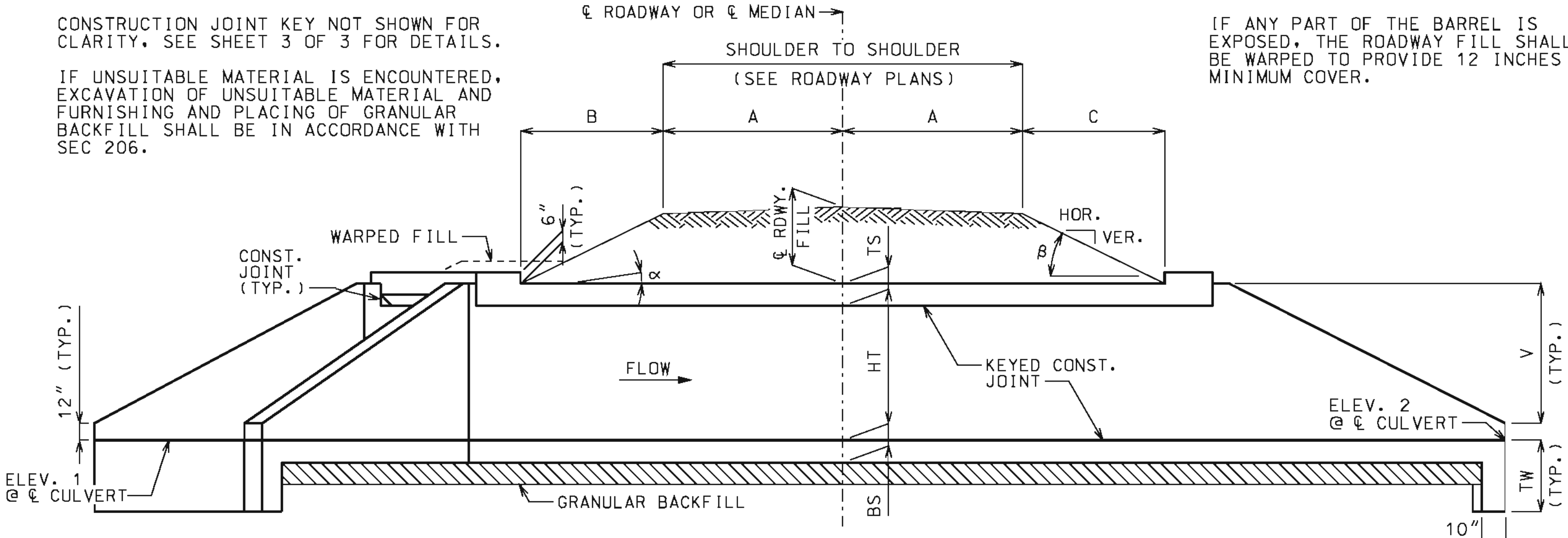
703.14J

SHEET NO. 3 OF 3

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

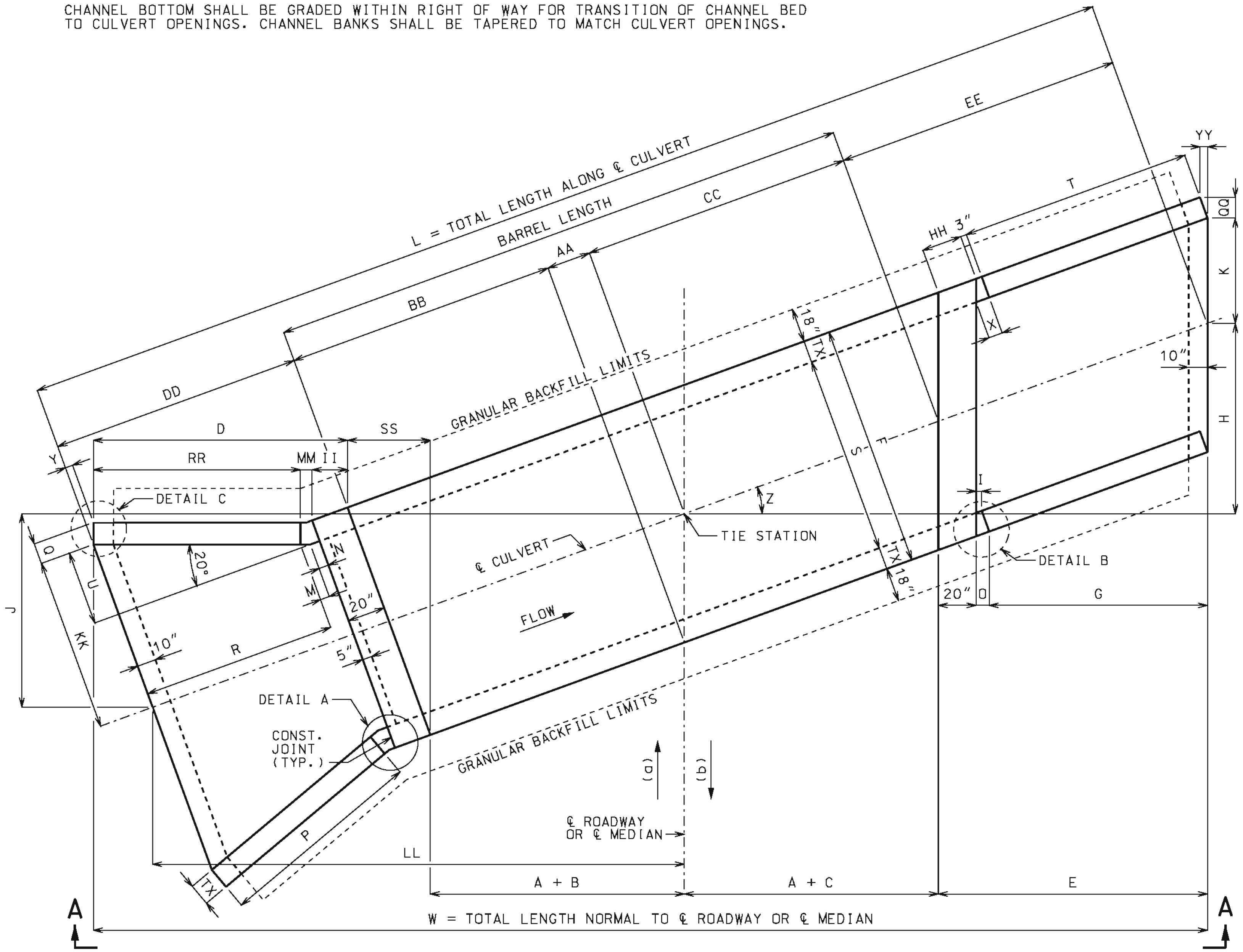
IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING α, β, B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\text{ARCTAN}\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{A + C + E + LL}\right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\text{ARCTAN}\left(\frac{\text{VER.}}{\text{HOR.}}\right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO UPSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) - A(\tan\alpha)}{\tan\beta + \tan\alpha}$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO DOWNSTREAM HEADWALL NORMAL TO ℄ ROADWAY OR ℄ MEDIAN = $\frac{\text{℄ RDWY. FILL} + A(CS) + A(\tan\alpha)}{\tan\beta - \tan\alpha}$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ℄ ROADWAY OR ℄ MEDIAN.

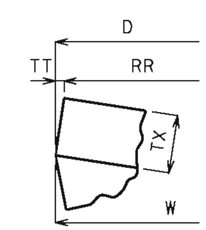
THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ℄ ROADWAY OR ℄ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ℄ ROADWAY OR ℄ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ℄ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

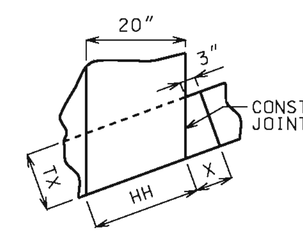
SEE ROADWAY PLANS FOR SLOPES, ℄ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

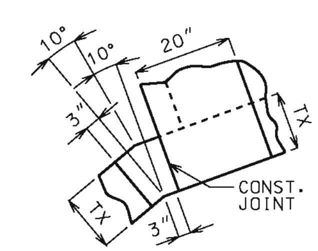
VARIABLE	DIMENSION	VARIABLE	DIMENSION	VARIABLE	DIMENSION
α	SEE EQUATIONS	N	3" + TX(TAN 10°)	CC	(A + C)(SEC Z)
β	SEE EQUATIONS	O	I + YY	DD	R + M + N + 20"
B	SEE EQUATIONS	P	2V[SEC(Z + 20°)]	EE	E(SEC Z)
C	SEE EQUATIONS	Q	TX(COS 20°)	HH	20"(SEC Z)
D	Z ≥ 20°: II + MM + RR	R	P(COS 20°)	II	20"(COS Z)
	Z < 20°: II + MM + RR + TT	T	G(SEC Z)	KK	S/2 + U
E	G + O + 20"	U	(R + M)(TAN 20°)	LL	(AA + BB + DD)(COS Z)
F	S + 2TX	V	HT + TS − 12"	MM	3"[COS Z + COS(Z − 20°)]
G	2V	W	2A + B + C + D + E + SS	QQ	TX(COS Z)
H	(A + C + E)(TAN Z)	X	3" + TX(TAN Z)	RR	P[COS (Z − 20°)]
I	3"(COS Z)	Y	TX(SIN 20°)	SS	F(SIN Z)
J	(AA + BB + DD)(SIN Z)	Z	SKEW ANGLE	TT	TX[SIN(20° − Z)]
K	S(SEC Z)/2	AA	F(TAN Z)/2	YY	TX(SIN Z)
L	AA + BB + CC + DD + EE	BB	(A + B)(SEC Z)	TW	MAX{3'-4" OR (BS + 12")}
M	N(COS 20°)				



DETAIL C
For Z < 20°



DETAIL B



DETAIL A

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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) fy = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

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

CONCRETE SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

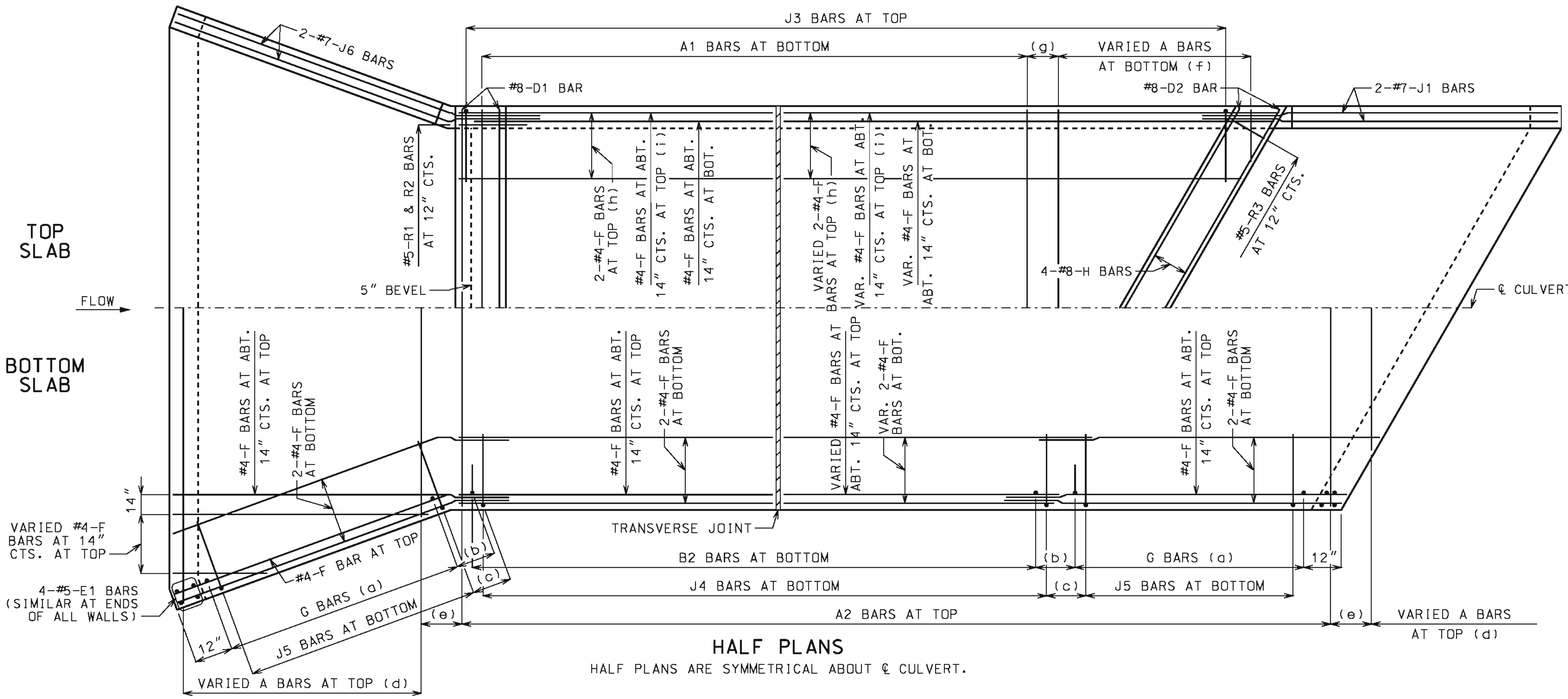
LAYOUT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 6/4/2015

703.15E

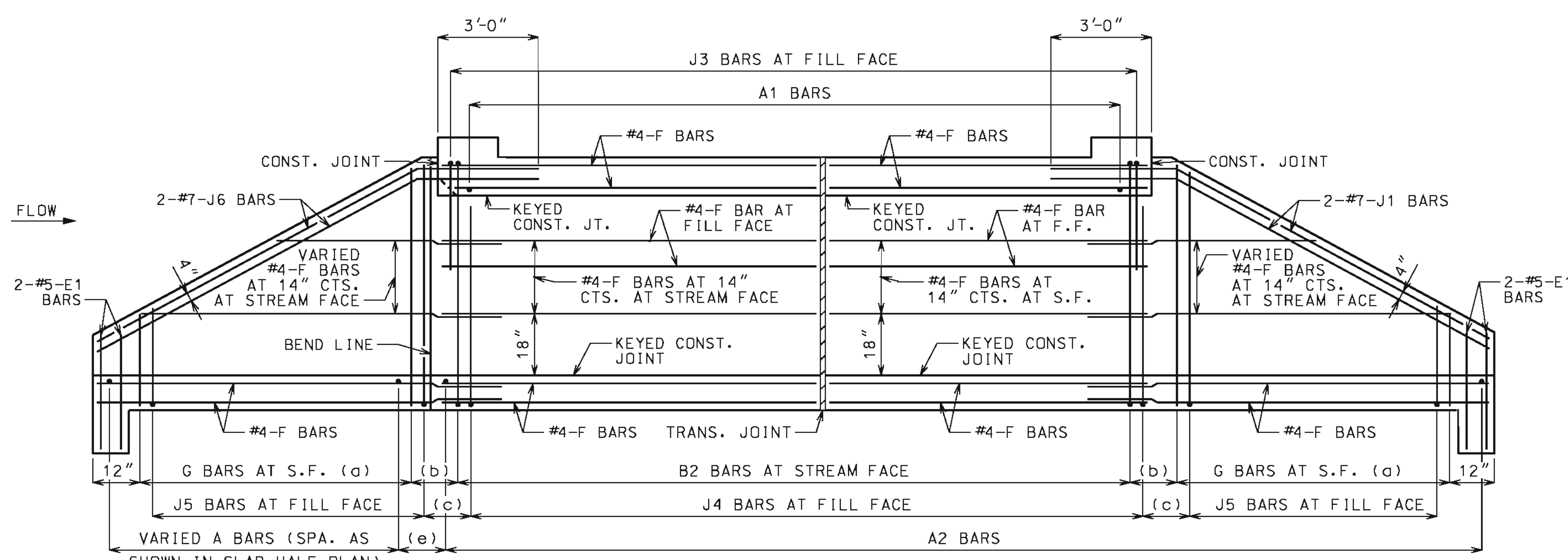
SHEET NO. 1 OF 3

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



HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT ℄ CULVERT.



DEVELOPED ELEVATION

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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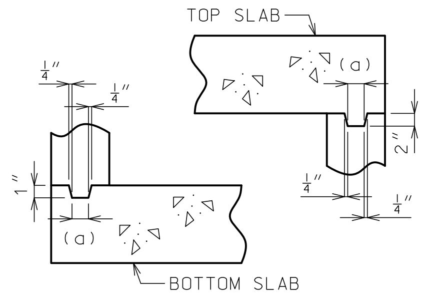
CONCRETE SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

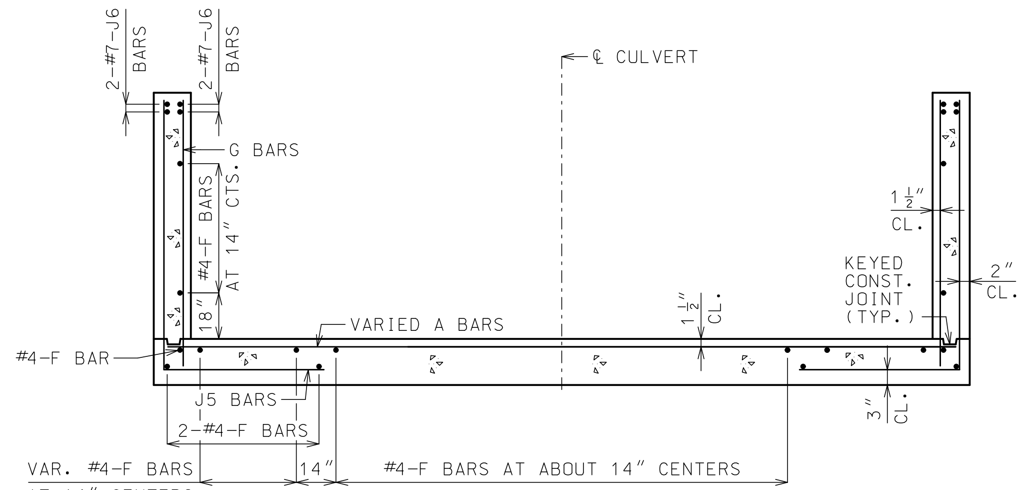
REINFORCEMENT

DATE EFFECTIVE:	07/01/2015	703.15E	SHEET NO. 2 OF 3
DATE PREPARED:	5/13/2015		

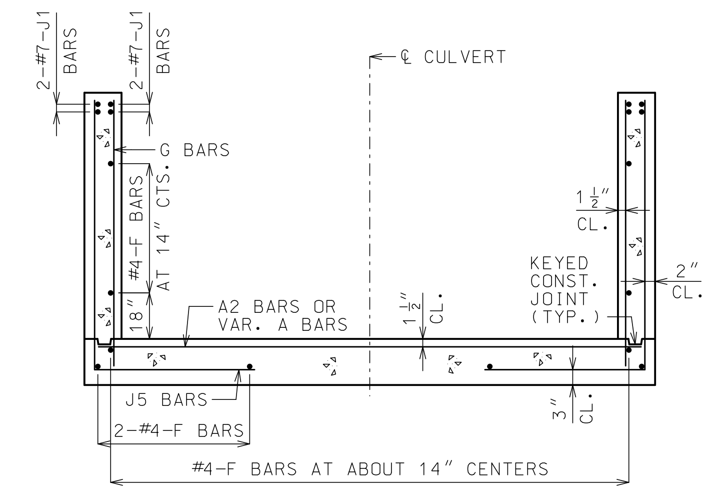


KEYED CONSTRUCTION JOINT

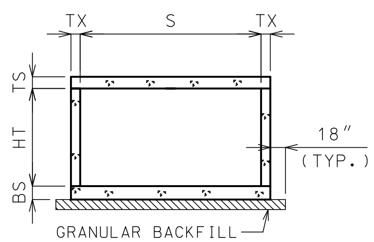
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



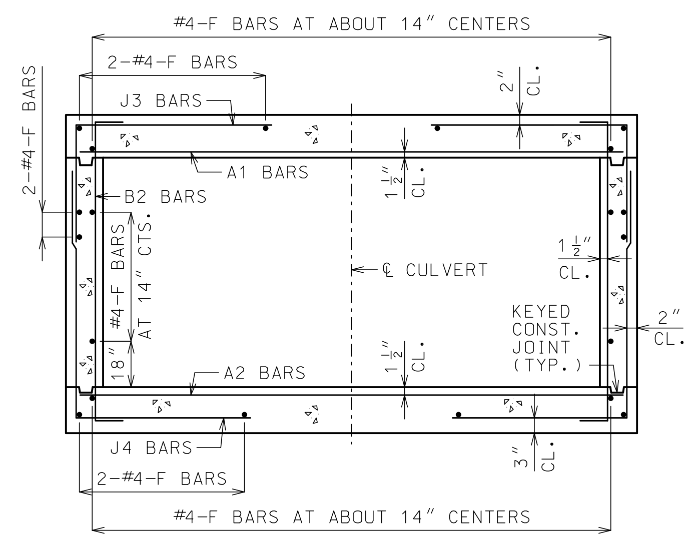
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT

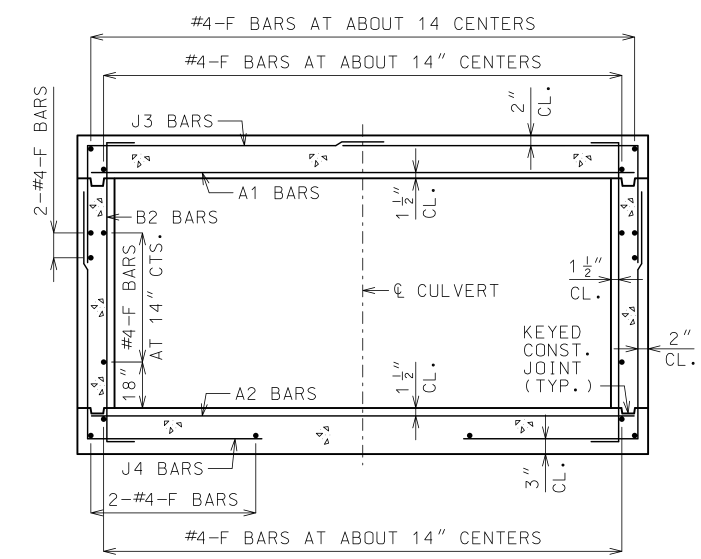


GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



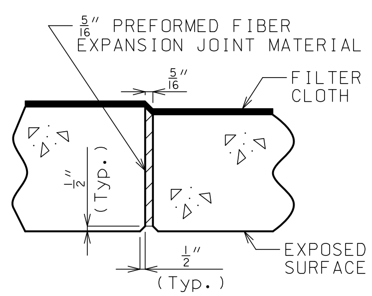
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT

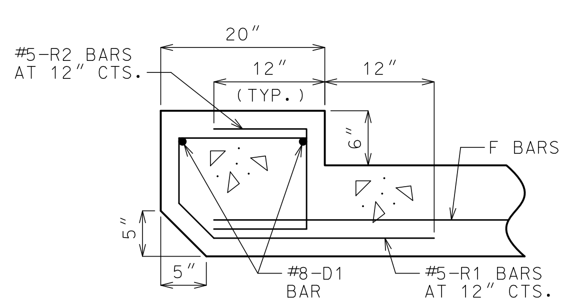
FOR DESIGN FILLS 2'-0" OR LESS



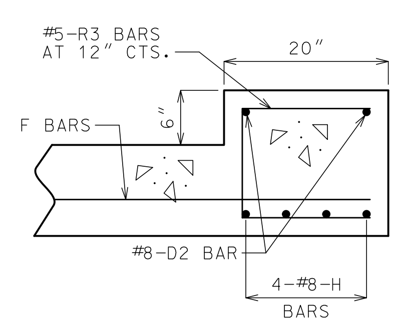
TRANSVERSE JOINT THRU BARREL

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

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 $1\frac{1}{2}$".

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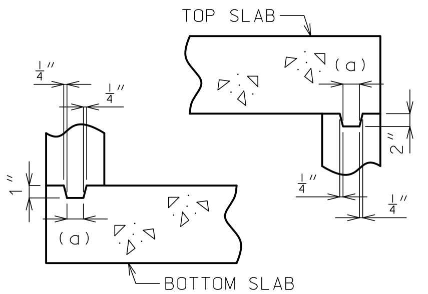
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

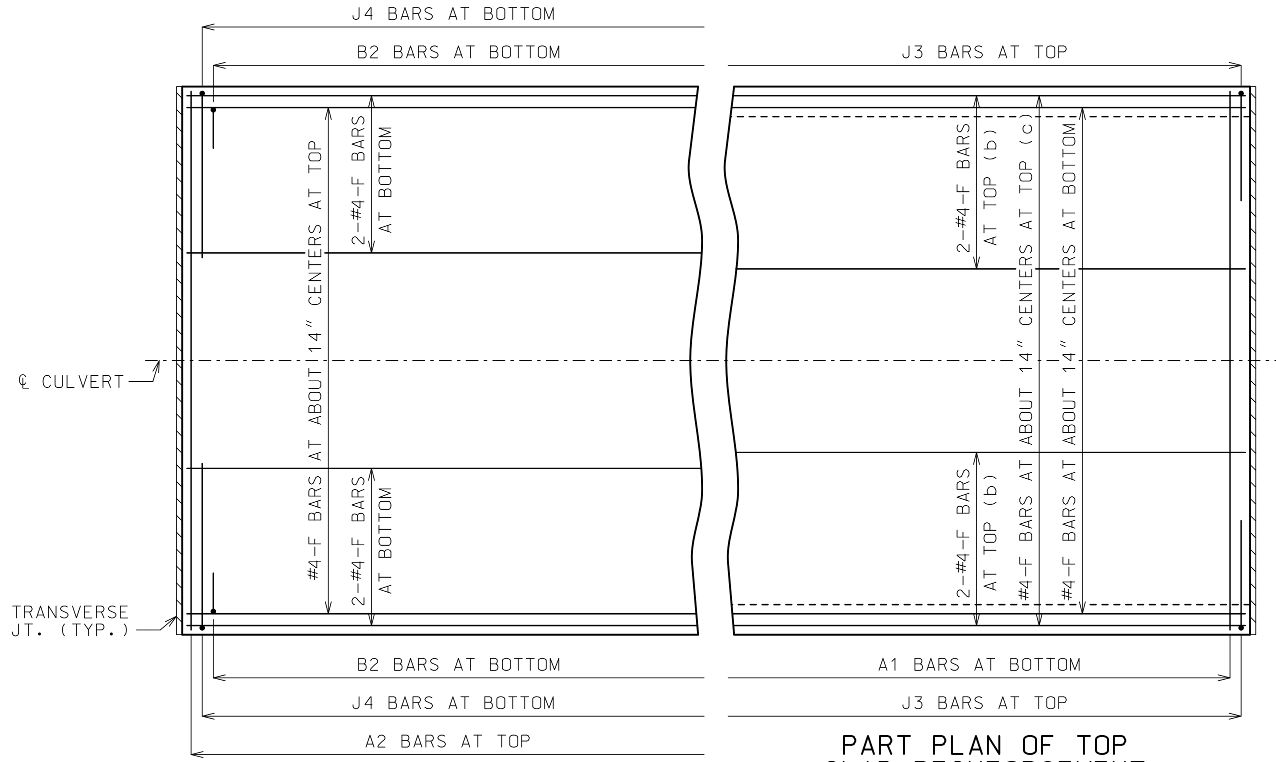
SECTIONS

DATE EFFECTIVE:	01/01/2021	703.15E	SHEET NO.
DATE PREPARED:	10/14/2020		3 OF 3



KEYED CONSTRUCTION JOINT

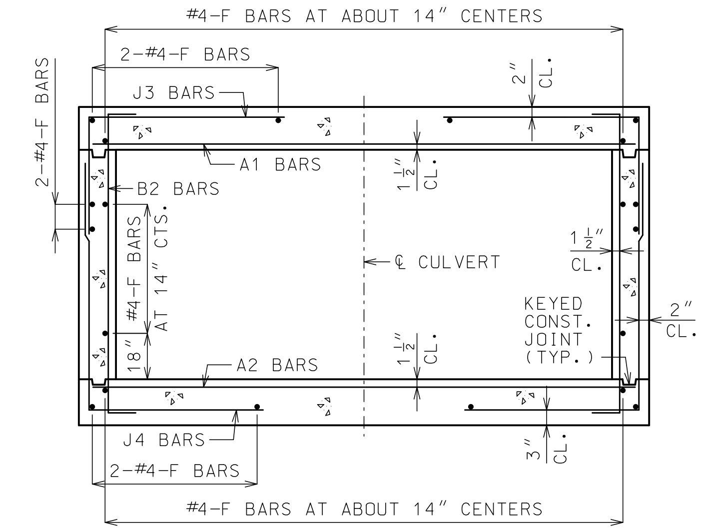
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



PART PLAN OF BOTTOM SLAB REINFORCEMENT

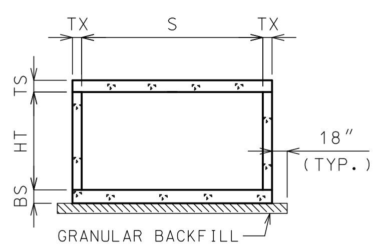
PART PLAN OF TOP SLAB REINFORCEMENT

(b) FOR DESIGN FILLS OVER 2′-0″
(c) FOR DESIGN FILLS 2′-0″ OR LESS

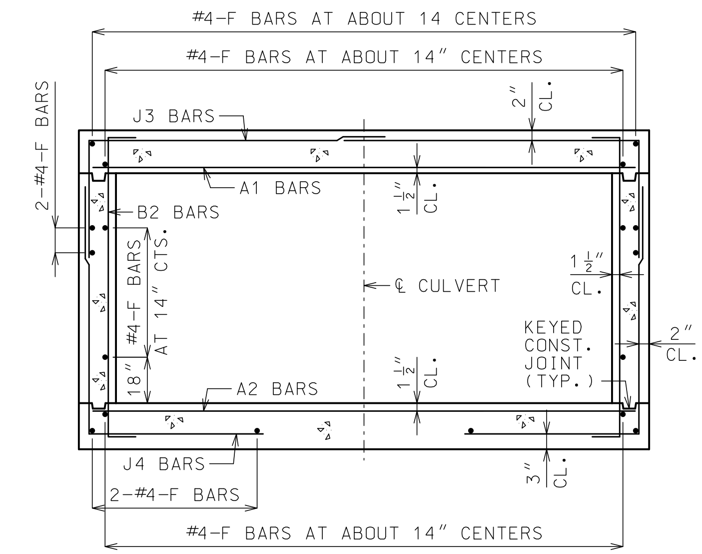


BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2′-0″
SYMMETRICAL ABOUT AND NORMAL TO ℄ CULVERT.

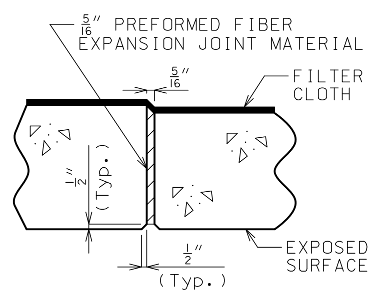


GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



BARREL REINFORCEMENT

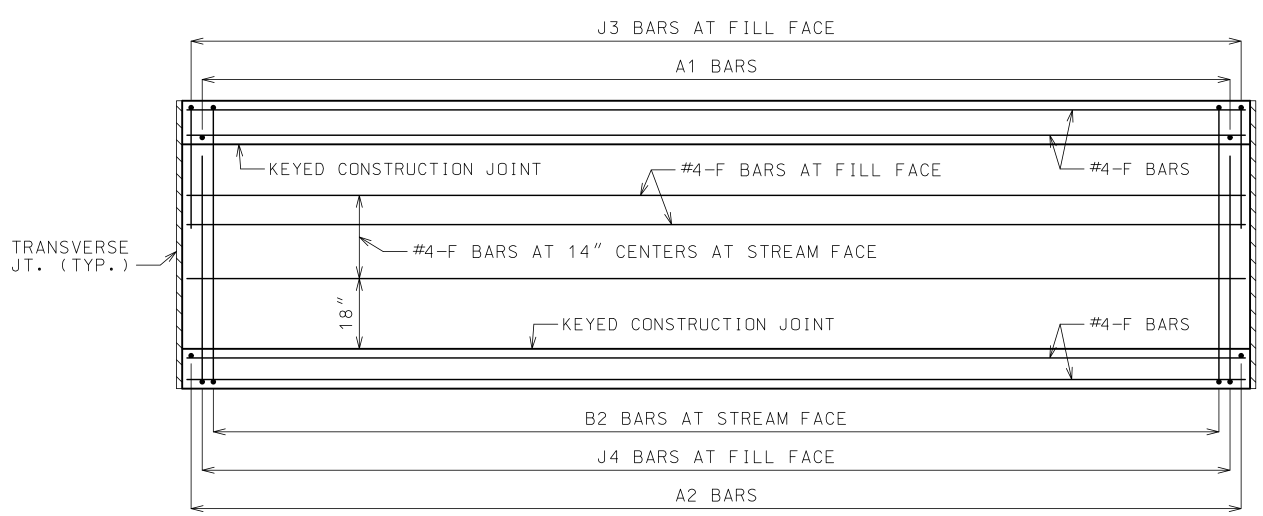
FOR DESIGN FILLS 2′-0″ OR LESS
SYMMETRICAL ABOUT AND NORMAL TO ℄ CULVERT.



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.



ELEVATION OF WALL REINFORCEMENT

GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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) fy = 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 1½″.

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STATE OF MISSOURI
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NUMBER PE-27141
PROFESSIONAL ENGINEER
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CONCRETE SINGLE BOX CULVERT

CUT SECTION

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

703.16

SHEET NO. 1 OF 1

SPAN (S) = 3 FT									HEIGHT (HT) = 2 FT OR 3 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=2′	K2 HT=3′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=2′	K3 HT=3′	SIZE	SPA.	G1
1 FT	9	8	8	4	7	4	12	32.5	25.3	33.6	4	11.5	4	12	32.5	28	40	5	12	12
2 FT	9	8	8	4	7	4	12	32.5	25.3	33.6	4	11.5	4	12	30.8	28	40	5	12	12
4 FT	8	8	8	4	12	4	12	26.4	24.1	32.4	4	12	4	12	26.0	28	40	5	12	0
6 FT	8	8	8	4	12	4	12	24.6	24.1	32.4	4	12	4	12	24.6	28	40	5	12	0
8 FT	8	8	8	4	12	4	12	23.8	24.1	32.4	4	12	4	12	23.8	28	40	5	12	0
10 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
12 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
14 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
16 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
18 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
20 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	11	4	12	22.0	28	40	5	12	0
22 FT	8	8	8	4	11.5	4	12	22.0	24.1	32.4	4	10	4	12	22.0	28	40	5	12	0
24 FT	8	8	8	4	10.5	4	12	22.0	24.1	32.4	4	9	4	12	22.0	28	40	5	12	0
26 FT	8	8	8	4	9.5	4	12	22.0	24.1	32.4	4	8.5	4	11.5	22.0	28	40	5	12	0
28 FT	8	8	8	4	9	4	11.5	22.0	24.1	32.4	4	8	4	10.5	22.0	28	40	5	12	0
30 FT	8	8	8	4	8.5	4	11	22.0	24.1	32.4	4	7.5	4	10	22.0	28	40	5	12	0
32 FT	8	8	8	4	8	4	10	22.0	24.1	32.4	4	7	4	9.5	22.0	28	40	5	12	0
34 FT	8	8	8	4	7.5	4	9.5	22.0	24.1	32.4	4	6.5	4	8.5	22.0	28	40	5	12	0
36 FT	8	8	8	4	7	4	9	22.0	24.1	32.4	4	6	4	8	22.0	28	40	5	12	0
38 FT	8	8	8	4	6.5	4	8.5	22.0	24.1	32.4	5	9	4	8	22.0	28	40	5	12	0
40 FT	8	9	8	4	6.5	4	8	22.0	24.1	32.1	4	6	4	11	21.5	29	41	5	12	0
42 FT	8	9	8	4	6	4	8	22.0	24.1	32.1	5	9	4	10	21.5	29	41	5	12	0
44 FT	8	9	8	4	6	4	7.5	22.0	24.1	32.1	5	8.5	4	10	21.5	29	41	5	12	0
46 FT	8	9	8	4	6	4	7	22.0	24.1	32.1	5	8	4	9.5	21.5	29	41	5	12	0
48 FT	8	10	8	4	6	4	7	22.0	24.0	31.9	5	8.5	4	12	21.5	30	42	5	12	0
50 FT	8	10	8	4	6	4	6.5	22.0	24.0	31.9	5	8	4	12	21.5	30	42	5	12	0

SPAN (S) = 3 FT									HEIGHT (HT) = 4 FT OR 5 FT										
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=4′	K2 HT=5′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=4′	K3 HT=5′	SIZE	SPA.	G1
1 FT	9	8	8	4	6.5	4	12	32.5	25.3	30.3	4	10.5	4	12	32.5	52	64	5	12	12
2 FT	9	8	8	4	6.5	4	12	32.5	25.3	30.3	4	10	4	12	32.5	52	64	5	12	12
4 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
6 FT	8	8	8	4	12	4	12	36.1	24.3	29.1	4	12	4	12	33.5	52	64	5	12	0
8 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
10 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
12 FT	8	8	8	4	12	4	12	35.6	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
14 FT	8	8	8	4	12	4	12	34.4	24.3	29.1	4	12	4	11.5	36.1	52	64	5	12	0
16 FT	8	8	8	4	12	4	12	33.5	24.3	29.1	4	12	4	11	35.3	52	64	5	12	0
18 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	10.5	34.8	52	64	5	12	0
20 FT	8	8	8	4	12	4	12	31.6	24.3	29.1	4	10.5	4	10	34.4	52	64	5	12	0
22 FT	8	8	8	4	11.5	4	11	31.6	24.3	29.1	4	9.5	4	9.5	33.9	52	64	5	12	0
24 FT	8	8	8	4	10.5	4	10	31.6	24.3	29.1	4	9	4	9	33.9	52	64	5	12	0
26 FT	8	8	8	4	9.5	4	9.5	31.3	24.3	29.1	4	8.5	4	8	33.5	52	64	5	12	0
28 FT	8	8	8	4	9	4	8.5	31.3	24.3	29.1	4	7.5	4	7.5	33.0	52	64	5	12	0
30 FT	8	8	8	4	8.5	4	8	31.3	24.3	29.1	4	7	4	7	33.0	52	64	5	12	0
32 FT	8	8	8	4	8	4	7.5	30.8	24.3	29.1	4	7	4	6.5	33.0	52	64	5	12	0
34 FT	8	8	8	4	7.5	4	7	30.8	24.3	29.1	4	6.5	4	6.5	32.5	52	64	5	12	0
36 FT	8	8	8	4	7	4	7	30.8	24.3	29.1	4	6	4	6	32.5	52	64	5	12	0
38 FT	8	8	8	4	6.5	4	6.5	30.8	24.3	29.1	5	9	5	7	32.5	52	64	5	12	0
40 FT	8	9	8	4	6.5	4	6	30.8	24.0	28.8	4	6	4	6.5	32.5	53	65	5	12	0
42 FT	8	9	8	4	6	4	6	30.8	24.0	28.8	5	9	4	6	32.5	53	65	5	11.5	0
44 FT	8	9	8	4	6	5	6.5	30.8	24.0	28.8	5	8.5	4	6	32.5	53	65	5	11	0
46 FT	8	9	8	4	6	5	6.5	30.4	24.0	28.8	5	8	5	6.5	34.8	53	65	5	10.5	0
48 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	5	8	5	6.5	34.8	53	65	5	10	0
50 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	5	7.5	5	6	34.8	53	65	5	9.5	0

GENERAL NOTES:

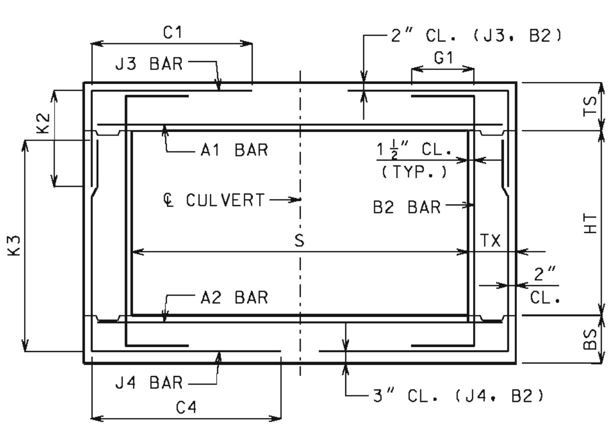
IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

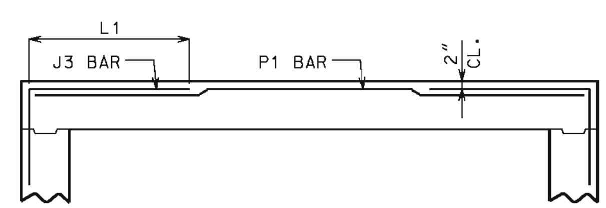
DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



BAR DIMENSIONS DIAGRAM

SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2′-0″. DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18″, 22″ AND 28″ FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

MoDOT

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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 3 FEET HEIGHT (HT): 2 THRU 5 FEET

DATE EFFECTIVE: 04/01/2011

DATE PREPARED: 4/18/2011

703.17

SHEET NO. 1 OF 14

SPAN (S) = 4 FT   HEIGHT (HT) = 2 FT OR 3 FT

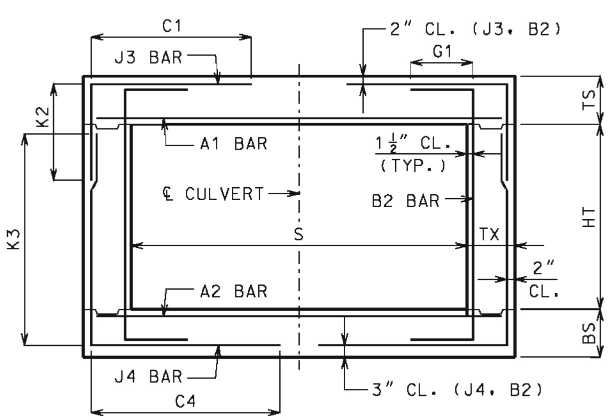
DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=2'	K2 HT=3'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=2'	K3 HT=3'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	4	6	4	10.5	38.6	26.3	34.8	4	7	4	7	30.3	28	40	5	12	12
2 FT	10	8	8	4	6	4	10.5	38.6	26.3	34.8	4	7	4	7	28.0	28	40	5	12	12
4 FT	8	8	8	4	12	4	12	25.3	24.1	32.4	4	11	4	12	25.3	28	40	5	12	0
6 FT	8	8	8	4	12	4	12	24.6	24.1	32.4	4	12	4	12	24.6	28	40	5	12	0
8 FT	8	8	8	4	12	4	12	24.1	24.1	32.4	4	12	4	12	24.1	28	40	5	12	0
10 FT	8	8	8	4	12	4	12	23.0	24.1	32.4	4	12	4	12	23.0	28	40	5	12	0
12 FT	8	8	8	4	12	4	12	23.0	24.1	32.4	4	11	4	12	23.0	28	40	5	12	0
14 FT	8	8	8	4	11	4	12	23.0	24.1	32.4	4	9.5	4	11.5	23.0	28	40	5	12	0
16 FT	8	8	8	4	10	4	11	23.0	24.1	32.4	4	8.5	4	10	23.0	28	40	5	12	0
18 FT	8	8	8	4	8.5	4	10	23.0	24.1	32.4	4	7.5	4	9	22.4	28	40	5	12	0
20 FT	8	8	8	4	8	4	9	23.0	24.1	32.4	4	6.5	4	8	22.4	28	40	5	12	0
22 FT	8	8	8	4	7	4	8	23.0	24.1	32.4	4	6	4	7.5	22.4	28	40	5	12	0
24 FT	8	8	8	4	6.5	4	7.5	23.0	24.1	32.4	5	8.5	4	6.5	22.4	28	40	5	12	0
26 FT	8	8	8	4	6	4	7	23.0	24.1	32.4	5	8	4	6	22.4	28	40	5	12	0
28 FT	8	9	8	4	6	4	6.5	23.0	24.1	32.1	5	8	4	8	21.9	29	41	5	12	0
30 FT	8	9	8	4	6	4	6	23.0	24.1	32.1	5	7.5	4	7.5	21.9	29	41	5	12	0
32 FT	8	10	8	4	6	5	6.5	23.0	24.0	31.9	5	7.5	4	10	21.3	30	42	5	12	0
34 FT	9	10	8	5	8.5	4	7	22.4	25.1	33.0	5	7.5	4	9.5	21.3	30	42	5	12	0
36 FT	9	10	8	5	8.5	4	7	22.4	25.1	33.0	5	7	4	9	21.3	30	42	5	12	0
38 FT	9	11	8	5	8.5	4	6.5	22.4	25.4	33.1	5	7	4	10	20.8	31	43	5	12	0
40 FT	9	11	8	5	8.5	4	6	22.4	25.4	33.1	5	6.5	4	9.5	20.8	31	43	5	12	0
42 FT	10	11	8	5	8	4	7	21.9	26.0	33.8	5	6.5	4	9	21.3	31	43	5	12	0
44 FT	10	11	8	5	8	4	6.5	21.9	26.0	33.8	5	6.5	4	8.5	21.3	31	43	5	12	0
46 FT	10	12	8	5	8	4	6.5	21.9	26.3	33.9	5	6	4	9.5	20.8	32	44	5	12	0
48 FT	10	12	8	5	8	4	6	21.9	26.3	33.9	5	6	4	9.5	20.8	32	44	5	12	0
50 FT	11	12	8	5	7.5	4	7	21.3	27.3	35.1	5	6	4	9.5	21.3	32	44	5	12	0

SPAN (S) = 4 FT   HEIGHT (HT) = 4 FT OR 5 FT

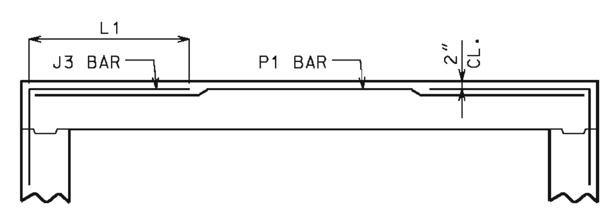
DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=4'	K2 HT=5'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=4'	K3 HT=5'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	5	9	4	10.5	38.6	26.3	31.4	4	6	4	8	38.6	52	64	5	12	12
2 FT	10	8	8	5	9	4	10.5	38.6	26.3	31.4	4	6	4	7.5	38.6	52	64	5	12	12
4 FT	8	8	8	4	11.5	4	12	38.6	24.3	29.1	4	9.5	4	11.5	38.6	52	64	5	12	0
6 FT	8	8	8	4	12	4	12	35.9	24.3	29.1	4	11	4	11.5	35.3	52	64	5	12	0
8 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	11	4	11	32.5	52	64	5	12	0
10 FT	8	8	8	4	12	4	12	28.0	24.3	29.1	4	11.5	4	11.5	28.0	52	64	5	12	0
12 FT	8	8	8	4	12	4	12	27.5	24.3	29.1	4	10	4	10.5	28.0	52	64	5	12	0
14 FT	8	8	8	4	10.5	4	12	27.5	24.3	29.1	4	9	4	10	27.5	52	64	5	12	0
16 FT	8	8	8	4	9.5	4	11	26.9	24.3	29.1	4	8	4	9.5	27.5	52	64	5	12	0
18 FT	8	8	8	4	8.5	4	9.5	26.9	24.3	29.1	4	7	4	8.5	27.5	52	64	5	12	0
20 FT	8	8	8	4	7.5	4	9	26.9	24.3	29.1	4	6.5	4	7.5	27.5	52	64	5	12	0
22 FT	8	8	8	4	7	4	8	26.9	24.3	29.1	4	6	4	7	27.5	52	64	5	12	0
24 FT	8	8	8	4	6	4	7.5	26.9	24.3	29.1	5	8.5	4	6.5	26.9	52	64	5	12	0
26 FT	8	8	8	4	6	4	6.5	26.9	24.3	29.1	5	8	4	6	26.9	52	64	5	12	0
28 FT	8	9	8	4	6	4	6	26.9	24.0	28.8	5	8	4	7.5	27.5	53	65	5	12	0
30 FT	8	9	8	4	6	4	6	26.9	24.0	28.8	5	7.5	4	7	27.5	53	65	5	12	0
32 FT	8	9	8	4	6	5	6.5	26.9	24.0	28.8	5	7.5	4	6.5	27.5	53	65	5	12	0
34 FT	9	10	8	5	8.5	4	6.5	26.9	25.4	30.4	5	7	4	7.5	28.0	54	66	5	12	0
36 FT	9	10	8	5	8.5	4	6	26.9	25.4	30.4	5	7	4	7	28.0	54	66	5	12	0
38 FT	9	10	8	5	8.5	5	7	26.9	25.4	30.4	5	7	4	7	28.0	54	66	5	12	0
40 FT	9	11	8	5	8.5	5	6.5	26.9	25.3	30.0	5	6.5	4	7	28.5	55	67	5	12	0
42 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6.5	28.5	55	67	5	12	0
44 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6	28.5	55	67	5	12	0
46 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6	28.5	55	67	5	12	0
48 FT	10	12	8	5	8	5	7.5	27.5	26.0	30.8	5	6	4	6	29.1	56	68	5	11.5	0
50 FT	11	12	8	5	7.5	5	8	28.0	27.0	32.0	5	6	4	6	29.1	56	68	5	11	0

SPAN (S) = 4 FT   HEIGHT (HT) = 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=6'	K2 HT=7'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=6'	K3 HT=7'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	5	8.5	4	10.5	38.6	26.4	30.1	5	9	4	7	38.6	76	88	5	12	12
2 FT	10	8	8	5	8.5	4	10.5	38.6	26.4	30.1	5	8.5	4	6.5	38.6	76	88	5	12	12
4 FT	8	8	8	4	11	4	11	38.6	24.1	27.5	4	9	4	8	38.6	76	88	5	12	0
6 FT	8	8	8	4	12	4	11	38.6	24.1	27.5	4	10.5	4	7	38.6	76	88	5	12	0
8 FT	8	8	8	4	12	4	10	38.6	24.1	27.5	4	10.5	4	7	38.6	76	88	5	12	0
10 FT	8	8	8	4	12	4	11	38.6	24.1	27.5	4	11	4	7	38.6	76	88	5	12	0
12 FT	8	8	8	4	12	4	9.5	38.6	24.1	27.5	4	10	4	6.5	38.6	76	88	5	12	0
14 FT	8	8	8	4	10.5	4	8	38.6	24.1	27.5	4	8.5	4	6	38.6	76	88	5	12	0
16 FT	8	9	8	4	9.5	4	7	38.6	24.4	27.9	4	8.5	4	6.5	38.6	77	89	5	12	0
18 FT	8	9	8	4	8.5	4	6.5	38.6	24.4	27.9	4	7.5	4	6	38.6	77	89	5	12	0
20 FT	8	10	8	4	8	4	6	38.6	24.6	28.1	4	7.5	4	6	40.9	78	90	5	11.5	0
22 FT	8	10	9	4	7.5	4	6.5	40.5	24.6	28.1	4	7	4	7	39.9	78	90	5	11.5	0
24 FT	8	10	9	4	7	4	6	39.9	24.6	28.1	4	6.5	4	6.5	39.9	78	90	5	11	0
26 FT	8	10	9	4	6.5	5	6.5	39.4	24.6	28.1	4	6	4	6	39.9	78	90	5	10	0
28 FT	8	10	9	4	6	5	6	38.8	24.6	28.1	5	9	5	7	41.6	78	90	5	9.5	0
30 FT	8	10	9	4	6	6	7.5	41.0	24.6	28.1	5	8.5	5	6.5	41.6	78	90	5	9	0
32 FT	8	10	9	4	6	6	7	40.5	24.6	28.1	5	8	5	6	41.6	78	90	5	8.5	0
34 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	8.5	5	6	41.6	79	91	5	8.5	0
36 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	8	5	6	41.6	79	91	5	8.5	0
38 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	7.5	6	7	43.9	79	91	5	8.5	0
40 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	7	6	7	43.9	79	91	5	8.5	0
42 FT	10	11	9	5	8	5	6	41.6	30.8	35.0	5	7	6	6.5	43.9	79	91	5	8.5	0
44 FT	10	11	9	5	8	5	6	41.6	30.8	35.0	5	6.5	6	6.5	43.9	79	91	5	8.5	0
46 FT	10	11	10	5	8	5	6.5	42.9	26.4	30.0	5	6.5	5	6	42.9	79	91	5	8	0
48 FT	10	11	10	5	8	5	6.5	42.9	30.8	35.0	5	6	6	7.5	44.6	79	91	5	8	0
50 FT	11	12	11	5	7.5	5	7	44.3	27.9	31.6	5	6.5	5	7.5	43.6	80	92	5	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 4 FEET
HEIGHT (HT): 2 THRU 7 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

SPAN (S) = 5 FT HEIGHT (HT) = 3 FT OR 4 FT

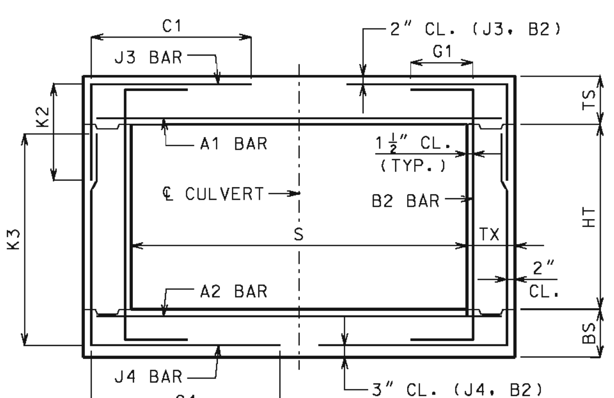
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=3′	K2 HT=4′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=3′	K3 HT=4′	SIZE	SPA.	G1
1 FT	10	8	8	5	8	4	10.5	44.9	26.5	33.0	5	8.5	4	6	35.4	40	52	5	12	12
2 FT	10	8	8	5	8	4	10.5	44.9	26.5	33.0	5	8	4	6	32.0	40	52	5	12	12
4 FT	8	8	8	4	8.5	4	10.5	28.5	24.5	30.6	4	7.5	4	10	28.5	40	52	5	12	0
6 FT	8	8	8	4	10	4	12	27.3	24.5	30.6	4	8	4	10	27.3	40	52	5	12	0
8 FT	8	8	8	4	9.5	4	11	26.5	24.5	30.6	4	8	4	9.5	26.5	40	52	5	12	0
10 FT	8	8	8	4	10	4	12	25.1	24.5	30.6	4	8.5	4	10.5	25.1	40	52	5	12	0
12 FT	8	8	8	4	8.5	4	10	25.1	24.5	30.6	4	7	4	9	25.1	40	52	5	12	0
14 FT	8	8	8	4	7.5	4	8.5	25.1	24.5	30.6	4	6	4	7.5	25.1	40	52	5	12	0
16 FT	8	8	8	4	6.5	4	7.5	25.1	24.5	30.6	5	8.5	4	7	25.1	40	52	5	12	0
18 FT	8	8	8	4	6	4	6.5	25.1	24.5	30.6	5	8	4	6	25.1	40	52	5	12	0
20 FT	8	8	8	4	6	4	6	25.1	24.5	30.6	5	8	5	6.5	25.1	40	52	5	12	0
22 FT	8	9	8	4	6	5	6.5	25.1	24.0	30.0	5	7.5	4	7	23.8	41	53	5	12	0
24 FT	8	9	8	4	6	5	6	25.1	24.0	30.0	5	7.5	4	6.5	23.8	41	53	5	12	0
26 FT	9	10	8	5	8.5	4	6.5	24.5	25.0	31.0	5	7	4	8.5	23.8	42	54	5	12	0
28 FT	9	10	8	5	8.5	4	6	24.5	25.0	31.0	5	7	4	8	23.8	42	54	5	12	0
30 FT	9	11	8	5	8	5	6.5	24.5	25.5	31.5	5	6.5	4	9	23.1	43	55	5	12	0
32 FT	10	11	8	5	8	4	6	23.8	26.0	32.0	5	6.5	4	8	23.1	43	55	5	12	0
34 FT	10	12	8	5	7.5	5	7.5	23.8	26.5	32.5	5	6	4	9	22.5	44	56	5	12	0
36 FT	10	12	8	5	7	5	7.5	23.8	26.5	32.5	5	6	4	8.5	22.5	44	56	5	12	0
38 FT	11	12	8	5	7	4	6	23.8	27.0	33.0	5	6	4	8	23.1	44	56	5	12	0
40 FT	11	13	8	5	6.5	5	8.5	23.8	27.5	33.5	5	6	4	8.5	22.5	45	57	5	12	0
42 FT	12	13	8	5	6.5	4	6	23.1	28.0	34.0	5	6	4	8	23.1	45	57	5	12	0
44 FT	12	13	8	5	6.5	5	9	23.1	28.0	34.0	5	6	4	7.5	23.1	45	57	5	12	0
46 FT	12	14	8	5	6	5	8.5	23.8	28.5	34.5	6	8	4	7.5	22.5	46	58	5	12	0
48 FT	13	14	8	5	6	4	6	23.1	29.0	35.0	6	8	4	7.5	23.1	46	58	5	12	0
50 FT	13	14	8	5	6	5	8.5	23.1	29.0	35.0	6	8	4	7.5	23.1	46	58	5	12	0

SPAN (S) = 5 FT HEIGHT (HT) = 5 FT OR 6 FT

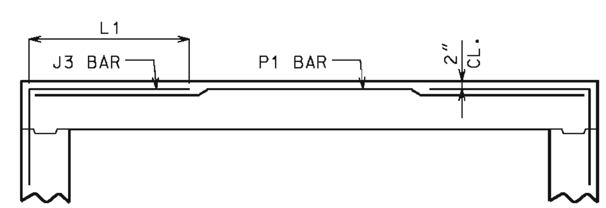
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=5′	K2 HT=6′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=5′	K3 HT=6′	SIZE	SPA.	G1
1 FT	10	8	8	5	8	4	10.5	44.9	26.3	30.6	5	8	4	6	44.9	64	76	5	12	12
2 FT	10	8	8	5	8	4	10.5	44.9	26.3	30.6	5	8	4	6	44.9	64	76	5	12	12
4 FT	8	8	8	4	8	4	11	44.9	24.1	28.3	4	7	4	8.5	44.9	64	76	5	12	0
6 FT	8	8	8	4	9	4	10.5	39.5	24.1	28.3	4	7.5	4	8	38.1	64	76	5	12	0
8 FT	8	8	8	4	9	4	10	34.6	24.1	28.3	4	7	4	7.5	34.6	64	76	5	12	0
10 FT	8	8	8	4	9.5	4	11	30.6	24.1	28.3	4	8	4	8	30.6	64	76	5	12	0
12 FT	8	8	8	4	8	4	9	29.9	24.1	28.3	4	6.5	4	7.5	30.6	64	76	5	12	0
14 FT	8	8	8	4	7	4	8	29.9	24.1	28.3	4	6	4	6.5	29.9	64	76	5	12	0
16 FT	8	8	8	4	6	4	7	29.3	24.1	28.3	5	8	4	6	29.9	64	76	5	12	0
18 FT	8	8	8	4	6	4	6	29.3	24.1	28.3	5	8	5	6.5	29.9	64	76	5	12	0
20 FT	8	8	8	4	6	5	6.5	29.3	24.1	28.3	5	8	5	6	29.9	64	76	5	12	0
22 FT	8	9	8	4	6	5	6	29.3	24.5	28.5	5	7.5	4	6	29.9	65	77	5	12	0
24 FT	8	9	8	5	9	6	7.5	32.0	28.1	32.8	5	7.5	5	6.5	29.9	65	77	5	12	0
26 FT	9	10	8	5	8.5	5	6.5	29.3	25.1	29.3	5	7	4	6	30.6	66	78	5	12	0
28 FT	9	10	8	5	8	5	6.5	29.3	25.1	29.3	5	7	5	7	29.9	66	78	5	12	0
30 FT	9	10	8	5	7.5	5	6.5	29.3	29.6	34.4	5	6.5	5	6.5	29.9	66	78	5	12	0
32 FT	10	11	8	5	7.5	5	7	29.3	26.6	30.8	5	6.5	5	7.5	30.6	67	79	5	12	0
34 FT	10	11	8	5	7.5	5	6.5	29.3	26.6	30.8	5	6.5	5	7	30.6	67	79	5	11.5	0
36 FT	10	11	8	5	7	5	6.5	29.3	30.4	35.3	5	6	5	6	30.6	67	79	5	11	0
38 FT	11	12	8	5	7	5	7	29.9	27.3	31.5	5	6	5	7	31.3	68	80	5	10	0
40 FT	11	12	8	5	6.5	5	6.5	29.9	31.3	36.0	5	6	5	6.5	31.3	68	80	5	10	0
42 FT	11	13	8	5	6.5	5	6	29.9	27.6	31.9	5	6	5	7	31.3	69	81	5	9.5	0
44 FT	12	13	8	5	6.5	5	6.5	29.9	28.0	32.3	5	6	5	6.5	32.0	69	81	5	9.5	0
46 FT	12	13	8	5	6	5	6	29.9	32.0	36.8	5	6	5	6	31.3	69	81	5	9.5	0
48 FT	12	14	9	5	6	5	7	30.4	28.4	32.5	6	8	5	8	31.8	70	82	5	9.5	0
50 FT	13	14	9	5	6	5	7.5	30.4	29.5	33.9	6	8	5	7.5	32.4	70	82	5	9	0

SPAN (S) = 5 FT HEIGHT (HT) = 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=7′	K2 HT=8′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=7′	K3 HT=8′	SIZE	SPA.	G1
1 FT	10	9	8	5	8	4	9.5	44.9	26.5	29.8	5	7.5	4	7	44.9	89	101	5	12	12
2 FT	10	9	8	5	8	4	8.5	44.9	26.5	29.8	5	7.5	4	6.5	44.9	89	101	5	12	12
4 FT	8	8	8	4	7.5	4	7.5	44.9	24.8	27.9	4	6.5	4	6	44.9	88	100	5	12	0
6 FT	8	9	8	4	9	4	7.5	44.9	24.0	27.0	4	7.5	4	6.5	44.9	89	101	5	12	0
8 FT	8	9	8	4	9	4	7	44.9	24.0	27.0	4	7.5	4	6	44.9	89	101	5	12	0
10 FT	8	9	8	4	10	4	7.5	44.9	24.0	27.0	4	8	4	6.5	44.9	89	101	5	12	0
12 FT	8	10	8	4	8.5	4	6.5	44.9	24.3	27.3	4	8	4	6.5	44.9	90	102	5	12	0
14 FT	8	10	9	4	7.5	4	6.5	41.4	24.3	27.3	4	7	4	7	45.5	90	102	5	12	0
16 FT	8	10	9	4	6.5	4	6	40.8	24.3	27.3	4	6	4	6.5	45.5	90	102	5	11.5	0
18 FT	8	10	9	4	6	5	6.5	40.0	24.3	27.3	5	9	4	6	45.5	90	102	5	10.5	0
20 FT	8	10	9	4	6	5	6	39.4	25.3	28.4	5	8	5	6.5	47.6	90	102	5	10	0
22 FT	8	10	9	4	6	6	7	42.1	25.3	28.4	5	7.5	5	6	47.6	90	102	5	9	0
24 FT	9	11	9	5	8.5	5	6	41.4	26.8	30.0	5	7.5	5	6	47.6	91	103	5	8.5	0
26 FT	9	11	9	5	8.5	5	6	41.4	26.8	30.0	5	7	6	7.5	49.6	91	103	5	8.5	0
28 FT	9	11	9	5	8.5	5	6	41.4	29.8	33.3	5	6.5	6	7	49.6	91	103	5	8.5	0
30 FT	9	11	9	5	8	5	6	40.8	29.8	33.3	5	6.5	6	6.5	49.6	91	103	5	8.5	0
32 FT	10	11	9	5	8	5	6	46.3	30.0	33.6	5	6.5	6	6	49.6	91	103	5	8.5	0
34 FT	10	11	9	5	7.5	5	6	45.5	30.0	33.6	5	6	6	6	49.6	91	103	5	8.5	0
36 FT	10	12	10	5	7	5	6.5	40.6	30.3	33.9	5	6	5	6	49.0	92	104	5	8	0
38 FT	11	12	10	5	7.5	5	6	43.4	31.6	35.4	5	6	6	7	51.1	92	104	5	8	0
40 FT	11	12	11	5	7.5	5	7	41.1	31.6	35.4	5	6	5	6.5	49.8	92	104	5	7.5	0
42 FT	11	13	11	5	7	5	7	41.1	31.9	35.6	5	6	5	6.5	49.8	93	105	5	7.5	0
44 FT	12	13	11	5	7	5	6.5	43.3	32.3	36.0	5	6	5	6	49.8	93	105	5	7.5	0
46 FT	12	13	11	5	7	5	6	43.3	32.3	36.0	5	6	5	6	49.8	93	105	5	7.5	0
48 FT	12	14	12	5	6.5	5	6.5	41.0	32.5	36.3	6	8	5	6.5	51.1	94	106	5	7	0
50 FT	13	14	12	5	6.5	5	6.5	43.3	33.9	37.8	6	8	5	6.5	51.1	94	106	5	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2′-0″. DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18″, 22″ AND 28″ FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET
HEIGHT (HT): 3 THRU 8 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

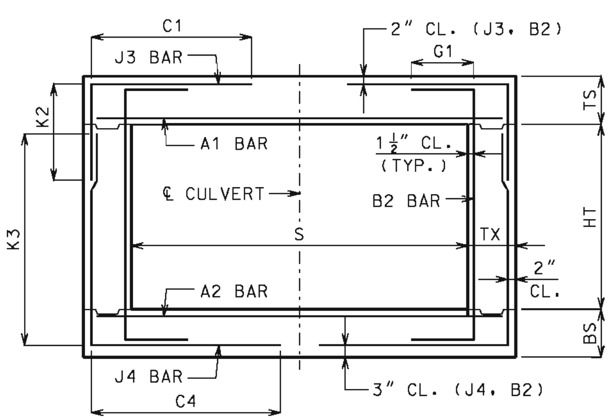
703.17

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

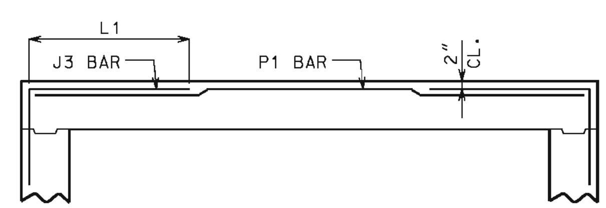
SPAN (S) = 6 FT HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT																						
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=3′	K2 HT=4′	K2 HT=5′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=3′	K3 HT=4′	K3 HT=5′	SIZE	SPA.	G1
1 FT	10	8	8	5	8	4	9	51.3	26.5	33.0	39.4	5	8	5	6	41.6	40	52	64	5	12	12
2 FT	11	8	8	5	7.5	4	9.5	51.3	27.0	33.5	40.0	5	8	6	7.5	36.0	40	52	64	5	12	12
4 FT	8	8	8	4	6.5	4	7.5	32.8	24.5	30.6	36.9	5	8.5	4	6.5	32.0	40	52	64	5	12	0
6 FT	8	8	8	4	7	4	8	30.4	24.5	30.6	36.9	5	9	4	7	30.4	40	52	64	5	12	0
8 FT	8	8	8	4	6.5	4	7.5	29.6	24.5	30.6	36.9	5	8.5	4	6.5	29.6	40	52	64	5	12	0
10 FT	8	8	8	4	7	4	8	27.3	24.5	30.6	36.9	4	6	4	7	27.3	40	52	64	5	12	0
12 FT	8	8	8	4	6	4	7	27.3	24.5	30.6	36.9	5	8	4	6	27.3	40	52	64	5	12	0
14 FT	8	8	8	4	6	4	6	27.3	24.5	30.6	36.9	5	8	5	6	27.3	40	52	64	5	12	0
16 FT	8	8	8	4	6	5	6	27.3	28.3	35.4	42.6	5	8	6	7	30.4	40	52	64	5	12	0
18 FT	8	9	8	5	8.5	6	7.5	30.4	24.0	30.0	36.0	5	7.5	4	6	26.4	41	53	65	5	12	0
20 FT	8	9	8	5	7.5	6	7.5	30.4	28.4	35.4	42.5	5	7	5	6.5	26.4	41	53	65	5	12	0
22 FT	9	10	8	5	7.5	5	6.5	26.4	25.0	31.0	37.0	5	7	4	6.5	25.6	42	54	66	5	12	0
24 FT	9	11	8	5	7	5	6.5	26.4	25.5	31.5	37.5	5	6.5	4	7	24.8	43	55	67	5	12	0
26 FT	10	11	8	5	7	5	7.5	26.4	26.0	32.0	38.0	5	6.5	4	6.5	25.6	43	55	67	5	12	0
28 FT	10	12	8	5	6.5	5	7.5	26.4	26.5	32.5	38.5	5	6	4	7	24.8	44	56	68	5	12	0
30 FT	11	12	8	5	6.5	5	8.5	25.6	27.0	33.0	39.0	5	6	4	6	24.8	44	56	68	5	12	0
32 FT	11	13	8	5	6	5	8	25.6	27.5	33.5	39.5	5	6	4	7	24.8	45	57	69	5	12	0
34 FT	12	13	8	5	6	5	8.5	25.6	28.0	34.0	40.0	5	6	4	6	24.8	45	57	69	5	12	0
36 FT	12	14	8	6	8	5	8.5	25.6	28.5	34.5	40.5	6	8	4	6.5	24.8	46	58	70	5	12	0
38 FT	13	14	8	6	8	5	8.5	24.8	29.0	35.0	41.0	6	8	4	6	24.8	46	58	70	5	12	0
40 FT	13	14	8	6	7.5	5	8.5	24.8	29.0	35.0	41.0	6	7.5	5	9	24.8	46	58	70	5	12	0
42 FT	14	15	8	6	8	5	8.5	24.8	30.0	36.0	42.0	6	7.5	4	6	24.8	47	59	71	5	12	0
44 FT	14	15	8	6	7.5	5	8.5	24.8	30.0	36.0	42.0	6	7.5	5	8.5	24.8	47	59	71	5	12	0
46 FT	14	16	8	6	7	5	8.5	24.8	30.5	36.5	42.5	6	7	4	6	24.8	48	60	72	5	12	0
48 FT	15	16	8	6	7	5	8	29.6	31.0	37.0	43.0	6	7	5	8	25.6	48	60	72	5	12	0
50 FT	15	16	8	6	7	5	8	29.6	31.0	37.0	43.0	6	7	5	8	24.8	48	60	72	5	12	0

SPAN (S) = 6 FT HEIGHT (HT) = 6 FT OR 7 FT																				
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=6′	K2 HT=7′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=6′	K3 HT=7′	SIZE	SPA.	G1
1 FT	10	8	8	5	8	4	9.5	51.3	26.4	30.1	5	8	5	6	52.8	76	88	5	12	12
2 FT	11	9	8	5	7.5	4	9.5	51.3	27.9	31.6	5	7.5	4	6.5	51.3	77	89	5	12	12
4 FT	8	8	8	4	6	4	7	51.3	24.1	27.5	5	8	4	6	51.3	76	88	5	12	0
6 FT	8	8	8	4	6.5	4	7.5	42.4	24.1	27.5	5	8	4	6	41.6	76	88	5	12	0
8 FT	8	8	8	4	6.5	4	7	38.4	24.1	27.5	5	8	5	6.5	38.4	76	88	5	12	0
10 FT	8	8	8	4	7	4	7.5	32.8	24.1	27.5	5	8.5	4	6	33.6	76	88	5	12	0
12 FT	8	9	8	4	6	4	6	32.8	24.4	27.9	5	8	4	7	33.6	77	89	5	12	0
14 FT	8	9	8	4	6	5	6.5	32.0	24.4	27.9	5	7.5	4	6	32.8	77	89	5	12	0
16 FT	8	9	8	4	6	6	7.5	35.3	28.5	32.6	5	7.5	5	6.5	32.8	77	89	5	12	0
18 FT	8	9	8	5	8.5	6	7.5	34.4	28.5	32.6	5	7.5	6	7.5	35.3	77	89	5	12	0
20 FT	8	9	8	5	7.5	6	7.5	34.4	28.5	32.6	5	6.5	6	7	35.3	77	89	5	12	0
22 FT	9	10	8	5	7.5	5	6	32.0	25.8	29.4	5	7	5	6	32.8	78	90	5	12	0
24 FT	9	11	8	5	7	6	7	34.4	29.6	33.6	5	6.5	5	6.5	32.8	79	91	5	12	0
26 FT	10	11	8	5	6.5	5	6	32.0	30.8	35.0	5	6.5	5	6	32.8	79	91	5	11	0
28 FT	10	12	8	5	6.5	6	7	34.4	30.3	34.4	5	6	5	6.5	33.6	80	92	5	10.5	0
30 FT	11	12	8	5	6.5	5	6	32.0	31.5	35.8	5	6	5	6	33.6	80	92	5	9.5	0
32 FT	11	13	8	5	6	6	7	35.3	31.9	36.0	5	6	5	6	33.6	81	93	5	9.5	0
34 FT	11	13	8	6	7.5	6	6.5	35.3	31.9	36.0	5	6	5	6	33.6	81	93	5	9.5	0
36 FT	12	13	8	6	8	6	7	35.3	32.3	36.4	6	8	6	7	36.8	81	93	5	9.5	0
38 FT	12	14	8	6	8	6	6.5	35.3	32.5	36.8	6	8	5	6	34.4	82	94	5	9.5	0
40 FT	13	14	9	6	8	5	6	32.4	33.9	38.1	6	8	5	6.5	34.0	82	94	5	8.5	0
42 FT	13	15	10	6	8	5	7	32.8	33.3	37.5	6	7.5	5	7.5	34.5	83	95	5	9	0
44 FT	14	15	10	6	8	5	7.5	32.8	34.5	38.9	6	7.5	5	7.5	34.5	83	95	5	8.5	0
46 FT	14	16	11	6	7.5	5	7	33.3	34.9	39.3	6	7	5	7	34.9	84	96	5	9	0
48 FT	14	16	11	6	7.5	5	6.5	33.3	34.9	39.3	6	7	5	7	34.9	84	96	5	9	0
50 FT	15	16	11	6	7.5	5	7	38.1	35.3	39.6	6	7	5	7	34.9	84	96	5	8.5	0

SPAN (S) = 6 FT HEIGHT (HT) = 8 FT OR 9 FT																				
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=8′	K2 HT=9′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=8′	K3 HT=9′	SIZE	SPA.	G1
1 FT	10	10	8	5	8	4	7	51.3	26.6	29.5	5	7	4	6.5	51.3	102	114	5	12	12
2 FT	11	10	8	5	7.5	4	7	51.3	28.0	31.0	5	7	4	6	51.3	102	114	5	12	12
4 FT	8	9	9	4	6	4	6.5	51.9	24.9	27.6	5	8	4	6.5	51.9	101	113	5	12	0
6 FT	8	9	9	4	6.5	4	6.5	51.9	24.9	27.6	5	8.5	4	6	51.9	101	113	5	12	0
8 FT	8	10	9	4	6.5	4	6	51.9	25.1	27.9	4	6	4	6	51.9	102	114	5	11.5	0
10 FT	8	10	9	4	7.5	4	6.5	45.4	25.1	27.9	4	6.5	4	6.5	51.9	102	114	5	12	0
12 FT	8	10	9	4	6	5	6.5	43.8	25.1	27.9	5	8.5	4	6	51.9	102	114	5	11.5	0
14 FT	8	10	9	4	6	5	6	42.1	26.1	29.0	5	7.5	5	6.5	54.3	102	114	5	10	0
16 FT	8	10	9	4	6	6	7	44.5	28.4	31.5	5	7	5	6	54.3	102	114	5	9.5	0
18 FT	8	10	9	5	9	6	7	43.8	29.4	32.6	5	7	6	7	55.9	102	114	5	8.5	0
20 FT	9	10	9	5	8.5	5	6	43.8	29.8	33.0	5	7	6	6.5	56.8	102	114	5	8.5	0
22 FT	9	11	9	5	8	5	6	42.9	30.0	33.3	5	6.5	6	6.5	55.9	103	115	5	8.5	0
24 FT	10	11	9	5	7.5	5	6	45.4	30.3	33.5	5	6.5	6	6	55.9	103	115	5	8.5	0
26 FT	10	11	9	5	7	5	6	44.5	30.3	33.5	5	6	6	6	55.9	103	115	5	8.5	0
28 FT	10	12	9	5	6.5	6	7	47.0	31.6	35.0	5	6	6	6	55.9	104	116	5	8	0
30 FT	11	12	9	5	6.5	6	6.5	49.4	35.4	39.0	5	6	6	6	55.9	104	116	5	8	0
32 FT	11	13	10	5	6.5	6	8	46.8	32.3	35.5	5	6	6	6.5	56.6	105	117	5	8	0
34 FT	12	13	11	5	6.5	5	6.5	44.0	32.5	35.9	5	6	5	6	49.8	105	117	5	7.5	0
36 FT	12	13	11	5	6	5	6.5	44.0	32.5	35.9	6	8	6	7.5	52.3	105	117	5	7.5	0
38 FT	12	14	12	5	6	5	6	42.0	32.8	36.1	6	8	5	6	48.8	106	118	5	7	0
40 FT	13	14	12	5	6	5	6	44.5	33.0	36.4	6	8	5	6	48.8	106	118	5	7	0
42 FT	13	15	12	5	6	5	6	43.6	33.4	36.6	6	7.5	5	6	52.1	107	119	5	7	0
44 FT	14	15	13	5	6	5	6	44.3	34.8	38.3	6	7.5	5	6	48.5	107	119	5	6.5	0
46 FT	14	15	13	6	8	5	6	44.3	34.8	38.3	6	7.5	6	8	51.0	107	119	5	6.5	0
48 FT	14	16	13	6	8	5	6	44.3	35.1	38.6	6	7	5	6	50.1	108	120	5	6.5	0
50 FT	15	16	13	6	8	5	6	51.0	35.4	38.9	6	7	6	8	53.5	108	120	5	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2′-0″. DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18″, 22″ AND 28″ FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 6 FEET
HEIGHT (HT): 3 THRU 9 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

SHEET NO.
4 OF 14

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

SPAN (S) = 7 FT — HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT

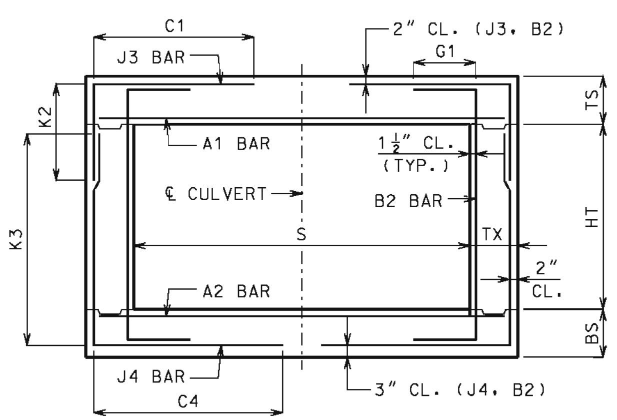
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS: A1 BARS		TOP SLAB BARS: J3 BARS						BOTTOM SLAB BARS: A2 BARS		BOTTOM SLAB BARS: J4 BARS						WALL BARS: B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=4′	K2 HT=5′	K2 HT=6′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=4′	K3 HT=5′	K3 HT=6′	SIZE	SPA.	G1
1 FT	11	9	8	5	7.5	4	9	57.0	27.1	32.3	37.4	5	7.5	4	6	54.3	53	65	77	5	12	12
2 FT	11	9	8	5	7.5	4	9	57.0	27.1	32.3	37.4	5	7.5	5	7	43.3	53	65	77	5	12	12
4 FT	8	8	8	4	6	4	6	36.8	24.3	29.1	34.0	5	8	5	6	35.9	52	64	76	5	12	0
6 FT	8	8	8	4	6	4	6	33.1	24.3	29.1	34.0	5	8	5	6	33.1	52	64	76	5	12	0
8 FT	8	9	8	4	6	5	6.5	32.3	24.0	28.8	33.6	5	7.5	4	6.5	32.3	53	65	77	5	12	0
10 FT	8	9	8	4	6	4	6	30.4	24.0	28.8	33.6	5	7.5	4	7.5	29.5	53	65	77	5	12	0
12 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	33.6	5	7.5	4	6	28.5	53	65	77	5	12	0
14 FT	8	9	8	5	8	6	7.5	33.1	28.3	33.9	39.5	5	7	5	6.5	28.5	53	65	77	5	12	0
16 FT	8	9	8	5	7	6	7	33.1	28.3	33.9	39.5	5	6.5	6	7.5	31.3	53	65	77	5	12	0
18 FT	9	10	8	5	7	5	6.5	28.5	25.4	30.4	35.3	5	6	5	7	28.5	54	66	78	5	12	0
20 FT	9	10	8	5	6	5	6	28.5	29.1	34.8	40.4	6	8	5	6	27.6	54	66	78	5	12	0
22 FT	10	11	8	5	6	5	7	28.5	26.3	31.1	36.1	6	8	5	7.5	27.6	55	67	79	5	12	0
24 FT	10	12	8	6	8	5	6	28.5	26.0	30.8	35.6	6	8	5	8.5	26.6	56	68	80	5	12	0
26 FT	11	13	8	6	8	5	7	27.6	27.5	32.4	37.3	6	8	5	8.5	26.6	57	69	81	5	12	0
28 FT	12	13	8	6	7.5	5	8	27.6	28.5	33.6	38.6	6	7.5	5	8.5	27.6	57	69	81	5	12	0
30 FT	12	14	8	6	7.5	5	7	27.6	28.3	33.3	38.1	6	7.5	5	8.5	26.6	58	70	82	5	12	0
32 FT	13	14	8	6	7	5	8	26.6	29.4	34.5	39.5	6	7	5	8.5	27.6	58	70	82	5	12	0
34 FT	13	15	8	6	7	5	7	27.6	29.1	34.0	39.0	6	7	5	8.5	26.6	59	71	83	5	12	0
36 FT	14	15	8	6	6.5	5	7.5	26.6	30.3	35.3	40.4	6	7	5	8.5	27.6	59	71	83	5	12	0
38 FT	14	16	8	6	6.5	5	7	26.6	30.6	35.8	40.8	6	7	5	8	26.6	60	72	84	5	11.5	0
40 FT	15	16	8	6	6.5	5	7.5	32.3	31.1	36.1	41.1	6	6.5	5	8	27.6	60	72	84	5	10.5	0
42 FT	15	17	8	6	6	5	7	32.3	35.3	40.9	46.5	6	6.5	5	7	27.6	61	73	85	5	10	0
44 FT	16	17	8	6	6	5	7	32.3	36.5	42.3	48.0	6	6.5	5	7	27.6	61	73	85	5	9.5	0
46 FT	16	18	8	6	6	5	6	32.3	36.3	41.9	47.5	6	6.5	5	6.5	27.6	62	74	86	5	9.5	0
48 FT	17	18	9	6	6	5	7.5	32.3	33.5	38.8	43.9	6	6.5	5	8	27.9	62	74	86	5	10	0
50 FT	17	19	9	6	6	5	7	32.5	37.1	42.8	48.4	6	6	5	7.5	27.9	63	75	87	5	9	0

SPAN (S) = 7 FT — HEIGHT (HT) = 7 FT OR 8 FT

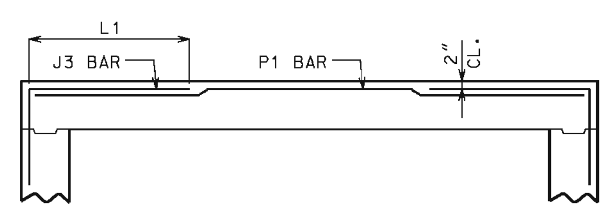
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS: A1 BARS		TOP SLAB BARS: J3 BARS					BOTTOM SLAB BARS: A2 BARS		BOTTOM SLAB BARS: J4 BARS					WALL BARS: B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=7′	K2 HT=8′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=7′	K3 HT=8′	SIZE	SPA.	G1
1 FT	11	9	8	5	7.5	4	8	57.0	27.8	31.1	5	7.5	5	6.5	58.9	89	101	5	12	12
2 FT	11	9	8	5	7.5	4	7.5	57.0	27.8	31.1	5	7.5	5	6	58.9	89	101	5	12	12
4 FT	8	9	8	4	6	5	6.5	58.9	24.0	27.0	5	7.5	4	6	57.0	89	101	5	12	0
6 FT	8	9	8	4	6	5	6.5	46.0	25.0	28.1	5	7.5	5	6.5	50.6	89	101	5	12	0
8 FT	8	9	8	4	6	5	6	41.4	25.0	28.1	5	7.5	5	6.5	44.1	89	101	5	12	0
10 FT	8	9	8	4	6	5	6.5	35.9	25.0	28.1	5	7.5	5	6.5	36.8	89	101	5	12	0
12 FT	8	9	8	4	6	6	7.5	38.6	28.8	32.4	5	7.5	5	6	36.8	89	101	5	12	0
14 FT	8	9	8	5	8	6	7.5	37.8	28.8	32.4	5	7	6	6.5	38.6	89	101	5	12	0
16 FT	8	9	8	5	7	6	7	37.8	32.6	36.8	5	6	6	6	38.6	89	101	5	12	0
18 FT	9	10	8	5	6.5	6	7	37.8	29.4	33.0	5	6	6	6.5	38.6	90	102	5	12	0
20 FT	9	10	8	5	6	6	7	36.8	33.4	37.4	6	7.5	6	6	38.6	90	102	5	11	0
22 FT	10	11	9	5	6	5	6	34.4	30.0	33.6	6	8	5	6	35.4	91	103	5	12	0
24 FT	10	12	9	6	8.5	5	6	34.4	30.3	33.9	6	8	5	6.5	36.3	92	104	5	11	0
26 FT	11	13	9	6	8	6	7.5	38.1	31.9	35.6	6	8	5	6.5	36.3	93	105	5	10	0
28 FT	11	13	9	6	7	6	7	37.3	31.9	35.6	6	7.5	5	6	36.3	93	105	5	9.5	0
30 FT	12	13	9	6	7.5	6	7.5	37.3	33.3	37.1	6	7	6	7.5	39.0	93	105	5	8.5	0
32 FT	12	14	9	6	6.5	6	6.5	37.3	32.5	36.3	6	7	5	6	36.3	94	106	5	8.5	0
34 FT	13	14	9	6	7	6	7	38.1	33.9	37.8	6	7	6	7	39.0	94	106	5	8.5	0
36 FT	14	15	10	6	7	5	6.5	34.8	34.5	38.4	6	7	5	7	36.6	95	107	5	8	0
38 FT	14	16	11	6	7	5	6.5	36.1	34.9	38.8	6	7	5	7	37.0	96	108	5	8.5	0
40 FT	15	16	11	6	7	5	6.5	40.9	35.3	39.0	6	7	5	7	37.0	96	108	5	8	0
42 FT	15	17	11	6	6.5	5	6	40.9	35.5	39.4	6	7	5	7	37.0	97	109	5	7.5	0
44 FT	16	17	12	6	6.5	5	6.5	41.3	37.0	40.9	6	6.5	5	6.5	37.5	97	109	5	8	0
46 FT	16	18	12	6	6.5	5	6.5	41.3	36.1	40.0	6	6.5	5	6.5	37.5	98	110	5	8	0
48 FT	17	18	12	6	6.5	5	6.5	41.3	37.6	41.6	6	6.5	5	6.5	38.4	98	110	5	7.5	0
50 FT	17	18	12	6	6	5	6	41.3	37.6	41.6	6	6	5	6.5	38.4	98	110	5	7	0

SPAN (S) = 7 FT — HEIGHT (HT) = 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS: A1 BARS		TOP SLAB BARS: J3 BARS					BOTTOM SLAB BARS: A2 BARS		BOTTOM SLAB BARS: J4 BARS					WALL BARS: B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=9′	K2 HT=10′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=9′	K3 HT=10′	SIZE	SPA.	G1
1 FT	11	10	8	5	7.5	4	6	57.0	27.3	29.9	5	7	5	6.5	58.9	114	126	5	12	12
2 FT	11	10	8	5	7.5	5	8.5	58.9	28.5	31.3	5	7	5	6	58.9	114	126	5	11	12
4 FT	8	9	9	4	6	5	6	59.5	28.8	31.6	5	7.5	5	6	59.5	113	125	5	10.5	0
6 FT	8	10	9	4	6	5	6	59.5	29.0	31.9	5	7	5	6.5	59.5	114	126	5	10	0
8 FT	8	10	9	4	6	6	7	62.3	29.0	31.9	5	7	5	6	59.5	114	126	5	9	0
10 FT	8	10	9	4	6	5	6	46.5	26.6	29.3	5	7.5	5	6	59.5	114	126	5	10	0
12 FT	8	11	9	4	6	6	7	47.4	25.6	28.1	5	7	5	6	59.5	115	127	5	9	0
14 FT	8	11	9	5	8.5	6	7	46.5	29.3	32.1	5	6.5	6	7	62.3	115	127	5	8.5	0
16 FT	9	11	9	5	8	5	6	46.5	29.5	32.4	5	6.5	6	6.5	62.3	115	127	5	8.5	0
18 FT	9	11	9	5	7	6	7	48.4	30.8	33.8	5	6.5	6	6	64.1	115	127	5	8.5	0
20 FT	10	11	9	5	7	6	7.5	50.3	31.0	34.0	5	6	6	6	60.5	115	127	5	8.5	0
22 FT	10	12	9	5	6.5	6	6.5	49.3	31.3	34.3	5	6	6	6	62.3	116	128	5	8	0
24 FT	11	12	9	5	6	6	7	51.1	35.3	38.6	6	8.5	6	6	64.1	116	128	5	7.5	0
26 FT	11	13	10	5	6	6	7.5	48.9	33.0	36.1	5	6	6	6.5	60.1	117	129	5	8	0
28 FT	12	13	11	5	6	5	6.5	45.6	32.0	35.0	6	8	6	7	54.1	117	129	5	7.5	0
30 FT	12	14	11	6	8	5	6	45.6	32.3	35.3	6	8	6	7	56.0	118	130	5	7.5	0
32 FT	13	14	12	6	8	5	6	46.1	33.8	36.9	6	7.5	6	8	52.8	118	130	5	7	0
34 FT	13	15	12	6	8	5	6	45.1	34.0	37.1	6	7.5	6	8	55.6	119	131	5	7	0
36 FT	14	15	12	6	7.5	6	8	49.9	35.6	38.9	6	7.5	6	7.5	54.8	119	131	5	7	0
38 FT	14	16	13	6	7.5	5	6	45.6	34.6	37.8	6	7	6	8	54.4	120	132	5	6.5	0
40 FT	15	16	13	6	7.5	6	8	55.3	36.1	39.4	6	7	6	7.5	54.4	120	132	5	6.5	0
42 FT	15	17	13	6	7	6	7.5	55.3	36.5	39.8	6	7	6	7.5	56.3	121	133	5	6.5	0
44 FT	16	17	14	6	7	6	8	55.9	38.1	41.5	6	7	6	7.5	53.9	121	133	5	6	0
46 FT	16	17	14	6	7	6	7.5	55.9	38.1	41.5	6	6.5	6	7	53.9	121	133	5	6	0
48 FT	16	18	14	6	6.5	6	7	55.9	37.0	40.3	6	6.5	6	7.5	55.9	122	134	5	6	0
50 FT	17	18	15	6	6.5	6	8	56.4	41.4	45.0	6	6.5	6	7.5	53.5	122	134	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2′-0″. DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18″, 22″ AND 28″ FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 7 FEET HEIGHT (HT): 4 THRU 10 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

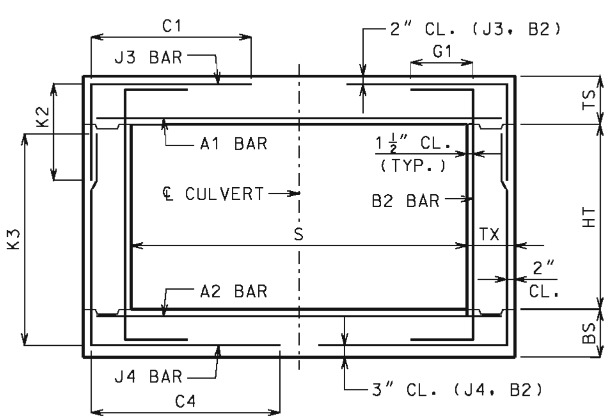
703.17

SHEET NO. 5 OF 14

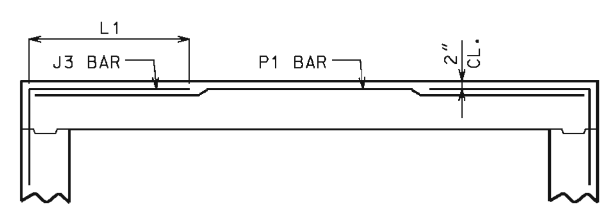
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
SPAN (S) = 8 FT HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=4'	K2 HT=5'	K2 HT=6'	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=4'	K3 HT=5'	K3 HT=6'	SIZE	SPA.	G1
1 FT	12	9	8	5	7	4	8.5	63.5	28.1	33.5	38.8	5	7.5	5	6	44.8	53	65	77	5	12	12
2 FT	12	9	8	5	7	4	8	63.5	28.1	33.5	38.8	5	7	6	7.5	43.6	53	65	77	5	12	12
4 FT	8	8	8	5	8	6	7.5	38.5	32.5	39.0	45.6	5	6.5	6	6	38.5	52	64	76	5	12	0
6 FT	8	8	8	5	8.5	6	7.5	37.5	32.5	39.0	45.6	5	7	6	6	36.4	52	64	76	5	12	0
8 FT	8	8	8	5	8	6	7.5	36.4	32.5	39.0	45.6	5	6.5	6	6	35.4	52	64	76	5	12	0
10 FT	8	8	8	5	8.5	6	7.5	34.4	32.5	39.0	45.6	5	7	6	6	34.4	52	64	76	5	12	0
12 FT	8	9	8	5	7.5	6	7.5	34.4	32.4	38.9	45.4	5	6.5	6	7.5	32.3	53	65	77	5	12	0
14 FT	8	9	8	5	6.5	6	6.5	34.4	32.4	38.9	45.4	6	8	6	7	32.3	53	65	77	5	12	0
16 FT	9	10	8	5	6	5	6	30.1	29.1	34.8	40.4	6	8	5	6.5	28.1	54	66	78	5	12	0
18 FT	9	11	8	6	7.5	6	7	33.3	29.6	35.3	40.9	6	7.5	5	7.5	27.0	55	67	79	5	12	0
20 FT	10	12	8	6	7.5	5	6	29.1	26.0	30.8	35.6	6	7.5	5	8.5	26.0	56	68	80	5	12	0
22 FT	11	13	8	6	7	5	6.5	28.1	27.5	32.4	37.3	6	7	5	8.5	26.0	57	69	81	5	12	0
24 FT	12	13	8	6	7	5	7.5	27.0	32.6	38.4	44.1	6	7	5	8	26.0	57	69	81	5	12	0
26 FT	13	14	8	6	7	5	8	27.0	29.4	34.5	39.5	6	7	5	8.5	26.0	58	70	82	5	12	0
28 FT	13	15	8	6	6.5	5	7	27.0	29.1	34.0	39.0	6	6.5	5	8.5	26.0	59	71	83	5	12	0
30 FT	14	15	8	6	6	5	7.5	26.0	30.3	35.3	40.4	6	6.5	5	8.5	26.0	59	71	83	5	12	0
32 FT	15	16	8	6	6	5	7.5	31.3	35.5	41.3	47.0	6	6.5	5	8	26.0	60	72	84	5	12	0
34 FT	15	17	8	6	6	5	7	31.3	31.5	36.5	41.6	6	6.5	5	7	26.0	61	73	85	5	12	0
36 FT	16	17	8	6	6	5	7	31.3	32.6	37.9	43.0	6	6	5	7	26.0	61	73	85	5	12	0
38 FT	16	18	8	7	7.5	5	7	31.3	36.3	41.9	47.5	6	6	5	6.5	26.0	62	74	86	5	11.5	0
40 FT	17	18	8	7	7.5	5	6.5	31.3	37.5	43.3	49.0	6	6	5	6.5	26.0	62	74	86	5	10.5	0
42 FT	17	19	8	7	7	5	6.5	31.3	37.1	42.8	48.4	6	6	5	6.5	26.0	63	75	87	5	10	0
44 FT	18	19	8	7	7	5	6.5	30.1	38.4	44.1	49.9	7	7.5	5	6.5	26.0	63	75	87	5	9.5	0
46 FT	18	20	8	7	7	5	6	31.3	38.1	43.8	49.4	7	7.5	5	6	26.0	64	76	88	5	9.5	0
48 FT	19	20	8	7	7	5	6	31.3	39.4	45.1	50.9	7	7.5	5	6	26.0	64	76	88	5	9.5	0
50 FT	19	20	8	7	6.5	5	6	31.3	39.4	45.1	50.9	7	7	6	7.5	29.1	64	76	88	5	9.5	0

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
SPAN (S) = 8 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=7'	K2 HT=8'	K2 HT=9'	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=7'	K3 HT=8'	K3 HT=9'	SIZE	SPA.	G1
1 FT	12	10	8	5	7	4	6.5	63.5	28.3	31.6	35.0	5	7	5	6.5	65.5	90	102	114	5	12	12
2 FT	12	10	8	5	7	4	6	63.5	28.3	31.6	35.0	5	7	5	6.5	65.5	90	102	114	5	12	12
4 FT	8	9	8	5	7.5	6	7.5	66.5	28.8	32.4	36.0	5	6.5	6	6.5	66.5	89	101	113	5	12	0
6 FT	8	9	8	5	8	6	7.5	53.0	28.8	32.4	36.0	5	7	6	6.5	58.3	89	101	113	5	12	0
8 FT	8	9	8	5	7.5	6	7.5	47.9	28.8	32.4	36.0	5	6.5	6	6	51.0	89	101	113	5	11.5	0
10 FT	8	9	8	5	8	6	7.5	41.6	28.8	32.4	36.0	5	7	6	6	43.6	89	101	113	5	12	0
12 FT	8	9	9	5	7.5	6	7	41.0	32.6	36.8	40.8	5	6.5	6	6.5	42.0	89	101	113	5	12	0
14 FT	8	10	9	5	6.5	6	6.5	41.0	28.1	31.6	35.1	5	6	6	7	42.0	90	102	114	5	12	0
16 FT	9	10	9	5	6	6	7.5	41.0	29.4	33.0	36.6	6	7.5	6	6.5	42.0	90	102	114	5	12	0
18 FT	9	11	9	6	8	6	6.5	39.9	29.8	33.3	36.9	6	7.5	6	7	42.0	91	103	115	5	11	0
20 FT	10	11	9	6	7.5	6	7	39.9	30.0	33.6	37.3	6	6.5	6	6	42.0	91	103	115	5	10	0
22 FT	11	12	9	6	7.5	6	7	39.9	31.6	35.4	39.0	6	7	6	6.5	42.0	92	104	116	5	9	0
24 FT	11	13	9	6	6.5	6	6.5	39.9	31.9	35.6	39.4	6	6.5	6	7	42.0	93	105	117	5	8.5	0
26 FT	12	14	10	6	7	5	6	38.1	32.5	36.3	40.0	6	7	5	6.5	39.3	94	106	118	5	9	0
28 FT	13	15	10	6	7	6	7.5	40.3	33.1	36.9	40.6	6	7	5	6.5	39.3	95	107	119	5	8	0
30 FT	13	15	10	6	6.5	6	6.5	40.3	33.1	36.9	40.6	6	6.5	5	6	39.3	95	107	119	5	8	0
32 FT	14	16	11	6	6.5	6	8.5	40.6	34.9	38.8	42.5	6	6.5	5	7	39.6	96	108	120	5	8	0
34 FT	15	17	11	6	6.5	6	8	47.1	35.5	39.4	43.3	6	6.5	5	7	39.6	97	109	121	5	7.5	0
36 FT	15	17	11	6	6	6	7	47.1	35.5	39.4	43.3	6	6	5	6.5	39.6	97	109	121	5	7.5	0
38 FT	16	18	12	6	6	6	8	47.5	36.1	40.0	43.9	6	6	5	6.5	40.0	98	110	122	5	7.5	0
40 FT	17	18	12	6	6	6	8	47.5	37.6	41.6	45.5	6	6	5	6.5	40.0	98	110	122	5	7	0
42 FT	17	19	12	7	8	6	7.5	47.5	38.0	41.9	45.9	6	6	5	6.5	41.0	99	111	123	5	7	0
44 FT	18	19	13	7	8	5	6	44.8	38.3	42.3	46.3	6	6	5	6	40.4	99	111	123	5	7	0
46 FT	18	20	13	7	7.5	6	8	48.0	38.6	42.6	46.5	7	8	5	6	41.4	100	112	124	5	6.5	0
48 FT	19	20	13	7	7.5	6	8	48.0	40.1	44.3	48.3	7	7.5	5	6	41.4	100	112	124	5	6.5	0
50 FT	19	21	13	7	7	6	7	48.0	39.3	43.3	47.3	7	7.5	5	6	41.4	101	113	125	5	6.5	0

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
SPAN (S) = 8 FT HEIGHT (HT) = 10 FT OR 11 FT				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=10'	K2 HT=11'	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=10'	K3 HT=11'	SIZE	SPA.	G1
1 FT	11	10	8	5	6.5	5	7.5	65.5	31.3	34.0	5	6.5	6	6.5	66.5	126	138	5	9.5	12
2 FT	11	10	8	5	6.5	5	7	65.5	31.3	34.0	5	6	6	6	66.5	126	138	5	9.5	12
4 FT	8	9	9	5	7.5	6	7	68.3	33.0	36.0	5	6	6	6	68.3	125	137	5	8.5	0
6 FT	8	10	9	5	8.5	6	7	68.3	30.6	33.4	5	7	6	6.5	68.3	126	138	5	8.5	0
8 FT	8	10	9	5	8	6	7	68.3	33.3	36.3	5	7	6	6	68.3	126	138	5	8.5	0
10 FT	8	10	9	5	8.5	6	7	52.5	30.6	33.4	5	7	6	6	68.3	126	138	5	8.5	0
12 FT	8	10	9	5	7.5	6	6.5	50.4	33.3	36.3	5	6.5	6	6	65.1	126	138	5	8.5	0
14 FT	9	11	9	5	7	6	7	52.5	31.0	33.8	5	6.5	6	6	69.3	127	139	5	8.5	0
16 FT	9	11	9	5	6	6	6	50.4	33.8	36.8	6	8	6	6	64.0	127	139	5	8.5	0
18 FT	10	12	9	5	6	6	6	52.5	34.3	37.3	6	8	6	6	68.3	128	140	5	8	0
20 FT	11	12	10	5	6	5	6	48.8	31.8	34.5	6	7.5	6	6.5	58.3	128	140	5	8	0
22 FT	11	13	10	6	8	6	7	50.9	33.4	36.3	6	7.5	6	6.5	60.4	129	141	5	7.5	0
24 FT	12	13	11	6	7.5	6	8	51.4	33.6	36.5	6	7	6	7	56.8	129	141	5	7.5	0
26 FT	12	14	11	6	7	6	7.5	50.3	33.9	36.8	6	7	6	7	57.8	130	142	5	7.5	0
28 FT	13	15	12	6	7.5	6	8	50.8	34.4	37.3	6	7	6	7.5	57.3	131	143	5	7	0
30 FT	14	15	12	6	7	6	7.5	51.9	36.0	39.0	6	6.5	6	7	57.3	131	143	5	7	0
32 FT	14	16	13	6	7	6	8	51.3	36.3	39.3	6	6.5	6	7.5	56.6	132	144	5	6.5	0
34 FT	15	16	13	6	6.5	6	7.5	57.8	36.5	39.5	6	6.5	6	7	55.6	132	144	5	6.5	0
36 FT	15	17	13	6	6.5	6	6.5	57.8	36.8	39.8	6	6.5	6	7	57.8	133	145	5	6.5	0
38 FT	16	18	14	6	6.5	6	7.5	58.3	37.3	40.3	6	6.5	6	7.5	57.3	134	146	5	6	0
40 FT	16	18	14	6	6	6	7	58.3	37.3	40.3	6	6	6	7	57.3	134	146	5	6	0
42 FT	17	19	15	6	6	6	7	58.9	42.3	45.6	6	6	6	7.5	56.6	135	147	6	8	0
44 FT	17	19	15	6	6	6	6.5	57.8	42.3	45.6	6	6	6	7	56.6	135	147	6	8	0
46 FT	18	19	15	6	6	6	7	58.9	42.5	45.9	7	8	6	6	56.6	135	147	6	8	0
48 FT	18	20	16	7	8	6	7	58.3	42.9	46.3	7	8	6	7	56.0	136	148	6	8	0
50 FT	19	21	16	7	7.5	6	7	59.4	43.4	46.8	7	8	6	7	58.3	137	149	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 8 FEET HEIGHT (HT): 4 THRU 11 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011
703.17

SPAN (S) = 9 FT HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

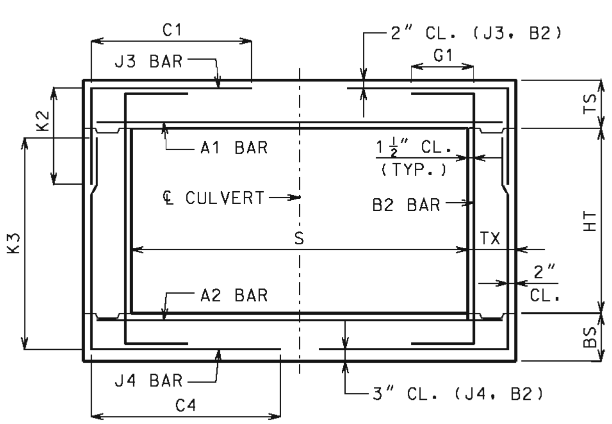
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	HT=6'	HT=7'	SIZE	SPA.	SIZE	SPA.	C4	HT=5'	HT=6'	HT=7'	SIZE	SPA.	G1
1 FT	12	9	8	5	6.5	4	7	69.6	28.1	32.5	37.0	5	6.5	6	7.5	54.5	65	77	89	5	12	12
2 FT	12	9	8	5	6.5	4	7	69.6	28.1	32.5	37.0	5	6	6	7	48.8	65	77	89	5	12	12
4 FT	8	9	8	5	6.5	6	7	42.9	32.4	37.8	43.3	5	6	6	7.5	42.9	65	77	89	5	12	0
6 FT	8	9	8	5	7	6	7.5	40.6	32.4	37.8	43.3	5	6	6	7	39.5	65	77	89	5	12	0
8 FT	8	10	8	5	6.5	6	7	39.5	24.1	28.0	32.0	5	6	5	6.5	33.6	66	78	90	5	12	0
10 FT	8	10	8	5	7	6	7.5	37.1	24.1	28.0	32.0	5	6.5	4	6	31.4	66	78	90	5	12	0
12 FT	8	10	8	5	6	6	6	37.1	28.5	33.1	37.9	6	8	5	6.5	30.1	66	78	90	5	12	0
14 FT	9	10	8	6	7.5	6	7	34.8	29.6	34.4	39.3	6	7	5	6	30.1	66	78	90	5	12	0
16 FT	9	11	8	6	7	6	6	34.8	29.3	33.9	38.6	6	6.5	5	7	29.0	67	79	91	5	12	0
18 FT	10	12	8	6	6.5	6	6.5	33.6	30.0	34.8	39.4	6	6.5	5	7.5	29.0	68	80	92	5	12	0
20 FT	11	13	8	6	6	6	7	33.6	31.6	36.4	41.3	6	6	5	8	29.0	69	81	93	5	12	0
22 FT	12	14	8	6	6	5	6	29.0	32.4	37.3	42.0	6	6	5	8.5	27.9	70	82	94	5	12	0
24 FT	13	15	8	6	6	5	6	29.0	29.0	33.3	37.5	6	6	5	8.5	27.9	71	83	95	5	12	0
26 FT	14	16	8	6	6	5	6	29.0	30.6	34.9	39.3	6	6	5	8	27.9	72	84	96	5	12	0
28 FT	15	16	8	7	7.5	5	6.5	33.6	35.3	40.1	45.1	7	8	5	8	27.9	72	84	96	5	12	0
30 FT	15	17	8	7	7	6	8	37.1	35.6	40.6	45.5	7	7.5	5	7	27.9	73	85	97	5	11.5	0
32 FT	16	17	8	7	7	5	6	32.5	36.1	41.0	45.9	7	7.5	5	6.5	27.9	73	85	97	5	10	0
34 FT	17	18	8	7	7	5	6	32.5	37.8	42.9	47.9	7	7.5	5	6.5	29.0	74	86	98	5	9.5	0
36 FT	17	19	9	7	7	5	6	33.9	37.3	42.3	47.1	7	7.5	5	7.5	29.3	75	87	99	5	10.5	0
38 FT	18	20	9	7	7	5	6	33.9	38.1	43.0	48.0	7	7.5	5	7	29.3	76	88	100	5	9.5	0
40 FT	19	20	9	7	6.5	5	6.5	33.9	39.5	44.5	49.5	7	7	5	7	29.3	76	88	100	5	8.5	0
42 FT	19	21	10	7	6.5	5	6.5	34.3	39.9	45.0	50.0	7	7	5	7.5	29.5	77	89	101	5	10	0
44 FT	20	21	10	7	6.5	5	6.5	34.3	40.4	45.4	50.4	7	6.5	5	7.5	29.5	77	89	101	5	9.5	0
46 FT	21	22	10	7	6.5	5	6.5	34.3	41.1	46.3	51.3	7	7	5	7	29.5	78	90	102	5	8.5	0
48 FT	21	22	10	7	6	5	6.5	34.3	41.1	46.3	51.3	7	6.5	5	7	29.5	78	90	102	5	8	0
50 FT	22	23	10	7	6	5	6.5	34.3	42.0	47.0	52.1	7	6.5	5	6.5	30.6	79	91	103	5	8	0

SPAN (S) = 9 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

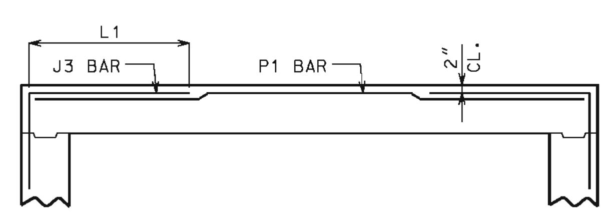
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	HT=9'	HT=10'	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	HT=9'	HT=10'	SIZE	SPA.	G1
1 FT	12	11	8	5	6.5	5	8.5	70.8	29.6	32.8	35.9	5	6.5	5	6.5	70.8	103	115	127	5	12	12
2 FT	12	11	8	5	6.5	5	8.5	70.8	29.6	32.8	35.9	5	6	5	6	70.8	103	115	127	5	11.5	12
4 FT	8	10	9	5	6.5	6	7	67.9	26.1	29.0	31.9	5	6	5	6	72.5	102	114	126	5	11.5	0
6 FT	8	10	9	5	7	6	7	53.9	28.4	31.5	34.6	5	6	6	7	64.4	102	114	126	5	11	0
8 FT	8	10	9	5	6.5	6	6.5	49.1	28.4	31.5	34.6	5	6	6	6.5	55.0	102	114	126	5	10.5	0
10 FT	8	10	9	5	7	6	7	44.5	28.4	31.5	34.6	5	6.5	6	7	46.8	102	114	126	5	12	0
12 FT	9	10	9	5	6.5	5	6	41.0	29.8	33.0	36.1	6	8	6	6	45.6	102	114	126	5	11.5	0
14 FT	9	10	9	6	8	6	6.5	43.3	33.0	36.6	40.3	6	6.5	6	6	45.6	102	114	126	5	10.5	0
16 FT	10	11	9	6	7.5	6	7	43.3	30.3	33.5	36.8	6	6.5	6	6	45.6	103	115	127	5	9.5	0
18 FT	10	12	9	6	6.5	6	6	43.3	31.6	35.0	38.4	6	6.5	6	6	45.6	104	116	128	5	8.5	0
20 FT	11	13	9	6	6.5	6	6.5	43.3	31.0	34.3	37.5	6	6.5	6	6	45.6	105	117	129	5	8.5	0
22 FT	12	13	9	6	6	6	6.5	43.3	33.6	37.1	40.6	6	6	7	6.5	48.0	105	117	129	5	8.5	0
24 FT	13	14	10	6	6	6	7	43.6	33.0	36.4	39.8	6	6	6	6.5	44.9	106	118	130	5	8	0
26 FT	14	15	10	6	6	6	7	43.6	34.8	38.3	41.8	6	6	6	7	44.9	107	119	131	5	8	0
28 FT	14	16	11	7	8	6	7	44.0	35.1	38.6	42.0	7	8	5	6	42.9	108	120	132	5	7.5	0
30 FT	15	17	11	7	8	6	6.5	50.0	35.6	39.1	42.6	6	6	5	6	42.9	109	121	133	5	7.5	0
32 FT	16	18	12	6	6	6	7.5	50.4	36.3	39.8	43.3	6	6	5	6	43.3	110	122	134	5	7	0
34 FT	16	18	12	7	7.5	6	7	50.4	36.3	39.8	43.3	7	7.5	5	6	43.3	110	122	134	5	7	0
36 FT	17	19	13	7	7.5	6	7.5	50.9	38.1	41.8	45.3	7	7.5	5	6	43.5	111	123	135	5	7	0
38 FT	18	20	13	7	7.5	6	7.5	50.9	38.8	42.3	45.9	7	7.5	5	6	43.5	112	124	136	5	6.5	0
40 FT	18	20	13	7	7	6	7	50.9	38.8	42.3	45.9	7	7	6	8.5	46.0	112	124	136	5	6.5	0
42 FT	19	21	13	7	7	6	6.5	50.9	39.3	42.9	46.5	7	7	6	8	47.3	113	125	137	5	6.5	0
44 FT	19	21	14	7	6.5	6	6.5	51.3	39.3	42.9	46.5	7	7	5	6	43.9	113	125	137	5	6	0
46 FT	20	22	14	7	6.5	6	7	51.3	41.3	45.0	48.6	7	7	6	8.5	47.6	114	126	138	5	6	0
48 FT	20	22	14	7	6.5	6	6	51.3	45.3	49.3	53.4	7	6.5	6	7.5	47.6	114	126	138	5	6	0
50 FT	21	23	14	7	6.5	6	6	51.3	41.9	45.6	49.3	7	6.5	6	8	47.6	115	127	139	5	6	0

SPAN (S) = 9 FT HEIGHT (HT) = 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
									K2							K3				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	SIZE	SPA.	G1
1 FT	11	11	8	5	6	5	6	70.8	31.3	33.8	5	6	6	6	73.1	139	151	5	9.5	12
2 FT	11	12	8	6	8.5	6	7	73.1	33.0	35.6	5	6	6	6	73.1	140	152	5	9.5	12
4 FT	8	10	9	5	6	6	6.5	73.8	33.4	36.1	6	8	6	6	73.8	138	150	5	8.5	0
6 FT	8	11	9	5	7	6	6.5	73.8	32.1	34.8	5	6	6	6	73.8	139	151	5	8.5	0
8 FT	9	11	9	5	7	6	7	73.8	30.9	33.4	5	6	6	6	73.8	139	151	5	8.5	0
10 FT	9	11	9	5	7.5	6	7	58.5	30.9	33.4	5	6.5	6	6	73.8	139	151	5	8.5	0
12 FT	9	12	9	5	6.5	6	6	56.1	34.0	36.8	5	6	6	6	73.8	140	152	5	8.5	0
14 FT	10	12	9	5	6	6	6	57.4	34.3	37.0	6	8	6	6	73.8	140	152	5	7.5	0
16 FT	10	12	10	6	8	6	6.5	53.1	34.3	37.0	6	7	6	6	63.8	140	152	5	8	0
18 FT	11	13	10	6	7.5	6	6.5	54.3	36.3	39.1	6	7	6	6	64.9	141	153	5	7.5	0
20 FT	11	13	11	6	6.5	6	6.5	52.4	36.3	39.1	6	6.5	6	7	59.5	141	153	5	7.5	0
22 FT	12	14	12	6	7	6	8	52.8	33.6	36.3	6	6.5	6	7.5	58.8	142	154	5	7	0
24 FT	13	15	12	6	6.5	6	7.5	54.0	37.3	40.1	6	6.5	6	7	60.0	143	155	5	7	0
26 FT	14	15	13	6	6.5	6	7.5	54.5	35.9	38.6	6	6	6	6.5	56.9	143	155	5	6.5	0
28 FT	14	16	13	6	6	6	7	53.3	39.3	42.3	6	6	6	7	58.1	144	156	5	6.5	0
30 FT	15	17	13	6	6	6	6.5	60.5	39.8	42.8	6	6	6	6.5	60.5	145	157	5	6.5	0
32 FT	16	17	14	6	6	6	7	61.0	40.0	43.0	6	6	6	6	57.4	145	157	5	6	0
34 FT	16	18	14	7	8	6	6.5	61.0	40.3	43.3	7	7.5	6	6.5	58.5	146	158	5	6	0
36 FT	17	19	15	6	6	6	7	60.3	42.4	45.5	7	8	6	6.5	59.0	147	159	6	8	0
38 FT	18	19	15	7	7.5	6	6.5	61.5	42.6	45.8	7	7.5	6	6.5	57.8	147	159	6	8	0
40 FT	18	20	15	7	7.5	6	6	61.5	42.9	46.0	7	7.5	6	6.5	60.3	148	160	6	8	0
42 FT	19	21	16	7	7.5	6	6.5	62.0	43.4	46.5	7	7.5	6	6.5	59.5	149	161	6	8	0
44 FT	19	21	16	7	7	6	6	62.0	43.4	46.5	7	7	6	6.5	59.5	149	161	6	8	0
46 FT	20	22	17	7	7	6	6.5	62.5	45.6	48.9	7	7	6	6.5	58.8	150	162	6	7.5	0
48 FT	20	22	17	7	7	6	6	61.3	45.6	48.9	7	7	6	6.5	58.8	150	162	6	7.5	0
50 FT	21	23	18	7	7	6	6.5	63.0	46.1	49.4	7	7	6	6.5	59.3	151	163	6	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT

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 SINGLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 9 FEET
HEIGHT (HT): 5 THRU 12 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

SHEET NO.
7 OF 14

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

SPAN (S) = 10 FT — HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

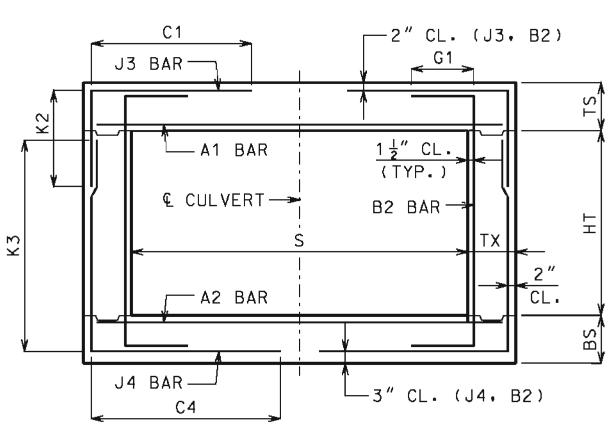
DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=5'	K2 HT=6'	K2 HT=7'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=5'	K3 HT=6'	K3 HT=7'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	12	9	8	5	6	4	6	75.5	28.1	32.5	37.0	5	6	6	6.5	52.5	65	77	89	5	12	12
2 FT	12	10	8	5	6	5	7.5	76.8	32.4	37.4	42.4	5	6	6	6.5	44.8	66	78	90	5	12	12
4 FT	8	9	8	6	8	7	6.5	44.8	32.4	37.8	43.3	6	7.5	6	7	42.3	65	77	89	5	12	0
6 FT	8	10	8	6	8.5	6	6	42.3	28.5	33.1	37.9	6	7.5	5	6.5	35.9	66	78	90	5	12	0
8 FT	8	10	8	6	7.5	7	6	43.5	28.5	33.1	37.9	6	7	5	6.5	33.3	66	78	90	5	12	0
10 FT	9	10	8	6	7	6	6.5	38.4	29.6	34.4	39.3	6	6.5	6	7	35.9	66	78	90	5	12	0
12 FT	9	10	8	6	7.5	6	6.5	35.9	29.6	34.4	39.3	6	6.5	6	7	34.5	66	78	90	5	12	0
14 FT	9	11	8	6	6.5	7	6	39.6	29.3	33.9	38.6	6	6	5	7	29.5	67	79	91	5	12	0
16 FT	10	12	8	6	6	6	6	34.5	30.0	34.8	39.4	6	6	5	7.5	28.1	68	80	92	5	12	0
18 FT	11	13	8	7	7.5	6	6.5	33.3	31.6	36.4	41.3	7	7.5	5	8	28.1	69	81	93	5	12	0
20 FT	12	14	8	7	7.5	6	7	33.3	32.4	37.3	42.0	7	7.5	5	8.5	26.9	70	82	94	5	12	0
22 FT	13	15	8	7	7	6	7.5	32.0	33.3	38.0	42.8	7	7.5	5	8.5	26.9	71	83	95	5	12	0
24 FT	14	16	8	7	7	6	8	30.8	34.0	38.8	43.6	7	7.5	5	8	26.9	72	84	96	5	12	0
26 FT	15	17	8	7	6.5	6	8	37.1	35.6	40.6	45.5	7	7	5	7	26.9	73	85	97	5	12	0
28 FT	16	18	8	7	6.5	6	8.5	35.9	36.5	41.4	46.4	7	7	5	6.5	26.9	74	86	98	5	12	0
30 FT	17	18	8	7	6.5	5	6	32.0	37.8	42.9	47.9	7	6.5	5	6.5	26.9	74	86	98	5	11.5	0
32 FT	18	19	8	7	6.5	5	6	32.0	38.6	43.6	48.8	7	6.5	5	6.5	26.9	75	87	99	5	10	0
34 FT	18	20	8	7	6	6	7.5	35.9	38.1	43.0	48.0	7	6.5	5	6	26.9	76	88	100	5	9.5	0
36 FT	19	21	8	7	6	6	7.5	35.9	39.9	45.0	50.0	7	6.5	6	7.5	30.8	77	89	101	5	9.5	0
38 FT	20	21	8	7	6	6	7.5	35.9	44.1	49.6	55.3	7	6.5	6	7.5	30.8	77	89	101	5	9.5	0
40 FT	21	22	8	7	6	6	7	35.9	45.1	50.6	56.1	7	6.5	6	7	30.8	78	90	102	5	9	0
42 FT	21	23	9	8	7.5	5	6	33.5	41.6	46.6	51.6	7	6	5	6	28.4	79	91	103	5	8.5	0
44 FT	22	23	9	8	7.5	6	7.5	37.4	42.0	47.0	52.1	7	6	5	6	28.4	79	91	103	5	8.5	0
46 FT	23	24	10	8	7.5	5	6.5	33.8	43.9	49.0	54.1	7	6	5	6.5	28.6	80	92	104	5	8.5	0
48 FT	23	25	10	8	7	5	6	33.8	43.3	48.3	53.4	7	6	5	6	28.6	81	93	105	5	8	0
50 FT	24	25	10	8	7	5	6	33.8	44.8	49.9	55.0	7	6	5	6	28.6	81	93	105	5	8	0

SPAN (S) = 10 FT — HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

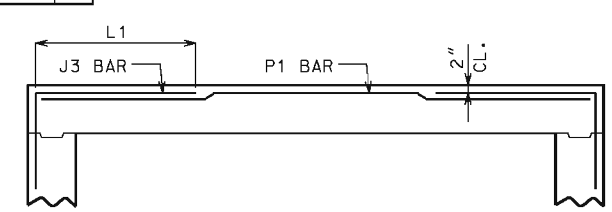
DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=8'	K2 HT=9'	K2 HT=10'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=8'	K3 HT=9'	K3 HT=10'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	12	11	8	5	6	5	8	76.8	33.0	36.5	40.0	5	6	5	6	76.8	103	115	127	5	12	12
2 FT	12	11	8	6	8	5	7	76.8	33.0	36.5	40.0	6	8	6	7.5	79.4	103	115	127	5	11.5	12
4 FT	8	10	9	6	8	6	6	59.4	28.4	31.5	34.6	6	7.5	6	7	68.4	102	114	126	5	12	0
6 FT	8	10	9	6	8	6	6	51.6	32.8	36.3	39.9	6	7.5	6	6.5	56.8	102	114	126	5	11.5	0
8 FT	9	10	9	6	8	6	7	49.0	33.0	36.6	40.3	6	7	6	6	51.6	102	114	126	5	11.5	0
10 FT	9	11	9	6	7.5	6	6	47.8	30.0	33.3	36.5	6	7	6	6.5	49.0	103	115	127	5	11	0
12 FT	9	11	9	6	7.5	6	6.5	43.9	30.0	33.3	36.5	6	7	6	6.5	43.9	103	115	127	5	12	0
14 FT	10	11	9	6	7	6	6.5	42.6	31.4	34.8	38.1	6	6	6	6	43.9	103	115	127	5	12	0
16 FT	10	12	9	6	6	6	6	42.6	30.5	33.8	37.0	7	8	6	6.5	42.6	104	116	128	5	10.5	0
18 FT	11	13	9	6	6	6	6	42.6	31.0	34.3	37.5	7	7.5	6	6.5	42.6	105	117	129	5	9.5	0
20 FT	12	14	9	7	7.5	6	6.5	41.3	32.8	36.1	39.5	7	7.5	6	6.5	42.6	106	118	130	5	8.5	0
22 FT	13	15	9	7	7.5	6	6	41.3	33.4	36.6	40.0	7	7.5	6	6.5	42.6	107	119	131	5	8.5	0
24 FT	14	16	10	7	7.5	6	7	41.6	35.1	38.6	42.0	7	7.5	6	8	42.9	108	120	132	5	8	0
26 FT	15	17	11	7	7.5	6	7	48.5	35.6	39.1	42.6	7	7.5	5	6	40.6	109	121	133	5	8.5	0
28 FT	16	18	11	7	7	6	7	48.5	36.3	39.8	43.3	7	7.5	5	6	40.6	110	122	134	5	7.5	0
30 FT	17	19	12	7	7	6	7.5	48.9	38.1	41.8	45.3	7	7	5	6	40.9	111	123	135	5	8	0
32 FT	17	19	12	7	6.5	6	7	48.9	38.1	41.8	45.3	7	7	5	6	40.9	111	123	135	5	7.5	0
34 FT	18	20	12	7	6.5	6	7	48.9	38.8	42.3	45.9	7	6.5	6	8.5	43.5	112	124	136	5	7	0
36 FT	19	21	12	7	6.5	6	6	48.9	39.3	42.9	46.5	7	6.5	6	8	43.5	113	125	137	5	7	0
38 FT	19	21	13	7	6	6	6	49.3	39.3	42.9	46.5	7	6.5	6	8	43.9	113	125	137	5	7	0
40 FT	20	22	13	7	6	6	6.5	49.3	41.3	45.0	48.6	7	6.5	6	8	43.9	114	126	138	5	6.5	0
42 FT	21	23	13	7	6	6	6	49.3	41.9	45.6	49.3	7	6.5	6	8	43.9	115	127	139	5	6.5	0
44 FT	21	23	14	7	6	6	6	49.6	41.9	45.6	49.3	7	6	6	7.5	44.3	115	127	139	5	6.5	0
46 FT	22	24	14	7	6	6	6.5	49.6	42.5	46.3	49.9	7	6	6	8	45.5	116	128	140	5	6	0
48 FT	23	25	14	8	7.5	6	6.5	49.6	43.1	46.8	50.5	7	6	6	8	45.5	117	129	141	5	6	0
50 FT	23	25	14	8	7	6	6	49.6	43.1	46.8	50.5	7	6	6	7.5	45.5	117	129	141	5	6	0

SPAN (S) = 10 FT — HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=11'	K2 HT=12'	K2 HT=13'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=11'	K3 HT=12'	K3 HT=13'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	11	11	9	6	8	6	7.5	80.0	31.3	33.8	36.4	6	7.5	6	6	80.0	139	151	163	5	8.5	12
2 FT	11	11	9	6	7.5	6	7	80.0	35.8	38.6	41.5	6	7.5	6	6	80.0	139	151	163	5	8.5	12
4 FT	9	11	9	6	8	6	6.5	80.0	33.8	36.6	39.4	6	7.5	6	6	80.0	139	151	163	5	8	0
6 FT	9	12	9	5	6	6	6	80.0	31.1	33.6	36.1	6	7.5	6	6	80.0	140	152	164	5	7.5	0
8 FT	9	12	10	5	6	6	6.5	75.4	31.1	33.6	36.1	6	7.5	6	6.5	80.6	140	152	164	5	7.5	0
10 FT	10	12	10	6	8	6	6.5	74.1	32.8	35.4	38.0	6	7	6	6	80.6	140	152	164	5	7	0
12 FT	10	12	10	6	8.5	6	6.5	58.5	32.8	35.4	38.0	6	7.5	6	6	71.5	140	152	164	5	8	0
14 FT	10	13	10	6	7.5	6	6	57.3	31.5	34.0	36.5	6	7	6	6	74.1	141	153	165	5	7	0
16 FT	11	13	11	6	7	6	6.5	56.4	33.3	35.9	38.5	6	6.5	6	6.5	65.5	141	153	165	5	7.5	0
18 FT	12	14	12	6	7	6	7.5	56.8	33.6	36.3	39.0	6	6.5	6	7.5	63.4	142	154	166	5	7	0
20 FT	13	15	12	6	6.5	6	7	56.8	35.6	38.4	41.1	6	6	6	7	64.6	143	155	167	5	7	0
22 FT	13	15	13	6	6	6	7	55.9	35.6	38.4	41.1	7	8	6	7	61.1	143	155	167	5	6.5	0
24 FT	14	16	13	6	6	6	6.5	57.3	36.1	38.9	41.6	7	7.5	6	7	61.1	144	156	168	5	6.5	0
26 FT	15	17	13	7	8	6	6	63.9	36.6	39.4	42.1	7	7.5	6	6	62.5	145	157	169	5	6.5	0
28 FT	16	18	14	7	8	6	6.5	63.0	38.6	41.5	44.4	7	7.5	6	6.5	61.6	146	158	170	5	6	0
30 FT	16	18	14	7	7	6	6	63.0	40.3	43.3	46.3	7	7	6	6	61.6	146	158	170	5	6	0
32 FT	17	19	15	7	7	6	6	63.5	42.4	45.5	48.6	7	7	6	6	60.8	147	159	171	6	8	0
34 FT	18	20	15	7	7	6	6	63.5	42.9	46.0	49.1	7	7	6	6	62.1	148	160	172	6	8	0
36 FT	19	21	16	7	7	6	6	63.9	43.4	46.5	49.6	7	7	6	6	62.5	149	161	173	6	8	0
38 FT	19	21	16	7	6.5	7	7.5	69.4	43.4	46.5	49.6	7	6.5	6	6	61.3	149	161	173	6	8	0
40 FT	20	22	17	7	6.5	6	6	64.4	45.6	48.9	52.1	7	6.5	6	6	61.6	150	162	174	6	7.5	0
42 FT	21	23	17	7	6.5	7	7.5	69.9	46.1	49.4	52.6	7	6.5	6	6	63.0	151	163	175	6	7.5	0
44 FT	21	23	18	7	6.5	6	6	64.9	46.1	49.4	52.6	7	6.5	6	6	62.1	151	163	175	6	7	0
46 FT	22	24	19	7	6.5	6	6	65.4	46.8	50.0	53.3	7	6.5	6	6	62.5	152	164	176	6	6.5	0
48 FT	23	25	19	7	6	6	6	65.4	47.3	50.5	53.8	7	6	6	6	62.5	153	165	177	6	6.5	0
50 FT	23	25	20	7	6	6	6	65.8	47.3	50.5	53.8	7	6	6	6	63.0	153	165	177	6	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 SINGLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 10 FEET
HEIGHT (HT): 5 THRU 13 FEET

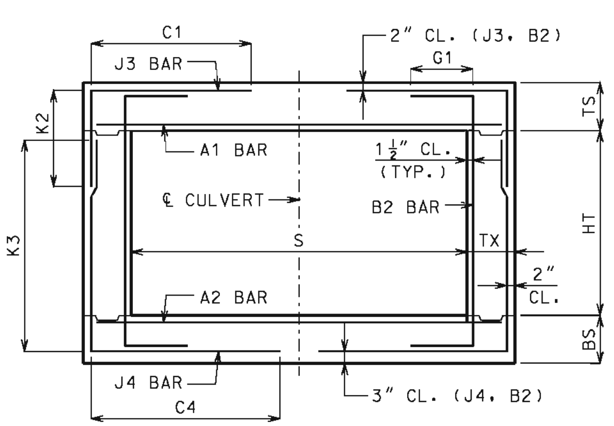
DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

SPAN (S) = 11 FT	HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT																					
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	HT=7'	HT=8'	SIZE	SPA.	SIZE	SPA.	C4	HT=6'	HT=7'	HT=8'	SIZE	SPA.	G1
1 FT	12	10	8	6	7.5	5	7	82.6	32.0	36.4	40.6	6	8	6	7.5	61.6	78	90	102	5	12	12
2 FT	12	10	8	6	7.5	5	6.5	82.6	32.0	36.4	40.6	6	7.5	6	7	53.3	78	90	102	5	12	12
4 FT	9	10	8	6	7	6	6.5	46.3	29.3	33.4	37.4	6	7	6	7.5	46.3	78	90	102	5	12	0
6 FT	9	10	8	6	7	6	6.5	43.4	29.3	33.4	37.4	6	6.5	6	6.5	42.0	78	90	102	5	12	0
8 FT	9	10	8	6	6.5	6	6	42.0	33.5	38.3	42.9	6	6	6	6	40.6	78	90	102	5	12	0
10 FT	10	11	8	6	6.5	6	6.5	39.3	30.8	35.0	39.3	7	8	6	7	37.8	79	91	103	5	12	0
12 FT	10	11	8	6	6.5	6	6.5	37.8	30.8	35.0	39.3	6	6	6	7	35.0	79	91	103	5	12	0
14 FT	10	11	8	7	7.5	6	6	36.4	34.4	39.0	43.6	7	7	6	6	35.0	79	91	103	5	12	0
16 FT	11	13	8	7	7	6	6	36.4	31.9	36.0	40.3	7	7	5	6.5	30.8	81	93	105	5	12	0
18 FT	11	14	8	7	6	7	6	39.3	31.3	35.4	39.5	7	6.5	5	7	29.4	82	94	106	5	12	0
20 FT	13	15	8	7	6.5	6	6.5	33.6	33.3	37.5	41.6	7	6.5	5	7	29.4	83	95	107	5	12	0
22 FT	14	16	8	7	6	6	6.5	33.6	34.9	39.3	43.5	7	6.5	5	7	29.4	84	96	108	5	12	0
24 FT	15	17	8	7	6	6	6.5	39.3	35.6	40.0	44.3	7	6.5	5	6.5	29.4	85	97	109	5	12	0
26 FT	16	18	8	7	6	6	6.5	37.8	36.4	40.6	45.0	7	6.5	5	6.5	29.4	86	98	110	5	10	0
28 FT	17	19	8	8	7.5	6	6.5	37.8	37.1	41.4	45.8	7	6	5	6.5	29.4	87	99	111	5	9.5	0
30 FT	18	20	8	8	7.5	6	6	37.8	38.9	43.3	47.8	7	6	5	6	29.4	88	100	112	5	9.5	0
32 FT	19	21	9	8	7.5	6	7	39.5	39.6	44.0	48.5	7	6	5	6.5	29.6	89	101	113	5	9	0
34 FT	20	22	10	8	7.5	6	8	39.8	40.4	44.8	49.3	7	6	5	7	31.3	90	102	114	5	10	0
36 FT	21	23	10	8	7.5	6	8	39.8	41.1	45.5	50.0	7	6	5	6.5	31.3	91	103	115	5	9	0
38 FT	22	23	10	8	7	6	8	39.8	42.5	47.1	51.6	8	7.5	5	6.5	31.3	91	103	115	5	8	0
40 FT	22	24	11	8	7	6	7	40.0	43.0	47.5	52.0	8	7.5	5	7	31.5	92	104	116	5	9	0
42 FT	23	25	11	8	7	6	8	40.0	43.8	48.3	52.9	8	7.5	5	7	31.5	93	105	117	5	8.5	0
44 FT	24	26	11	8	7	6	8	40.0	44.5	49.0	53.6	8	7.5	5	6.5	31.5	94	106	118	5	7.5	0
46 FT	25	26	11	8	6.5	6	8	40.0	46.0	50.8	55.4	8	7	5	6.5	31.5	94	106	118	5	7.5	0
48 FT	25	27	11	8	6.5	6	7.5	40.0	45.3	49.8	54.4	8	7	5	6	31.5	95	107	119	5	7.5	0
50 FT	26	27	11	8	6.5	6	8	40.0	46.8	51.5	56.1	8	7	5	6	31.5	95	107	119	5	7.5	0

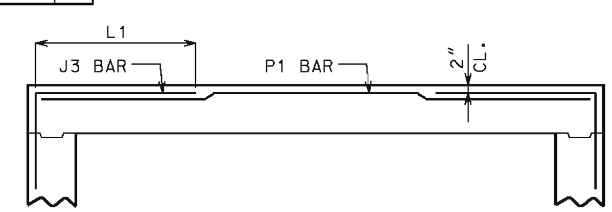
SPAN (S) = 11 FT	HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT																					
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=9'	HT=10'	HT=11'	SIZE	SPA.	SIZE	SPA.	C4	HT=9'	HT=10'	HT=11'	SIZE	SPA.	G1
1 FT	12	11	8	6	7.5	5	7	82.6	32.8	35.9	39.0	6	7.5	6	6.5	85.4	115	127	139	5	9.5	12
2 FT	12	11	8	6	7	5	6.5	82.6	32.8	35.9	39.0	6	7	6	6	85.4	115	127	139	5	9.5	12
4 FT	9	10	9	6	7	6	6.5	70.5	34.1	37.5	40.9	6	6.5	6	6	73.4	114	126	138	5	9.5	0
6 FT	9	11	9	6	7.5	6	6	57.8	30.8	33.8	36.8	6	6.5	6	6	64.9	115	127	139	5	9.5	0
8 FT	9	11	9	6	7	7	6.5	56.4	30.8	33.8	36.8	6	6	6	6	56.4	115	127	139	5	9	0
10 FT	10	12	9	6	6.5	6	6	50.8	31.3	34.3	37.3	6	6	6	6	55.0	116	128	140	5	8.5	0
12 FT	10	12	9	6	6.5	6	6	46.5	31.3	34.3	37.3	6	6	6	6	48.0	116	128	140	5	10	0
14 FT	11	12	9	6	6	6	6.5	45.1	35.3	38.6	42.0	7	7.5	6	6	46.5	116	128	140	5	9	0
16 FT	11	13	10	7	7.5	6	6	45.5	33.0	36.1	39.3	7	7	6	6.5	46.9	117	129	141	5	9.5	0
18 FT	12	14	10	7	7	6	6.5	45.5	32.3	35.3	38.3	7	7	6	6.5	45.5	118	130	142	5	8.5	0
20 FT	13	15	10	7	7	6	6	45.5	34.0	37.1	40.3	7	6.5	6	6.5	45.5	119	131	143	5	8	0
22 FT	14	16	11	7	7	6	6.5	45.8	35.9	39.1	42.4	7	6.5	6	7.5	45.8	120	132	144	5	8	0
24 FT	15	17	11	7	6.5	6	6	51.5	36.5	39.8	42.9	7	6.5	6	7.5	45.8	121	133	145	5	7.5	0
26 FT	16	18	12	7	6.5	6	6.5	51.9	37.0	40.3	43.5	7	6.5	6	8	46.1	122	134	146	5	7.5	0
28 FT	17	19	12	7	6.5	6	6.5	51.9	37.5	40.8	44.0	7	6.5	6	7.5	46.1	123	135	147	5	7	0
30 FT	18	20	13	7	6.5	6	6.5	52.3	38.1	41.3	44.5	7	6.5	6	8	46.4	124	136	148	5	7.5	0
32 FT	19	21	13	7	6	6	6.5	52.3	40.0	43.4	46.8	7	6	6	7.5	46.4	125	137	149	5	6.5	0
34 FT	20	22	13	7	6	6	6	52.3	40.6	44.0	47.4	7	6	6	7.5	46.4	126	138	150	5	6.5	0
36 FT	21	22	13	7	6	6	6	52.3	45.3	49.0	52.8	7	6	6	6.5	46.4	126	138	150	5	6.5	0
38 FT	21	23	14	8	7.5	6	6	52.5	41.1	44.5	47.9	7	6	6	7.5	46.8	127	139	151	5	6	0
40 FT	22	24	14	8	7.5	6	6	52.5	43.3	46.8	50.1	8	7.5	6	7	48.1	128	140	152	5	6	0
42 FT	23	25	15	8	7.5	6	6.5	52.9	48.4	52.1	56.0	8	7.5	6	7.5	48.5	129	141	153	5	6	0
44 FT	24	25	15	8	7	6	6.5	52.9	48.6	52.5	56.4	8	7	6	6.5	48.5	129	141	153	6	8	0
46 FT	24	26	15	8	7	6	6	52.9	49.0	52.8	56.6	8	7	6	7	48.5	130	142	154	6	8	0
48 FT	25	27	16	8	7	6	6	53.3	49.6	53.5	57.3	8	7	6	7.5	48.9	131	143	155	6	8	0
50 FT	26	27	16	8	6.5	6	6	53.3	51.5	55.5	59.4	8	7	6	6.5	48.9	131	143	155	6	8	0

SPAN (S) = 11 FT	HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT																					
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=12'	HT=13'	HT=14'	SIZE	SPA.	SIZE	SPA.	C4	HT=12'	HT=13'	HT=14'	SIZE	SPA.	G1
1 FT	12	12	9	6	7.5	6	7	86.0	32.6	35.0	37.4	6	7.5	6	6	86.0	152	164	176	5	8.5	12
2 FT	12	12	9	6	7	6	6.5	86.0	34.3	36.8	39.3	6	7	6	6	86.0	152	164	176	5	8	12
4 FT	9	11	10	6	7	6	6	86.6	33.4	35.9	38.4	6	6.5	6	6	86.6	151	163	175	5	7.5	0
6 FT	9	12	10	6	7.5	6	6	86.6	33.6	36.1	38.6	6	6.5	6	6	88.0	152	164	176	5	7	0
8 FT	10	13	10	6	7.5	6	6	86.6	34.0	36.5	39.0	6	7	6	6	86.6	153	165	177	5	6.5	0
10 FT	10	13	11	6	7	6	6	70.1	34.0	36.5	39.0	6	6.5	6	6.5	88.6	153	165	177	5	6.5	0
12 FT	10	13	11	6	7.5	6	6	60.0	32.4	34.8	37.3	6	6.5	6	6.5	74.4	153	165	177	5	7.5	0
14 FT	11	13	11	6	6.5	6	6	60.0	35.9	38.5	41.1	6	6	6	6	70.1	153	165	177	5	7	0
16 FT	12	14	12	6	6.5	6	7	60.5	36.3	39.0	41.6	7	8	6	6.5	67.6	154	166	178	5	7	0
18 FT	13	15	13	6	6	6	7	59.5	38.4	41.1	43.9	7	7.5	6	7	65.3	155	167	179	5	6.5	0
20 FT	14	16	13	6	6	6	6.5	60.9	38.9	41.6	44.4	7	7.5	6	6.5	66.8	156	168	180	5	6.5	0
22 FT	14	17	14	7	7.5	6	6.5	59.9	39.1	41.9	44.6	7	7	6	6.5	64.3	157	169	181	5	6	0
24 FT	15	17	14	7	7	6	6	65.8	39.4	42.1	44.9	7	6.5	6	6	64.3	157	169	181	5	6	0
26 FT	16	18	15	7	7	6	6	66.1	41.5	44.4	47.3	7	6.5	6	6	63.3	158	170	182	6	8	0
28 FT	17	19	15	7	7	6	6	66.1	42.0	44.9	47.8	7	6.5	6	6	64.6	159	171	183	6	8	0
30 FT	18	20	16	7	7	6	6	66.6	42.5	45.4	48.3	7	6.5	6	6	63.6	160	172	184	6	8	0
32 FT	19	21	16	7	6.5	7	8	72.5	44.8	47.8	50.8	7	6.5	7	8	68.1	161	173	185	6	8	0
34 FT	20	22	16	7	6.5	7	7	72.5	45.3	48.3	51.3	7	6.5	7	7	68.1	162	174	186	6	8	0
36 FT	20	22	17	7	6	7	7.5	71.5	50.6	54.0	57.4	7	6	7	7	67.0	162	174	186	6	7.5	0
38 FT	21	23	18	7	6	7	7.5	72.0	45.8	48.8	51.8	7	6	7	7.5	67.5	163	175	187	6	7	0
40 FT	22	24	18	7	6	7	7	73.5	46.3	49.3	52.3	7	6	7	7.5	69.0	164	176	188	6	7	0
42 FT	23	25	19	7	6	7	7.5	74.0	48.6	51.8	54.9	7	6	7	8	68.0	165	177	189	6	6.5	0
44 FT	23	26	20	7	6	7	7.5	73.0	47.0	50.0	53.0	7	6	6	6	65.4	166	178	190	6	6.5	0
46 FT	24	26	20	8	7.5	7	7	73.0	49.1	52.3	55.4	8	7.5	7	7.5	68.4	166	178	190	6	6.5	0
48 FT	25	27	21	8	7.5	7	7.5	73.5	49.6	52.8	55.9	8	7.5	7	8	68.9	167	179	191	6	6	0
50 FT	25	27	21	8	7	7	7	73.5	49.6	52.8	55.9	8	7	7	7	68.9	167	179	191	6	6	0



BAR DIMENSIONS DIAGRAM

SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 SINGLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 11 FEET
HEIGHT (HT): 6 THRU 14 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

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

SPAN (S) = 12 FT HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=6'	K2 HT=7'	K2 HT=8'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=6'	K3 HT=7'	K3 HT=8'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	13	10	8	6	7.5	5	8.5	89.6	33.3	37.8	42.1	6	7.5	6	6.5	57.8	78	90	102	5	12	12
2 FT	14	10	8	6	7	5	8.5	89.6	34.6	39.1	43.8	6	7	6	6	51.6	78	90	102	5	12	12
4 FT	10	11	8	6	6.5	6	6.5	47.1	30.8	35.0	39.3	6	6.5	5	6.5	42.5	79	91	103	5	12	0
6 FT	10	11	8	6	6.5	6	6.5	44.1	30.8	35.0	39.3	6	6	5	6	39.5	79	91	103	5	12	0
8 FT	10	11	8	6	6	6	6.5	41.0	30.8	35.0	39.3	7	7.5	6	6.5	39.5	79	91	103	5	12	0
10 FT	10	11	8	7	7	7	6	42.5	34.4	39.0	43.6	7	6.5	6	6	38.0	79	91	103	5	12	0
12 FT	11	12	8	7	7	6	6	38.0	35.1	39.8	44.5	7	6.5	6	6.5	36.5	80	92	104	5	12	0
14 FT	11	13	8	7	7	6	6	36.5	31.9	36.0	40.3	7	6.5	5	7	30.4	81	93	105	5	12	0
16 FT	12	14	8	7	6.5	6	6	35.0	32.5	36.8	41.0	7	6.5	5	7	30.4	82	94	106	5	12	0
18 FT	13	15	8	7	6	6	6.5	33.5	33.3	37.5	41.6	7	6	5	6.5	30.4	83	95	107	5	12	0
20 FT	15	17	8	7	6	6	7	39.5	35.6	40.0	44.3	7	6.5	5	7	30.4	85	97	109	5	12	0
22 FT	16	18	8	7	6	6	7	39.5	36.4	40.6	45.0	7	6	5	6.5	30.4	86	98	110	5	12	0
24 FT	17	19	8	8	7.5	6	7	39.5	37.1	41.4	45.8	7	6	5	6.5	30.4	87	99	111	5	11	0
26 FT	18	20	8	8	7	6	7	39.5	38.9	43.3	47.8	7	6	5	6	30.4	88	100	112	5	9.5	0
28 FT	19	21	8	8	7	6	7	39.5	39.6	44.0	48.5	7	6	6	7.5	33.5	89	101	113	5	9.5	0
30 FT	20	21	8	8	7	6	6.5	39.5	44.3	49.3	54.1	8	7	6	7.5	33.5	89	101	113	5	9.5	0
32 FT	21	23	9	8	7	6	7.5	39.8	41.1	45.5	50.0	8	7.5	5	6	30.6	91	103	115	5	8.5	0
34 FT	22	23	9	8	6.5	6	7.5	39.8	42.5	47.1	51.6	8	7	5	6	30.6	91	103	115	5	8.5	0
36 FT	23	24	9	8	6.5	6	7	39.8	47.9	52.9	58.0	8	7	6	7	33.6	92	104	116	5	8.5	0
38 FT	24	25	9	8	6.5	6	6.5	39.8	48.8	53.8	58.8	8	7	6	7	33.6	93	105	117	5	8.5	0
40 FT	24	26	10	8	6	6	7	40.0	44.5	49.0	53.6	8	7	5	6	30.8	94	106	118	5	8	0
42 FT	25	27	10	8	6	6	7	40.0	45.3	49.8	54.4	8	7	6	7	33.9	95	107	119	5	8	0
44 FT	26	27	10	8	6	6	7	40.0	50.4	55.5	60.5	8	6.5	6	7	33.9	95	107	119	5	8	0
46 FT	27	28	10	8	6	6	7	40.0	51.3	56.3	61.4	8	6.5	6	7	33.9	96	108	120	5	7.5	0
48 FT	28	29	11	8	6	6	7.5	40.3	52.1	57.1	62.1	8	6.5	6	7.5	34.1	97	109	121	5	7.5	0
50 FT	28	30	11	8	6	6	7.5	40.3	52.5	57.5	62.6	8	6.5	6	7	34.1	98	110	122	5	7.5	0

SPAN (S) = 12 FT HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT

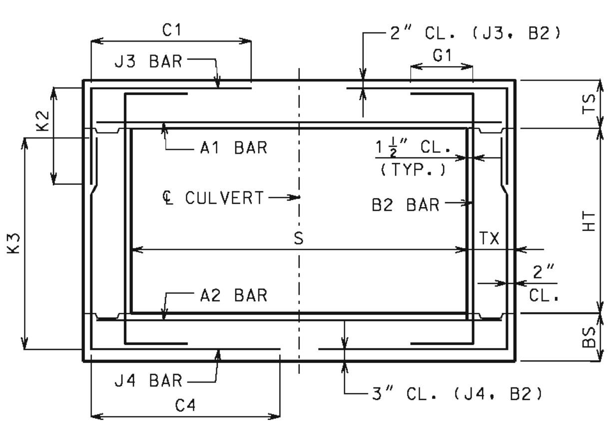
DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=9'	K2 HT=10'	K2 HT=11'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=9'	K3 HT=10'	K3 HT=11'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	11	12	8	6	6.5	6	7	91.3	31.5	34.5	37.5	6	7.5	6	7	91.3	116	128	140	5	10	12
2 FT	11	12	8	6	6	6	6.5	91.3	31.5	34.5	37.5	6	7	6	6.5	91.3	116	128	140	5	9.5	12
4 FT	10	12	8	6	6	6	6	69.9	30.0	32.9	35.8	6	6.5	6	6.5	83.6	116	128	140	5	9.5	0
6 FT	10	12	8	6	6.5	6	6	57.8	31.3	34.3	37.3	6	6	6	6	62.4	116	128	140	5	9.5	0
8 FT	10	12	8	6	6	6	6	52.0	31.3	34.3	37.3	7	8	6	6	55.1	116	128	140	5	10	0
10 FT	10	12	9	7	7.5	7	6	52.0	35.0	38.4	41.8	7	7	6	6	50.5	116	128	140	5	9.5	0
12 FT	11	13	10	7	7.5	6	6	49.3	33.0	36.1	39.3	7	7	6	6.5	49.3	117	129	141	5	10	0
14 FT	11	13	10	7	7.5	6	6	46.3	31.8	34.8	37.8	7	7	6	6.5	46.3	117	129	141	5	12	0
16 FT	12	14	10	7	7	6	6.5	46.3	32.3	35.3	38.3	7	6.5	6	7	44.6	118	130	142	5	11	0
18 FT	13	15	10	7	6.5	6	6	44.6	38.0	41.5	45.0	7	6	6	7	44.6	119	131	143	5	9.5	0
20 FT	14	16	10	7	6	7	7.5	47.8	38.6	42.0	45.5	7	6	6	6.5	44.6	120	132	144	5	8.5	0
22 FT	16	18	11	7	6.5	6	6.5	51.1	37.0	40.3	43.5	7	6.5	6	7.5	45.0	122	134	146	5	8.5	0
24 FT	17	19	11	7	6	6	6	49.6	37.5	40.8	44.0	7	6	6	7.5	45.0	123	135	147	5	7.5	0
26 FT	18	20	12	7	6	6	6.5	49.9	38.1	41.3	44.5	7	6	6	7.5	45.3	124	136	148	5	8	0
28 FT	19	21	12	7	6	6	6	49.9	40.0	43.4	46.8	7	6	6	7.5	45.3	125	137	149	5	7	0
30 FT	20	22	13	8	7.5	6	6.5	51.8	40.6	44.0	47.4	7	6	6	8	45.5	126	138	150	5	7.5	0
32 FT	21	23	13	8	7.5	6	6	50.3	41.1	44.5	47.9	8	7.5	6	7.5	45.5	127	139	151	5	7	0
34 FT	21	23	13	8	7	6	6	50.3	45.6	49.3	53.0	8	7	6	7	45.5	127	139	151	5	6.5	0
36 FT	22	24	14	8	7	6	6	52.1	43.3	46.8	50.1	8	7	6	7.5	45.9	128	140	152	5	7	0
38 FT	23	25	14	8	6.5	6	6	50.5	43.8	47.3	50.8	8	7	6	7.5	45.9	129	141	153	5	6	0
40 FT	24	26	14	8	6.5	6	6	50.5	44.4	47.9	51.4	8	7	6	7	45.9	130	142	154	5	6	0
42 FT	25	27	15	8	6.5	6	6	52.5	49.6	53.5	57.3	8	7	6	7.5	46.1	131	143	155	5	6	0
44 FT	26	28	15	8	6.5	6	6	52.5	50.3	54.1	57.9	8	6.5	6	7.5	47.8	132	144	156	6	8	0
46 FT	27	28	15	8	6.5	6	6	50.9	52.1	56.1	60.0	8	6.5	6	7	47.8	132	144	156	6	8	0
48 FT	27	29	15	8	6	6	6	52.5	52.5	56.4	60.4	8	6.5	6	7	47.8	133	145	157	6	8	0
50 FT	28	30	16	8	6	6	6	52.8	53.1	57.1	61.0	8	6.5	6	7.5	48.0	134	146	158	6	8	0

SPAN (S) = 12 FT HEIGHT (HT) = 12 FT OR 13 FT

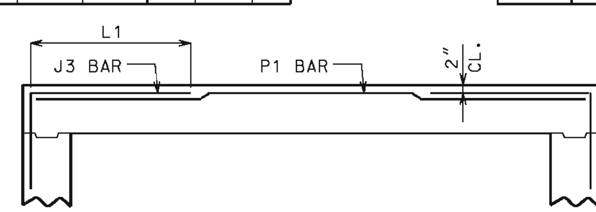
DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=12'	K2 HT=13'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=12'	K3 HT=13'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	12	11	9	6	6.5	5	6	90.3	32.4	34.8	6	6.5	6	6	91.8	151	163	5	8.5	12
2 FT	12	11	9	6	6.5	6	7	91.8	34.0	36.5	6	6.5	6	6	91.8	151	163	5	8.5	12
4 FT	10	12	9	6	6.5	6	6	91.8	35.4	38.0	6	6.5	6	6	91.8	152	164	5	8.5	0
6 FT	10	12	9	6	6.5	7	6.5	81.1	35.4	38.0	6	6	6	6	91.8	152	164	5	8	0
8 FT	10	12	10	6	6.5	6	6	64.6	35.4	38.0	7	7.5	6	6	73.9	152	164	5	8	0
10 FT	11	13	10	6	6	6	6	61.6	35.9	38.5	7	7.5	6	6	69.3	153	165	5	8	0
12 FT	12	13	11	6	6	6	6	58.9	36.1	38.8	7	7	6	6	62.0	153	165	5	7.5	0
14 FT	12	13	11	6	6	6	7	54.3	36.1	38.8	7	7	6	6	55.8	153	165	5	7.5	0
16 FT	12	14	11	7	7	6	6	52.8	36.3	39.0	7	6.5	6	6.5	55.8	154	166	5	7.5	0
18 FT	13	16	12	7	7	6	6	53.0	38.6	41.4	7	6.5	6	7	56.1	156	168	5	7	0
20 FT	14	16	12	7	6.5	6	6	53.0	38.9	41.6	7	6	6	6	54.6	156	168	5	7	0
22 FT	16	18	13	7	6.5	6	6	59.6	41.5	44.4	7	6.5	6	7	55.0	158	170	5	6.5	0
24 FT	16	19	13	7	6	7	7	64.4	40.0	42.8	7	6	6	6.5	55.0	159	171	5	6.5	0
26 FT	18	20	14	7	6.5	6	6	58.5	42.5	45.4	7	6	6	6.5	55.3	160	172	5	6	0
28 FT	18	21	14	7	6	7	7	63.3	42.8	45.6	7	6	6	6.5	55.3	161	173	5	6	0
30 FT	19	22	14	8	7.5	7	6.5	63.3	43.3	46.1	7	6	6	6	55.3	162	174	5	6	0
32 FT	20	23	15	8	7.5	7	7.5	63.6	45.5	48.5	8	7.5	6	6.5	55.6	163	175	6	8	0
34 FT	21	23	15	8	7	7	7	63.6	45.8	48.8	8	7	6	6	55.6	163	175	6	8	0
36 FT	22	24	16	8	7	7	7.5	64.0	46.3	49.3	8	7	6	6.5	56.0	164	176	6	8	0
38 FT	23	25	16	8	7	7	7	64.0	48.6	51.8	8	7	6	6	56.0	165	177	6	8	0
40 FT	24	26	17	8	7	7	7.5	64.4	49.1	52.3	8	7	6	6.5	56.4	166	178	6	7.5	0
42 FT	24	27	17	8	6.5	7	6.5	64.4	49.4	52.5	8	7	6	6	56.4	167	179	6	7.5	0
44 FT	25	28	18	8	6.5	7	7	66.4	49.9	53.0	8	7	6	6.5	56.8	168	180	6	7	0
46 FT	26	28	18	8	6.5	7	7	66.4	50.1	53.3	8	6.5	6	6	56.8	168	180	6	7	0
48 FT	27	29	19	8	6.5	7	7.5	66.9	52.6	55.9	8	6.5	6	6.5	57.0	169	181	6	6.5	0
50 FT	28	30	19	8	6.5	7	7	66.9	53.3	56.4	8	6.5	6	6	57.0	170	182	6	6.5	0

SPAN (S) = 12 FT HEIGHT (HT) = 14 FT OR 15 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=14'	K2 HT=15'	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=14'	K3 HT=15'	WALL BARS B2 BARS SIZE	B2 SPA.	G1
1 FT	12	12	10	6	7	6	7.5	94.0	35.5	37.8	6	7	6	6.5	94.0	176	188	5	7.5	12
2 FT	12	12	10	6	6.5	6	7	94.0	37.4	39.8	6	6.5	6	6	94.0	176	188	5	7.5	12
4 FT	10	13	10	6	6.5	6	6	94.0	35.4	37.6	6	6.5	6	6	94.0	177	189	5	6.5	0
6 FT	10	13	11	6	7	6	6.5	94.5	35.4	37.6	6	6.5	6	6.5	94.5	177	189	5	6.5	0
8 FT	10	13	11	6	6.5	6	6	85.3	35.4	37.6	6	6	6	6	94.5	177	189	5	6	0
10 FT	11	13	12	6	6.5	6	6.5	74.9	35.5	37.8	7	7.5	6	6	95.1	177	189	5	6	0
12 FT	12	14	13	6	6.5	6	7	70.6	37.8	40.3	7	7.5	6	6.5	83.3	178	190	5	6	0
14 FT	12	14	13	6	6.5	6	7	62.8	37.8	40.3	7	7.5	6	6.5	69.1	178	190	5	6.5	0
16 FT	13	15	13	6	6	6	6.5	64.4	38.3	40.6	7	7	6	6.5	70.6	179	191	5	6.5	0
18 FT	14	16	14	7	7.5	6	6.5	63.3	38.6	41.0	7	7	6	6.5	68.0	180	192	5	6	0
20 FT	15	17	14	7	7	6	6	69.5	39.0	41.4	7	6.5	6	6	68.0	181	193	5	6	0
22 FT	16	18	15	7	7	6	6	70.0	41.4	43.9	7	6.5	6	6.5	68.4	182	194	6	8	0
24 FT	16	19	15	7	6.5	7	7	73.1	41.6	44.1	7	6	6	6	68.4	183	195	6	8	0
26 FT	17	20	16	7	6.5	7	7	73.6	42.0	44.5	7	6	6	6	67.3	184	196	6	8	0
28 FT	18	21	16	7	6	7	7	75.3	46.5	49.3	7	6	7	7.5	72.0	185	197	6	8	0
30 FT	19	22	17	7	6	7	7	74.0	46.9	49.6	7	6	7	7.5	70.9	186	198	6	7.5	0
32 FT	20	23	17	7	6	7	6.5	75.6	47.4	50.1	7	6	7	7	70.9	187	199	6	7.5	0
34 FT	21	23	18	8	7.5	7	7	74.5	51.8	54.8	8	7.5	7	6.5	71.3	187	199	6	7	0
36 FT	22	24	19	8	7.5	7	7.5	75.0	52.3	55.3	8	7.5	7	7	70.1	188	200	6	6.5	0
38 FT	23	25	19	8	7.5	7	6.5	76.6	50.6	53.5	8	7	7	7	71.8	189	201	6	6.5	0
40 FT	24	26	20	8	7	7	7	75.5	51.1	54.0	8	7	7	7.5	70.5	190	202	6	6.5	0
42 FT	25	27	20	8	7	7	6.5	77.1	53.8	56.8	8	7	7	7	72.1	191	203	6	6.5	0
44 FT	25	28	21	8	7	7	6.5	75.9	54.0	57.0	8	7	7	7.5	72.6	192	204	6	6	0
46 FT	26	28	22	8	6.5	7	7	76.4	56.4	59.5	8	6.5	7	7	71.4	192	204	6	6	0
48 FT	27	29	22	8	6.5	7	6.5	76.4	59.1	62.4	8	6.5	7	6.5	71.4	193	205	6	6	0
50 FT	27	30	23	8	6.5	7	6.5	76.9	57.3	60.4	8	6.5	7	7	71.8	194	206	7	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 12 FEET
HEIGHT (HT): 6 THRU 15 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

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

SPAN (S) = 13 FT — HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=7′	HT=8′	HT=9′	SIZE	SPA.	SIZE	SPA.	C4	HT=7′	HT=8′	HT=9′	SIZE	SPA.	G1
1 FT	13	11	8	6	6.5	5	8.5	95.1	34.0	38.0	41.9	6	7	6	7	67.3	91	103	115	5	12	12
2 FT	13	11	8	6	6	5	6.5	95.1	34.0	38.0	41.9	6	6.5	6	6.5	59.0	91	103	115	5	12	12
4 FT	10	11	8	7	7.5	6	6	49.3	31.0	34.8	38.5	6	6	6	6.5	49.3	91	103	115	5	12	0
6 FT	10	11	8	7	7.5	6	6	45.9	34.0	38.1	42.1	7	7	6	6	45.9	91	103	115	5	12	0
8 FT	10	12	8	7	7	7	6	47.5	30.3	33.9	37.5	7	7	6	7	42.6	92	104	116	5	12	0
10 FT	11	12	8	7	6.5	7	6.5	44.3	35.8	39.9	44.1	7	6	6	6	41.0	92	104	116	5	12	0
12 FT	12	13	8	7	6	7	6.5	42.6	36.4	40.6	44.8	7	6	6	6.5	39.4	93	105	117	5	12	0
14 FT	12	14	8	7	6	7	6.5	41.0	32.5	36.3	40.0	7	6	5	6	32.8	94	106	118	5	12	0
16 FT	13	15	8	8	7.5	7	6.5	39.4	33.1	36.9	40.6	7	6	5	6	31.1	95	107	119	5	12	0
18 FT	14	16	8	8	7	7	7	37.8	34.9	38.8	42.5	8	7.5	6	8	34.5	96	108	120	5	12	0
20 FT	15	18	8	8	6.5	7	7	45.9	35.9	39.6	43.5	8	7.5	5	6	31.1	98	110	122	5	11.5	0
22 FT	17	19	8	8	7	6	6	41.0	38.0	41.9	45.9	8	7.5	6	8	34.5	99	111	123	5	9.5	0
24 FT	18	20	8	8	6.5	7	7.5	45.9	38.6	42.6	46.5	8	7	6	7.5	34.5	100	112	124	5	9.5	0
26 FT	19	21	9	8	6.5	6	6	41.3	39.3	43.3	47.3	8	7	5	6	31.4	101	113	125	5	9	0
28 FT	20	22	10	8	6.5	6	6.5	41.5	41.1	45.3	49.3	8	7	5	6	33.3	102	114	126	5	10	0
30 FT	21	23	10	8	6.5	6	6.5	41.5	41.9	45.9	50.0	8	6.5	5	6	33.3	103	115	127	5	9	0
32 FT	22	24	10	8	6	6	6	41.5	42.5	46.6	50.6	8	6.5	5	6	33.3	104	116	128	5	8	0
34 FT	23	25	11	8	6	6	6.5	41.8	43.1	47.3	51.4	8	6.5	5	6.5	33.4	105	117	129	5	8.5	0
36 FT	24	26	11	8	6	6	6.5	41.8	45.1	49.4	53.5	8	6.5	5	6	33.4	106	118	130	5	8	0
38 FT	25	27	12	8	6	6	6.5	42.0	45.9	50.0	54.3	8	6.5	5	6	33.6	107	119	131	5	8.5	0
40 FT	26	28	12	8	6	6	7	42.0	46.5	50.8	55.0	8	6.5	5	6	33.6	108	120	132	5	7.5	0
42 FT	27	29	12	9	7.5	6	7	42.0	51.3	55.9	60.4	8	6	6	8.5	37.0	109	121	133	5	7	0
44 FT	28	30	12	9	7	6	7	42.0	52.0	56.6	61.1	8	6	6	8	37.0	110	122	134	5	7	0
46 FT	29	30	12	9	7	6	7	42.0	53.9	58.5	63.1	8	6	6	7.5	37.0	110	122	134	5	7	0
48 FT	30	31	12	9	7	6	7	42.0	54.6	59.3	64.0	8	6	6	7.5	37.0	111	123	135	5	7	0
50 FT	30	32	12	9	7	6	6.5	42.0	55.0	59.6	64.4	8	6	6	7.5	37.0	112	124	136	5	7	0

SPAN (S) = 13 FT — HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT

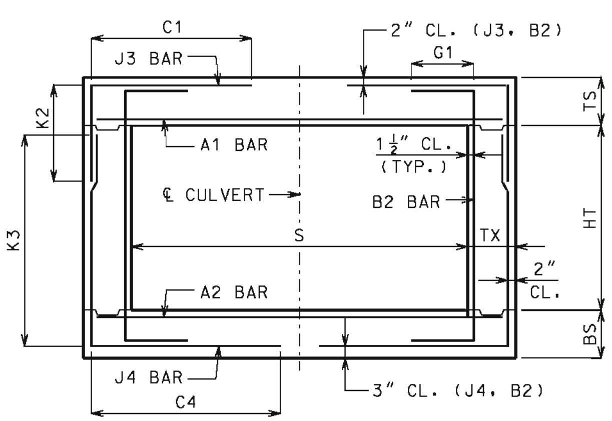
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=10′	HT=11′	HT=12′	SIZE	SPA.	SIZE	SPA.	C4	HT=10′	HT=11′	HT=12′	SIZE	SPA.	G1
1 FT	12	12	9	6	6.5	5	6	95.8	33.4	36.3	39.1	6	7	6	6.5	99.0	128	140	152	5	9	12
2 FT	12	13	9	6	6	6	7	99.0	32.3	35.0	37.8	6	6.5	6	7	99.0	129	141	153	5	9	12
4 FT	10	11	9	7	7.5	6	6	72.6	34.0	37.0	40.0	7	7.5	6	6	77.5	127	139	151	5	8.5	0
6 FT	10	11	10	6	6	6	6	61.4	34.0	37.0	40.0	7	7.5	6	6	63.1	127	139	151	5	9	0
8 FT	10	12	10	7	7.5	7	6	59.8	34.3	37.3	40.3	7	7	6	6.5	59.8	128	140	152	5	9	0
10 FT	11	13	10	7	7	6	6	54.8	36.1	39.3	42.4	7	6.5	6	6.5	56.5	129	141	153	5	8.5	0
12 FT	12	14	10	7	6.5	6	6	51.5	33.9	36.8	39.6	7	6.5	6	6	53.1	130	142	154	5	8	0
14 FT	12	14	10	7	6.5	6	6	48.1	33.9	36.8	39.6	7	6	6	6	48.1	130	142	154	5	9.5	0
16 FT	13	15	10	7	6	7	7	51.5	34.4	37.3	40.1	7	6	6	6	48.1	131	143	155	5	8	0
18 FT	14	16	11	7	6	7	7.5	51.8	39.1	42.4	45.6	8	7.5	6	6.5	48.4	132	144	156	5	8.5	0
20 FT	15	18	11	8	7.5	7	7	58.5	37.0	40.0	43.0	8	7.5	6	7	46.8	134	146	158	5	7.5	0
22 FT	17	19	12	8	7.5	6	6	53.8	39.3	42.4	45.5	8	7.5	6	7	48.8	135	147	159	5	7.5	0
24 FT	18	20	12	8	7	7	7.5	58.8	39.8	42.9	46.0	8	7	6	6.5	48.8	136	148	160	5	7	0
26 FT	19	21	13	8	7	7	8	59.1	40.3	43.4	46.5	8	7	6	7	49.0	137	149	161	5	7	0
28 FT	20	22	13	8	7	7	7.5	59.1	42.4	45.6	48.9	8	7	6	6.5	49.0	138	150	162	5	6.5	0
30 FT	21	23	14	8	7	7	8	59.5	46.1	49.6	53.1	8	7	6	7	49.3	139	151	163	5	7	0
32 FT	22	24	14	8	6.5	7	7.5	59.5	46.8	50.1	53.6	8	6.5	6	6.5	49.3	140	152	164	5	6	0
34 FT	23	25	14	8	6.5	7	7	59.5	44.0	47.3	50.5	8	6.5	6	6.5	49.3	141	153	165	5	6	0
36 FT	24	26	15	8	6.5	7	7.5	59.9	49.5	53.1	56.8	8	6.5	6	6.5	49.6	142	154	166	5	6	0
38 FT	25	27	15	8	6	7	7.5	59.9	50.1	53.8	57.3	8	6.5	6	6.5	49.6	143	155	167	6	8	0
40 FT	26	28	15	8	6	7	7	59.9	50.8	54.3	57.9	8	6.5	6	6.5	49.6	144	156	168	6	8	0
42 FT	27	29	16	8	6	7	7.5	60.3	51.3	54.9	58.5	8	6	6	6.5	49.9	145	157	169	6	8	0
44 FT	27	30	16	8	6	7	7.5	60.3	53.6	57.4	61.1	8	6	6	6.5	49.9	146	158	170	6	8	0
46 FT	28	30	16	9	7	7	6.5	60.3	53.6	57.4	61.1	8	6	6	6	49.9	146	158	170	6	8	0
48 FT	29	31	17	9	7	7	7.5	60.5	54.3	58.0	61.8	8	6	6	6.5	50.1	147	159	171	6	7.5	0
50 FT	30	32	17	9	7	7	7.5	60.5	54.9	58.6	62.3	8	6	6	6.5	50.1	148	160	172	6	7.5	0

SPAN (S) = 13 FT — HEIGHT (HT) = 13 FT OR 14 FT

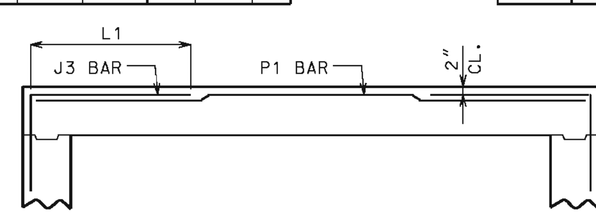
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
									K2							K3				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=13′	HT=14′	SIZE	SPA.	SIZE	SPA.	C4	HT=13′	HT=14′	SIZE	SPA.	G1
1 FT	12	12	9	6	6	6	6.5	99.0	36.8	39.3	6	6.5	6	6	99.0	164	176	5	8.5	12
2 FT	12	12	9	7	8	6	6.5	99.0	36.8	39.3	6	6	6	6	99.0	164	176	5	8	12
4 FT	10	12	10	6	6	6	6	99.6	34.6	37.0	7	8	6	6	99.6	164	176	5	8	0
6 FT	11	13	10	6	6	6	6.5	84.6	35.0	37.4	6	6	6	6.5	99.6	165	177	5	7.5	0
8 FT	11	13	10	6	6	7	6.5	74.8	35.0	37.4	7	7	6	6	84.6	165	177	5	7	0
10 FT	11	13	11	7	7.5	7	6.5	68.5	35.0	37.4	7	6.5	6	6	70.1	165	177	5	7.5	0
12 FT	12	14	12	7	7	6	6.5	62.1	37.1	39.8	7	6.5	6	6.5	67.3	166	178	5	7	0
14 FT	13	15	12	7	7	6	6	62.1	37.6	40.1	7	6	6	6	65.5	167	179	5	7	0
16 FT	13	15	12	7	6.5	7	7	60.5	37.6	40.1	7	6	6	6.5	58.8	167	179	5	7	0
18 FT	14	17	13	7	6.5	7	8	59.1	38.3	40.8	7	6	6	6.5	59.1	169	181	5	6.5	0
20 FT	15	18	13	7	6	7	7	67.6	40.5	43.1	7	6	6	6	59.1	170	182	5	6.5	0
22 FT	17	19	14	7	6	7	7.5	68.0	41.1	43.8	7	6	6	6	59.5	171	183	5	6	0
24 FT	18	20	14	7	6	7	7.5	66.3	43.5	46.3	8	7.5	6	6	59.5	172	184	5	6	0
26 FT	19	21	15	8	7.5	7	7.5	66.8	43.9	46.8	8	7	6	6	58.1	173	185	6	8	0
28 FT	20	22	15	8	7	7	7	66.8	44.4	47.1	8	7	6	6	58.1	174	186	6	8	0
30 FT	21	23	16	8	7	7	7	67.1	46.8	49.6	8	7	6	6	58.5	175	187	6	8	0
32 FT	22	24	16	8	7	7	7	67.1	49.3	52.3	8	7	7	7.5	61.9	176	188	6	8	0
34 FT	23	25	17	8	6.5	7	7	67.5	47.8	50.6	8	6.5	6	6	58.9	177	189	6	7.5	0
36 FT	24	26	17	8	6.5	7	6.5	67.5	52.3	55.4	8	6.5	7	7.5	62.3	178	190	6	7.5	0
38 FT	25	27	18	8	6.5	7	7	67.9	50.8	53.8	8	6.5	6	6	59.1	179	191	6	7	0
40 FT	25	28	18	8	6	7	6	67.9	51.0	54.0	8	6.5	6	6	59.1	180	192	6	7	0
42 FT	26	29	19	8	6	7	6.5	68.3	51.5	54.5	8	6.5	6	6	59.5	181	193	6	6.5	0
44 FT	27	30	19	8	6	7	6	68.3	52.0	55.0	8	6	6	6	59.5	182	194	6	6.5	0
46 FT	28	31	20	8	6	7	6.5	68.6	52.5	55.5	8	6	6	6	59.9	183	195	6	6.5	0
48 FT	29	31	20	8	6	7	6	68.6	57.0	60.3	8	6	7	7.5	63.4	183	195	6	6.5	0
50 FT	30	32	21	9	7.5	7	7	69.0	55.4	58.5	8	6	6	6	60.1	184	196	6	6	0

SPAN (S) = 13 FT — HEIGHT (HT) = 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
									K2							K3				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=15′	HT=16′	SIZE	SPA.	SIZE	SPA.	C4	HT=15′	HT=16′	SIZE	SPA.	G1
1 FT	13	13	11	6	6.5	5	6	98.5	34.1	36.3	6	6.5	6	7	100.3	189	201	5	7	12
2 FT	13	13	11	6	6.5	6	7.5	100.3	36.1	38.4	6	6.5	6	6.5	100.3	189	201	5	7	12
4 FT	10	13	11	6	6	6	6	100.3	35.6	37.8	6	6	6	6	100.3	189	201	5	6	0
6 FT	10	13	12	6	6.5	6	6	100.8	35.6	37.8	6	6	6	6	100.8	189	201	5	6	0
8 FT	11	13	12	6	6	6	6	94.1	35.9	38.0	7	7.5	6	6	100.8	189	201	6	8	0
10 FT	12	14	13	6	6	6	6.5	81.1	36.1	38.4	7	7	6	6	103.1	190	202	6	8.5	0
12 FT	13	15	14	6	6	6	6.5	74.8	38.6	40.9	7	7	6	6	85.0	191	203	5	6	0
14 FT	14	16	14	7	7.5	6	6	74.8	39.0	41.3	7	6.5	6	6	85.0	192	204	6	8	0
16 FT	14	16	14	7	7	6	6	68.0	39.0	41.3	7	6.5	6	6	73.1	192	204	5	6	0
18 FT	15	17	14	7	6.5	7	7.5	78.3	43.5	46.0	7	6	7	7	76.5	193	205	6	8	0
20 FT	16	18	15	7	6.5	7	7.5	78.6	43.9	46.4	7	6	7	8	75.3	194	206	6	8	0
22 FT	17	19	16	7	6.5	7	7.5	77.4	46.4	49.0	7	6	7	8	74.0	195	207	6	8	0
24 FT	18	20	16	7	6	7	7	77.4	46.9	49.5	8	7.5	7	7	74.0	196	208	6	8	0
26 FT	19	21	17	7	6	7	7	77.9	49.5	52.3	8	7.5	7	7	74.4	197	209	6	7.5	0
28 FT	20	23	18	7	6	7	7	78.3	48.0	50.6	8	7.5	7	7	74.9	199	211	6	7	0
30 FT	21	23	18	8	7.5	7	7	78.3	52.5	55.5	8	7	7	6.5	74.9	199	211	6	7	0
32 FT	22	24	19	8	7	7	7	78.8	53.0	55.9	8	7	7	6.5	73.5	200	212	6	6.5	0
34 FT	23	25	19	8	7	7	6	78.8	53.5	56.4	8	6.5	7	6	73.5	201	213	6	6.5	0
36 FT	24	26	20	8	7	7	6.5	79.3	54.0	56.9	8	6.5	7	6.5	73.9	202	214	6	6.5	0
38 FT	25	27	21	8	6.5	7	6.5	79.6	56.8	59.8	8	6.5	7	7	74.4	203	215	6	6	0
40 FT	25	28	22	8	6.5	7	6	78.4	57.0	60.0	8	6.5	7	7	74.8	204	216	6	6	0
42 FT	26	29	22	8	6.5	7	6	80.1	57.5	60.5	8	6.5	7	7	74.8	205	217	6	6	0
44 FT	27	30	23	8	6.5	7	6	80.5	58.0	61.0	8	6.5	7	7	75.1	206	218	7	7.5	0
46 FT	28	31	24	8	6	7	6.5	81.0	58.5	61.5	8	6	7	7	75.6	207	219	7	7.5	0
48 FT	29	31	24	8	6	7	6	81.0	61.1	64.3	8	6	7	6.5	75.6	207	219	7	7.5	0
50 FT	29	32	25	8	6	7	6	79.6	59.0	62.0	8	6	7	6.5	76.0	208	220	7	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2′-0″. DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS. WHERE L1 IS EQUAL TO 18″, 22″ AND 28″ FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET
HEIGHT (HT): 7 THRU 16 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

SPAN (S) = 14 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=7'	K2 HT=8'	K2 HT=9'	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=7'	K3 HT=8'	K3 HT=9'	SIZE	SPA.	G1
1 FT	13	12	8	6	6	5	7	102.1	33.3	37.1	41.0	6	6.5	6	6.5	66.9	92	104	116	5	12	12
2 FT	13	12	8	7	8	5	6	102.1	33.3	37.1	41.0	6	6	6	6	58.1	92	104	116	5	12	12
4 FT	10	11	8	7	6.5	7	6	52.8	34.0	38.1	42.1	7	7	6	6	49.3	91	103	115	5	12	0
6 FT	11	12	8	7	7	6	6	45.8	31.6	35.4	39.0	7	7	6	7	44.0	92	104	116	5	12	0
8 FT	11	12	8	7	6.5	7	6.5	45.8	35.8	39.9	44.1	7	6	6	6	42.3	92	104	116	5	12	0
10 FT	12	13	8	7	6	7	6.5	44.0	33.3	37.1	41.0	8	7.5	6	6.5	38.8	93	105	117	5	12	0
12 FT	12	14	8	8	7	7	6	42.3	36.8	41.0	45.1	8	7	6	7	37.0	94	106	118	5	12	0
14 FT	13	16	8	8	6.5	7	6	42.3	33.5	37.3	40.9	8	7	5	6	31.6	96	108	120	5	12	0
16 FT	13	16	8	8	6.5	7	6	40.5	33.5	37.3	40.9	8	7	5	6	31.6	96	108	120	5	12	0
18 FT	15	17	8	8	6.5	7	7	45.8	35.5	39.4	43.3	8	6.5	6	7.5	35.3	97	109	121	5	12	0
20 FT	16	19	8	8	6	7	6.5	45.8	36.5	40.4	44.1	8	7	5	6	31.6	99	111	123	5	11.5	0
22 FT	18	20	8	8	6	7	7.5	45.8	38.6	42.6	46.5	8	6.5	6	7.5	35.3	100	112	124	5	9.5	0
24 FT	19	21	8	8	6	7	7	45.8	44.0	48.5	52.9	8	6.5	6	7.5	35.3	101	113	125	5	9.5	0
26 FT	21	23	9	8	6	6	6.5	42.5	41.9	45.9	50.0	8	6.5	5	6	33.6	103	115	127	5	8.5	0
28 FT	22	24	9	8	6	6	6	42.5	46.3	50.8	55.1	8	6.5	6	7	35.4	104	116	128	5	8.5	0
30 FT	23	25	10	8	6	6	6.5	42.8	43.1	47.3	51.4	8	6.5	5	6	33.9	105	117	129	5	8.5	0
32 FT	24	26	10	9	7.5	6	6	42.8	45.1	49.4	53.5	8	6	5	6	33.9	106	118	130	5	8	0
34 FT	25	27	11	9	7	6	7	43.0	45.9	50.0	54.3	8	6	5	6	34.0	107	119	131	5	8.5	0
36 FT	26	28	11	9	7	6	7	43.0	46.5	50.8	55.0	8	6	5	6	34.0	108	120	132	5	7.5	0
38 FT	27	29	11	9	7	6	7	43.0	51.3	55.9	60.4	8	6	6	7.5	37.6	109	121	133	5	7.5	0
40 FT	28	30	11	9	7	6	6.5	43.0	52.0	56.6	61.1	8	6	6	7	37.6	110	122	134	5	7.5	0
42 FT	29	31	12	9	6.5	6	7	43.3	54.3	58.9	63.6	9	7.5	6	7.5	37.8	111	123	135	5	7	0
44 FT	30	32	12	9	6.5	6	7	43.3	55.0	59.6	64.4	9	7	6	7.5	37.8	112	124	136	5	7	0
46 FT	31	33	12	9	6.5	6	7	43.3	55.8	60.5	65.1	9	7	6	7	37.8	113	125	137	5	7	0
48 FT	32	33	12	9	6.5	6	7	43.3	56.1	60.9	65.5	9	7	6	7	37.8	113	125	137	5	7	0
50 FT	33	34	12	9	6.5	6	7	43.3	58.4	63.3	68.0	9	7	6	7	37.8	114	126	138	5	6.5	0

SPAN (S) = 14 FT HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT

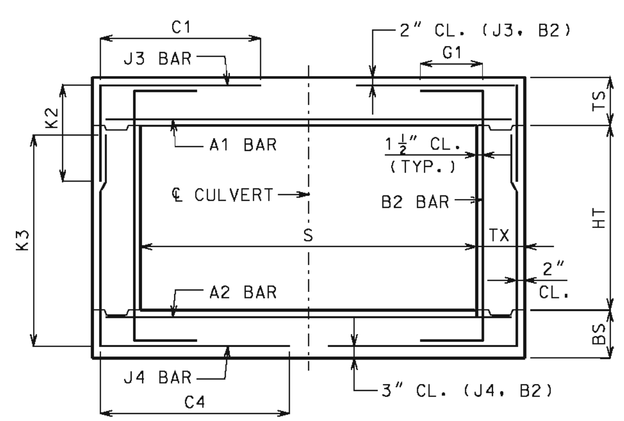
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=10'	K2 HT=11'	K2 HT=12'	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=10'	K3 HT=11'	K3 HT=12'	SIZE	SPA.	G1
1 FT	13	12	9	6	6	5	6.5	102.6	33.6	36.5	39.4	6	6	6	6	106.3	128	140	152	5	9	12
2 FT	13	12	9	7	7.5	5	6	102.6	33.6	36.5	39.4	7	7.5	6	6	106.3	128	140	152	5	8.5	12
4 FT	11	12	9	7	7	6	6.5	69.0	35.9	39.0	42.1	7	7.5	6	6	72.6	128	140	152	5	9	0
6 FT	11	12	9	7	7	6	6	60.1	35.9	39.0	42.1	7	6.5	6	6	62.0	128	140	152	5	9	0
8 FT	11	12	10	7	7	6	6	55.1	35.9	39.0	42.1	7	6.5	6	6	57.0	128	140	152	5	10	0
10 FT	12	13	10	7	6.5	6	6	53.4	36.4	39.5	42.6	7	6	6	6	53.4	129	141	153	5	9.5	0
12 FT	12	14	10	8	7.5	7	6	55.1	36.6	39.8	42.9	8	7	6	6	51.6	130	142	154	5	9	0
14 FT	14	16	10	8	7.5	7	7	53.4	39.1	42.4	45.6	8	7.5	6	6	49.9	132	144	156	5	8	0
16 FT	14	16	10	8	7	7	7	49.9	39.1	42.4	45.6	8	7	6	6.5	46.3	132	144	156	5	9	0
18 FT	15	17	11	8	7	7	7.5	59.1	39.8	42.9	46.1	8	7	6	6	46.5	133	145	157	5	9.5	0
20 FT	16	19	11	8	6.5	7	6.5	57.3	37.5	40.5	43.5	8	7	6	7	46.5	135	147	159	5	8	0
22 FT	18	20	12	8	7	7	7.5	57.6	39.8	42.9	46.0	8	7	6	6.5	46.8	136	148	160	5	8	0
24 FT	19	21	12	8	6.5	7	7	57.6	43.4	46.8	50.1	8	6.5	6	6.5	46.8	137	149	161	5	7.5	0
26 FT	20	23	13	8	6.5	7	7	57.9	41.1	44.3	47.4	8	6.5	6	7	47.0	139	151	163	5	7.5	0
28 FT	21	24	13	8	6	7	6.5	57.9	43.3	46.5	49.6	8	6.5	6	7	47.0	140	152	164	5	7	0
30 FT	22	25	14	8	6	7	6.5	58.3	43.8	47.0	50.3	8	6.5	6	7	47.4	141	153	165	5	7	0
32 FT	24	26	14	8	6	7	7.5	58.3	46.3	49.5	52.9	8	6	6	6.5	47.4	142	154	166	5	6.5	0
34 FT	25	27	14	8	6	7	7.5	58.3	46.8	50.1	53.5	8	6	6	6.5	47.4	143	155	167	5	6	0
36 FT	26	28	14	9	7.5	7	6.5	58.3	47.4	50.6	54.0	8	6	6	6.5	47.4	144	156	168	5	6	0
38 FT	27	29	15	9	7	7	7.5	58.5	51.3	54.9	58.5	8	6	6	6.5	47.6	145	157	169	6	8	0
40 FT	28	30	15	9	7	7	7.5	58.5	53.6	57.4	61.1	8	6	6	6.5	47.6	146	158	170	6	8	0
42 FT	29	31	15	9	7	7	6.5	58.5	54.3	58.0	61.8	9	7.5	6	6.5	47.6	147	159	171	6	8	0
44 FT	30	32	16	9	7	7	7.5	58.9	54.9	58.6	62.3	9	7	6	6.5	49.6	148	160	172	6	8	0
46 FT	31	33	16	9	6.5	7	7.5	58.9	55.5	59.3	62.9	9	7	6	6.5	49.6	149	161	173	6	8	0
48 FT	31	33	16	9	6.5	7	6.5	58.9	55.5	59.3	62.9	9	7	6	6	49.6	149	161	173	6	8	0
50 FT	32	34	17	9	6.5	7	7	59.3	56.1	59.9	63.5	9	7	6	6.5	50.0	150	162	174	6	7.5	0

SPAN (S) = 14 FT HEIGHT (HT) = 13 FT OR 14 FT

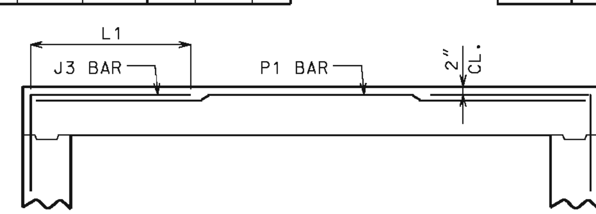
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=13'	K2 HT=14'	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=13'	K3 HT=14'	SIZE	SPA.	G1
1 FT	12	12	10	6	6	6	7	105.0	36.8	39.3	6	6	6	6	105.0	164	176	5	8	12
2 FT	13	13	10	7	8	6	7	105.0	35.4	37.8	7	8	6	6.5	105.0	165	177	5	8	12
4 FT	11	12	10	7	7.5	6	6.5	105.0	36.5	39.0	7	7	6	6	105.0	164	176	5	8	0
6 FT	11	13	10	7	7.5	6	6	76.5	35.0	37.4	7	7	6	6	87.3	165	177	5	8	0
8 FT	11	13	11	7	7.5	6	6	66.3	35.0	37.4	7	6.5	6	6	71.6	165	177	5	7.5	0
10 FT	12	14	11	7	7	6	6	64.5	37.1	39.8	7	6	6	6	68.0	166	178	5	7.5	0
12 FT	13	15	12	7	6.5	6	6	61.3	37.6	40.1	7	6	6	6.5	64.8	167	179	5	7	0
14 FT	14	16	13	7	6.5	6	6	59.8	38.0	40.5	7	6	6	6.5	63.4	168	180	5	6.5	0
16 FT	14	16	13	7	6	7	8	59.8	38.0	40.5	8	7.5	6	6	56.1	168	180	5	7.5	0
18 FT	15	18	13	7	6	7	7	67.0	40.5	43.1	8	7.5	6	6.5	56.1	170	182	5	6.5	0
20 FT	16	19	13	8	7	7	6.5	65.1	40.9	43.5	8	7	6	6	56.1	171	183	5	6.5	0
22 FT	18	20	14	8	7	7	7	65.5	43.5	46.3	8	7	6	6	56.4	172	184	5	6	0
24 FT	19	22	14	8	7	7	7	65.5	44.1	46.9	8	7	6	6	56.4	174	186	5	6	0
26 FT	20	23	15	8	6.5	7	7	65.9	44.6	47.4	8	6.5	6	6	56.8	175	187	6	8	0
28 FT	21	24	15	8	6.5	7	6.5	65.9	45.1	47.9	8	6.5	6	6	56.8	176	188	6	8	0
30 FT	22	25	16	8	6.5	7	6.5	66.3	47.5	50.4	8	6.5	6	6	57.0	177	189	6	8	0
32 FT	23	26	16	8	6	7	6	66.3	50.0	53.0	8	6	7	8	58.9	178	190	6	8	0
34 FT	24	27	17	8	6	7	6	66.6	48.5	51.4	8	6	6	6	57.4	179	191	6	7.5	0
36 FT	25	28	17	8	6	7	6	66.6	53.0	56.1	8	6	7	8	59.3	180	192	6	7.5	0
38 FT	26	29	18	9	7.5	7	6	67.0	51.5	54.5	8	6	6	6	57.6	181	193	6	7	0
40 FT	27	30	18	9	7	7	6	67.0	54.1	57.3	8	6	7	8	61.4	182	194	6	7	0
42 FT	28	31	19	9	7	7	6	67.4	52.5	55.5	9	7.5	6	6	58.0	183	195	6	6.5	0
44 FT	29	32	19	9	7	7	6	67.4	57.3	60.5	9	7	7	8	61.8	184	196	6	6.5	0
46 FT	30	33	20	9	7	7	6.5	67.6	55.6	58.8	9	7	6	6	58.3	185	197	6	6.5	0
48 FT	31	34	20	9	6.5	7	6	67.6	58.4	61.5	9	7	7	8	62.0	186	198	6	6.5	0
50 FT	32	35	21	9	6.5	7	6.5	69.9	56.6	59.8	9	7	6	6	58.6	187	199	6	6	0

SPAN (S) = 14 FT HEIGHT (HT) = 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS							BOTTOM SLAB BARS							WALL BARS		
				A1 BARS		J3 BARS					A2 BARS		J4 BARS					B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=15'	K2 HT=16'	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=15'	K3 HT=16'	SIZE	SPA.	G1
1 FT	12	13	11	6	6	6	6	105.6	36.0	38.1	6	6	6	6.5	105.6	189	201	5	7	12
2 FT	13	14	11	6	6	6	7	105.6	38.4	40.6	6	6	6	6.5	105.6	190	202	5	7	12
4 FT	11	13	11	7	7.5	6	6	105.6	35.9	38.0	7	7.5	6	6	105.6	189	201	5	6	0
6 FT	11	13	12	6	6	6	6.5	99.0	35.9	38.0	7	7	6	6	108.0	189	201	5	6	0
8 FT	12	14	12	7	8	6	6.5	86.4	36.1	38.4	7	7	6	6	108.0	190	202	5	6	0
10 FT	12	15	13	7	7.5	6	6	74.3	36.4	38.5	7	6.5	6	6.5	90.5	191	203	5	6	0
12 FT	13	16	14	7	7	6	6	71.0	38.8	41.0	7	6.5	6	6.5	81.9	192	204	5	6	0
14 FT	14	17	14	7	6.5	7	7.5	72.8	39.1	41.4	7	6	6	6	78.3	193	205	5	6	0
16 FT	14	17	14	7	6.5	7	7.5	67.4	39.1	41.4	7	6	6	6	69.1	193	205	5	6	0
18 FT	15	18	14	7	6	7	7	76.5	43.6	46.3	8	7	7	7	72.8	194	206	5	6	0
20 FT	16	19	15	8	7.5	7	6.5	75.0	44.1	46.6	8	7	7	7.5	71.4	195	207	6	8	0
22 FT	18	20	16	8	7.5	7	7	75.5	49.0	51.8	8	7	7	7	71.8	196	208	6	8	0
24 FT	19	22	16	8	7	7	6.5	75.5	47.5	50.1	8	7	7	7	71.8	198	210	6	8	0
26 FT	20	23	17	8	7	7	6.5	75.9	48.0	50.6	8	6.5	7	7	72.1	199	211	6	7.5	0
28 FT	21	24	18	8	7	7	6.5	76.3	48.4	51.0	8	6.5	7	7	70.6	200	212	6	7	0
30 FT	22	25	18	8	6.5	7	6	76.3	51.0	53.9	8	6.5	7	6.5	70.6	201	213	6	7	0
32 FT	23	26	19	8	6.5	7	6	76.6	51.5	54.3	8	6.5	7	7	71.0	202	214	6	6.5	0
34 FT	24	27	20	8	6.5	7	6	77.1	52.0	54.8	8	6	7	7	71.5	203	215	6	6.5	0
36 FT	25	28	20	8	6	7	6	77.1	52.5	55.3	8	6	7	6.5	71.5	204	216	6	6.5	0
38 FT	26	29	21	8	6	7	6	77.5	55.3	58.1	8	6	7	7	71.9	205	217	6	6	0
40 FT	27	30	22	8	6	7	6	77.9	58.0	61.0	8	6	7	7	72.3	206	218	6	6	0
42 FT	28	31	23	8	6	7	6.5	78.3	58.5	61.5	8	6	7	7.5	72.6	207	219	7	8	0
44 FT	29	32	23	9	7.5	7	6	78.3	59.0	62.0	9	7.5	7	7	72.6	208	220	7	7.5	0
46 FT	30	33	24	9	7	7	6	78.8	61.9	65.0	9	7	7	7	73.0	209	221	7	7.5	0
48 FT	31	34	25	9	7	7	6.5	79.1	62.4	65.5	9	7	7	7	73.4	210	222	7	7.5	0
50 FT	32	35	25	9	7	7	6	79.1	62.9	66.0	9	7	7	7	73.4	211	223	7	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS. WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET
HEIGHT (HT): 7 THRU 16 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

SPAN (S) = 15 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

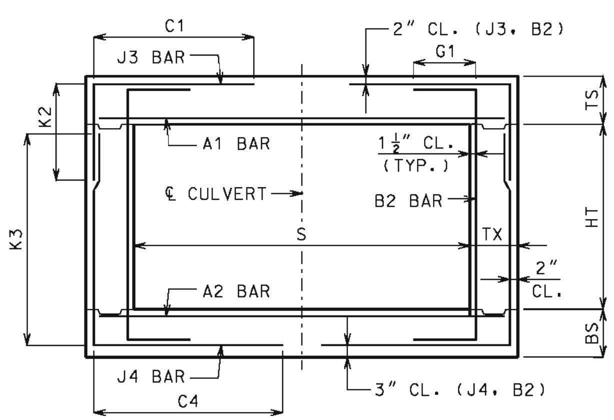
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	HT=9'	HT=10'	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	HT=9'	HT=10'	SIZE	SPA.	G1
1 FT	12	13	8	7	7	6	7	109.0	32.5	35.9	39.3	6	6	6	7	82.8	105	117	129	5	12	12
2 FT	12	13	8	7	6.5	6	6.5	109.0	33.6	37.1	40.6	7	7.5	6	6.5	65.8	105	117	129	5	12	12
4 FT	11	12	8	7	6	6	6	52.6	35.4	39.0	42.8	7	7	6	6	52.6	104	116	128	5	12	0
6 FT	11	12	9	7	6.5	6	6	51.0	35.4	39.0	42.8	7	6.5	6	6	49.1	104	116	128	5	12	0
8 FT	11	12	9	7	6	7	6	51.0	35.4	39.0	42.8	8	7.5	6	6	47.3	104	116	128	5	12	0
10 FT	12	14	9	8	7.5	7	6	49.1	32.8	36.1	39.5	8	7	6	7	43.5	106	118	130	5	12	0
12 FT	13	15	9	8	6.5	7	6.5	47.3	34.5	38.0	41.5	8	6.5	6	7	41.6	107	119	131	5	12	0
14 FT	14	17	9	8	6.5	7	6.5	45.4	34.1	37.5	40.9	8	6.5	6	8	39.8	109	121	133	5	12	0
16 FT	14	17	9	8	6	7	6	43.5	34.1	37.5	40.9	8	6.5	6	8	37.8	109	121	133	5	12	0
18 FT	16	19	9	8	6	7	7	49.1	36.5	40.0	43.5	8	6.5	6	8	37.8	111	123	135	5	12	0
20 FT	17	20	9	9	7.5	7	6	49.1	37.1	40.6	44.1	8	6.5	6	7.5	37.8	112	124	136	5	11	0
22 FT	19	21	9	9	7.5	7	7	49.1	43.3	47.3	51.1	8	6	6	7	37.8	113	125	137	5	9	0
24 FT	21	23	10	8	6	6	6	43.8	41.9	45.6	49.3	8	6	6	8	38.0	115	127	139	5	9	0
26 FT	22	24	11	9	7.5	6	6	43.9	42.5	46.3	49.9	8	6	6	8	38.3	116	128	140	5	10.5	0
28 FT	23	25	11	9	7	6	6	43.9	43.1	46.8	50.5	8	6	6	8	38.3	117	129	141	5	9	0
30 FT	24	26	11	9	7	7	7.5	49.6	49.4	53.5	57.8	9	7.5	6	7	38.3	118	130	142	5	8	0
32 FT	26	28	12	9	7	6	6.5	46.1	46.4	50.3	54.1	8	6	6	8.5	38.4	120	132	144	5	8	0
34 FT	27	29	12	9	7	6	6.5	46.1	51.5	55.6	59.9	9	7.5	6	8	38.4	121	133	145	5	7.5	0
36 FT	28	30	12	9	6.5	6	6.5	46.1	52.1	56.4	60.5	9	7	6	8	38.4	122	134	146	5	7	0
38 FT	29	31	12	9	6.5	6	6	46.1	54.4	58.6	63.0	9	7	6	7.5	38.4	123	135	147	5	7	0
40 FT	30	32	13	9	6.5	6	6.5	46.4	55.1	59.4	63.8	9	7	6	7.5	40.5	124	136	148	5	6.5	0
42 FT	31	33	13	9	6.5	6	6.5	46.4	55.8	60.1	64.5	9	7	6	7	40.5	125	137	149	5	6.5	0
44 FT	32	34	13	9	6	6	6.5	46.4	56.5	60.9	65.1	9	6.5	6	7	40.5	126	138	150	5	6.5	0
46 FT	33	35	13	9	6	6	6.5	46.4	57.3	61.5	65.9	9	6.5	6	6.5	40.5	127	139	151	5	6.5	0
48 FT	34	36	13	9	6	6	6.5	46.4	59.6	64.0	68.5	9	6.5	6	6.5	40.5	128	140	152	5	6.5	0
50 FT	35	36	13	9	6	6	6.5	46.4	60.0	64.4	68.9	9	6.5	6	6	40.5	128	140	152	5	6	0

SPAN (S) = 15 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT

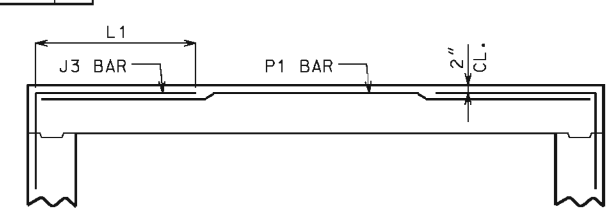
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	HT=13'	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	HT=13'	SIZE	SPA.	G1
1 FT	12	12	9	7	7	6	6.5	109.6	36.3	39.1	42.0	7	7	6	6	109.6	140	152	164	5	8.5	12
2 FT	13	14	9	7	7	6	6.5	109.6	38.5	41.5	44.5	7	7.5	6	6	109.6	142	154	166	5	8.5	12
4 FT	11	12	10	7	6.5	6	6	74.1	36.0	38.9	41.8	7	7	6	6	76.0	140	152	164	5	8	0
6 FT	12	13	10	7	7	6	6.5	64.6	36.5	39.4	42.3	7	6.5	6	6.5	68.4	141	153	165	5	8	0
8 FT	12	13	10	7	6.5	6	6	58.9	36.5	39.4	42.3	7	6	6	6	62.8	141	153	165	5	8	0
10 FT	13	14	10	7	6	7	7	58.9	38.5	41.5	44.5	8	7	6	6	58.9	142	154	166	5	8	0
12 FT	13	15	10	8	7	7	6	57.0	38.8	41.8	44.8	8	6.5	7	6.5	58.9	143	155	167	5	8	0
14 FT	14	17	11	8	7	7	6.5	57.3	39.5	42.5	45.5	8	6.5	6	6	53.5	145	157	169	5	7.5	0
16 FT	14	17	11	8	6.5	7	6	53.5	39.5	42.5	45.5	8	6.5	6	6	49.6	145	157	169	5	8.5	0
18 FT	16	19	12	8	6.5	7	7	61.5	40.5	43.5	46.5	8	6.5	6	6.5	49.9	147	159	171	5	8.5	0
20 FT	17	20	12	8	6	7	6	61.5	41.0	44.0	47.0	8	6.5	6	6	49.9	148	160	172	5	7.5	0
22 FT	19	22	13	8	6.5	7	7	61.8	43.6	46.8	49.9	8	6.5	6	6.5	50.1	150	162	174	5	7.5	0
24 FT	20	23	13	8	6	7	6.5	59.9	44.3	47.4	50.5	8	6	6	6	50.1	151	163	175	5	6.5	0
26 FT	21	24	14	8	6	7	6	62.1	46.5	49.6	52.9	8	6	6	6.5	50.5	152	164	176	5	7	0
28 FT	23	25	14	8	6	7	7	60.1	47.3	50.5	53.8	8	6	6	6	50.5	153	165	177	5	6	0
30 FT	24	27	15	9	7.5	7	7	60.5	48.0	51.3	54.5	8	6	6	6.5	50.8	155	167	179	5	6	0
32 FT	25	28	15	9	7	7	6.5	60.5	50.4	53.8	57.1	8	6	6	6	50.8	156	168	180	6	8	0
34 FT	26	29	15	9	7	7	6	60.5	51.0	54.4	57.6	9	7.5	6	6	50.8	157	169	181	6	8	0
36 FT	27	30	16	9	7	7	6	60.8	51.5	54.9	58.3	9	7	6	6	51.0	158	170	182	6	8	0
38 FT	28	31	16	9	6.5	7	6	60.8	52.1	55.5	58.8	9	7	6	6	51.0	159	171	183	6	8	0
40 FT	29	32	17	9	6.5	7	6	61.1	54.5	58.0	61.5	9	7	6	6	51.3	160	172	184	6	7.5	0
42 FT	31	33	17	9	6.5	7	7	61.1	55.4	58.9	62.4	9	7	6	6	51.3	161	173	185	6	7.5	0
44 FT	32	34	17	9	6.5	7	6.5	61.1	57.9	61.5	65.1	9	6.5	6	6	51.3	162	174	186	6	7.5	0
46 FT	33	35	17	9	6	7	6	61.1	58.5	62.1	65.8	9	6.5	6	6	53.3	163	175	187	6	7.5	0
48 FT	34	36	18	9	6	7	7	61.4	59.1	62.8	66.3	9	6.5	6	6	53.5	164	176	188	6	7	0
50 FT	34	37	18	9	6	7	6	61.4	59.4	63.0	66.6	9	6.5	6	6	53.5	165	177	189	6	7	0

SPAN (S) = 15 FT HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
									K2								K3					
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=14'	HT=15'	HT=16'	SIZE	SPA.	SIZE	SPA.	C4	HT=14'	HT=15'	HT=16'	SIZE	SPA.	G1
1 FT	13	14	11	7	8	6	7.5	112.8	36.1	38.4	40.6	7	8	6	7	112.8	178	190	202	5	7.5	12
2 FT	13	14	11	7	7.5	6	6.5	112.8	38.0	40.4	42.8	7	7.5	6	6.5	112.8	178	190	202	5	7	12
4 FT	12	13	11	7	7	6	6.5	112.8	37.6	40.0	42.4	7	7	6	6	112.8	177	189	201	5	6.5	0
6 FT	12	13	12	7	7.5	6	6.5	92.1	37.6	40.0	42.4	7	6.5	6	6	97.9	177	189	201	5	6.5	0
8 FT	12	14	13	7	7.5	6	6	77.3	37.8	40.3	42.6	7	6.5	6	6	84.9	178	190	202	5	6.5	0
10 FT	13	15	13	7	6.5	6	6	73.4	38.3	40.6	43.0	7	6	6	6	81.0	179	191	203	5	6.5	0
12 FT	14	16	14	7	6.5	7	8	73.8	38.6	41.0	43.4	8	7.5	6	6	75.6	180	192	204	5	6	0
14 FT	15	17	14	7	6	7	7	81.5	41.0	43.5	46.0	8	7	7	7.5	75.6	181	193	205	5	6	0
16 FT	16	18	15	8	7.5	7	7	80.0	45.3	48.1	50.9	8	7	7	7	74.1	182	194	206	6	8	0
18 FT	16	19	15	8	7	7	7	74.1	41.6	44.1	46.6	8	7	7	7.5	70.3	183	195	207	6	8	0
20 FT	17	20	15	8	7	7	6	74.1	46.0	48.8	51.5	8	6.5	7	7	68.3	184	196	208	6	8	0
22 FT	19	21	15	8	6.5	7	6	74.1	50.8	53.8	56.8	8	6	7	6	68.3	185	197	209	6	8	0
24 FT	20	23	16	8	6.5	7	6	74.5	47.4	50.1	52.9	8	6	7	6.5	68.6	187	199	211	6	8	0
26 FT	21	24	17	8	6	7	6	72.9	49.9	52.8	55.6	8	6	7	7	69.0	188	200	212	6	7.5	0
28 FT	23	25	17	8	6	7	6	72.9	54.9	58.0	61.1	8	6	7	6	69.0	189	201	213	6	7.5	0
30 FT	24	27	18	8	6	7	6	73.3	51.4	54.3	57.1	8	6	7	6.5	69.3	191	203	215	6	7	0
32 FT	25	28	19	8	6	7	6	73.6	49.6	52.5	55.3	8	6	7	7	69.6	192	204	216	6	6.5	0
34 FT	26	29	20	8	6	7	6	74.0	52.4	55.3	58.1	9	7.5	7	7	68.0	193	205	217	6	6.5	0
36 FT	27	30	21	9	7.5	7	6	74.4	52.8	55.6	58.5	9	7	7	7.5	68.4	194	206	218	6	6.5	0
38 FT	28	31	21	9	7	7	6	74.4	55.5	58.5	61.5	9	7	7	7	68.4	195	207	219	6	6	0
40 FT	29	32	22	9	7	7	6	74.8	60.5	63.8	67.0	9	7	7	7	68.6	196	208	220	6	6	0
42 FT	30	33	23	9	7	7	6	77.1	61.0	64.3	67.5	9	7	7	7	69.0	197	209	221	6	6	0
44 FT	31	34	24	9	6.5	7	6	77.5	61.5	64.8	68.0	9	6.5	7	7	69.4	198	210	222	6	6	0
46 FT	32	35	24	9	6.5	7	6	77.5	62.1	65.4	68.6	9	6.5	7	7	69.4	199	211	223	7	8	0
48 FT	33	36	25	9	6.5	7	6	77.9	65.0	68.4	71.6	9	6.5	7	7	69.8	200	212	224	7	8	0
50 FT	34	37	25	9	6.5	7	6	77.9	65.5	68.9	72.3	9	6.5	7	7	71.8	201	213	225	7	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 SINGLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 15 FEET
HEIGHT (HT): 8 THRU 16 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

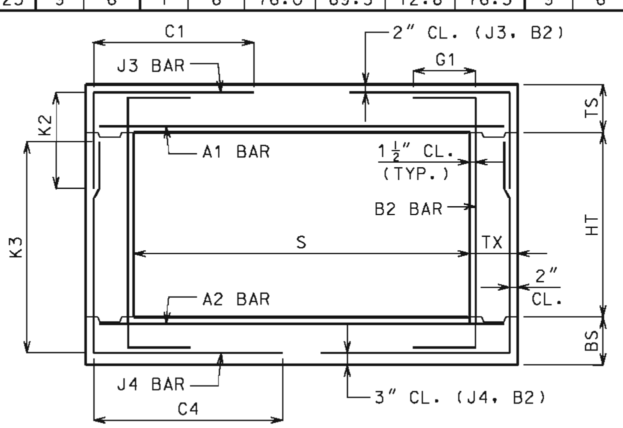
SHEET NO.
13 OF 14

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

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
SPAN (S) = 16 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=8′	K2 HT=9′	K2 HT=10′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=8′	K3 HT=9′	K3 HT=10′	SIZE	SPA.	G1
1 FT	12	13	8	7	6.5	6	6.5	116.0	37.1	41.0	44.8	7	7.5	6	6.5	76.0	105	117	129	5	12	12
2 FT	12	13	8	7	6	6	6	116.0	37.1	41.0	44.8	7	7	6	6	64.0	105	117	129	5	12	12
4 FT	12	12	9	7	6.5	6	6.5	54.3	36.8	40.6	44.5	7	6.5	6	6	54.3	104	116	128	5	12	0
6 FT	12	12	9	7	6	6	6.5	50.3	36.8	40.6	44.5	7	6	6	6	50.3	104	116	128	5	12	0
8 FT	12	13	9	8	7.5	7	6.5	50.3	37.1	41.0	44.8	8	7	6	6	46.3	105	117	129	5	12	0
10 FT	13	14	9	8	6.5	7	6.5	48.3	37.8	41.6	45.5	8	6.5	6	6	44.3	106	118	130	5	12	0
12 FT	14	16	9	8	6.5	7	6.5	46.3	35.1	38.6	42.0	8	6.5	6	7.5	40.3	108	120	132	5	12	0
14 FT	15	18	9	8	6	7	6	52.3	36.0	39.5	42.9	8	6	6	8	38.3	110	122	134	5	12	0
16 FT	16	19	9	9	7	7	6	50.3	36.5	40.0	43.5	8	6	6	7.5	38.3	111	123	135	5	12	0
18 FT	17	20	9	9	7	7	6.5	50.3	37.1	40.6	44.1	8	6	6	8	38.3	112	124	136	5	12	0
20 FT	19	21	9	9	7	7	7	50.3	39.3	42.9	46.5	8	6	6	7.5	38.3	113	125	137	5	10.5	0
22 FT	20	23	9	9	6.5	7	6.5	50.3	40.3	43.8	47.4	8	6	6	7.5	38.3	115	127	139	5	9	0
24 FT	22	24	10	9	7	7	7.5	50.5	42.5	46.3	49.9	9	7.5	6	7.5	38.4	116	128	140	5	9.5	0
26 FT	23	25	10	9	6.5	7	7	50.5	47.3	51.4	55.4	9	7	6	7	38.4	117	129	141	5	8.5	0
28 FT	25	27	11	9	6.5	6	6	46.8	45.8	49.6	53.5	9	7	6	8	40.6	119	131	143	5	8.5	0
30 FT	26	28	11	9	6.5	6	6	46.8	46.4	50.3	54.1	9	7	6	8	40.6	120	132	144	5	7.5	0
32 FT	28	29	11	9	6.5	6	6.5	46.8	53.3	57.6	61.9	9	7	6	7	40.6	121	133	145	5	7.5	0
34 FT	29	31	12	9	6.5	6	6.5	46.9	54.4	58.6	63.0	9	7	6	7.5	40.8	123	135	147	5	7	0
36 FT	30	32	12	9	6	6	6.5	46.9	55.1	59.4	63.8	9	6.5	6	7.5	40.8	124	136	148	5	7	0
38 FT	31	33	12	9	6	6	6.5	46.9	55.8	60.1	64.5	9	6.5	6	7	40.8	125	137	149	5	7	0
40 FT	32	34	12	9	6	6	6.5	46.9	56.5	60.9	65.1	9	6.5	6	7	40.8	126	138	150	5	7	0
42 FT	33	35	12	9	6	6	6	46.9	57.3	61.5	65.9	9	6.5	6	6.5	40.8	127	139	151	5	6.5	0
44 FT	34	36	13	10	7.5	6	6.5	47.1	59.6	64.0	68.5	9	6	6	6.5	41.0	128	140	152	5	6.5	0
46 FT	35	37	13	10	7	6	6	47.1	60.3	64.8	69.3	9	6	6	6.5	41.0	129	141	153	5	6.5	0
48 FT	36	38	13	10	7	6	6.5	47.1	61.0	65.5	69.9	9	6	6	6	41.0	130	142	154	5	6	0
50 FT	37	39	13	10	7	6	6	47.1	61.8	66.3	70.6	9	6	6	6	41.0	131	143	155	6	8.5	0

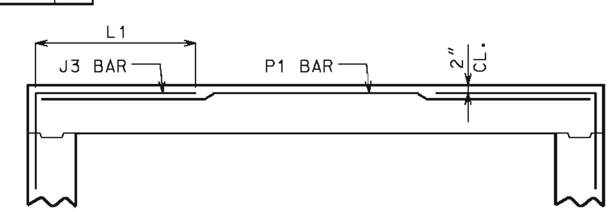
DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
SPAN (S) = 16 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=11′	K2 HT=12′	K2 HT=13′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=11′	K3 HT=12′	K3 HT=13′	SIZE	SPA.	G1
1 FT	12	14	9	7	6.5	6	6	116.6	36.8	39.6	42.5	7	7.5	6	6	116.6	142	154	166	5	8.5	12
2 FT	13	14	10	7	7	6	7	117.1	38.5	41.5	44.5	7	7.5	6	6	101.0	142	154	166	5	8.5	12
4 FT	12	13	10	7	6.5	6	6.5	72.8	36.5	39.4	42.3	7	6.5	6	6.5	74.8	141	153	165	5	8.5	0
6 FT	12	13	10	7	6	6	6	62.6	36.5	39.4	42.3	7	6	6	6	64.6	141	153	165	5	8.5	0
8 FT	12	14	10	7	6	7	6	62.6	36.8	39.6	42.5	8	7.5	6	6	60.6	142	154	166	5	8.5	0
10 FT	13	15	11	8	7.5	7	6.5	60.9	37.3	40.1	43.0	8	7	6	6.5	56.9	143	155	167	5	9	0
12 FT	14	16	11	8	6.5	7	6.5	58.9	39.3	42.3	45.3	8	6.5	6	6	54.8	144	156	168	5	8.5	0
14 FT	15	17	11	8	6	7	6	65.0	46.1	49.6	53.1	8	6	7	7	56.9	145	157	169	5	8	0
16 FT	16	19	12	8	6	7	6	65.3	40.5	43.5	46.5	8	6	6	6	53.0	147	159	171	5	8	0
18 FT	17	20	12	8	6	7	6.5	61.3	41.0	44.0	47.0	8	6	6	6.5	49.0	148	160	172	5	9	0
20 FT	19	21	12	8	6	7	6.5	59.1	43.4	46.5	49.6	8	6	6	6	49.0	149	161	173	5	7.5	0
22 FT	20	23	13	9	7.5	7	6.5	61.5	44.3	47.4	50.5	8	6	6	6.5	49.3	151	163	175	5	8	0
24 FT	22	24	13	9	7	7	6.5	59.5	46.8	50.0	53.3	9	7.5	6	6	49.3	152	164	176	5	6.5	0
26 FT	23	26	14	9	7	7	6.5	59.8	47.5	50.8	54.0	9	7.5	6	6.5	49.5	154	166	178	5	7	0
28 FT	24	27	14	9	7	7	6.5	59.8	48.0	51.3	54.5	9	7	6	6	49.5	155	167	179	5	6	0
30 FT	26	28	14	9	6.5	7	6	59.8	50.6	54.0	57.4	9	7	6	6	49.5	156	168	180	5	6	0
32 FT	27	29	15	9	6.5	7	6.5	60.0	51.3	54.6	58.0	9	7	6	6	49.6	157	169	181	5	6	0
34 FT	28	31	15	9	6.5	7	6	60.0	52.1	55.5	58.8	9	7	6	6	49.6	159	171	183	6	8	0
36 FT	29	32	16	9	6.5	7	6.5	60.4	54.5	58.0	61.5	9	6.5	6	6	49.9	160	172	184	6	8	0
38 FT	30	33	16	9	6	7	6	60.4	55.1	58.6	62.0	9	6.5	6	6	49.9	161	173	185	6	8	0
40 FT	32	34	16	9	6	7	6.5	60.4	57.9	61.5	65.1	9	6.5	6	6	49.9	162	174	186	6	8	0
42 FT	33	35	17	9	6	7	7	60.6	58.5	62.1	65.8	9	6.5	6	6	50.1	163	175	187	6	7.5	0
44 FT	34	36	17	9	6	7	7	60.6	59.1	62.8	66.3	9	6	6	6	50.1	164	176	188	6	7.5	0
46 FT	35	37	17	10	7.5	7	6.5	60.6	59.8	63.3	66.9	9	6	6	6	50.1	165	177	189	6	7.5	0
48 FT	36	38	18	10	7	7	7	60.9	60.3	63.9	67.5	9	6	6	6	52.5	166	178	190	6	7	0
50 FT	37	39	18	10	7	7	7	60.9	62.9	66.6	70.4	9	6	6	6	52.5	167	179	191	6	7	0

DESIGN FILL	MEMBER THICKNESS			TOP SLAB BARS								BOTTOM SLAB BARS								WALL BARS		
SPAN (S) = 16 FT HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT				A1 BARS		J3 BARS						A2 BARS		J4 BARS						B2 BARS		
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=14′	K2 HT=15′	K2 HT=16′	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=14′	K3 HT=15′	K3 HT=16′	SIZE	SPA.	G1
1 FT	13	14	11	7	7.5	6	7	117.8	38.0	40.4	42.8	7	7.5	6	6.5	117.8	178	190	202	5	7.5	12
2 FT	13	14	11	7	7	7	7.5	121.8	38.0	40.4	42.8	7	7	6	6.5	117.8	178	190	202	5	7	12
4 FT	12	14	11	7	6.5	6	6	117.8	37.8	40.3	42.6	7	6.5	6	6	117.8	178	190	202	5	6.5	0
6 FT	12	14	12	7	6.5	6	6	83.6	37.8	40.3	42.6	7	6.5	6	6	95.9	178	190	202	5	7	0
8 FT	12	14	13	7	6.5	7	6.5	77.9	37.8	40.3	42.6	7	6	6	6	80.0	178	190	202	5	6.5	0
10 FT	13	16	13	7	6	7	6.5	75.9	38.4	40.8	43.3	8	7.5	6	6	77.9	180	192	204	5	6.5	0
12 FT	14	17	14	7	6	7	6.5	72.1	40.8	43.3	45.8	8	7	7	8	76.3	181	193	205	5	6	0
14 FT	16	18	14	8	7	7	6.5	78.3	45.3	48.1	50.9	8	6.5	7	7	74.1	182	194	206	5	6	0
16 FT	17	19	15	8	7	7	6.5	78.6	47.8	50.6	53.5	8	6.5	7	6.5	72.5	183	195	207	6	8	0
18 FT	17	20	15	8	6.5	7	6.5	72.5	42.0	44.5	47.0	8	6	7	7.5	66.3	184	196	208	6	8	0
20 FT	19	21	15	8	6.5	7	6	72.5	50.8	53.8	56.8	8	6	7	6.5	66.3	185	197	209	6	8	0
22 FT	20	23	16	8	6	7	6	72.8	45.4	48.0	50.6	8	6	7	7	66.5	187	199	211	6	8	0
24 FT	22	24	16	8	6	7	6	72.8	52.3	55.3	58.3	9	7.5	7	6.5	66.5	188	200	212	6	8	0
26 FT	23	26	17	8	6	7	6	73.1	50.9	53.8	56.6	9	7.5	7	7	66.9	190	202	214	6	7.5	0
28 FT	24	27	18	9	7	7	6	73.5	51.4	54.3	57.1	9	7	7	7	67.3	191	203	215	6	7	0
30 FT	26	28	18	9	7	7	6	73.5	56.4	59.5	62.6	9	7	7	6.5	67.3	192	204	216	6	7	0
32 FT	27	30	19	9	7	7	6	73.9	55.0	58.0	61.0	9	7	7	7	67.5	194	206	218	6	6.5	0
34 FT	28	31	20	9	7	7	6	74.3	55.5	58.5	61.5	9	7	7	7	67.9	195	207	219	6	6.5	0
36 FT	29	32	21	9	6.5	7	6	74.5	53.8	56.6	59.5	9	6.5	7	7	68.1	196	208	220	6	6.5	0
38 FT	30	33	22	9	6.5	7	6	74.9	61.0	64.3	67.5	9	6.5	7	7	68.5	197	209	221	6	6.5	0
40 FT	31	34	22	9	6.5	7	6	74.9	61.5	64.8	68.0	9	6.5	7	7	68.5	198	210	222	6	6	0
42 FT	32	35	23	9	6.5	7	6	75.3	62.1	65.4	68.6	9	6.5	7	7	68.8	199	211	223	6	6	0
44 FT	34	36	23	9	6	7	6	75.3	65.3	68.6	72.0	9	6	7	6.5	68.8	200	212	224	7	8	0
46 FT	35	37	24	9	6	7	6	75.6	65.8	69.1	72.5	9	6	7	6.5	69.1	201	213	225	6	6	0
48 FT	36	38	24	9	6	7	6	75.6	66.4	69.8	73.1	9	6	7	7	69.1	202	214	226	7	7.5	0
50 FT	37	39	25	9	6	7	6	76.0	69.3	72.8	76.3	9	6	7	7	69.5	203	215	227	7	7.5	0



BAR DIMENSIONS DIAGRAM

SYMMETRICAL ABOUT ℄ CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2′-0″. DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18″, 22″ AND 28″ FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT

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 SINGLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 16 FEET
HEIGHT (HT): 8 THRU 16 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.17

AREA OF STEEL REQUIRED FOR J5 BARS IN WINGS (SQ. IN./FT.)
WALL HEIGHT VS. WALL THICKNESS

① Backfill Slope = 2:1

Wall Thickness TX (in.)	Wall Height (ft.) 5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
8	0.168	0.168	0.197	0.291	0.414	0.429	0.578	0.766	1.003							
9	0.168	0.168	0.168	0.244	0.346	0.456	0.477	0.626	0.809	1.034	1.312					
10	0.168	0.168	0.168	0.211	0.298	0.407	0.487	0.532	0.683	0.864	1.084	1.349				
11	0.168	0.168	0.168	0.185	0.261	0.357	0.475	0.520	0.592	0.746	0.929	1.147	1.405			
12		0.168	0.168	0.168	0.233	0.318	0.422	0.548	0.554	0.658	0.816	1.002	1.220	1.475		
13		0.168	0.168	0.168	0.210	0.287	0.380	0.493	0.588	0.589	0.729	0.892	1.081	1.301		
14			0.168	0.168	0.192	0.261	0.346	0.448	0.569	0.623	0.659	0.805	0.973	1.167	1.390	
15				0.168	0.176	0.240	0.317	0.411	0.521	0.652	0.658	0.734	0.886	1.059	1.258	
16					0.168	0.222	0.293	0.379	0.481	0.601	0.693	0.693	0.813	0.971	1.151	
17					0.168	0.206	0.273	0.352	0.447	0.557	0.686	0.729	0.752	0.897	1.061	1.247
18							0.255	0.329	0.417	0.520	0.639	0.764	0.764	0.834	0.985	1.156
19								0.309	0.391	0.487	0.599	0.727	0.800	0.800	0.920	1.078
20								0.291	0.368	0.459	0.563	0.684	0.821	0.836	0.863	1.011
21									0.348	0.433	0.532	0.645	0.774	0.871	0.871	0.952
22										0.411	0.504	0.611	0.733	0.870	0.907	0.970
23											0.479	0.580	0.696	0.826	0.943	0.943
24											0.456	0.552	0.662	0.786	0.925	0.979
25												0.527	0.632	0.750	0.882	1.015
26													0.604	0.717	0.843	0.984
27														0.686	0.807	0.942

AREA OF STEEL REQUIRED FOR J5 BARS IN WINGS (SQ. IN./FT.)
WALL HEIGHT VS. WALL THICKNESS

① Backfill Slope = 3:1

Wall Thickness TX (in.)	Wall Height (ft.) 5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
8	0.168	0.168	0.168	0.187	0.264	0.362	0.425	0.475	0.612							
9	0.168	0.168	0.168	0.168	0.222	0.303	0.403	0.456	0.504	0.637	0.795					
10	0.168	0.168	0.168	0.168	0.191	0.261	0.346	0.450	0.487	0.541	0.671	0.824	1.005	1.217		
11	0.168	0.168	0.168	0.168	0.168	0.229	0.304	0.394	0.501	0.520	0.583	0.713	0.864	1.039		
12		0.168	0.168	0.168	0.168	0.204	0.271	0.351	0.445	0.554	0.554	0.629	0.760	0.910		
13		0.168	0.168	0.168	0.168	0.185	0.244	0.316	0.401	0.501	0.588	0.588	0.679	0.812	0.963	
14			0.168	0.168	0.168	0.168	0.223	0.288	0.365	0.455	0.560	0.623	0.623	0.733	0.868	
15				0.168	0.168	0.168	0.204	0.264	0.335	0.417	0.513	0.623	0.658	0.669	0.791	
16					0.168	0.168	0.189	0.244	0.309	0.385	0.474	0.575	0.690	0.693	0.727	
17					0.168	0.168	0.176	0.227	0.287	0.358	0.440	0.533	0.640	0.729	0.729	0.788
18							0.168	0.212	0.269	0.334	0.411	0.498	0.597	0.709	0.764	0.764
19								0.199	0.252	0.314	0.385	0.467	0.559	0.664	0.782	0.800
20								0.188	0.237	0.295	0.362	0.439	0.526	0.625	0.735	0.836
21									0.224	0.279	0.342	0.415	0.497	0.590	0.694	0.810
22										0.265	0.325	0.393	0.471	0.558	0.657	0.766
23											0.308	0.373	0.447	0.530	0.624	0.727
24											0.294	0.356	0.426	0.505	0.594	0.692
25												0.340	0.407	0.482	0.566	0.661
26													0.389	0.461	0.542	0.632
27														0.442	0.519	0.605

NOTE:

THE WALL HEIGHT IS EQUAL TO THE BARREL HEIGHT (HT) PLUS THE TOP SLAB THICKNESS (TS). WHEN WALL HEIGHT IS IN BETWEEN OR OUTSIDE TABULATED WALL HEIGHTS, THE AREA OF STEEL REQUIRED SHOULD BE INTERPOLATED BETWEEN OR EXTRAPOLATED FROM ADJACENT AREAS OF STEEL USING THE ACTUAL WALL HEIGHT.

IF AREA OF STEEL IN THE WALL OF THE CULVERT (J4 BARS) IS GREATER THAN THAT INDICATED IN THE TABLE, USE THE SAME SIZE AND SPACING FOR THE J5 BARS IN THE WINGS. HOWEVER, IF THE AREA OF STEEL PROVIDED BY MATCHING SIZE AND SPACING OF THE J4 BARS IS INSUFFICIENT, INCREASE THE SIZE OF THE J5 BARS (#8 MAX.) AND/OR DECREASE THE SPACING OF THE J5 BARS (6" MIN.). USE SMALLEST BAR SIZE POSSIBLE BASED ON MINIMUM SPACING.

MINIMUM STEEL TO BE USED IN THE WINGS FOR J5 BARS IS #4 BARS AT 14" CENTERS (AREA OF STEEL = 0.1683 SQ. IN./FT.)

① SEE STANDARD PLAN 703.37C, SHEET 2 OF 2 FOR BACKFILL SLOPE TO BE USED BASED ON SKEW.

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

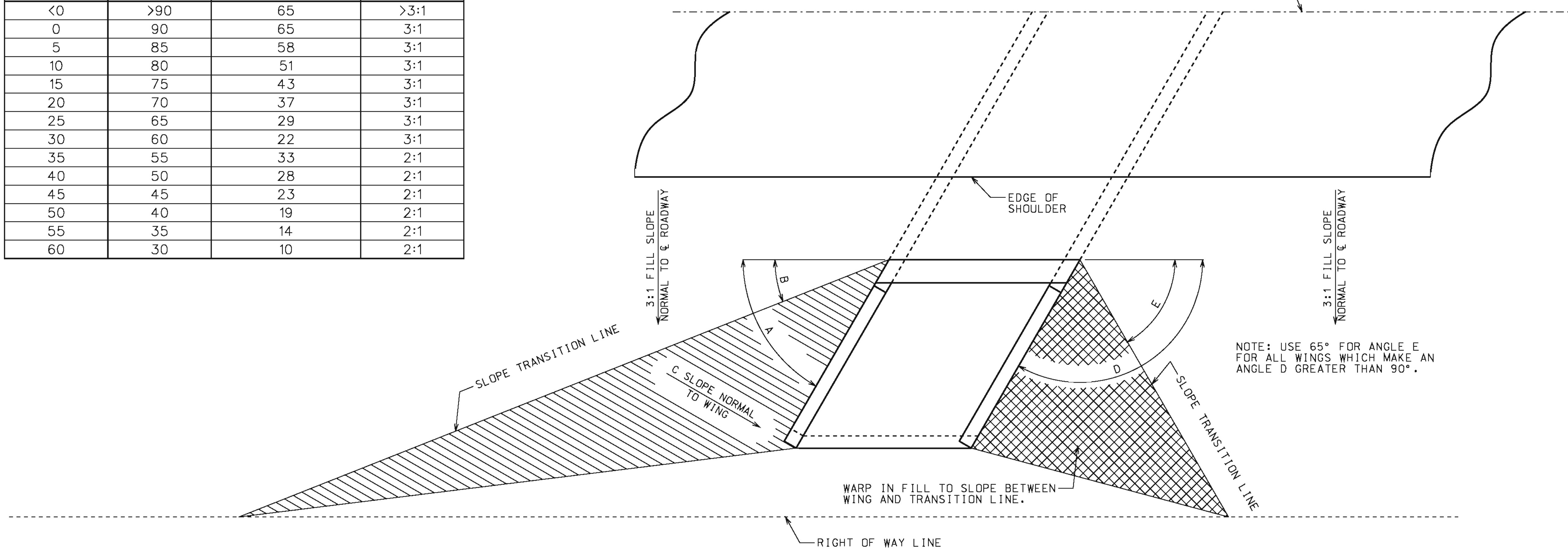
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE BOX CULVERT
EXTERIOR WING REINFORCEMENT

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.37C

WING BACKFILL TABLE			
WING SKEW (DEGREES)	A (DEGREES)	B TRANSITION ANGLE (DEGREES)	C BACKFILL SLOPE (H:V)
<0	>90	65	>3:1
0	90	65	3:1
5	85	58	3:1
10	80	51	3:1
15	75	43	3:1
20	70	37	3:1
25	65	29	3:1
30	60	22	3:1
35	55	33	2:1
40	50	28	2:1
45	45	23	2:1
50	40	19	2:1
55	35	14	2:1
60	30	10	2:1



NOTE: USE 65° FOR ANGLE E FOR ALL WINGS WHICH MAKE AN ANGLE D GREATER THAN 90°.

PLAN OF WINGS AND SLOPE TRANSITION LINES

NOTE: BACKFILL TRANSITION ANGLE AND BACKFILL SLOPE SHALL APPLY TO ALL BOX CULVERTS REGARDLESS OF TYPE - SINGLE, DOUBLE, OR TRIPLE.

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CONCRETE BOX CULVERT

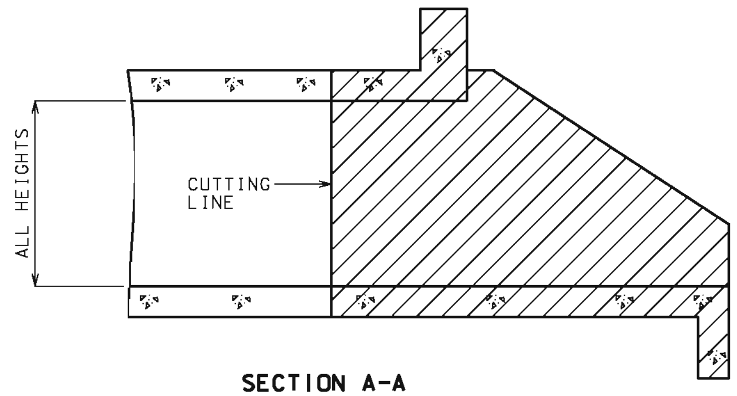
EXTERIOR WING BACKFILL SLOPE TRANSITION

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

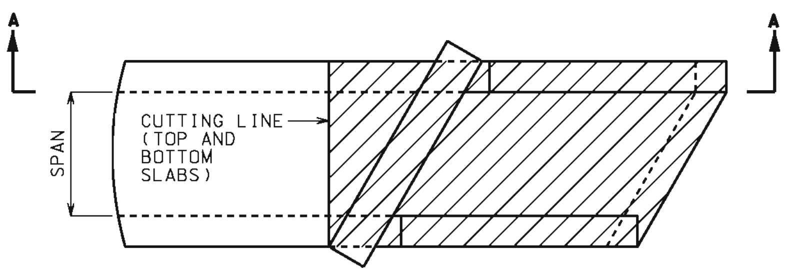
703.37C

SHEET NO. 2 OF 2

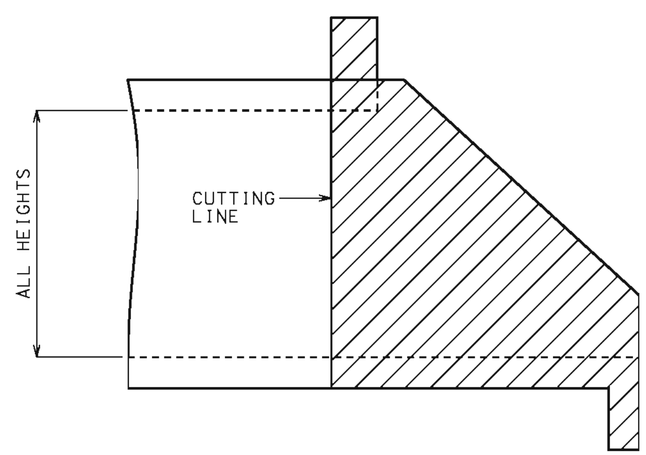
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



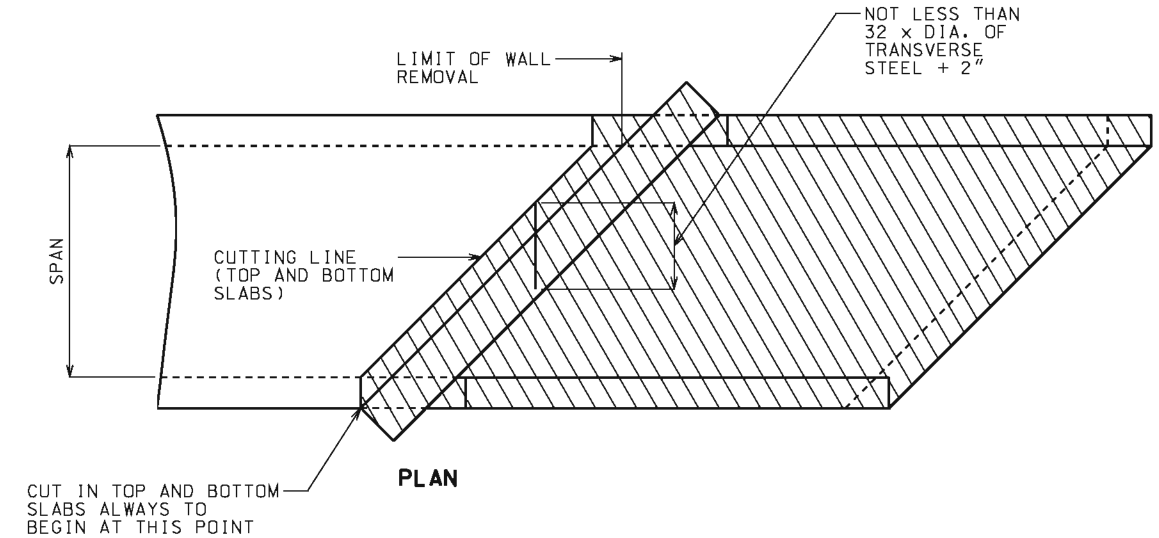
SECTION A-A



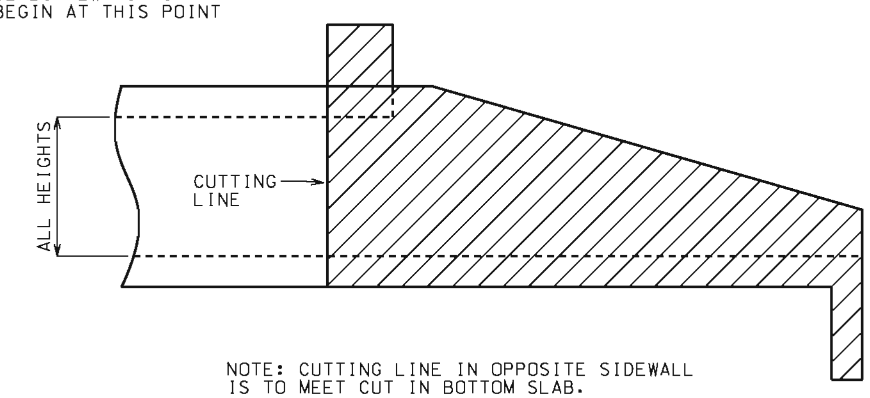
PLAN



SIDE ELEVATION
NO SKEW OR SKEWS LESS THAN 20°



PLAN



NOTE: CUTTING LINE IN OPPOSITE SIDEWALL IS TO MEET CUT IN BOTTOM SLAB.

SIDE ELEVATION
SKEW OF 20° OR MORE

GENERAL NOTES:

THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED, THAT ARE BONDED IN UNDISTURBED OLD CONCRETE, SHALL BE CLEANLY STRIPPED, STRAIGHTENED, AND EXTENDED INTO NEW CONCRETE.

SEE STANDARD SPECIFICATIONS FOR REQUIRED BUSHHAMMERING AND TREATING OF OLD CONCRETE SURFACES WHICH ARE TO RECEIVE NEW CONCRETE.

A CONTINUOUS V-GROOVE AT LEAST 1″ IN DEPTH SHALL BE CUT ON THE FACE OF THE CONCRETE AS A GUIDE FOR THE LINE OF BREAK AND TO PREVENT SPALLING.

THE BOX EXTENSION OPENING SHALL BE BUILT TO MATCH THE EXISTING BOX OPENING. WHEN THE EXISTING OPENING DOES NOT MATCH A SIZE FROM THE TABLES, THE NEXT LARGER SIZE SHALL BE USED FOR DETERMINING THE MEMBER SIZES AND REINFORCEMENT.

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

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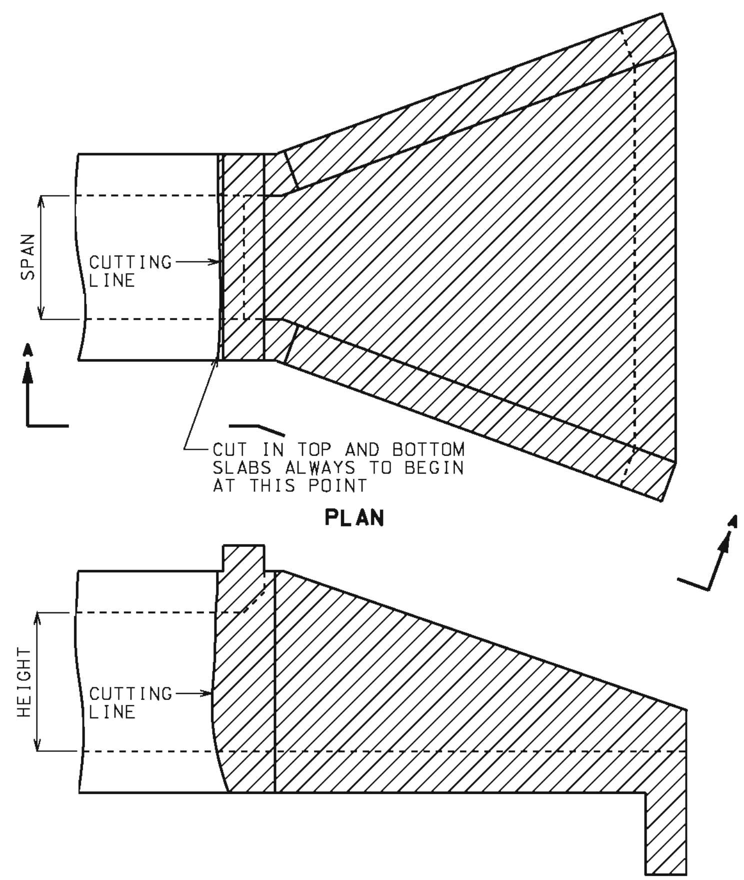
CONCRETE BOX CULVERTS
CUTTING DETAILS
EXTENSION TO STRAIGHT WINGS

DATE EFFECTIVE: 10-01-2009
DATE PREPARED: 8/18/2009

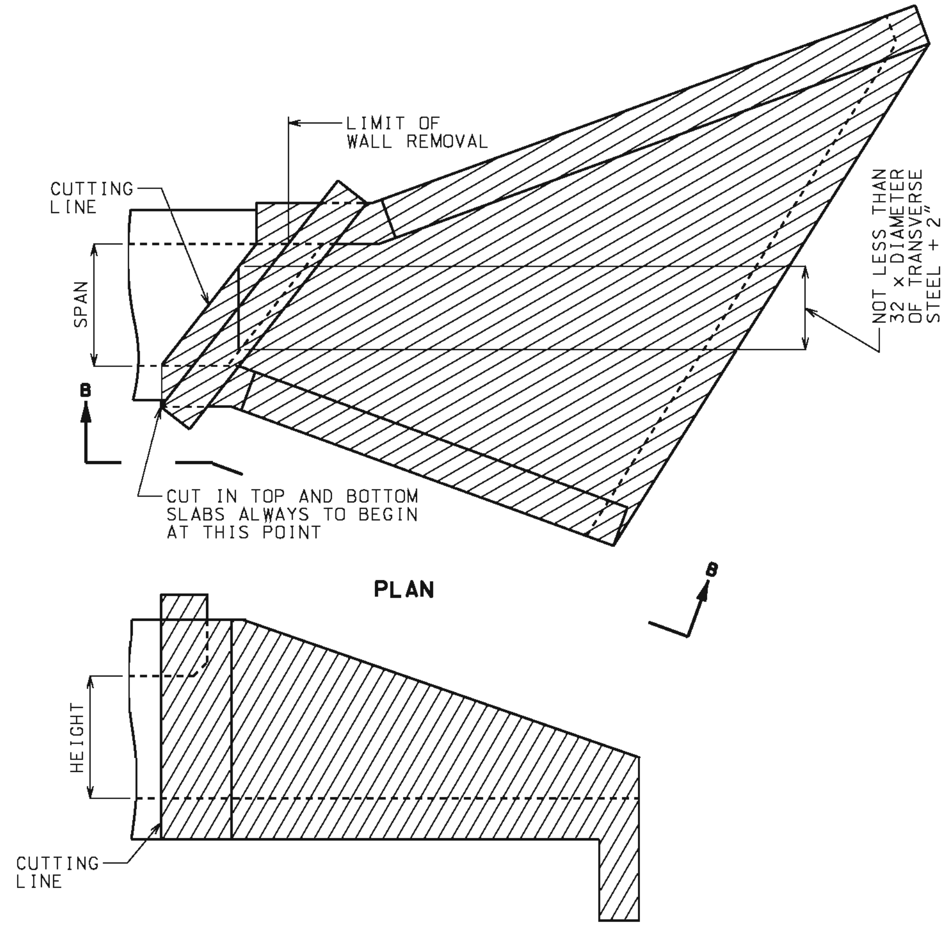
703.38A

SHEET NO. 1 OF 2



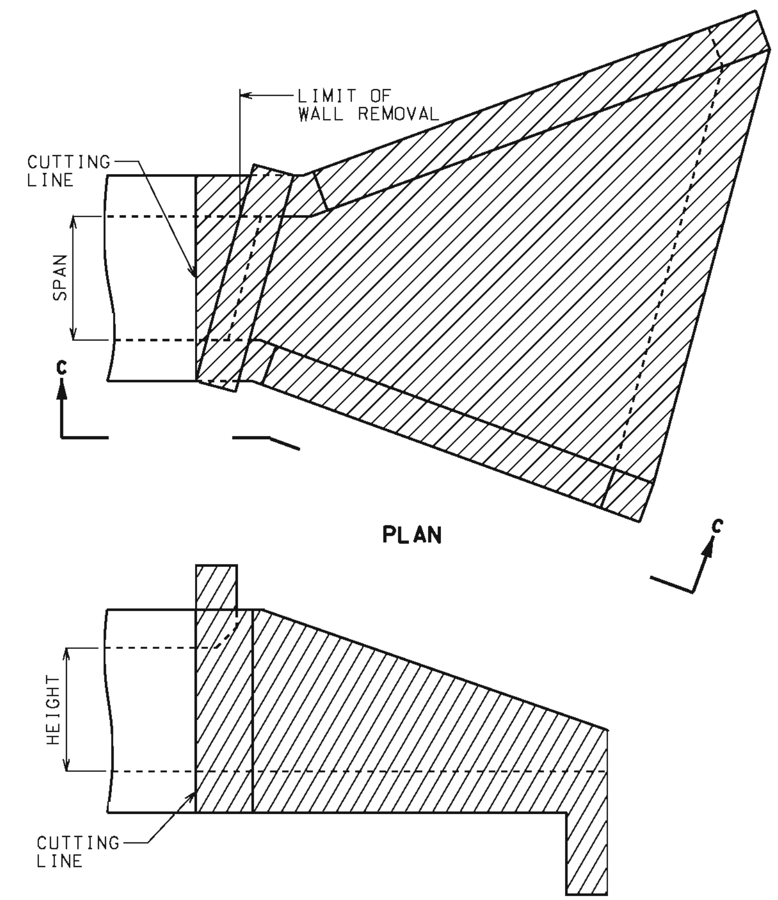
ELEVATION A-A

NO SKEW



ELEVATION B-B

SKEWS OF 20° OR MORE



ELEVATION C-C

SKEWS LESS THAN 20°

GENERAL NOTES:

THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED, THAT ARE BONDED IN UNDISTURBED OLD CONCRETE, SHALL BE CLEANLY STRIPPED, STRAIGHTENED, AND EXTENDED INTO NEW CONCRETE.

SEE STANDARD SPECIFICATIONS FOR REQUIRED BUSHHAMMERING AND TREATING OF OLD CONCRETE SURFACES WHICH ARE TO RECEIVE NEW CONCRETE.

A CONTINUOUS V-GROOVE AT LEAST 1" IN DEPTH SHALL BE CUT ON THE FACE OF THE CONCRETE AS A GUIDE FOR THE LINE OF BREAK AND TO PREVENT SPALLING.

THE BOX EXTENSION OPENING SHALL BE BUILT TO MATCH THE EXISTING BOX OPENING. WHEN THE EXISTING OPENING DOES NOT MATCH A SIZE FROM THE TABLES, THE NEXT LARGER SIZE SHALL BE USED FOR DETERMINING THE MEMBER SIZES AND REINFORCEMENT.

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CONCRETE BOX CULVERTS

CUTTING DETAILS
EXTENSION TO FLARED WINGS

DATE EFFECTIVE: 10-01-2009
DATE PREPARED: 8/18/2009

703.38A

SHEET NO. 2 OF 2

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

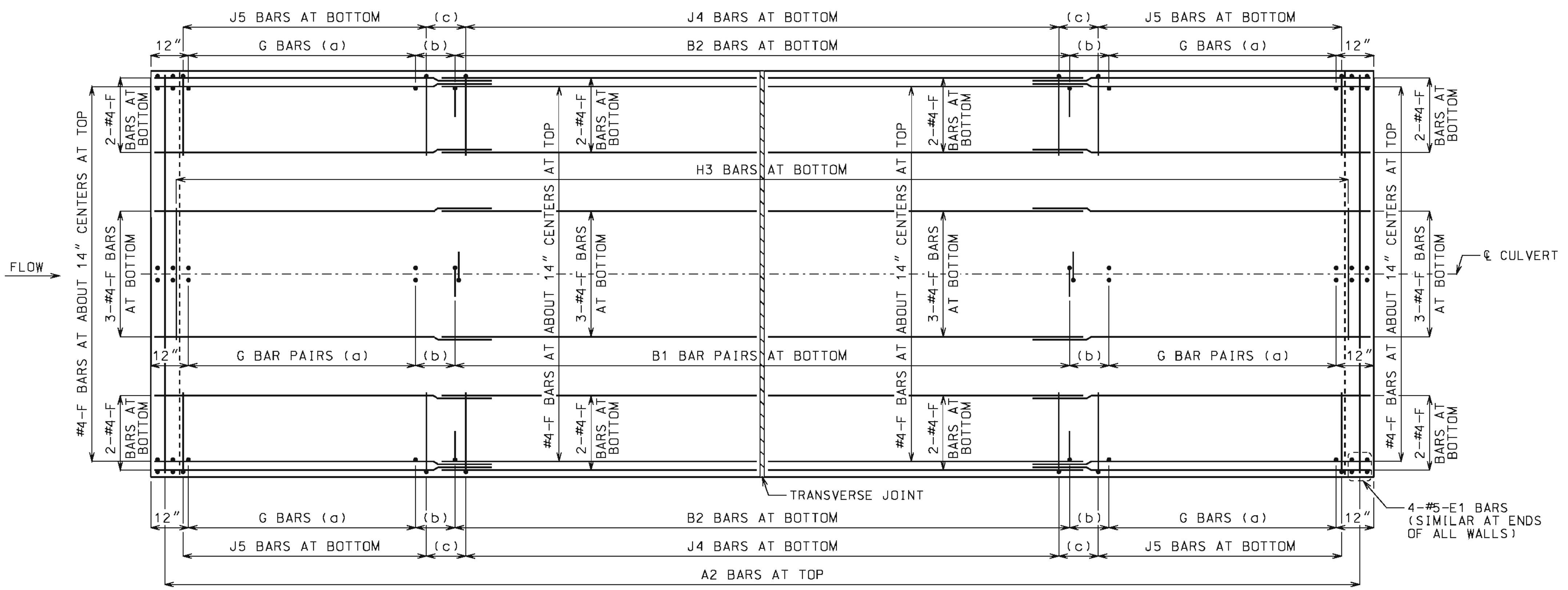
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

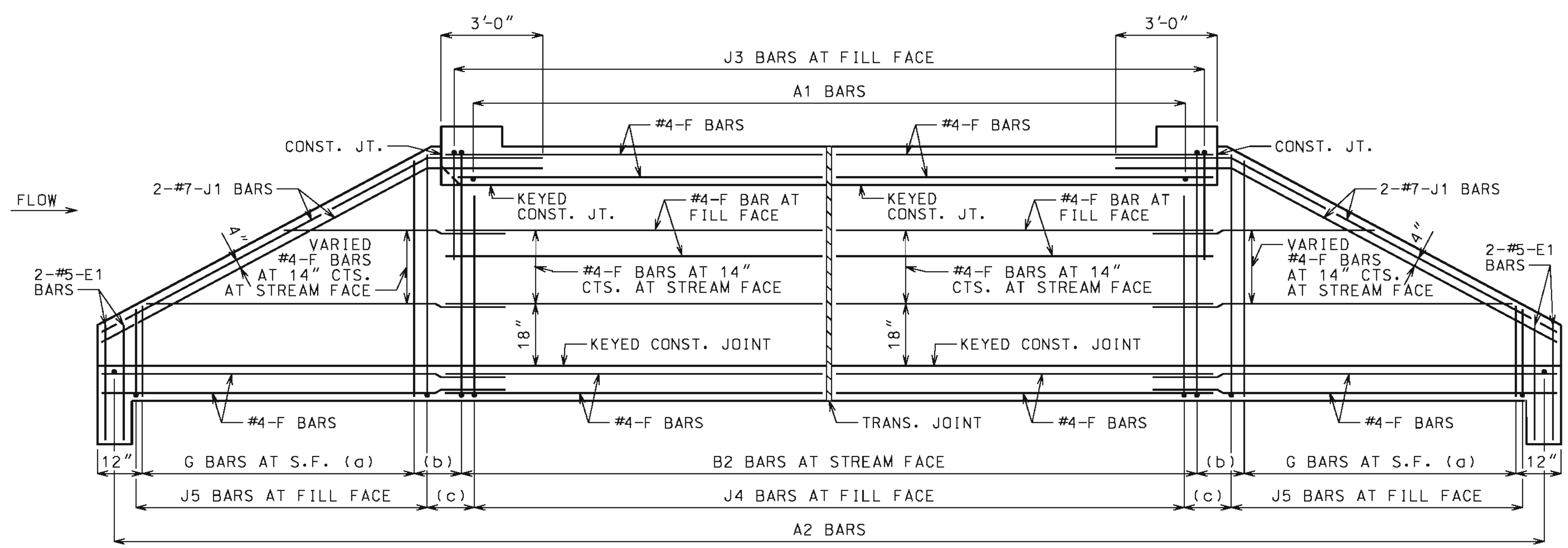
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

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NUMBER PE-27141
PROFESSIONAL ENGINEER

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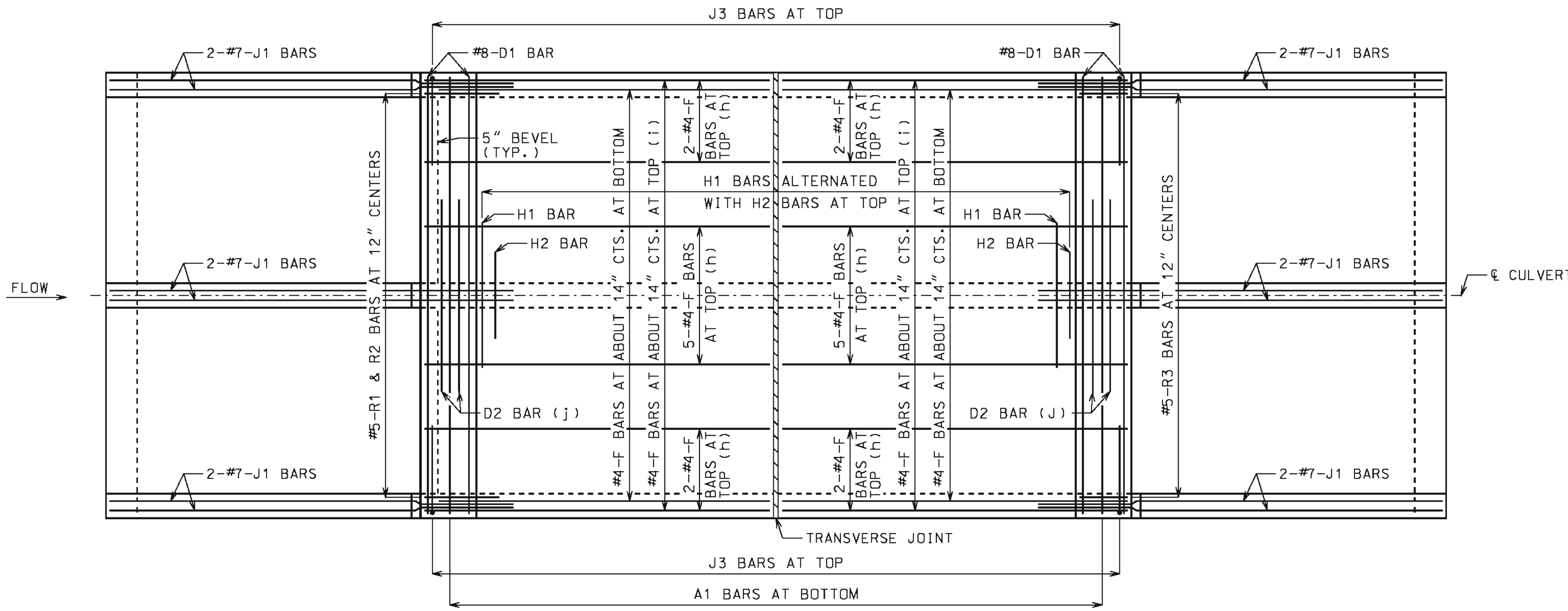
CONCRETE DOUBLE BOX CULVERT

SKEW: SQUARED
WINGS: STRAIGHT

REINFORCEMENT

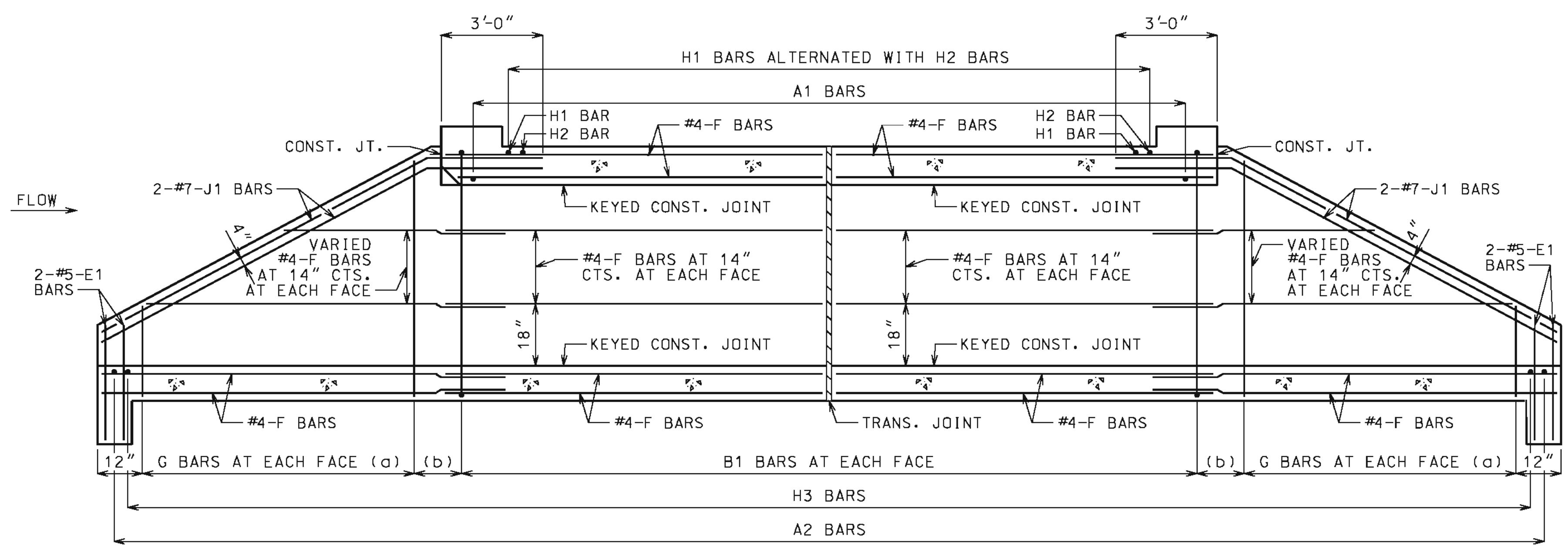
DATE EFFECTIVE:	10/01/2011	703.40H	SHEET NO.
DATE PREPARED:	5/13/2015		1 OF 3

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



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) NOT SPECIFIED ON THIS SHEET

(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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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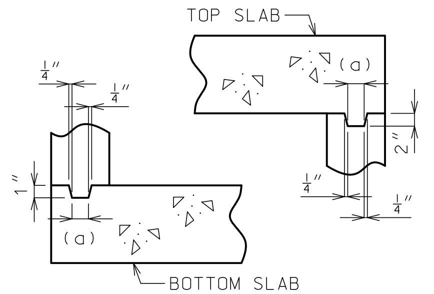
CONCRETE DOUBLE BOX CULVERT

SKEW: SQUARED
WINGS: STRAIGHT

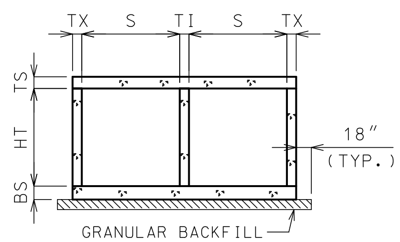
REINFORCEMENT

DATE EFFECTIVE:	10/01/2011	703.40H	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

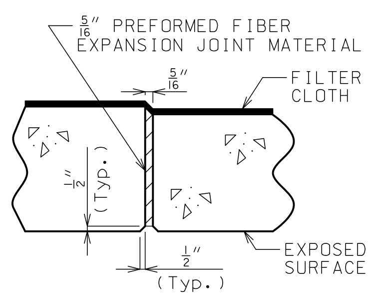


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



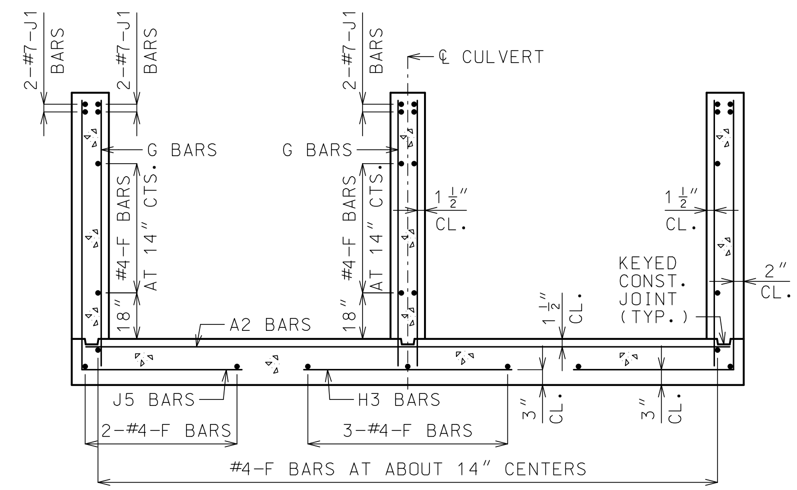
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



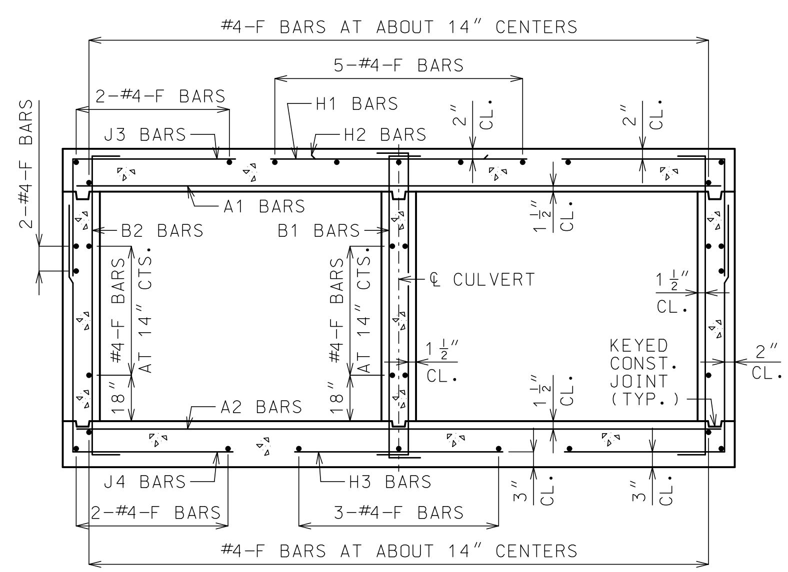
TRANSVERSE JOINT THRU BARREL

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.

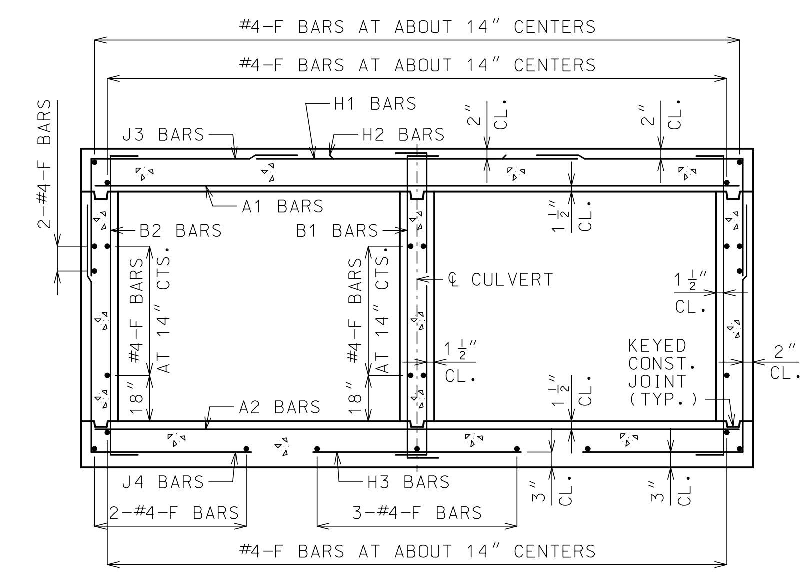


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



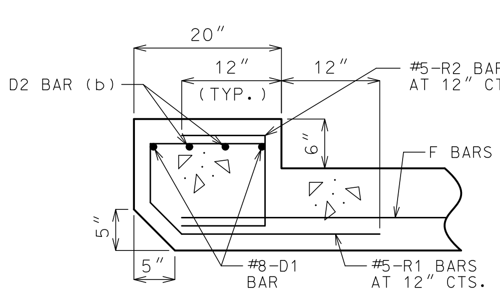
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



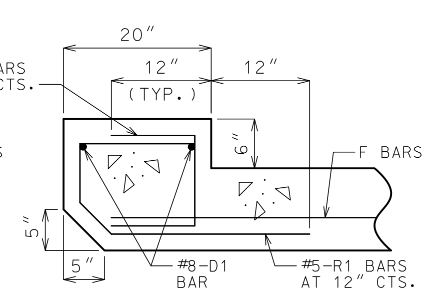
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



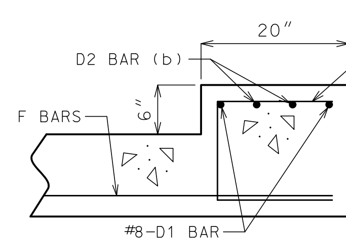
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



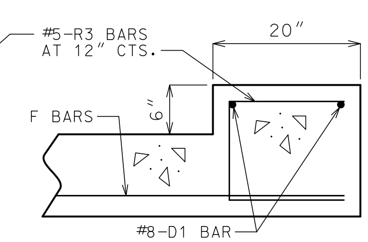
UPSTREAM HEADWALL REINFORCEMENT

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 ℄ 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".

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NUMBER PE-27141
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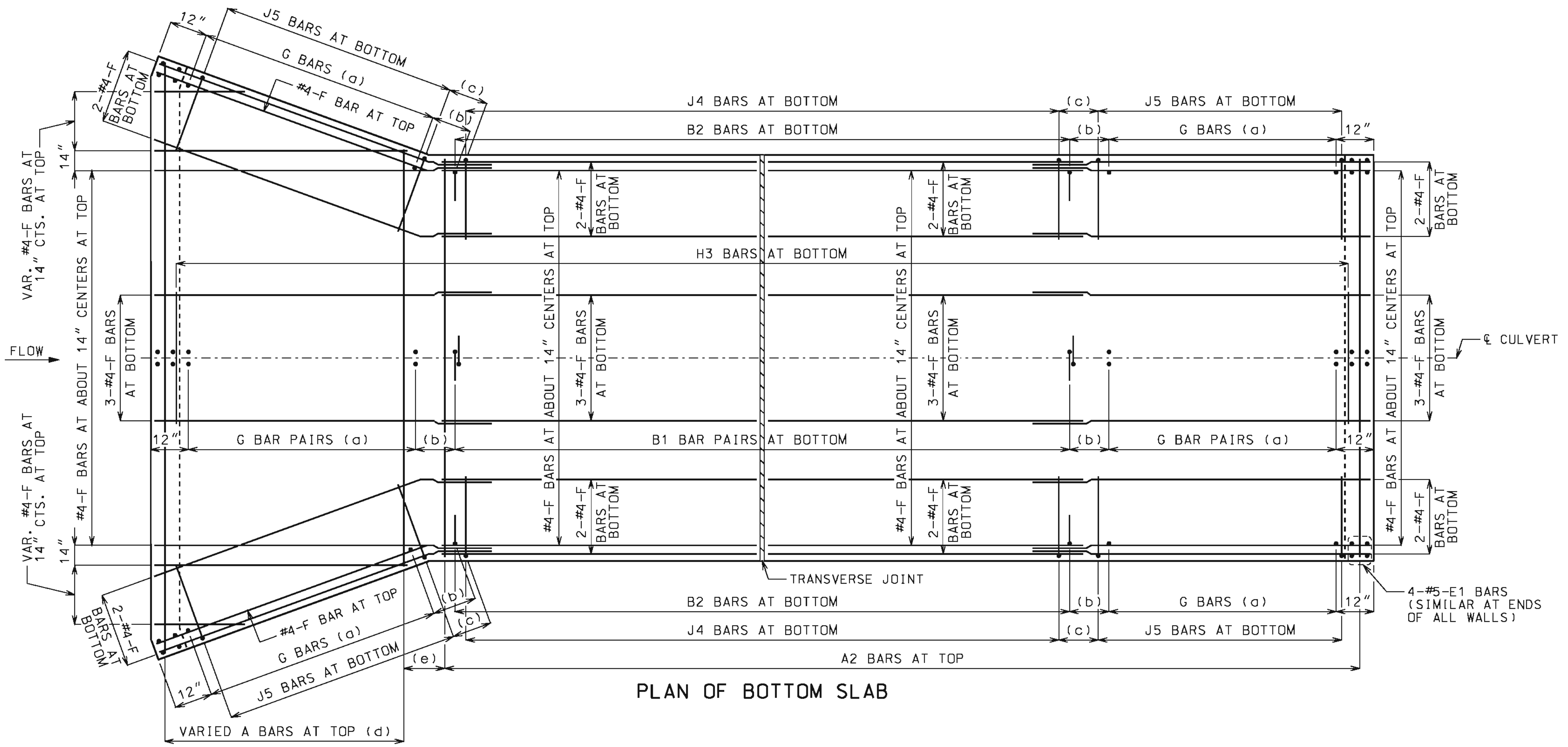
CONCRETE DOUBLE BOX CULVERT

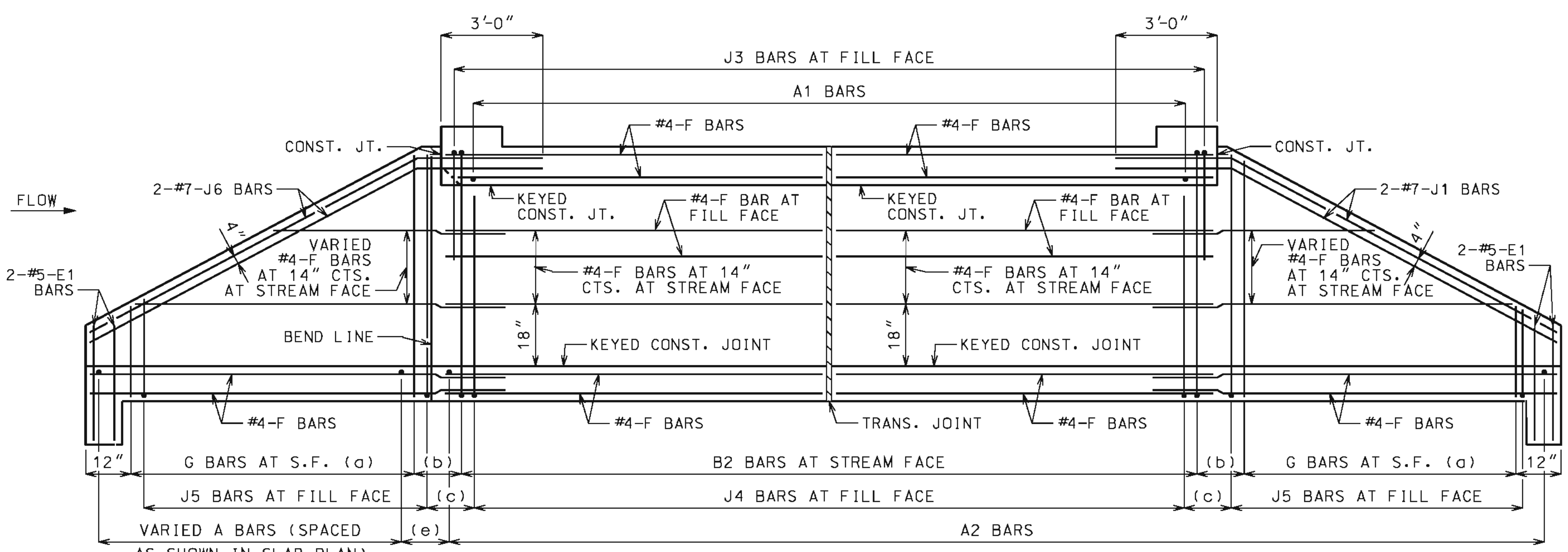
SKEW: SQUARED
WINGS: STRAIGHT

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.40H	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

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 DOUBLE BOX CULVERT

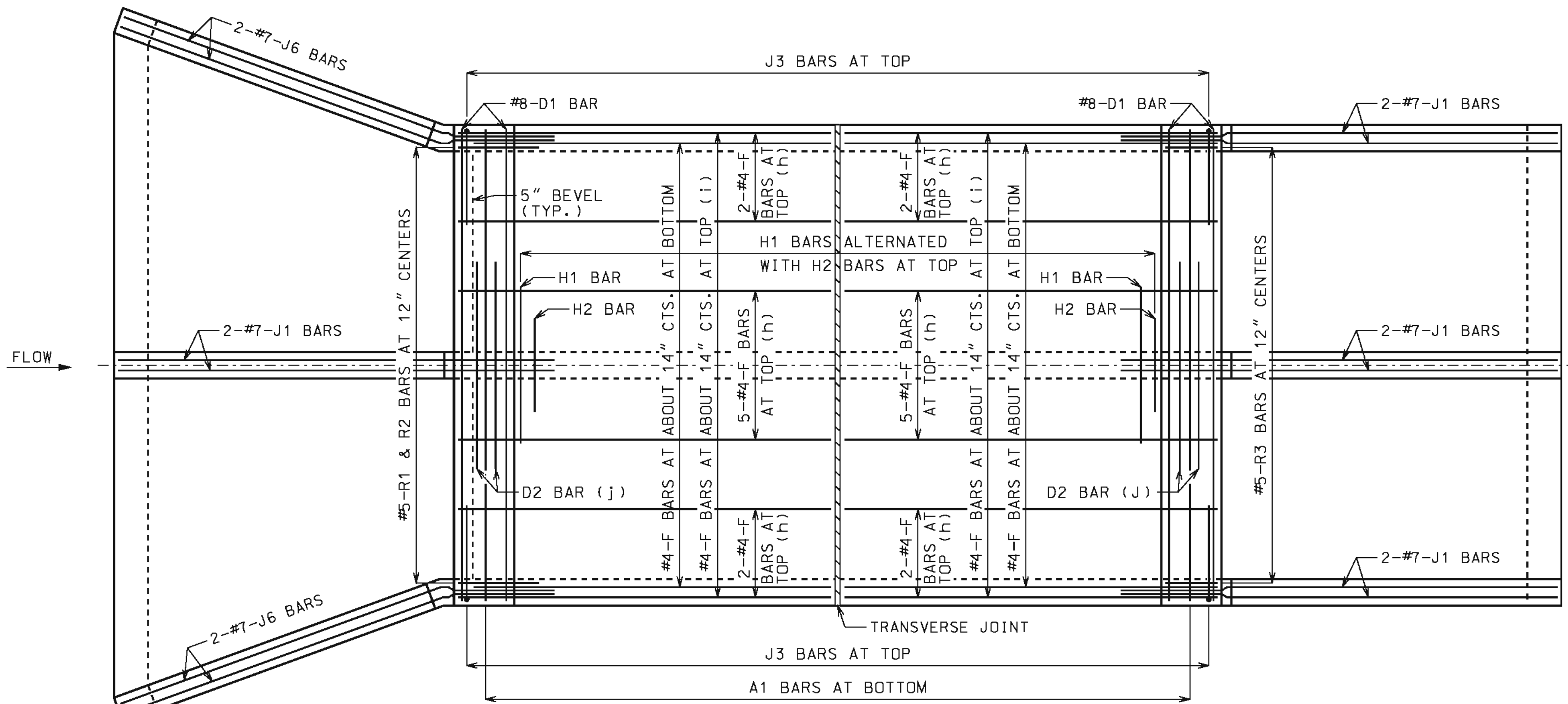
SKEW: SQUARED
WINGS: FLARED

REINFORCEMENT

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 5/13/2015

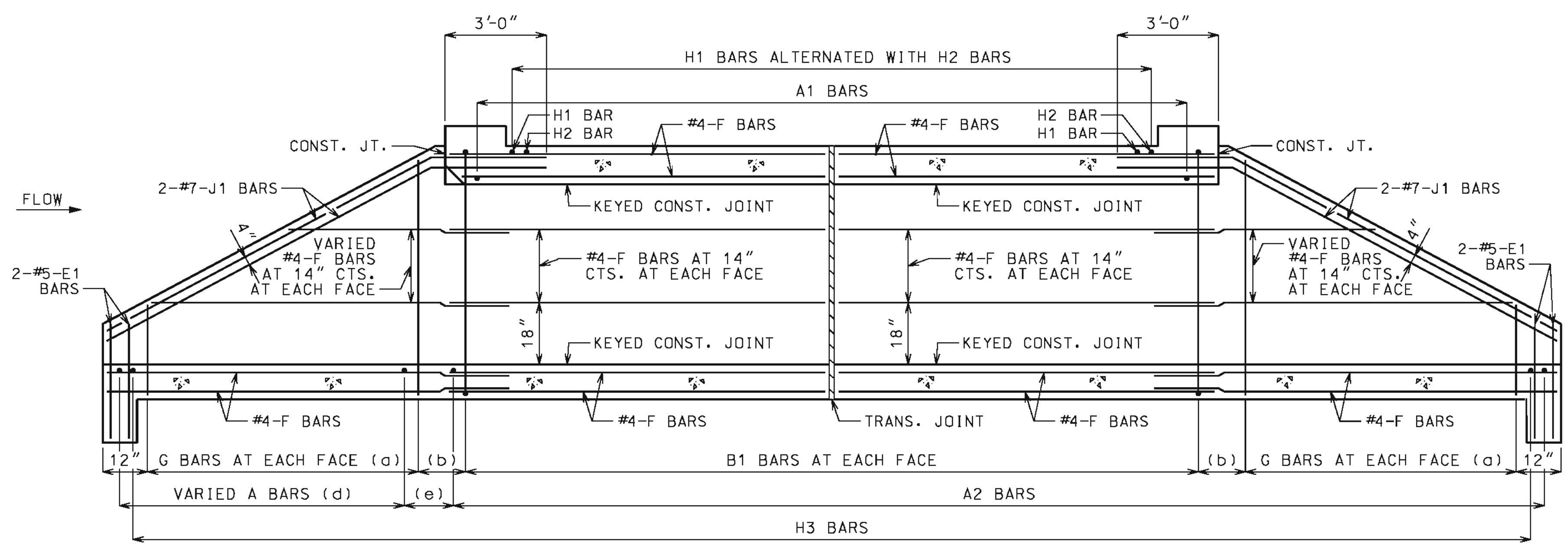
703.41H

SHEET NO. 1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) NOT SPECFIED ON THIS SHEET

(g) NOT SPECFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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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DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
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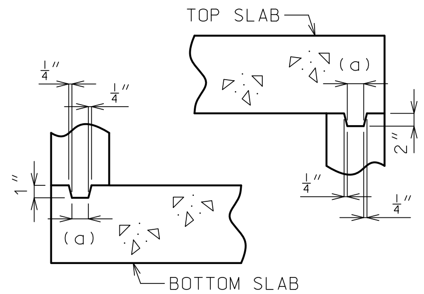
CONCRETE DOUBLE BOX CULVERT

SKEW: SQUARED
WINGS: FLARED

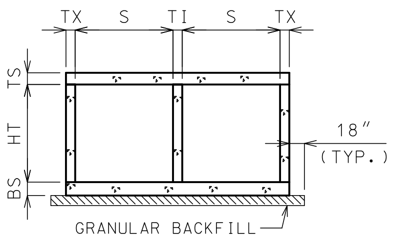
REINFORCEMENT

DATE EFFECTIVE:	10/01/2011	703.41H	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

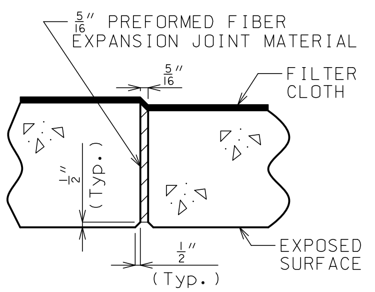


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



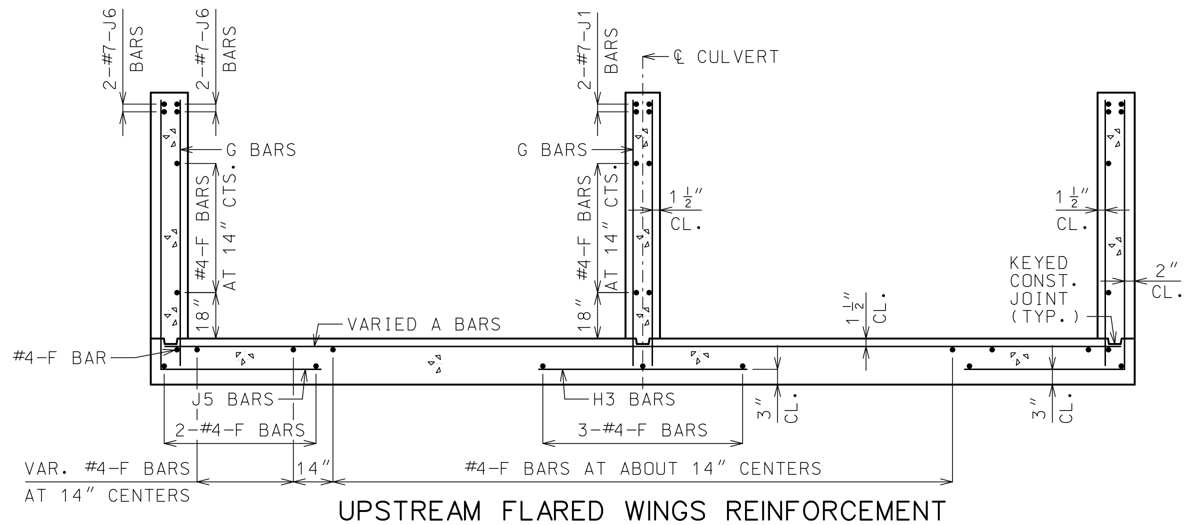
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



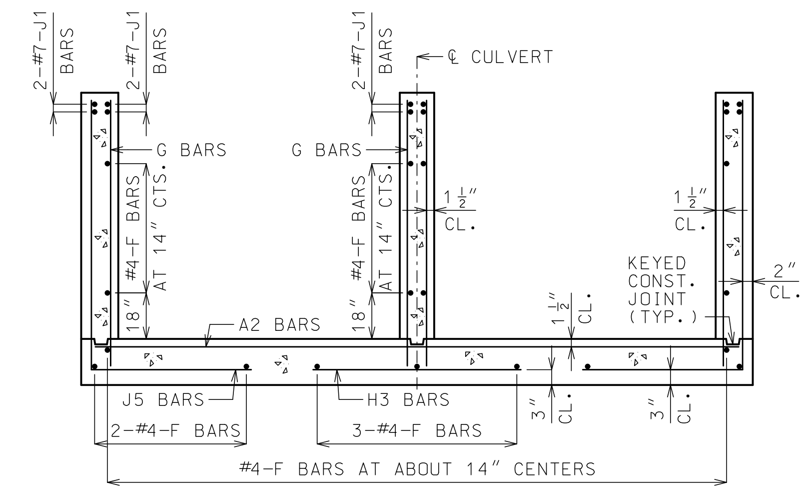
TRANSVERSE JOINT THRU BARREL

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.

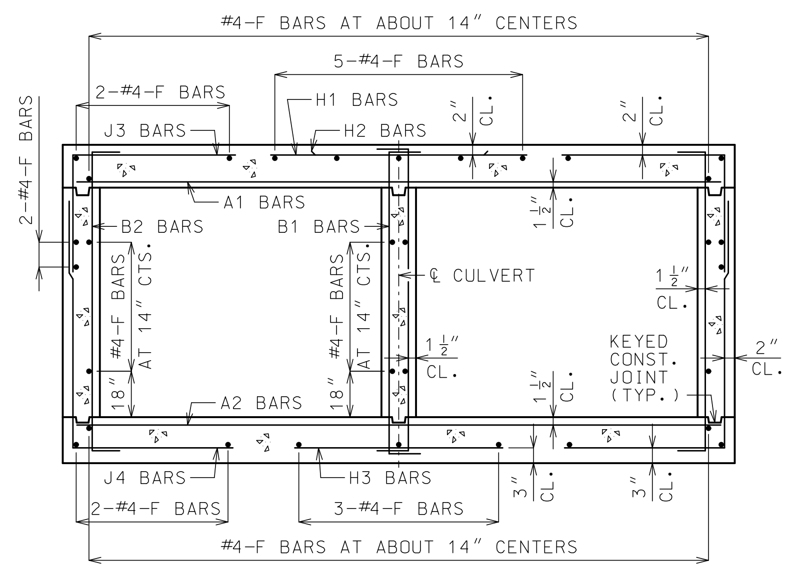
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED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



UPSTREAM FLARED WINGS REINFORCEMENT

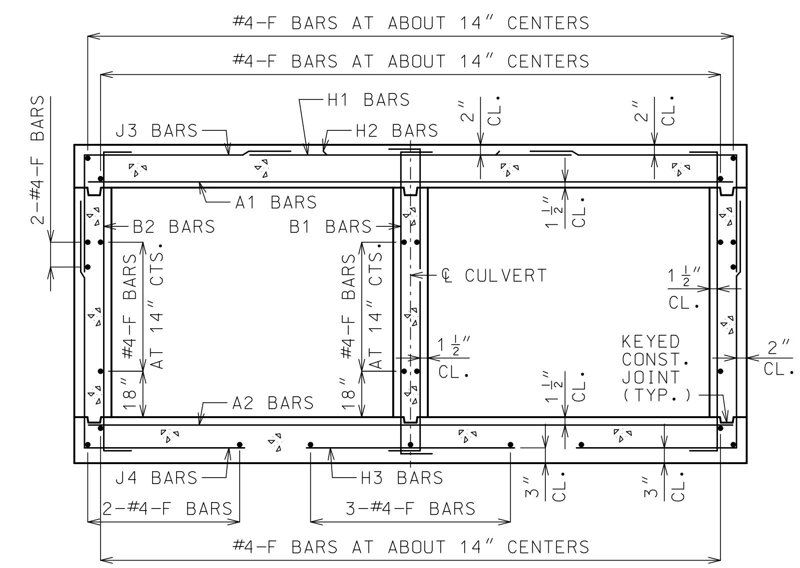


DOWNSTREAM WINGS REINFORCEMENT



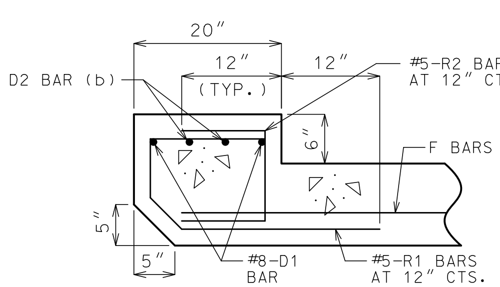
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



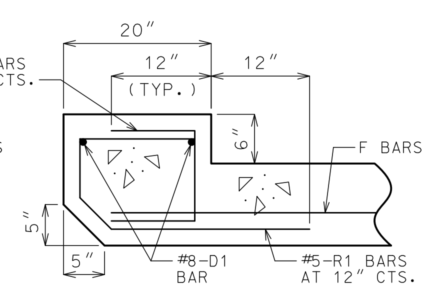
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



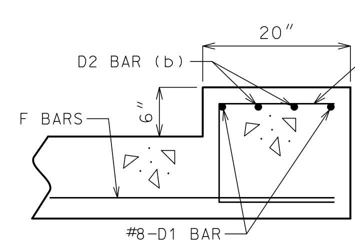
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



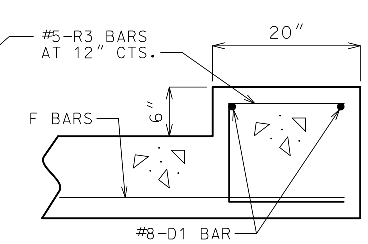
UPSTREAM HEADWALL REINFORCEMENT

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 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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".

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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 DOUBLE BOX CULVERT

SKEW: SQUARED
WINGS: FLARED

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.41H	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		

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

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

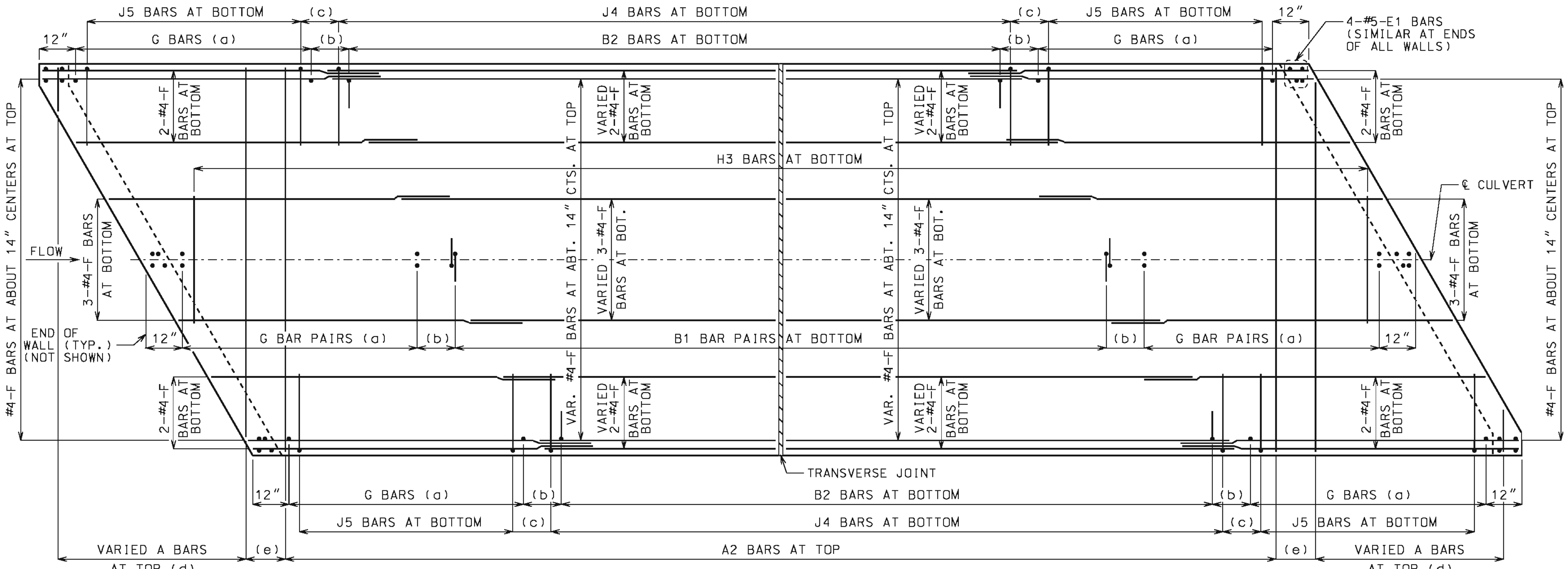
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

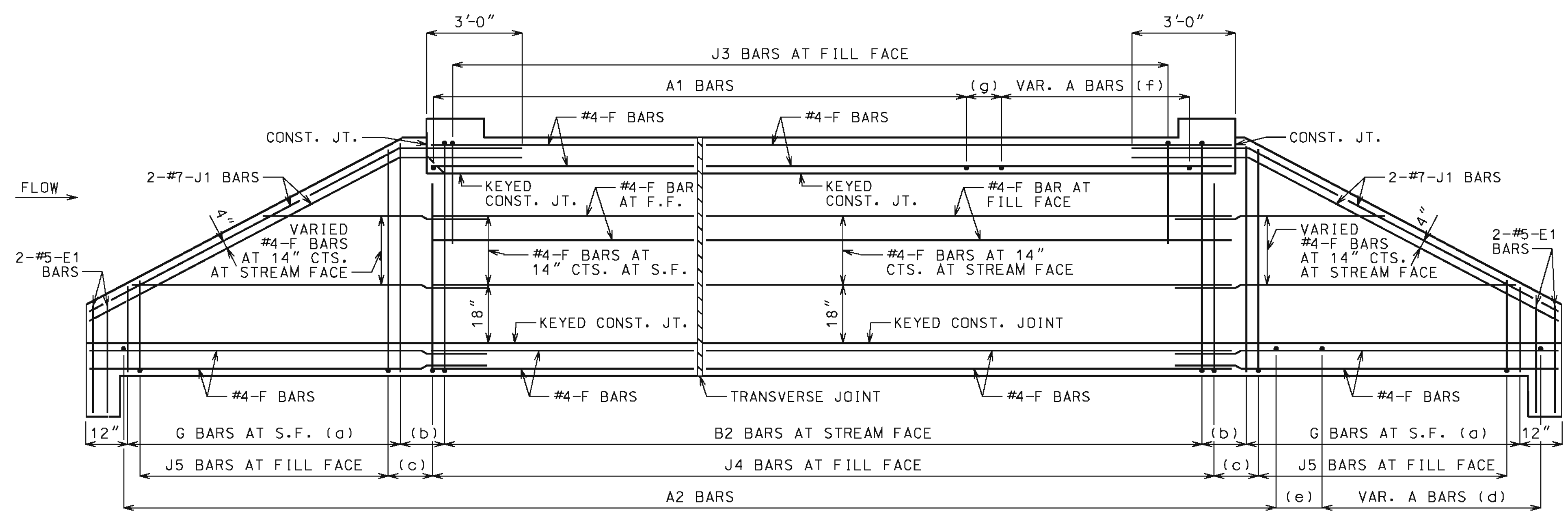
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

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PROFESSIONAL ENGINEER

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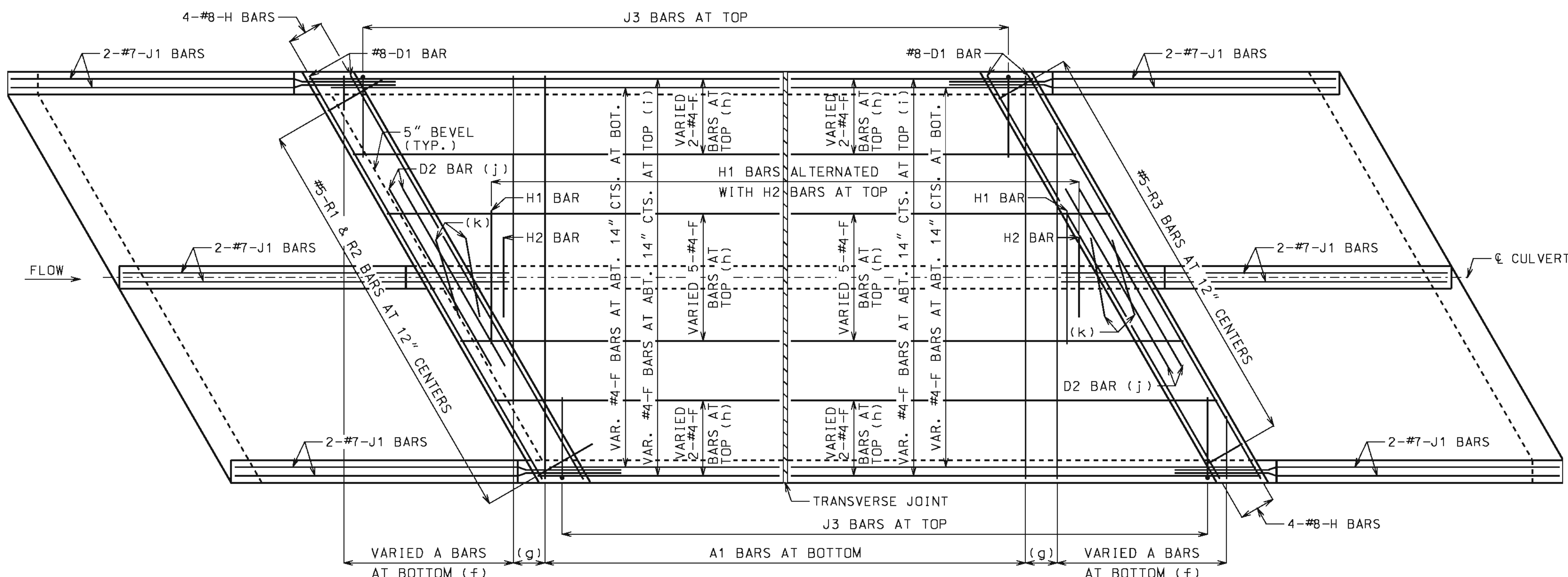
CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

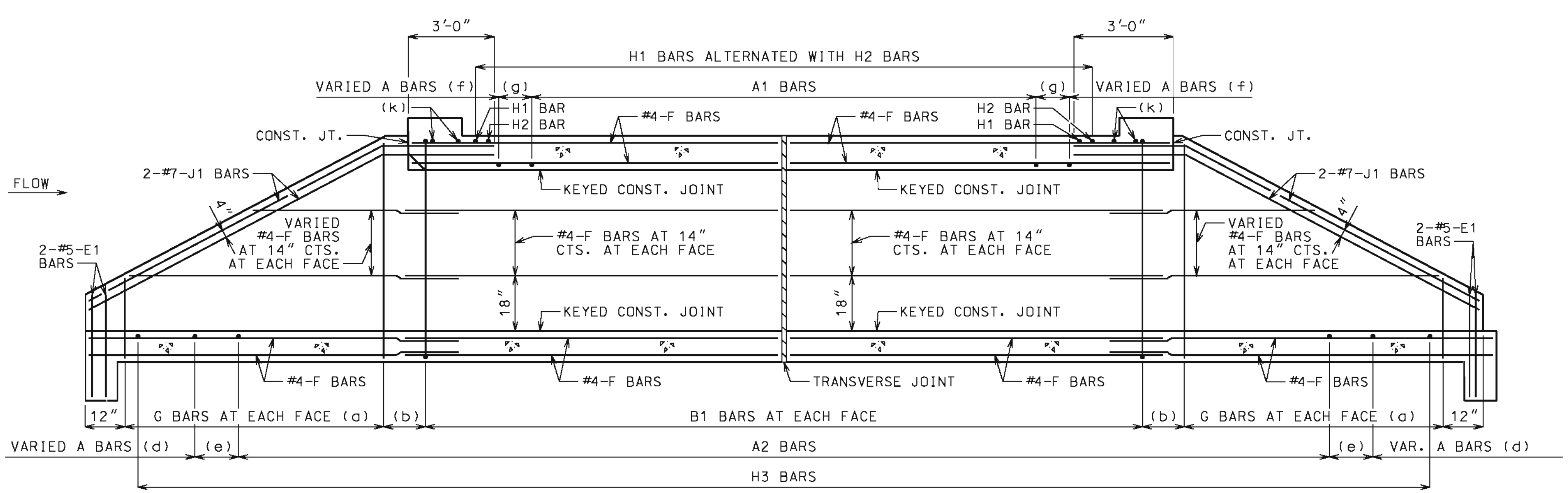
REINFORCEMENT

DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015		703.42H	SHEET NO. 1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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

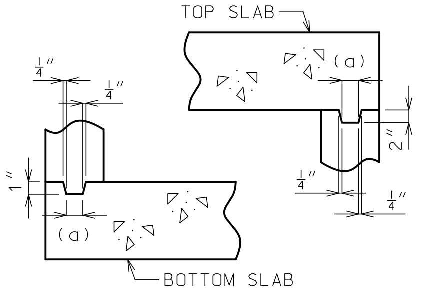
CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

REINFORCEMENT

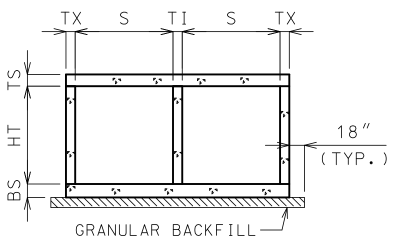
DATE EFFECTIVE:	10/01/2011	703.42H	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

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

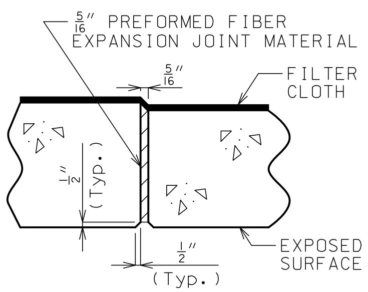


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



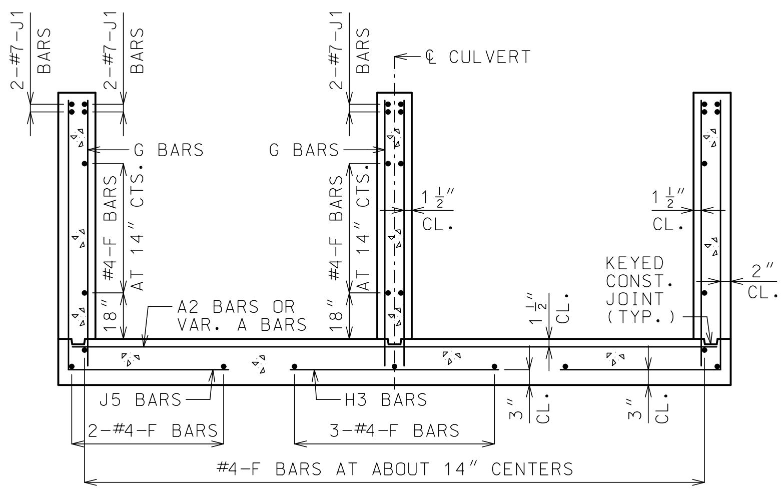
GRANULAR BACKFILL LIMITS
AND MEMBER DIMENSIONS



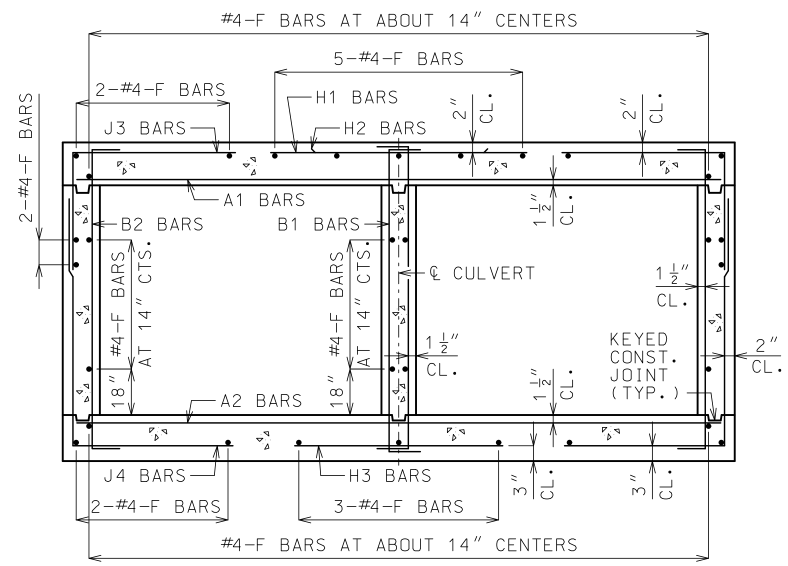
TRANSVERSE JOINT THRU BARREL

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.

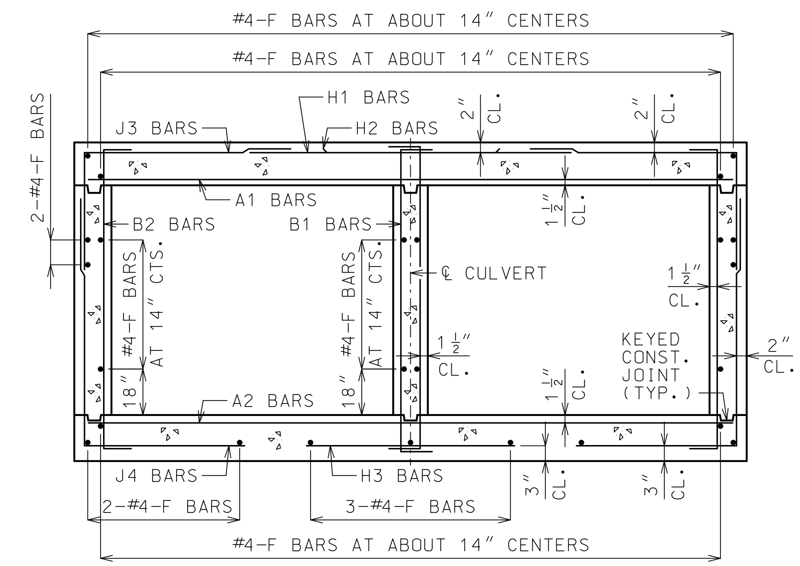


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



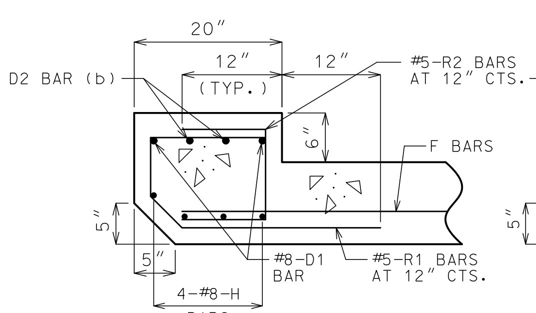
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



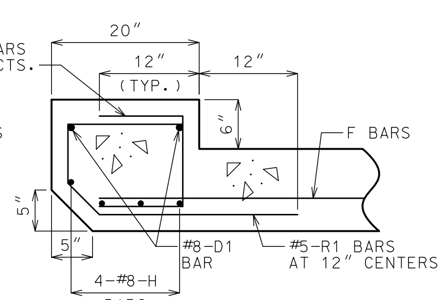
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



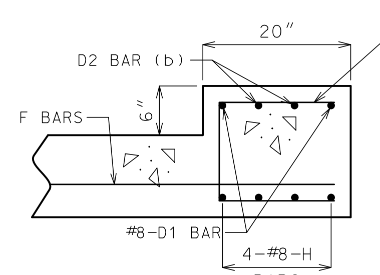
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



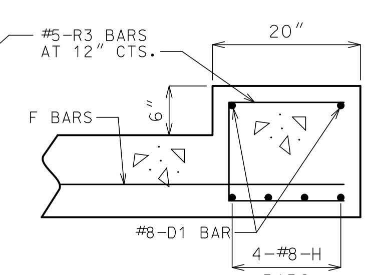
UPSTREAM HEADWALL REINFORCEMENT

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 ℄ 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
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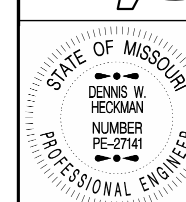


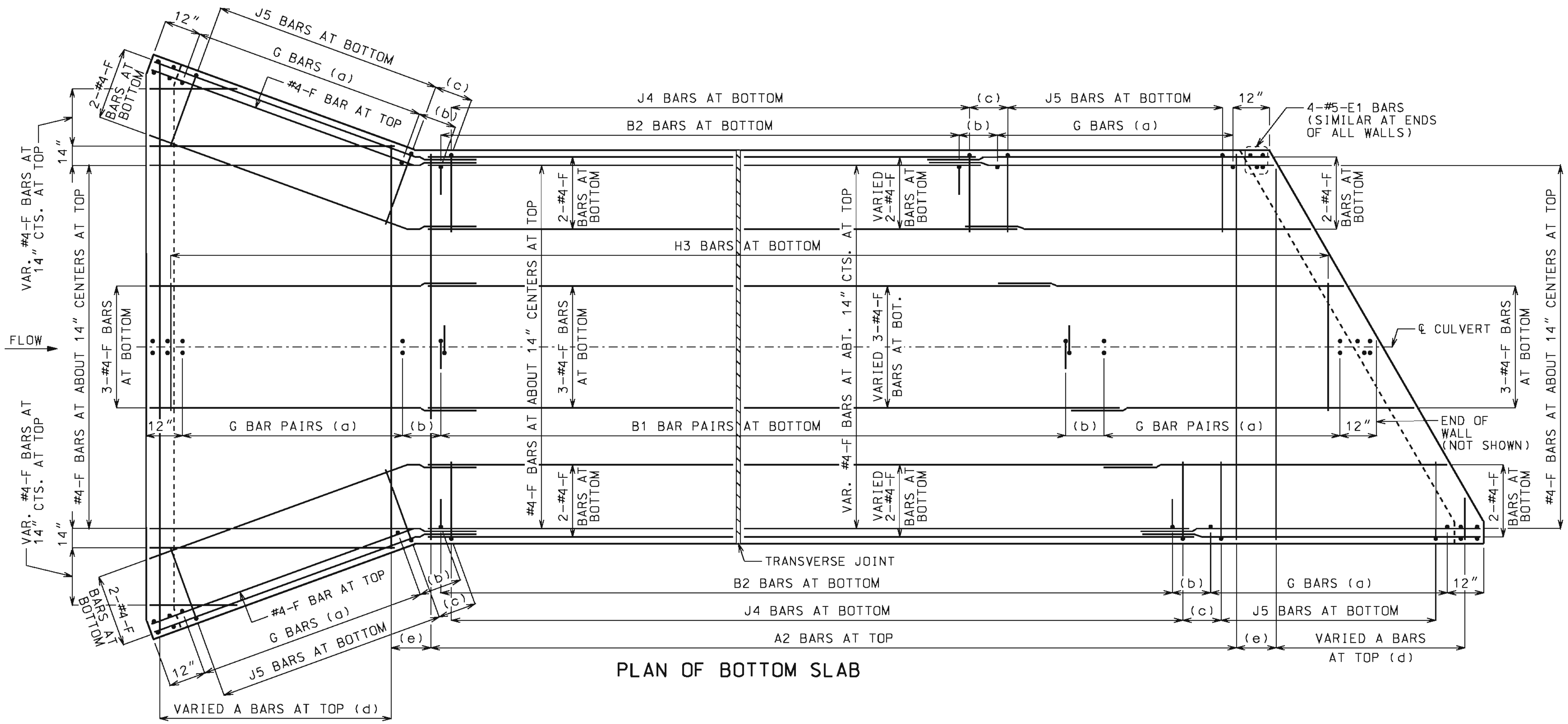
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

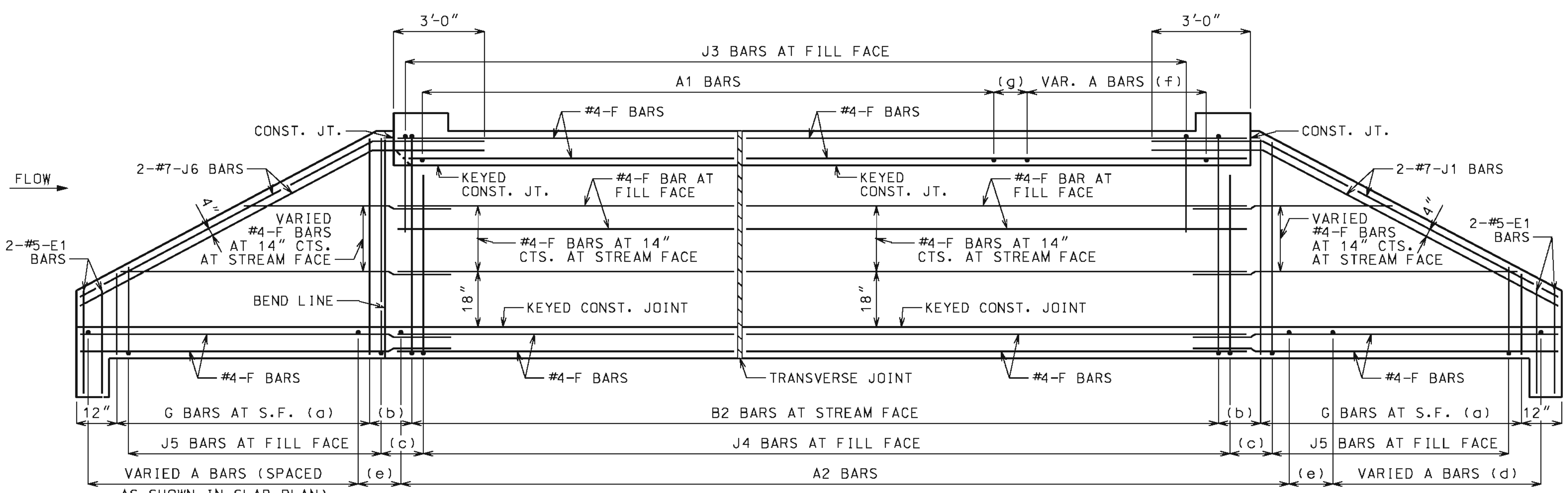
SKEW: LEFT ADVANCE
WINGS: STRAIGHT

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.42H	SHEET NO.
DATE PREPARED:	10/14/2020		3 OF 3



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

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.

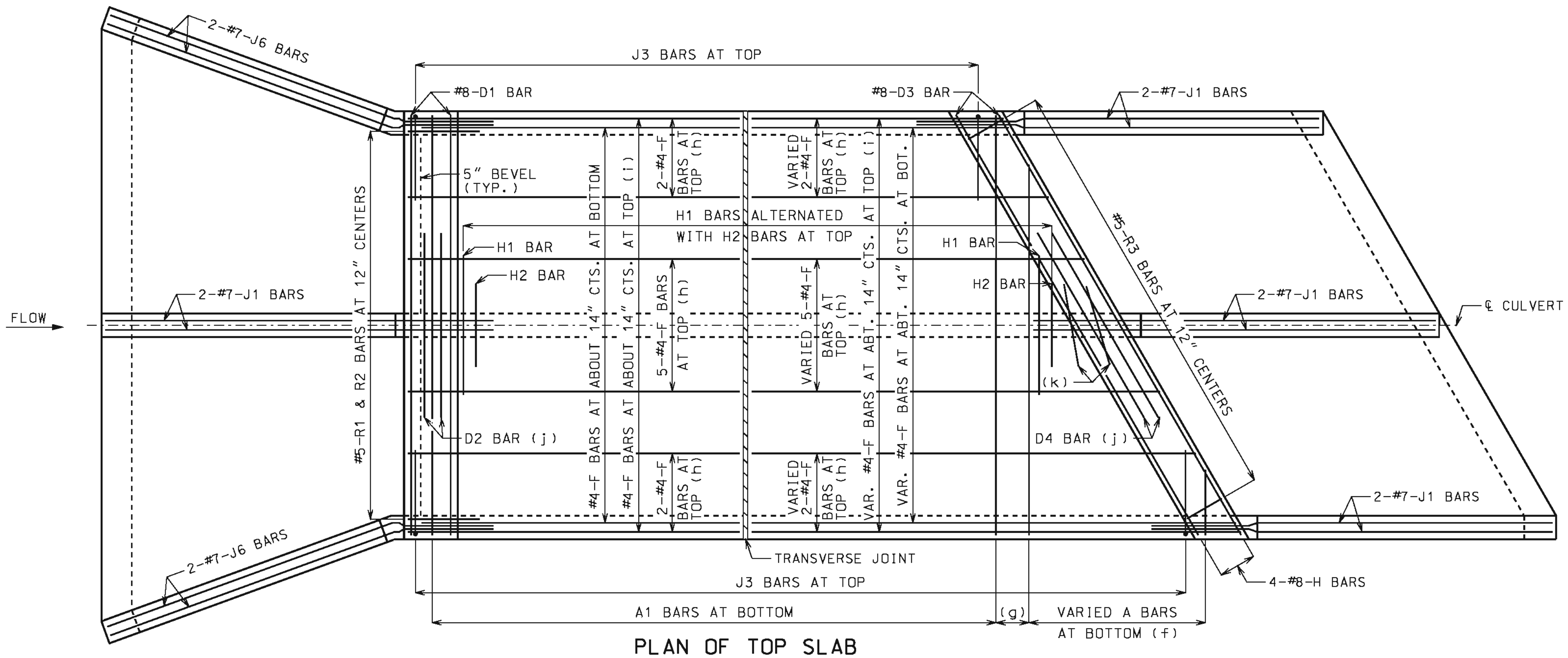
CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

REINFORCEMENT

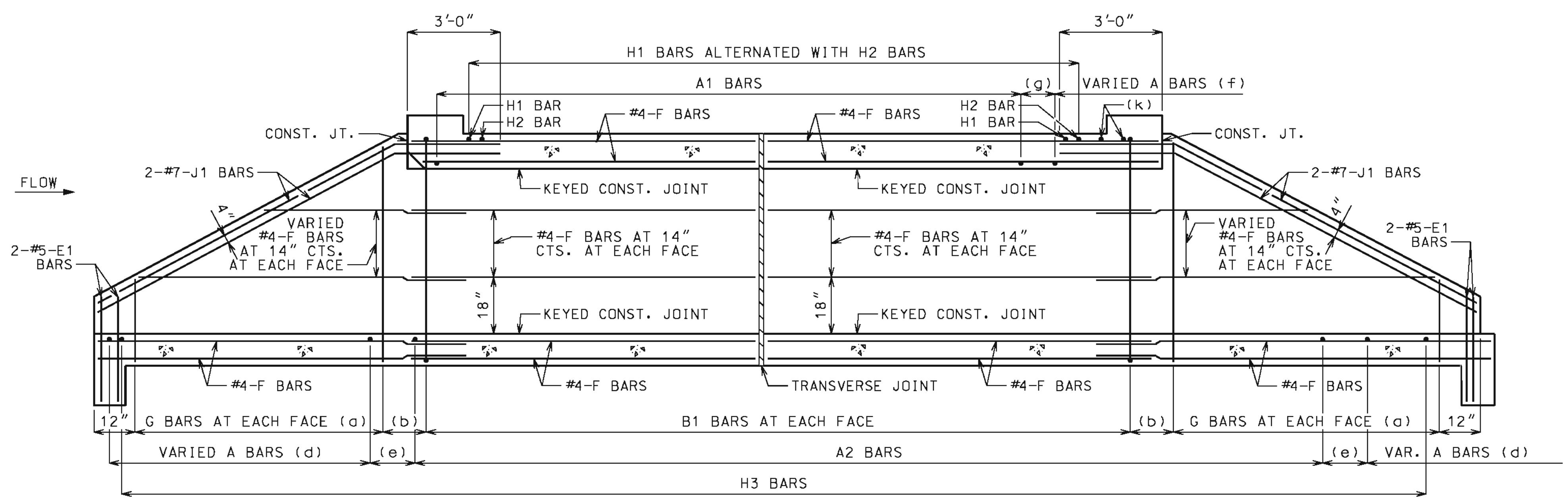
DATE EFFECTIVE:	10/01/2011	703.43H	SHEET NO.
DATE PREPARED:	5/13/2015		1 OF 3

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



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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NUMBER PE-27141
PROFESSIONAL ENGINEER
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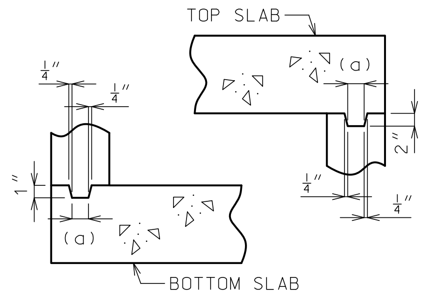
CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

REINFORCEMENT

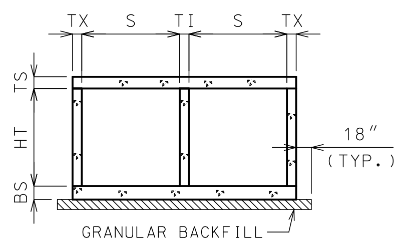
DATE EFFECTIVE:	10/01/2011	703.43H	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

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

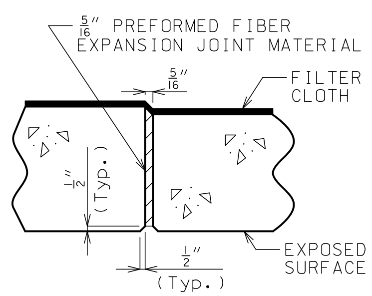


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



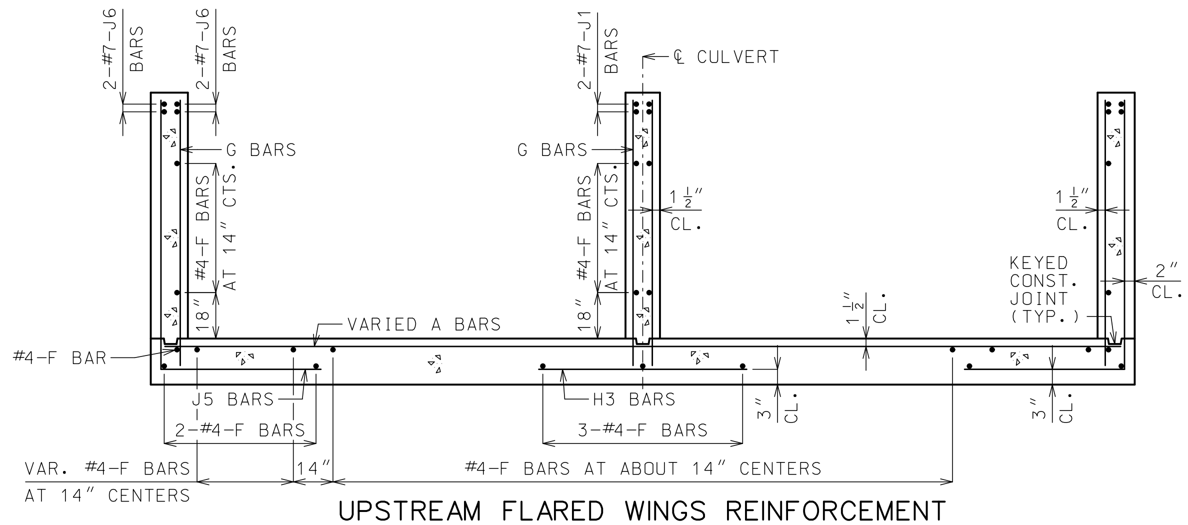
GRANULAR BACKFILL LIMITS
AND MEMBER DIMENSIONS



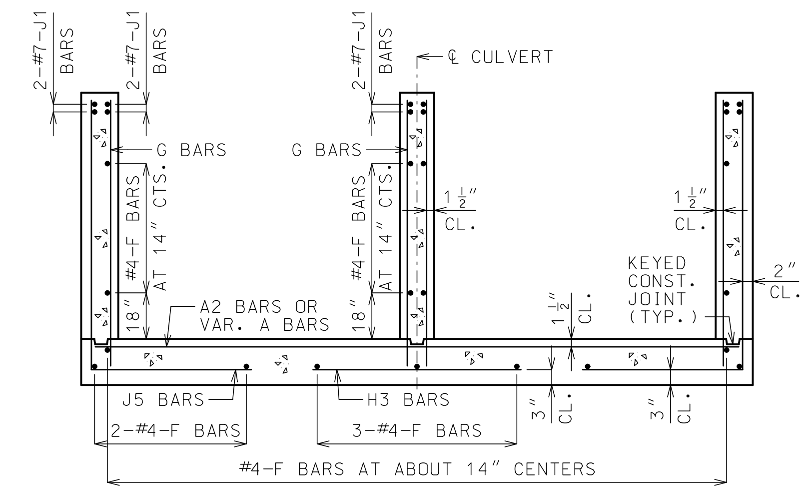
TRANSVERSE JOINT THRU BARREL

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.

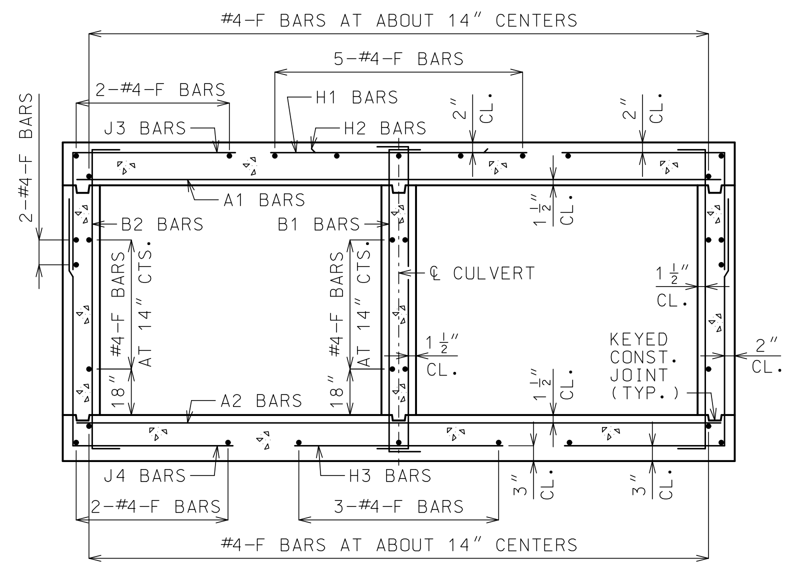
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED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



UPSTREAM FLARED WINGS REINFORCEMENT

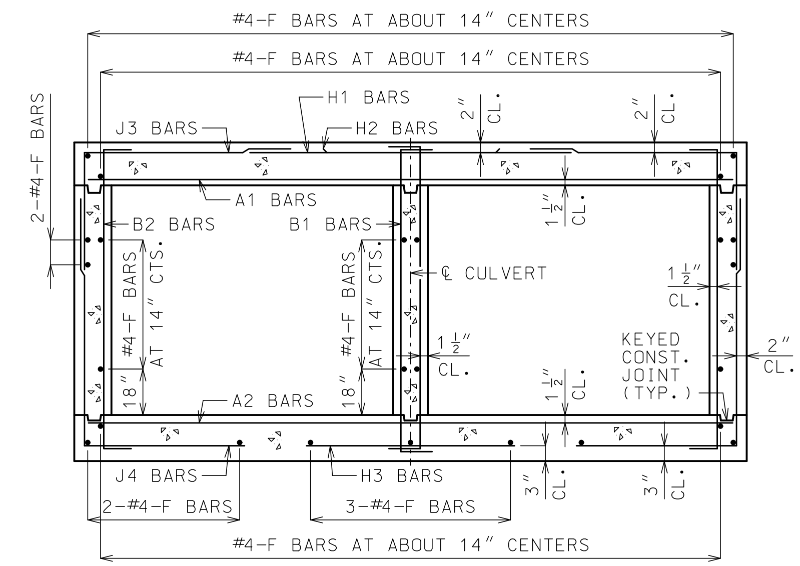


DOWNSTREAM WINGS REINFORCEMENT



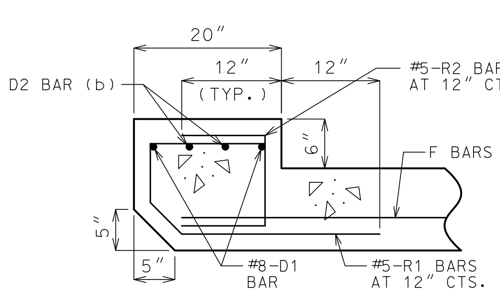
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



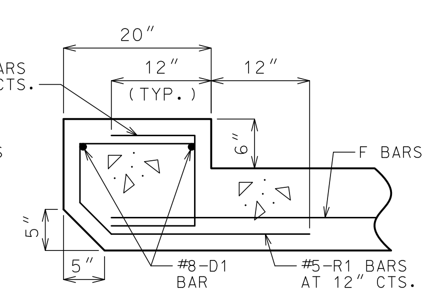
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



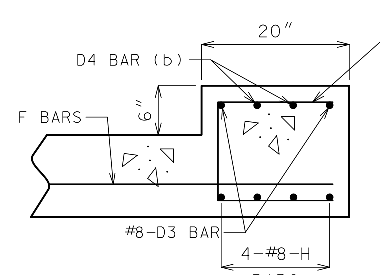
UPSTREAM HEADWALL
REINFORCEMENT

NEAR INTERIOR WALL



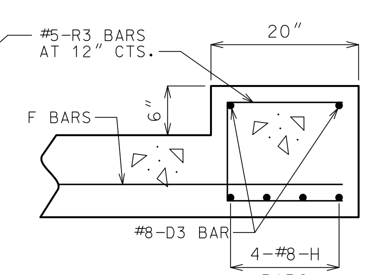
UPSTREAM HEADWALL
REINFORCEMENT

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 ℄ 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".

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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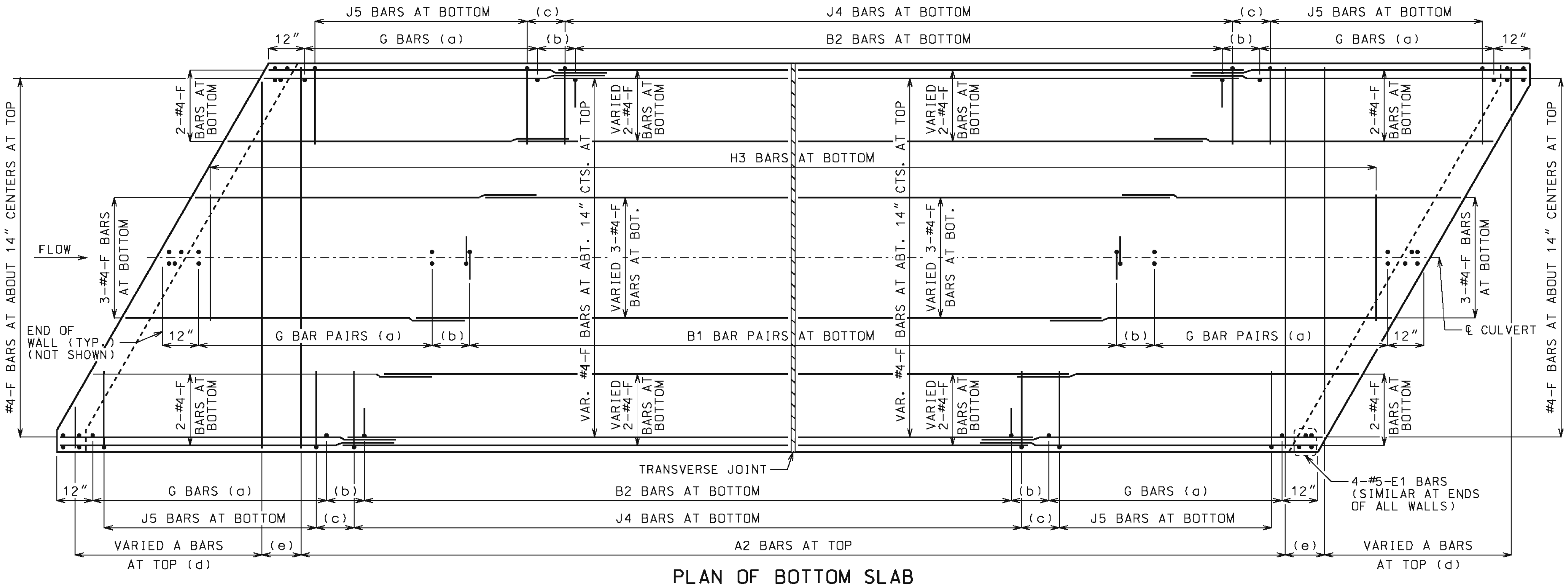
STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE
DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.43H	SHEET NO.
DATE PREPARED:	10/14/2020		3 OF 3



PLAN OF BOTTOM SLAB

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

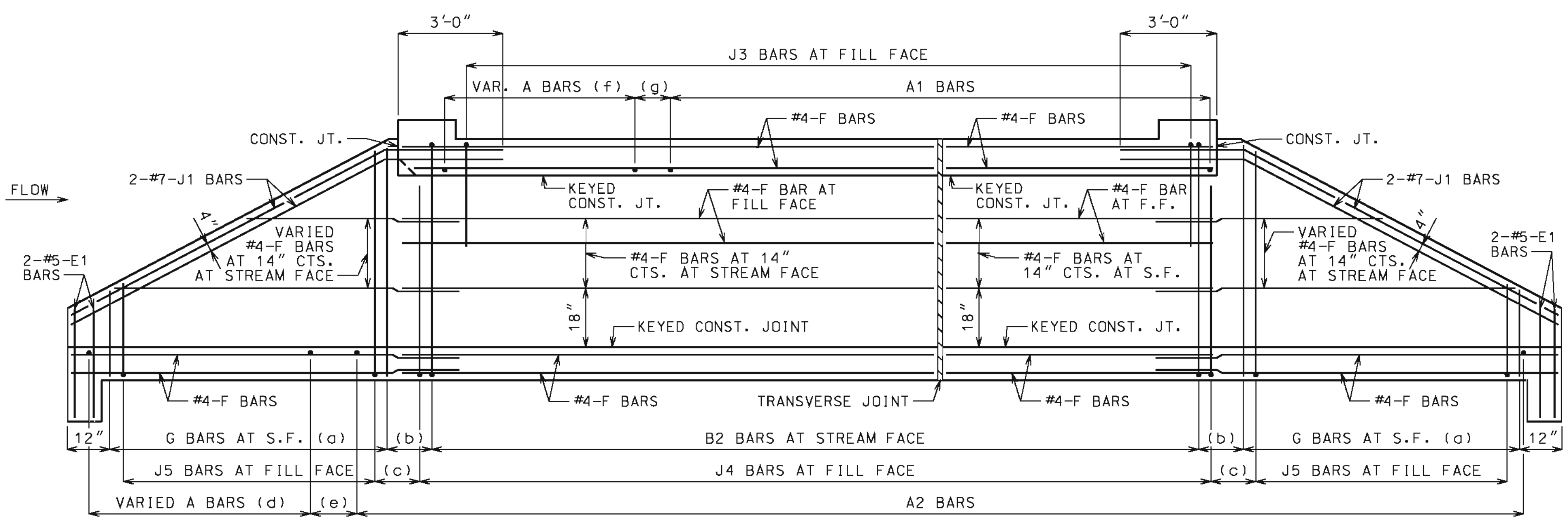
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

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

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

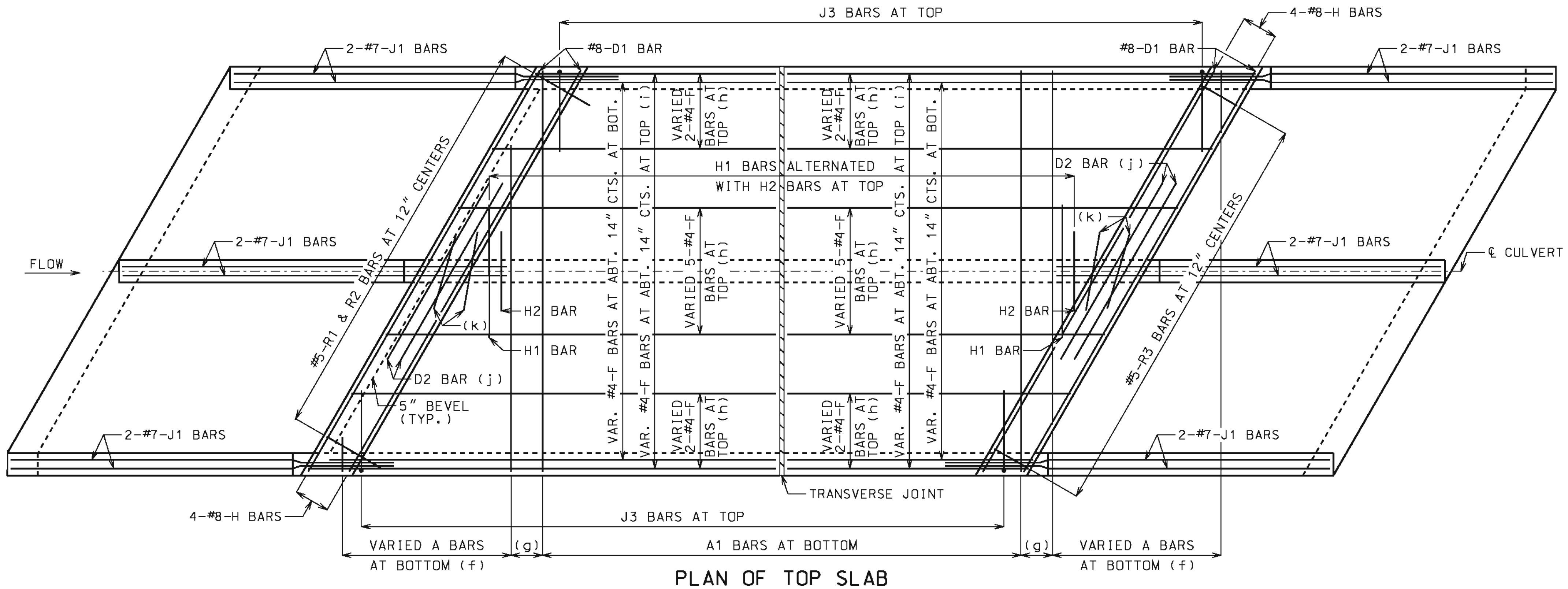
REINFORCEMENT

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 5/13/2015

703.44H

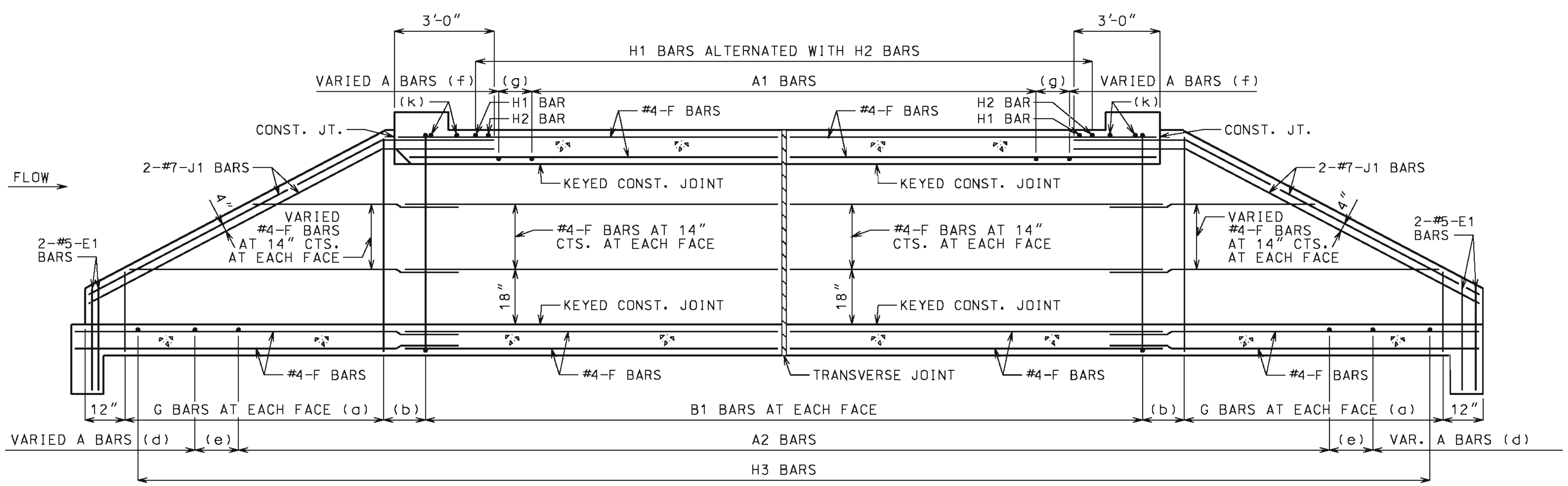
SHEET NO. 1 OF 3

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



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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STATE OF MISSOURI
DENNIS W. HECKMAN
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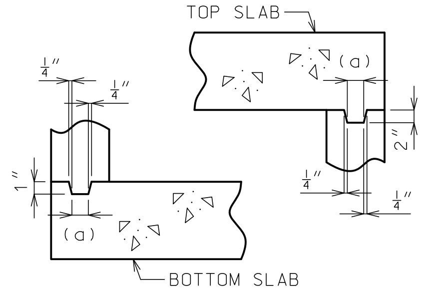
CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

REINFORCEMENT

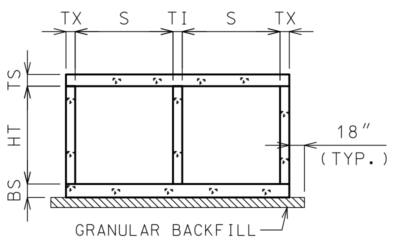
DATE EFFECTIVE:	10/01/2011	703.44H	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

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

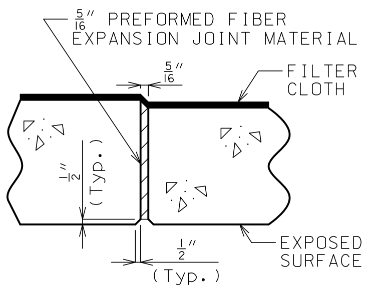


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



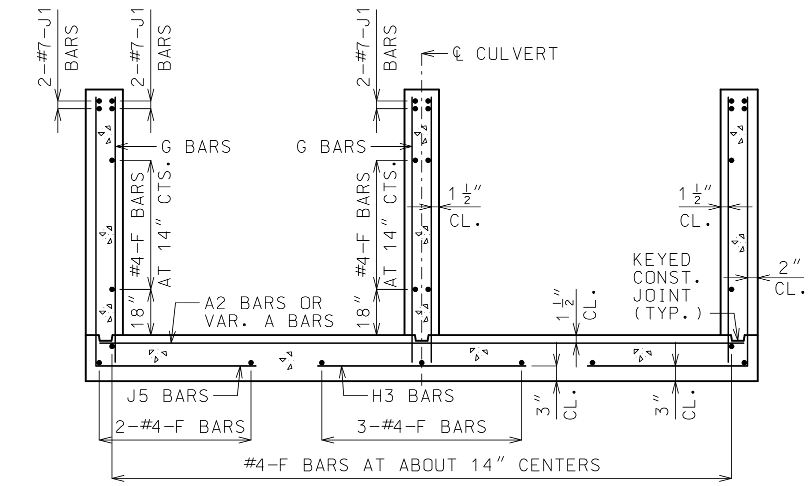
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



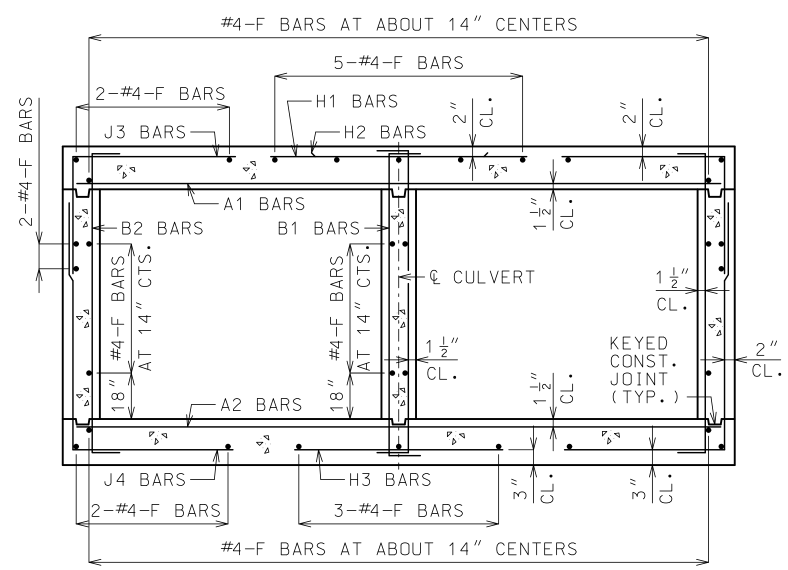
TRANSVERSE JOINT THRU BARREL

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.

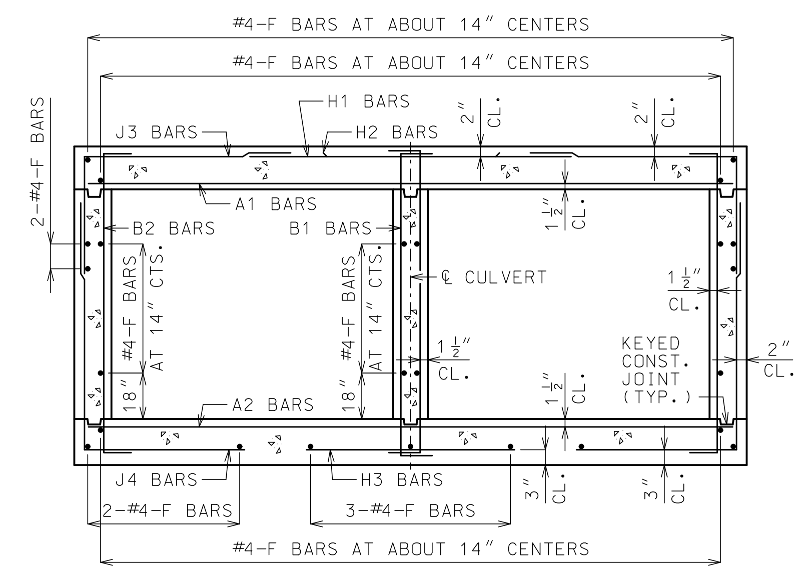


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



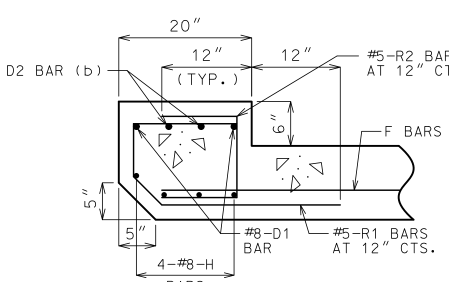
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



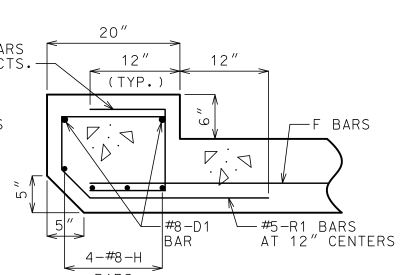
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



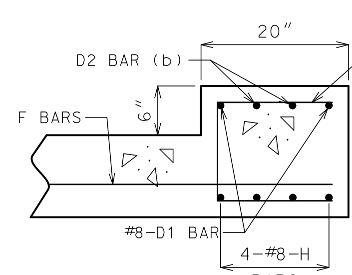
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



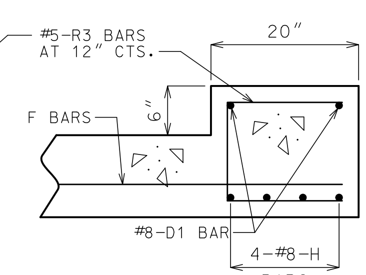
UPSTREAM HEADWALL REINFORCEMENT

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 ℄ 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.

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 $1\frac{1}{2}$".

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

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

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

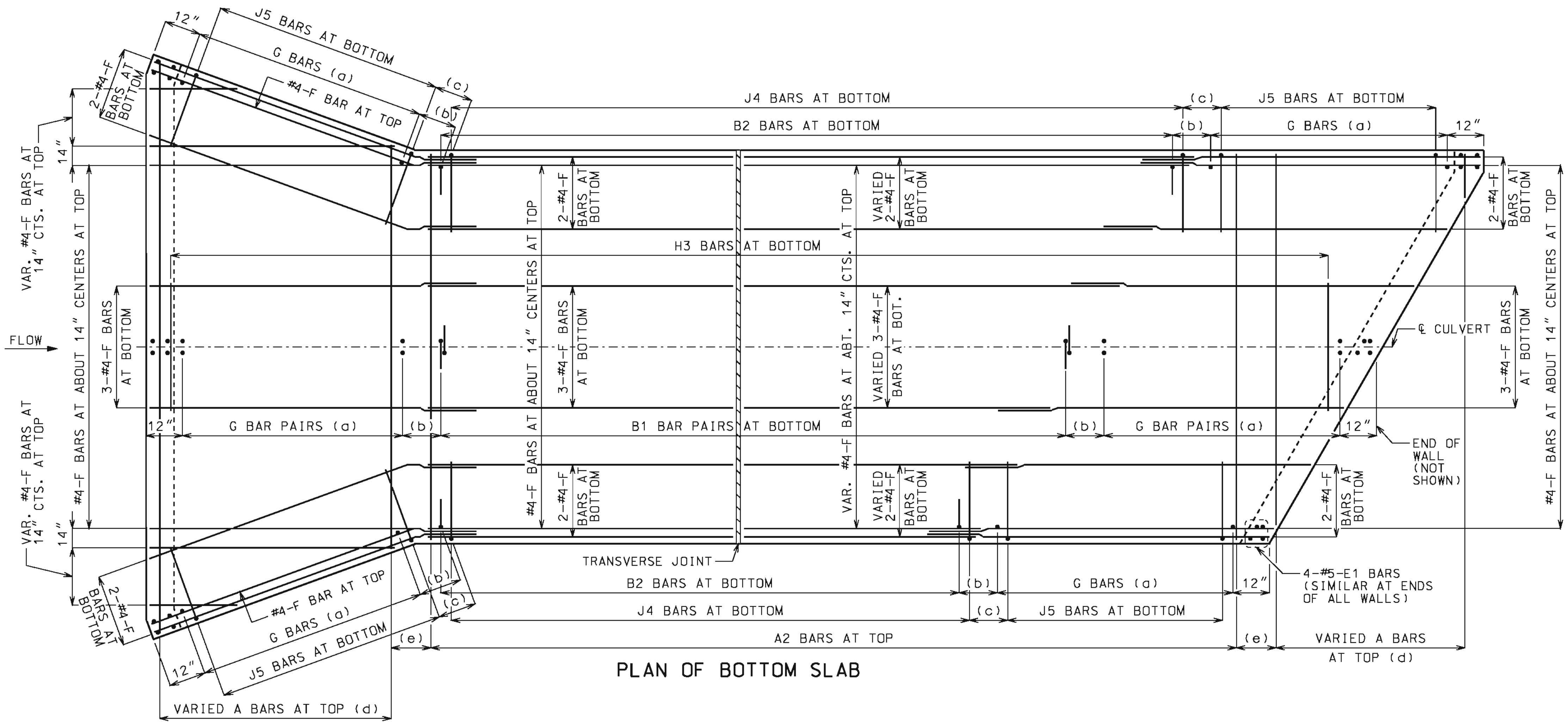
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



PLAN OF BOTTOM SLAB

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

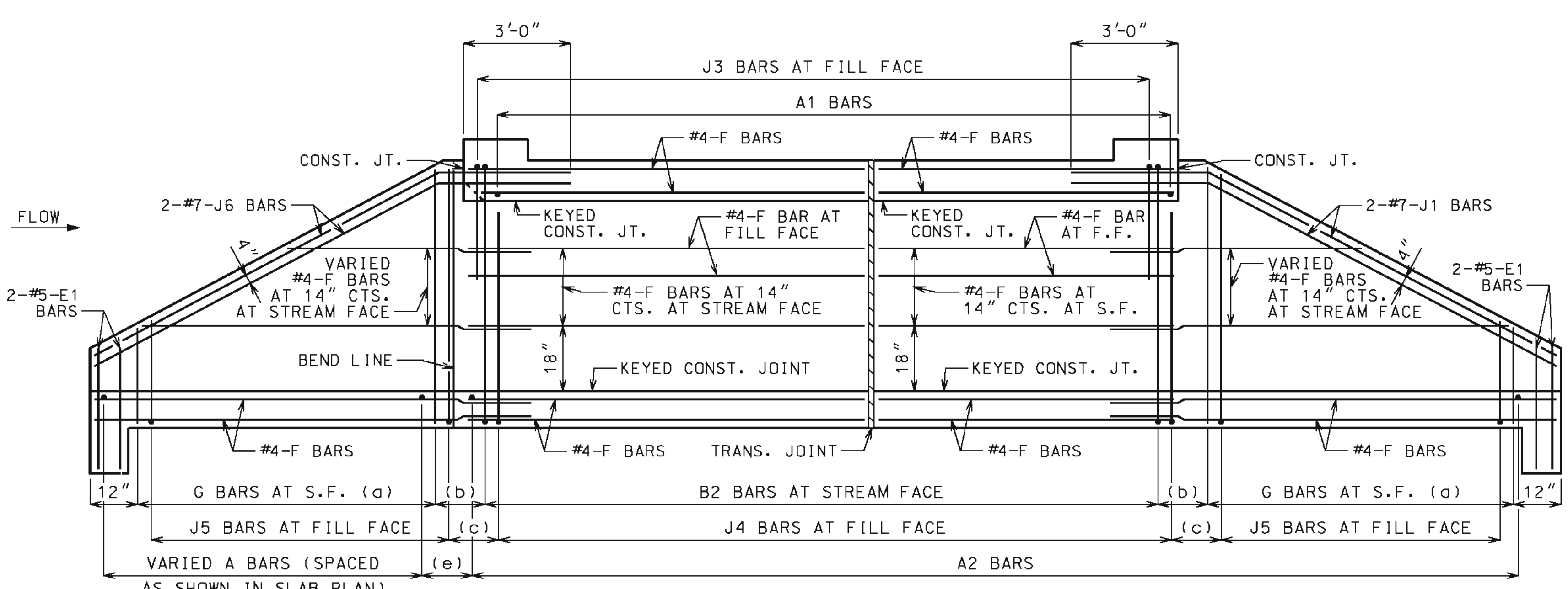
(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MoDOT
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

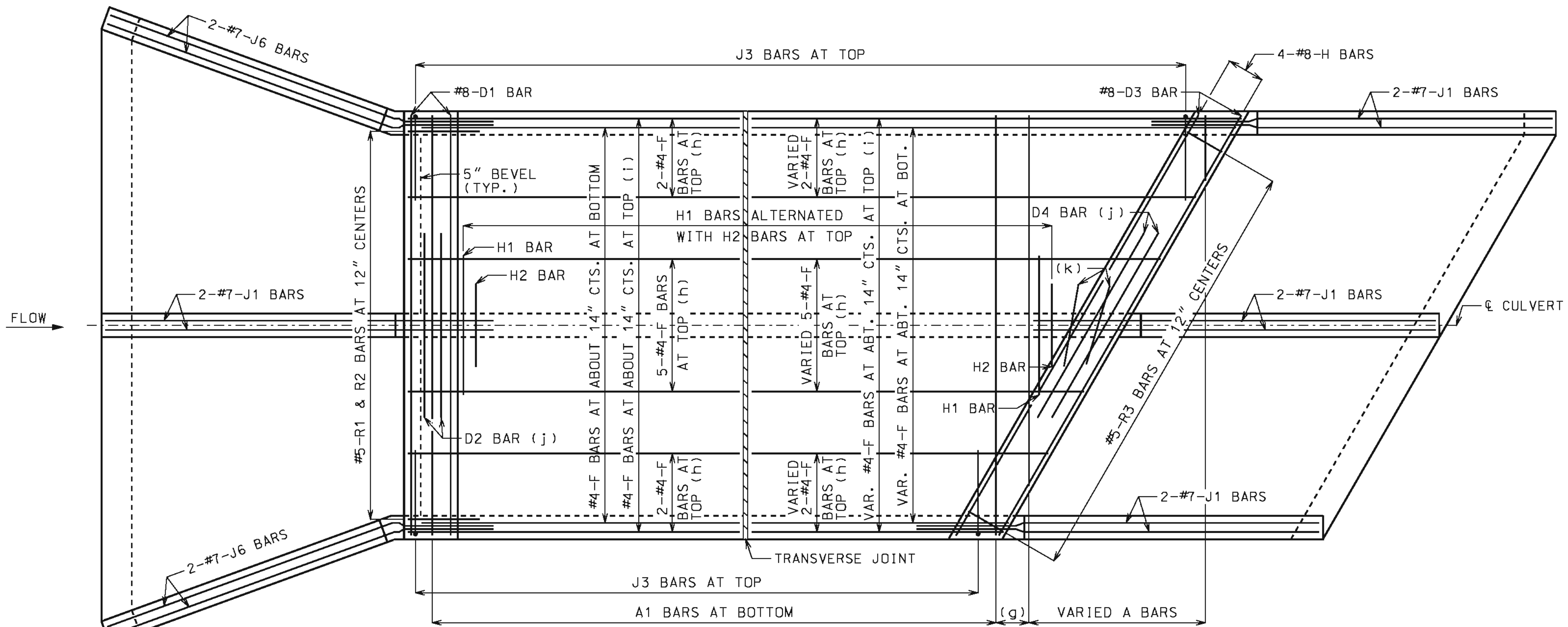
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

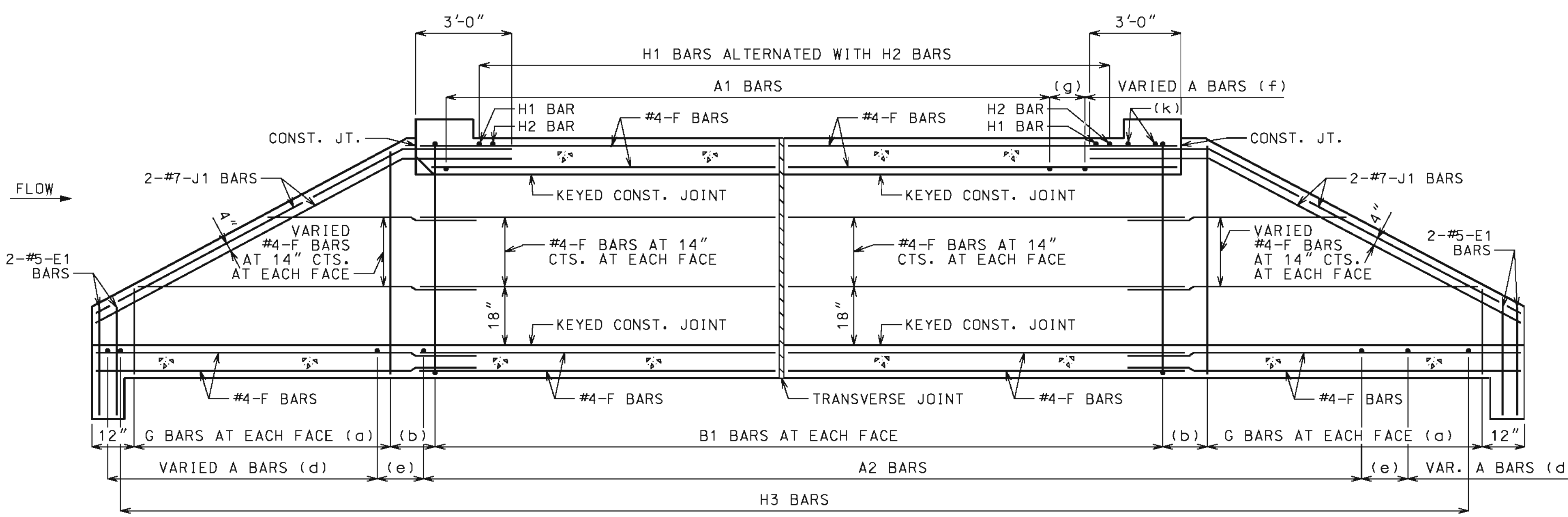
REINFORCEMENT

DATE EFFECTIVE:	10/01/2011	703.45C	SHEET NO. 1 OF 3
DATE PREPARED:	5/13/2015		



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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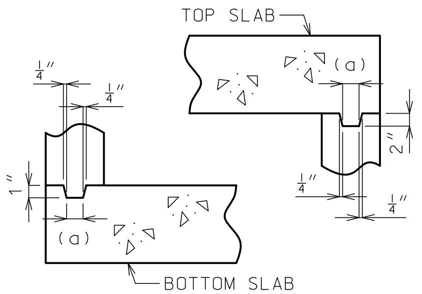
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

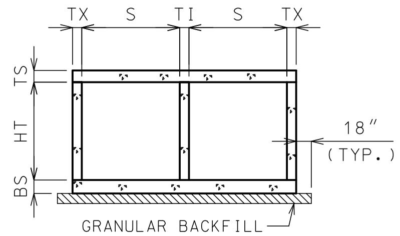
REINFORCEMENT

DATE EFFECTIVE:	10/01/2011	703.45C	SHEET NO. 2 OF 3
DATE PREPARED:	5/13/2015		

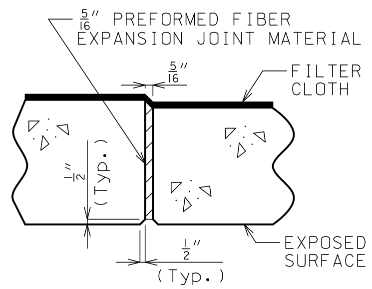


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



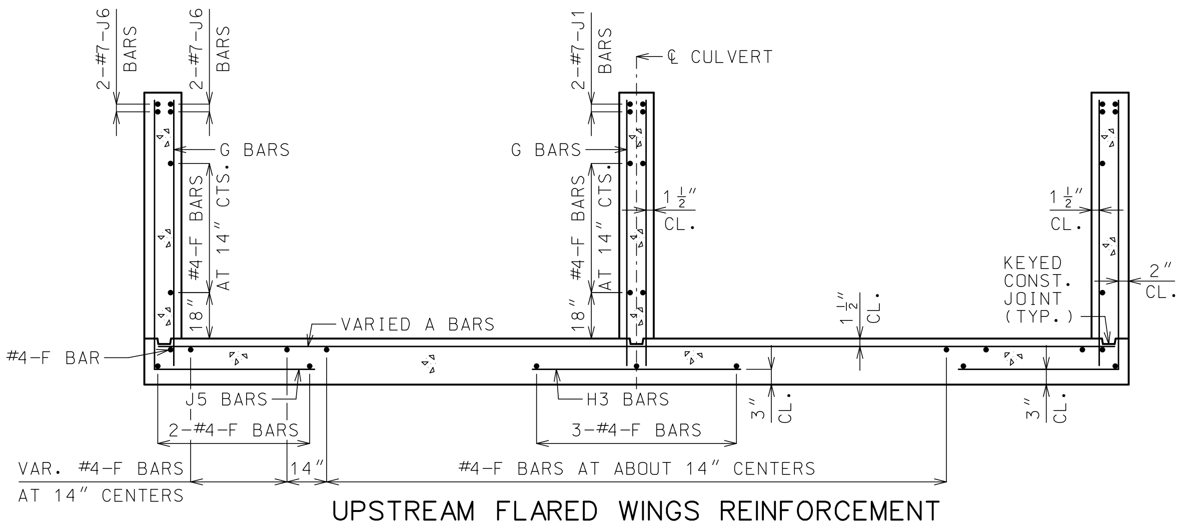
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



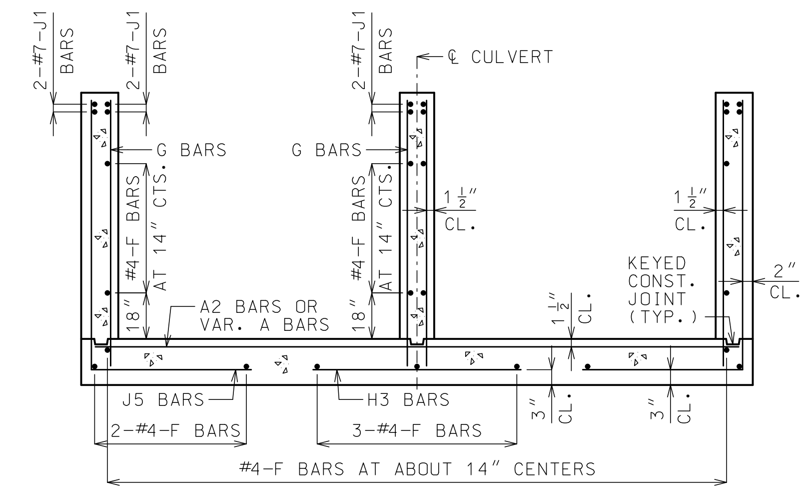
TRANSVERSE JOINT THRU BARREL

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.

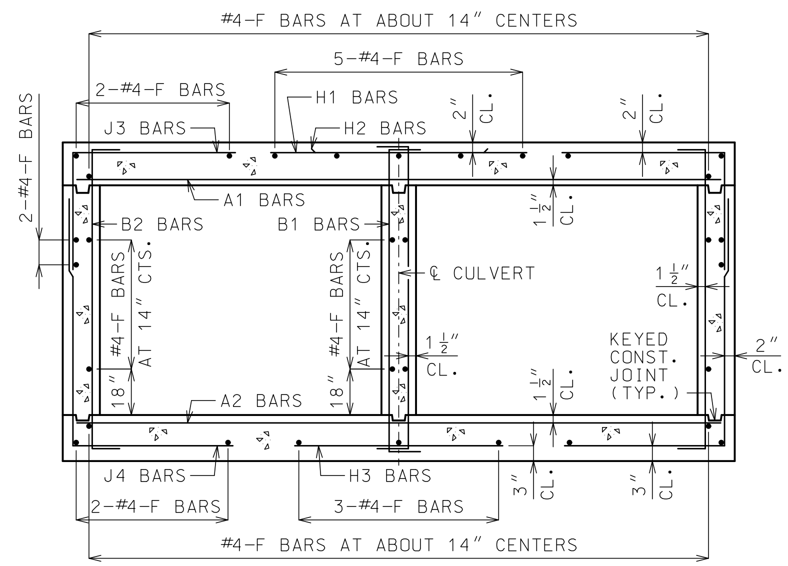
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED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



UPSTREAM FLARED WINGS REINFORCEMENT

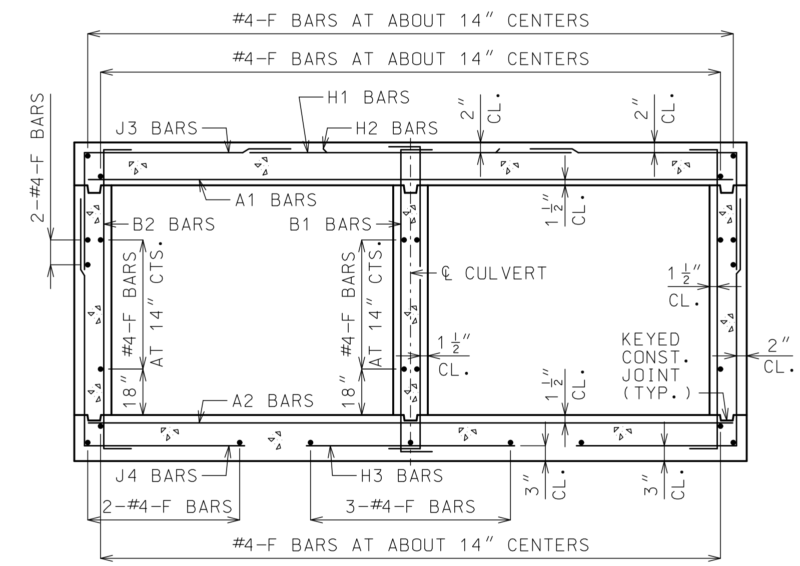


DOWNSTREAM WINGS REINFORCEMENT



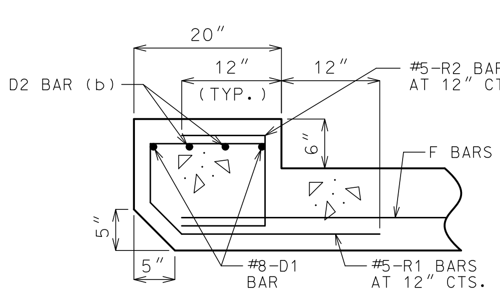
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



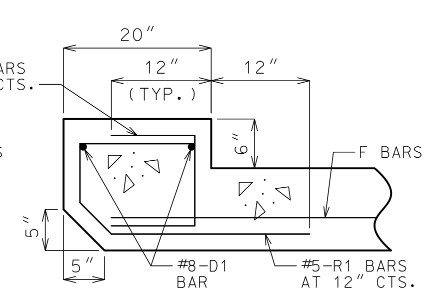
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



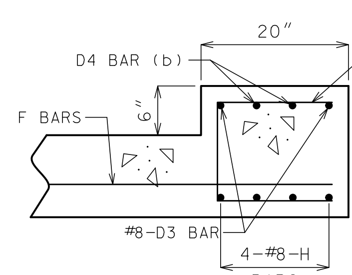
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



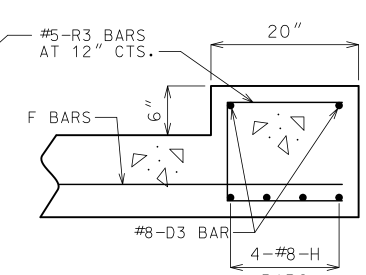
UPSTREAM HEADWALL REINFORCEMENT

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 ℄ 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".

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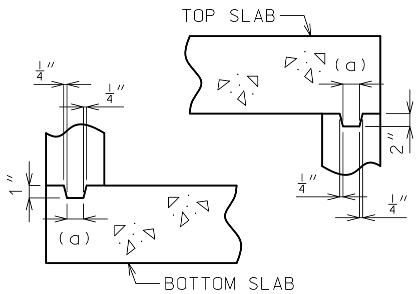
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

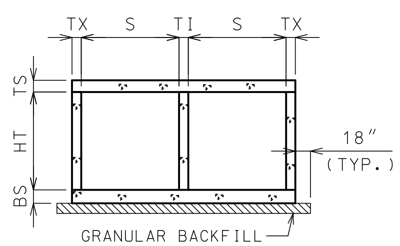
SECTIONS

DATE EFFECTIVE:	01/01/2021	703.45C	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		

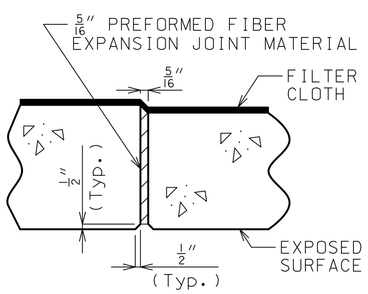


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



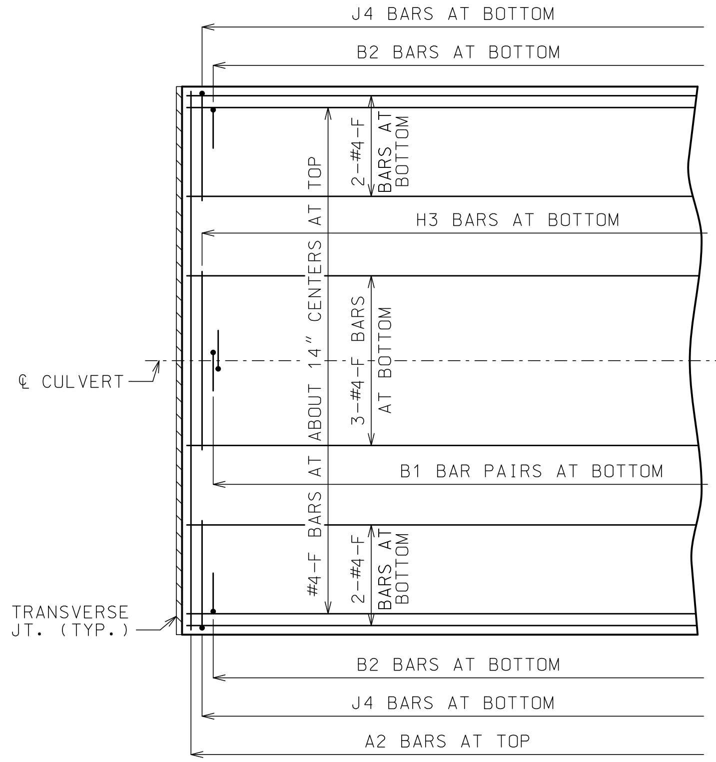
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



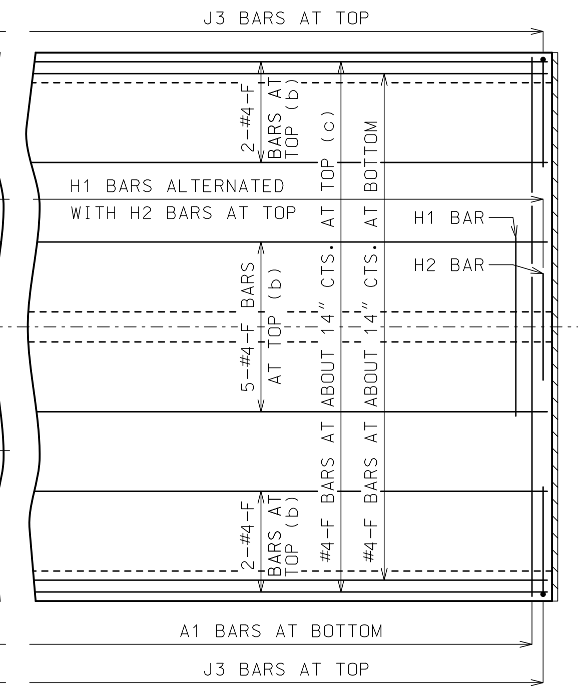
TRANSVERSE JOINT THRU BARREL

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.

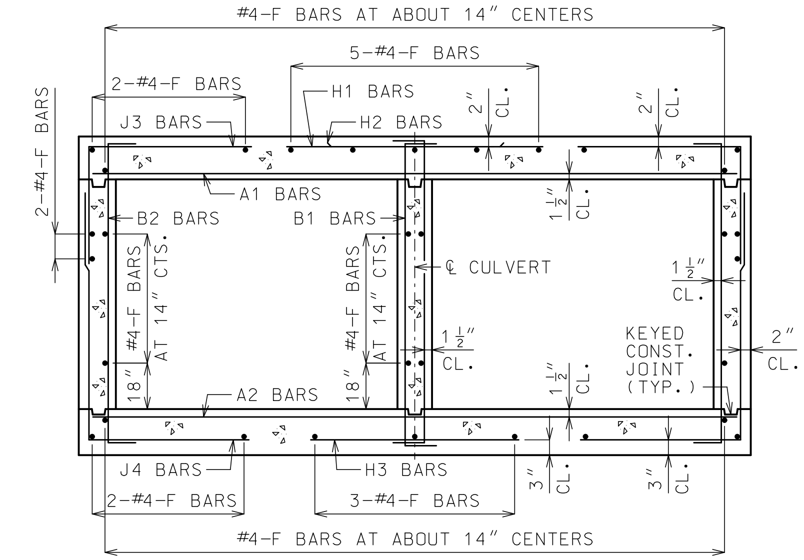


PART PLAN OF BOTTOM SLAB REINFORCEMENT



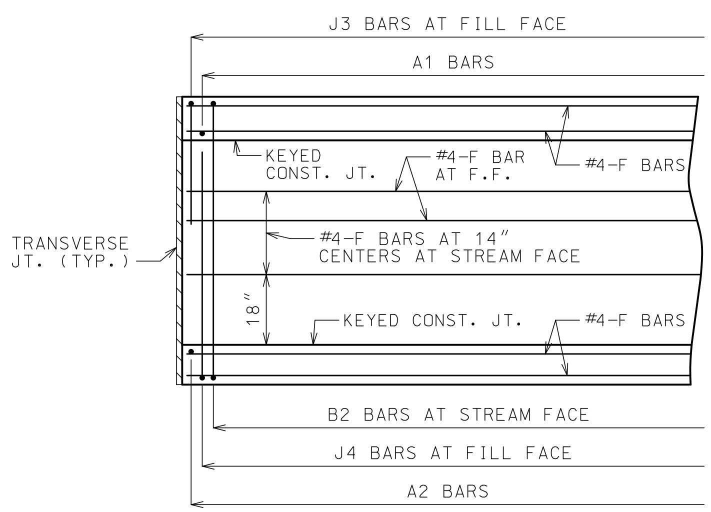
PART PLAN OF TOP SLAB REINFORCEMENT

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

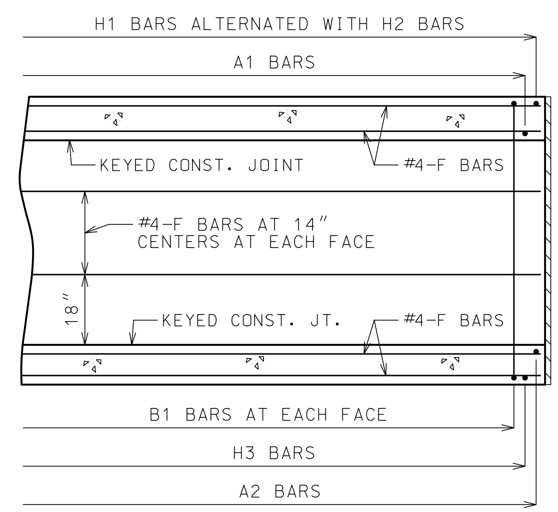


BARREL REINFORCEMENT

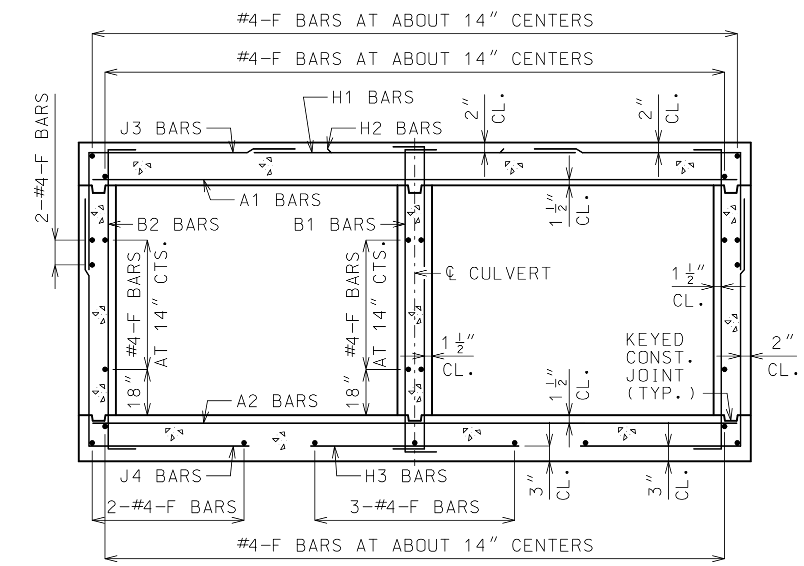
FOR DESIGN FILLS OVER 2'-0"
SYMMETRICAL ABOUT AND NORMAL TO ℄ CULVERT.



PART ELEVATION OF EXTERIOR WALL REINFORCEMENT



PART SECTION NEAR INTERIOR WALL REINFORCEMENT



BARREL REINFORCEMENT

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

GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS 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) fy = 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".

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DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
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CONCRETE DOUBLE BOX CULVERT

CUT SECTION

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

703.46

SHEET NO. 1 OF 1

SPAN (S) = 3 FT HEIGHT (HT) = 2 FT OR 3 FT OR 4 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=2'	K2 HT=3'	K2 HT=4'	H1 BARS SIZE	H1 SPA.	C5	H2 BARS SIZE	H2 SPA.	C6	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=2'	K3 HT=3'	K3 HT=4'	H3 BARS SIZE	H3 SPA.	C7	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	12	35.3	28	40	52	4	12	24.5	5	12	5	12	12
2 FT	10	8	8	8	4	9	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	12	33.0	28	40	52	4	12	24.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	23.8	24.0	24.0	24.0	4	24	39.5	4	24	15.5	4	12	4	12	30.1	28	40	52	4	12	23.5	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	30.0	24.0	24.0	24.0	4	24	24.5	4	24	15.0	4	12	4	12	28.0	28	40	52	4	12	23.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	28.0	24.0	24.0	24.0	4	24	23.5	4	24	15.0	4	12	4	12	27.0	28	40	52	4	12	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	25.0	24.0	24.0	24.0	4	24	22.0	4	24	14.5	4	12	4	12	24.6	28	40	52	4	12	22.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	24.9	24.0	24.0	24.0	4	24	22.0	4	24	15.5	4	12	4	12	24.5	28	40	52	4	12	22.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	24.0	4	24	22.0	4	24	16.0	4	12	4	12	24.5	28	40	52	4	11.5	22.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	24.0	4	24	22.0	4	24	17.0	4	12	4	12	24.4	28	40	52	4	10.5	22.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	24.0	4	24	22.0	4	24	17.5	4	12	4	12	24.4	28	40	52	4	10	22.5	5	12	5	12	0
20 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	17.5	4	12	4	12	24.3	28	40	52	4	9.5	22.5	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	12	4	12	24.3	28	40	52	4	9	22.5	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	12	4	12	24.3	28	40	52	4	8.5	22.5	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	11	4	11	24.3	28	40	52	4	8	22.5	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	11	24.4	24.0	24.0	24.0	4	23	22.0	4	23	18.0	4	10.5	4	10.5	24.1	28	40	52	4	7.5	22.5	5	12	5	12	0
30 FT	8	8	8	8	4	11.5	4	10.5	24.4	24.0	24.0	24.0	4	22	22.0	4	22	18.0	4	9	4	9.5	24.1	28	40	52	4	7.5	22.5	5	12	5	12	0
32 FT	8	9	8	8	4	11	4	9.5	24.5	24.0	24.0	24.0	4	21	22.0	4	21	18.0	4	10.5	4	12	24.5	29	41	53	4	8	22.5	5	12	5	12	0
34 FT	8	9	8	8	4	10.5	4	9	24.5	24.0	24.0	24.0	4	20	22.0	4	20	18.0	4	9.5	4	11.5	24.4	29	41	53	4	8	22.5	5	12	5	12	0
36 FT	8	9	8	8	4	10	4	8.5	24.4	24.0	24.0	24.0	4	19	22.0	4	19	18.0	4	9	4	11	24.4	29	41	53	4	7.5	22.5	5	12	5	12	0
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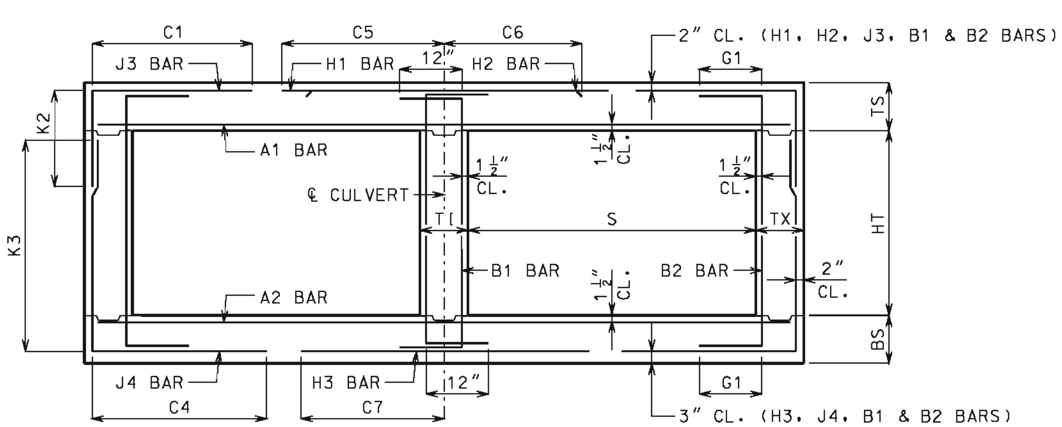
40 FT	8	10	8	8	4	9	4	7.5	24.5	24.0	24.0	24.0	4	17	22.0	4	17	17.5	4	9.5	4	12	24.8	30	42	54	4	8	22.5	5	12	5	12	0
42 FT	9	10	8	8	4	9	4	9	24.6	25.0	25.0	25.0	4	19	22.0	4	19	17.5	4	9	4	11.5	24.8	30	42	54	4	8	22.5	5	12	5	12	0
44 FT	9	10	8	8	4	9	4	8.5	24.6	25.0	25.0	25.0	4	18	22.0	4	18	17.5	4	8.5	4	11	24.8	30	42	54	4	8	22.5	5	12	5	12	0
46 FT	9	11	8	8	4	8.5	4	8	24.8	25.0	25.0	25.0	4	18	22.0	4	18	17.5	4	9	4	10.5	25.0	31	43	55	4	8.5	22.5	5	12	5	12	0
48 FT	9	11	8	8	4	8	4	7.5	24.8	25.0	25.0	25.0	4	17	22.0	4	17	17.5	4	8.5	4	10.5	25.0	31	43	55	4	8	22.5	5	12	5	12	0
50 FT	10	11	8	8	4	8.5	4	8	24.9	26.0	26.0	26.0	4	19	21.5	4	19	17.5	4	8.5	4	10.5	25.1	31	43	55	4	8	22.5	5	12	5	12	0

SPAN (S) = 3 FT HEIGHT (HT) = 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=5'	K2 HT=6'	H1 BARS SIZE	H1 SPA.	C5	H2 BARS SIZE	H2 SPA.	C6	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=5'	K3 HT=6'	H3 BARS SIZE	H3 SPA.	C7	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	11.5	39.0	64	76	4	12	24.5	5	12	5	12	12
2 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	11	39.9	64	76	4	11.5	24.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	23.8	24.0	24.0	4	24	39.5	4	24	15.0	4	12	4	10	38.6	64	76	4	12	23.5	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	36.9	24.0	24.0	4	24	25.0	4	24	14.5	4	12	4	9.5	36.9	64	76	4	12	23.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	38.6	24.0	24.0	4	24	23.5	4	24	15.0	4	12	4	9	35.8	64	76	4	12	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	33.1	24.0	24.0	4	24	21.5	4	24	14.0	4	12	4	9.5	32.8	64	76	4	12	22.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	32.8	24.0	24.0	4	24	21.5	4	24	15.0	4	12	4	9	32.5	64	76	4	12	22.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	11	32.4	24.0	24.0	4	24	21.5	4	24	16.0	4	12	4	8.5	32.3	64	76	4	12	22.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	10	32.1	24.0	24.0	4	24	21.5	4	24	16.5	4	12	4	8	32.1	64	76	4	11.5	22.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	9	32.0	24.0	24.0	4	24	21.5	4	24	17.0	4	12	4	7.5	32.0	64	76	4	11	22.5	5	12	5	12	0
20 FT	8	8	8	8	4	12	4	8	31.8	24.0	24.0	4	24	21.5	4	24	17.0	4	12	4	7	31.9	64	76	4	10	22.5	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	7.5	31.6	24.0	24.0	4	24	21.5	4	24	17.5	4	12	4	6.5	31.8	64	76	4	9.5	22.5	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	7	31.6	24.0	24.0	4	24	21.5	4	24	17.5	4	12	4	6	31.6	64	76	4	9.5	22.5	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	6.5	31.5	24.0	24.0	4	24	21.5	4	24	17.5	4	11.5	5	6.5	31.6	64	76	4	9	22.5	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	6	31.5	24.0	24.0	4	24	21.5	4	24	17.5	4	10.5	5	6	31.5	64	76	4	8.5	22.5	5	12	5	12	0
30 FT	8	9	8	8	4	12	5	6.5	31.3	24.0	28.0	4	24	21.5	4	24	17.5	4	11.5	5	6.5	32.8	65	77	4	10	22.5	5	12	5	11.5	0
32 FT	8	9	8	8	4	11	5	6	31.3	24.0	28.0	4	24	21.5	4	24	17.5	4	11	5	6	32.6	65	77	4	9.5	22.5	5	12	5	11	0
34 FT	8	9	8	8	4	10.5	5	6	31.3	24.0	28.0	4	23	21.5	4	23	17.5	4	10	5	6	32.6	65	77	4	9	22.5	5	12	5	10.5	0
36 FT	8	10	8	8	4	10	6	7.5	34.1	24.0	28.0	4	22	21.5	4	22	17.5	4	11	5	6	33.5	66	78	4	10.5	22.5	5	12	5	10	0
38 FT	8	10	8	8	4	9.5	6	7.5	34.1	24.0	28.0	4	21	21.5	4	21	17.5	4	10.5	5	6	33.5	66	78	4	10	22.5	5	12	5	9.5	0
40 FT	9	10	8	8	4	10	5	6	31.9	25.0	29.0	4	24	21.0	4	24	17.5	4	10	6	7	36.4	66	78	4	9.5	22.5	5	12	5	9.5	0
42 FT	9	10	8	8	4	9.5	5	6	31.9	25.0	29.0	4	23	21.0	4	23	17.5	4	9.5	6	7	36.3	66	78	4	9	22.5	5	12	5	9.5	0
44 FT	9	10	8	8	4	9	6	7	34.9	25.0	33.0	4	22	21.0	4	22	17.5	4	9	6	6.5	36.3	66	78	4	8.5	22.5	5	12	5	9.5	0
46 FT	10	11	8	8	4	9.5	5	6	32.8	26.0	30.0	4	24	20.5	4	24	17.0	4	10	6	7	36.9	67	79	4	9.5	22.5	5	12	5	9.5	0
48 FT	10	11	8	8	4	9	6	7	35.8	26.0	34.0	4	24	20.5	4	24	17.5	4	9.5	6	6.5	36.9	67	79	4	9	22.5	5	12	5	9.5	0
50 FT	10	11	8	8	4	8.5	6	7	35.6	26.0	34.0	4	24	20.5	4	24	17.5	4	9	6	6.5	36.9	67	79	4	9	22.5	5	12	5	9.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 3 FEET HEIGHT (HT): 2 THRU 6 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

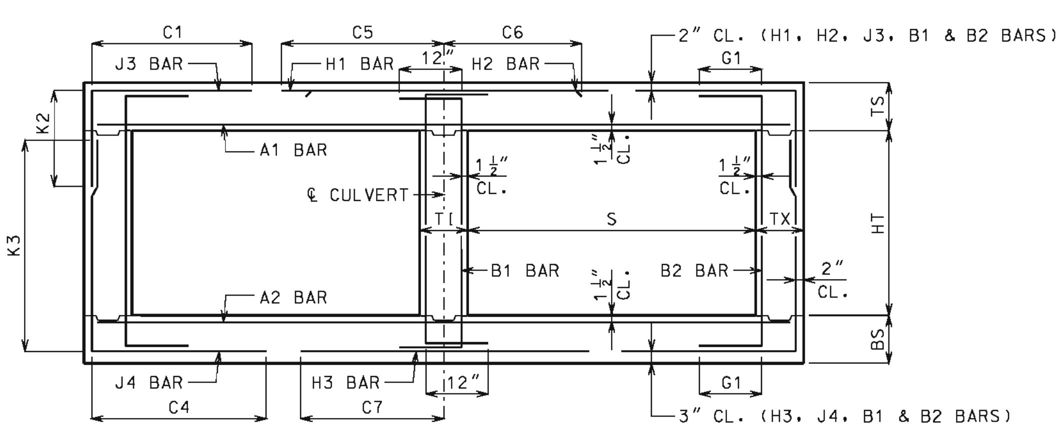
703.47

SPAN (S) = 4 FT HEIGHT (HT) = 2 FT OR 3 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=2'	K2 HT=3'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=2'	K3 HT=3'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	29.3	28	40	4	9.5	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.0	4	12	4	12	27.3	28	40	4	9	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	26.3	24.0	24.0	4	24	34.0	4	24	19.0	4	12	4	12	25.0	28	40	4	9.5	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	12	24.0	28	40	4	9.5	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	24.1	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	12	23.4	28	40	4	9	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	22.6	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	22.1	28	40	4	9	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	22.1	28	40	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	22	25.5	4	22	18.5	4	12	4	12	22.1	28	40	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	20	25.5	4	20	18.5	4	11	4	12	22.1	28	40	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	18	25.5	4	18	18.5	4	10	4	11.5	22.0	28	40	4	6.5	25.5	5	12	5	12	0
20 FT	8	8	8	8	4	10.5	4	11.5	22.5	24.0	24.0	4	17	25.5	4	17	18.5	4	9	4	10.5	22.0	28	40	4	6	25.5	5	12	5	12	0
22 FT	8	9	8	8	4	10	4	10.5	22.6	24.0	24.0	4	15	25.5	4	15	18.5	4	9	4	12	21.4	29	41	4	6.5	26.0	5	12	5	12	0
24 FT	8	9	8	8	4	9	4	9.5	22.6	24.0	24.0	4	14	25.5	4	14	18.5	4	8.5	4	12	21.4	29	41	4	6	26.0	5	12	5	12	0
26 FT	8	10	8	8	4	8.5	4	8.5	22.8	24.0	24.0	4	13	25.5	4	13	18.5	4	8.5	4	12	20.9	30	42	4	6.5	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	8	22.8	24.0	24.0	4	12	25.5	4	12	18.5	4	8	4	12	20.9	30	42	4	6.5	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	8	4	10.5	22.3	25.0	25.0	4	13	25.5	4	13	18.5	4	7.5	4	12	21.0	30	42	4	6	26.0	5	12	5	12	0
32 FT	9	11	8	8	4	7.5	4	10	22.4	25.0	25.0	4	12	25.5	4	12	18.5	4	8	4	10.5	20.6	31	43	4	6.5	26.0	5	12	5	12	0
34 FT	10	11	8	8	4	7.5	4	10.5	22.0	26.0	26.0	4	13	25.0	4	13	18.5	4	7.5	4	10.5	20.9	31	43	4	6	26.0	5	12	5	12	0
36 FT	10	12	8	8	4	7.5	4	10	22.1	26.0	26.0	4	12	25.0	4	12	18.5	4	7.5	4	9.5	20.6	32	44	4	6.5	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	7	4	9.5	22.1	26.0	26.0	4	12	25.0	4	12	18.5	4	7.5	4	9.5	20.6	32	44	4	6	26.0	5	12	5	12	0
40 FT	11	12	8	8	4	7	4	9.5	21.8	27.0	27.0	4	13	25.0	4	13	18.5	4	7	4	9.5	20.9	32	44	4	6	26.0	5	12	5	12	0
42 FT	11	13	8	8	4	6.5	4	9.5	21.9	27.0	27.0	4	12	25.0	4	12	18.5	4	7	4	8.5	20.6	33	45	4	6	26.0	5	12	5	12	0
44 FT	11	13	8	8	4	6.5	4	9	21.9	27.0	27.0	4	12	25.0	4	12	18.5	4	7	4	8.5	20.6	33	45	4	6	26.0	5	12	5	12	0
46 FT	12	13	8	8	4	6.5	4	8.5	21.6	28.0	28.0	4	12	24.5	4	12	18.5	4	6.5	4	8.5	20.9	33	45	5	8.5	26.0	5	12	5	12	0
48 FT	12	13	8	8	4	6.5	4	8.5	21.6	28.0	28.0	4	12	24.5	4	12	18.5	4	6	4	8.5	20.9	33	45	5	8.5	26.0	5	12	5	12	0
50 FT	12	14	8	8	4	6	4	8.5	21.8	28.0	28.0	4	12	24.5	4	12	18.5	4	6.5	4	7.5	20.8	34	46	5	9	26.0	5	12	5	12	0

SPAN (S) = 4 FT HEIGHT (HT) = 4 FT OR 5 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=4'	K2 HT=5'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=4'	K3 HT=5'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	39.9	52	64	4	9	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	36.8	52	64	4	9	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	27.3	24.0	24.0	4	24	48.0	4	24	19.5	4	12	4	12	33.8	52	64	4	9	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	33.5	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	11.5	31.3	52	64	4	9	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	30.6	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	11	29.9	52	64	4	8.5	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	27.4	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	27.1	52	64	4	9	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	27.1	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	11	26.9	52	64	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	27.0	24.0	24.0	4	22	25.0	4	22	18.5	4	12	4	10.5	26.8	52	64	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	11	26.9	24.0	24.0	4	21	25.0	4	21	18.5	4	10.5	4	10	26.6	52	64	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	11.5	4	10	26.8	24.0	24.0	4	19	25.0	4	19	18.5	4	9.5	4	9	26.6	52	64	4	6.5	25.5	5	12	5	12	0
20 FT	8	8	8	8	4	10.5	4	9	26.6	24.0	24.0	4	17	25.0	4	17	18.5	4	8.5	4	8	26.5	52	64	4	6	25.5	5	12	5	12	0
22 FT	8	9	8	8	4	9.5	4	8	26.8	24.0	24.0	4	15	25.0	4	15	18.5	4	9	4	9.5	26.8	53	65	4	6.5	26.0	5	12	5	12	0
24 FT	8	9	8	8	4	9	4	7.5	26.6	24.0	24.0	4	14	25.0	4	14	18.5	4	8.5	4	9	26.6	53	65	4	6.5	26.0	5	12	5	12	0
26 FT	8	10	8	8	4	8.5	4	6.5	26.6	24.0	24.0	4	13	25.0	4	13	18.5	4	8.5	4	10.5	26.9	54	66	4	7	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	6	26.6	24.0	24.0	4	12	25.0	4	12	18.5	4	8	4	10	26.9	54	66	4	6.5	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	8	4	7.5	26.8	25.0	25.0	4	13	25.0	4	13	18.5	4	7	4	9	26.9	54	66	4	6	26.0	5	12	5	12	0
32 FT	9	11	8	8	4	7.5	4	6.5	26.9	25.0	25.0	4	12	25.0	4	12	18.5	4	8	4	9	27.1	55	67	4	6.5	26.0	5	12	5	12	0
34 FT	10	11	8	8	4	7.5	4	6.5	27.0	26.0	26.0	4	14	24.5	4	14	18.5	4	7.5	4	8.5	27.1	55	67	4	6	26.0	5	12	5	12	0
36 FT	10	12	8	8	4	7.5	4	6.5	27.1	26.0	26.0	4	13	24.5	4	13	18.5	4	8	4	8.5	27.4	56	68	4	6.5	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	7	4	6	27.1	26.0	26.0	4	12	24.5	4	12	18.5	4	7.5	4	8	27.4	56	68	4	6	26.0	5	12	5	12	0
40 FT	11	12	8	8	4	7	4	6	27.3	27.0	27.0	4	14	24.5	4	14	18.5	4	7	4	7.5	27.5	56	68	4	6	26.0	5	12	5	12	0
42 FT	11	13	8	8	4	7	5	9	27.3	27.0	27.0	4	13	24.5	4	13	18.5	4	7.5	4	7.5	27.8	57	69	4	6	26.0	5	12	5	12	0
44 FT	11	13	8	8	4	6.5	5	8.5	27.3	27.0	27.0	4	12	24.5	4	12	18.5	4	7	4	7.5	27.6	57	69	4	6	26.0	5	12	5	12	0
46 FT	11	13	8	8	4	6	5	8.5	27.3	27.0	27.0	4	12	24.5	4	12	18.5	4	6.5	4	7	27.6	57	69	5	9	26.0	5	12	5	12	0
48 FT	12	13	8	8	4	6.5	5	8.5	27.4	28.0	28.0	4	13	24.0	4	13	18.5	4	6.5	4	6.5	27.8	57	69	5	8.5	26.0	5	12	5	11.5	0
50 FT	12	14	8	8	4	6	5	8.5	27.5	28.0	28.0	4	13	23.5	4	13	18.0	4	7	4	6.5	28.0	58	70	4	6	25.5	5	12	5	11	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 4 FEET
HEIGHT (HT): 2 THRU 5 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

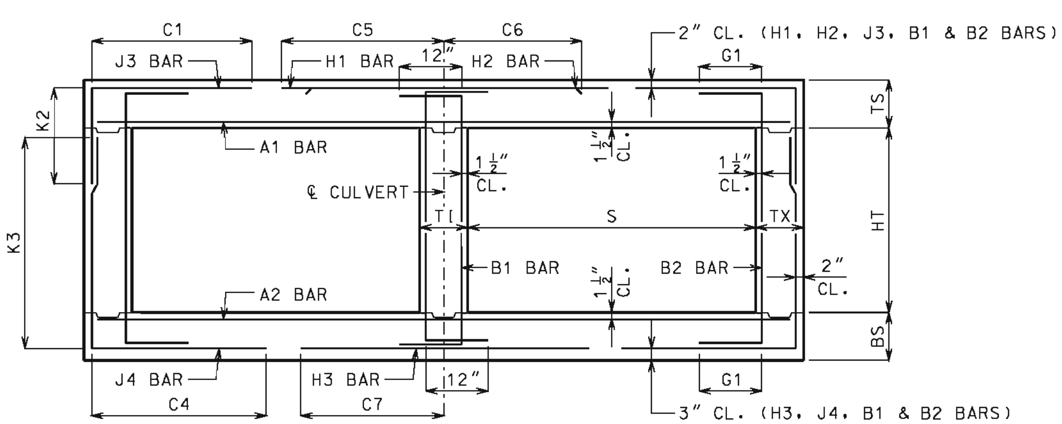
703.47

SHEET NO. 2 OF 27

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

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=6′	K2 HT=7′	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=6′	K3 HT=7′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	6.5	4	10.5	27.3	26.0	26.0	4	24	48.0	4	24	20.5	4	12	4	8.5	46.6	76	88	4	8.5	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	6.5	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	8.5	45.3	76	88	4	8.5	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	10.5	27.3	24.0	24.0	4	24	48.0	4	24	19.5	4	12	4	7.5	43.0	76	88	4	9	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10	47.3	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	7	40.8	76	88	4	9	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	9	41.4	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	6.5	39.0	76	88	4	8.5	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	10	35.4	24.0	24.0	4	24	25.0	4	24	18.5	4	12	4	7	35.1	76	88	4	8.5	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	8.5	34.9	24.0	24.0	4	24	25.0	4	24	18.5	4	12	4	6.5	34.9	76	88	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	7.5	34.6	24.0	24.0	4	23	25.0	4	23	18.5	4	12	4	6	34.6	76	88	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	6.5	34.4	24.0	24.0	4	22	25.0	4	22	18.5	4	10.5	5	6.5	34.4	76	88	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	6	34.1	24.0	24.0	4	19	25.0	4	19	18.5	4	9.5	5	6	34.3	76	88	4	6.5	25.5	5	12	5	12	0
20 FT	8	9	9	8	4	11	4	6.5	33.6	24.0	24.0	4	18	24.5	4	18	18.5	4	10	4	6.5	34.9	77	89	4	7.5	25.5	5	12	5	12	0
22 FT	8	9	9	8	4	10	4	6	33.5	24.0	24.0	4	16	25.0	4	16	18.5	4	9	4	6	34.8	77	89	4	7	25.5	5	12	5	12	0
24 FT	8	9	9	8	4	9	5	6.5	33.4	24.0	28.0	4	15	25.0	4	15	18.5	4	8.5	5	7	34.6	77	89	4	6.5	25.5	5	12	5	12	0
26 FT	8	10	9	8	4	8.5	5	6	33.1	24.0	24.0	4	14	24.5	4	14	18.5	4	9	4	6	35.5	78	90	4	7	26.0	5	12	5	11.5	0
28 FT	8	10	9	8	4	8	6	7.5	36.1	24.0	28.0	4	13	24.5	4	13	18.5	4	8.5	5	7	35.5	78	90	4	6.5	26.0	5	12	5	10.5	0
30 FT	9	10	9	8	4	8	5	6	34.0	25.0	29.0	4	14	24.5	4	14	18.5	4	7.5	5	6.5	35.3	78	90	4	6	25.5	5	12	5	10	0
32 FT	9	11	9	8	4	8	5	6	33.9	25.0	29.0	4	13	24.5	4	13	18.5	4	8	5	6.5	35.9	79	91	4	6.5	26.0	5	12	5	9.5	0
34 FT	9	11	9	8	4	7.5	5	6	33.9	25.0	29.0	4	13	24.5	4	13	18.5	4	7.5	5	6.5	35.9	79	91	4	6	26.0	5	12	5	9	0
36 FT	10	11	9	8	4	7.5	5	6.5	34.6	26.0	30.0	4	14	24.0	4	14	18.0	4	7	5	6	35.8	79	91	4	6	25.5	5	12	5	8.5	0
38 FT	10	12	9	8	4	7	5	6	34.5	26.0	30.0	4	14	24.0	4	14	18.0	4	7.5	5	6	36.3	80	92	4	6	25.5	5	12	5	8.5	0
40 FT	10	12	9	8	4	7	5	6	34.5	26.0	30.0	4	13	24.0	4	13	18.0	4	7.5	5	6	36.3	80	92	4	6	25.5	5	12	5	8.5	0
42 FT	11	12	9	8	4	7	5	6	35.1	31.0	31.0	4	14	23.5	4	14	18.0	4	6.5	6	7.5	39.1	80	92	5	9	25.5	5	12	5	8.5	0
44 FT	11	13	10	8	4	6.5	5	7	35.1	27.0	31.0	4	14	23.0	4	14	18.0	4	7.5	5	7.5	36.8	81	93	4	6	25.5	5	12	5	8	0
46 FT	11	13	10	8	4	6.5	5	6.5	35.0	27.0	31.0	4	13	23.0	4	13	18.0	4	7	5	7	36.8	81	93	5	9	26.0	5	12	5	8	0
48 FT	11	13	10	8	4	6	5	6	35.0	27.0	31.0	4	13	23.0	4	13	18.0	4	6.5	5	6.5	36.8	81	93	5	8.5	25.5	5	12	5	8	0
50 FT	12	14	11	8	4	6.5	5	7	35.6	28.0	32.0	4	15	23.0	4	15	18.0	4	7	5	7.5	37.3	82	94	5	9	26.0	5	12	5	8	0

SPAN (S) = 4 FT HEIGHT (HT) = 6 FT OR 7 FT



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 4 FEET
HEIGHT (HT): 6 THRU 7 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

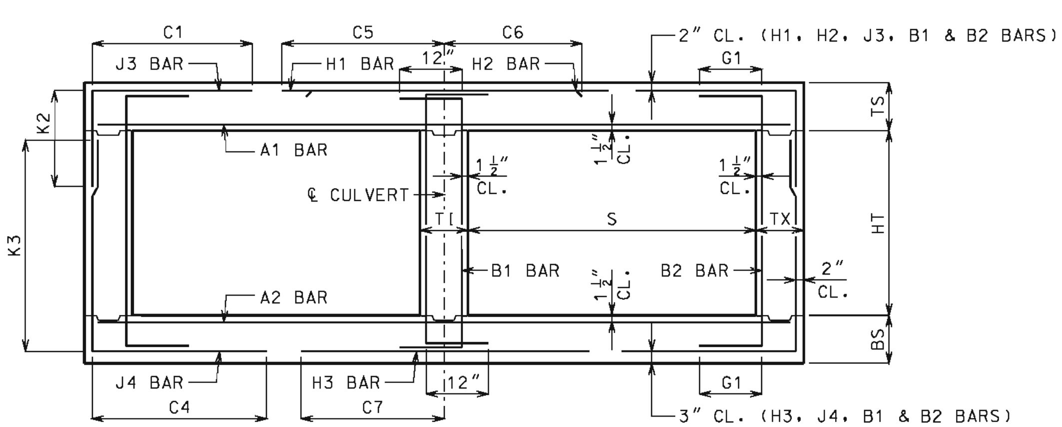
SHEET NO. 3 OF 27

SPAN (S) = 5 FT HEIGHT (HT) = 3 FT OR 4 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=3'	K2 HT=4'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=3'	K3 HT=4'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6.5	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	21.5	4	12	4	12	33.3	40	52	4	7.5	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6.5	4	9.5	30.9	27.0	27.0	4	19	56.0	4	19	21.5	4	11.5	4	11.5	31.0	40	52	4	7	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	11	4	12	30.0	24.0	24.0	4	18	39.0	4	18	20.0	4	12	4	12	28.4	40	52	4	7	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	27.4	24.0	24.0	4	19	32.0	4	19	20.0	4	11.5	4	12	26.9	40	52	4	7	29.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	26.6	24.0	24.0	4	18	30.5	4	18	19.5	4	10.5	4	11.5	26.0	40	52	4	6.5	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	11	4	12	26.1	24.0	24.0	4	16	29.5	4	16	19.5	4	9.5	4	10.5	25.5	40	52	4	6	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	4	16	28.5	4	16	19.0	4	9.5	4	11	24.4	40	52	5	7.5	28.5	5	12	5	12	0
14 FT	8	8	8	8	4	10	4	11	24.6	24.0	24.0	4	14	28.5	4	14	19.0	4	8.5	4	10	24.3	40	52	5	7	28.5	5	12	5	12	0
16 FT	8	9	8	8	4	9	4	9.5	24.8	24.0	24.0	4	12	28.5	4	12	19.0	4	8.5	4	12	23.5	41	53	5	7.5	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	8	4	8.5	24.8	24.0	24.0	5	17	28.5	5	17	19.5	4	7.5	4	11.5	23.5	41	53	5	7	29.0	5	12	5	12	0
20 FT	8	10	8	8	4	7.5	4	7.5	24.9	24.0	24.0	5	17	28.0	5	17	20.0	4	7.5	4	12	22.9	42	54	5	7.5	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	9	24.3	25.0	25.0	5	16	28.5	5	16	19.0	4	7	4	12	23.1	42	54	5	7	29.0	5	12	5	12	0
24 FT	9	11	8	8	4	6.5	4	8	24.5	25.0	25.0	5	16	28.5	5	16	20.0	4	7	4	10.5	22.8	43	55	5	7.5	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	4	8.5	24.0	26.0	26.0	5	16	28.5	5	16	19.0	4	6.5	4	10.5	23.0	43	55	5	7	29.0	5	12	5	12	0
28 FT	10	12	8	8	4	6.5	4	8	24.1	26.0	26.0	5	15	28.0	5	15	19.5	4	6.5	4	9.5	22.6	44	56	5	7.5	29.0	5	12	5	12	0
30 FT	11	12	8	8	4	6.5	4	8.5	23.8	27.0	27.0	5	15	28.0	5	15	19.0	4	6	4	9.5	22.9	44	56	5	7	29.0	5	12	5	12	0
32 FT	11	13	8	8	4	6	4	7.5	23.9	27.0	27.0	5	15	28.0	5	15	19.0	4	6.5	4	8.5	22.8	45	57	5	7.5	29.0	5	12	5	12	0
34 FT	12	13	8	8	4	6	4	8.5	23.6	28.0	28.0	5	15	28.0	5	15	19.0	4	6	4	8.5	22.9	45	57	5	7	29.0	5	12	5	12	0
36 FT	12	14	8	8	5	9	4	7.5	23.8	28.0	28.0	5	15	28.0	5	15	19.0	4	6	4	7.5	22.8	46	58	5	7.5	29.0	5	12	5	12	0
38 FT	13	14	8	8	5	9	4	7.5	23.5	29.0	29.0	5	15	27.5	5	15	19.0	4	6	4	7.5	23.0	46	58	5	7	29.0	5	12	5	12	0
40 FT	13	15	8	8	5	8.5	4	7.5	23.8	29.0	29.0	5	15	27.5	5	15	19.0	4	6	4	7	22.9	47	59	5	7.5	29.0	5	12	5	12	0
42 FT	13	15	8	8	5	8	4	7	23.8	29.0	29.0	5	14	27.5	5	14	19.0	5	9	4	7	22.9	47	59	5	7	29.0	5	12	5	12	0
44 FT	14	15	8	8	5	8.5	4	7	23.5	30.0	30.0	5	15	27.0	5	15	19.0	5	8.5	4	7	23.1	47	59	5	6.5	29.0	5	12	5	12	0
46 FT	14	16	8	8	5	8	4	7	23.6	30.0	30.0	5	14	27.0	5	14	19.0	5	9	4	6.5	23.1	48	60	5	7	29.0	5	12	5	12	0
48 FT	14	16	8	8	5	7.5	4	6.5	23.6	30.0	30.0	5	14	27.0	5	14	19.0	5	8.5	4	6.5	23.1	48	60	5	6.5	29.0	5	12	5	12	0
50 FT	15	16	8	8	5	7.5	4	6.5	25.6	31.0	31.0	5	15	31.5	5	15	24.0	5	8	4	6.5	23.3	48	60	5	6.5	29.0	5	12	5	12	0

SPAN (S) = 5 FT HEIGHT (HT) = 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=5'	K2 HT=6'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=5'	K3 HT=6'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	11.5	4	9.5	44.1	64	76	4	7	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	19	56.0	4	19	21.5	4	10.5	4	9	40.6	64	76	4	7	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10.5	4	10.5	30.9	24.0	24.0	4	18	56.0	4	18	20.0	4	11.5	4	9	37.6	64	76	4	7	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10.5	37.1	24.0	24.0	4	19	32.0	4	19	20.0	4	11	4	8.5	34.6	64	76	4	6.5	29.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	10	33.8	24.0	24.0	4	18	30.5	4	18	19.5	4	10	4	8	33.0	64	76	4	6	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	11	4	9	32.3	24.0	24.0	4	16	29.5	4	16	19.5	4	9	4	7.5	31.9	64	76	5	7.5	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	11.5	4	9.5	29.5	24.0	24.0	4	16	28.5	4	16	19.0	4	9	4	7.5	29.4	64	76	5	7.5	28.5	5	12	5	12	0
14 FT	8	8	8	8	4	10	4	8	29.3	24.0	24.0	4	14	28.5	4	14	19.0	4	8	4	7	29.1	64	76	5	7	28.5	5	12	5	12	0
16 FT	8	9	8	8	4	9	4	7	29.3	24.0	24.0	4	12	28.0	4	12	19.0	4	8	4	8	29.3	65	77	5	7.5	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	8	4	6.5	29.1	24.0	24.0	5	17	28.0	5	17	19.5	4	7	4	7.5	29.1	65	77	5	7	29.0	5	12	5	12	0
20 FT	8	10	8	8	4	7	5	7	29.0	24.0	24.0	5	17	28.0	5	17	20.0	4	7.5	4	8.5	29.3	66	78	5	7.5	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	6.5	29.1	25.0	25.0	5	16	28.0	5	16	19.0	4	7	4	7.5	29.3	66	78	5	7	29.0	5	12	5	12	0
24 FT	9	11	8	8	4	6.5	4	6	29.1	25.0	25.0	5	16	28.0	5	16	19.5	4	7	4	7.5	29.5	67	79	5	7.5	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	5	8	29.3	26.0	26.0	5	16	28.0	5	16	19.0	4	6.5	4	6.5	29.5	67	79	5	7.5	29.0	5	12	5	12	0
28 FT	10	12	8	8	4	6.5	5	7.5	29.3	26.0	26.0	5	15	28.0	5	15	19.0	4	6.5	4	6.5	29.6	68	80	5	7.5	29.0	5	12	5	12	0
30 FT	11	12	8	8	4	6.5	5	8.5	29.4	27.0	27.0	5	16	27.5	5	16	19.0	4	6.5	4	6	29.8	68	80	5	7.5	29.0	5	12	5	12	0
32 FT	11	13	8	8	4	6	5	8	29.5	27.0	27.0	5	15	27.5	5	15	19.0	4	6.5	4	6	29.9	69	81	5	7.5	29.0	5	12	5	12	0
34 FT	12	13	8	8	4	6	5	8.5	29.5	28.0	32.0	5	16	27.5	5	16	19.0	4	6	5	8.5	30.0	69	81	5	7	29.0	5	12	5	11.5	0
36 FT	12	14	8	8	5	9	5	7.5	29.6	28.0	32.0	5	15	27.0	5	15	19.0	4	6.5	5	9	30.1	70	82	5	7.5	29.0	5	12	5	10.5	0
38 FT	12	14	8	8	5	8.5	5	7.5	29.6	28.0	32.0	5	15	27.0	5	15	19.0	4	6	5	8.5	30.1	70	82	5	7	29.0	5	12	5	10	0
40 FT	13	14	8	8	5	8.5	5	7.5	29.6	29.0	33.0	5	16	27.0	5	16	19.0	5	8.5	5	8	30.3	70	82	5	7	29.0	5	12	5	9.5	0
42 FT	13	15	8	8	5	8.5	5	7	29.8	29.0	33.0	5	15	26.5	5	15	19.0	4	6	5	8	30.4	71	83	5	7	28.5	5	12	5	9.5	0
44 FT	13	15	8	8	5	8	5	6.5	29.8	29.0	33.0	5	14	26.5	5	14	19.0	5	9	5	8	30.4	71	83	5	7	28.5	5	12	5	9.5	0
46 FT	14	16	9	8	5	8	5	8	30.5	30.0	34.0	5	16	26.0	5	16	19.0	5	9	5	9	31.0	72	84	5	7	29.0	5	12	5	9.5	0
48 FT	14	16	9	8	5	8	5	8	30.4	30.0	34.0	5	15	26.0	5	15	19.0	5	8.5	5	8.5	31.0	72	84	5	6.5	29.0	5	12	5	9	0
50 FT	14	16	10	8	5	7.5	5	7.5	31.0	30.0	30.0	5	15	26.0	5	15	19.0	5	8	4	6	31.1	72	84	5	6.5	29.0	5	12	5	10	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 DOUBLE BOX CULVERT

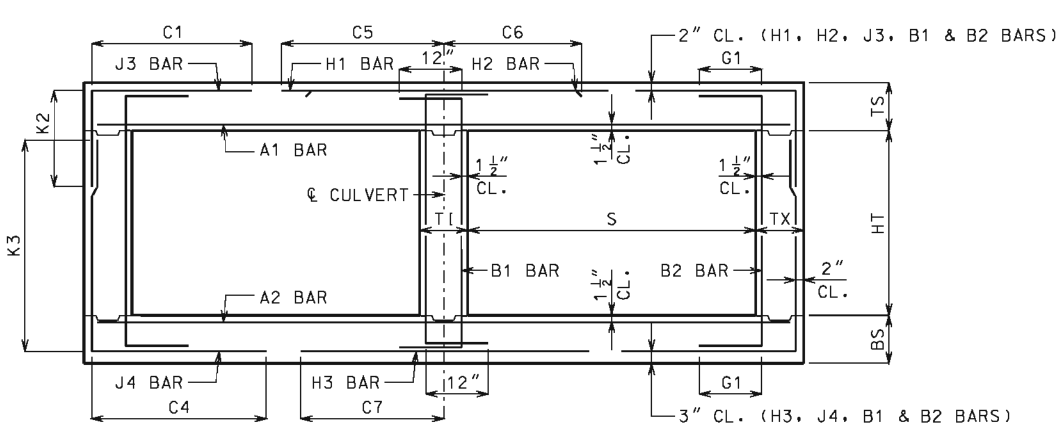
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET
HEIGHT (HT): 3 THRU 6 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SPAN (S) = 5 FT HEIGHT (HT) = 7 FT OR 8 FT																																
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=7′	K2 HT=8′	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=7′	K3 HT=8′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	10.5	4	7	52.1	88	100	4	7	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	10	4	6.5	50.0	88	100	4	6.5	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10	4	7	30.9	24.0	24.0	4	18	56.0	4	18	20.5	4	10.5	4	6	47.4	88	100	4	6.5	30.0	5	12	5	12	12
6 FT	8	9	8	8	4	12	4	7	51.6	24.0	24.0	4	19	32.5	4	19	20.0	4	12	4	6.5	46.3	89	101	4	7.5	29.5	5	12	5	12	12
8 FT	8	9	8	8	4	12	4	6.5	44.5	24.0	24.0	4	18	30.5	4	18	19.5	4	11	4	6	44.0	89	101	4	7	29.5	5	12	5	12	0
10 FT	8	9	9	8	4	11.5	4	7	40.8	24.0	24.0	4	16	29.5	4	16	19.5	4	10	4	6.5	41.4	89	101	4	6.5	29.0	5	12	5	12	0
12 FT	8	9	9	8	4	12	4	7	36.9	24.0	24.0	4	17	28.0	4	17	19.0	4	10.5	4	7	38.3	89	101	4	6.5	29.0	5	12	5	12	0
14 FT	8	9	9	8	4	10.5	4	6.5	36.4	24.0	24.0	4	15	28.0	4	15	19.0	4	9	4	6.5	37.9	89	101	4	6	29.0	5	12	5	12	0
16 FT	8	9	9	8	4	9	5	7	36.0	24.0	28.0	4	13	28.0	4	13	19.0	4	8	5	7	37.5	89	101	5	7.5	28.5	5	12	5	12	0
18 FT	8	9	9	8	4	8	5	6	35.8	24.0	28.0	5	18	28.0	5	18	19.0	4	7.5	5	6	37.3	89	101	5	7	28.5	5	12	5	12	0
20 FT	8	10	9	8	4	7.5	6	7	38.4	24.0	28.0	5	17	28.0	5	17	19.5	4	7.5	5	6.5	38.1	90	102	5	7.5	29.0	5	12	5	11	0
22 FT	9	10	9	8	4	7.5	5	6	36.4	25.0	29.0	5	17	27.5	5	17	19.0	4	7	5	6	37.8	90	102	5	7.5	29.0	5	12	5	10	0
24 FT	9	11	9	8	4	7	5	6	36.1	25.0	29.0	5	16	27.5	5	16	19.0	4	7	5	6	38.5	91	103	5	8	29.0	5	12	5	9.5	0
26 FT	10	11	9	8	4	7	5	6	36.9	26.0	30.0	5	17	27.5	5	17	19.0	4	6.5	5	6	38.3	91	103	5	7.5	29.0	5	12	5	9	0
28 FT	10	12	9	8	4	6.5	5	6	36.8	30.0	30.0	5	16	27.5	5	16	19.0	4	7	5	6	38.9	92	104	5	8	29.0	5	12	5	8.5	0
30 FT	11	12	9	8	4	6.5	5	6	37.4	31.0	31.0	5	17	27.0	5	17	19.0	4	6.5	6	7.5	41.6	92	104	5	7.5	29.0	5	12	5	8.5	0
32 FT	11	13	9	8	4	6.5	6	7	40.3	31.0	31.0	5	16	27.0	5	16	19.0	4	6.5	5	6	39.1	93	105	5	7.5	29.0	5	12	5	8.5	0
34 FT	11	13	9	8	4	6	6	7	40.1	31.0	35.0	5	15	27.0	5	15	19.0	4	6.5	6	7	42.1	93	105	5	7.5	29.0	5	12	5	8.5	0
36 FT	12	14	10	8	4	6	5	6.5	37.8	32.0	32.0	5	17	26.0	5	17	19.0	4	6.5	5	7	39.5	94	106	5	7.5	29.0	5	12	5	8	0
38 FT	12	14	10	8	5	9	5	6	37.6	32.0	32.0	5	16	26.0	5	16	19.0	4	6	5	6.5	39.5	94	106	5	7	29.0	5	12	5	8	0
40 FT	12	15	11	8	5	8.5	5	7	37.8	28.0	32.0	5	15	26.0	5	15	19.0	4	6	5	7	40.0	95	107	5	7.5	29.0	5	12	5	7.5	0
42 FT	13	15	11	8	5	8.5	5	7	38.3	33.0	33.0	5	17	25.5	5	17	18.5	4	6	5	7	39.9	95	107	5	7	29.0	5	12	5	7.5	0
44 FT	13	15	11	8	5	8.5	5	6.5	38.1	33.0	33.0	5	16	25.5	5	16	18.5	5	9	5	7	39.9	95	107	5	6.5	29.0	5	12	5	7.5	0
46 FT	13	16	12	8	5	8	5	6.5	38.3	29.0	33.0	5	16	25.5	5	16	18.5	4	6	5	7	40.4	96	108	5	7	29.0	5	12	5	7.5	0
48 FT	14	16	12	8	5	8	5	6.5	38.8	34.0	34.0	5	17	25.0	5	17	18.5	5	9	5	6.5	40.4	96	108	5	6.5	29.0	5	12	5	7	0
50 FT	14	16	12	8	5	7.5	5	6.5	38.8	34.0	34.0	5	17	25.0	5	17	18.5	5	8.5	5	6.5	40.3	96	108	5	6.5	29.0	5	12	5	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

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MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET
HEIGHT (HT): 7 THRU 8 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

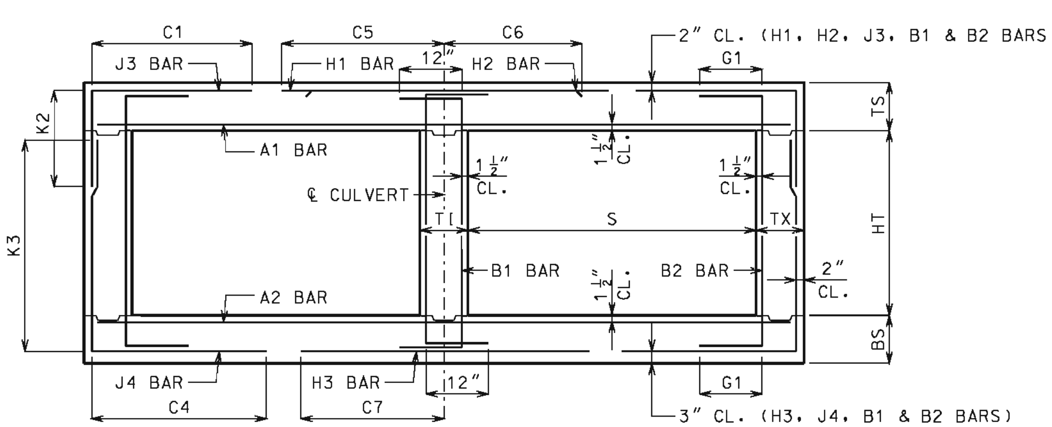
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 6 FT HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS													WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=3'	HT=4'	HT=5'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=3'	HT=4'	HT=5'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	5	8.5	4	9.5	34.5	27.0	27.0	27.0	4	16	64.5	4	16	23.0	4	9.5	4	9.5	37.6	40	52	64	4	6	34.5	5	12	5	12	12
2 FT	11	8	8	8	5	8.5	4	9.5	34.5	27.0	27.0	27.0	4	15	64.5	4	15	22.5	4	9	4	9	35.0	40	52	64	5	7.5	34.0	5	12	5	12	12
4 FT	8	8	8	8	4	8	4	9	34.0	24.0	24.0	24.0	4	13	43.5	4	13	21.0	4	9	4	9.5	32.0	40	52	64	5	7.5	33.5	5	12	5	12	12
6 FT	8	8	8	8	4	9.5	4	9.5	30.4	24.0	24.0	24.0	4	13	35.5	4	13	20.5	4	8.5	4	9	29.9	40	52	64	5	7	32.5	5	12	5	12	12
8 FT	8	8	8	8	4	9	4	9	29.3	24.0	24.0	24.0	4	12	34.0	4	12	20.5	4	7.5	4	8	28.9	40	52	64	5	6.5	32.0	5	12	5	12	0
10 FT	8	9	8	8	4	8	4	8	28.8	24.0	24.0	24.0	5	17	33.0	5	17	20.5	4	7.5	4	10	27.8	41	53	65	5	7	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	4	7	28.4	24.0	24.0	24.0	5	16	32.5	5	16	21.5	4	6.5	4	9	27.3	41	53	65	5	6.5	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	7.5	4	7	27.0	24.0	24.0	24.0	5	16	31.5	5	16	21.5	4	6.6	4	9.5	25.9	41	53	65	5	6	32.0	5	12	5	12	0
16 FT	8	10	8	8	4	6.5	4	6	27.1	24.0	24.0	24.0	5	15	31.5	5	15	22.5	4	6.5	4	11.5	25.3	42	54	66	5	6.5	32.0	5	12	5	12	0
18 FT	9	11	8	8	4	6.5	4	7.5	26.6	25.0	25.0	25.0	5	16	31.5	5	16	21.5	4	6.5	4	10.5	25.0	43	55	67	5	7	32.0	5	12	5	12	0
20 FT	10	11	8	8	4	6	4	7.5	26.1	26.0	26.0	26.0	5	15	31.5	5	15	21.0	4	6	4	10	25.3	43	55	67	5	6.5	32.0	5	12	5	12	0
22 FT	10	12	8	8	5	9	4	6.5	26.3	26.0	26.0	26.0	5	15	31.5	5	15	21.5	4	6	4	9.5	24.9	44	56	68	5	6.5	32.0	5	12	5	12	0
24 FT	11	12	8	8	5	9	4	7	25.9	27.0	27.0	27.0	5	14	31.5	5	14	21.0	5	8.5	4	9	25.1	44	56	68	5	6	32.0	5	12	5	12	0
26 FT	11	13	8	8	5	8.5	4	6	26.0	27.0	27.0	27.0	5	14	31.5	5	14	21.5	5	8.5	4	8.5	24.9	45	57	69	5	6	32.0	5	12	5	12	0
28 FT	12	14	8	8	5	8.5	4	6.5	25.9	28.0	28.0	28.0	5	13	31.5	5	13	20.5	5	9	4	7.5	25.0	46	58	70	5	6.5	32.0	5	12	5	12	0
30 FT	13	14	8	8	5	8.5	4	6.5	25.6	29.0	29.0	29.0	5	12	31.0	5	12	20.0	5	8.5	4	7.5	25.1	46	58	70	5	6	32.0	5	12	5	12	0
32 FT	13	15	8	8	5	8	4	6	25.8	29.0	29.0	29.0	5	12	31.0	5	12	20.5	5	8.5	4	7	25.1	47	59	71	5	6	32.0	5	12	5	12	0
34 FT	14	15	8	8	5	8	4	6	25.5	30.0	30.0	30.0	5	12	31.0	5	12	20.0	5	8	4	7	25.3	47	59	71	6	8.5	35.0	5	12	5	12	0
36 FT	14	16	8	8	5	7.5	5	8.5	25.8	30.0	30.0	30.0	5	12	31.0	5	12	20.0	5	8	4	6.5	25.3	48	60	72	5	6	32.0	5	12	5	12	0
38 FT	15	16	8	8	5	7.5	4	6	27.5	31.0	31.0	31.0	5	12	35.5	5	12	25.0	5	7.5	4	6.5	25.4	48	60	72	6	8	35.0	5	12	5	12	0
40 FT	15	17	8	8	5	7	5	8	30.8	31.0	31.0	31.0	6	17	39.5	6	17	29.0	5	7.5	4	6	25.4	49	61	73	6	8.5	35.0	5	12	5	12	0
42 FT	16	17	8	8	5	7	5	7	30.6	32.0	32.0	32.0	5	12	35.0	5	12	25.0	5	7.5	4	6	25.6	49	61	73	6	8	35.0	5	12	5	12	0
44 FT	16	18	8	8	5	6.5	5	7	30.8	32.0	32.0	36.0	6	17	39.0	6	17	29.0	5	7.5	5	6.5	25.6	50	62	74	6	8	35.0	5	12	5	12	0
46 FT	16	18	8	8	5	6	5	7	30.8	32.0	32.0	36.0	6	16	39.0	6	16	29.0	5	7	5	6.5	25.6	50	62	74	6	8	35.0	5	12	5	11.5	0
48 FT	17	19	8	8	5	6.5	5	6.5	30.8	37.0	37.0	37.0	5	12	34.5	5	12	24.5	5	7.5	5	6.5	25.9	51	63	75	6	8	35.0	5	12	5	10.5	0
50 FT	17	19	8	8	5	6	5	6.5	30.8	37.0	37.0	37.0	6	16	38.5	6	16	28.5	5	7	5	6.5	25.9	51	63	75	6	7.5	35.0	5	12	5	10	0

SPAN (S) = 6 FT HEIGHT (HT) = 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
										K2													K3									
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	HT=7'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=6'	HT=7'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	5	8	4	9.5	34.5	27.0	27.0	4	16	64.5	4	16	23.5	4	9	4	7.5	48.9	76	88	5	7.5	34.5	5	12	5	12	12
2 FT	11	8	8	8	5	8	4	9.5	34.5	27.0	27.0	4	15	64.5	4	15	23.0	4	8.5	4	7	45.0	76	88	5	7.5	34.0	5	12	5	12	12
4 FT	8	8	8	8	4	7.5	4	7.5	34.5	24.0	24.0	4	13	64.5	4	13	21.0	4	8.5	4	7	41.6	76	88	5	7	33.5	5	12	5	12	12
6 FT	8	8	8	8	4	9	4	7.5	40.9	24.0	24.0	4	13	36.0	4	13	20.5	4	8	4	6.5	38.1	76	88	5	7	32.5	5	12	5	12	12
8 FT	8	8	8	8	4	9	4	7	37.0	24.0	24.0	4	12	34.0	4	12	20.5	4	7.5	4	6	36.3	76	88	5	6.5	32.0	5	12	5	12	0
10 FT	8	9	8	8	4	8	4	6	35.1	24.0	24.0	5	17	33.0	5	17	21.0	4	7.5	4	6.5	35.5	77	89	5	7	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	5	6.5	34.1	24.0	24.0	5	16	32.5	5	16	21.5	4	6.5	4	6	34.5	77	89	5	6.5	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	7	5	6.5	31.8	24.0	24.0	5	16	31.5	5	16	21.5	4	6.5	4	6	32.0	77	89	5	6	32.0	5	12	5	12	0
16 FT	8	10	8	8	4	6.5	5	6	31.6	24.0	24.0	5	15	31.0	5	15	22.5	4	6.5	4	7	32.0	78	90	5	6.5	32.0	5	12	5	12	0
18 FT	9	11	8	8	4	6.5	5	6.5	31.8	25.0	25.0	5	16	31.0	5	16	21.5	4	6.5	4	6.5	32.3	79	91	5	7	32.0	5	12	5	12	0
20 FT	10	11	8	8	4	6	5	7.5	31.8	26.0	30.0	5	15	31.0	5	15	21.0	4	6	5	7.5	32.1	79	91	5	6.5	32.0	5	12	5	12	0
22 FT	10	12	8	8	5	9	5	7	31.6	26.0	30.0	5	15	31.0	5	15	21.5	4	6	5	8	32.3	80	92	5	6.5	32.0	5	12	5	12	0
24 FT	11	12	8	8	5	9	5	7.5	31.8	27.0	31.0	5	14	31.0	5	14	20.5	5	8.5	5	7.5	32.1	80	92	5	6	32.0	5	12	5	12	0
26 FT	11	13	8	8	5	8.5	5	6.5	31.8	27.0	31.0	5	14	31.0	5	14	21.0	5	9	5	7.5	32.3	81	93	5	6	32.0	5	12	5	11	0
28 FT	12	14	8	8	5	8.5	5	7	31.9	28.0	32.0	5	13	30.5	5	13	20.0	5	9	5	8	32.6	82	94	5	6.5	32.0	5	12	5	10	0
30 FT	12	14	8	8	5	7.5	5	6.5	31.8	28.0	32.0	5	13	30.5	5	13	20.5	5	8.5	5	7.5	32.5	82	94	5	6	32.0	5	12	5	9.5	0
32 FT	13	15	8	8	5	8	5	6.5	32.0	29.0	33.0	5	12	30.0	5	12	20.0	5	8.5	5	7.5	32.8	83	95	5	6	32.0	5	12	5	9.5	0
34 FT	13	15	8	8	5	7	5	6	31.9	29.0	33.0	5	12	30.0	5	12	20.0	5	8	5	7	32.8	83	95	5	6	32.0	5	12	5	9.5	0
36 FT	14	16	9	8	5	7.5	5	7.5	32.6	30.0	34.0	5	12	29.5	5	12	19.5	5	8	5	8	33.3	84	96	5	6	32.0	5	12	5	9	0
38 FT	14	16	9	8	5	7	5	7	32.5	30.0	34.0	5	12	29.5	5	12	19.5	5	8	5	8	33.1	84	96	6	8	35.0	5	12	5	8.5	0
40 FT	15	17	9	8	5	7	5	6.5	37.8	31.0	35.0	5	13	34.0	5	13	24.5	5	8	5	8	33.5	85	97	6	8.5	35.0	5	12	5	8.5	0
42 FT	15	17	10	8	5	7	5	7.5	38.3	31.0	35.0	5	12	34.0	5	12	24.5	5	7.5	5	7.5	33.6	85	97	6	8	35.0	5	12	5	9	0
44 FT	15	18	10	8	5	6	5	7	38.4	31.0	35.0	5	12	34.0	5	12	24.5	5	7.5	5	7.5	33.9	86	98	6	8	35.0	5	12	5	8.5	0
46 FT	16	18	10	8	5	6.5	5	6.5	38.4	32.0	36.0	5	12	33.0	5	12	24.5	5	7.5	5	7.5	34.0	86	98	6	7.5	35.0	5	12	5	8	0
48 FT	16	19	11	8	5	6.5	5	7	39.0	32.0	36.0	5	12	33.0	5	12	24.5	5	7.5	5	8.5	34.4	87	99	6	8	35.0	5	12	5	8.5	0
50 FT	17	19	11	8	5	6.5	5	7	39.1	33.0	37.0	5	13	32.5	5	13	24.5	5	7	5	8	34.5	87	99	6	7.5	35.0	5	12	5	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

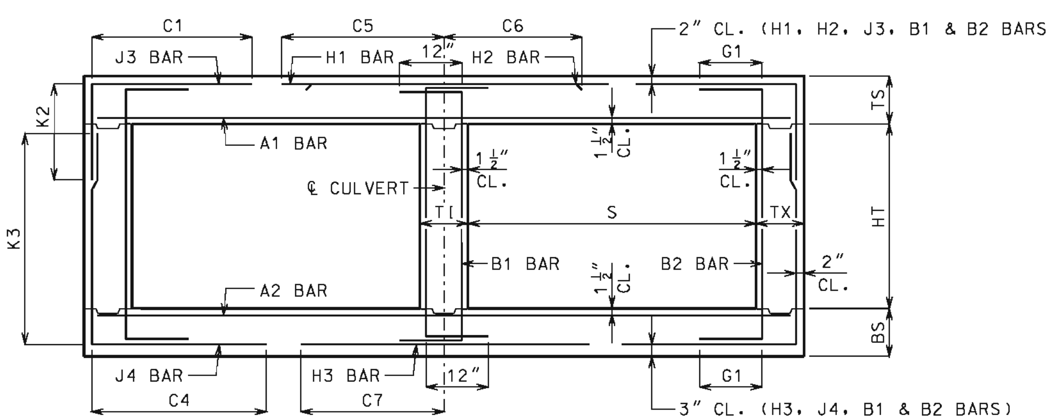
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 6 FEET
HEIGHT (HT): 3 THRU 7 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SPAN (S) = 6 FT HEIGHT (HT) = 8 FT OR 9 FT																																
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=8′	K2 HT=9′	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=8′	K3 HT=9′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	9	8	8	5	8	4	7	34.5	27.0	27.0	4	16	64.5	4	16	23.5	4	9.5	4	6.5	59.4	101	113	4	6.5	34.5	5	12	5	12	12
2 FT	11	9	8	8	5	8	4	6.5	34.5	27.0	27.0	4	16	64.5	4	16	23.0	4	9	4	6	57.0	101	113	4	6	34.0	5	12	5	12	12
4 FT	8	9	9	8	4	7.5	4	6.5	35.1	24.0	24.0	4	13	65.0	4	13	21.0	4	9.5	4	6.5	53.0	101	113	4	6	33.5	5	12	5	12	12
6 FT	8	9	9	8	4	9	4	6	53.1	24.0	24.0	4	13	36.0	4	13	20.5	4	9	4	6	49.5	101	113	4	6	33.0	5	12	5	12	12
8 FT	8	9	9	8	4	9	5	7	46.5	24.0	28.0	4	12	33.5	4	12	20.5	4	8	5	6.5	46.5	101	113	5	7.5	32.5	5	12	5	12	0
10 FT	8	9	9	8	4	8	5	6	43.8	24.0	28.0	5	17	32.5	5	17	20.5	4	7.5	5	6	44.6	101	113	5	6.5	32.0	5	12	5	11.5	0
12 FT	8	9	10	8	4	7.5	5	6.5	41.8	24.0	28.0	5	17	32.0	5	17	21.5	4	6.5	5	6.5	42.9	101	113	5	6.5	32.0	5	12	5	11.5	0
14 FT	8	9	10	8	4	7.5	5	6.5	38.5	24.0	28.0	5	17	31.0	5	17	21.0	4	6.5	5	6.5	39.6	101	113	5	6	31.5	5	12	5	12	0
16 FT	8	10	10	8	4	6.5	5	6	38.1	24.0	28.0	5	16	31.0	5	16	22.0	4	6.5	5	7	40.6	102	114	5	6.5	32.0	5	12	5	11.5	0
18 FT	9	11	10	8	4	6.5	5	6	38.8	25.0	29.0	5	16	31.0	5	16	21.0	4	6.5	5	7	41.1	103	115	5	7	32.0	5	12	5	10.5	0
20 FT	9	11	10	8	4	6	5	6	38.5	25.0	29.0	5	16	31.0	5	16	22.0	4	6	5	6.5	40.9	103	115	5	6	32.0	5	12	5	10	0
22 FT	10	12	10	8	4	6	5	6.5	39.1	30.0	30.0	5	15	30.5	5	15	21.0	4	6	5	6.5	41.4	104	116	5	6.5	32.0	5	12	5	9	0
24 FT	11	13	10	8	4	6	5	6.5	39.6	31.0	31.0	5	14	30.5	5	14	20.0	4	6	5	6.5	41.8	105	117	5	6.5	32.0	5	12	5	8.5	0
26 FT	11	13	10	8	5	9	5	6	39.4	31.0	31.0	5	14	30.5	5	14	20.5	5	9	5	6.5	41.6	105	117	5	6	32.0	5	12	5	8	0
28 FT	12	14	10	8	5	9	5	6	40.0	32.0	32.0	5	13	30.0	5	13	19.5	4	6	5	6.5	42.0	106	118	5	6.5	32.0	5	12	5	8	0
30 FT	12	14	10	8	5	8	5	6	39.9	32.0	32.0	5	13	30.0	5	13	20.0	5	8.5	5	6	41.9	106	118	5	6	32.0	5	12	5	8	0
32 FT	13	15	11	8	5	8.5	5	7	40.4	33.0	33.0	5	13	29.0	5	13	19.5	5	8.5	5	7	42.3	107	119	5	6	32.0	5	12	5	7.5	0
34 FT	13	15	11	8	5	8	5	6.5	40.3	33.0	33.0	5	13	29.0	5	13	19.5	5	8	5	7	42.1	107	119	6	8	35.0	5	12	5	7.5	0
36 FT	14	16	11	8	5	8	5	6	40.8	34.0	34.0	5	14	28.5	5	14	19.5	5	8.5	5	7	42.6	108	120	5	6	32.0	5	12	5	7.5	0
38 FT	14	16	12	8	5	7.5	5	6.5	40.8	34.0	34.0	5	13	28.5	5	13	19.5	5	7.5	5	6.5	42.5	108	120	6	8	35.0	5	12	5	7	0
40 FT	14	17	12	8	5	7	5	6	40.8	34.0	34.0	5	12	28.5	5	12	19.5	5	8	5	6.5	43.0	109	121	6	8	35.0	5	12	5	7	0
42 FT	15	17	13	8	5	7	5	6	46.4	35.0	35.0	5	13	33.0	5	13	24.5	5	7	5	6	42.8	109	121	6	7.5	35.0	5	12	5	7	0
44 FT	15	18	13	8	5	7	5	6	46.4	35.0	35.0	5	13	33.0	5	13	24.5	5	7.5	5	6	43.3	110	122	6	8	35.0	5	12	5	6.5	0
46 FT	15	18	13	8	5	6	5	6	46.3	35.0	35.0	5	12	33.0	5	12	24.5	5	7.5	5	6	43.3	110	122	6	7.5	35.0	5	12	5	6.5	0
48 FT	16	19	14	8	5	6.5	5	6	47.0	36.0	36.0	5	14	32.5	5	14	24.0	5	7.5	5	6	43.8	111	123	6	7.5	35.0	5	12	5	6.5	0
50 FT	16	19	14	8	5	6	5	6	46.9	36.0	36.0	5	13	32.5	5	13	24.0	5	7	5	6	43.6	111	123	6	7.5	35.0	5	12	5	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

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MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 6 FEET HEIGHT (HT): 8 THRU 9 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO.
7 OF 27

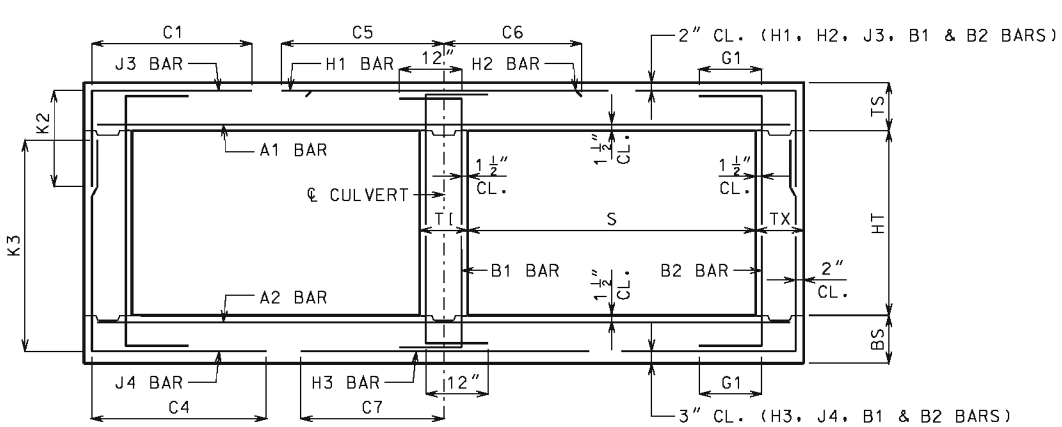
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 7 FT HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	HT=5'	HT=6'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	HT=5'	HT=6'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	8	8	8	5	8	4	8.5	38.1	28.0	28.0	28.0	4	15	73.0	4	15	25.5	4	7	4	6.5	41.8	52	64	76	5	6.5	37.5	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	4	8.5	38.1	28.0	28.0	28.0	4	14	73.0	4	14	24.5	4	7.5	4	8.5	39.9	53	65	77	5	7	37.5	5	12	5	12	12
4 FT	8	8	8	8	4	6	4	6.5	38.4	24.0	24.0	24.0	5	17	48.0	5	17	23.5	4	7	4	7	35.8	52	64	76	5	6	36.5	5	12	5	12	12
6 FT	8	8	8	8	4	7	4	7	33.9	24.0	24.0	24.0	5	17	39.0	5	17	23.5	4	6.5	4	6.5	33.3	52	64	76	6	7	38.5	5	12	5	12	12
8 FT	8	9	8	8	4	7	4	6.5	32.1	24.0	24.0	24.0	5	16	37.0	5	16	24.0	4	6.5	4	8	31.8	53	65	77	5	6	35.5	5	12	5	12	0
10 FT	8	10	8	8	4	6	5	7	31.5	24.0	24.0	24.0	5	15	36.0	5	15	24.0	4	6.5	4	9.5	30.5	54	66	78	5	6.5	35.5	5	12	5	12	0
12 FT	9	10	8	8	4	6	4	6.5	30.5	25.0	25.0	25.0	5	15	35.5	5	15	24.0	5	9	4	8.5	29.8	54	66	78	5	6	35.5	5	12	5	12	0
14 FT	9	11	8	8	5	8.5	5	7	30.4	25.0	25.0	25.0	5	14	35.5	5	14	24.0	5	9	4	8.5	29.1	55	67	79	5	6	35.5	5	12	5	12	0
16 FT	10	11	8	8	4	6	4	6.5	28.5	26.0	26.0	26.0	5	15	34.5	5	15	23.0	5	8.5	4	8	27.8	55	67	79	5	6	35.0	5	12	5	12	0
18 FT	10	12	8	8	5	8	5	8	28.6	26.0	26.0	26.0	5	14	34.5	5	14	23.5	5	8.5	4	8.5	27.4	56	68	80	5	6	35.0	5	12	5	12	0
20 FT	11	12	8	8	5	8	5	9	28.1	27.0	27.0	27.0	5	14	34.5	5	14	23.5	5	7	4	7	27.5	56	68	80	6	7	38.0	5	12	5	12	0
22 FT	12	13	8	8	5	8	5	8.5	27.9	28.0	28.0	28.0	5	13	34.5	5	13	23.0	5	7.5	4	7	27.5	57	69	81	6	7.5	38.0	5	12	5	12	0
24 FT	12	14	8	8	5	7.5	5	8.5	28.0	28.0	28.0	28.0	5	13	34.5	5	13	23.5	5	7.5	4	7	27.3	58	70	82	6	7.5	38.0	5	12	5	12	0
26 FT	13	15	8	8	5	7	5	8.5	27.9	29.0	29.0	29.0	5	12	34.5	5	12	22.5	5	7.5	4	7	27.4	59	71	83	6	7.5	38.0	5	12	5	12	0
28 FT	14	15	8	8	5	7	5	8.5	27.6	30.0	30.0	30.0	5	12	34.0	5	12	22.0	5	7	4	6.5	27.6	59	71	83	6	7	38.0	5	12	5	12	0
30 FT	14	16	8	8	5	6.5	5	8.5	27.8	30.0	30.0	30.0	5	12	34.0	5	12	22.5	5	7	4	6.5	27.5	60	72	84	6	7	38.0	5	12	5	12	0
32 FT	15	17	8	8	5	6.5	5	8	32.8	31.0	31.0	31.0	6	16	43.0	6	16	30.5	5	7.5	4	6	27.8	61	73	85	6	7.5	38.0	5	12	5	12	0
34 FT	16	17	8	8	5	6.5	5	7	32.6	32.0	32.0	32.0	6	15	42.5	6	15	29.5	5	7	4	6	27.9	61	73	85	6	7	38.0	5	12	5	11.5	0
36 FT	16	18	8	8	5	6	5	7	32.8	32.0	36.0	36.0	6	15	42.5	6	15	30.0	5	7	5	6.5	27.9	62	74	86	6	7	38.0	5	12	5	10.5	0
38 FT	17	18	8	8	5	6	5	6.5	32.8	37.0	37.0	37.0	6	14	42.0	6	14	29.5	5	6	5	6.5	28.0	62	74	86	6	6.5	38.0	5	12	5	10	0
40 FT	17	19	8	8	5	6	5	6.5	32.8	37.0	37.0	37.0	6	14	42.0	6	14	30.0	5	6.5	5	6.5	28.0	63	75	87	6	7	38.0	5	12	5	9.5	0
42 FT	18	20	8	8	5	6	5	6.5	32.9	38.0	38.0	38.0	6	14	41.5	6	14	29.5	5	6.5	5	6	28.3	64	76	88	6	7	38.0	5	12	5	9.5	0
44 FT	18	20	8	8	6	8	5	6.5	32.9	38.0	38.0	38.0	6	14	41.5	6	14	29.5	5	6.5	5	6	28.3	64	76	88	6	6.5	38.0	5	12	5	9.5	0
46 FT	19	21	8	8	6	8	5	6	33.0	39.0	39.0	39.0	6	14	41.0	6	14	29.5	5	6.5	6	7.5	31.5	65	77	89	6	6.5	38.0	5	12	5	9.5	0
48 FT	19	21	8	8	6	8	5	6	32.9	39.0	39.0	39.0	6	14	41.0	6	14	29.5	5	6	6	7.5	31.4	65	77	89	6	6.5	38.0	5	12	5	9.5	0
50 FT	20	22	9	8	6	8	5	6.5	33.8	40.0	40.0	40.0	6	15	40.0	6	15	29.0	5	6	5	6	29.0	66	78	90	6	6.5	38.0	5	12	5	8.5	0

SPAN (S) = 7 FT HEIGHT (HT) = 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
										K2													K3									
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7.5	4	8.5	38.1	28.0	28.0	4	15	73.0	4	15	25.5	4	7.5	4	7	56.0	89	101	5	7	37.5	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	4	8	38.1	28.0	28.0	4	15	73.0	4	15	25.0	4	7	4	6.5	51.4	89	101	5	7	37.5	5	12	5	12	12
4 FT	8	9	8	8	4	6	5	6.5	40.1	24.0	24.0	5	17	75.0	5	17	23.5	4	7.5	4	6.5	47.8	89	101	5	7	37.0	5	12	5	12	12
6 FT	8	9	8	8	4	7	5	6.5	44.6	24.0	24.0	5	17	39.5	5	17	23.5	4	7	4	6	43.5	89	101	5	6.5	36.0	5	12	5	12	12
8 FT	8	9	9	8	4	7	4	6	40.1	24.0	24.0	5	16	37.0	5	16	23.5	4	6.5	4	6.5	40.4	89	101	5	6	35.5	5	12	5	12	0
10 FT	8	10	9	8	4	6.5	5	6	38.4	24.0	24.0	5	15	36.0	5	15	24.0	4	6.5	4	7	39.5	90	102	5	6.5	35.5	5	12	5	12	0
12 FT	9	10	9	8	4	6	5	6.5	37.8	25.0	25.0	5	15	35.5	5	15	24.0	5	9	4	6	38.1	90	102	5	6	35.0	5	12	5	12	0
14 FT	9	11	9	8	5	8.5	5	6	37.1	25.0	25.0	5	14	35.0	5	14	23.5	5	9	4	6	37.9	91	103	5	6	35.5	5	12	5	12	0
16 FT	9	11	9	8	5	8.5	5	6	34.8	25.0	25.0	5	14	34.0	5	14	23.5	5	8.5	4	6	35.3	91	103	5	6	35.0	5	12	5	12	0
18 FT	10	12	9	8	5	8.5	5	7	34.9	26.0	30.0	5	14	34.0	5	14	23.5	5	8.5	5	8.5	35.3	92	104	5	6	35.0	5	12	5	12	0
20 FT	11	13	9	8	5	8	5	7.5	34.9	27.0	31.0	5	14	34.0	5	14	23.0	5	8.5	5	8	35.4	93	105	6	8	38.0	5	12	5	12	0
22 FT	11	13	9	8	5	7	5	6.5	34.8	27.0	31.0	5	13	34.0	5	13	23.5	5	7.5	5	8	35.1	93	105	6	7.5	38.0	5	12	5	11.5	0
24 FT	12	14	9	8	5	7.5	5	7	34.8	28.0	32.0	5	13	34.0	5	13	23.0	5	8	5	8	35.4	94	106	6	7.5	38.0	5	12	5	10.5	0
26 FT	13	15	9	8	5	7.5	5	7	34.9	29.0	33.0	5	12	33.5	5	12	22.0	5	8	5	8	35.6	95	107	6	7.5	38.0	5	12	5	9.5	0
28 FT	13	15	9	8	5	6.5	5	6.5	34.8	33.0	33.0	5	12	33.5	5	12	22.5	5	7	5	7.5	35.4	95	107	6	7	38.0	5	12	5	9	0
30 FT	14	16	9	8	5	7	5	6.5	34.9	34.0	34.0	5	12	33.0	5	12	21.5	5	7.5	5	7.5	35.6	96	108	6	7	38.0	5	12	5	8.5	0
32 FT	15	17	9	8	5	7	5	6	40.0	35.0	35.0	6	16	41.5	6	16	29.5	5	7.5	5	7.5	36.0	97	109	6	7.5	38.0	5	12	5	8.5	0
34 FT	15	17	10	8	5	6.5	5	7	40.5	35.0	35.0	6	16	41.5	6	16	30.0	5	6.5	5	7.5	36.0	97	109	6	7	38.0	5	12	5	8.5	0
36 FT	16	18	10	8	5	6.5	5	6.5	40.6	36.0	36.0	6	15	41.0	6	15	29.5	5	7	5	7.5	36.4	98	110	6	7	38.0	5	12	5	8	0
38 FT	16	19	11	8	5	6	5	7	41.3	32.0	36.0	6	15	40.5	6	15	29.5	5	7	5	7	36.8	99	111	6	7	38.0	5	12	5	8.5	0
40 FT	17	19	11	8	5	6	5	7	41.3	33.0	37.0	6	15	40.0	6	15	29.0	5	6.5	5	7	36.8	99	111	6	6.5	38.0	5	12	5	8	0
42 FT	17	20	11	8	5	6	5	6.5	41.4	37.0	37.0	6	15	40.0	6	15	29.0	5	6.5	5	7	36.9	100	112	6	7	38.0	5	12	5	7.5	0
44 FT	18	20	11	8	6	8.5	5	6	41.4	38.0	38.0	6	16	39.5	6	16	29.0	5	6.5	5	7	37.0	100	112	6	6.5	38.0	5	12	5	7.5	0
46 FT	18	21	12	8	6	8	5	6.5	42.1	38.0	38.0	6	15	39.5	6	15	29.0	5	6.5	5	7	37.4	101	113	6	6.5	38.0	5	12	5	7.5	0
48 FT	19	21	12	8	6	8	5	6.5	42.0	39.0	39.0	6	16	39.0	6	16	29.0	5	6	5	6.5	37.5	101	113	6	6.5	38.0	5	12	5	7	0
50 FT	19	22	12	8	6	7.5	5	6	42.1	39.0	39.0	6	15	39.0	6	15	29.0	5	6	5	6.5	37.6	102	114	6	6.5	38.0	5	12	5	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

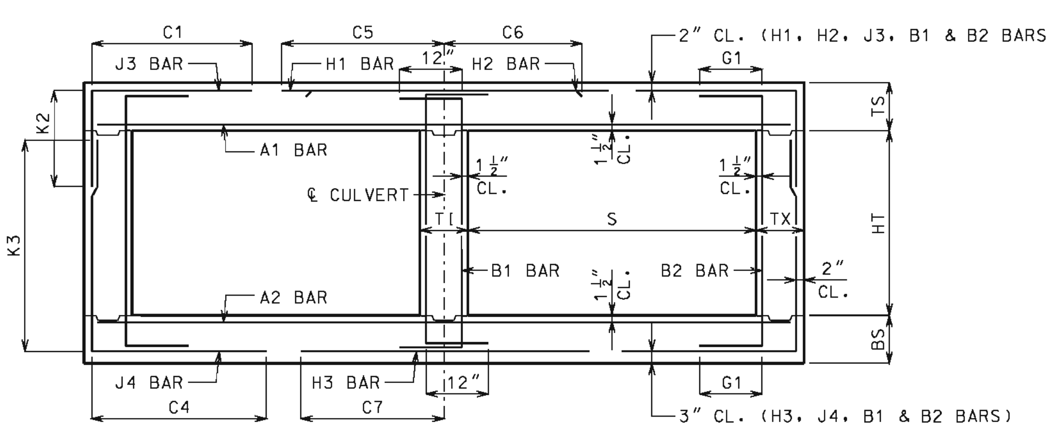
MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 7 FEET HEIGHT (HT): 4 THRU 8 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SPAN (S) = 7 FT HEIGHT (HT) = 9 FT OR 10 FT																																
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS										WALL BARS			
					A1 BARS		J3 BARS					H1 BARS			H2 BARS				A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS	
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	SIZE	SPA.	C6		SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
										HT=9'	HT=10'													HT=9'	HT=10'								
1 FT	12	9	8	8	5	7.5	4	6	38.1	28.0	28.0	4	16	73.0	4	16	26.0	4	7	6	7	68.1	113	125	5	7	38.0	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	5	8.5	38.1	28.0	32.0	4	15	73.0	4	15	25.0	4	6.5	6	6.5	64.9	113	125	5	6.5	37.5	5	12	5	12	12
4 FT	8	9	9	8	4	6	5	6	40.8	24.0	28.0	5	17	75.5	5	17	23.5	4	7.5	5	6	57.8	113	125	5	7	37.0	5	12	5	11.5	12
6 FT	8	9	10	8	4	7	5	6.5	55.0	24.0	28.0	5	17	39.5	5	17	23.0	4	7	5	6.5	51.9	113	125	5	6.5	36.0	5	12	5	11.5	12
8 FT	8	9	10	8	4	7	5	6	49.0	28.0	28.0	5	16	37.0	5	16	23.5	4	6.5	5	6	49.3	113	125	5	6	35.5	5	12	5	10.5	0
10 FT	8	10	10	8	4	6.5	6	7	49.0	28.0	28.0	5	15	36.0	5	15	24.0	4	6.5	5	6	49.1	114	126	5	6	35.5	5	12	5	10	0
12 FT	9	10	10	8	4	6	5	6	46.1	29.0	29.0	5	16	35.5	5	16	23.5	5	9	6	7	50.3	114	126	5	6	35.0	5	12	5	9.5	0
14 FT	9	11	10	8	5	9	5	6	44.6	29.0	29.0	5	15	35.0	5	15	23.5	5	9	6	7.5	50.6	115	127	5	6	35.0	5	12	5	8.5	0
16 FT	9	11	10	8	5	9	5	6	41.5	29.0	29.0	5	14	34.0	5	14	23.5	5	8.5	5	6	44.0	115	127	5	6	35.0	5	12	5	9.5	0
18 FT	10	12	10	8	5	8.5	5	6.5	42.0	30.0	30.0	5	15	34.0	5	15	23.5	5	8.5	5	6	44.3	116	128	5	6	35.0	5	12	5	8.5	0
20 FT	11	13	10	8	5	8.5	5	6	42.4	31.0	31.0	5	14	33.5	5	14	22.5	5	8.5	5	6	44.6	117	129	6	8	38.0	5	12	5	8	0
22 FT	11	13	10	8	5	7.5	5	6	42.1	31.0	31.0	5	14	33.5	5	14	23.5	5	7.5	6	7	47.3	117	129	6	7.5	38.0	5	12	5	8	0
24 FT	12	14	10	8	5	7.5	5	6	42.5	32.0	32.0	5	13	33.5	5	13	22.5	5	8	6	7.5	47.6	118	130	6	7.5	38.0	5	12	5	8	0
26 FT	13	15	10	8	5	7.5	6	7	45.8	33.0	37.0	5	12	33.0	5	12	21.5	5	8	6	7.5	47.9	119	131	6	7.5	38.0	5	12	5	8	0
28 FT	13	16	11	8	5	7	5	6	42.9	33.0	33.0	5	12	32.5	5	12	22.0	5	8	5	6.5	45.3	120	132	6	7.5	38.0	5	12	5	7.5	0
30 FT	14	16	11	8	5	7	6	7.5	46.1	34.0	34.0	5	12	32.0	5	12	21.0	5	7.5	5	6	45.0	120	132	6	7	38.0	5	12	5	7.5	0
32 FT	14	17	12	8	5	7	5	6	43.4	34.0	34.0	5	12	32.0	5	12	21.5	5	7.5	5	6.5	45.4	121	133	6	7	38.0	5	12	5	7	0
34 FT	15	17	12	8	5	6.5	6	8.5	52.6	35.0	35.0	6	16	40.5	6	16	29.5	5	6.5	5	6.5	45.1	121	133	6	7	38.0	5	12	5	7	0
36 FT	15	18	13	8	5	6	6	8.5	52.9	35.0	35.0	6	16	40.0	6	16	29.5	5	7	5	6	45.5	122	134	6	7	38.0	5	12	5	6.5	0
38 FT	16	19	13	8	5	6.5	6	8	53.1	36.0	36.0	6	16	39.5	6	16	29.0	5	7	5	6	45.9	123	135	6	7	38.0	5	12	5	6.5	0
40 FT	17	19	13	8	5	6	6	7.5	53.4	37.0	37.0	5	12	35.0	5	12	25.0	5	6.5	5	6	45.8	123	135	6	6.5	38.0	5	12	5	6.5	0
42 FT	17	20	14	8	5	6	6	8	53.8	37.0	37.0	6	16	39.0	6	16	29.0	5	6.5	5	6	46.1	124	136	6	6.5	38.5	5	12	5	6	0
44 FT	17	20	14	8	6	8.5	6	7.5	53.6	37.0	37.0	6	15	39.0	6	15	29.0	5	6	5	6	46.1	124	136	6	6.5	38.5	5	12	5	6	0
46 FT	18	21	14	8	6	8	6	7	53.9	38.0	38.0	6	17	38.5	6	17	29.0	5	6.5	5	6	46.5	125	137	6	6.5	38.0	5	12	5	6	0
48 FT	18	22	15	8	6	8	6	7.5	54.3	38.0	42.0	6	16	38.5	6	16	29.0	5	6.5	6	8	49.9	126	138	6	6.5	38.5	5	12	5	6	0
50 FT	18	22	15	8	6	7.5	6	7.5	54.3	38.0	42.0	6	15	38.5	6	15	29.0	5	6	6	8	49.9	126	138	6	6	38.5	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 7 FEET HEIGHT (HT): 9 THRU 10 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

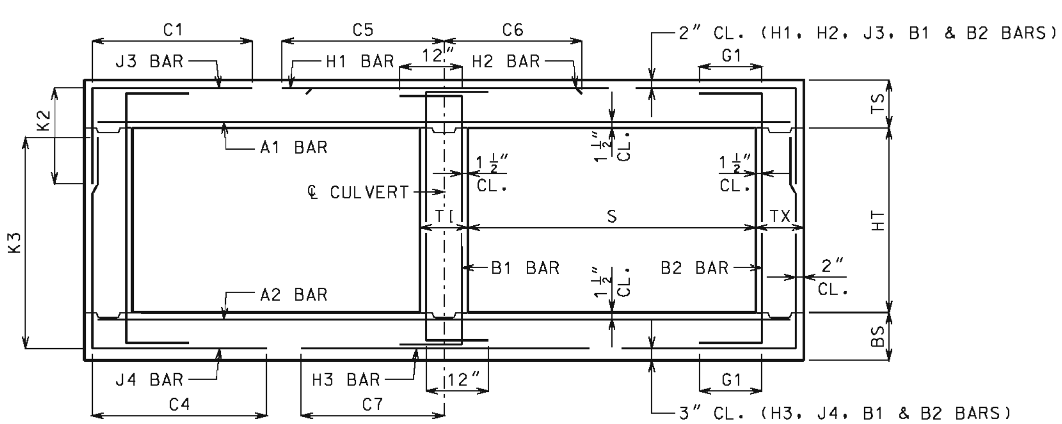
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 8 FT HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS													WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	HT=5'	HT=6'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	HT=5'	HT=6'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7	4	8.5	41.8	28.0	28.0	28.0	4	12	81.5	4	12	26.5	4	7	4	8	43.0	53	65	77	5	6.5	41.0	5	12	5	12	12
2 FT	13	9	8	8	5	7.5	4	7.5	41.8	29.0	29.0	29.0	4	13	81.5	4	13	26.5	4	6.5	4	7	39.1	53	65	77	5	6	40.5	5	12	5	12	12
4 FT	8	8	8	8	4	6	5	6.5	36.4	24.0	24.0	24.0	5	15	51.0	5	15	26.5	4	6	4	6	35.3	52	64	76	6	6.5	42.5	5	9.5	5	12	12
6 FT	8	9	8	8	4	6	5	6.5	34.3	24.0	24.0	24.0	5	15	42.5	5	15	26.0	4	6	4	7.5	33.1	53	65	77	6	7	42.0	5	12	5	12	12
8 FT	8	9	8	8	4	6	5	6	33.1	24.0	24.0	24.0	5	13	40.5	5	13	25.5	5	8.5	4	7	31.6	53	65	77	6	6.5	41.5	5	12	5	12	0
10 FT	9	10	8	8	5	8.5	4	6	31.9	25.0	25.0	25.0	5	14	39.5	5	14	25.5	5	8	4	8	30.4	54	66	78	6	7	41.5	5	12	5	12	0
12 FT	10	11	8	8	5	8	4	6	30.6	26.0	26.0	26.0	5	14	39.0	5	14	25.0	5	8	4	8	29.3	55	67	79	6	7	41.5	5	12	5	12	0
14 FT	11	12	8	8	5	8	4	6	29.8	27.0	27.0	27.0	5	14	38.5	5	14	25.0	5	7.5	4	7.5	28.6	56	68	80	6	7	41.5	5	12	5	12	0
16 FT	11	13	8	8	5	7.5	5	8.5	29.6	27.0	27.0	27.0	5	12	38.5	5	12	25.0	5	7.5	4	8	28.0	57	69	81	6	7	41.5	5	12	5	12	0
18 FT	12	13	8	8	5	7.5	4	6	27.5	28.0	28.0	28.0	5	13	37.5	5	13	25.0	5	7	4	7.5	26.8	57	69	81	6	7	41.0	5	12	5	12	0
20 FT	12	14	8	8	5	7	5	8.5	27.8	28.0	28.0	28.0	5	12	37.5	5	12	25.0	5	7	4	7.5	26.4	58	70	82	6	7	41.5	5	12	5	12	0
22 FT	13	15	8	8	5	6.5	6	8.5	27.4	29.0	29.0	29.0	5	12	37.5	5	12	25.0	5	7	4	7	26.4	59	71	83	6	7	41.5	5	12	5	12	0
24 FT	14	16	8	8	5	6.5	5	8.5	27.3	30.0	30.0	30.0	5	12	37.5	5	12	24.5	5	7	4	6.5	26.5	60	72	84	6	7	41.5	5	12	5	12	0
26 FT	15	16	8	8	5	6.5	5	8	31.9	31.0	31.0	31.0	6	16	46.5	6	16	33.0	5	6.5	4	6.5	26.6	60	72	84	6	7	41.0	5	12	5	12	0
28 FT	16	17	8	8	5	6	5	7	31.8	32.0	32.0	32.0	6	15	46.0	6	15	32.0	5	6.5	4	6	26.8	61	73	85	6	6.5	41.0	5	12	5	12	0
30 FT	16	18	8	8	5	6	5	7	32.0	32.0	32.0	36.0	6	15	46.0	6	15	33.0	5	6.5	5	6.5	26.6	62	74	86	6	6.5	41.0	5	12	5	12	0
32 FT	17	19	8	8	5	6	5	6.5	31.9	37.0	37.0	37.0	6	14	45.5	6	14	32.0	5	6.5	5	6.5	26.8	63	75	87	6	6.5	41.0	5	12	5	12	0
34 FT	18	19	8	8	6	8.5	5	6.5	31.8	38.0	38.0	38.0	6	13	45.5	6	13	31.0	5	6	5	6.5	26.9	63	75	87	6	6	41.0	5	12	5	11	0
36 FT	18	20	8	8	6	8	5	6.5	31.9	38.0	38.0	38.0	6	13	45.5	6	13	32.0	5	6	5	6	26.9	64	76	88	6	6	41.0	5	12	5	10	0
38 FT	19	21	8	8	6	8	5	6	32.0	39.0	39.0	39.0	6	13	45.0	6	13	31.0	5	6	6	7.5	30.1	65	77	89	6	6	41.0	5	12	5	9.5	0
40 FT	20	22	8	8	6	7.5	6	7.5	36.0	44.0	44.0	44.0	6	13	44.5	6	13	30.5	5	6	6	7	30.4	66	78	90	6	6	41.0	5	12	5	9.5	0
42 FT	20	22	8	8	6	7.5	6	7.5	36.0	44.0	44.0	44.0	6	12	44.5	6	12	30.5	6	8.5	6	7	30.3	66	78	90	6	6	41.0	5	12	5	9.5	0
44 FT	21	23	8	8	6	7.5	6	7	36.0	45.0	45.0	45.0	6	12	43.5	6	12	30.0	6	8.5	6	6.5	30.5	67	79	91	6	6	41.0	5	12	5	9.5	0
46 FT	21	23	8	8	6	7	6	7	36.0	45.0	45.0	45.0	6	12	43.5	6	12	30.0	6	8	6	6.5	30.5	67	79	91	7	7.5	44.0	5	12	5	9.5	0
48 FT	22	24	8	8	6	7	6	6.5	36.1	46.0	46.0	46.0	6	12	43.0	6	12	30.0	6	8	6	6	30.8	68	80	92	7	7.5	44.0	5	12	5	9	0
50 FT	22	24	8	8	6	6.5	6	6.5	36.1	46.0	46.0	46.0	6	12	43.0	6	12	30.0	6	7.5	6	6	30.8	68	80	92	7	7.5	44.0	5	12	5	8.5	0

SPAN (S) = 8 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS													WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7	4	6.5	41.8	28.0	28.0	28.0	4	12	81.5	4	12	27.5	4	6	5	6.5	61.6	89	101	113	5	6	41.0	5	12	5	12	12
2 FT	13	10	8	8	5	7	4	6.5	41.8	29.0	29.0	29.0	4	13	81.5	4	13	27.0	4	6.5	4	6	58.3	90	102	114	5	6.5	40.5	5	12	5	12	12
4 FT	8	9	8	8	4	6	6	7.5	43.8	24.0	24.0	28.0	5	15	83.5	5	15	27.0	4	6	5	6	52.3	89	101	113	5	6	40.0	5	11	5	12	12
6 FT	8	10	8	8	4	6	6	7.5	51.4	24.0	24.0	28.0	5	15	43.0	5	15	26.0	4	6.5	5	6	49.0	90	102	114	5	6.5	39.5	5	12	5	12	12
8 FT	8	11	8	8	4	6	6	7.5	46.6	24.0	24.0	28.0	5	13	40.5	5	13	25.5	4	6.5	5	6.5	46.3	91	103	115	5	6	39.0	5	12	5	12	0
10 FT	9	11	8	8	5	8.5	6	7	45.3	25.0	25.0	29.0	5	14	39.5	5	14	25.5	5	8.5	5	6	43.6	91	103	115	5	6	38.5	5	12	5	11	0
12 FT	10	12	8	8	5	8	6	7	44.4	26.0	30.0	30.0	5	14	39.0	5	14	25.0	5	8.5	5	6	42.5	92	104	116	5	6	38.5	5	12	5	10	0
14 FT	11	12	8	8	5	8	6	7	43.5	27.0	31.0	35.0	5	14	38.5	5	14	25.0	5	7.5	6	7	44.4	92	104	116	6	7	41.5	5	12	5	9.5	0
16 FT	11	13	8	8	5	7.5	6	6.5	42.9	27.0	31.0	35.0	5	12	38.0	5	12	25.0	5	7.5	6	7	44.0	93	105	117	6	7.5	41.5	5	12	5	9.5	0
18 FT	12	13	8	8	5	7.5	5	6	37.1	28.0	32.0	32.0	5	13	37.5	5	13	25.0	5	7	6	7.5	41.1	93	105	117	6	7	41.0	5	12	5	9.5	0
20 FT	12	14	8	8	5	7	6	7	39.9	32.0	32.0	36.0	5	12	37.5	5	12	25.0	5	7	6	7.5	41.1	94	106	118	6	7	41.0	5	12	5	9.5	0
22 FT	13	15	8	8	5	6.5	6	7	39.9	33.0	33.0	37.0	5	12	37.0	5	12	25.0	5	7	6	7.5	41.3	95	107	119	6	7	41.0	5	12	5	9.5	0
24 FT	14	16	8	8	5	6.5	6	7	40.0	34.0	34.0	38.0	5	12	37.0	5	12	24.0	5	7	6	7	41.4	96	108	120	6	7	41.0	5	12	5	9	0
26 FT	15	16	9	8	5	6.5	5	6	42.4	35.0	35.0	35.0	6	16	45.5	6	16	32.0	5	6.5	5	6	38.5	96	108	120	6	7	41.0	5	12	5	8.5	0
28 FT	15	17	10	8	5	6	5	6.5	42.9	31.0	35.0	35.0	6	16	45.5	6	16	33.0	5	6.5	5	7.5	38.8	97	109	121	6	6.5	41.5	5	12	5	8	0
30 FT	16	18	11	8	5	6	5	6.5	43.6	32.0	36.0	36.0	6	15	44.5	6	15	31.5	5	6.5	5	7	39.1	98	110	122	6	6.5	41.5	5	12	5	8.5	0
32 FT	17	19	11	8	5	6	5	6.5	43.6	33.0	37.0	37.0	6	14	44.0	6	14	31.0	5	6.5	5	7	39.4	99	111	123	6	6	41.5	5	12	5	7.5	0
34 FT	17	20	11	8	6	8	5	6	43.8	37.0	37.0	37.0	6	14	44.0	6	14	31.5	5	6.5	5	7	39.5	100	112	124	6	6	41.5	5	12	5	7.5	0
36 FT	18	20	12	8	6	8	5	6.5	44.3	38.0	38.0	38.0	6	13	43.5	6	13	30.5	5	6	5	6.5	39.6	100	112	124	6	6	41.5	5	12	5	7.5	0
38 FT	18	21	12	8	6	7.5	5	6	44.4	38.0	38.0	38.0	6	13	43.5	6	13	31.0	5	6	5	6.5	39.9	101	113	125	6	6	41.5	5	12	5	7	0
40 FT	19	22	12	8	6	7.5	6	8.5	48.4	39.0	39.0	39.0	6	13	42.5	6	13	30.0	5	6	5	6.5	40.1	102	114	126	6	6	41.5	5	12	5	7	0
42 FT	19	22	13	8	6	7	5	6	45.0	39.0	39.0	39.0	6	13	42.5	6	13	30.5	6	8	5	6.5	40.3	102	114	126	7	7.5	44.5	5	12	5	7	0
44 FT	20	23	13	8	6	7	6	8.5	49.1	40.0	40.0	40.0	6	13	42.0	6	13	30.0	6	8	5	6	40.5	103	115	127	7	7.5	44.5	5	12	5	7	0
46 FT	20	24	13	8	6	6.5	6	8	49.3	40.0	40.0	40.0	6	12	42.0	6	12	30.0	6	8	5	6	40.6	104	116	128	7	7.5	44.5	5	12	5	6.5	0
48 FT	21	24	13	8	6	7	6	7.5	49.1	41.0	41.0	41.0	6	13	41.5	6	13	29.5	6	8	5	6	40.8	104	116	128	7	7.5	44.5	5	12	5	6.5	0
50 FT	21	25	14	8	6	6.5	6	8	49.9	41.0	41.0	41.0	6	13	41.5	6	13	29.5	6	8	5	6.5	41.1	105	117	129	7	7.5	44.5	5	12	5	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

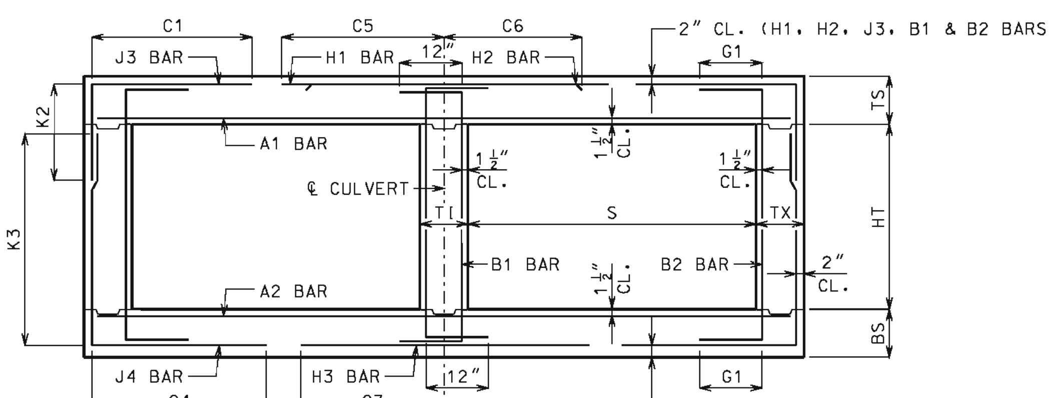
SPAN (S): 8 FEET HEIGHT (HT): 4 THRU 9 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SPAN (S) = 8 FT HEIGHT (HT) = 10 FT OR 11 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=10'	J3 K2 HT=11'	H1 BARS SIZE	H1 SPA.	H1 C5	H2 BARS SIZE	H2 SPA.	H2 C6	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=10'	J4 K3 HT=11'	H3 BARS SIZE	H3 SPA.	H3 C7	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	B2 G1
1 FT	12	9	8	9	5	7	5	7.5	41.9	32.0	32.0	4	12	81.5	4	12	27.5	5	9	6	6	73.9	125	137	5	6	41.5	5	12	5	10.5	12
2 FT	13	10	9	9	5	7	5	8	42.5	29.0	33.0	4	13	82.0	4	13	27.0	4	6	5	6	66.8	126	138	5	6.5	41.0	5	12	5	11	12
4 FT	8	11	9	9	4	6	6	7	44.5	24.0	28.0	5	16	84.0	5	16	27.0	4	7	5	6	66.0	127	139	5	7.5	41.0	5	10.5	5	9.5	12
6 FT	8	11	9	9	4	6	6	7	61.5	28.0	32.0	5	15	43.0	5	15	26.0	4	6.5	6	7	64.5	127	139	5	7	40.0	5	11.5	5	9	12
8 FT	8	11	9	9	4	6	6	7	55.6	28.0	32.0	5	14	40.5	5	14	25.5	4	6	6	6.5	60.4	127	139	5	6	39.5	5	11.5	5	8.5	0
10 FT	9	11	9	9	5	8.5	6	7.5	54.9	29.0	33.0	5	14	39.5	5	14	25.5	5	8.5	6	6	57.5	127	139	5	6	39.0	5	12	5	8.5	0
12 FT	10	11	9	9	5	8	5	6	51.1	30.0	30.0	5	14	39.0	5	14	25.5	5	7.5	6	6	55.3	127	139	6	7	41.5	5	12	5	8.5	0
14 FT	10	12	9	9	5	8	6	6.5	52.0	30.0	34.0	5	13	38.5	5	13	25.5	5	7.5	6	6	54.8	128	140	6	7	41.5	5	12	5	8.5	0
16 FT	11	13	10	9	5	7.5	5	6	48.6	31.0	31.0	5	13	38.0	5	13	25.5	5	7.5	6	6.5	54.1	129	141	6	7.5	41.5	5	12	5	8	0
18 FT	11	13	10	9	5	7.5	5	6	45.1	31.0	31.0	5	12	37.0	5	12	25.0	5	7	6	6.5	50.4	129	141	6	7	41.5	5	12	5	8	0
20 FT	12	14	10	9	5	7	6	7.5	48.4	32.0	36.0	5	13	37.0	5	13	25.0	5	7	6	6.5	50.5	130	142	6	7.5	41.5	5	12	5	8	0
22 FT	13	15	10	9	5	7	6	7	48.5	33.0	37.0	5	12	37.0	5	12	24.5	5	7	6	6.5	50.6	131	143	6	7	41.5	5	12	5	8	0
24 FT	13	16	11	9	5	6.5	6	8	48.5	33.0	33.0	5	12	36.5	5	12	25.0	5	7	5	6	47.8	132	144	6	7	41.5	5	12	5	7.5	0
26 FT	14	16	12	9	5	6.5	5	6	46.0	34.0	34.0	5	12	36.0	5	12	24.5	5	6	5	6	47.5	132	144	6	7	41.5	5	12	5	7	0
28 FT	15	17	12	9	5	6.5	6	8	55.3	35.0	35.0	6	16	44.5	6	16	32.5	5	6.5	5	6	47.8	133	145	6	6.5	41.5	5	12	5	7	0
30 FT	16	18	13	9	5	6.5	6	8	55.8	36.0	36.0	6	15	44.0	6	15	31.5	5	6.5	5	6	48.0	134	146	6	6.5	41.5	5	12	5	6.5	0
32 FT	16	19	13	9	5	6	6	7.5	55.8	36.0	36.0	6	15	44.0	6	15	32.0	5	6.5	5	6	48.3	135	147	6	6	41.5	5	12	5	6.5	0
34 FT	17	20	13	9	5	6	6	7	56.0	37.0	37.0	6	14	43.5	6	14	31.0	5	6.5	5	6	48.5	136	148	6	6.5	41.5	5	12	5	6.5	0
36 FT	17	20	14	9	6	8	6	7.5	56.1	37.0	37.0	6	14	43.0	6	14	31.5	5	6	5	6	48.6	136	148	6	6	41.5	5	12	5	6	0
38 FT	18	21	14	9	6	8	6	7	56.4	38.0	38.0	6	13	42.5	6	13	30.5	5	6	5	6	48.9	137	149	6	6	41.5	5	12	5	6	0
40 FT	18	22	15	9	6	7	6	7.5	56.8	38.0	42.0	6	13	42.5	6	13	30.5	5	6	6	8	52.3	138	150	6	6	41.5	5	12	6	8	0
42 FT	19	22	15	9	6	7.5	6	7	57.0	39.0	43.0	6	14	42.0	6	14	30.0	6	8.5	6	8	52.3	138	150	7	7.5	44.5	5	12	6	8	0
44 FT	19	23	15	9	6	6.5	6	6.5	56.9	39.0	43.0	6	13	42.0	6	13	30.0	6	8.5	6	8	52.5	139	151	7	8	44.5	5	12	6	8	0
46 FT	20	24	16	9	6	7	6	7	57.6	40.0	44.0	6	14	41.5	6	14	30.0	6	8	6	7.5	52.9	140	152	7	8	44.5	5	12	6	8	0
48 FT	20	24	16	9	6	6.5	6	6.5	57.5	40.0	44.0	6	13	41.5	6	13	30.0	6	8	6	7.5	52.9	140	152	7	7.5	44.5	5	12	6	8	0
50 FT	21	25	16	9	6	6.5	6	6	57.8	41.0	45.0	6	14	41.0	6	14	30.0	6	8	6	7.5	53.1	141	153	7	7.5	44.5	5	12	6	8	0



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SYMMETRICAL ABOUT ℄ CULVERT.

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MoDOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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DENNIS W. HECKMAN
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CONCRETE DOUBLE BOX CULVERT

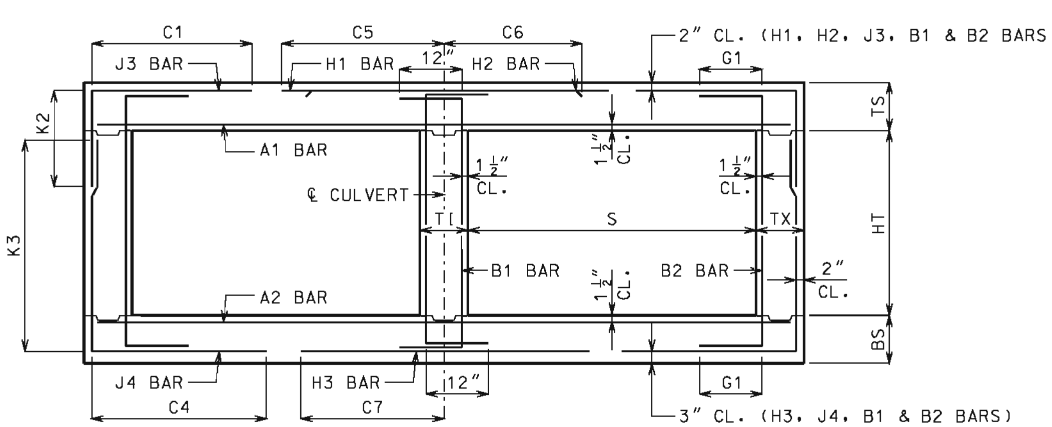
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 8 FEET
HEIGHT (HT): 10 THRU 11 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011
703.47

					TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
SPAN (S) = 9 FT HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT																																		
DESIGN FILL	MEMBER THICKNESS				A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=5'	K2 HT=6'	K2 HT=7'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=5'	K3 HT=6'	K3 HT=7'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	4	7.5	45.3	29.0	29.0	29.0	5	17	89.5	5	17	28.5	4	6	4	6	47.3	65	77	89	5	6	44.0	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	4	7.5	45.3	29.0	29.0	29.0	5	16	89.5	5	16	27.5	4	6	4	7.5	44.5	66	78	90	5	6.5	44.0	5	12	5	12	12
4 FT	9	9	8	8	5	8.5	5	6.5	42.1	25.0	25.0	25.0	5	15	59.0	5	15	28.5	5	8	4	6	39.5	65	77	89	6	6.5	46.0	5	11	5	12	12
6 FT	9	9	8	8	5	8.5	5	6.5	36.9	25.0	25.0	29.0	5	14	47.0	5	14	27.5	5	7.5	5	7	36.5	65	77	89	6	6	45.0	5	12	5	12	12
8 FT	9	10	8	8	5	8.5	5	6.5	35.6	25.0	25.0	25.0	5	12	44.0	5	12	27.0	5	7.5	4	6.5	34.6	66	78	90	6	6.5	45.0	5	12	5	12	0
10 FT	10	11	8	8	5	8	5	7.5	34.3	26.0	26.0	26.0	5	12	43.0	5	12	26.5	5	7.5	4	6.5	33.3	67	79	91	6	6.5	44.5	5	12	5	12	0
12 FT	11	12	8	8	5	7.5	5	8.5	33.0	27.0	27.0	27.0	5	12	42.5	5	12	26.5	5	7	4	6	32.1	68	80	92	6	6.5	44.5	5	12	5	12	0
14 FT	12	13	8	8	5	7	5	8.5	32.1	28.0	28.0	28.0	5	12	42.0	5	12	26.5	5	6.5	4	6	31.5	69	81	93	6	6.5	44.5	5	12	5	12	0
16 FT	13	14	8	8	5	6.5	5	8.5	31.5	29.0	29.0	33.0	6	16	44.5	6	16	29.5	5	6.5	5	8.5	31.0	70	82	94	6	6.5	44.5	5	12	5	12	0
18 FT	13	15	8	8	5	6.5	5	8	31.3	29.0	29.0	33.0	6	15	44.5	6	15	29.5	5	6.5	5	8.5	30.5	71	83	95	6	6.5	44.5	5	12	5	12	0
20 FT	14	15	8	8	5	6	5	8.5	29.3	30.0	30.0	34.0	6	16	43.5	6	16	29.0	5	6	5	8.5	29.1	71	83	95	6	6.5	44.5	5	12	5	12	0
22 FT	15	16	8	8	5	6	5	8	34.1	31.0	31.0	35.0	6	15	49.5	6	15	35.0	5	6	5	8	29.1	72	84	96	6	6.5	44.5	5	12	5	12	0
24 FT	15	17	8	8	6	7.5	5	8	34.3	31.0	31.0	35.0	6	14	49.5	6	14	35.0	5	6	5	7	28.9	73	85	97	6	6.5	44.5	5	12	5	12	0
26 FT	16	18	8	8	6	8	5	7	34.1	32.0	36.0	36.0	6	14	49.0	6	14	35.0	5	6	5	6.5	29.0	74	86	98	6	6.5	44.5	5	12	5	11	0
28 FT	17	19	8	8	6	7.5	5	6.5	34.0	37.0	37.0	37.0	6	14	49.0	6	14	35.0	5	6	5	6.5	29.1	75	87	99	6	6	44.5	5	12	5	10	0
30 FT	18	20	8	8	6	7.5	5	6.5	34.0	38.0	38.0	38.0	6	13	48.5	6	13	34.0	6	8.5	5	6	29.3	76	88	100	6	6	44.5	5	12	5	9.5	0
32 FT	19	21	8	8	6	7.5	5	6	34.1	39.0	39.0	39.0	6	13	48.0	6	13	33.0	6	8.5	6	7.5	32.5	77	89	101	7	7.5	47.0	5	12	5	9.5	0
34 FT	20	21	8	8	6	7.5	6	7.5	38.0	44.0	44.0	44.0	6	12	47.5	6	12	32.5	6	7.5	6	7.5	32.6	77	89	101	7	7.5	47.0	5	12	5	9.5	0
36 FT	20	22	8	8	6	7	6	7.5	38.0	44.0	44.0	44.0	6	12	47.5	6	12	33.0	6	8	6	7	32.6	78	90	102	7	7.5	47.0	5	12	5	9.5	0
38 FT	21	23	8	8	6	7	6	7	38.1	45.0	45.0	45.0	6	12	47.0	6	12	32.0	6	7.5	6	6.5	32.8	79	91	103	7	7	47.0	5	12	5	9	0
40 FT	22	24	8	8	6	6.5	6	6.5	38.3	46.0	46.0	46.0	7	15	51.5	7	15	36.0	6	7.5	6	6	33.0	80	92	104	7	7	47.0	5	12	5	8	0
42 FT	22	24	8	8	6	6.5	6	6	38.1	46.0	46.0	46.0	7	15	51.5	7	15	36.5	6	7.5	6	6	33.0	80	92	104	7	7	47.0	5	12	5	7.5	0
44 FT	23	25	9	8	6	6.5	6	7	39.0	47.0	47.0	47.0	7	15	50.5	7	15	36.0	6	7.5	6	7	33.5	81	93	105	7	7	47.0	5	12	5	8.5	0
46 FT	24	26	9	8	6	6	6	7	39.0	48.0	48.0	48.0	7	15	49.5	7	15	35.5	6	7.5	6	6.5	33.8	82	94	106	7	7	47.0	5	12	5	8	0
48 FT	24	26	9	8	6	6	6	7	39.0	48.0	48.0	48.0	7	15	49.5	7	15	35.5	6	6.5	6	6.5	33.8	82	94	106	7	6.5	47.0	5	12	5	8	0
50 FT	25	27	9	8	6	6	6	6.5	39.0	49.0	49.0	49.0	7	15	49.0	7	15	35.5	6	7	6	6.5	34.0	83	95	107	7	6.5	47.0	5	12	5	7.5	0

					TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
SPAN (S) = 9 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT																																		
DESIGN FILL	MEMBER THICKNESS				A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=8'	K2 HT=9'	K2 HT=10'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=8'	K3 HT=9'	K3 HT=10'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	8	8	5	6.5	5	8.5	47.3	29.0	29.0	33.0	5	18	91.5	5	18	29.0	4	6	5	6	69.0	102	114	126	5	6.5	44.5	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	5	8.5	47.3	29.0	29.0	33.0	5	17	91.5	5	17	28.0	5	9	6	7	66.6	102	114	126	5	6	44.0	5	12	5	12	12
4 FT	9	9	8	8	5	8.5	6	7	47.3	29.0	33.0	33.0	5	15	91.5	5	15	29.0	5	7.5	6	6	59.4	101	113	125	6	6	46.0	5	12	5	10.5	12
6 FT	9	10	9	8	5	8.5	5	6	54.1	25.0	25.0	29.0	5	14	48.0	5	14	27.5	5	8	5	6	51.8	102	114	126	6	6.5	45.5	5	12	5	11.5	12
8 FT	9	11	9	8	5	8.5	5	6	48.0	25.0	29.0	29.0	5	13	44.0	5	13	27.0	5	8	5	6	49.3	103	115	127	6	7	45.0	5	12	5	11	0
10 FT	10	11	9	8	5	8	5	6	46.6	26.0	30.0	30.0	5	12	43.0	5	12	26.5	5	7	6	7	50.0	103	115	127	6	6.5	44.5	5	12	5	10	0
12 FT	11	12	9	8	5	7.5	6	7	48.4	31.0	31.0	35.0	5	12	42.0	5	12	26.5	5	7	6	7	49.0	104	116	128	6	6.5	44.5	5	12	5	9.5	0
14 FT	12	13	9	8	5	7	6	7.5	47.4	32.0	32.0	36.0	5	12	41.5	5	12	26.5	5	6.5	6	7	48.1	105	117	129	6	6.5	44.5	5	12	5	8.5	0
16 FT	12	14	9	8	5	7	6	6.5	46.4	32.0	32.0	36.0	6	15	44.5	6	15	29.5	5	6.5	6	7	47.5	106	118	130	6	6.5	44.5	5	12	5	8.5	0
18 FT	13	15	9	8	5	6.5	6	6.5	46.0	33.0	33.0	37.0	6	15	44.0	6	15	29.0	5	6.5	6	7.5	47.3	107	119	131	6	7	44.5	5	12	5	8.5	0
20 FT	14	15	9	8	5	6.5	5	6	40.1	34.0	34.0	34.0	6	16	43.0	6	16	29.0	5	6	6	7.5	44.4	107	119	131	6	6.5	44.5	5	12	5	8.5	0
22 FT	14	16	10	8	5	6	5	6	40.5	34.0	34.0	34.0	6	15	43.0	6	15	29.0	5	6	5	7	41.5	108	120	132	6	6.5	44.5	5	12	5	8	0
24 FT	15	17	10	8	6	8	6	8	49.5	35.0	35.0	35.0	6	15	48.5	6	15	35.0	5	6	5	6.5	41.6	109	121	133	6	6.5	44.5	5	12	5	8	0
26 FT	16	18	11	8	6	8	5	6	46.1	36.0	36.0	36.0	6	15	48.0	6	15	34.5	5	6	5	7	41.9	110	122	134	6	6.5	44.5	5	12	5	7.5	0
28 FT	17	19	11	8	6	8	6	8	50.1	37.0	37.0	37.0	6	14	47.5	6	14	33.5	5	6	5	7	42.0	111	123	135	6	6	44.5	5	12	5	7.5	0
30 FT	18	20	12	8	6	8	5	6	46.8	38.0	38.0	38.0	6	13	47.0	6	13	32.5	6	8.5	5	6.5	42.4	112	124	136	6	6	44.5	5	12	5	7.5	0
32 FT	18	21	12	8	6	7.5	6	8	50.8	38.0	38.0	38.0	6	13	47.0	6	13	33.5	6	8	5	6.5	42.5	113	125	137	7	7.5	47.5	5	12	5	7	0
34 FT	19	22	12	8	6	7	6	7.5	50.9	39.0	39.0	39.0	6	13	46.0	6	13	32.5	6	8	5	6.5	42.8	114	126	138	7	7.5	47.5	5	12	5	7	0
36 FT	20	23	13	8	6	7	6	8	51.5	40.0	40.0	40.0	6	12	45.0	6	12	31.5	6	8	5	6	43.1	115	127	139	7	7	47.5	5	12	5	6.5	0
38 FT	20	23	13	8	6	6.5	6	7.5	51.4	40.0	40.0	40.0	6	12	45.0	6	12	32.0	6	7.5	5	6	43.0	115	127	139	7	7	47.5	5	12	5	6.5	0
40 FT	21	24	13	8	6	6.5	6	7	51.5	41.0	41.0	41.0	6	12	44.5	6	12	31.0	6	7.5	5	6	43.3	116	128	140	7	7	47.5	5	12	5	6.5	0
42 FT	21	25	14	8	6	6	6	7.5	52.3	41.0	41.0	41.0	6	12	44.5	6	12	31.5	6	7.5	5	6	43.5	117	129	141	7	7	47.5	5	12	5	6	0
44 FT	22	25	14	8	6	6.5	6	7	52.1	42.0	42.0	42.0	7	16	49.0	7	16	35.5	6	6.5	5	6	43.6	117	129	141	7	6.5	47.5	5	12	5	6	0
46 FT	23	26	14	8	6	6	6	7	52.1	43.0	43.0	43.0	6	12	43.5	6	12	30.5	6	7	5	6	43.9	118	130	142	7	6.5	47.5	5	12	5	6	0
48 FT	23	27	15	8	6	6	6	7	53.0	43.0	43.0	47.0	6	12	43.5	6	12	30.0	6	7	6	8.5	47.1	119	131	143	7	6.5	47.5	5	12	5	6	0
50 FT	24	28	15	8	6	6	6	7	53.0	44.0	44.0	48.0	6	12	43.0	6	12	30.0	6	7	6	8	47.5	120	132	144	7	6.5	47.5	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 9 FEET
HEIGHT (HT): 5 THRU 10 FEET

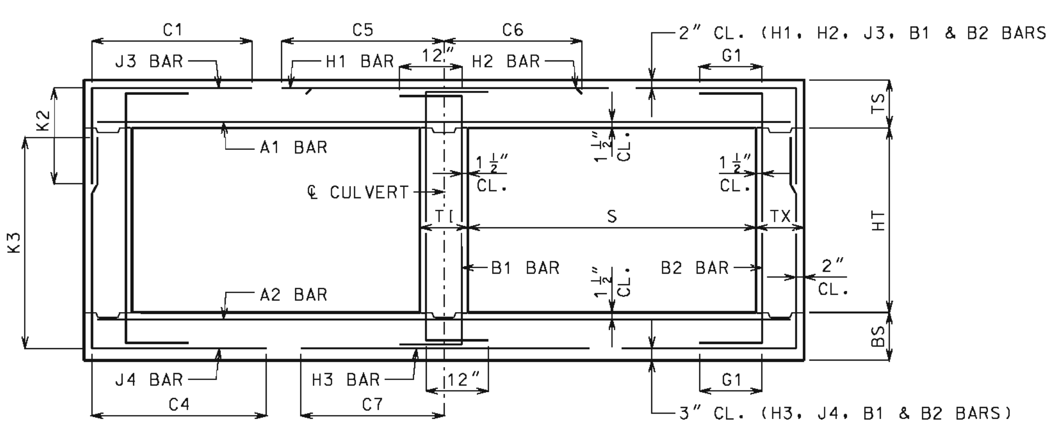
DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO.
12 OF 27

SPAN (S) = 9 FT HEIGHT (HT) = 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=11'	K2 HT=12'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=11'	K3 HT=12'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	9	10	5	6.5	5	8	48.3	33.0	33.0	5	17	93.0	5	17	29.0	5	9	6	6.5	79.4	138	150	5	6	44.5	5	12	5	9.5	12
2 FT	13	11	9	10	5	6.5	5	7.5	48.3	33.0	33.0	5	16	93.0	5	16	28.0	4	6	6	7	77.0	139	151	5	6	44.5	5	12	5	9	12
4 FT	9	10	9	10	5	8.5	5	6	48.3	29.0	29.0	5	15	93.0	5	15	29.0	5	8	6	6	71.4	138	150	6	7	46.5	5	12	5	8.5	12
6 FT	9	11	9	10	5	8.5	6	7	69.3	29.0	33.0	5	15	47.0	5	15	28.0	5	8.5	6	6	68.0	139	151	5	6	43.0	5	12	5	8.5	12
8 FT	9	11	9	10	5	8.5	6	6.5	61.6	29.0	33.0	5	13	44.0	5	13	27.5	5	7.5	6	6	63.8	139	151	6	7	45.5	5	12	5	8.5	0
10 FT	10	11	10	10	5	8	5	6	56.4	30.0	30.0	5	13	43.0	5	13	27.5	5	7	6	6	60.1	139	151	6	6.5	45.0	5	12	5	8	0
12 FT	11	12	10	10	5	7.5	5	6	55.0	31.0	31.0	5	13	42.5	5	13	27.0	5	6.5	6	6.5	59.1	140	152	6	6.5	45.0	5	12	5	8	0
14 FT	11	13	10	10	5	7.5	6	7	55.6	31.0	35.0	6	16	45.0	6	16	30.0	5	6.5	6	6.5	58.5	141	153	6	6.5	45.0	5	12	5	8	0
16 FT	12	14	11	10	5	7	6	8.5	54.6	32.0	36.0	6	16	44.5	6	16	30.0	5	6.5	6	7	57.4	142	154	6	6.5	45.0	5	12	5	7.5	0
18 FT	13	15	11	10	5	6.5	6	7.5	54.6	33.0	37.0	6	16	44.0	6	16	30.0	5	6.5	6	6.5	57.1	143	155	6	7	44.5	5	12	5	7.5	0
20 FT	13	15	11	10	5	6.5	6	7.5	51.5	33.0	37.0	6	15	43.5	6	15	29.5	5	6	6	6.5	53.4	143	155	6	6.5	44.5	5	12	5	7.5	0
22 FT	14	16	12	10	5	6	6	8	51.9	34.0	38.0	6	16	43.0	6	16	29.5	5	6	6	7.5	53.6	144	156	6	6.5	44.5	5	12	5	7	0
24 FT	15	17	12	10	5	6	6	7.5	58.0	35.0	39.0	6	16	48.5	6	16	35.5	5	6	6	7.5	53.8	145	157	6	6.5	44.5	5	12	5	7	0
26 FT	16	18	13	10	6	8.5	6	7.5	58.5	36.0	40.0	6	15	48.0	6	15	34.5	5	6	6	8	54.0	146	158	6	6.5	44.5	5	12	5	6.5	0
28 FT	17	19	13	10	6	8	6	7	58.6	37.0	41.0	6	14	47.5	6	14	33.5	6	8.5	6	8	54.1	147	159	6	6	44.5	5	12	5	6.5	0
30 FT	17	20	13	10	6	7.5	6	6.5	58.5	37.0	41.0	6	14	47.5	6	14	34.5	6	8	6	7	54.4	148	160	6	6	44.5	5	12	5	6.5	0
32 FT	18	21	14	10	6	7.5	6	7	59.1	38.0	42.0	6	13	47.0	6	13	33.5	6	8	6	8	54.6	149	161	7	7.5	47.5	5	12	5	6	0
34 FT	19	22	14	10	6	7.5	6	6.5	59.3	39.0	43.0	6	13	46.5	6	13	32.5	6	8	6	8	54.9	150	162	7	7.5	47.5	5	12	5	6	0
36 FT	19	22	15	10	6	7	6	6.5	59.5	43.0	43.0	6	13	46.0	6	13	33.0	6	7	6	8	54.9	150	162	7	7.5	48.0	5	12	6	8	0
38 FT	20	23	15	10	6	7	6	6.5	59.6	44.0	44.0	6	12	45.5	6	12	32.0	6	7.5	6	8	55.1	151	163	7	7	47.5	5	12	6	8	0
40 FT	20	24	16	10	6	6	6	6.5	60.0	44.0	44.0	6	12	45.0	6	12	32.5	6	7.5	6	7.5	55.5	152	164	7	7	48.0	5	12	6	8	0
42 FT	21	25	16	10	6	6.5	6	6	60.3	45.0	45.0	6	12	44.5	6	12	31.5	6	7.5	6	7.5	55.8	153	165	7	7	48.0	5	12	6	8	0
44 FT	22	25	17	10	6	6.5	6	6.5	60.8	46.0	46.0	6	12	44.0	6	12	31.0	6	6.5	6	7	55.9	153	165	7	6.5	48.0	5	12	6	7.5	0
46 FT	22	26	17	10	6	6	6	6	60.8	46.0	46.0	6	12	44.0	6	12	31.0	6	7	6	7	56.1	154	166	7	6.5	48.0	5	12	6	7.5	0
48 FT	23	27	18	10	6	6	6	6.5	61.5	47.0	47.0	6	12	43.5	6	12	31.0	6	7	6	6.5	56.6	155	167	7	6.5	48.0	5	12	6	7	0
50 FT	23	28	19	10	6	6	6	6.5	62.0	43.0	47.0	6	12	43.5	6	12	31.0	6	7	6	7	57.0	156	168	7	6.5	48.0	5	12	6	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 9 FEET
HEIGHT (HT): 11 THRU 12 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

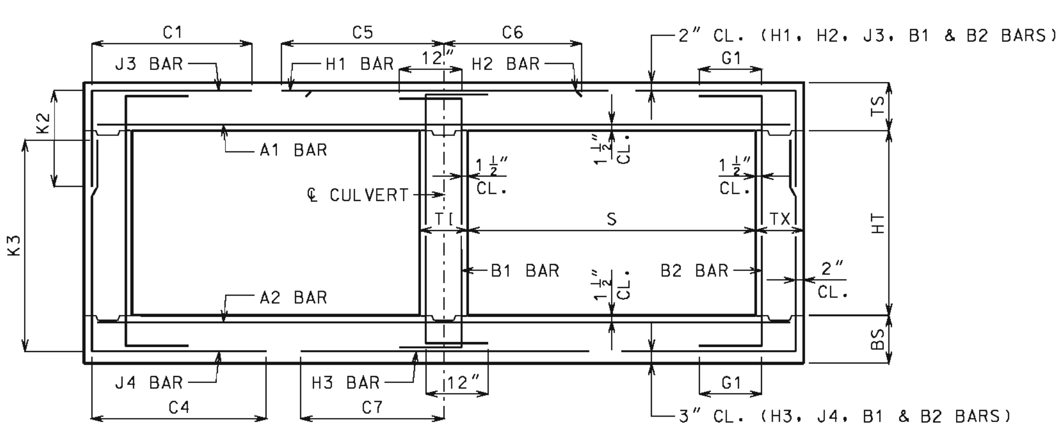
703.47

SPAN (S) = 10 FT HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS							H1 BARS			H2 BARS			A2 BARS		J4 BARS							H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=5'	K2 HT=6'	K2 HT=7'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=5'	K3 HT=6'	K3 HT=7'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	8	8	5	6.5	4	7	48.9	29.0	29.0	29.0	5	15	98.0	5	15	29.0	4	6	4	7	48.1	66	78	90	5	6	47.5	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	4	7	48.9	29.0	29.0	29.0	5	13	98.0	5	13	28.5	5	8.5	4	6.5	43.8	66	78	90	6	7	50.0	5	12	5	12	12
4 FT	9	10	8	8	5	7.5	6	7.5	43.1	25.0	25.0	25.0	5	12	62.0	5	12	30.0	5	8	4	7	38.9	66	78	90	6	6.5	49.5	5	8.5	5	12	12
6 FT	9	10	8	8	5	8.5	5	6	38.0	25.0	25.0	25.0	6	15	53.5	6	15	32.0	5	7	4	6.5	36.1	66	78	90	6	6	48.5	5	12	5	12	12
8 FT	10	11	8	8	5	8	5	7.5	36.0	26.0	26.0	26.0	6	16	51.0	6	16	31.5	5	7	4	6.5	34.1	67	79	91	6	6	48.0	5	12	5	12	0
10 FT	11	12	8	8	5	7.5	5	8	34.1	27.0	27.0	27.0	6	15	49.5	6	15	31.0	5	6.5	4	6	32.6	68	80	92	6	6.5	48.0	5	12	5	12	0
12 FT	12	13	8	8	5	7	5	8.5	32.8	28.0	28.0	28.0	6	15	48.5	6	15	31.0	5	6.5	4	6	31.5	69	81	93	6	6.5	48.0	5	12	5	12	0
14 FT	13	14	8	8	5	6.5	5	8.5	31.6	29.0	29.0	33.0	6	15	48.5	6	15	31.0	5	6	5	9	30.8	70	82	94	6	6	47.5	5	12	5	12	0
16 FT	14	15	8	8	5	6	5	8.5	30.8	30.0	30.0	34.0	6	14	48.0	6	14	31.0	5	6	5	8.5	30.1	71	83	95	6	6	47.5	5	12	5	12	0
18 FT	15	16	8	8	6	8	5	8	35.1	31.0	31.0	35.0	6	14	53.5	6	14	36.5	6	8	5	8	29.9	72	84	96	6	6	47.5	5	12	5	12	0
20 FT	15	17	8	8	6	7.5	5	8	35.1	31.0	31.0	35.0	6	13	53.5	6	13	36.5	6	8	5	7	29.4	73	85	97	6	6	47.5	5	12	5	12	0
22 FT	16	18	8	8	6	8	5	7	33.4	32.0	36.0	36.0	6	13	52.5	6	13	36.5	6	8	5	6.5	28.0	74	86	98	6	6.5	47.5	5	12	5	12	0
24 FT	17	19	8	8	6	7.5	5	6.5	33.3	37.0	37.0	37.0	6	13	52.5	6	13	36.5	6	8	5	6.5	28.0	75	87	99	6	6	47.5	5	12	5	12	0
26 FT	18	20	8	8	6	7	5	6.5	33.1	38.0	38.0	38.0	6	13	52.0	6	13	36.5	6	8	5	6	28.1	76	88	100	6	6	47.5	5	12	5	10.5	0
28 FT	19	21	8	8	6	7	5	6	33.1	39.0	39.0	39.0	6	13	52.0	6	13	36.0	6	7.5	6	7.5	31.3	77	89	101	7	7.5	50.5	5	12	5	9.5	0
30 FT	20	22	8	8	6	7	6	7.5	37.1	44.0	44.0	44.0	6	12	51.5	6	12	35.5	6	7.5	6	7	31.4	78	90	102	7	7.5	50.5	5	12	5	9.5	0
32 FT	21	23	8	8	6	6.5	6	7	37.1	45.0	45.0	45.0	6	12	51.0	6	12	34.5	6	7.5	6	6.5	31.5	79	91	103	7	7	50.5	5	12	5	9.5	0
34 FT	22	23	8	8	6	6.5	6	6.5	37.0	46.0	46.0	46.0	7	15	55.5	7	15	38.5	6	6.5	6	6.5	31.6	79	91	103	7	7	50.5	5	12	5	9.5	0
36 FT	22	24	8	8	6	6	6	6.5	37.1	46.0	46.0	46.0	7	15	55.5	7	15	39.5	6	7	6	6	31.6	80	92	104	7	7	50.0	5	12	5	9	0
38 FT	23	25	8	8	6	6	6	6	37.1	47.0	47.0	47.0	7	15	55.0	7	15	38.5	6	7	6	6	31.9	81	93	105	7	6.5	50.0	5	12	5	8.5	0
40 FT	24	26	9	8	6	6	6	7	38.0	48.0	48.0	48.0	7	14	54.0	7	14	37.5	6	7	6	6.5	32.5	82	94	106	7	6.5	50.0	5	12	5	8.5	0
42 FT	25	27	9	8	6	6	6	6.5	38.0	49.0	49.0	49.0	7	14	53.5	7	14	37.0	6	7	6	6.5	32.6	83	95	107	7	6	50.0	5	12	5	8.5	0
44 FT	25	28	9	8	7	7.5	6	6.5	38.1	49.0	49.0	49.0	7	14	53.0	7	14	37.5	6	6.5	6	6	32.8	84	96	108	7	6	50.0	5	12	5	8.5	0
46 FT	26	28	9	8	7	7.5	6	6.5	38.1	50.0	50.0	50.0	7	13	52.5	7	13	36.5	6	6.5	6	6	32.9	84	96	108	7	6	50.0	5	12	5	8	0
48 FT	27	29	9	8	7	7.5	6	6	38.1	51.0	51.0	51.0	7	14	51.5	7	14	36.5	6	6.5	6	6	33.0	85	97	109	7	6	50.0	5	12	5	7.5	0
50 FT	27	30	10	8	7	7	6	7	39.0	51.0	51.0	51.0	7	13	51.5	7	13	36.0	6	6.5	6	6.5	33.5	86	98	110	7	6	50.0	5	12	5	8	0

SPAN (S) = 10 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS							H1 BARS			H2 BARS			A2 BARS		J4 BARS							H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=8'	K2 HT=9'	K2 HT=10'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=8'	K3 HT=9'	K3 HT=10'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	8	8	5	6.5	5	8.5	50.9	29.0	33.0	33.0	5	14	100.0	5	14	29.5	5	8.5	6	7.5	71.6	102	114	126	5	6	47.5	5	12	5	12	12
2 FT	13	11	8	8	5	6.5	5	8.5	50.9	29.0	33.0	33.0	5	13	100.0	5	13	28.5	5	8.5	5	6	64.1	103	115	127	5	6	47.0	5	12	5	12	12
4 FT	9	10	9	8	5	7.5	5	6	69.0	25.0	25.0	29.0	5	12	73.0	5	12	30.0	5	7.5	5	6	55.4	102	114	126	6	6.5	49.5	5	10	5	12	12
6 FT	9	10	9	8	5	8.5	5	6	51.4	25.0	29.0	29.0	6	15	54.0	6	15	32.0	5	7	6	7	53.4	102	114	126	6	6	48.5	5	12	5	12	12
8 FT	10	11	9	8	5	8	5	6	48.0	26.0	30.0	30.0	5	12	48.0	5	12	28.5	5	7	6	7.5	50.9	103	115	127	6	6	48.0	5	12	5	11.5	0
10 FT	11	12	9	8	5	7.5	5	6	46.0	31.0	31.0	31.0	6	16	49.5	6	16	31.0	5	6.5	5	6	46.3	104	116	128	6	6	48.0	5	12	5	10.5	0
12 FT	12	13	9	8	5	7	5	6	44.5	32.0	32.0	32.0	6	15	48.5	6	15	31.0	5	6.5	5	6	45.0	105	117	129	6	6	47.5	5	12	5	9.5	0
14 FT	13	14	9	8	5	6.5	5	6	43.3	33.0	33.0	33.0	6	15	48.0	6	15	30.5	5	6	5	6	43.9	106	118	130	6	6	47.5	5	12	5	8.5	0
16 FT	14	15	9	8	5	6	5	6	42.1	34.0	34.0	34.0	6	15	47.5	6	15	30.5	5	6	5	6	43.0	107	119	131	6	6	47.5	5	12	5	8.5	0
18 FT	15	16	10	8	6	8.5	5	6.5	47.1	35.0	35.0	35.0	6	15	53.0	6	15	36.5	6	8	5	7	42.8	108	120	132	6	6	47.5	5	12	5	8.5	0
20 FT	15	17	10	8	6	8	6	8	50.6	35.0	35.0	35.0	6	13	52.5	6	13	36.5	6	8	5	6.5	42.3	109	121	133	6	6	47.5	5	12	5	8	0
22 FT	16	18	10	8	6	8	5	6	44.5	36.0	36.0	36.0	6	14	52.0	6	14	36.0	6	8	5	7	40.0	110	122	134	6	6.5	47.5	5	12	5	8	0
24 FT	17	19	10	8	6	7.5	6	8	48.4	37.0	37.0	37.0	6	14	51.5	6	14	36.0	6	8	5	6.5	40.1	111	123	135	6	6	47.5	5	12	5	8	0
26 FT	18	20	11	8	6	7.5	5	6	45.0	38.0	38.0	38.0	6	13	51.0	6	13	35.5	6	7.5	5	7	40.5	112	124	136	6	6	47.5	5	12	5	7.5	0
28 FT	19	21	11	8	6	7	6	8	49.0	39.0	39.0	39.0	6	13	50.5	6	13	35.0	6	7.5	5	7	40.5	113	125	137	7	7.5	50.5	5	12	5	7.5	0
30 FT	19	22	12	8	6	6.5	6	8	49.8	39.0	39.0	39.0	6	13	50.0	6	13	35.5	6	7.5	5	6.5	40.9	114	126	138	7	7.5	50.5	5	12	5	7.5	0
32 FT	20	23	12	8	6	6.5	6	8	49.6	40.0	40.0	40.0	6	12	49.5	6	12	34.5	6	7.5	5	6.5	41.0	115	127	139	7	7	50.5	5	12	5	7	0
34 FT	21	24	12	8	6	6.5	6	7.5	49.6	41.0	41.0	41.0	6	12	49.0	6	12	33.5	6	7.5	5	6.5	41.1	116	128	140	7	7	50.5	5	12	5	7	0
36 FT	22	25	12	8	6	6.5	6	6.5	49.6	42.0	42.0	42.0	7	15	53.0	7	15	38.0	6	7	5	6.5	41.3	117	129	141	7	6.5	50.5	5	12	5	7	0
38 FT	23	26	13	8	6	6	6	7.5	50.4	43.0	43.0	43.0	7	15	52.0	7	15	37.0	6	7	5	6	41.8	118	130	142	7	6.5	50.5	5	12	5	6.5	0
40 FT	23	26	13	8	6	6	6	7	50.3	43.0	43.0	43.0	7	15	52.0	7	15	37.5	6	6.5	5	6	41.6	118	130	142	7	6.5	50.5	5	12	5	6.5	0
42 FT	24	27	14	8	6	6	6	7.5	51.0	44.0	44.0	44.0	7	14	51.5	7	14	36.5	6	6.5	5	6	42.1	119	131	143	7	6	50.5	5	12	5	6	0
44 FT	24	28	14	8	7	7	6	7	51.1	44.0	44.0	44.0	7	14	51.5	7	14	37.0	6	6.5	5	6	42.1	120	132	144	7	6	50.5	5	12	5	6	0
46 FT	25	29	14	8	7	7.5	6	6.5	51.1	45.0	49.0	49.0	7	14	51.0	7	14	36.0	6	6.5	6	8.5	45.4	121	133	145	7	6	50.5	5	12	5	6	0
48 FT	26	30	14	8	7	7	6	6	51.1	46.0	50.0	50.0	7	15	50.5	7	15	36.0	6	6.5	6	8	45.6	122	134	146	7	6	50.5	5	12	5	6	0
50 FT	26	30	15	8	7	7	6	6.5	51.9	50.0	50.0	50.0	7	14	50.5	7	14	36.0	6	6	6	8	45.8	122	134	146	8	7.5	56.5	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

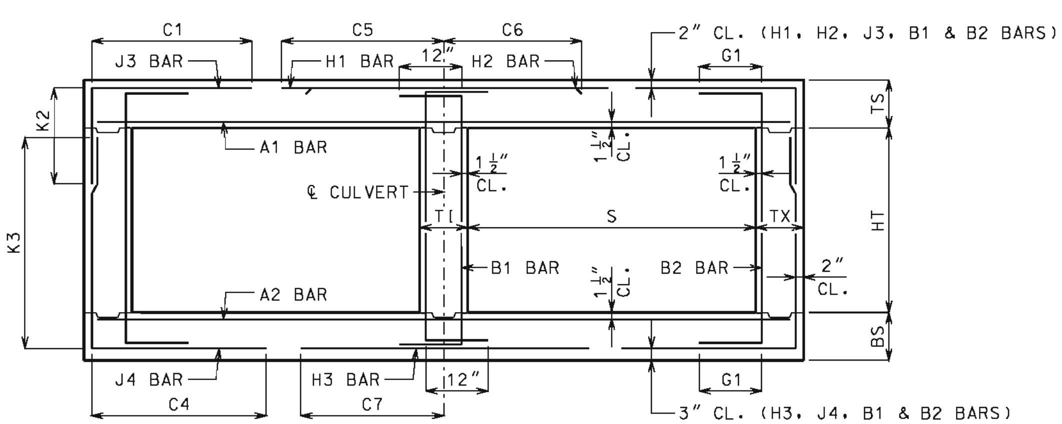
SPAN (S): 10 FEET
HEIGHT (HT): 5 THRU 10 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

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

SPAN (S) = 10 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT																																		
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	HT=13'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	HT=13'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	9	10	5	6.5	5	6.5	51.9	33.0	33.0	33.0	5	14	101.0	5	14	30.0	5	7.5	6	6	85.4	138	150	162	6	7	51.0	5	12	5	8.5	12
2 FT	13	11	9	10	5	6.5	5	6	51.9	33.0	33.0	33.0	5	13	101.0	5	13	29.0	5	8	6	6	82.6	139	151	163	5	6	47.5	5	12	5	8.5	12
4 FT	9	10	10	10	5	7.5	6	7	52.5	29.0	29.0	33.0	5	12	101.5	5	12	30.5	5	7	6	6	74.5	138	150	162	6	6	50.0	5	10	5	8	12
6 FT	9	11	10	10	5	8.5	6	7	70.4	29.0	29.0	33.0	5	12	50.5	5	12	29.5	5	7	6	6	71.0	139	151	163	6	6.5	49.5	5	12	5	8	12
8 FT	10	12	11	10	5	8	5	6	62.6	30.0	30.0	30.0	5	12	47.5	5	12	29.0	5	7	5	6	64.6	140	152	164	6	6.5	48.5	5	12	5	7.5	0
10 FT	11	12	11	10	5	7.5	5	6.5	60.9	31.0	31.0	31.0	5	12	46.5	5	12	28.5	5	6.5	6	6.5	64.4	140	152	164	6	6	48.0	5	12	5	7.5	0
12 FT	11	13	11	10	5	7.5	6	7.5	60.6	31.0	31.0	35.0	6	15	48.5	6	15	31.5	5	6	6	6.5	63.6	141	153	165	6	6	48.0	5	12	5	7.5	0
14 FT	12	14	11	10	5	7	6	7.5	59.6	32.0	32.0	36.0	6	14	48.0	6	14	31.5	5	6	6	6.5	62.5	142	154	166	6	6	48.0	5	12	5	7.5	0
16 FT	13	15	12	10	5	6.5	6	7.5	58.4	33.0	33.0	37.0	6	14	47.5	6	14	31.0	6	8	6	7	61.1	143	155	167	6	6	48.0	5	12	5	7	0
18 FT	14	16	12	10	5	6	6	7	58.0	34.0	38.0	38.0	6	14	47.0	6	14	31.0	6	8	6	6.5	60.5	144	156	168	6	6.5	48.0	5	12	5	7	0
20 FT	15	17	13	10	6	8	6	7	64.0	35.0	39.0	39.0	6	14	52.5	6	14	37.0	6	8	6	6.5	59.9	145	157	169	6	6.5	48.0	5	12	5	6.5	0
22 FT	15	18	13	10	6	7.5	6	7	61.1	35.0	35.0	39.0	6	13	52.0	6	13	37.0	6	8	6	7.5	57.4	146	158	170	6	6.5	48.0	5	12	5	6.5	0
24 FT	16	19	13	10	6	7.5	6	6.5	61.3	36.0	36.0	40.0	6	13	51.5	6	13	36.5	6	7.5	6	7.5	57.4	147	159	171	6	6	48.0	5	12	5	6.5	0
26 FT	17	20	14	10	6	7.5	6	7	61.8	37.0	37.0	41.0	6	13	51.5	6	13	36.5	6	7.5	6	7.5	57.6	148	160	172	6	6	48.0	5	12	5	6	0
28 FT	18	21	14	10	6	7	6	6.5	61.9	38.0	38.0	42.0	6	13	51.0	6	13	36.5	6	7.5	6	7.5	57.8	149	161	173	7	7.5	51.0	5	12	5	6	0
30 FT	19	22	15	10	6	7	6	6.5	62.4	39.0	43.0	43.0	6	13	50.0	6	13	35.5	6	7.5	6	7.5	58.0	150	162	174	7	7.5	51.0	5	12	6	8	0
32 FT	20	23	15	10	6	7	6	6	62.5	44.0	44.0	44.0	6	12	49.5	6	12	34.5	6	7	6	7.5	58.1	151	163	175	7	7	51.0	5	12	6	8	0
34 FT	21	24	16	10	6	6.5	6	6.5	63.0	41.0	45.0	45.0	6	12	48.5	6	12	33.5	6	7	6	7.5	58.5	152	164	176	7	7	51.0	5	12	6	8	0
36 FT	21	25	16	10	6	6	6	6	62.9	45.0	45.0	45.0	6	12	48.5	6	12	34.0	6	7	6	7.5	58.6	153	165	177	7	6.5	51.0	5	12	6	8	0
38 FT	22	26	17	10	6	6.5	6	6	63.5	42.0	46.0	46.0	7	15	52.5	7	15	38.5	6	7	6	7	59.0	154	166	178	7	6.5	51.0	5	12	6	7.5	0
40 FT	23	26	17	10	6	6	6	6	63.5	47.0	47.0	47.0	7	15	52.0	7	15	37.5	6	6	6	7	58.9	154	166	178	7	6.5	51.0	5	12	6	7.5	0
42 FT	24	27	18	10	6	6	6	6	64.1	44.0	48.0	48.0	7	15	51.5	7	15	37.0	6	6.5	6	6.5	59.3	155	167	179	7	6	51.0	5	12	6	7	0
44 FT	24	28	19	10	7	8	6	6	64.6	44.0	48.0	48.0	7	14	51.5	7	14	37.0	6	6.5	6	6.5	59.6	156	168	180	7	6	51.0	5	12	6	7	0
46 FT	25	29	19	10	7	7.5	6	6	64.8	49.0	49.0	49.0	7	15	51.0	7	15	36.5	6	6.5	6	6.5	59.9	157	169	181	7	6	51.0	5	12	6	6.5	0
48 FT	25	30	20	10	7	7.5	7	8	70.3	49.0	49.0	49.0	7	15	51.0	7	15	36.5	6	6.5	6	6.5	60.3	158	170	182	7	6	51.0	5	12	6	6.5	0
50 FT	26	31	20	10	7	7	7	7	70.4	50.0	50.0	50.0	7	15	50.5	7	15	36.5	6	6	6	6	60.5	159	171	183	7	6	51.0	5	12	6	6.5	0



BAR DIMENSIONS DIAGRAM

SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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MoDOT

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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 10 FEET
HEIGHT (HT): 11 THRU 13 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

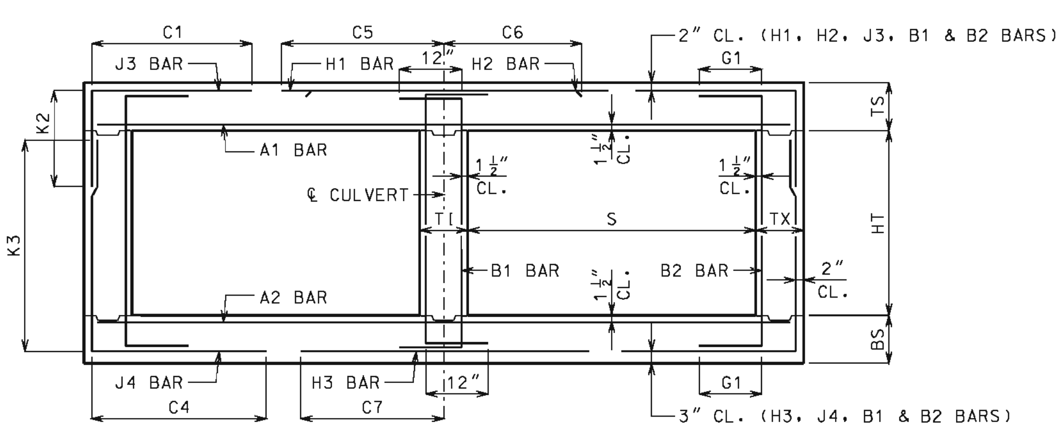
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 11 FT HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS													WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS				A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS				
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=6'	K2 HT=7'	K2 HT=8'	SIZE	SPA.	C5	SIZE	SPA.	C6		SIZE	SPA.	SIZE	SPA.	C4	K3 HT=6'	K3 HT=7'	K3 HT=8'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1		
1 FT	14	10	8	8	5	6	4	6.5	52.5	30.0	30.0	30.0	5	13	106.5	5	13	30.0		5	8	5	7	52.9	78	90	102	6	7	53.5	5	12	5	12	12		
2 FT	14	11	8	8	5	6	4	6	52.5	30.0	30.0	30.0	5	12	106.5	5	12	29.0		5	8	5	8	49.1	79	91	103	6	7	53.0	5	12	5	12	12		
4 FT	10	10	8	8	5	7	5	6	45.6	26.0	26.0	30.0	6	16	72.5	6	16	35.0		5	7	5	6.5	43.0	78	90	102	6	6	52.5	5	10.5	5	12	12		
6 FT	10	11	8	8	5	7.5	5	6	40.8	26.0	26.0	30.0	6	15	58.5	6	15	33.5		5	6.5	5	7.5	39.5	79	91	103	6	6	52.0	5	12	5	12	12		
8 FT	11	12	8	8	5	7.5	5	7	38.6	27.0	27.0	31.0	6	15	54.5	6	15	33.0		5	6.5	5	8	37.3	80	92	104	6	6	51.5	5	12	5	12	0		
10 FT	12	13	8	8	5	7	5	7.5	36.6	28.0	28.0	32.0	6	14	53.0	6	14	32.5		5	6	5	8	35.6	81	93	105	6	6	51.0	5	12	5	12	0		
12 FT	13	14	8	8	5	6.5	5	7.5	35.3	29.0	33.0	33.0	6	14	52.0	6	14	32.5		6	8.5	5	8.5	34.6	82	94	106	6	6	51.0	5	12	5	12	0		
14 FT	14	15	8	8	5	6	5	8	34.1	30.0	34.0	34.0	6	13	51.5	6	13	32.0		6	8	5	8.5	33.8	83	95	107	6	6	51.0	5	12	5	12	0		
16 FT	15	16	8	8	6	8	5	7.5	38.3	31.0	35.0	35.0	6	13	57.0	6	13	38.0		6	7.5	5	8	33.1	84	96	108	6	6	51.0	5	12	5	12	0		
18 FT	16	17	8	8	6	8	5	7	37.5	32.0	36.0	36.0	6	12	56.5	6	12	38.0		6	7	5	7	32.6	85	97	109	7	7	53.5	5	12	5	10.5	0		
20 FT	17	18	8	8	6	7.5	5	6.5	37.1	37.0	37.0	37.0	6	12	56.5	6	12	38.0		6	7	5	6.5	32.4	86	98	110	7	7	53.5	5	12	5	9.5	0		
22 FT	18	20	8	8	6	7	5	6.5	37.1	38.0	38.0	38.0	6	12	56.0	6	12	37.5		6	7.5	5	6	32.4	88	100	112	6	6	50.5	5	12	5	9.5	0		
24 FT	19	20	8	8	6	6.5	5	6	35.1	39.0	39.0	39.0	6	12	55.0	6	12	37.5		6	7	5	6	30.9	88	100	112	6	6	50.5	5	12	5	9.5	0		
26 FT	20	21	8	8	6	6.5	6	7.5	39.1	44.0	44.0	44.0	6	12	54.5	6	12	37.5		6	6.5	6	7.5	33.9	89	101	113	7	7	53.5	5	12	5	9.5	0		
28 FT	21	22	8	8	6	6.5	6	7	39.1	45.0	45.0	45.0	6	12	54.5	6	12	37.0		6	6	6	7	34.0	90	102	114	7	7	53.5	5	12	5	9.5	0		
30 FT	22	23	8	8	6	6	6	6.5	39.1	46.0	46.0	46.0	7	15	59.0	7	15	41.0		6	6	6	6.5	34.1	91	103	115	7	7	53.5	5	12	5	8.5	0		
32 FT	23	24	8	8	6	6	6	6	39.1	47.0	47.0	47.0	7	15	58.5	7	15	40.5		6	6	6	6	34.3	92	104	116	7	7	53.5	5	12	5	8	0		
34 FT	23	26	9	8	7	7.5	6	7	40.3	47.0	47.0	47.0	7	15	58.0	7	15	41.0		6	6.5	6	6.5	34.8	94	106	118	7	6.5	53.5	5	12	5	8.5	0		
36 FT	24	27	9	8	7	7.5	6	7	40.3	48.0	48.0	48.0	7	14	57.5	7	14	40.5		6	6.5	6	6.5	34.9	95	107	119	7	6	53.5	5	12	5	8	0		
38 FT	25	27	9	8	7	7.5	6	6.5	40.1	49.0	49.0	49.0	7	14	57.0	7	14	39.5		6	6	6	6.5	35.0	95	107	119	7	6	53.5	5	12	5	7.5	0		
40 FT	26	28	10	8	7	7.5	6	7	40.9	50.0	50.0	50.0	7	13	56.0	7	13	38.5		6	6	6	7	35.5	96	108	120	7	6	53.5	5	12	5	8	0		
42 FT	27	29	10	8	7	7	6	7	41.0	51.0	51.0	51.0	7	13	55.0	7	13	37.5		6	6	6	6.5	35.8	97	109	121	8	7.5	59.5	5	12	5	8	0		
44 FT	27	30	11	8	7	6.5	5	6	37.9	47.0	47.0	47.0	7	13	54.5	7	13	38.0		6	6	6	7	36.1	98	110	122	8	7.5	59.5	5	12	5	7.5	0		
46 FT	28	31	11	8	7	6.5	6	7.5	41.9	52.0	52.0	52.0	7	12	54.0	7	12	37.5		6	6	6	7	36.4	99	111	123	8	7	59.5	5	12	5	7.5	0		
48 FT	29	32	11	8	7	6.5	6	7	41.9	53.0	53.0	53.0	7	12	53.5	7	12	37.0		6	6	6	6.5	36.5	100	112	124	8	7	59.0	5	12	5	7.5	0		
50 FT	29	33	11	8	7	6.5	6	7	42.0	53.0	53.0	53.0	7	12	53.5	7	12	37.0		6	6	6	6.5	36.6	101	113	125	8	7	59.0	5	12	5	7	0		

SPAN (S) = 11 FT HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS													WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS			
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=9'	K2 HT=10'	K2 HT=11'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=9'	K3 HT=10'	K3 HT=11'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1	
1 FT	14	10	8	9	5	6	5	8	54.6	34.0	34.0	34.0	5	13	109.0	5	13	30.5	5	7.5	6	6	76.4	114	126	138	6	6.5	54.0	5	12	5	10	12	
2 FT	14	11	8	9	5	6	5	8	54.6	34.0	34.0	34.0	5	12	109.0	5	12	29.5	5	7.5	6	6.5	71.8	115	127	139	6	7	53.5	5	12	5	10	12	
4 FT	10	10	9	9	5	7	5	6	82.4	30.0	30.0	30.0	6	16	84.0	6	16	35.0	5	7	6	6.5	62.1	114	126	138	7	7	55.5	5	10.5	5	10	12	
6 FT	10	11	9	9	5	7.5	5	6	56.3	30.0	30.0	30.0	6	15	58.5	6	15	33.5	5	6.5	6	6.5	58.1	115	127	139	6	6	52.0	5	12	5	9.5	12	
8 FT	11	12	10	9	5	7.5	5	6	52.4	31.0	31.0	31.0	6	15	54.5	6	15	33.0	5	6	5	6	52.1	116	128	140	6	6	51.5	5	12	5	10.5	0	
10 FT	11	13	10	9	5	7.5	5	6	49.6	31.0	31.0	31.0	6	14	52.5	6	14	32.5	5	6	5	6	50.5	117	129	141	6	6	51.5	5	12	5	9.5	0	
12 FT	12	14	10	9	5	6.5	5	6	48.1	32.0	32.0	32.0	6	13	52.0	6	13	32.5	6	8	5	6	49.0	118	130	142	6	6	51.0	5	12	5	9	0	
14 FT	14	15	10	9	5	6	5	6	47.1	34.0	34.0	34.0	6	14	51.5	6	14	32.5	6	8	5	6	47.9	119	131	143	6	6	51.0	5	12	5	8	0	
16 FT	15	16	10	9	6	8	6	8	55.0	35.0	35.0	35.0	6	13	57.0	6	13	38.5	6	7.5	5	6	46.9	120	132	144	6	6	51.0	5	12	5	8	0	
18 FT	16	17	10	9	6	8	6	7.5	53.9	36.0	36.0	40.0	6	13	56.5	6	13	38.0	6	7	6	7	49.0	121	133	145	6	6	51.0	5	12	5	8	0	
20 FT	17	18	11	9	6	7.5	6	8	54.0	37.0	37.0	37.0	6	13	56.0	6	13	38.0	6	6.5	5	6	45.9	122	134	146	6	6	51.0	5	12	5	7.5	0	
22 FT	18	20	12	9	6	7	6	8	54.4	38.0	38.0	38.0	6	13	55.5	6	13	38.0	6	7.5	5	6.5	46.0	124	136	148	6	6	51.0	5	12	5	7	0	
24 FT	18	20	12	9	6	7	6	8	52.1	38.0	38.0	38.0	6	12	54.5	6	12	37.5	6	6.5	5	6.5	43.5	124	136	148	6	6	51.0	5	12	5	7.5	0	
26 FT	19	22	12	9	6	6.5	6	7.5	52.1	39.0	39.0	39.0	6	12	54.5	6	12	37.5	6	7	5	6.5	43.6	126	138	150	7	7.5	54.0	5	12	5	7	0	
28 FT	20	23	12	9	6	6.5	6	7	52.1	40.0	40.0	40.0	6	12	54.0	6	12	37.5	6	7	5	6	43.8	127	139	151	7	7	54.0	5	12	5	7	0	
30 FT	21	24	13	9	6	6	6	7.5	52.8	41.0	41.0	41.0	6	12	53.0	6	12	37.0	6	6.5	5	6	44.1	128	140	152	7	7	54.0	5	12	5	6.5	0	
32 FT	22	25	13	9	6	6	6	7	52.8	42.0	42.0	42.0	7	15	56.5	7	15	41.0	6	6.5	5	6	44.3	129	141	153	7	6.5	54.0	5	12	5	6.5	0	
34 FT	23	26	13	9	6	6	6	6.5	52.8	43.0	43.0	43.0	7	15	57.0	7	15	40.0	6	6.5	5	6	44.4	130	142	154	7	6.5	54.0	5	12	5	6.5	0	
36 FT	24	27	14	9	7	8	6	7	53.4	44.0	44.0	44.0	7	14	56.0	7	14	39.5	6	6.5	5	6	44.8	131	143	155	7	6	54.0	5	12	5	6	0	
38 FT	25	28	14	9	7	7.5	6	7	53.4	45.0	45.0	45.0	7	14	55.0	7	14	38.5	6	6.5	5	6	44.9	132	144	156	7	6	54.0	5	12	5	6	0	
40 FT	25	29	14	9	7	7	6	6	53.4	45.0	49.0	49.0	7	14	55.0	7	14	39.0	6	6	6	8.5	47.9	133	145	157	8	7.5	60.0	5	12	5	6	0	
42 FT	26	30	15	9	7	7	6	6.5	54.1	50.0	50.0	50.0	7	13	54.0	7	13	38.0	6	6	6	8	48.4	134	146	158	8	7.5	60.0	5	12	6	8	0	
44 FT	27	31	15	9	7	7	6	6.5	54.1	51.0	51.0	51.0	7	13	54.0	7	13	37.0	6	6	6	7.5	48.6	135	147	159	8	7	60.0	5	12	6	8	0	
46 FT	27	32	16	9	7	6.5	6	6.5	55.0	51.0	51.0	51.0	7	13	53.5	7	13	37.5	6	6	6	7.5	48.9	136	148	160	8	7	60.0	5	12	6	8	0	
48 FT	28	32	16	9	7	6.5	6	6	54.9	52.0	52.0	52.0	7	13	53.0	7	13	37.0	7	8	6	7.5	49.0	136	148	160	8	7	60.0	5	12	6	8	0	
50 FT	29	33	17	9	7	6.5	6	6.5	55.6	53.0	53.0	53.0	7	13	52.5	7	13	37.0	7	7.5	6	7	49.5	137	149	161	8	7	60.0	5	12	6	7.5	0	



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NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

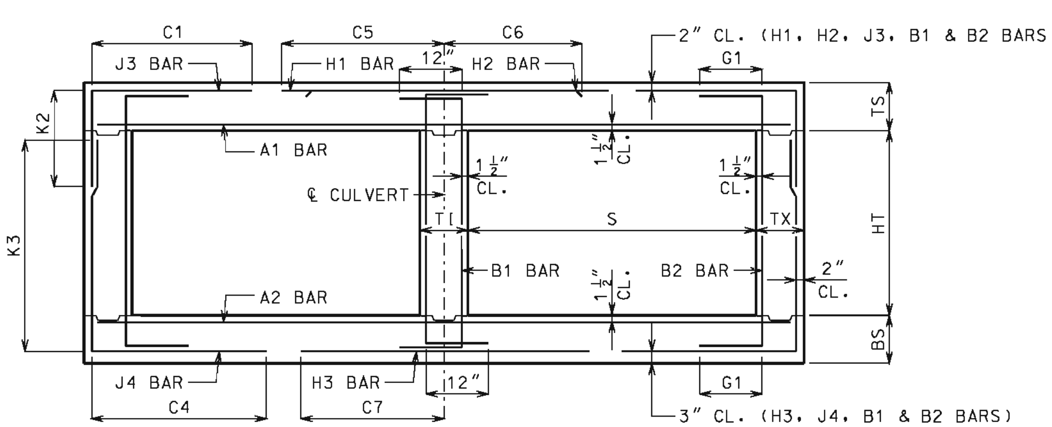
SPAN (S): 11 FEET HEIGHT (HT): 6 THRU 11 FEET

DATE EFFECTIVE:	10/01/2011	703.47	SHEET NO. 16 OF 27
DATE PREPARED:	9/8/2011		

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

SPAN (S) = 11 FT   HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=12′	HT=13′	HT=14′	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=12′	HT=13′	HT=14′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	12	9	11	5	6	5	6	55.6	34.0	34.0	34.0	5	13	110.0	5	13	30.5	5	8	6	6	94.6	152	164	176	5	6	51.5	5	12	5	8.5	12
2 FT	14	12	9	11	5	6	6	7.5	55.6	34.0	34.0	38.0	5	12	110.0	5	12	30.0	5	7.5	6	6	89.4	152	164	176	5	6	51.0	5	12	5	8.5	12
4 FT	10	12	10	11	5	7	6	7	58.3	30.0	30.0	34.0	6	16	112.5	6	16	35.5	5	7	6	6.5	83.4	152	164	176	6	7	53.5	5	11.5	5	8	12
6 FT	10	12	10	11	5	7.5	6	6.5	78.8	30.0	34.0	34.0	6	15	57.5	6	15	34.0	5	6.5	6	6	77.1	152	164	176	6	6.5	52.5	5	12	5	7.5	12
8 FT	10	13	10	11	5	7.5	6	6	70.1	34.0	34.0	34.0	6	14	54.0	6	14	33.5	5	6	6	6	74.1	153	165	177	6	6.5	52.0	5	12	5	7	0
10 FT	11	13	11	11	5	7.5	6	7	67.0	31.0	31.0	35.0	6	14	52.5	6	14	33.0	5	6	6	6	69.9	153	165	177	6	6	51.5	5	12	5	7.5	0
12 FT	12	14	12	11	5	7	6	8	64.6	32.0	32.0	36.0	6	14	51.5	6	14	33.0	6	8	6	7	67.6	154	166	178	6	6	51.5	5	12	5	7	0
14 FT	13	15	12	11	5	6.5	6	7	63.4	33.0	37.0	37.0	6	13	51.0	6	13	33.0	6	7.5	6	6.5	66.4	155	167	179	6	6	51.0	5	12	5	7	0
16 FT	14	16	13	11	5	6	6	7	62.3	34.0	38.0	38.0	6	13	51.0	6	13	33.0	6	7	6	7	64.8	156	168	180	6	6	51.0	5	12	5	6.5	0
18 FT	15	17	13	11	6	8	6	6.5	67.6	35.0	39.0	39.0	6	12	56.5	6	12	38.5	6	6.5	6	6	63.8	157	169	181	6	6	51.0	5	12	5	6.5	0
20 FT	16	19	14	11	6	8	6	6.5	67.4	36.0	40.0	40.0	6	12	56.0	6	12	38.5	6	7.5	6	6.5	63.8	159	171	183	6	6	51.5	5	12	5	6	0
22 FT	17	20	14	11	6	7.5	6	6	67.3	37.0	41.0	41.0	6	12	55.5	6	12	38.5	6	7	6	6	63.5	160	172	184	6	6	51.0	5	12	5	6	0
24 FT	18	21	15	11	6	7	6	6.5	67.4	42.0	42.0	42.0	6	12	55.0	6	12	38.5	6	7	6	6.5	63.4	161	173	185	7	7.5	54.5	5	12	6	8	0
26 FT	19	22	15	11	6	6.5	6	6.5	65.3	43.0	43.0	43.0	6	13	54.5	6	13	38.0	6	7	6	7	61.1	162	174	186	7	7.5	54.0	5	12	6	8	0
28 FT	20	23	15	11	6	6.5	6	6	65.3	44.0	44.0	44.0	6	12	54.0	6	12	38.0	6	7	6	6.5	61.3	163	175	187	7	7	54.0	5	12	6	8	0
30 FT	21	24	16	11	6	6.5	6	6	65.8	45.0	45.0	45.0	6	12	53.0	6	12	37.0	6	6.5	6	7	61.4	164	176	188	7	7	54.0	5	12	6	8	0
32 FT	22	25	16	11	6	6	7	7.5	70.8	46.0	46.0	46.0	7	15	57.5	7	15	41.0	6	6.5	6	6.5	61.6	165	177	189	7	6.5	54.0	5	12	6	8	0
34 FT	23	26	17	11	6	6	6	6	66.4	47.0	47.0	47.0	7	15	56.5	7	15	40.0	6	6.5	6	7	61.9	166	178	190	7	6.5	54.5	5	12	6	7.5	0
36 FT	23	27	17	11	7	7.5	7	7	71.3	47.0	47.0	47.0	7	15	56.5	7	15	41.0	6	6.5	6	6.5	62.0	167	179	191	7	6	54.5	5	12	6	7.5	0
38 FT	24	28	18	11	7	7.5	7	7.5	71.8	48.0	48.0	48.0	7	14	55.5	7	14	40.0	6	6	6	6.5	62.4	168	180	192	7	6	54.5	5	12	6	7	0
40 FT	25	29	19	11	7	7.5	7	7.5	72.4	49.0	49.0	49.0	7	14	55.0	7	14	39.0	6	6	6	6.5	62.6	169	181	193	8	7.5	60.5	5	12	6	6.5	0
42 FT	26	30	19	11	7	7.5	7	7	72.5	50.0	50.0	50.0	7	13	54.5	7	13	38.0	6	6	6	6.5	62.9	170	182	194	8	7.5	60.5	5	12	6	6.5	0
44 FT	27	31	20	11	7	7	7	7.5	73.0	51.0	51.0	51.0	7	14	54.0	7	14	38.0	6	6	6	6	63.3	171	183	195	8	7	60.5	5	12	6	6.5	0
46 FT	28	32	20	11	7	7	7	6.5	73.1	52.0	52.0	52.0	7	14	53.5	7	14	38.0	6	6	6	6	63.5	172	184	196	8	7	60.5	5	12	6	6.5	0
48 FT	28	32	21	11	7	6.5	7	6.5	73.6	52.0	52.0	52.0	7	14	53.5	7	14	37.5	7	7	6	6	63.5	172	184	196	8	7	60.5	5	12	6	6	0
50 FT	28	33	22	11	7	6.5	7	6.5	74.1	52.0	52.0	52.0	7	13	53.5	7	13	37.5	7	7.5	6	6	63.9	173	185	197	8	7	60.5	5	12	6	6	0



BAR DIMENSIONS DIAGRAM

SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT

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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 11 FEET HEIGHT (HT): 12 THRU 14 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

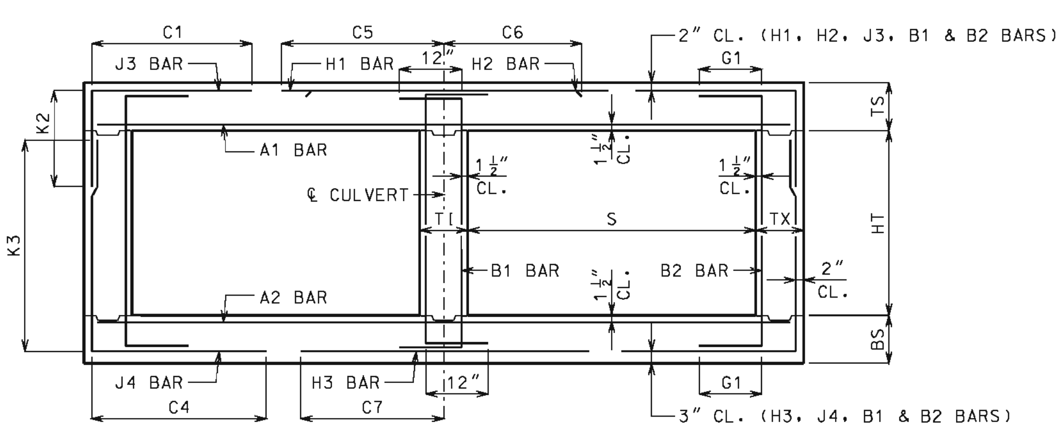
703.47

SPAN (S) = 12 FT HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=6'	K2 HT=7'	K2 HT=8'	H1 BARS SIZE	H1 SPA.	C5	H2 BARS SIZE	H2 SPA.	C6	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=6'	K3 HT=7'	K3 HT=8'	H3 BARS SIZE	H3 SPA.	C7	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	10	8	8	5	6	4	6	56.1	30.0	30.0	30.0	5	12	115.0	5	12	31.5	5	7.5	5	6.5	52.4	78	90	102	6	6.5	56.5	5	12	5	12	12
2 FT	15	11	8	8	6	8	4	6.5	59.1	31.0	31.0	31.0	6	16	118.0	6	16	39.0	5	7.5	5	7.5	47.9	79	91	103	6	6.5	56.0	5	12	5	12	12
4 FT	11	10	8	8	5	6.5	5	7	43.6	31.0	31.0	31.0	6	15	77.5	6	15	36.5	5	6.5	5	6	42.6	78	90	102	7	6.5	58.5	5	12	5	12	12
6 FT	11	11	8	8	5	7	5	6.5	40.9	27.0	31.0	31.0	6	14	63.0	6	14	35.0	5	6.5	5	7	39.3	79	91	103	7	6.5	57.5	5	12	5	12	12
8 FT	11	13	8	8	5	7	5	6	39.1	27.0	27.0	31.0	6	12	58.0	6	12	34.0	5	6	5	8.5	36.3	81	93	105	6	6	54.5	5	12	5	12	0
10 FT	12	14	8	8	5	6.5	5	6.5	37.0	28.0	28.0	32.0	6	12	56.5	6	12	33.5	6	8	5	8.5	34.5	82	94	106	6	6	54.5	5	12	5	12	0
12 FT	14	15	8	8	5	6	5	8	34.6	30.0	34.0	34.0	6	13	55.5	6	13	33.5	6	7.5	5	8.5	33.8	83	95	107	7	7	57.0	5	12	5	12	0
14 FT	15	16	8	8	6	8	5	7.5	38.4	31.0	35.0	35.0	6	12	61.0	6	12	39.5	6	7.5	5	8	32.9	84	96	108	7	7	57.0	5	12	5	12	0
16 FT	16	17	8	8	6	8	5	7	37.5	32.0	36.0	36.0	7	16	65.5	7	16	44.5	6	7	5	7	32.3	85	97	109	7	6.5	57.0	5	12	5	12	0
18 FT	17	19	8	8	6	7.5	5	6.5	37.0	37.0	37.0	37.0	7	15	65.0	7	15	44.0	6	7	5	6.5	31.6	87	99	111	7	7	57.0	5	12	5	10.5	0
20 FT	18	20	8	8	6	7	5	6.5	36.4	38.0	38.0	38.0	7	15	64.5	7	15	44.0	6	6.5	5	6	31.3	88	100	112	7	7	57.0	5	12	5	9.5	0
22 FT	19	21	8	8	6	6	5	6	36.0	39.0	39.0	39.0	7	14	64.0	7	14	44.0	6	6.5	6	7.5	34.1	89	101	113	7	7	57.0	5	12	5	9.5	0
24 FT	21	22	8	8	6	6	6	7	39.6	45.0	45.0	45.0	7	15	63.5	7	15	44.0	6	6.5	6	7	34.4	90	102	114	7	7	56.5	5	12	5	9.5	0
26 FT	21	23	8	8	6	6	6	7	38.3	45.0	45.0	45.0	7	14	63.0	7	14	43.5	6	6.5	6	6.5	32.8	91	103	115	7	7	56.5	5	12	5	9.5	0
28 FT	23	24	8	8	6	6	6	6	38.3	47.0	47.0	47.0	7	15	62.0	7	15	43.0	6	6	6	6	33.0	92	104	116	7	7	56.5	5	12	5	9	0
30 FT	23	25	8	8	7	7	6	6	38.3	47.0	47.0	47.0	7	14	62.0	7	14	43.5	6	6	6	6	33.0	93	105	117	7	6.5	56.5	5	12	5	8.5	0
32 FT	25	27	9	8	7	7.5	6	6.5	39.1	49.0	49.0	49.0	7	14	61.0	7	14	41.5	6	6	6	6.5	33.8	95	107	119	7	6	56.5	5	12	5	8.5	0
34 FT	25	28	9	8	7	6.5	6	6.5	39.3	49.0	49.0	49.0	7	13	61.0	7	13	42.5	6	6	6	6	33.8	96	108	120	7	6	56.5	5	12	5	8.5	0
36 FT	26	29	9	8	7	6.5	6	6.5	39.3	50.0	50.0	50.0	7	13	60.0	7	13	41.5	6	6	6	6	33.9	97	109	121	8	7.5	62.5	5	12	5	8	0
38 FT	27	30	10	8	7	6.5	6	7	40.1	51.0	51.0	51.0	7	13	59.0	7	13	41.0	6	6	6	6.5	34.5	98	110	122	8	7.5	62.5	5	12	5	8	0
40 FT	28	31	10	8	7	6.5	6	6.5	40.1	52.0	52.0	52.0	7	12	58.5	7	12	40.0	7	8	6	6	34.6	99	111	123	8	7	62.5	5	12	5	8	0
42 FT	29	32	10	8	7	6.5	6	6.5	40.1	53.0	53.0	53.0	7	12	57.5	7	12	39.0	7	8	6	6	34.9	100	112	124	8	7	62.5	5	12	5	7.5	0
44 FT	30	33	10	8	7	6.5	6	6	40.3	54.0	54.0	54.0	7	12	56.5	7	12	38.5	7	7.5	7	6.5	38.1	101	113	125	8	6.5	62.0	5	12	5	7	0
46 FT	31	34	10	8	7	6	6	6	40.3	55.0	55.0	55.0	8	15	64.0	8	15	45.5	7	7.5	7	6.5	38.3	102	114	126	8	6.5	62.0	5	12	5	6.5	0
48 FT	31	34	11	8	7	6	6	6.5	41.0	55.0	55.0	55.0	8	15	64.0	8	15	46.0	7	6.5	6	6	35.6	102	114	126	8	6.5	62.5	5	12	5	7.5	0
50 FT	32	35	11	8	8	7.5	6	6.5	41.0	56.0	56.0	56.0	8	15	63.5	8	15	45.5	7	7	6	6	35.8	103	115	127	8	6.5	62.0	5	12	5	7	0

SPAN (S) = 12 FT HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=9'	K2 HT=10'	K2 HT=11'	H1 BARS SIZE	H1 SPA.	C5	H2 BARS SIZE	H2 SPA.	C6	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=9'	K3 HT=10'	K3 HT=11'	H3 BARS SIZE	H3 SPA.	C7	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	11	8	9	5	6	5	8	58.3	34.0	34.0	34.0	5	12	117.5	5	12	32.0	5	7.5	6	6.5	77.5	115	127	139	6	7	57.0	5	12	5	10	12
2 FT	15	12	8	9	6	8	5	8	62.3	35.0	35.0	35.0	6	16	121.5	6	16	39.5	5	7.5	6	7	71.9	116	128	140	6	7	56.5	5	12	5	10	12
4 FT	11	11	9	9	5	6.5	6	7	76.1	31.0	31.0	35.0	6	15	86.0	6	15	37.0	5	6.5	6	7	61.8	115	127	139	6	6	56.0	5	11.5	5	10.5	12
6 FT	11	12	9	9	5	7	6	7	59.0	31.0	31.0	35.0	6	14	63.0	6	14	35.5	5	6	6	7	57.6	116	128	140	6	6	55.0	5	12	5	10	12
8 FT	11	13	9	9	5	7	6	7	54.0	31.0	31.0	35.0	6	13	58.0	6	13	34.5	5	6	6	7	54.5	117	129	141	6	6	55.0	5	12	5	9.5	0
10 FT	12	14	10	9	5	7	5	6	49.0	32.0	32.0	32.0	6	12	56.0	6	12	34.0	6	8	5	6.5	49.3	118	130	142	7	7	57.5	5	12	5	10	0
12 FT	13	15	10	9	5	6.5	6	7.5	50.1	33.0	33.0	33.0	6	12	55.0	6	12	33.5	6	7.5	5	6.5	47.6	119	131	143	7	7	57.5	5	12	5	9	0
14 FT	15	16	10	9	6	8	5	6	50.6	35.0	35.0	35.0	6	12	60.5	6	12	39.5	6	7	5	6	46.4	120	132	144	7	7	57.0	5	12	5	8	0
16 FT	16	17	10	9	6	8	6	7.5	53.8	36.0	36.0	36.0	6	12	60.0	6	12	39.5	6	6.5	5	6	45.4	121	133	145	7	6.5	57.0	5	12	5	8	0
18 FT	17	19	10	9	6	7.5	6	7	53.1	37.0	37.0	41.0	7	16	64.5	7	16	44.5	6	7	6	7.5	47.8	123	135	147	7	7	57.0	5	12	5	8	0
20 FT	18	20	11	9	6	7	6	7.5	53.1	38.0	38.0	38.0	7	15	64.0	7	15	44.0	6	6.5	5	6	44.6	124	136	148	7	7	57.0	5	12	5	7.5	0
22 FT	19	21	12	9	6	6.5	6	7.5	53.5	39.0	39.0	39.0	7	15	63.5	7	15	44.0	6	6.5	5	6.5	44.8	125	137	149	7	7	57.0	5	12	5	7.5	0
24 FT	20	23	12	9	6	6.5	6	7	53.4	40.0	40.0	40.0	7	15	63.0	7	15	44.0	6	6.5	5	6.5	44.6	127	139	151	7	7	57.0	5	12	5	7	0
26 FT	21	23	12	9	6	6	6	7.5	51.4	41.0	41.0	41.0	7	15	62.0	7	15	43.5	6	6	5	6.5	42.8	127	139	151	7	7	57.0	5	12	5	7	0
28 FT	22	25	12	9	6	6	6	7	51.4	42.0	42.0	42.0	7	15	61.5	7	15	43.5	6	6.5	5	6.5	42.9	129	141	153	7	6.5	57.0	5	12	5	7	0
30 FT	23	26	12	9	7	7.5	6	6.5	51.3	43.0	43.0	43.0	7	15	61.0	7	15	43.5	6	6	5	6	43.0	130	142	154	7	6.5	57.0	5	12	5	7	0
32 FT	24	27	13	9	7	7.5	6	7	52.0	44.0	44.0	44.0	7	14	60.5	7	14	42.5	6	6	5	6	43.4	131	143	155	7	6	57.0	5	12	5	6.5	0
34 FT	25	28	13	9	7	7	6	7	52.0	45.0	45.0	45.0	7	14	59.5	7	14	41.5	6	6	5	6	43.5	132	144	156	7	6	57.0	5	12	5	6.5	0
36 FT	26	29	13	9	7	7	6	6	51.9	46.0	50.0	50.0	7	13	58.5	7	13	41.0	6	6	6	8.5	46.6	133	145	157	8	7.5	63.0	5	12	5	6.5	0
38 FT	27	30	14	9	7	7	6	6.5	52.6	47.0	51.0	51.0	7	13	57.5	7	13	40.0	7	8	6	8	47.1	134	146	158	8	7.5	63.0	5	12	5	6	0
40 FT	28	31	14	9	7	6.5	6	6.5	52.6	52.0	52.0	52.0	7	12	56.5	7	12	39.0	7	7.5	6	7.5	47.3	135	147	159	8	7	63.0	5	12	5	6	0
42 FT	28	32	15	9	7	6	6	6.5	53.5	52.0	52.0	52.0	7	12	56.5	7	12	39.5	7	7.5	6	7.5	47.5	136	148	160	8	7	63.0	5	12	6	8	0
44 FT	29	33	15	9	7	6	6	6.5	53.4	53.0	53.0	53.0	7	12	56.0	7	12	38.5	7	7.5	6	7	47.8	137	149	161	8	6.5	63.0	5	12	6	8	0
46 FT	30	34	15	9	7	6	6	6	53.4	54.0	54.0	54.0	7	12	55.5	7	12	38.0	7	7.5	6	7	47.9	138	150	162	8	6.5	63.0	5	12	6	8	0
48 FT	31	35	16	9	7	6	6	6.5	54.1	55.0	55.0	55.0	7	12	55.0	7	12	37.5	7	7	6	6.5	48.4	139	151	163	8	6.5	63.0	5	12	6	8	0
50 FT	31	36	16	9	8	7.5	6	6	54.3	55.0	55.0	55.0	7	12	55.0	7	12	37.5	7	7	6	6.5	48.4	140	152	164	8	6.5	63.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 12 FEET
HEIGHT (HT): 6 THRU 11 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

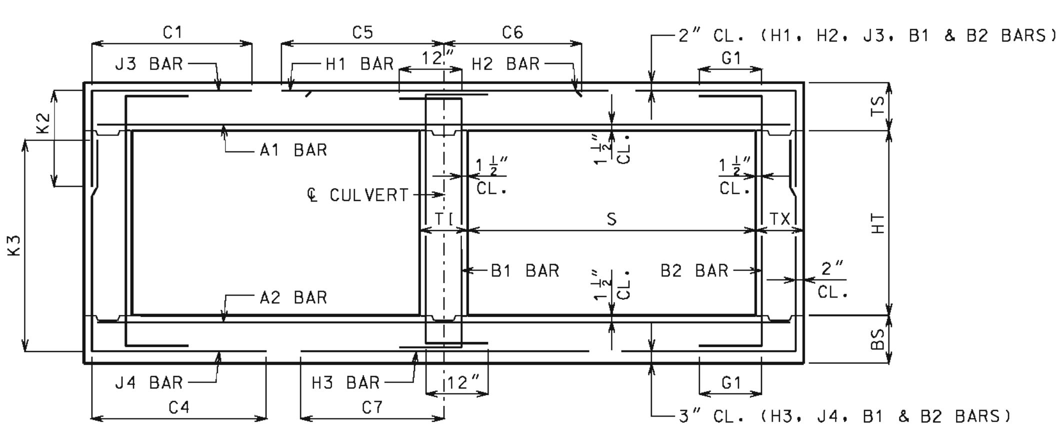
SHEET NO.
18 OF 27

SPAN (S) = 12 FT HEIGHT (HT) = 12 FT OR 13 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=12'	J3 K2 HT=13'	H1 BARS SIZE	H1 SPA.	H1 C5	H2 BARS SIZE	H2 SPA.	H2 C6	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=12'	J4 K3 HT=13'	H3 BARS SIZE	H3 SPA.	H3 C7	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	11	9	10	5	6	5	6.5	59.0	34.0	34.0	5	12	118.0	5	12	32.5	5	7	6	6	88.9	151	163	6	6.5	57.5	5	12	5	8.5	12
2 FT	15	12	9	10	6	8	5	7	63.0	35.0	35.0	6	16	122.0	6	16	39.5	5	7	6	6	83.6	152	164	6	7	57.0	5	12	5	8.5	12
4 FT	11	12	9	10	5	6.5	6	7	61.0	35.0	35.0	6	15	120.0	6	15	37.0	5	6.5	6	6	76.5	152	164	6	6.5	56.5	5	12	5	8.5	12
6 FT	11	12	9	10	5	7	6	6.5	73.5	35.0	35.0	6	14	63.5	6	14	35.5	5	6	6	6	70.0	152	164	6	6	55.5	5	12	5	8.5	12
8 FT	11	13	10	10	5	7	6	7	63.9	31.0	35.0	6	13	58.0	6	13	34.5	5	6	6	6.5	65.8	153	165	6	6	55.0	5	12	5	8	0
10 FT	12	14	10	10	5	7	6	7	61.6	36.0	36.0	6	12	56.5	6	12	34.5	6	8	6	6	63.1	154	166	7	7	57.5	5	12	5	8	0
12 FT	13	15	11	10	5	6.5	6	7.5	59.9	33.0	37.0	6	12	55.0	6	12	34.0	6	7.5	6	6.5	61.4	155	167	7	7	57.5	5	12	5	7.5	0
14 FT	14	16	12	10	5	6	6	7.5	58.8	34.0	38.0	6	12	54.5	6	12	34.0	6	7	6	7.5	60.0	156	168	7	7	57.5	5	12	5	7	0
16 FT	16	18	12	10	6	8	6	7	64.1	36.0	40.0	6	12	60.0	6	12	40.0	6	7	6	7.5	59.5	158	170	6	6	54.0	5	12	5	7	0
18 FT	17	19	12	10	6	7.5	6	6.5	63.1	37.0	41.0	6	12	59.5	6	12	39.5	6	7	6	6.5	58.5	159	171	7	7	57.0	5	12	5	7	0
20 FT	18	20	13	10	6	7	6	6.5	62.6	38.0	42.0	6	12	58.5	6	12	39.5	6	6.5	6	7.5	57.9	160	172	7	7	57.0	5	12	5	6.5	0
22 FT	19	21	13	10	6	6.5	6	6.5	62.3	39.0	43.0	7	16	63.0	7	16	44.5	6	6	6	6.5	57.5	161	173	7	7	57.0	5	12	5	6.5	0
24 FT	20	23	14	10	6	6.5	6	6.5	62.5	40.0	44.0	7	16	62.5	7	16	44.0	6	6.5	6	7.5	57.8	163	175	7	7	57.0	5	12	5	6	0
26 FT	21	24	14	10	6	6	6	6	62.3	41.0	45.0	7	15	62.0	7	15	44.0	6	6.5	6	7	57.6	164	176	7	7	57.0	5	12	5	6	0
28 FT	22	25	14	10	6	6	6	6	59.8	42.0	46.0	7	15	61.0	7	15	43.5	6	6.5	6	7.5	55.1	165	177	7	6.5	57.0	5	12	5	6	0
30 FT	23	26	15	10	7	8	6	6	60.3	47.0	47.0	7	15	60.0	7	15	42.5	6	6	6	7.5	55.4	166	178	7	6.5	57.0	5	12	6	8	0
32 FT	24	27	15	10	7	7.5	6	6	60.3	48.0	48.0	7	14	59.5	7	14	42.0	6	6	6	7.5	55.5	167	179	7	6	57.0	5	12	6	8	0
34 FT	25	28	16	10	7	7.5	6	6	60.9	49.0	49.0	7	14	58.5	7	14	41.0	6	6	6	7.5	55.8	168	180	7	6	57.0	5	12	6	8	0
36 FT	25	29	16	10	7	6.5	7	7.5	65.8	49.0	49.0	7	13	58.5	7	13	41.5	6	6	6	7.5	55.8	169	181	8	7.5	63.0	5	12	6	8	0
38 FT	26	30	17	10	7	7	6	6	61.5	50.0	50.0	7	13	57.5	7	13	40.5	7	7.5	6	7	56.1	170	182	8	7.5	63.0	5	12	6	7.5	0
40 FT	27	31	17	10	7	6.5	7	7.5	66.5	51.0	51.0	7	13	57.0	7	13	40.0	7	7.5	6	7	56.3	171	183	8	7	63.0	5	12	6	7.5	0
42 FT	28	32	18	10	7	6.5	7	7.5	67.1	52.0	52.0	7	12	56.5	7	12	39.0	7	7.5	6	6.5	56.6	172	184	8	7	63.0	5	12	6	7	0
44 FT	29	33	18	10	7	6.5	7	7	67.1	53.0	53.0	7	12	56.0	7	12	38.0	7	7.5	6	6.5	56.9	173	185	8	6.5	63.0	5	12	6	7	0
46 FT	29	34	19	10	7	6	7	7.5	67.9	53.0	53.0	7	12	56.0	7	12	38.5	7	7.5	6	6.5	57.0	174	186	8	6.5	63.0	5	12	6	6.5	0
48 FT	30	35	19	10	7	6	7	6.5	67.9	54.0	54.0	7	12	55.0	7	12	38.0	7	7	6	6.5	57.3	175	187	8	6.5	63.0	5	12	6	6.5	0
50 FT	31	36	20	10	7	6	7	7	68.6	55.0	55.0	7	13	54.5	7	13	37.5	7	7	6	6.5	57.6	176	188	8	6	63.0	5	12	6	6.5	0

SPAN (S) = 12 FT HEIGHT (HT) = 14 FT OR 15 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=14'	J3 K2 HT=15'	H1 BARS SIZE	H1 SPA.	H1 C5	H2 BARS SIZE	H2 SPA.	H2 C6	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=14'	J4 K3 HT=15'	H3 BARS SIZE	H3 SPA.	H3 C7	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	12	10	12	5	6	5	6	60.0	34.0	34.0	5	12	119.0	5	12	32.5	5	7	6	6	98.8	176	188	6	7	58.0	5	12	5	8	12
2 FT	15	12	10	12	6	8	6	8	67.0	35.0	39.0	6	16	126.0	6	16	40.0	5	6.5	6	6	92.5	176	188	6	6.5	57.0	5	12	5	8	12
4 FT	11	13	10	12	5	6.5	6	6.5	62.0	35.0	35.0	6	16	121.0	6	16	37.5	5	6.5	6	6	89.8	177	189	6	7	57.0	5	12	5	7	12
6 FT	11	13	11	12	5	7	6	7	83.8	31.0	35.0	6	15	61.0	6	15	36.0	5	6	6	6.5	81.4	177	189	6	6.5	56.0	5	12	5	7	12
8 FT	11	13	12	12	5	7	6	7.5	73.9	35.0	35.0	6	13	57.5	6	13	35.0	5	6	6	6.5	76.1	177	189	7	7	58.0	5	12	5	7	0
10 FT	12	14	12	12	5	7	6	7	71.4	36.0	36.0	6	13	56.0	6	13	35.0	6	8	6	6.5	74.1	178	190	7	7	58.0	5	12	5	7	0
12 FT	13	15	13	12	5	6.5	6	7.5	68.8	37.0	37.0	6	13	55.0	6	13	34.5	6	7.5	6	6.5	71.6	179	191	7	7	57.5	5	12	5	6.5	0
14 FT	14	16	13	12	5	6	6	6.5	67.3	38.0	38.0	6	12	54.5	6	12	34.5	6	6.5	6	6	70.1	180	192	7	7	57.5	5	12	5	6.5	0
16 FT	15	18	14	12	6	8	6	6.5	72.1	39.0	39.0	6	12	60.0	6	12	40.5	6	7	6	6.5	69.5	182	194	6	6	54.5	5	12	5	6	0
18 FT	17	19	14	12	6	7.5	6	6	72.1	41.0	41.0	6	12	59.5	6	12	40.5	6	6.5	6	6	68.1	183	195	6	6	54.5	5	12	5	6	0
20 FT	18	20	15	12	6	7	6	6	71.5	42.0	42.0	6	12	59.0	6	12	40.0	6	6.5	6	6	67.1	184	196	7	7	57.5	5	12	6	8	0
22 FT	19	22	16	12	6	6.5	6	6	71.4	43.0	43.0	6	12	58.5	6	12	40.0	6	6.5	6	6	67.4	186	198	7	7	57.5	5	12	6	8	0
24 FT	20	23	16	12	6	6.5	6	6	71.3	44.0	44.0	6	12	58.0	6	12	40.0	6	6.5	6	6	67.1	187	199	7	7	57.5	5	12	6	8	0
26 FT	21	24	17	12	6	6	6	6	71.4	45.0	45.0	6	12	57.0	6	12	39.5	6	6	6	6	67.1	188	200	7	7	57.5	5	12	6	7.5	0
28 FT	22	25	17	12	6	6	6	6	69.1	46.0	46.0	7	15	61.5	7	15	44.0	6	6	6	6.5	64.9	189	201	7	6.5	57.5	5	12	6	7.5	0
30 FT	23	26	17	12	6	6	7	7.5	74.1	47.0	47.0	7	15	61.0	7	15	43.0	6	6	6	6.5	64.9	190	202	7	6.5	57.5	5	12	6	7.5	0
32 FT	23	27	17	12	7	7	7	6.5	74.0	47.0	47.0	7	14	61.0	7	14	44.0	6	6	6	6	65.0	191	203	7	6	57.5	5	12	6	7.5	0
34 FT	24	28	18	12	7	7	7	7	74.5	48.0	48.0	7	14	60.0	7	14	43.0	6	6	6	6	65.3	192	204	7	6	57.5	5	12	6	7	0
36 FT	25	29	19	12	7	7	7	7	75.0	49.0	49.0	7	14	59.0	7	14	42.0	7	7.5	6	6.5	65.5	193	205	8	7.5	63.5	5	12	6	6.5	0
38 FT	26	30	20	12	7	7	7	7.5	75.5	50.0	50.0	7	13	58.0	7	13	41.5	7	7.5	6	6	65.9	194	206	8	7.5	63.5	5	12	6	6.5	0
40 FT	27	31	20	12	7	7	7	6.5	75.6	51.0	51.0	7	13	57.5	7	13	40.5	7	7.5	6	6	66.0	195	207	8	7	63.5	5	12	6	6.5	0
42 FT	28	32	21	12	7	6.5	7	7	76.3	52.0	52.0	7	12	57.0	7	12	39.5	7	7	6	6	66.4	196	208	8	7	63.5	5	12	6	6	0
44 FT	28	33	22	12	7	6.5	7	7	76.6	52.0	58.0	7	12	57.0	7	12	40.0	7	7	7	7.5	69.6	197	209	8	6.5	63.5	5	12	6	6	0
46 FT	29	34	22	12	7	6.5	7	6	76.8	53.0	59.0	7	12	56.5	7	12	39.0	7	7	7	7.5	69.9	198	210	8	6.5	63.5	5	12	6	6	0
48 FT	30	35	24	12	7	6	7	7	78.0	54.0	60.0	7	12	56.0	7	12	39.0	7	7	7	7.5	70.4	199	211	8	6.5	64.0	5	12	6	6	0
50 FT	30	36	24	12	7	6	7	6	78.0	54.0	60.0	7	12	56.0	7	12	39.0	7	7	7	7.5	70.5	200	212	8	6	64.0	5	12	7	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

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SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 12 FEET
HEIGHT (HT): 12 THRU 15 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO. 19 OF 27

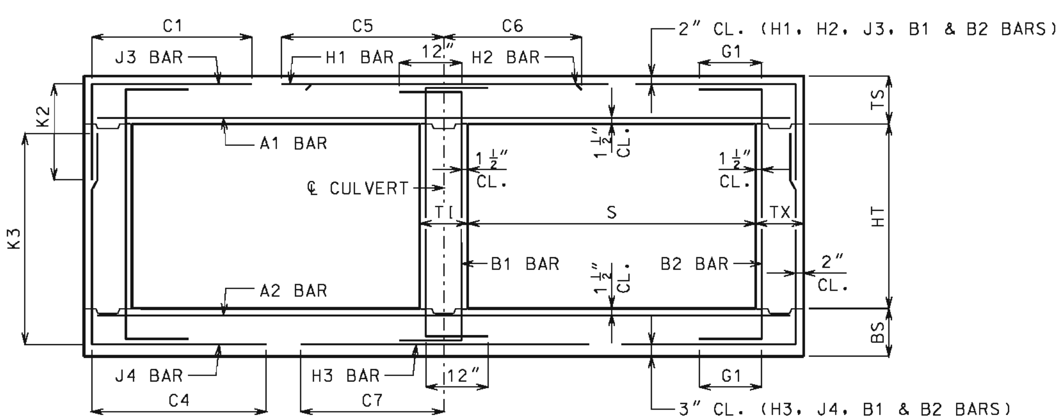
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 13 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8	8	5	6	5	8.5	61.8	30.0	34.0	34.0	5	12	125.5	5	12	36.5	5	7	6	7	61.0	90	102	114	6	6	60.0	5	12	5	12	12
2 FT	15	12	8	8	6	8	5	8	65.8	31.0	35.0	35.0	6	16	129.5	6	16	43.5	5	7	5	7	53.8	92	104	116	6	6.5	59.5	5	12	5	12	12
4 FT	11	11	8	8	6	8	6	7	52.1	31.0	31.0	31.0	6	13	82.0	6	13	38.0	5	6.5	5	6	46.5	91	103	115	7	6.5	62.0	5	11	5	12	12
6 FT	12	12	8	8	5	6.5	6	6.5	44.1	32.0	32.0	32.0	6	13	68.0	6	13	36.5	5	6	5	6.5	42.8	92	104	116	7	6.5	61.0	5	12	5	12	12
8 FT	12	13	8	8	5	6	5	6	41.5	32.0	32.0	32.0	7	16	65.0	7	16	38.5	5	6	5	6.5	40.0	93	105	117	7	6.5	60.5	5	12	5	12	0
10 FT	13	15	8	8	5	6	5	6	39.5	29.0	33.0	33.0	7	15	63.0	7	15	38.0	6	7.5	5	8	38.0	95	107	119	7	7	60.5	5	12	5	12	0
12 FT	15	16	8	8	6	8	5	6.5	42.4	35.0	35.0	35.0	7	16	70.0	7	16	46.0	6	7	5	7.5	37.1	96	108	120	7	6.5	60.0	5	12	5	11	0
14 FT	16	17	8	8	6	8	5	6	41.1	36.0	36.0	36.0	7	15	69.0	7	15	46.0	6	7	5	7	36.1	97	109	121	7	6.5	60.0	5	12	5	10	0
16 FT	17	18	8	8	6	7.5	5	6	40.1	37.0	37.0	37.0	7	14	68.5	7	14	45.5	6	6	5	6.5	35.4	98	110	122	7	6.5	60.0	5	12	5	9.5	0
18 FT	18	20	8	8	6	6.5	6	8	43.5	38.0	38.0	38.0	7	14	68.0	7	14	45.5	6	6.5	5	6	34.8	100	112	124	7	6.5	60.0	5	12	5	9.5	0
20 FT	20	21	8	8	6	6.5	6	7.5	42.6	44.0	44.0	44.0	7	14	67.0	7	14	45.5	6	6	6	7.5	37.5	101	113	125	7	6.5	60.0	5	12	5	9	0
22 FT	21	23	8	8	6	6	6	6.5	42.5	45.0	45.0	45.0	7	14	66.5	7	14	45.0	6	6	6	6.5	37.3	103	115	127	7	6.5	60.0	5	12	5	8	0
24 FT	22	24	9	8	6	6	6	7.5	43.1	42.0	42.0	46.0	7	13	66.0	7	13	45.0	6	6	6	7	37.6	104	116	128	7	6.5	60.0	5	12	5	8.5	0
26 FT	23	25	9	8	7	7.5	6	6.5	42.9	47.0	47.0	47.0	7	13	65.5	7	13	45.0	6	6	6	7	37.6	105	117	129	7	6.5	60.0	5	12	5	8.5	0
28 FT	24	26	9	8	7	7.5	6	7	41.3	48.0	48.0	48.0	7	13	64.5	7	13	44.5	7	8	6	6.5	36.1	106	118	130	7	6.5	59.5	5	12	5	8.5	0
30 FT	25	27	9	8	7	7	6	6	41.3	49.0	49.0	49.0	7	13	64.0	7	13	44.5	7	7.5	6	6.5	36.3	107	119	131	7	6	59.5	5	12	5	7.5	0
32 FT	26	29	10	8	7	7	6	7	42.3	50.0	50.0	50.0	7	13	63.5	7	13	44.0	7	8	6	6.5	36.9	109	121	133	8	7.5	65.5	5	12	5	8	0
34 FT	27	30	10	8	7	6.5	6	6.5	42.3	51.0	51.0	51.0	7	13	62.5	7	13	43.5	7	7.5	6	6.5	37.0	110	122	134	8	7.5	65.5	5	12	5	7.5	0
36 FT	28	31	11	8	7	6.5	6	7.5	43.1	52.0	52.0	52.0	7	12	62.0	7	12	42.5	7	7.5	6	7	37.5	111	123	135	8	7	65.5	5	12	5	7.5	0
38 FT	29	32	11	8	7	6	6	7	43.1	53.0	53.0	53.0	7	12	61.0	7	12	41.5	7	7.5	6	6.5	37.6	112	124	136	8	7	65.5	5	12	5	7.5	0
40 FT	30	33	11	8	7	6	6	7	43.1	54.0	54.0	54.0	7	12	60.0	7	12	41.0	7	7	6	6.5	37.9	113	125	137	8	6.5	65.5	5	12	5	7	0
42 FT	31	34	12	8	7	6	6	7.5	44.0	55.0	55.0	55.0	8	15	67.0	8	15	48.0	7	7	6	7	38.4	114	126	138	8	6.5	65.5	5	12	5	7	0
44 FT	32	35	12	8	8	7.5	6	7	44.0	56.0	56.0	56.0	8	14	66.5	8	14	47.0	7	7	6	6.5	38.5	115	127	139	8	6.5	65.5	5	12	5	7	0
46 FT	33	36	12	8	8	7	6	7	44.0	57.0	57.0	57.0	8	14	66.0	8	14	46.0	7	7	6	6.5	38.8	116	128	140	8	6	65.5	5	12	5	6.5	0
48 FT	33	37	12	8	8	6.5	6	7	44.0	57.0	57.0	57.0	8	13	66.0	8	13	46.5	7	6.5	6	6.5	38.8	117	129	141	8	6	65.5	5	12	5	6.5	0
50 FT	34	38	12	8	8	7	6	6	44.0	58.0	58.0	58.0	8	14	65.0	8	14	46.0	7	6.5	6	6	39.0	118	130	142	8	6	65.5	5	12	5	6	0

SPAN (S) = 13 FT HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	11	9	10	5	6	5	7.5	62.6	34.0	34.0	34.0	5	12	126.5	5	12	36.5	5	6.5	6	6.5	81.1	127	139	151	6	6.5	60.5	5	11.5	5	9.5	12
2 FT	15	12	9	10	6	8	5	7.5	66.6	35.0	35.0	35.0	6	16	130.5	6	16	43.5	5	6.5	6	6.5	75.6	128	140	152	6	6.5	60.0	5	12	5	9	12
4 FT	11	11	9	10	6	8	6	7	78.5	35.0	35.0	35.0	6	13	84.0	6	13	38.0	5	6.5	6	6	66.3	127	139	151	7	6.5	62.0	5	9	5	8.5	12
6 FT	12	12	9	10	5	6.5	6	6.5	63.6	32.0	36.0	36.0	6	13	67.0	6	13	37.0	5	6	6	6	61.5	128	140	152	7	6.5	61.5	5	12	5	8.5	12
8 FT	12	14	9	10	5	6	6	6.5	58.3	32.0	32.0	36.0	6	12	61.5	6	12	36.0	6	8	6	6.5	59.1	130	142	154	7	7	61.0	5	12	5	8.5	0
10 FT	13	15	9	10	5	6	6	6	55.4	33.0	33.0	37.0	7	15	63.0	7	15	38.5	6	7.5	6	6.5	56.6	131	143	155	7	7	61.0	5	12	5	8.5	0
12 FT	14	16	10	10	5	6	6	6.5	53.6	34.0	34.0	38.0	7	15	61.5	7	15	38.5	6	7	6	7	54.6	132	144	156	7	6.5	60.5	5	12	5	8.5	0
14 FT	16	17	10	10	6	8	6	7	58.0	36.0	36.0	40.0	7	15	69.0	7	15	46.5	6	7	6	6.5	53.3	133	145	157	7	6.5	60.5	5	12	5	8	0
16 FT	17	19	11	10	6	7.5	6	7	57.5	37.0	37.0	41.0	7	15	68.5	7	15	46.0	6	6.5	6	8	52.4	135	147	159	7	7	60.5	5	12	5	7.5	0
18 FT	18	20	12	10	6	7	6	7.5	57.4	38.0	38.0	38.0	7	14	68.0	7	14	46.0	6	6.5	5	6	48.8	136	148	160	7	6.5	60.5	5	12	5	7	0
20 FT	19	21	12	10	6	6.5	6	7	56.6	39.0	39.0	43.0	7	14	67.5	7	14	46.0	6	6	6	8	51.1	137	149	161	7	6.5	60.5	5	12	5	7	0
22 FT	21	23	12	10	6	6	6	6.5	56.1	41.0	41.0	45.0	7	14	66.5	7	14	45.5	6	6	6	7.5	51.0	139	151	163	7	6.5	60.5	5	12	5	7	0
24 FT	22	24	13	10	6	6	6	7	56.5	42.0	42.0	46.0	7	14	66.0	7	14	45.5	6	6	6	8	51.1	140	152	164	7	6.5	60.5	5	12	5	6.5	0
26 FT	23	25	13	10	7	7.5	6	6.5	56.3	43.0	43.0	47.0	7	14	65.5	7	14	45.5	7	7.5	6	7.5	51.0	141	153	165	7	6.5	60.5	5	12	5	6.5	0
28 FT	24	26	13	10	7	7.5	6	6.5	54.4	44.0	44.0	48.0	7	14	64.5	7	14	45.0	7	7.5	6	8	49.1	142	154	166	7	6.5	60.0	5	12	5	6.5	0
30 FT	25	28	13	10	7	7	6	6	54.4	45.0	45.0	49.0	7	14	64.0	7	14	45.0	7	8	6	8	49.3	144	156	168	7	6	60.0	5	12	5	6.5	0
32 FT	26	29	14	10	7	7	6	6.5	55.1	46.0	50.0	50.0	7	13	63.5	7	13	44.0	7	7.5	6	8.5	49.8	145	157	169	8	7.5	66.0	5	12	5	6	0
34 FT	27	30	14	10	7	6.5	6	6	55.0	47.0	51.0	51.0	7	13	62.5	7	13	43.0	7	7.5	6	8	49.8	146	158	170	8	7.5	66.0	5	12	5	6	0
36 FT	28	31	15	10	7	6.5	6	6.5	55.8	52.0	52.0	52.0	7	12	61.5	7	12	42.5	7	7	6	7.5	50.3	147	159	171	8	7	66.0	5	12	6	8	0
38 FT	29	32	15	10	7	6	6	6	55.6	53.0	53.0	53.0	7	12	60.5	7	12	41.5	7	7	6	7.5	50.4	148	160	172	8	7	66.0	5	12	6	8	0
40 FT	30	33	16	10	7	6	6	6	56.4	54.0	54.0	54.0	7	12	59.5	7	12	41.0	7	6.5	6	7	50.8	149	161	173	8	6.5	66.0	5	12	6	8	0
42 FT	31	35	16	10	7	6	6	6	56.5	55.0	55.0	55.0	8	15	67.0	8	15	48.0	7	7	6	6.5	51.0	151	163	175	8	6.5	66.0	5	12	6	8	0
44 FT	31	35	16	10	8	7	7	7.5	61.4	55.0	55.0	55.0	8	14	67.0	8	14	48.5	7	6	6	6.5	50.9	151	163	175	8	6.5	66.0	5	12	6	8	0
46 FT	32	36	17	10	8	7.5	6	6	57.1	56.0	56.0	56.0	8	14	66.5	8	14	47.5	7	6	6	6.5	51.4	152	164	176	8	6	66.0	5	12	6	7.5	0
48 FT	33	37	17	10	8	7	7	7.5	62.1	57.0	57.0	57.0	8	14	66.0	8	14	47.0	7	6	6	6.5	51.5	153	165	177	8	6	66.0	5	12	6	7.5	0
50 FT	34	38	17	10	8	7	7	7	62.1	58.0	58.0	58.0	8	14	65.5	8	14	46.5	7	6	6	6	51.8	154	166	178	8	6	66.0	5	12	6	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET HEIGHT (HT): 7 THRU 12 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

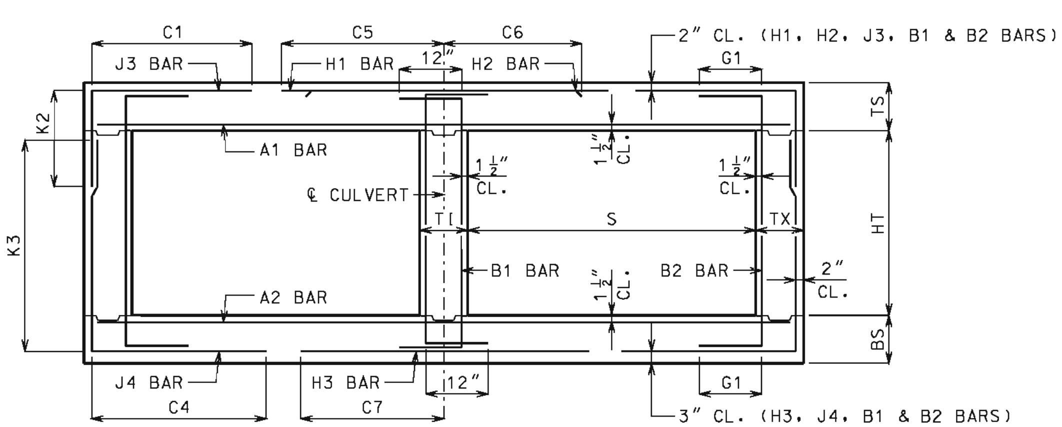
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 13 FT   HEIGHT (HT) = 13 FT OR 14 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=13'	K2 HT=14'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=13'	K3 HT=14'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	11	11	11	5	6	5	7	64.1	34.0	34.0	5	12	127.5	5	12	36.5	5	6.5	5	6	85.3	163	175	6	6	60.5	5	12	5	8	12
2 FT	15	12	11	11	6	8	5	7	68.1	35.0	35.0	6	16	131.5	6	16	43.5	5	6.5	5	6	80.9	164	176	6	6.5	60.0	5	12	5	7.5	12
4 FT	11	12	11	11	5	6	5	6	92.9	31.0	31.0	6	13	82.5	6	13	38.0	5	6	5	6	75.5	164	176	7	7	62.5	5	11.5	5	7.5	12
6 FT	11	12	11	11	5	6	6	7.5	74.6	31.0	35.0	6	12	64.5	6	12	37.0	5	6	6	6.5	72.1	164	176	7	6.5	61.5	5	12	5	7.5	12
8 FT	12	14	11	11	5	6.5	6	7.5	68.5	32.0	36.0	6	12	61.5	6	12	36.5	6	8	6	7	70.1	166	178	7	7	61.5	5	12	5	7.5	0
10 FT	13	15	11	11	5	6.5	6	7	65.9	37.0	37.0	6	12	59.5	6	12	36.0	6	7.5	6	6.5	67.4	167	179	7	6.5	61.0	5	12	5	7.5	0
12 FT	14	16	12	11	5	6	6	7	64.0	38.0	38.0	7	15	61.5	7	15	38.5	6	7	6	7	65.5	168	180	7	6.5	60.5	5	12	5	7	0
14 FT	15	17	12	11	6	7.5	6	6.5	68.5	39.0	39.0	7	15	69.0	7	15	46.5	6	6.5	6	6	64.1	169	181	7	6.5	60.5	5	12	5	7	0
16 FT	17	19	13	11	6	7.5	6	6.5	68.0	41.0	41.0	7	15	68.0	7	15	46.5	6	6.5	6	7	63.4	171	183	7	6.5	60.5	5	12	5	6.5	0
18 FT	18	20	13	11	6	7	6	6	66.9	42.0	42.0	7	15	67.5	7	15	46.5	6	6	6	6	62.4	172	184	7	6.5	60.5	5	12	5	6.5	0
20 FT	19	22	14	11	6	6.5	6	6	66.5	43.0	43.0	7	14	67.0	7	14	46.0	6	6	6	7	62.0	174	186	7	7	60.5	5	12	5	6	0
22 FT	20	23	14	11	6	6	7	8	70.6	44.0	44.0	7	14	66.5	7	14	46.0	6	6	6	6	61.3	175	187	7	6.5	60.5	5	12	5	6	0
24 FT	22	25	15	11	6	6	6	6	66.1	46.0	46.0	7	15	65.5	7	15	45.5	6	6	6	7	61.5	177	189	7	6.5	60.5	5	12	6	8	0
26 FT	23	25	15	11	7	7.5	7	7.5	70.6	47.0	47.0	7	14	65.0	7	14	45.5	7	7	6	6	60.9	177	189	7	6.5	60.5	5	12	6	8	0
28 FT	24	27	16	11	7	7.5	7	8	71.0	48.0	48.0	7	14	64.5	7	14	45.0	7	8	6	7	61.3	179	191	7	6	60.5	5	12	6	8	0
30 FT	25	28	16	11	7	7	7	8	68.5	49.0	49.0	7	14	63.5	7	14	44.0	7	7.5	6	7	58.9	180	192	7	6	60.5	5	12	6	8	0
32 FT	26	29	16	11	7	7	7	7.5	68.4	50.0	50.0	7	13	62.5	7	13	43.5	7	7.5	6	6.5	58.9	181	193	8	7.5	66.5	5	12	6	8	0
34 FT	27	30	17	11	7	6.5	7	7.5	69.0	51.0	51.0	7	13	61.5	7	13	42.5	7	7.5	6	7	59.1	182	194	8	7.5	66.5	5	12	6	7.5	0
36 FT	27	31	17	11	7	6	7	6.5	68.9	51.0	51.0	7	12	61.5	7	12	43.5	7	7	6	7	59.1	183	195	8	7	66.5	5	12	6	7.5	0
38 FT	28	33	18	11	7	6	7	7	69.8	52.0	52.0	7	12	60.0	7	12	42.5	7	7	6	6.5	59.6	185	197	8	6.5	66.5	5	12	6	7	0
40 FT	29	34	19	11	7	6	7	7	70.4	53.0	53.0	7	12	59.5	7	12	41.5	7	7	6	6.5	60.0	186	198	8	6.5	66.5	5	12	6	6.5	0
42 FT	30	35	19	11	7	6	7	6.5	70.4	54.0	54.0	7	12	59.0	7	12	40.5	7	7	6	6.5	60.1	187	199	8	6.5	66.5	5	12	6	6.5	0
44 FT	31	36	20	11	7	6	7	7	71.0	55.0	55.0	8	15	66.5	8	15	47.5	7	7	6	6	60.5	188	200	8	6	66.5	5	12	6	6.5	0
46 FT	32	37	21	11	8	7.5	7	7	71.8	56.0	56.0	8	15	66.0	8	15	47.0	7	6.5	6	6	60.8	189	201	8	6	66.5	5	12	6	6	0
48 FT	32	38	21	11	8	7	7	6	71.8	56.0	56.0	8	14	66.0	8	14	47.0	7	6.5	6	6	60.9	190	202	8	6	66.5	5	12	6	6	0
50 FT	33	39	22	11	8	7	7	6.5	72.5	57.0	57.0	8	15	65.5	8	15	47.0	7	6.5	6	6	61.3	191	203	8	6	66.5	5	12	6	6	0

SPAN (S) = 13 FT   HEIGHT (HT) = 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=15'	K2 HT=16'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=15'	K3 HT=16'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	12	12	13	5	6	5	6	65.0	34.0	34.0	5	12	128.5	5	12	36.0	5	6.5	6	7	99.8	188	200	6	6.5	61.0	5	12	5	7	12
2 FT	15	13	12	13	6	8	6	8.5	72.0	35.0	39.0	6	16	135.5	6	16	43.5	5	6.5	6	7	96.4	189	201	6	6.5	60.5	5	12	5	7	12
4 FT	11	13	12	13	5	6	6	7	115.0	35.0	35.0	6	14	81.0	6	14	38.5	5	6	6	6.5	91.6	189	201	6	6	60.5	5	12	5	7	12
6 FT	11	13	12	13	5	6.5	6	6.5	84.8	35.0	35.0	6	13	63.5	6	13	37.5	5	6	6	6	84.8	189	201	7	7	62.0	5	12	5	6.5	12
8 FT	12	14	13	13	5	6.5	6	7	78.8	36.0	36.0	6	13	61.0	6	13	37.0	6	8	6	6.5	80.6	190	202	7	7	61.5	5	12	5	6.5	0
10 FT	13	15	13	13	5	6.5	6	7	75.9	37.0	37.0	6	12	59.5	6	12	36.5	6	7.5	6	6.5	78.4	191	203	7	6.5	61.0	5	12	5	6.5	0
12 FT	14	16	14	13	5	6	6	7	72.9	38.0	38.0	6	12	58.5	6	12	36.5	6	6.5	6	6.5	75.6	192	204	7	6.5	61.0	5	12	5	6	0
14 FT	15	18	14	13	6	8	6	6	77.1	39.0	39.0	7	16	69.0	7	16	47.0	6	6.5	6	6	75.3	194	206	7	7	61.0	5	12	5	6	0
16 FT	16	19	15	13	6	7.5	6	6	76.0	40.0	40.0	7	15	68.0	7	15	47.0	6	6.5	6	6	73.3	195	207	7	6.5	61.0	5	12	6	8	0
18 FT	18	20	16	13	6	7	6	6	76.0	42.0	42.0	7	15	67.5	7	15	47.0	6	6	6	6	71.6	196	208	7	6.5	61.0	5	12	6	8	0
20 FT	19	22	16	13	6	6.5	7	8	80.4	43.0	49.0	7	15	67.5	7	15	47.0	6	6	7	7.5	74.5	198	210	7	7	61.0	5	12	6	8	0
22 FT	20	23	17	13	6	6.5	7	8	79.9	44.0	50.0	7	14	67.0	7	14	46.5	6	6	7	7.5	73.9	199	211	7	6.5	61.0	5	12	6	7.5	0
24 FT	21	24	17	13	6	6	7	7.5	79.6	45.0	51.0	7	14	66.5	7	14	46.5	7	7	7	7	73.6	200	212	7	6.5	61.0	5	12	6	7.5	0
26 FT	23	26	18	13	7	7.5	7	7.5	80.1	47.0	53.0	7	15	65.5	7	15	46.0	7	8	7	8	73.9	202	214	7	6.5	61.0	5	12	6	7	0
28 FT	23	27	19	13	7	7.5	7	7.5	80.0	47.0	47.0	7	14	65.0	7	14	46.0	7	7.5	6	6	70.9	203	215	7	6	61.0	5	12	6	6.5	0
30 FT	24	28	19	13	7	7.5	7	7.5	77.8	48.0	48.0	7	14	64.5	7	14	46.0	7	7.5	6	6	68.5	204	216	7	6	61.0	5	12	6	6.5	0
32 FT	25	29	19	13	7	7	7	7	77.8	49.0	49.0	7	14	63.5	7	14	45.5	7	7.5	6	6	68.6	205	217	8	7.5	67.0	5	12	6	6.5	0
34 FT	26	30	20	13	7	7	7	7	78.3	50.0	50.0	7	13	63.0	7	13	44.5	7	6.5	6	6	68.9	206	218	8	7.5	67.0	5	12	6	6.5	0
36 FT	27	32	21	13	7	6.5	7	7	78.9	51.0	51.0	7	13	62.0	7	13	43.5	7	7	6	6	69.4	208	220	8	7	67.0	5	12	6	6	0
38 FT	28	33	22	13	7	6.5	7	7	79.4	52.0	58.0	7	12	61.0	7	12	43.0	7	7	7	7.5	72.6	209	221	8	6.5	67.0	5	12	6	6	0
40 FT	29	34	22	13	7	6.5	7	6.5	79.5	59.0	59.0	7	12	60.0	7	12	42.0	7	7	7	7.5	72.9	210	222	8	6.5	67.0	5	12	6	6	0
42 FT	30	35	23	13	7	6	7	6.5	80.1	60.0	60.0	7	12	60.0	7	12	41.0	7	7	7	7.5	73.1	211	223	8	6.5	67.0	5	12	7	7.5	0
44 FT	31	36	24	13	7	6	7	6.5	80.8	55.0	61.0	8	15	67.5	8	15	48.5	7	6.5	7	7	73.5	212	224	8	6	67.0	5	12	7	7.5	0
46 FT	32	37	24	13	7	6	7	6	80.8	56.0	62.0	8	15	67.0	8	15	48.0	7	6.5	7	7	73.6	213	225	8	6	67.0	5	12	7	7.5	0
48 FT	32	38	26	13	8	7.5	7	6	81.9	56.0	62.0	8	14	67.0	8	14	48.0	7	6.5	7	7.5	74.1	214	226	8	6	67.0	5	12	7	7.5	0
50 FT	33	39	27	13	8	7	7	6	82.6	57.0	63.0	8	15	66.0	8	15	47.5	7	6.5	7	7.5	74.5	215	227	8	6	67.0	5	12	7	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET
HEIGHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

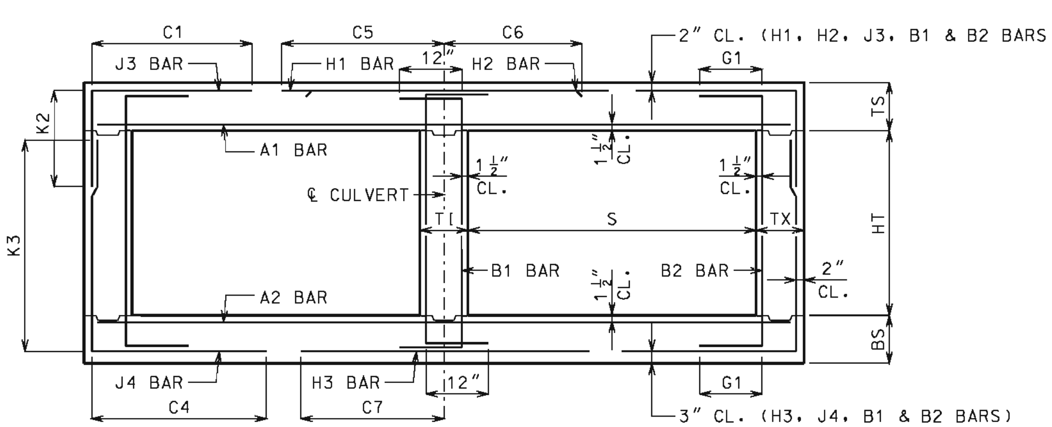
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 14 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														A2 BARS (BOTTOM SLAB BARS)											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	11	8	8	6	8	5	8	69.3	31.0	35.0	35.0	6	16	137.5	6	16	46.5	5	6.5	5	6	57.8	91	103	115	6	6	63.0	5	12	5	12	12
2 FT	15	12	8	8	6	8	5	8	69.3	35.0	35.0	35.0	6	16	137.5	6	16	48.0	5	6	5	6.5	52.5	92	104	116	6	6	62.5	5	12	5	12	12
4 FT	12	11	8	8	6	7.5	5	6	48.0	32.0	32.0	32.0	6	12	86.0	6	12	39.5	5	6.5	6	7	49.3	91	103	115	7	6	64.5	5	12	5	12	12
6 FT	12	13	8	8	6	8	6	7.5	47.6	32.0	32.0	32.0	7	15	74.0	7	15	41.0	5	6	5	7	41.9	93	105	117	7	6.5	64.5	5	12	5	12	12
8 FT	13	14	8	8	5	6	5	6.5	41.1	33.0	33.0	33.0	7	15	68.5	7	15	40.0	6	8	5	7.5	39.1	94	106	118	7	6.5	64.0	5	12	5	12	0
10 FT	14	15	8	8	6	8	5	6.5	38.6	34.0	34.0	34.0	7	14	66.5	7	14	39.5	6	7.5	5	7.5	37.4	95	107	119	7	6	63.5	5	12	5	12	0
12 FT	16	17	8	8	6	8	5	6.5	41.5	36.0	36.0	36.0	7	14	73.0	7	14	47.5	6	7	5	7	36.1	97	109	121	7	6.5	63.5	5	12	5	11	0
14 FT	17	18	8	8	6	7.5	5	6	40.3	37.0	37.0	37.0	7	14	72.5	7	14	47.0	6	6.5	5	6.5	35.1	98	110	122	7	6.5	63.0	5	12	5	10	0
16 FT	18	20	8	8	6	7	6	8	43.4	38.0	38.0	38.0	7	13	71.5	7	13	47.0	6	6	5	6	34.4	100	112	124	7	6.5	63.0	5	12	5	9.5	0
18 FT	20	21	8	8	6	6.5	6	7.5	42.4	44.0	44.0	44.0	7	13	71.0	7	13	46.5	6	6	6	7.5	37.0	101	113	125	7	6.5	63.0	5	12	5	9.5	0
20 FT	21	22	8	8	6	6	6	7	41.8	45.0	45.0	45.0	7	13	70.5	7	13	46.5	7	7.5	6	7	36.5	102	114	126	7	6	63.0	5	12	5	9	0
22 FT	23	24	8	8	7	7.5	6	6	41.3	47.0	47.0	47.0	7	13	69.5	7	13	46.5	7	7.5	6	6	36.4	104	116	128	7	6	63.0	5	12	5	8	0
24 FT	24	26	9	8	7	7.5	6	7	42.1	48.0	48.0	48.0	7	13	69.0	7	13	46.0	7	7.5	6	6.5	36.8	106	118	130	7	6.5	63.0	5	12	5	8.5	0
26 FT	25	27	9	8	7	7	6	6.5	41.9	49.0	49.0	49.0	7	12	68.5	7	12	46.0	7	7.5	6	6.5	36.6	107	119	131	7	6	63.0	5	12	5	8	0
28 FT	26	28	9	8	7	7	6	6	41.8	50.0	50.0	50.0	7	12	68.0	7	12	46.0	7	7.5	6	6	36.6	108	120	132	7	6	63.0	5	12	5	7.5	0
30 FT	27	29	9	8	7	6.5	6	6	41.1	51.0	51.0	51.0	7	12	67.0	7	12	45.5	7	7	6	6	35.4	109	121	133	8	7.5	68.5	5	12	5	7.5	0
32 FT	28	31	10	8	7	6.5	6	6.5	41.8	52.0	52.0	52.0	7	12	66.0	7	12	45.0	7	7	6	6	35.9	111	123	135	8	7	68.5	5	12	5	8	0
34 FT	29	32	10	8	7	6	6	6.5	41.8	53.0	53.0	53.0	7	12	65.5	7	12	44.5	7	7	6	6	36.0	112	124	136	8	7	68.5	5	12	5	7.5	0
36 FT	31	33	10	8	7	6	6	6	41.8	55.0	55.0	55.0	8	15	71.5	8	15	50.5	7	7	7	6.5	39.4	113	125	137	8	6.5	68.5	5	12	5	6.5	0
38 FT	31	34	11	8	8	7	6	6.5	42.3	55.0	55.0	55.0	8	14	71.5	8	14	51.0	7	6.5	6	6	36.8	114	126	138	8	6.5	68.5	5	12	5	7.5	0
40 FT	33	35	11	8	8	7.5	6	6	42.3	57.0	57.0	57.0	8	14	69.5	8	14	49.0	7	6	6	6	37.0	115	127	139	8	6.5	68.5	5	12	5	7	0
42 FT	33	37	11	8	8	7	6	6	42.3	57.0	57.0	57.0	8	14	69.5	8	14	49.5	7	6.5	7	6.5	40.1	117	129	141	8	6	68.5	5	12	5	6.5	0
44 FT	34	38	12	8	8	7	6	6.5	43.3	58.0	58.0	58.0	8	14	69.0	8	14	48.5	7	6.5	6	6	37.6	118	130	142	8	6	68.5	5	12	5	7	0
46 FT	35	39	12	8	8	6.5	6	6.5	43.1	59.0	59.0	59.0	8	13	68.5	8	13	47.5	7	6.5	6	6	37.9	119	131	143	8	6	68.5	5	12	5	6.5	0
48 FT	36	40	12	8	8	6.5	6	6.5	43.1	60.0	60.0	60.0	8	13	67.5	8	13	46.5	7	6.5	6	6	38.1	120	132	144	9	7	74.5	5	11.5	5	6	0
50 FT	37	41	12	8	8	6.5	6	6	43.3	61.0	61.0	61.0	8	13	67.0	8	13	46.5	7	6	7	6.5	41.3	121	133	145	9	7	74.5	5	8.5	6	8	0

SPAN (S) = 14 FT HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	8	10	6	8	5	7	69.6	35.0	35.0	35.0	6	16	138.5	6	16	47.0	5	6.5	6	6	83.9	128	140	152	6	6.5	63.5	5	12	5	9.5	12
2 FT	15	13	8	10	6	8	5	6.5	69.6	35.0	35.0	35.0	6	16	138.5	6	16	48.0	5	6	6	6	77.4	129	141	153	6	6.5	63.0	5	12	5	9.5	12
4 FT	12	12	10	10	6	8	5	6	70.1	32.0	32.0	32.0	6	13	85.5	6	13	40.0	5	6	6	7	65.5	128	140	152	7	6.5	65.5	5	10	5	9.5	12
6 FT	12	13	10	10	6	8.5	5	6	58.6	32.0	32.0	32.0	6	12	69.0	6	12	38.0	5	6	6	7	60.8	129	141	153	7	6.5	64.5	5	12	5	9.5	12
8 FT	13	14	10	10	5	6	6	7	57.1	33.0	33.0	37.0	7	15	68.0	7	15	40.5	6	8	6	7	57.4	130	142	154	7	6.5	64.0	5	12	5	9	0
10 FT	14	16	10	10	5	6	6	7	54.4	34.0	34.0	34.0	7	15	66.5	7	15	40.0	6	7	5	6	52.0	132	144	156	7	6.5	64.0	5	12	5	8	0
12 FT	15	17	10	10	6	8	6	7	58.6	35.0	35.0	39.0	7	14	73.0	7	14	48.0	6	7	6	7.5	53.1	133	145	157	7	6.5	63.5	5	12	5	8	0
14 FT	17	18	10	10	6	7.5	6	7	57.1	37.0	37.0	41.0	7	14	72.5	7	14	47.5	6	6.5	6	6.5	52.0	134	146	158	7	6.5	63.5	5	12	5	8	0
16 FT	18	20	11	10	6	7	6	7	57.0	38.0	38.0	42.0	7	14	71.5	7	14	47.5	6	6	6	8	51.5	136	148	160	7	6.5	63.5	5	12	5	7.5	0
18 FT	19	21	12	10	6	6.5	6	7	56.9	39.0	39.0	43.0	7	13	71.0	7	13	47.5	6	6	6	8.5	51.1	137	149	161	7	6.5	63.5	5	12	5	7	0
20 FT	21	23	12	10	6	6	6	7	56.1	41.0	41.0	45.0	7	13	70.5	7	13	47.0	7	8	6	8	50.8	139	151	163	7	6.5	63.5	5	12	5	7	0
22 FT	22	24	12	10	6	6	6	6.5	55.5	42.0	42.0	46.0	7	13	70.0	7	13	47.0	7	7.5	6	7.5	50.1	140	152	164	7	6.5	63.5	5	12	5	7	0
24 FT	23	26	13	10	7	7	6	6.5	55.9	43.0	43.0	47.0	7	12	69.5	7	12	47.0	7	7.5	6	8.5	50.3	142	154	166	7	6.5	63.5	5	12	5	6.5	0
26 FT	25	27	13	10	7	7	6	6.5	55.5	45.0	45.0	49.0	7	13	68.5	7	13	46.5	7	7.5	6	8	50.3	143	155	167	7	6	63.5	5	12	5	6.5	0
28 FT	26	29	14	10	7	7	6	6.5	56.3	46.0	50.0	50.0	7	13	67.5	7	13	46.5	7	7.5	6	8.5	50.5	145	157	169	8	7.5	69.5	5	12	5	6	0
30 FT	27	30	14	10	7	6.5	6	6.5	56.0	47.0	51.0	51.0	7	13	67.0	7	13	46.0	7	7	6	8	50.5	146	158	170	8	7.5	69.5	5	12	5	6	0
32 FT	28	31	14	10	7	6.5	6	6.5	54.3	52.0	52.0	52.0	7	12	66.0	7	12	45.5	7	7	6	7.5	48.9	147	159	171	8	7	69.5	5	12	5	6	0
34 FT	29	32	14	10	7	6	6	6	54.1	53.0	53.0	53.0	7	12	65.0	7	12	44.5	7	7	6	7.5	48.9	148	160	172	8	7	69.0	5	12	5	6	0
36 FT	30	33	15	10	7	6	6	6.5	54.9	54.0	54.0	54.0	7	12	64.0	7	12	44.0	7	6	6	7	49.4	149	161	173	8	6.5	69.5	5	12	6	8	0
38 FT	31	35	15	10	8	7.5	6	6	55.0	55.0	55.0	55.0	8	15	71.0	8	15	51.0	7	6.5	6	6.5	49.6	151	163	175	8	6.5	69.0	5	12	6	8	0
40 FT	32	36	16	10	8	7.5	6	6	55.8	56.0	56.0	56.0	8	14	70.0	8	14	50.0	7	6.5	6	6.5	50.0	152	164	176	8	6	69.5	5	12	6	8	0
42 FT	33	37	16	10	8	7	6	6	55.8	57.0	57.0	57.0	8	14	69.5	8	14	49.5	7	6.5	6	6.5	50.1	153	165	177	8	6	69.0	5	12	6	8	0
44 FT	34	38	16	10	8	7	6	6	55.6	58.0	58.0	58.0	8	14	69.0	8	14	48.5	7	6.5	6	6	50.3	154	166	178	8	6	69.0	5	12	6	8	0
46 FT	35	39	17	10	8	7	6	6	56.5	59.0	59.0	59.0	8	13	68.5	8	13	47.5	7	6	6	6	50.8	155	167	179	8	6	69.0	5	12	6	7.5	0
48 FT	35	40	17	10	8	6	7	7.5	61.5	59.0	59.0	59.0	8	12	68.5	8	12	48.0	7	6	6	6	50.8	156	168	180	9	7	75.0	5	12	6	7.5	0
50 FT	36	41	17	10	8	6.5	7	7	61.5	60.0	60.0	66.0	8	13	68.0	8	13	47.5	7	6	7	8	53.9	157	169	181	9	7	75.0	5	12	6	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

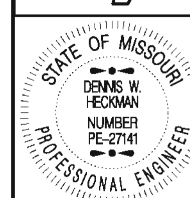
SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET
HEIGHT (HT): 7 THRU 12 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO. 22 OF 27

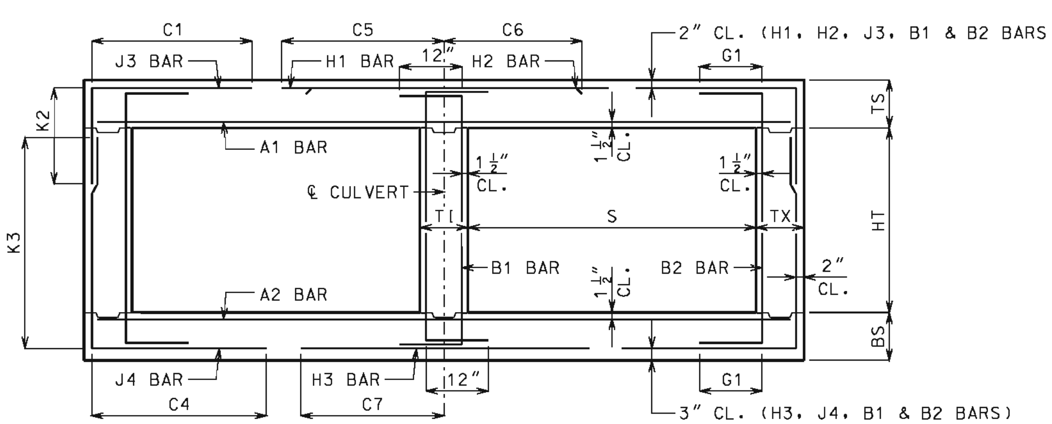
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 14 FT HEIGHT (HT) = 13 FT OR 14 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
										K2													K3									
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=13'	HT=14'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=13'	HT=14'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	9	11	6	8	5	6	70.4	35.0	35.0	6	16	139.0	6	16	47.0	5	6	6	6	96.1	164	176	6	6	64.0	5	12	5	8.5	12
2 FT	15	13	10	11	6	8	5	6	71.0	35.0	35.0	6	16	139.5	6	16	47.5	5	6	6	6.5	87.6	165	177	6	6.5	63.5	5	12	5	8	12
4 FT	12	12	10	11	6	7.5	6	7.5	100.0	36.0	36.0	6	13	94.5	6	13	40.0	5	6	6	6	77.9	164	176	7	6.5	65.5	5	12	5	8	12
6 FT	12	13	10	11	6	8	6	7	74.8	36.0	36.0	6	12	69.0	6	12	38.5	5	6	6	6	72.4	165	177	7	6.5	65.0	5	12	5	8	12
8 FT	13	14	11	11	5	6	6	7	68.4	37.0	37.0	7	16	68.0	7	16	41.0	6	8	6	7	68.4	166	178	7	6	64.0	5	12	5	7.5	0
10 FT	14	16	11	11	5	6	6	6.5	65.4	38.0	38.0	7	15	66.5	7	15	40.5	6	7	6	6.5	66.8	168	180	7	6.5	64.0	5	12	5	7.5	0
12 FT	15	17	12	11	6	8	6	6.5	69.4	39.0	39.0	7	14	73.0	7	14	48.0	6	7	6	7	64.6	169	181	7	6.5	64.0	5	12	5	7	0
14 FT	17	18	12	11	6	7.5	6	6.5	67.9	41.0	41.0	7	15	72.0	7	15	48.0	6	6	6	6	63.0	170	182	7	6	63.5	5	12	5	7	0
16 FT	18	20	13	11	6	7	6	6.5	66.9	42.0	42.0	7	14	71.5	7	14	47.5	6	6	6	7	62.1	172	184	7	6.5	63.5	5	12	5	6.5	0
18 FT	19	21	13	11	6	6.5	6	6	65.6	43.0	43.0	7	13	71.0	7	13	47.5	7	8	6	6	61.0	173	185	7	6.5	63.5	5	12	5	6.5	0
20 FT	21	23	14	11	6	6	6	6	65.4	45.0	45.0	7	14	70.0	7	14	47.5	7	8	6	7	60.6	175	187	7	6.5	63.5	5	12	5	6	0
22 FT	22	24	14	11	6	6	7	8	69.4	46.0	46.0	7	13	69.5	7	13	47.0	7	7	6	6	59.8	176	188	7	6.5	63.5	5	12	5	6	0
24 FT	23	26	15	11	7	7.5	7	8	69.5	47.0	47.0	7	13	69.0	7	13	47.0	7	7.5	6	7	59.5	178	190	7	6.5	63.5	5	12	6	8	0
26 FT	24	27	15	11	7	7	7	7.5	69.0	48.0	48.0	7	13	68.5	7	13	47.0	7	7	6	6.5	59.3	179	191	7	6	63.5	5	12	6	8	0
28 FT	25	29	16	11	7	6.5	7	7.5	69.5	49.0	49.0	7	13	67.5	7	13	46.5	7	7	6	7	59.5	181	193	8	7.5	69.5	5	12	6	8	0
30 FT	27	30	16	11	7	6.5	7	7	69.3	51.0	51.0	7	13	66.0	7	13	45.5	7	7	6	6.5	59.5	182	194	8	7.5	69.5	5	12	6	8	0
32 FT	28	31	16	11	7	6.5	7	7.5	67.1	52.0	52.0	7	12	65.0	7	12	44.5	7	7	6	7	57.1	183	195	8	7	69.5	5	12	6	8	0
34 FT	29	32	17	11	7	6	7	7.5	67.8	53.0	53.0	7	12	64.0	7	12	44.0	7	6.5	6	7	57.5	184	196	8	7	69.5	5	12	6	7.5	0
36 FT	30	34	17	11	7	6	7	6.5	67.8	54.0	54.0	7	12	63.0	7	12	43.0	7	7	6	7	57.6	186	198	8	6.5	69.5	5	12	6	7.5	0
38 FT	31	35	18	11	7	6	7	7	68.5	55.0	55.0	8	15	70.0	8	15	50.5	7	6.5	6	6.5	58.0	187	199	8	6.5	69.5	5	12	6	7	0
40 FT	32	36	18	11	8	7.5	7	6.5	68.4	56.0	56.0	8	14	69.5	8	14	49.5	7	6.5	6	6.5	58.1	188	200	8	6	69.5	5	12	6	7	0
42 FT	33	37	19	11	8	7	7	7	69.1	57.0	57.0	8	14	69.0	8	14	48.5	7	6.5	6	6.5	58.5	189	201	8	6	69.5	5	12	6	6.5	0
44 FT	33	38	20	11	8	7	7	7	69.9	57.0	57.0	8	14	69.0	8	14	49.0	7	6	6	6	58.9	190	202	8	6	69.5	5	12	6	6.5	0
46 FT	34	39	20	11	8	7	7	6	69.8	58.0	58.0	8	14	68.5	8	14	48.5	7	6	6	6	59.0	191	203	8	6	69.5	5	12	6	6.5	0
48 FT	35	41	21	11	8	6.5	7	6.5	70.6	65.0	65.0	8	13	68.0	8	13	47.5	7	6	7	8	62.5	193	205	9	7	75.5	5	12	6	6	0
50 FT	36	42	22	11	8	6.5	7	6.5	71.4	66.0	66.0	8	14	67.0	8	14	47.5	7	6	7	7.5	63.0	194	206	9	7	75.5	5	12	6	6	0

SPAN (S) = 14 FT HEIGHT (HT) = 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS													BOTTOM SLAB BARS										WALL BARS				
					A1 BARS		J3 BARS					H1 BARS			H2 BARS			A2 BARS		J4 BARS					H3 BARS			B1 BARS		B2 BARS		
										K2													K3									
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=15'	HT=16'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=15'	HT=16'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	13	12	13	6	8	5	6	72.6	35.0	35.0	6	16	141.0	6	16	46.0	5	6.5	6	7.5	102.5	189	201	6	6.5	64.5	5	12	5	7	12
2 FT	15	13	12	13	6	8	6	8	75.6	35.0	39.0	6	16	144.0	6	16	47.5	5	6	6	7	95.8	189	201	6	6	63.5	5	12	5	7	12
4 FT	12	12	12	13	6	8	6	7.5	118.3	36.0	36.0	6	13	86.5	6	13	40.0	5	6	6	6	86.6	188	200	7	6.5	65.5	5	12	5	7	12
6 FT	12	13	12	13	5	6	6	7	86.4	36.0	36.0	6	12	68.0	6	12	39.0	5	6	6	6	83.0	189	201	7	6	65.0	5	12	5	7	12
8 FT	13	15	13	13	5	6	6	7	78.9	37.0	37.0	6	12	64.5	6	12	38.0	6	7.5	6	6.5	80.3	191	203	7	6.5	64.5	5	12	5	6.5	0
10 FT	14	16	13	13	5	6	6	6.5	75.0	38.0	38.0	7	15	66.0	7	15	41.0	6	7	6	6.5	77.3	192	204	7	6.5	64.5	5	12	5	6.5	0
12 FT	15	17	14	13	6	8	6	6.5	78.5	39.0	39.0	7	15	73.0	7	15	48.5	6	6.5	6	6.5	74.1	193	205	7	6.5	64.0	5	12	5	6	0
14 FT	16	19	14	13	6	8	6	6	77.0	40.0	40.0	7	14	72.0	7	14	48.5	6	6	6	6	73.6	195	207	7	6.5	64.0	5	12	5	6	0
16 FT	18	20	15	13	6	7	6	6	76.5	42.0	42.0	7	14	71.5	7	14	48.5	6	6	6	6	72.1	196	208	7	6.5	64.0	5	12	6	8	0
18 FT	19	21	15	13	6	6.5	7	7.5	80.5	43.0	49.0	7	14	71.0	7	14	48.5	7	8	7	7	74.1	197	209	7	6.5	64.0	5	12	6	8	0
20 FT	20	23	16	13	6	6.5	7	7.5	79.9	44.0	50.0	7	13	70.5	7	13	48.0	7	7.5	7	8	73.8	199	211	7	6.5	64.0	5	12	6	8	0
22 FT	22	25	17	13	6	6	7	7.5	79.8	46.0	46.0	7	14	69.5	7	14	48.0	7	7.5	6	6	70.5	201	213	7	6.5	64.0	5	12	6	7.5	0
24 FT	23	26	18	13	7	7.5	7	7.5	79.5	47.0	47.0	7	13	69.0	7	13	47.5	7	7.5	6	6	69.9	202	214	7	6.5	64.0	5	12	6	7	0
26 FT	24	27	18	13	7	7.5	7	7	79.1	48.0	48.0	7	13	68.5	7	13	47.5	7	6.5	6	6	69.6	203	215	7	6	64.0	5	12	6	7	0
28 FT	25	29	19	13	7	7	7	7	79.5	49.0	49.0	7	13	68.0	7	13	47.5	7	7	6	6	70.0	205	217	8	7.5	70.0	5	12	6	6.5	0
30 FT	26	30	20	13	7	6.5	7	7	79.8	50.0	50.0	7	13	67.0	7	13	47.0	7	6.5	6	6	69.9	206	218	8	7.5	70.0	5	12	6	6.5	0
32 FT	27	31	20	13	7	6.5	7	7	77.4	51.0	51.0	7	13	66.5	7	13	47.0	7	6.5	6	6	67.5	207	219	8	7	70.0	5	12	6	6.5	0
34 FT	28	32	20	13	7	6	7	7	77.4	52.0	52.0	7	12	65.5	7	12	46.0	7	6	6	6	67.6	208	220	8	7	70.0	5	12	6	6.5	0
36 FT	29	34	21	13	7	6	7	7	78.0	53.0	53.0	7	12	64.5	7	12	45.0	7	6.5	6	6	68.1	210	222	8	6.5	70.0	5	12	6	6	0
38 FT	30	35	22	13	7	6	7	6.5	78.6	54.0	60.0	7	12	63.5	7	12	44.5	7	6.5	7	7.5	71.4	211	223	8	6.5	70.0	5	12	6	6	0
40 FT	31	36	22	13	8	7.5	7	6	78.6	61.0	61.0	8	15	71.0	8	15	51.5	7	6.5	7	7.5	71.5	212	224	8	6	70.0	5	12	6	6	0
42 FT	32	37	23	13	8	7.5	7	6.5	79.3	56.0	62.0	8	14	70.0	8	14	51.0	7	6	7	7.5	71.8	213	225	8	6	70.0	5	12	7	7.5	0
44 FT	33	39	24	13	8	7	7	6.5	80.0	57.0	63.0	8	14	70.0	8	14	50.0	7	6	7	7	72.4	215	227	8	6	70.0	5	12	7	7.5	0
46 FT	34	40	25	13	8	7	7	6.5	80.6	58.0	64.0	8	14	69.5	8	14	49.0	7	6	7	7.5	72.6	216	228	9	7	76.0	5	12	7	7.5	0
48 FT	35	41	26	13	8	7	7	6	81.4	65.0	65.0	8	14	68.5	8	14	48.5	7	6	7	7.5	73.0	217	229	9	7	76.5	5	12	7	8	0
50 FT	35	42	27	13	8	6.5	7	6	82.0	65.0	65.0	8	13	68.5	8	13	48.5	7	6	7	7.5	73.3	218	230	9	7	76.5	5	12	7	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET
HEIGHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

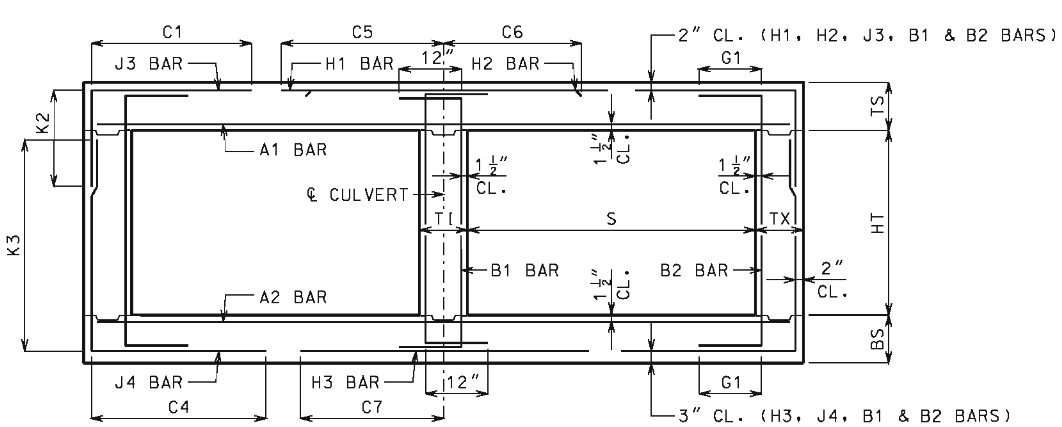
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 15 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	HT=9'	HT=10'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	HT=9'	HT=10'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	8	8	6	8	5	8	72.9	35.0	35.0	35.0	6	16	146.0	6	16	51.0	5	6	5	6	64.9	104	116	128	6	6	66.5	5	12	5	12	12
2 FT	17	13	8	8	6	7.5	5	6.5	72.9	37.0	37.0	37.0	6	14	146.0	6	14	45.5	5	6	5	6	57.8	105	117	129	6	6	65.5	5	12	5	12	12
4 FT	13	12	8	8	6	7	5	6	53.1	33.0	33.0	33.0	6	12	92.5	6	12	41.5	5	6	6	6.5	53.3	104	116	128	7	6	68.0	5	12	5	12	12
6 FT	13	13	8	8	6	7.5	6	7.5	50.4	33.0	33.0	37.0	7	15	78.5	7	15	42.5	5	6	6	7	48.9	105	117	129	7	6	67.0	5	12	5	12	12
8 FT	14	15	8	8	6	8	5	6	44.0	34.0	34.0	34.0	7	14	72.5	7	14	41.5	6	7.5	5	6.5	42.8	107	119	131	7	6	67.0	5	12	5	11	0
10 FT	15	16	8	8	6	7.5	6	8	50.5	35.0	35.0	35.0	7	13	78.0	7	13	49.0	6	7	5	6.5	40.9	108	120	132	7	6	66.5	5	12	5	10	0
12 FT	17	18	8	8	6	7.5	6	8	48.4	37.0	37.0	37.0	7	13	76.5	7	13	48.5	6	6.5	5	6	39.6	110	122	134	7	6	66.5	5	12	5	9.5	0
14 FT	18	19	8	8	6	7	6	7.5	47.0	38.0	38.0	42.0	7	13	75.5	7	13	48.5	6	6	6	8	41.5	111	123	135	7	6	66.5	5	12	5	9.5	0
16 FT	19	21	8	8	6	6	6	6.5	46.1	39.0	43.0	43.0	7	12	75.0	7	12	48.0	6	6	6	7	40.8	113	125	137	7	6	66.5	5	12	5	9	0
18 FT	21	22	9	8	6	6	6	7.5	46.0	41.0	41.0	41.0	7	12	74.0	7	12	48.0	7	7.5	5	6	37.8	114	126	138	7	6	66.0	5	12	5	8.5	0
20 FT	22	24	9	8	6	6	6	6.5	45.5	42.0	42.0	46.0	7	12	73.5	7	12	47.5	7	7.5	6	7	40.3	116	128	140	7	6	66.0	5	12	5	8.5	0
22 FT	24	26	10	8	7	7.5	6	7.5	46.0	44.0	44.0	44.0	7	12	72.5	7	12	47.5	7	7.5	5	6	37.5	118	130	142	7	6	66.0	5	12	5	8	0
24 FT	25	27	11	8	7	7	6	8	46.5	45.0	45.0	45.0	7	12	71.5	7	12	47.0	7	6.5	5	6	37.5	119	131	143	8	7	72.0	5	12	5	7.5	0
26 FT	27	29	11	8	7	6.5	6	8	46.1	47.0	47.0	51.0	7	12	70.5	7	12	47.0	7	7	6	7.5	40.6	121	133	145	8	7	72.0	5	12	5	7.5	0
28 FT	28	30	11	8	7	6.5	6	7	45.9	52.0	52.0	52.0	7	12	69.5	7	12	46.5	7	6.5	6	7	40.5	122	134	146	8	7	72.0	5	12	5	7.5	0
30 FT	29	32	12	8	7	6	6	7.5	46.9	53.0	53.0	53.0	7	12	69.0	7	12	46.5	7	7	6	7.5	41.0	124	136	148	8	7	72.0	5	12	5	7	0
32 FT	30	33	12	8	7	6	6	7.5	45.4	54.0	54.0	54.0	7	12	67.5	7	12	46.0	7	6.5	6	7	39.5	125	137	149	8	6.5	72.0	5	12	5	7	0
34 FT	31	34	12	8	8	7.5	6	7.5	45.3	55.0	55.0	55.0	8	15	75.0	8	15	53.0	7	6.5	6	7	39.6	126	138	150	8	6.5	72.0	5	12	5	7	0
36 FT	32	36	12	8	8	7	6	7	45.4	56.0	56.0	56.0	8	14	73.5	8	14	52.5	7	6.5	6	6.5	39.9	128	140	152	8	6	72.0	5	12	5	7	0
38 FT	33	37	12	8	8	6.5	6	6.5	45.4	57.0	57.0	57.0	8	13	72.5	8	13	51.5	7	6.5	6	6.5	40.0	129	141	153	8	6	72.0	5	12	5	6.5	0
40 FT	35	38	12	8	8	6.5	6	6.5	45.1	59.0	59.0	59.0	8	13	71.0	8	13	49.5	7	6	6	6	40.3	130	142	154	8	6	71.5	5	12	5	6	0
42 FT	35	39	13	8	8	6	6	6.5	46.1	59.0	59.0	59.0	8	12	71.0	8	12	50.0	7	6	6	6	40.6	131	143	155	8	6	72.0	5	12	5	6.5	0
44 FT	36	41	13	8	8	6	6	6.5	46.3	60.0	60.0	60.0	8	12	70.5	8	12	49.0	7	6	7	7	43.9	133	145	157	9	7	77.5	5	9	5	6	0
46 FT	37	42	13	8	8	6	6	6	46.3	61.0	61.0	61.0	8	12	70.0	8	12	48.0	7	6	7	7	44.1	134	146	158	9	7	77.5	5	6.5	6	8.5	0
48 FT	38	43	13	9	8	6	6	6	46.3	62.0	62.0	62.0	8	12	70.5	8	12	48.5	7	6	7	6.5	44.3	135	147	159	9	7	77.5	5	12	6	8	0
50 FT	39	44	14	9	8	6	6	6	47.1	63.0	63.0	63.0	8	12	70.0	8	12	47.5	8	7.5	7	7	44.8	136	148	160	9	6.5	77.5	5	12	6	8	0

SPAN (S) = 15 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	HT=13'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	HT=13'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	9	10	6	8	5	6.5	73.9	35.0	35.0	35.0	6	16	147.0	6	16	51.0	5	6	6	6	88.3	140	152	164	6	6	67.0	5	12	5	8.5	12
2 FT	17	13	9	10	6	7.5	5	6.5	73.9	37.0	37.0	37.0	6	14	147.0	6	14	46.0	5	6	6	6	80.4	141	153	165	6	6	66.0	5	12	5	8.5	12
4 FT	13	12	9	10	6	7	6	6	85.5	33.0	37.0	37.0	6	12	96.0	6	12	42.0	5	6	6	6	70.6	140	152	164	7	6	68.5	5	12	5	8.5	12
6 FT	13	14	10	10	6	8	6	7	67.4	33.0	33.0	37.0	7	15	76.5	7	15	43.0	6	8	6	6.5	66.0	142	154	166	7	6.5	68.0	5	12	5	8	12
8 FT	14	15	10	10	6	8	6	6.5	62.0	34.0	34.0	38.0	7	14	72.0	7	14	42.0	6	7.5	6	6.5	62.1	143	155	167	7	6	67.0	5	12	5	8	0
10 FT	15	17	10	10	6	8	6	6.5	64.6	35.0	35.0	39.0	7	14	78.0	7	14	49.5	6	7	6	6.5	59.6	145	157	169	7	6.5	67.0	5	12	5	8	0
12 FT	16	18	11	10	6	7.5	6	6.5	62.6	36.0	36.0	40.0	7	13	76.5	7	13	49.0	6	6.5	6	7.5	57.4	146	158	170	7	6	67.0	5	12	5	7.5	0
14 FT	18	20	12	10	6	7	6	7	62.0	38.0	38.0	42.0	7	13	75.5	7	13	49.0	6	6	6	8	56.4	148	160	172	7	6.5	67.0	5	12	5	7	0
16 FT	19	21	12	10	6	6.5	6	6.5	60.9	39.0	39.0	43.0	7	13	74.5	7	13	48.5	7	8	6	7.5	55.4	149	161	173	7	6	66.5	5	12	5	7	0
18 FT	21	22	12	10	6	6	6	6.5	59.8	41.0	45.0	45.0	7	13	74.0	7	13	48.5	7	7	6	6	54.6	150	162	174	7	6	66.5	5	12	5	7	0
20 FT	22	24	13	10	6	6	6	6.5	59.9	42.0	42.0	46.0	7	12	73.5	7	12	48.5	7	7	6	7.5	54.4	152	164	176	7	6	66.5	5	12	5	6.5	0
22 FT	23	26	13	10	7	7	6	6	59.3	43.0	43.0	47.0	7	12	72.5	7	12	48.0	7	7	6	7	53.9	154	166	178	7	6	66.5	5	12	5	6.5	0
24 FT	25	28	14	10	7	7	6	6	59.5	45.0	45.0	49.0	7	12	71.5	7	12	48.0	7	7	6	7.5	54.0	156	168	180	7	6	66.5	5	12	5	6	0
26 FT	26	29	14	10	7	6.5	6	6	59.0	50.0	50.0	50.0	7	12	71.0	7	12	47.5	7	7	6	7.5	53.6	157	169	181	8	7	72.5	5	12	5	6	0
28 FT	27	31	15	10	7	6	6	6	59.6	51.0	51.0	51.0	7	12	70.5	7	12	47.5	7	7	6	7.5	53.9	159	171	183	8	7	72.5	5	12	6	8	0
30 FT	29	32	15	10	7	6	7	8	64.3	53.0	53.0	53.0	7	12	69.0	7	12	47.0	7	6.5	6	7.5	54.0	160	172	184	8	7	72.5	5	12	6	8	0
32 FT	30	33	16	10	7	6	6	6	59.9	54.0	54.0	54.0	7	12	68.0	7	12	46.5	7	6	6	7	54.3	161	173	185	8	6.5	72.5	5	12	6	8	0
34 FT	31	35	16	10	8	7.5	6	6	58.3	55.0	55.0	55.0	8	15	75.0	8	15	53.0	7	6.5	6	6.5	52.6	163	175	187	8	6.5	72.5	5	12	6	8	0
36 FT	32	36	16	10	8	7.5	7	7.5	63.1	56.0	56.0	56.0	8	14	74.0	8	14	52.5	7	6.5	6	6.5	52.8	164	176	188	8	6	72.5	5	12	6	8	0
38 FT	33	37	16	10	8	7	7	7	63.1	57.0	57.0	57.0	8	14	72.5	8	14	52.0	7	6	6	6.5	52.9	165	177	189	8	6	72.5	5	12	6	8	0
40 FT	34	38	17	10	8	7	7	7.5	63.9	58.0	58.0	58.0	8	14	72.0	8	14	51.0	7	6	6	6	53.3	166	178	190	8	6	72.5	5	12	6	7.5	0
42 FT	35	40	18	10	8	6.5	7	7.5	64.8	59.0	59.0	59.0	8	13	71.5	8	13	50.0	7	6	6	6	53.8	168	180	192	9	7	78.5	5	12	6	7	0
44 FT	36	41	18	10	8	6.5	7	7.5	64.6	60.0	60.0	66.0	8	13	71.0	8	13	49.5	7	6	7	8	56.9	169	181	193	9	7	78.5	5	12	6	7	0
46 FT	37	42	18	10	8	6.5	7	6.5	64.6	61.0	61.0	67.0	8	12	70.5	8	12	48.5	7	6	7	7.5	57.0	170	182	194	9	7	78.5	5	12	6	7	0
48 FT	38	43	19	10	8	6	7	7	65.4	62.0	62.0	68.0	8	13	69.5	8	13	48.0	8	7.5	7	7.5	57.5	171	183	195	9	7	78.5	5	12	6	6.5	0
50 FT	39	44	19	10	8	6	7	6.5	65.3	63.0	63.0	69.0	8	13	69.0	8	13	47.5	8	7.5	7	7	57.6	172	184	196	9	6.5	78.5	5	12	6	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

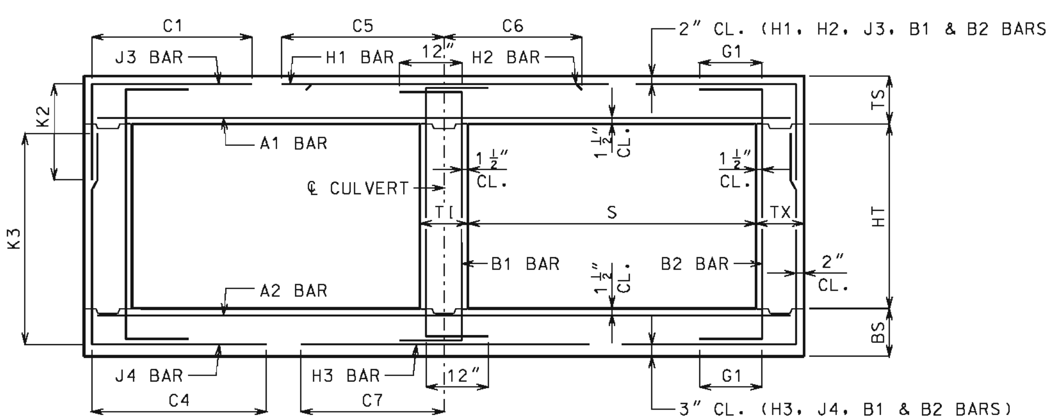
SPAN (S): 15 FEET
HEIGHT (HT): 8 THRU 13 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SPAN (S) = 15 FT HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=14'	K2 HT=15'	K2 HT=16'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=14'	K3 HT=15'	K3 HT=16'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	13	12	13	6	8	6	8.5	79.3	35.0	35.0	39.0	6	16	152.5	6	16	50.0	5	6	6	7	102.4	177	189	201	6	6	67.5	5	11	5	7	12
2 FT	16	14	12	13	6	7.5	5	6	76.3	36.0	36.0	36.0	6	15	149.5	6	15	48.5	6	8	6	7.5	96.3	178	190	202	6	6	67.0	5	12	5	7	12
4 FT	12	13	12	13	6	7	6	7	101.4	36.0	36.0	36.0	6	12	86.5	6	12	41.5	5	6	6	6.5	88.5	177	189	201	7	6.5	69.0	5	10.5	5	7	12
6 FT	13	14	12	13	6	8	6	6.5	86.3	37.0	37.0	37.0	7	16	74.5	7	16	43.5	6	8	6	6.5	82.9	178	190	202	7	6	68.0	5	12	5	7	12
8 FT	13	15	13	13	6	8	6	6.5	76.4	37.0	37.0	37.0	7	14	70.5	7	14	42.5	6	7.5	6	6.5	77.9	179	191	203	7	6	68.0	5	12	5	6.5	0
10 FT	15	17	13	13	6	8	6	6	80.6	39.0	39.0	39.0	7	14	77.5	7	14	50.5	6	7	6	6.5	76.0	181	193	205	7	6.5	67.5	5	12	5	6.5	0
12 FT	16	18	14	13	6	8	6	6	78.4	40.0	40.0	40.0	7	14	76.5	7	14	50.0	6	6.5	6	6.5	73.8	182	194	206	7	6	67.5	5	12	5	6	0
14 FT	17	20	14	13	6	7.5	7	7.5	81.6	41.0	41.0	41.0	7	13	75.5	7	13	50.0	6	6	6	6	72.9	184	196	208	7	6	67.5	5	12	5	6	0
16 FT	19	21	15	13	6	6.5	7	8	80.9	43.0	43.0	49.0	7	13	75.0	7	13	49.5	7	8	7	8	74.4	185	197	209	7	6	67.0	5	12	6	8	0
18 FT	20	23	16	13	6	6.5	7	8	80.1	44.0	44.0	44.0	7	13	74.0	7	13	49.5	7	7.5	6	6	70.8	187	199	211	7	6	67.0	5	12	6	8	0
20 FT	21	24	17	13	6	6	7	7.5	79.5	45.0	45.0	45.0	7	12	73.5	7	12	49.5	7	7	6	6	69.8	188	200	212	7	6	67.0	5	12	6	7.5	0
22 FT	23	26	17	13	7	7.5	7	7.5	78.9	47.0	47.0	47.0	7	12	73.0	7	12	49.0	7	7	6	6	69.4	190	202	214	7	6	67.0	5	12	6	7.5	0
24 FT	24	28	18	13	7	7	7	7.5	78.6	48.0	48.0	48.0	7	12	72.5	7	12	49.0	7	7	6	6.5	69.0	192	204	216	7	6	67.0	5	12	6	7	0
26 FT	26	29	18	13	7	7	7	7	78.1	50.0	50.0	50.0	7	12	71.5	7	12	49.0	7	6	6	6	68.5	193	205	217	8	7	73.0	5	12	6	7	0
28 FT	27	31	19	13	7	6.5	7	7	78.5	51.0	51.0	51.0	7	12	71.0	7	12	48.5	7	6.5	6	6	68.6	195	207	219	8	7	73.0	5	12	6	6.5	0
30 FT	28	32	19	13	7	6	7	6	78.1	52.0	52.0	52.0	7	12	70.5	7	12	48.5	7	6.5	6	6	68.5	196	208	220	8	7	73.0	5	12	6	6.5	0
32 FT	30	34	20	13	7	6	7	6.5	78.8	54.0	54.0	54.0	7	12	69.0	7	12	47.0	7	6.5	6	6	68.9	198	210	222	8	6.5	73.0	5	12	6	6.5	0
34 FT	31	35	20	13	7	6	7	6.5	76.3	55.0	55.0	55.0	8	15	76.0	8	15	54.0	7	6.5	6	6	66.4	199	211	223	8	6.5	73.0	5	12	6	6.5	0
36 FT	32	36	21	13	8	7.5	7	6.5	76.8	56.0	56.0	56.0	8	14	75.0	8	14	53.5	7	6	6	6	66.6	200	212	224	8	6	73.0	5	12	6	6	0
38 FT	33	37	21	13	8	7	7	6	76.8	57.0	57.0	57.0	8	14	74.0	8	14	53.0	7	6	6	6	66.6	201	213	225	8	6	73.0	5	12	6	6	0
40 FT	34	39	22	13	8	7	7	6	77.5	58.0	58.0	64.0	8	14	73.0	8	14	52.0	7	6	7	7.5	70.1	203	215	227	8	6	73.0	5	12	6	6	0
42 FT	35	40	23	13	8	7	7	6.5	78.1	59.0	59.0	65.0	8	13	72.5	8	13	51.0	7	6	7	7.5	70.4	204	216	228	9	7	79.0	5	12	7	7.5	0
44 FT	35	41	24	13	8	6	7	6	78.9	65.0	65.0	65.0	8	12	72.5	8	12	52.0	8	7.5	7	7	70.6	205	217	229	9	7	79.5	5	12	7	8	0
46 FT	36	42	25	13	8	6	7	6	79.5	66.0	66.0	66.0	8	12	72.0	8	12	51.0	8	7	7	7.5	70.9	206	218	230	9	7	79.5	5	12	7	8	0
48 FT	37	43	26	13	8	6.5	7	6	80.3	67.0	67.0	67.0	8	12	71.5	8	12	50.0	8	6.5	7	7.5	71.3	207	219	231	9	7	79.5	5	12	7	8	0
50 FT	38	45	27	13	8	6	7	6	81.1	68.0	68.0	68.0	8	12	71.0	8	12	49.0	8	7	7	7	71.8	209	221	233	9	6.5	79.5	5	12	7	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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 DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 15 FEET
HEIGHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

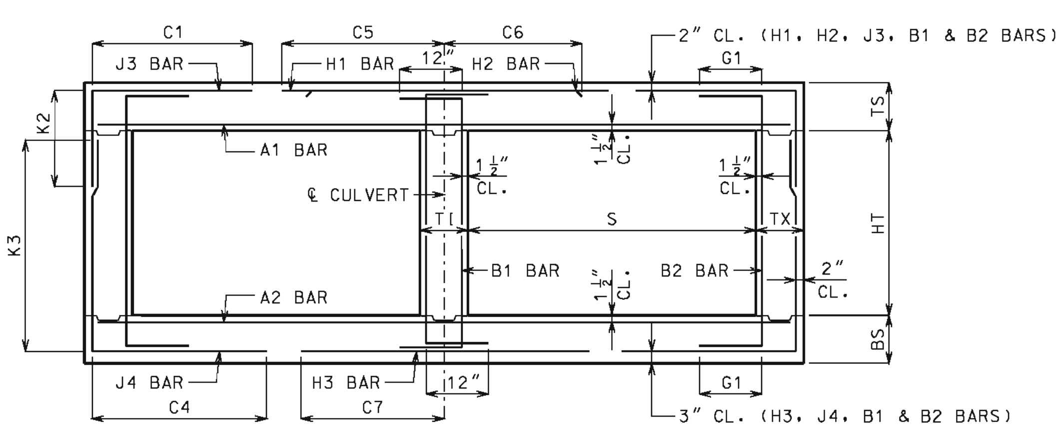
SHEET NO.

SPAN (S) = 16 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	HT=9'	HT=10'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	HT=9'	HT=10'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	8	8	6	7.5	5	8	76.5	35.0	35.0	35.0	6	15	154.5	6	15	54.0	5	6	6	7	66.9	104	116	128	7	7	72.5	5	12	5	12	12
2 FT	17	13	8	8	6	7	5	6.5	76.5	37.0	37.0	37.0	6	14	154.5	6	14	50.0	5	6	5	6	56.4	105	117	129	7	7	71.5	5	12	5	12	12
4 FT	13	13	8	8	6	6.5	6	7	55.6	33.0	33.0	33.0	7	14	97.0	7	14	45.5	5	6	5	6	49.6	105	117	129	7	6	71.0	5	12	5	12	12
6 FT	14	14	8	8	6	7	5	6	47.1	34.0	34.0	34.0	7	14	82.0	7	14	44.0	6	8	5	6	45.1	106	118	130	7	6	70.5	5	12	5	12	12
8 FT	15	16	8	8	6	7.5	5	6	48.4	35.0	35.0	35.0	7	13	84.0	7	13	51.0	6	7	5	7	41.9	108	120	132	7	6	70.0	5	12	5	11	0
10 FT	16	17	8	8	6	7	6	8	49.6	36.0	36.0	36.0	7	12	81.5	7	12	50.5	6	7	5	6.5	39.9	109	121	133	7	6	69.5	5	12	5	10	0
12 FT	18	19	8	8	6	7	6	7.5	47.5	38.0	38.0	38.0	7	12	80.0	7	12	50.0	6	6	5	6	38.6	111	123	135	7	6	69.5	5	12	5	9.5	0
14 FT	19	20	8	8	6	6.5	6	7	46.0	39.0	39.0	43.0	7	12	79.0	7	12	49.5	6	6	6	7.5	40.5	112	124	136	7	6	69.5	5	12	5	9.5	0
16 FT	21	22	8	8	6	6	6	7	44.9	45.0	45.0	45.0	7	12	78.0	7	12	49.5	7	7.5	6	7	39.9	114	126	138	7	6	69.5	5	12	5	8.5	0
18 FT	22	23	9	8	6	6	6	7.5	45.1	42.0	42.0	42.0	8	15	85.0	8	15	57.0	7	6.5	5	6	36.8	115	127	139	8	6.5	75.5	5	12	5	8.5	0
20 FT	24	25	9	8	7	7.5	6	7	44.4	48.0	48.0	48.0	8	15	84.0	8	15	57.0	7	7	6	7	39.4	117	129	141	8	7	75.5	5	12	5	8.5	0
22 FT	25	27	10	8	7	7	6	7.5	45.0	45.0	45.0	49.0	8	14	83.5	8	14	56.5	7	6.5	6	7	39.5	119	131	143	8	7	75.5	5	12	5	8	0
24 FT	27	29	10	8	7	6.5	6	6.5	44.5	51.0	51.0	51.0	8	14	82.5	8	14	56.5	7	6.5	6	6.5	39.3	121	133	145	8	7	75.0	5	12	5	8	0
26 FT	28	31	11	8	7	6	6	7.5	45.3	52.0	52.0	52.0	8	14	81.5	8	14	56.0	7	6.5	6	7	39.5	123	135	147	8	7	75.0	5	12	5	7.5	0
28 FT	30	32	11	8	7	6	6	7	44.9	54.0	54.0	54.0	8	14	80.5	8	14	56.0	7	6.5	6	6.5	39.6	124	136	148	8	7	75.0	5	12	5	7.5	0
30 FT	31	34	11	8	8	7.5	6	6	44.9	55.0	55.0	55.0	8	14	79.5	8	14	55.5	7	6.5	6	6	39.6	126	138	150	8	6.5	75.0	5	12	5	7	0
32 FT	32	35	12	8	8	7	6	7	45.8	56.0	56.0	56.0	8	14	78.5	8	14	55.0	7	6	6	6.5	40.0	127	139	151	8	6.5	75.0	5	12	5	7	0
34 FT	33	36	12	8	8	7	6	7	45.3	57.0	57.0	57.0	8	14	77.5	8	14	54.5	7	6	6	6.5	39.3	128	140	152	8	6	75.0	5	12	5	7	0
36 FT	35	38	12	8	8	6.5	6	6.5	45.3	59.0	59.0	59.0	8	13	75.0	8	13	52.0	7	6	6	6	39.3	130	142	154	8	6	75.0	5	12	5	7	0
38 FT	36	39	12	8	8	6.5	6	6.5	45.3	60.0	60.0	60.0	8	13	74.0	8	13	51.5	7	6	6	6	39.3	131	143	155	8	6	75.0	5	12	5	6.5	0
40 FT	37	41	12	8	8	6.5	6	6	45.3	61.0	61.0	61.0	8	12	73.5	8	12	50.5	7	6	7	6.5	42.5	133	145	157	9	7	80.5	5	11	5	6	0
42 FT	38	42	12	8	8	6	6	6	45.3	62.0	62.0	62.0	8	12	73.0	8	12	50.0	7	6	7	6	42.6	134	146	158	9	7	80.5	5	7	6	8	0
44 FT	39	43	13	9	8	6	6	6	45.8	63.0	63.0	63.0	8	12	73.5	8	12	50.5	8	7.5	7	6.5	43.1	135	147	159	9	7	81.0	5	12	5	6	0
46 FT	40	44	13	9	8	6	7	7	50.8	70.0	70.0	70.0	8	12	73.0	8	12	49.5	8	7.5	7	6.5	43.4	136	148	160	9	6.5	80.5	5	12	6	8	0
48 FT	41	45	13	9	9	7.5	7	7	50.8	71.0	71.0	71.0	9	15	80.5	9	15	56.5	8	7	7	6.5	43.5	137	149	161	9	6.5	80.5	5	12	6	7.5	0
50 FT	42	46	13	9	9	7	7	6.5	50.8	72.0	72.0	72.0	9	14	80.0	9	14	56.0	8	7	7	6	43.8	138	150	162	9	6.5	80.5	5	9.5	6	7	0

SPAN (S) = 16 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	HT=13'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	HT=13'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	13	9	10	6	7.5	5	6	77.5	35.0	35.0	35.0	6	15	155.5	6	15	53.5	5	6	6	6	89.5	141	153	165	6	6	70.0	5	11.5	5	8.5	12
2 FT	17	14	9	10	6	7.5	5	6.5	77.5	37.0	37.0	37.0	6	14	155.5	6	14	50.0	6	8	6	6.5	79.8	142	154	166	6	6	69.5	5	12	5	8.5	12
4 FT	13	13	10	10	6	6.5	6	7	76.9	33.0	37.0	37.0	7	15	96.5	7	15	46.0	5	6	6	6.5	70.0	141	153	165	7	6	71.5	5	11	5	8.5	12
6 FT	13	14	10	10	6	7	6	7	65.3	33.0	37.0	37.0	7	13	79.5	7	13	44.0	6	8	6	6.5	64.5	142	154	166	7	6	71.0	5	12	5	8	12
8 FT	14	16	10	10	6	7	6	6.5	60.3	34.0	34.0	38.0	7	13	75.0	7	13	43.0	6	7	6	7	60.6	144	156	168	7	6	70.5	5	12	5	8	0
10 FT	16	17	10	10	6	7	6	6.5	63.1	36.0	40.0	40.0	7	13	81.5	7	13	51.0	6	7	6	6.5	57.8	145	157	169	7	6	70.0	5	12	5	8	0
12 FT	17	19	11	10	6	7	6	6.5	62.3	37.0	37.0	41.0	7	12	80.0	7	12	50.5	6	6	6	7.5	56.5	147	159	171	7	6	70.0	5	12	5	7.5	0
14 FT	19	21	12	10	6	6.5	6	7	61.5	39.0	39.0	43.0	7	12	78.5	7	12	50.5	7	8	6	8	55.8	149	161	173	7	6	70.0	5	12	5	7	0
16 FT	20	22	12	10	6	6.5	6	6.5	60.3	40.0	40.0	44.0	7	12	78.0	7	12	50.0	7	7.5	6	7	54.6	150	162	174	7	6	70.0	5	12	5	7	0
18 FT	22	24	12	10	6	6	6	6	59.3	42.0	46.0	46.0	7	12	77.0	7	12	50.0	7	7	6	6.5	54.0	152	164	176	7	6	69.5	5	12	5	7	0
20 FT	23	25	13	10	7	7.5	6	6	59.1	43.0	43.0	47.0	8	15	84.5	8	15	57.5	7	6.5	6	7	53.6	153	165	177	8	7	75.5	5	12	5	6.5	0
22 FT	25	27	13	10	7	7	6	6	58.4	45.0	45.0	49.0	8	15	83.5	8	15	57.5	7	6.5	6	7	53.1	155	167	179	8	7	75.5	5	12	5	6.5	0
24 FT	27	29	14	10	7	6.5	6	6	58.6	51.0	51.0	51.0	8	15	82.5	8	15	57.0	7	6.5	6	7.5	53.3	157	169	181	8	7	75.5	5	12	5	6	0
26 FT	28	31	14	10	7	6.5	6	6	58.3	52.0	52.0	52.0	8	14	82.0	8	14	57.0	7	6.5	6	7.5	52.9	159	171	183	8	7	75.5	5	12	5	6	0
28 FT	30	33	15	10	7	6	6	6	58.8	54.0	54.0	54.0	8	15	80.5	8	15	56.5	7	6.5	6	7	53.3	161	173	185	8	6.5	75.5	5	12	6	8	0
30 FT	31	34	15	10	8	7.5	7	8	63.5	55.0	55.0	55.0	8	15	79.5	8	15	56.0	7	6	6	7	53.1	162	174	186	8	6.5	75.5	5	12	6	8	0
32 FT	32	35	15	10	8	7.5	7	7	63.3	56.0	56.0	56.0	8	14	79.0	8	14	55.5	7	6	6	6.5	53.0	163	175	187	8	6.5	75.5	5	12	6	8	0
34 FT	33	37	16	10	8	7	7	7.5	64.0	57.0	57.0	57.0	8	14	77.5	8	14	55.0	7	6	6	6.5	53.5	165	177	189	8	6	75.5	5	12	6	8	0
36 FT	34	38	16	10	8	7	7	7.5	62.4	58.0	58.0	58.0	8	14	76.5	8	14	54.0	7	6	6	6	51.9	166	178	190	8	6	75.5	5	12	6	8	0
38 FT	35	40	16	10	8	6.5	7	7	62.4	59.0	59.0	59.0	8	13	75.0	8	13	53.5	7	6	6	6	52.0	168	180	192	9	7	81.5	5	12	6	8	0
40 FT	36	41	17	10	8	6	7	7.5	63.1	60.0	60.0	66.0	8	12	74.5	8	12	52.5	8	7.5	7	8	55.5	169	181	193	9	7	81.5	5	12	6	7.5	0
42 FT	38	42	17	10	8	6	7	7.5	62.9	62.0	62.0	68.0	8	12	73.5	8	12	50.0	8	7.5	7	7.5	55.8	170	182	194	9	7	81.5	5	12	6	7.5	0
44 FT	39	43	18	10	8	6	7	7.5	63.8	63.0	63.0	69.0	8	12	73.0	8	12	49.0	8	7	7	7.5	56.1	171	183	195	9	7	81.5	5	12	6	7	0
46 FT	40	44	18	10	8	6	7	7.5	63.6	70.0	70.0	70.0	8	12	72.0	8	12	48.5	8	6.5	7	7	56.3	172	184	196	9	6.5	81.5	5	12	6	7	0
48 FT	40	46	19	10	8	6	7	7	64.8	70.0	70.0	70.0	8	12	72.0	8	12	49.0	8	7	7	7	56.6	174	186	198	9	6.5	81.5	5	12	6	6.5	0
50 FT	41	47	19	10	9	7.5	7	6.5	64.6	71.0	71.0	71.0	8	12	71.5	8	12	48.5	8	7	7	6.5	56.9	175	187	199	9	6	81.5	5	12	6	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

CONCRETE DOUBLE BOX CULVERT

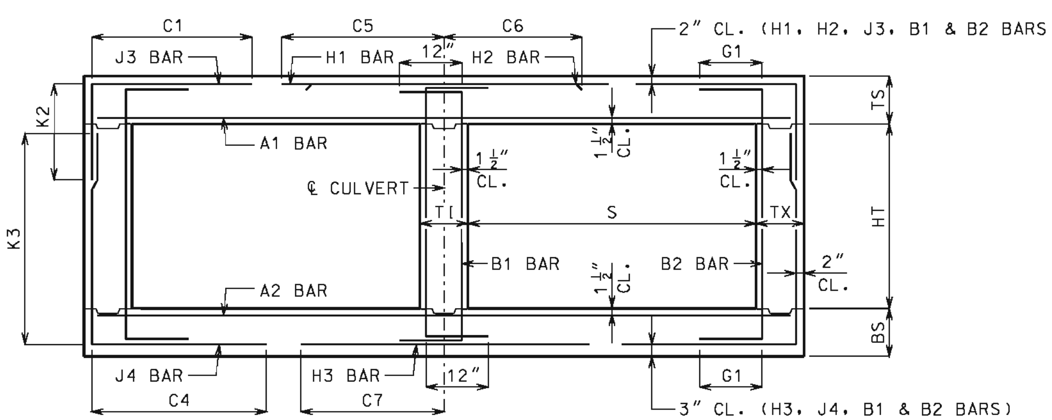
MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 16 FEET
HEIGHT (HT): 8 THRU 13 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SPAN (S) = 16 FT HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT																																		
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS						H1 BARS			H2 BARS			A2 BARS		J4 BARS						H3 BARS			B1 BARS		B2 BARS		
										K2														K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=14′	HT=15′	HT=16′	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=14′	HT=15′	HT=16′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	13	12	13	6	7.5	6	8	82.9	35.0	35.0	39.0	6	15	160.5	6	15	53.0	5	6	6	7	101.1	177	189	201	6	6	70.5	5	10	5	7	12
2 FT	17	14	12	13	6	7.5	6	8.5	82.9	37.0	37.0	41.0	6	14	160.5	6	14	50.0	6	8	6	7	95.1	178	190	202	7	7	73.0	5	12	5	7	12
4 FT	13	13	12	13	6	7	6	7	99.8	37.0	37.0	37.0	7	15	94.0	7	15	46.0	6	8.5	6	6	86.1	177	189	201	7	6	72.0	5	11	5	7	12
6 FT	13	15	12	13	6	7	6	6.5	82.6	37.0	37.0	37.0	7	14	77.5	7	14	44.5	6	7.5	6	6.5	82.5	179	191	203	7	6	71.5	5	12	5	7	12
8 FT	14	16	13	13	6	7.5	6	6.5	76.6	38.0	38.0	38.0	7	13	74.5	7	13	44.0	6	7	6	6.5	77.6	180	192	204	7	6	71.0	5	12	5	6.5	0
10 FT	15	18	13	13	6	6.5	6	6	79.5	39.0	39.0	39.0	7	13	80.5	7	13	51.5	6	6.5	6	6	75.6	182	194	206	7	6	71.0	5	12	5	6.5	0
12 FT	17	19	14	13	6	7	6	6	77.8	41.0	41.0	41.0	7	13	79.5	7	13	51.5	6	6	6	6	73.1	183	195	207	7	6	70.5	5	12	5	6	0
14 FT	18	21	15	13	6	7	6	6	76.3	42.0	42.0	42.0	7	12	78.5	7	12	51.0	7	8	6	6	71.8	185	197	209	7	6	70.5	5	12	6	8	0
16 FT	20	22	15	13	6	6.5	7	7.5	79.9	44.0	44.0	44.0	7	12	78.0	7	12	51.0	7	7.5	6	6	70.3	186	198	210	7	6	70.0	5	12	6	8	0
18 FT	22	24	15	13	6	6	7	7	78.8	46.0	46.0	52.0	7	12	77.5	7	12	51.0	7	7	7	7	72.4	188	200	212	7	6	70.0	5	12	6	8	0
20 FT	23	25	16	13	7	7.5	7	7	78.0	47.0	47.0	53.0	8	15	85.0	8	15	58.5	7	6	7	7.5	71.4	189	201	213	8	7	76.0	5	12	6	8	0
22 FT	25	27	17	13	7	7	7	7.5	77.8	49.0	49.0	49.0	7	12	76.0	7	12	50.5	7	6	6	6	68.0	191	203	215	8	7	76.0	5	12	6	7.5	0
24 FT	26	29	17	13	7	7	7	7	76.9	50.0	50.0	56.0	8	15	83.5	8	15	58.5	7	6.5	7	7.5	70.4	193	205	217	8	7	76.0	5	12	6	7.5	0
26 FT	28	31	18	13	7	6.5	7	7	76.9	52.0	52.0	52.0	8	15	82.5	8	15	58.0	7	6.5	6	6	67.1	195	207	219	8	7	76.5	5	12	6	7	0
28 FT	29	33	19	13	7	6	7	7	77.1	53.0	53.0	53.0	8	15	82.0	8	15	58.0	7	6	6	6	67.1	197	209	221	8	6.5	76.5	5	12	6	6.5	0
30 FT	31	34	19	13	8	7.5	7	6.5	76.8	55.0	55.0	55.0	8	15	80.5	8	15	57.0	7	6	6	6	67.0	198	210	222	8	6.5	76.0	5	12	6	6.5	0
32 FT	32	36	20	13	8	7.5	7	6.5	77.3	56.0	56.0	56.0	8	14	79.5	8	14	56.5	7	6	6	6	67.3	200	212	224	8	6	76.5	5	12	6	6.5	0
34 FT	33	37	21	13	8	7	7	6.5	77.6	57.0	57.0	57.0	8	14	78.5	8	14	55.5	7	6	6	6	67.3	201	213	225	8	6	76.5	5	12	6	6	0
36 FT	34	38	21	13	8	7	7	6.5	75.5	58.0	58.0	58.0	8	14	77.5	8	14	55.0	8	7	6	6	64.9	202	214	226	8	6	76.5	5	12	6	6	0
38 FT	35	40	21	13	8	6.5	7	6	75.5	59.0	59.0	59.0	8	13	76.5	8	13	54.0	8	7.5	6	6	65.1	204	216	228	9	7	82.0	5	12	6	6	0
40 FT	36	41	22	13	8	6.5	7	6	76.1	66.0	66.0	66.0	8	13	75.5	8	13	53.5	8	7.5	7	7.5	68.5	205	217	229	9	7	82.0	5	12	6	6	0
42 FT	37	42	23	13	8	6.5	7	6.5	76.9	67.0	67.0	67.0	8	12	75.0	8	12	52.5	8	6.5	7	7.5	68.8	206	218	230	9	7	82.5	5	12	7	7.5	0
44 FT	38	44	24	13	8	6	7	6	77.6	68.0	68.0	68.0	8	12	74.5	8	12	52.0	8	7	7	7	69.4	208	220	232	9	6.5	82.5	5	12	7	7.5	0
46 FT	39	45	25	13	8	6	7	6	78.4	69.0	69.0	69.0	8	12	74.0	8	12	51.0	8	7	7	7	69.8	209	221	233	9	6.5	82.5	5	12	7	7.5	0
48 FT	40	46	26	13	8	6	7	6	79.1	70.0	70.0	70.0	8	12	73.5	8	12	50.0	8	6.5	7	7	70.1	210	222	234	9	6.5	82.5	5	12	7	8	0
50 FT	41	47	27	13	9	7.5	7	6	79.9	71.0	71.0	71.0	8	12	73.0	8	12	49.5	8	6	7	6.5	70.5	211	223	235	9	6	82.5	5	12	7	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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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 DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

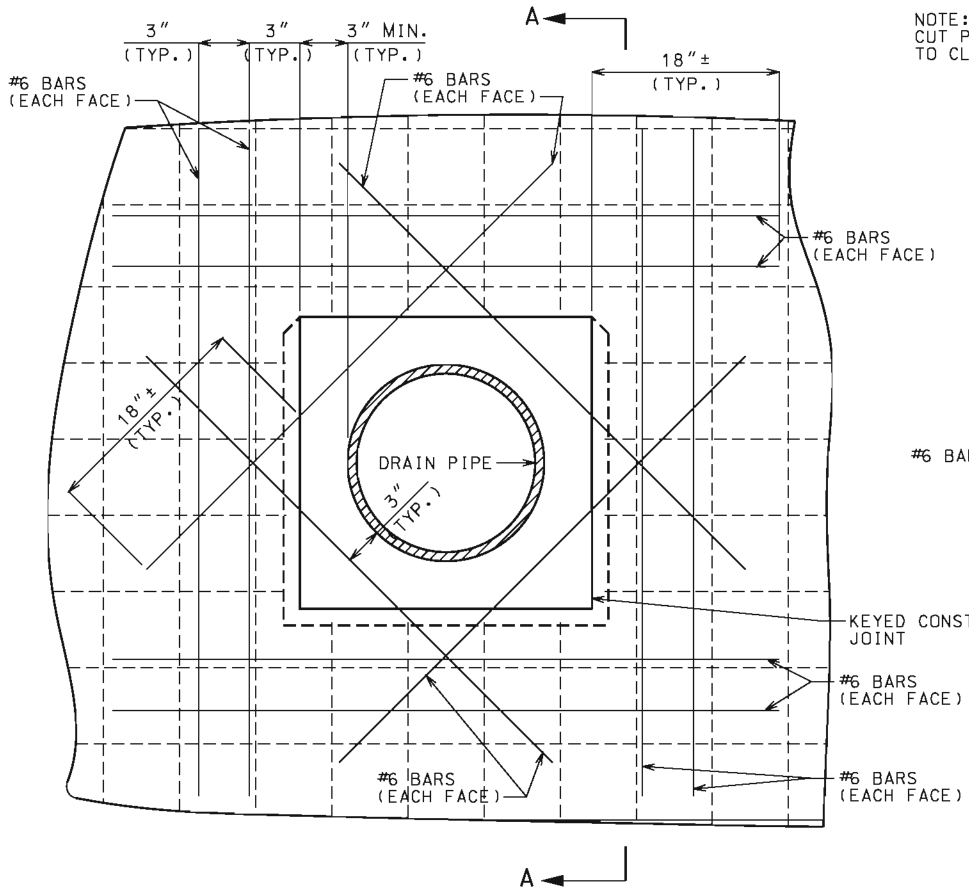
SPAN (S): 16 FEET
HEIGHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

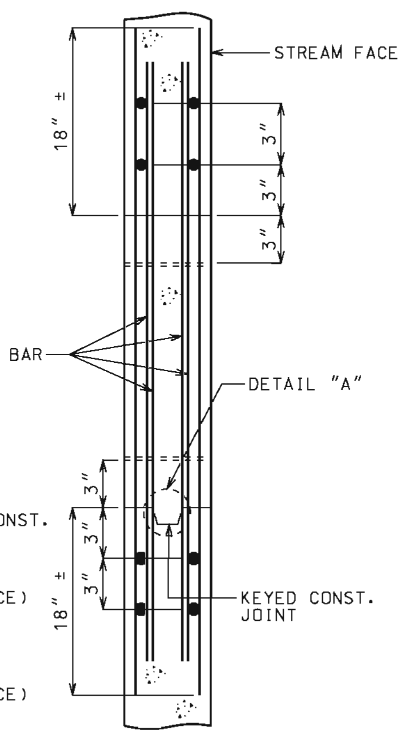
SHEET NO.

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

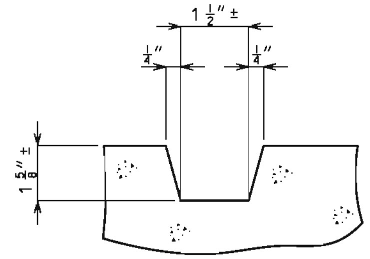


PART ELEVATION OF EXTERIOR WALL
(PIPE DIAMETER = 24″ OR MORE)
(WALL THICKNESS = 12″ OR MORE)

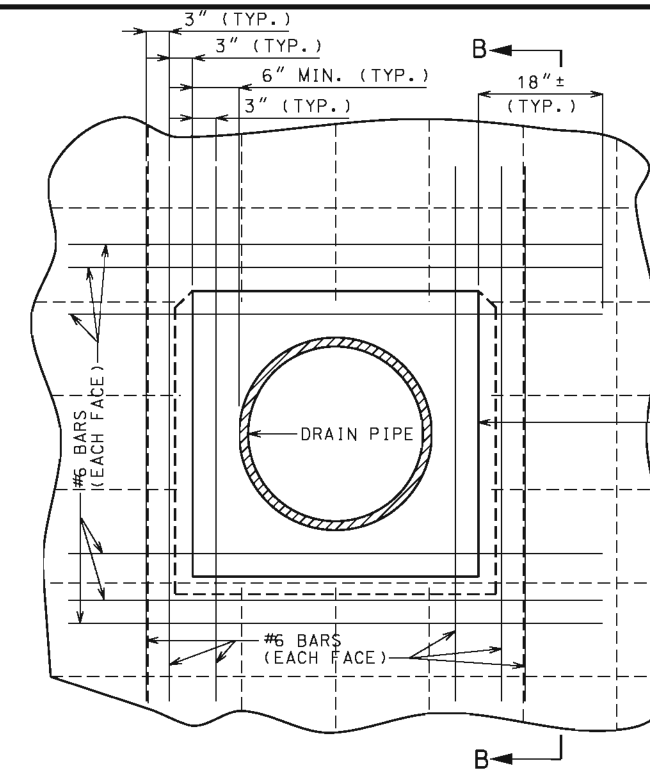
NOTE:
CUT PLAN REINFORCING BARS TO CLEAR PIPE BLOCK-OUT.



SECTION A-A

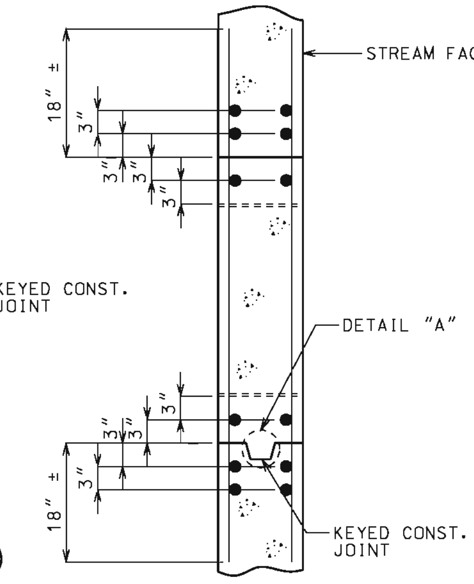


DETAIL "A"
(KEYED JOINT)



PART ELEVATION OF EXTERIOR WALL
(PIPE DIAMETER = 24″ OR MORE)
(WALL THICKNESS = 8″ TO 12″)

NOTE:
CUT PLAN REINFORCING BARS TO CLEAR PIPE BLOCK-OUT.



SECTION B-B

NOTE:
DASHED BARS REPRESENT PLAN REINFORCEMENT.

SOLID BARS INDICATE ADDITIONAL #6 BARS.

BAR COVER FROM FACE OF CONCRETE = 1-1/2″ CLEAR.

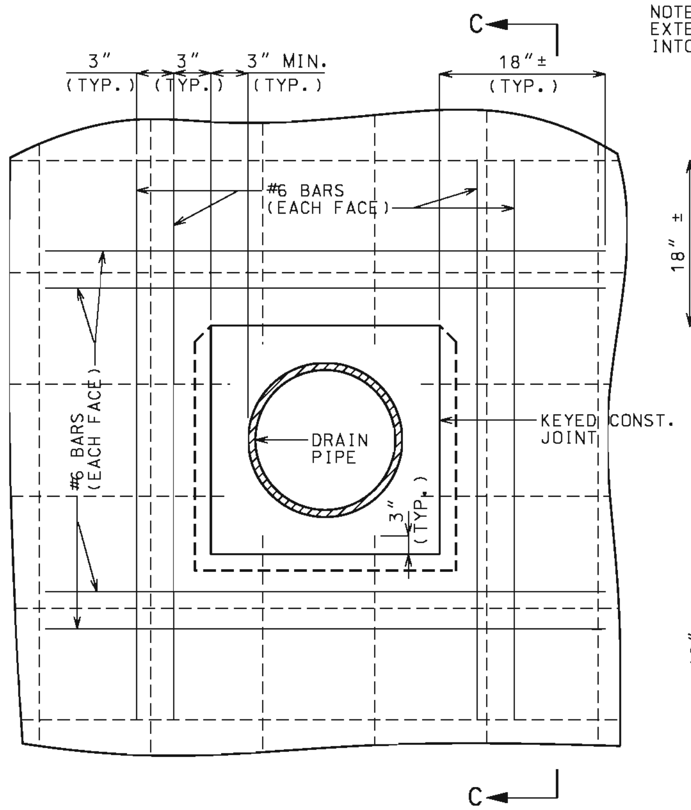
SEE ROAD PLANS FOR LOCATION, SIZE AND TYPE OF PIPE.

PLACE 5/16″ JOINT FILLER AROUND REINFORCED CONCRETE PIPE AND EMULSIFIED ASPHALT AROUND CORRUGATED METAL PIPE AT PIPE INLET.

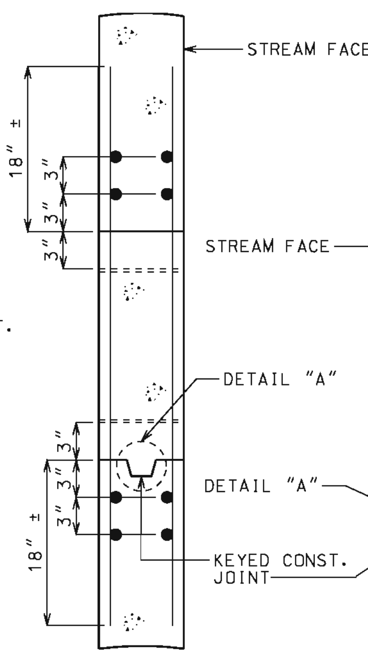
THE BLOCK-OUT MAY BE ELIMINATED AT CONTRACTORS ELECTION. IF BLOCK-OUT IS ELIMINATED, REINFORCEMENT SHALL BE AS SHOWN EXCEPT PLAN REINFORCEMENT MAY BE BENT TO CLEAR PIPE.

ADDITIONAL REINFORCEMENT REQUIRED FOR BLOCK-OUT IS NOT INCLUDED IN ESTIMATED QUANTITIES. NO SEPARATE PAYMENT WILL BE MADE FOR ADDITIONAL REINFORCING REQUIRED.

NOTE:
EXTEND PLAN REINFORCING BARS INTO PIPE BLOCK-OUT AS SHOWN.

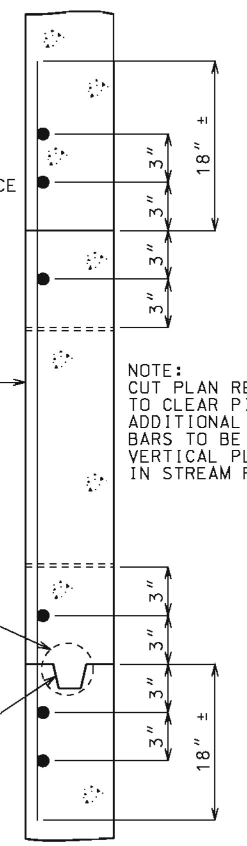


PART ELEVATION OF EXTERIOR WALL
(PIPE DIAMETER = LESS THAN 24″)
(WALL THICKNESS = 8″ OR MORE)

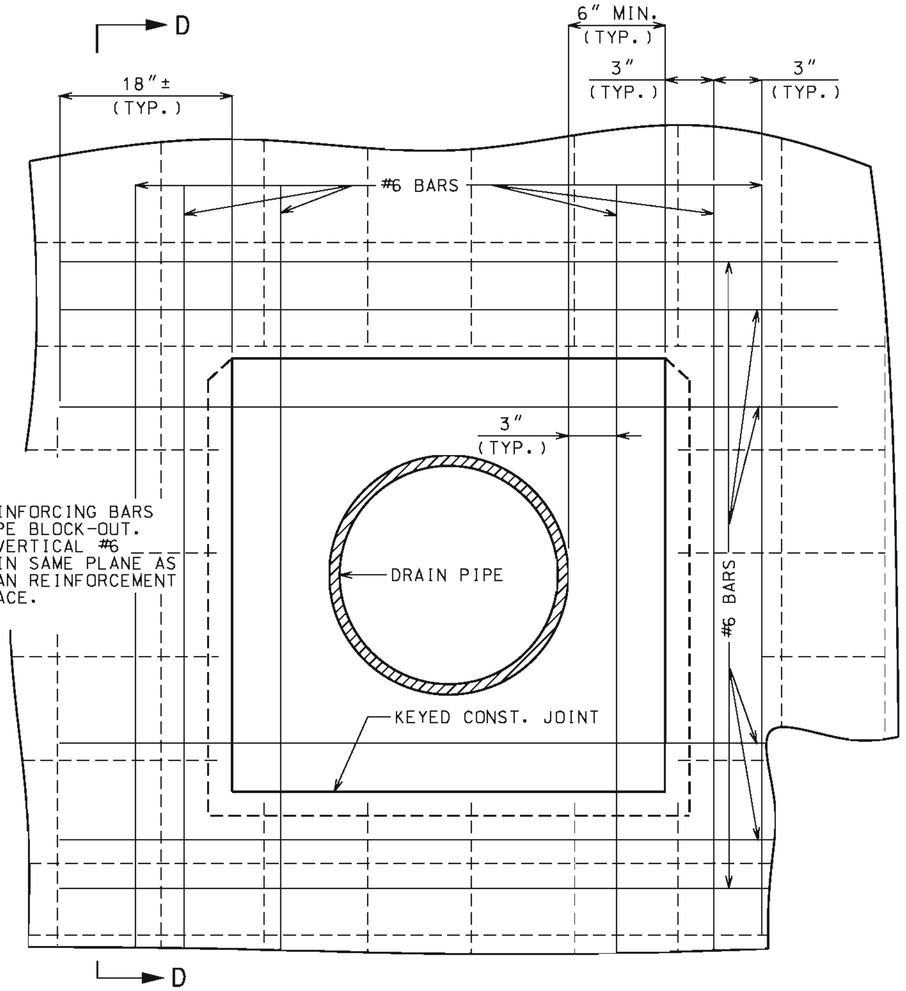


SECTION C-C

NOTE:
CUT PLAN REINFORCING BARS TO CLEAR PIPE BLOCK-OUT. ADDITIONAL VERTICAL #6 BARS TO BE IN SAME PLANE AS VERTICAL PLAN REINFORCEMENT IN STREAM FACE.



SECTION D-D



PART ELEVATION OF EXTERIOR WALL
(PIPE DIAMETER = 36″ OR LESS)
(WALL THICKNESS = LESS THAN 8″)

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

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE BOX STRUCTURE PIPE INLET

DATE EFFECTIVE:	07/01/2001	703.60E	SHEET NO. 1 OF 1
DATE PREPARED:	9/3/2009		

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

LAYING OUT TRANVERSE JOINTS
UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

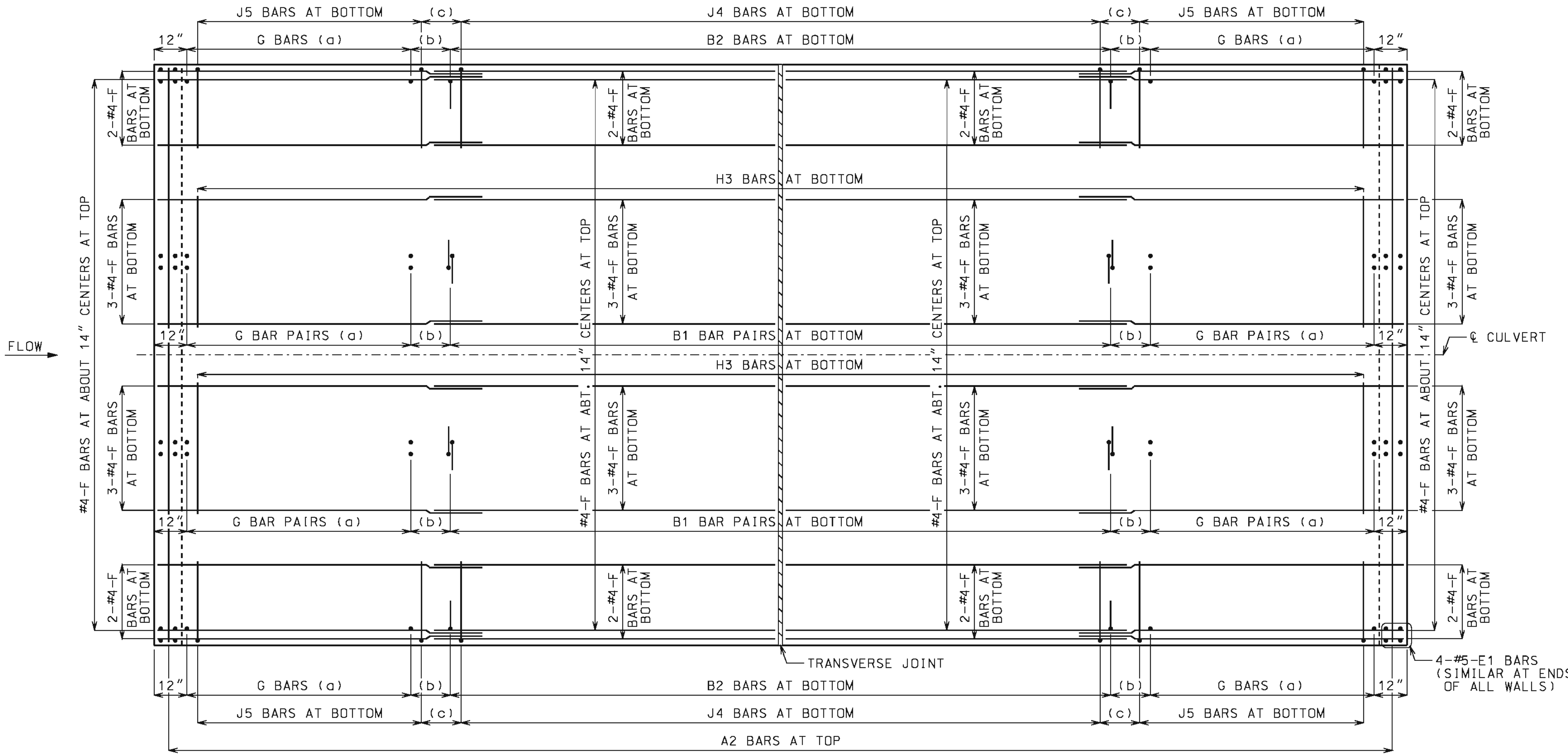
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

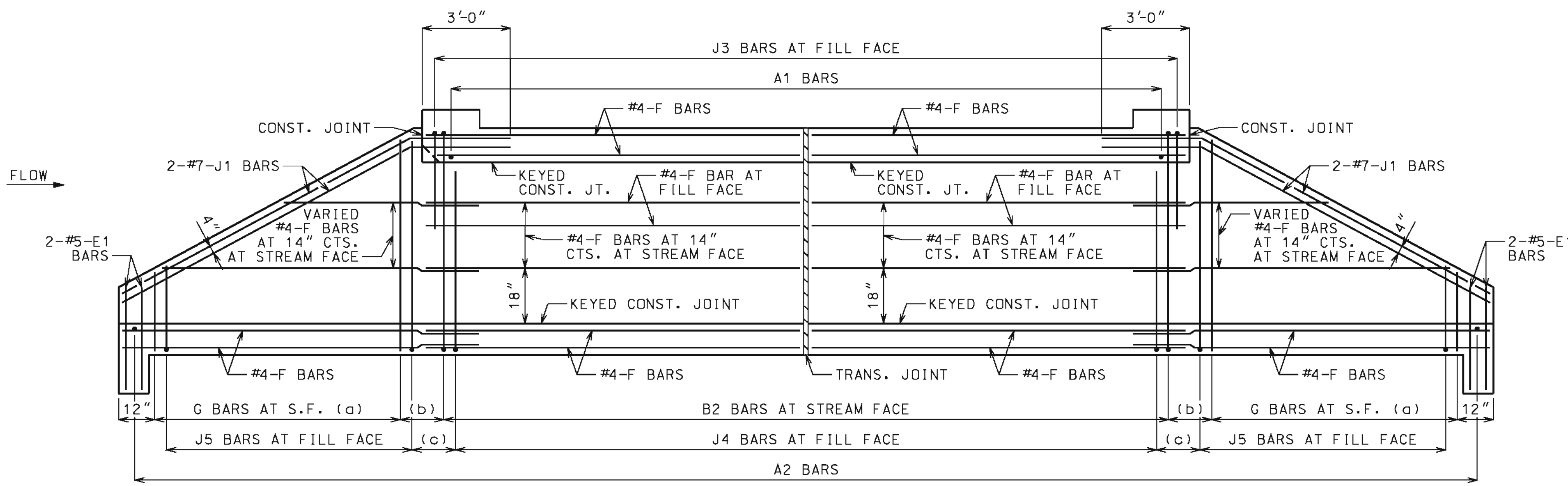
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

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

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

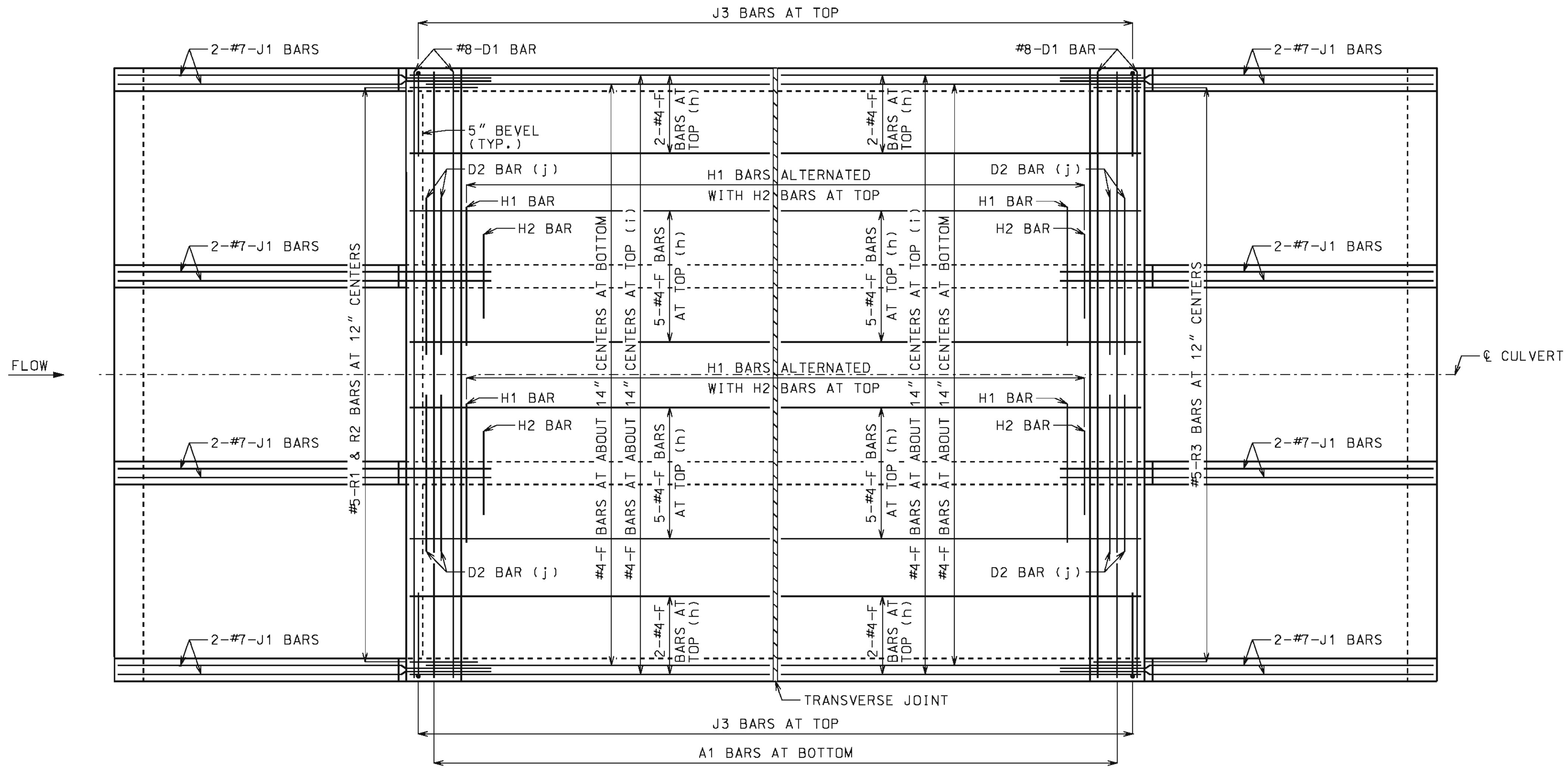
SKEW: SQUARED
WINGS: STRAIGHT

REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

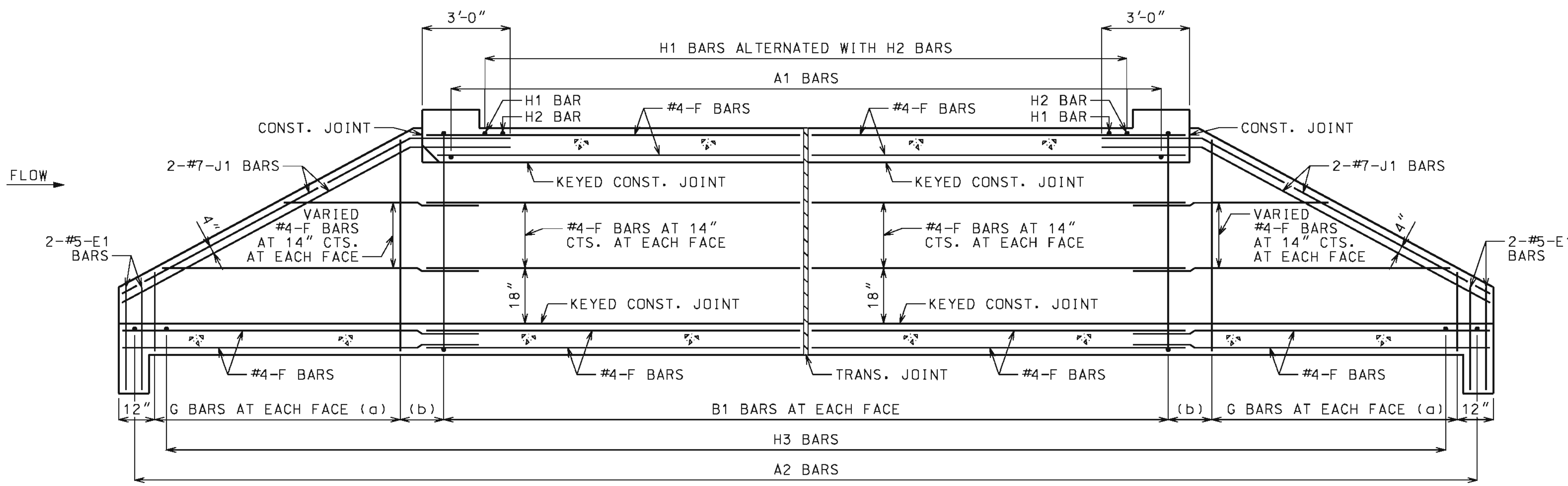
703.80H

SHEET NO. 1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) NOT SPECIFIED ON THIS SHEET

(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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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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

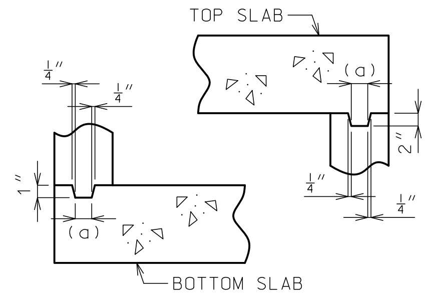
REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

703.80H

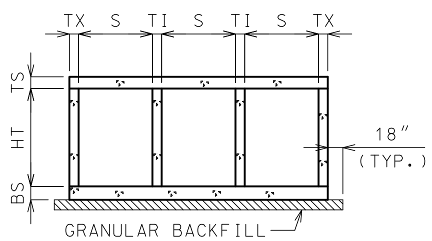
SHEET NO. 2 OF 3

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

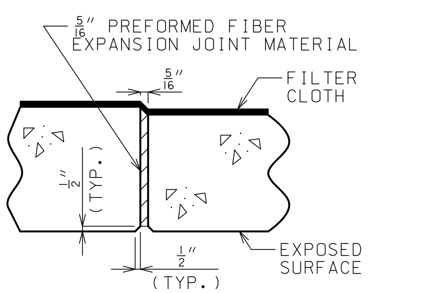


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



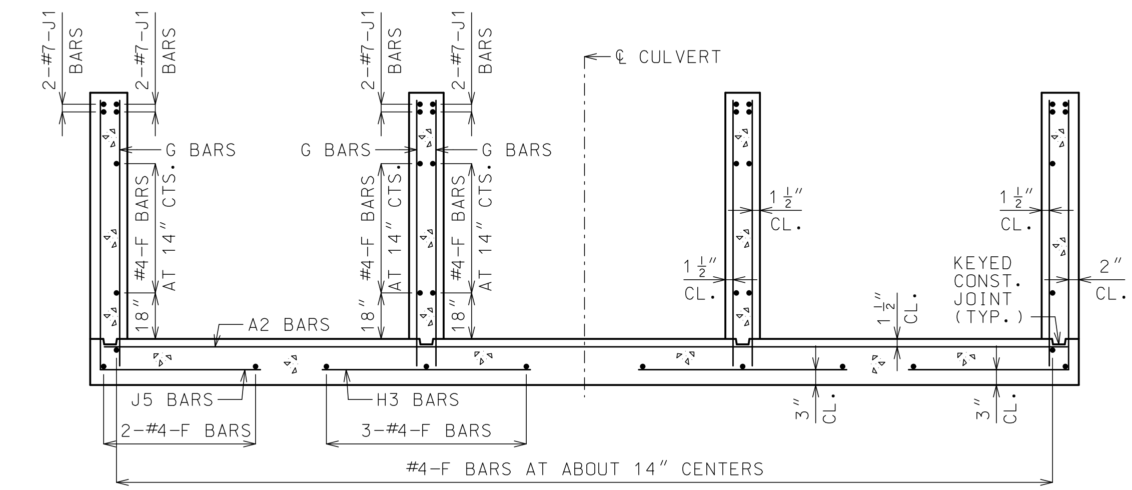
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



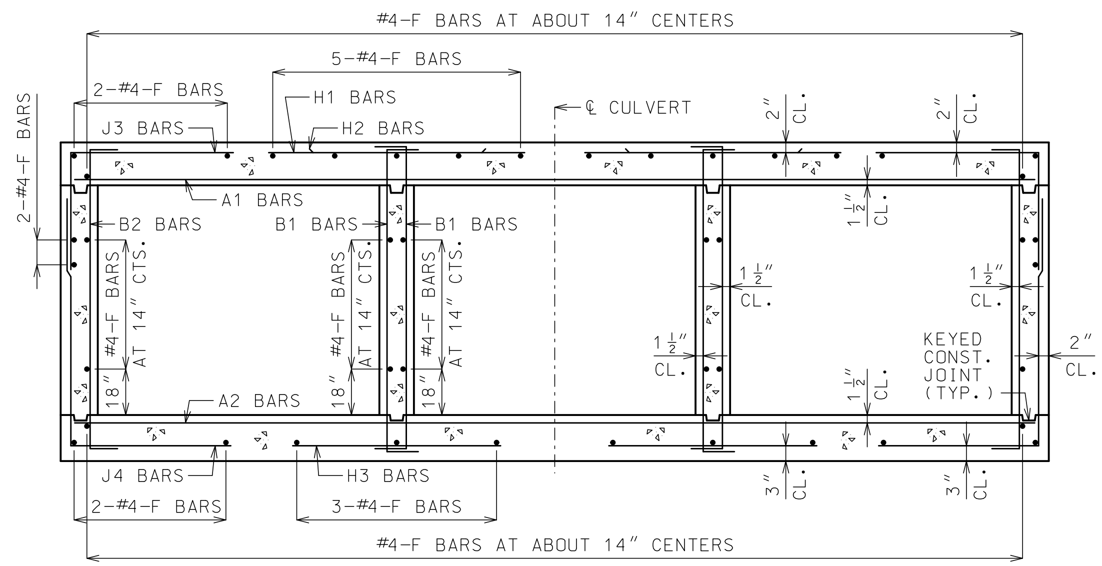
TRANSVERSE JOINT THRU BARREL

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.

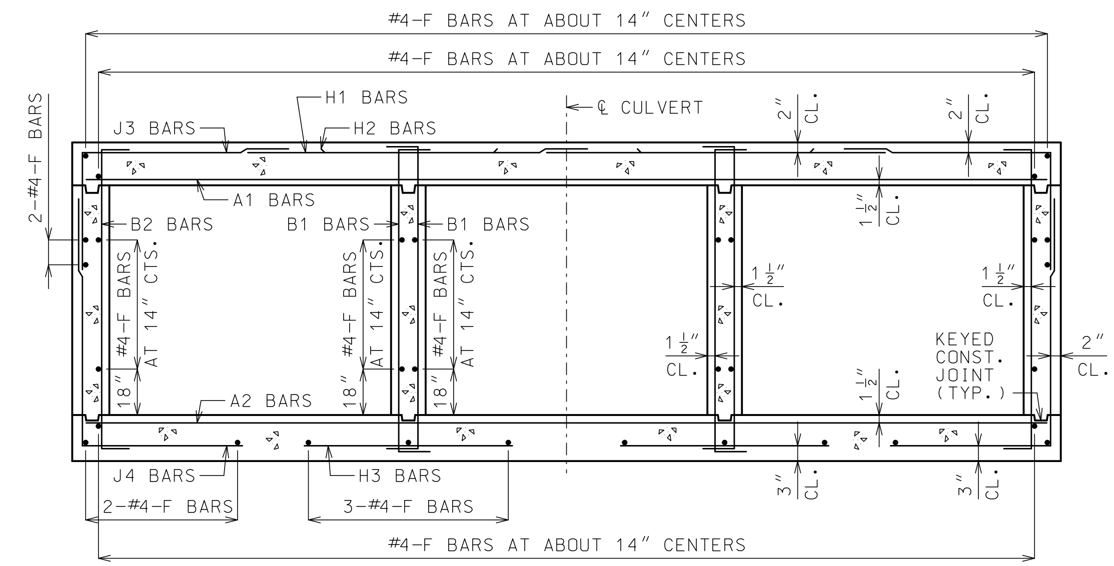


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



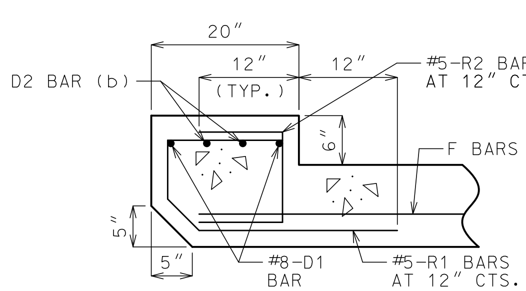
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2′-0″



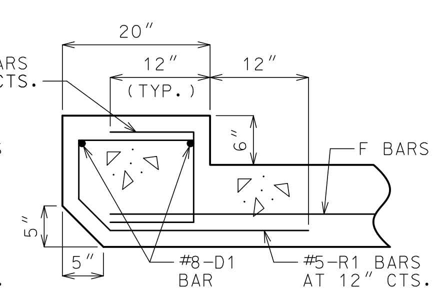
BARREL REINFORCEMENT

FOR DESIGN FILLS 2′-0″ OR LESS



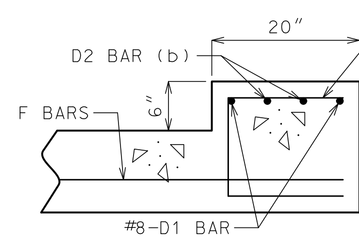
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



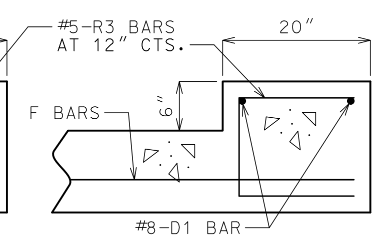
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) 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 ℄ 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.

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 ℄ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

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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	703.80H	SHEET NO.
DATE PREPARED:	10/14/2020		3 OF 3

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

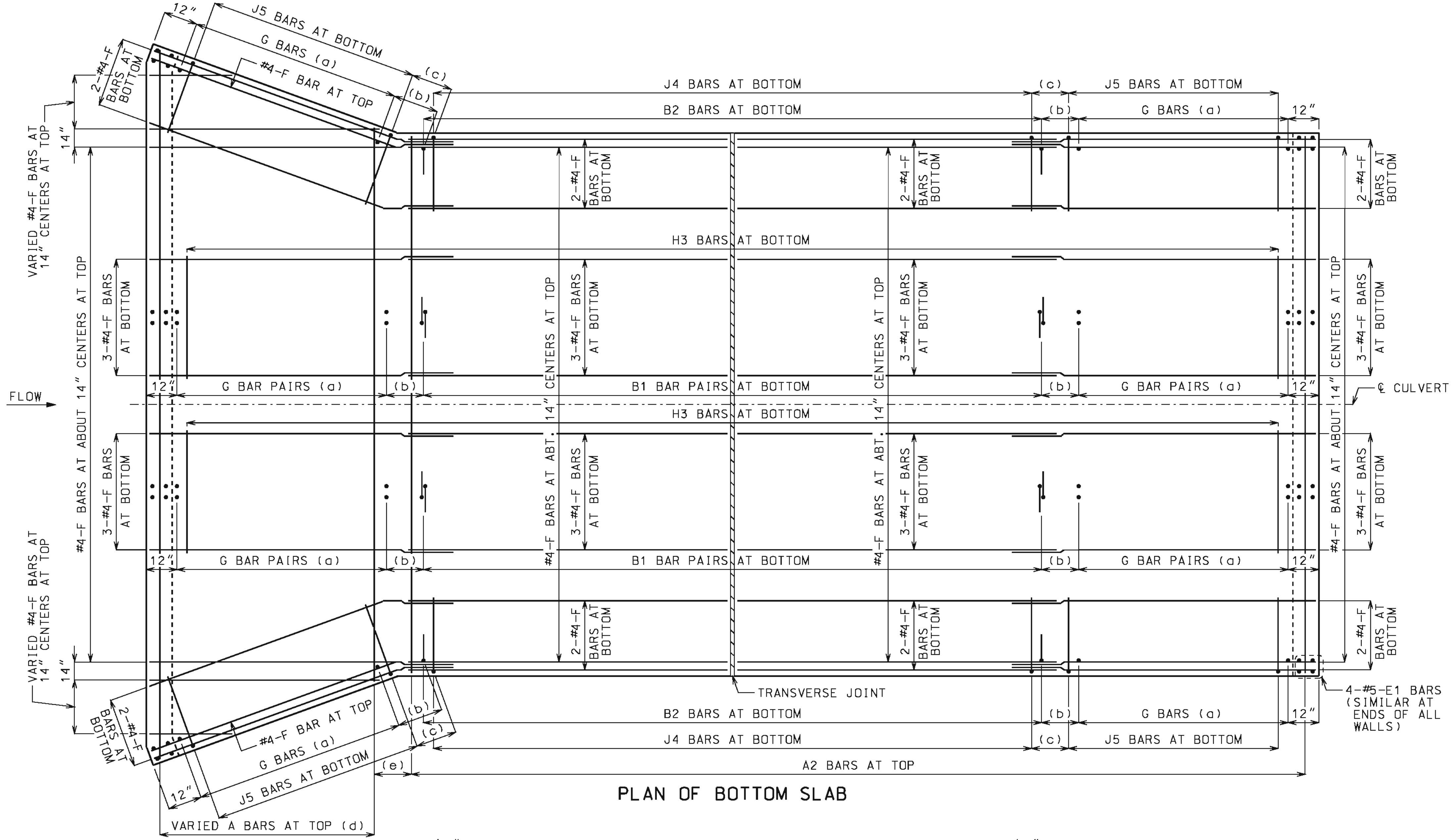
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

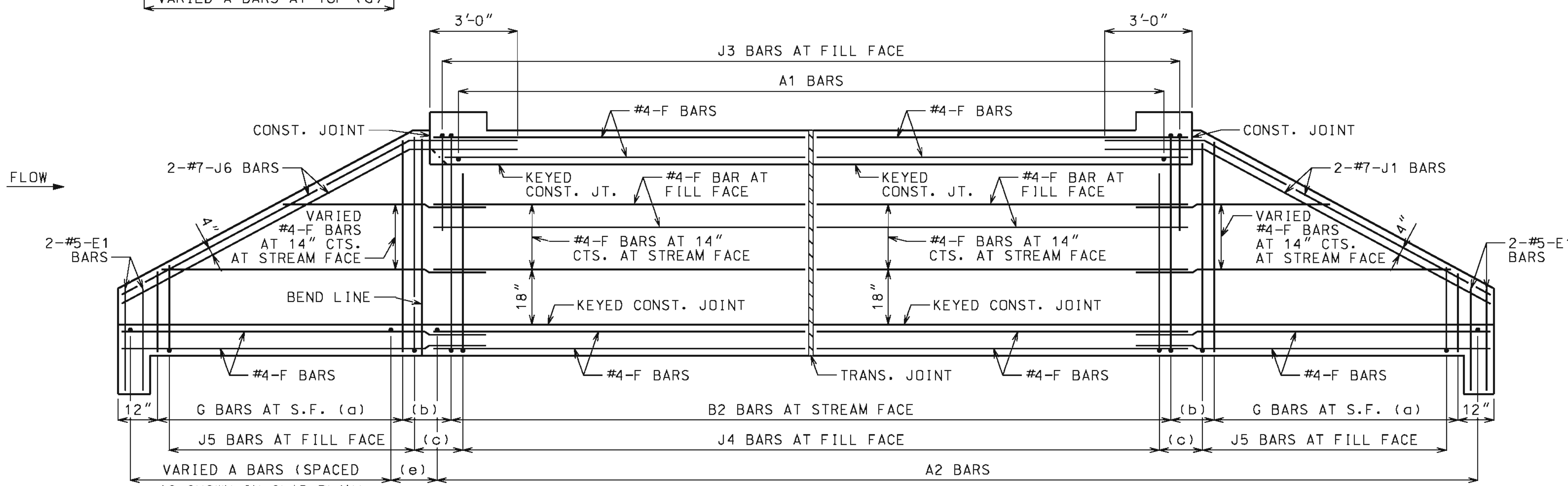
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

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

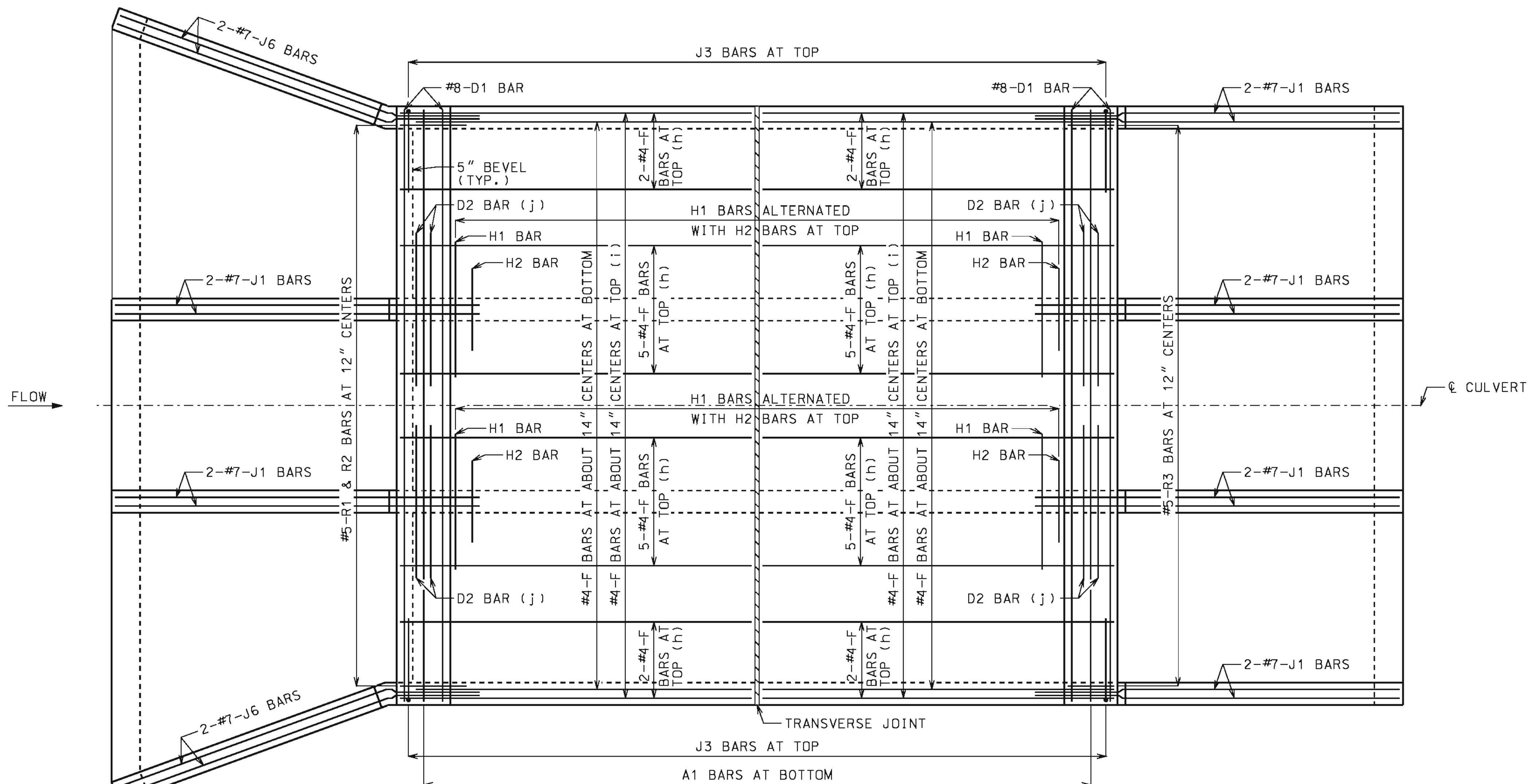
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

SKEW: SQUARED
WINGS: FLARED

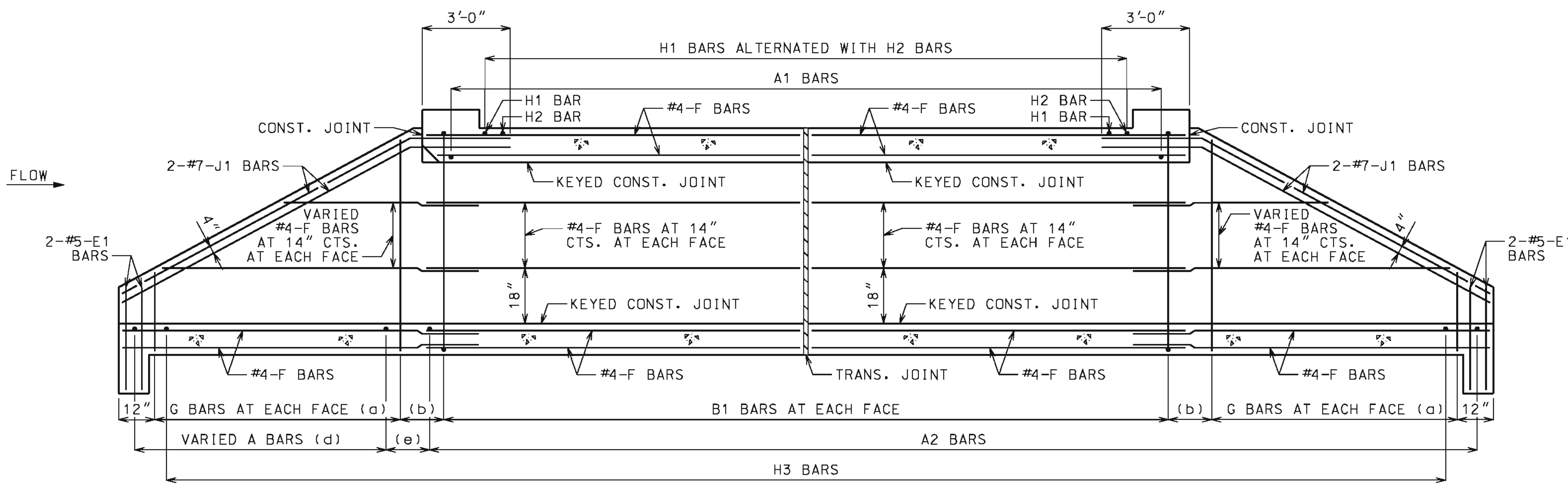
REINFORCEMENT

DATE EFFECTIVE:	12/01/2011	703.81H	SHEET NO.
DATE PREPARED:	5/13/2015		1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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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NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

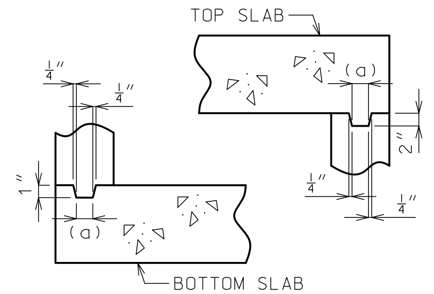
SKEW: SQUARED
WINGS: FLARED

REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

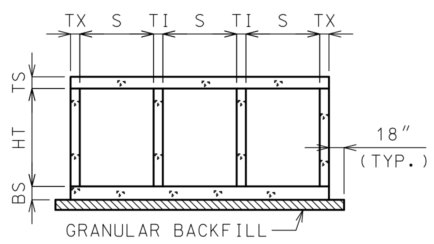
703.81H

SHEET NO.
2 OF 3

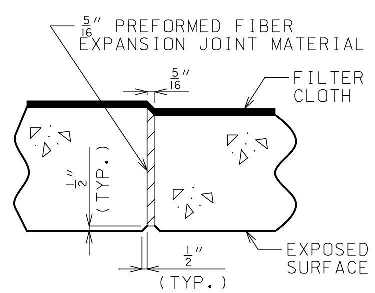


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



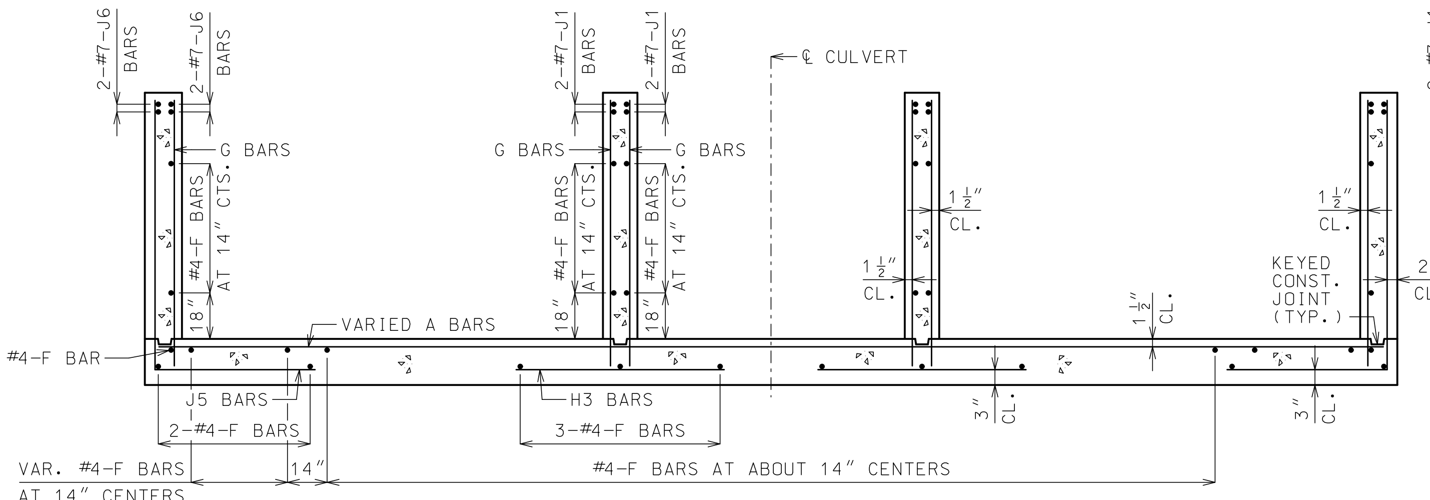
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



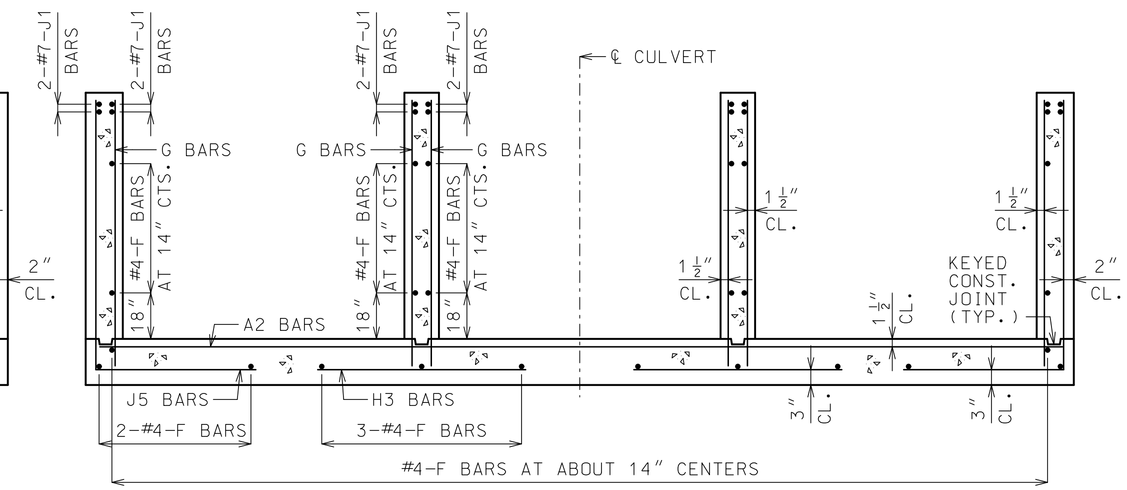
TRANSVERSE JOINT THRU BARREL

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.

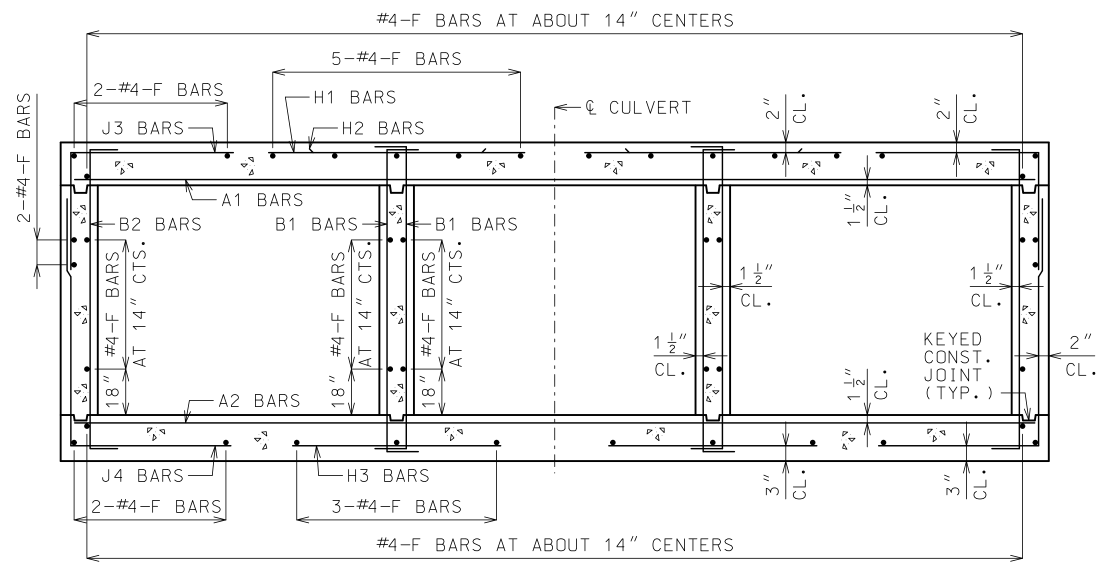
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED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



UPSTREAM FLARED WINGS REINFORCEMENT

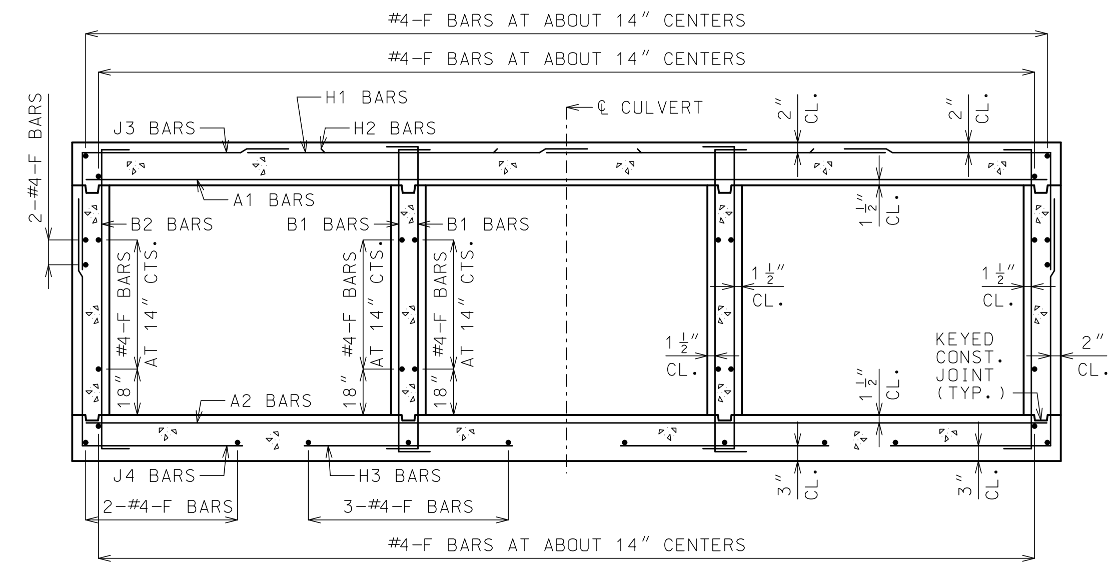


DOWNSTREAM WINGS REINFORCEMENT



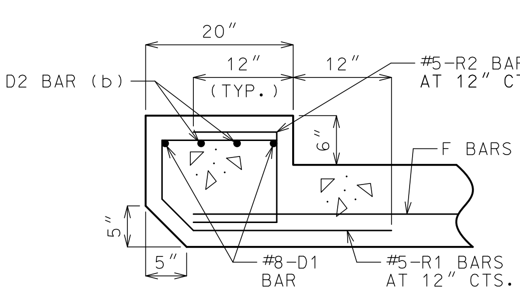
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2′-0″



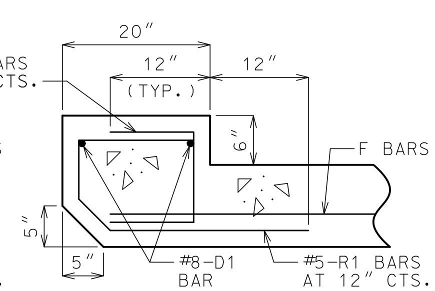
BARREL REINFORCEMENT

FOR DESIGN FILLS 2′-0″ OR LESS



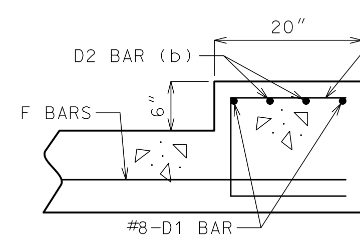
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



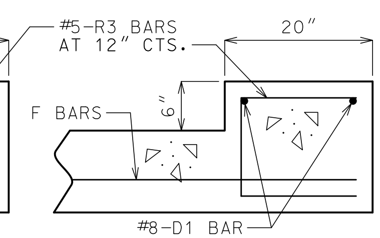
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) 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 ℄ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ 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 703.87. 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 1½″.

MoDOT

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: FLARED

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.81H	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		

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

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

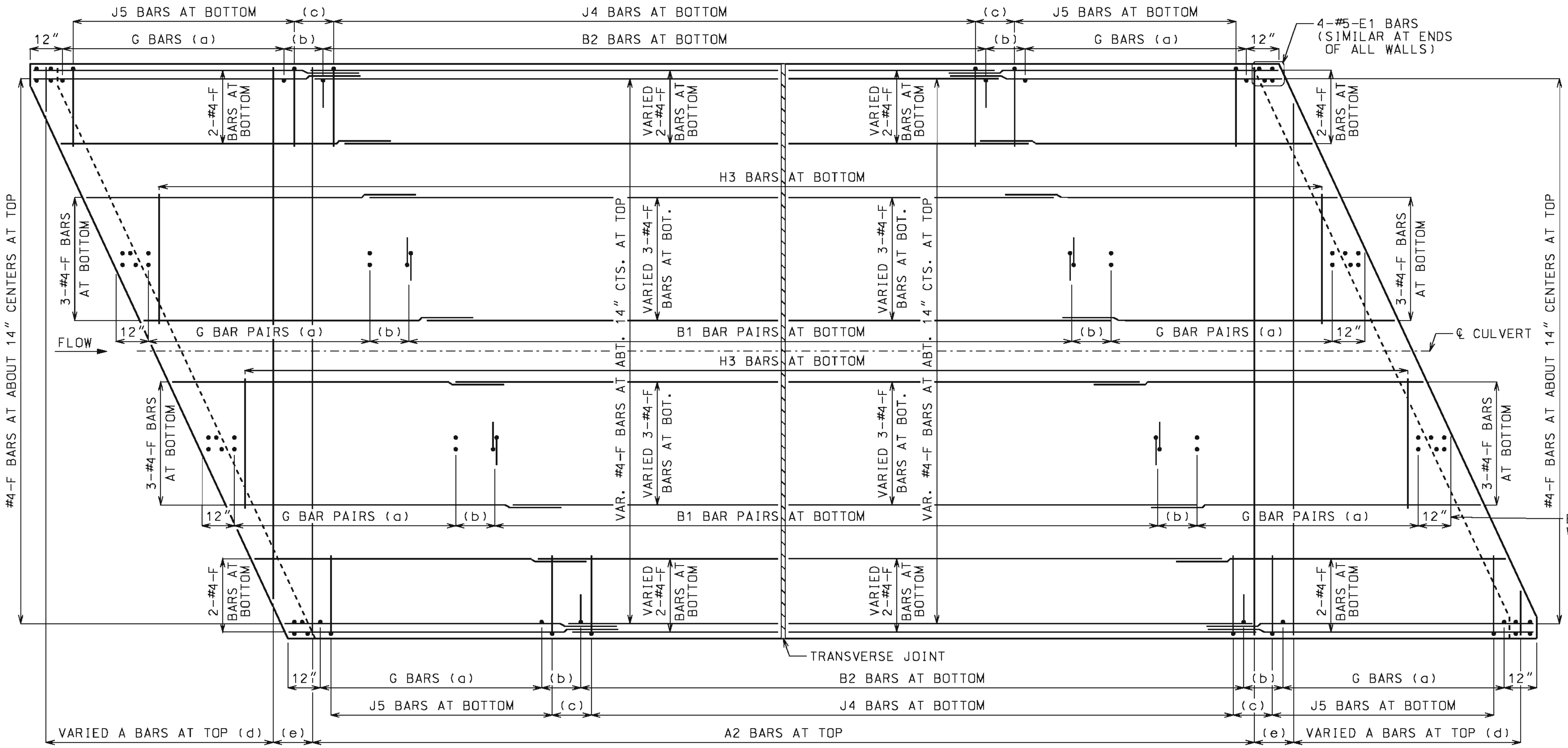
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

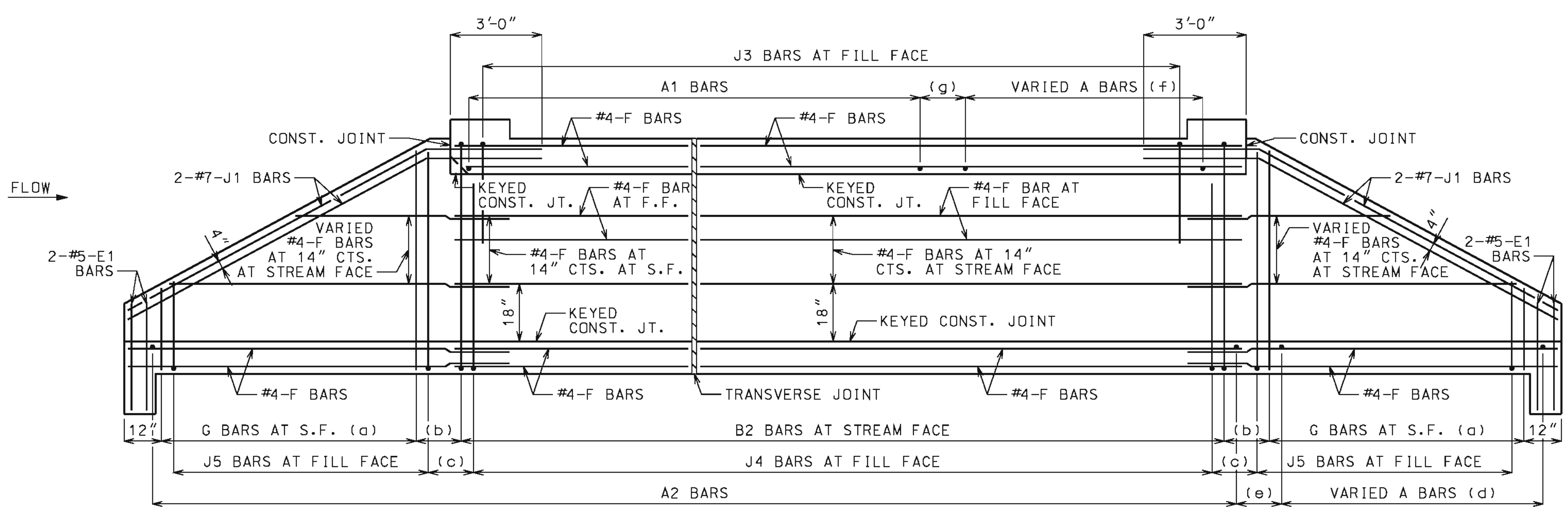
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

MoDOT
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.

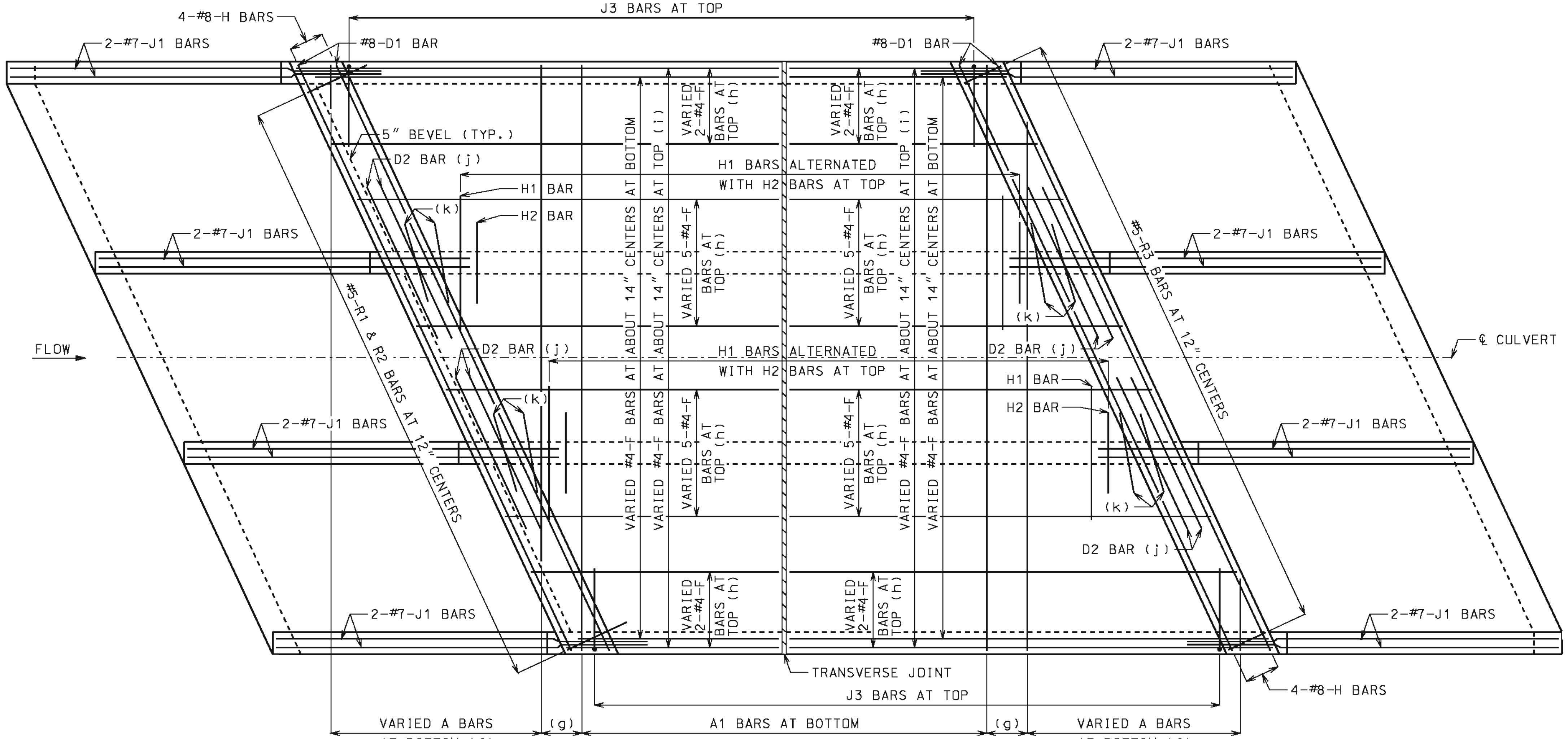
CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

REINFORCEMENT

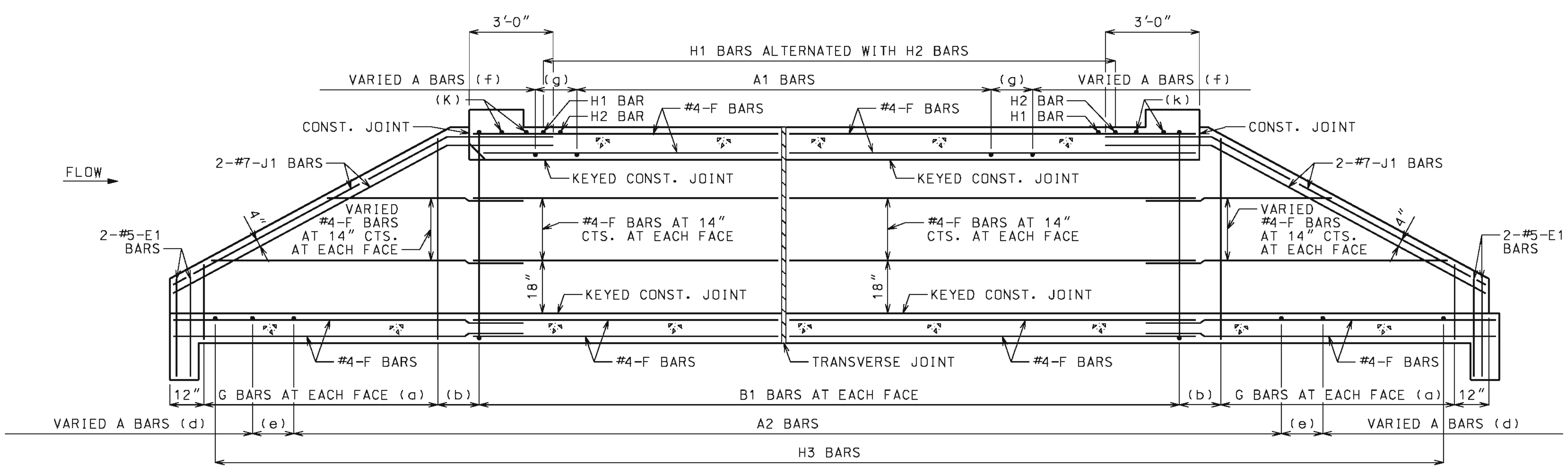
DATE EFFECTIVE:	12/01/2011	703.82H	SHEET NO.
DATE PREPARED:	5/13/2015		1 OF 3

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



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

MoDOT
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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.

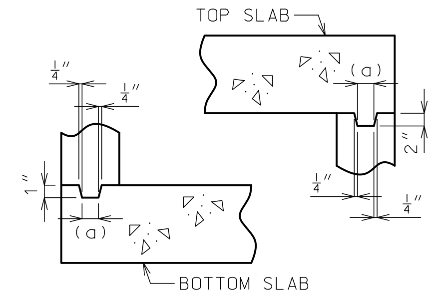
CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

REINFORCEMENT

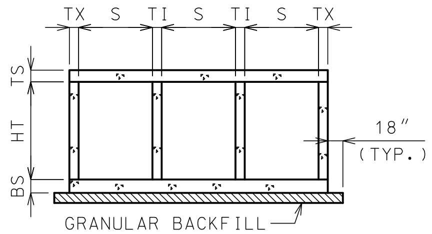
DATE EFFECTIVE: 12/01/2011		703.82H	SHEET NO. 2 OF 3
DATE PREPARED: 5/13/2015			

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

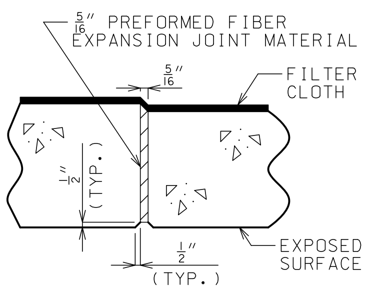


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



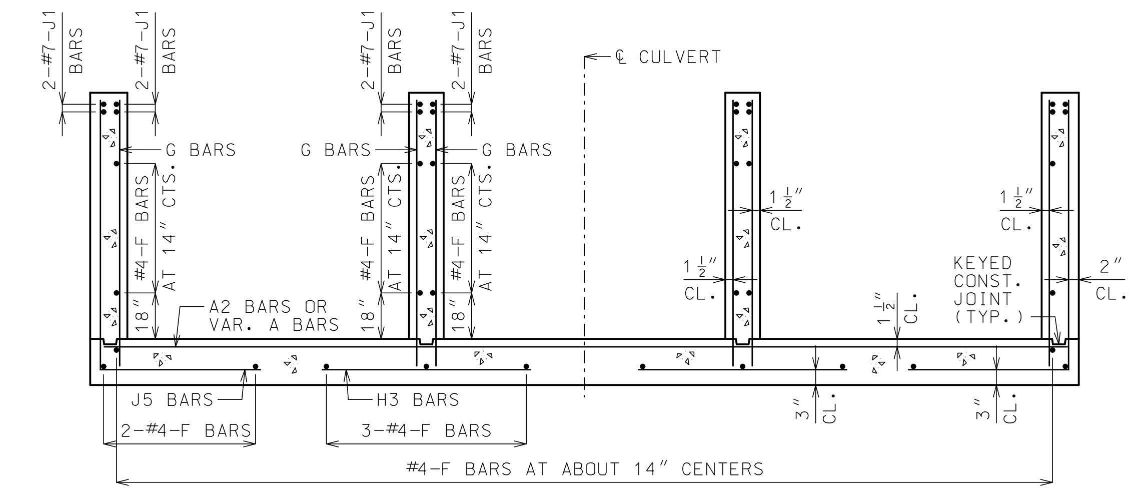
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



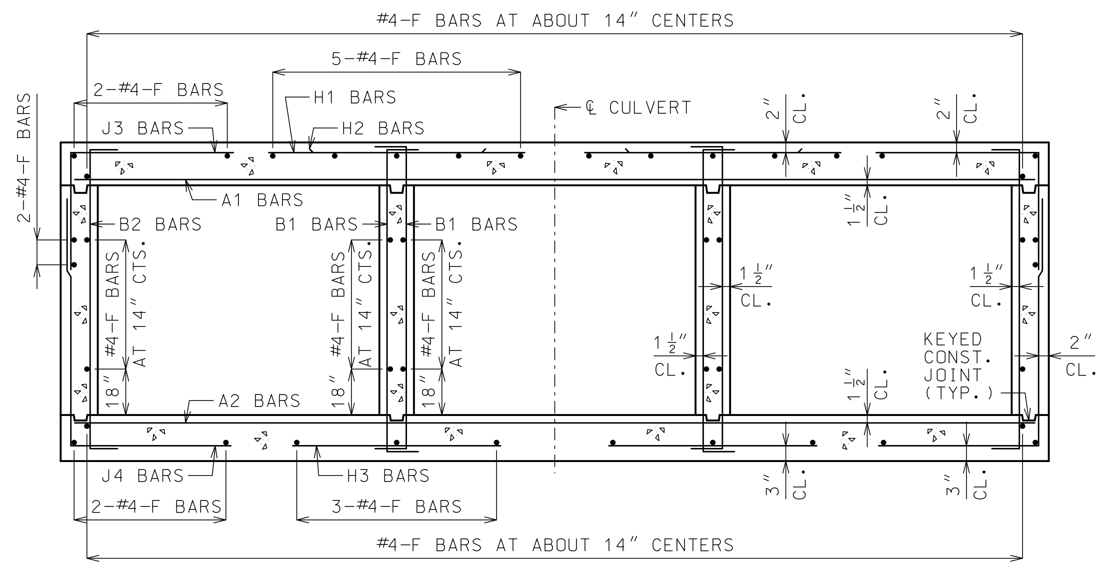
TRANSVERSE JOINT THRU BARREL

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.

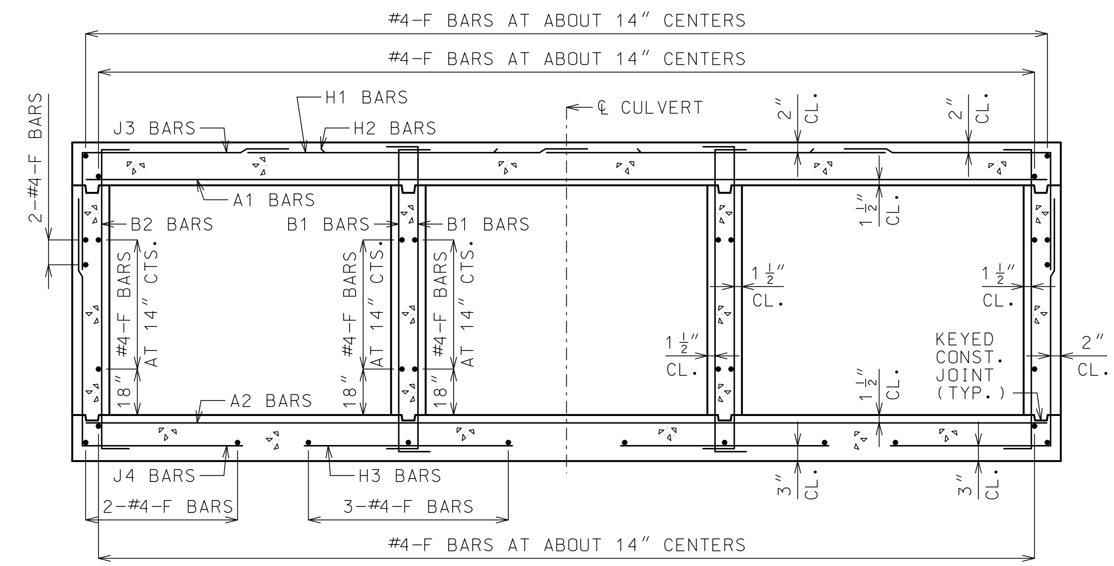


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



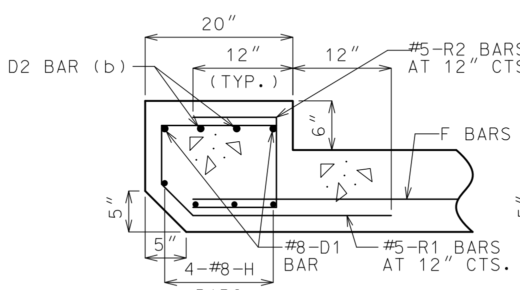
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2′-0″



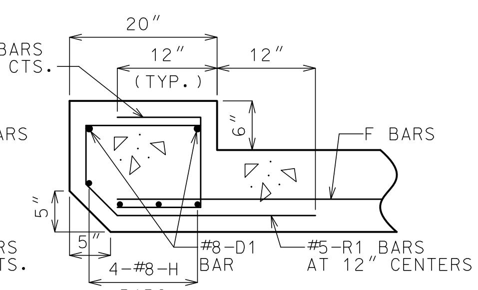
BARREL REINFORCEMENT

FOR DESIGN FILLS 2′-0″ OR LESS



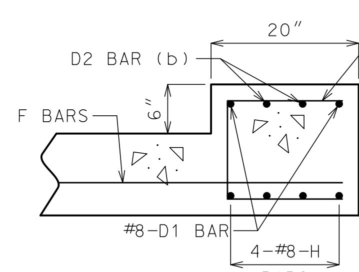
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



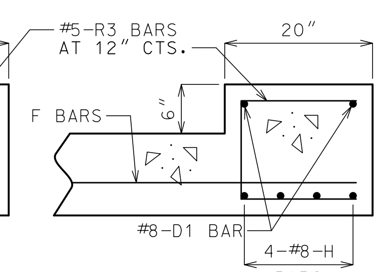
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) 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 ℄ 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 703.87. 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″.

MoDOT
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: LEFT ADVANCE
WINGS: STRAIGHT

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.82H	SHEET NO.
DATE PREPARED:	10/14/2020		3 OF 3

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

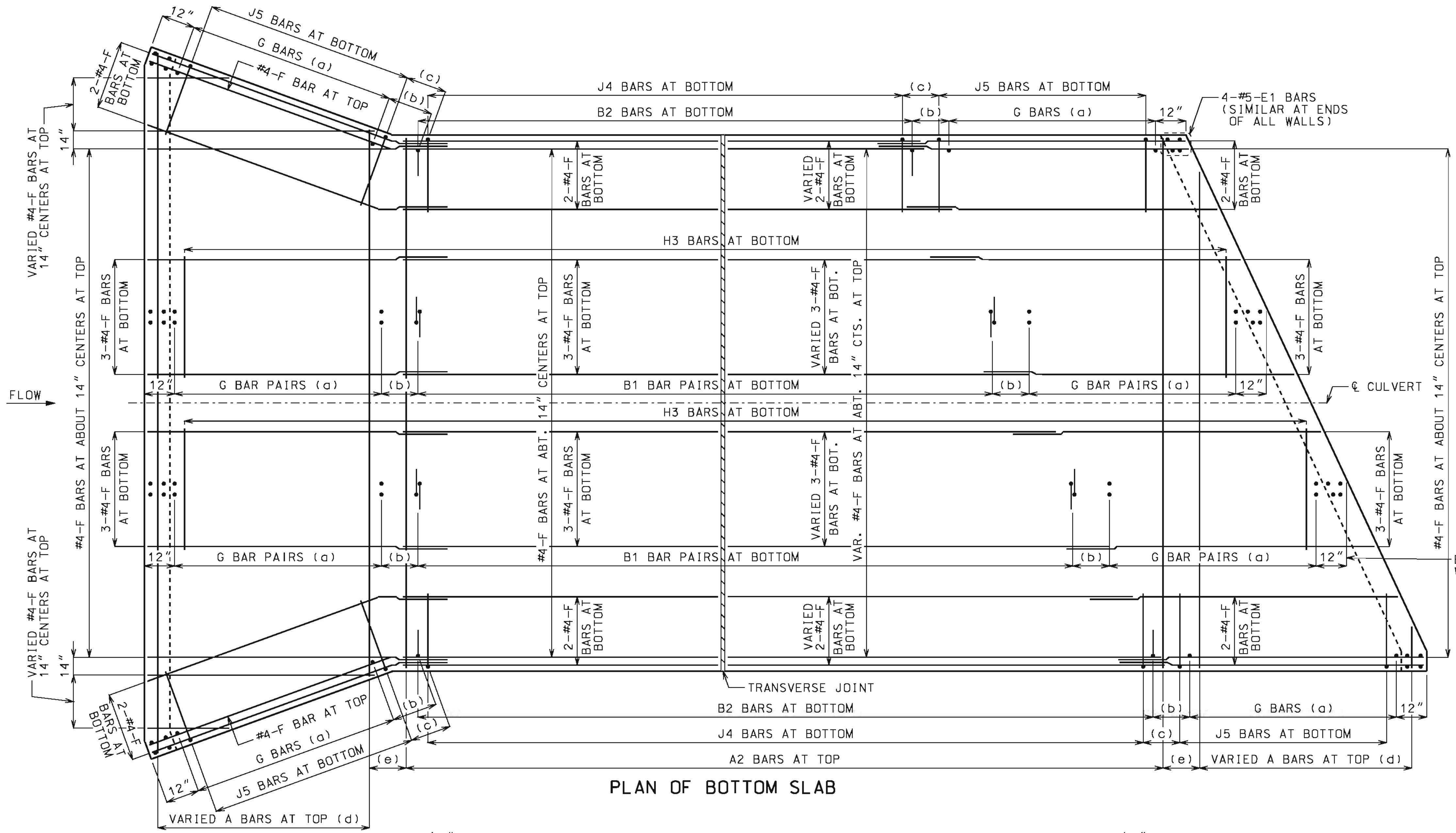
BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

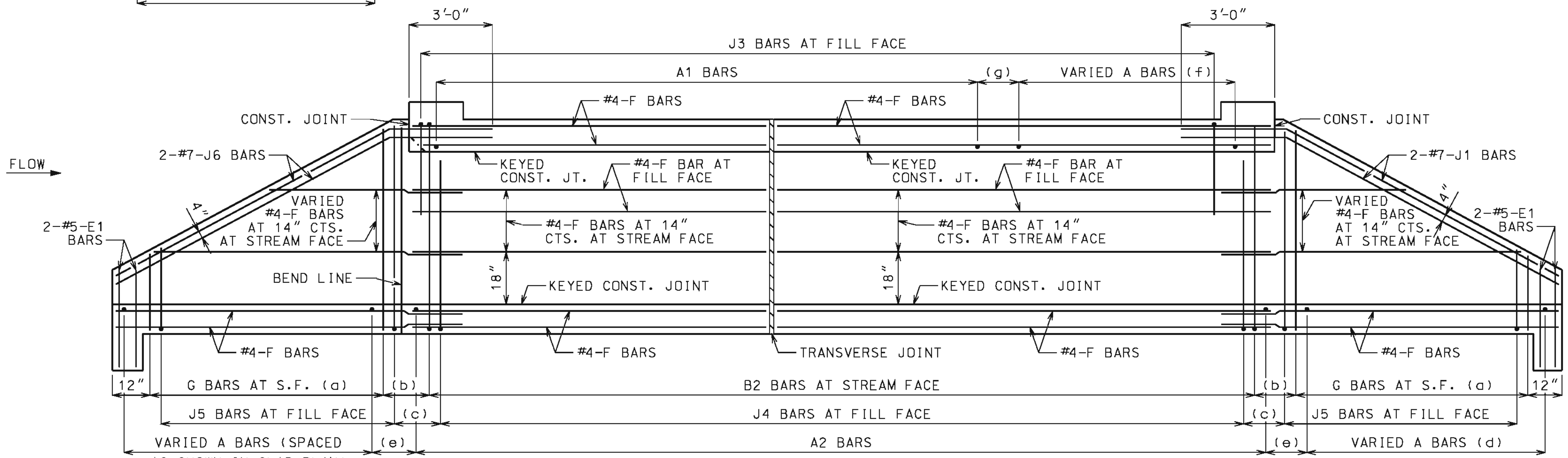
WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

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

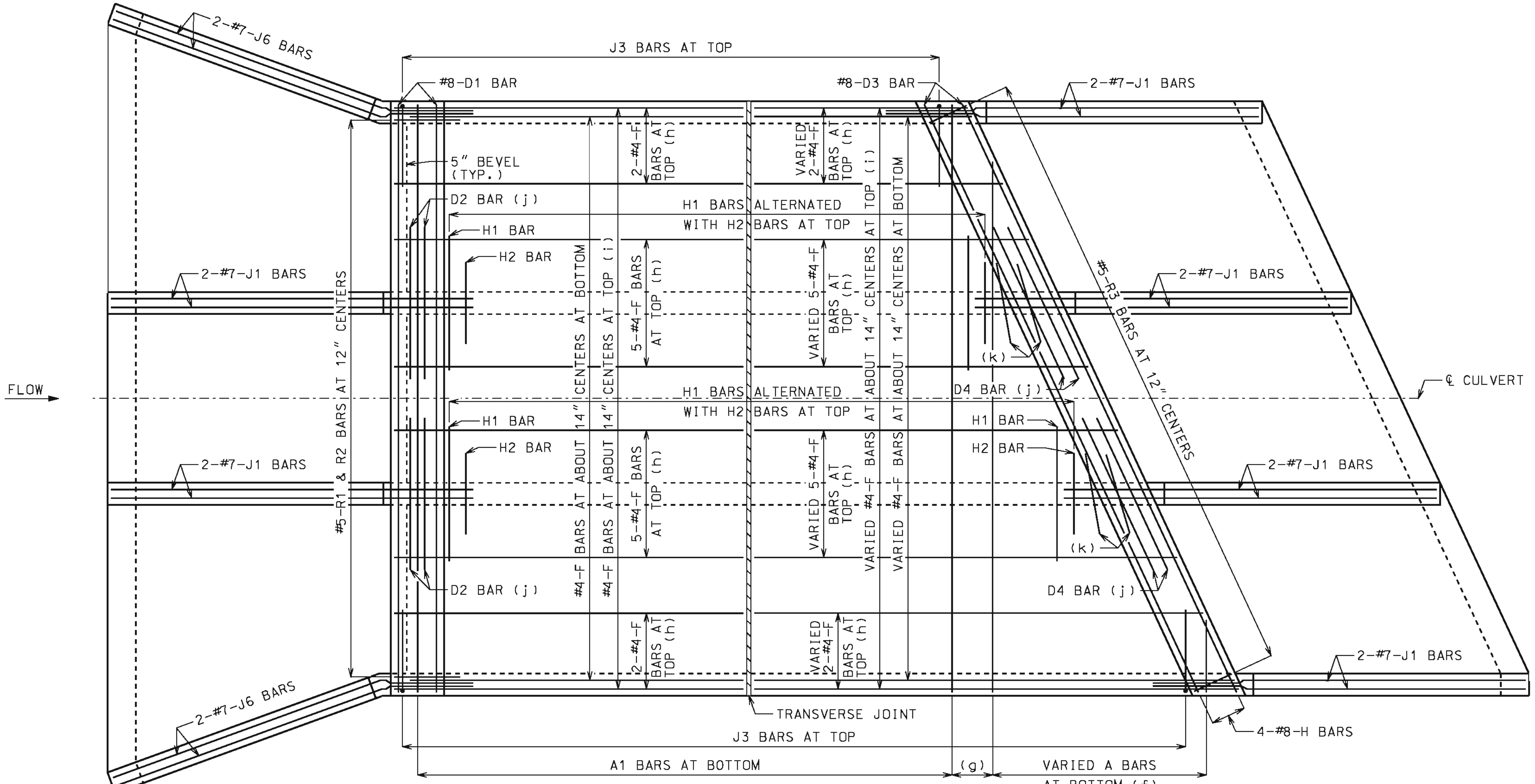
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

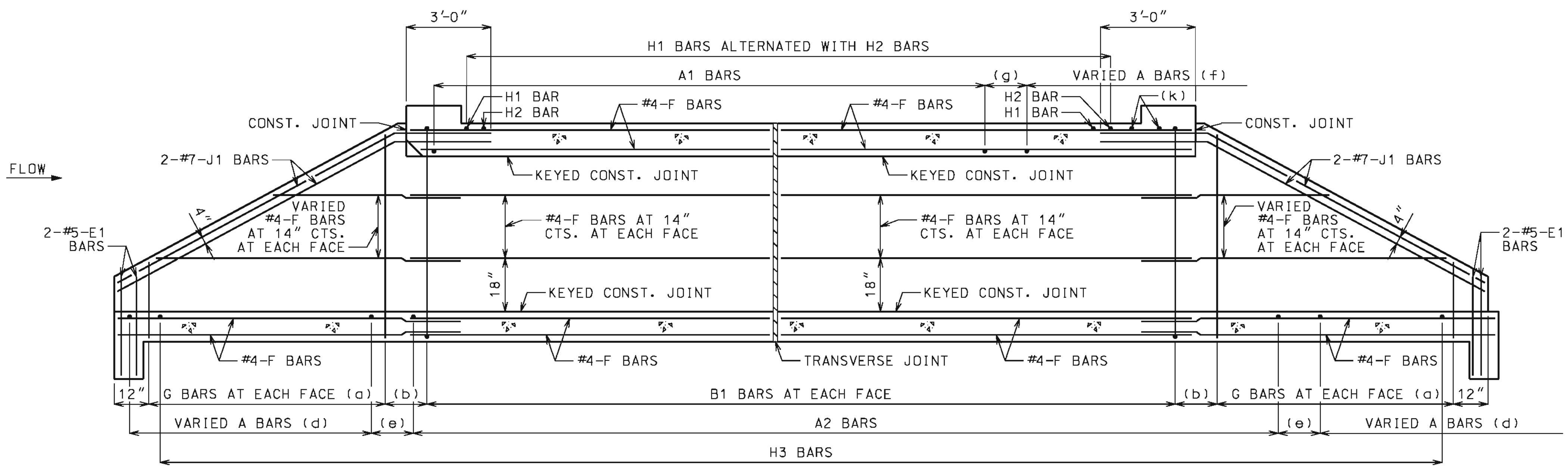
REINFORCEMENT

DATE EFFECTIVE:	12/01/2011	703.83H	SHEET NO.
DATE PREPARED:	5/13/2015		1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ 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.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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JEFFERSON CITY, MO 65102
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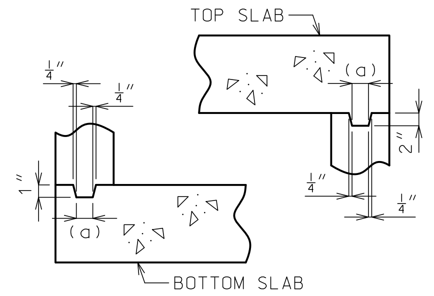
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

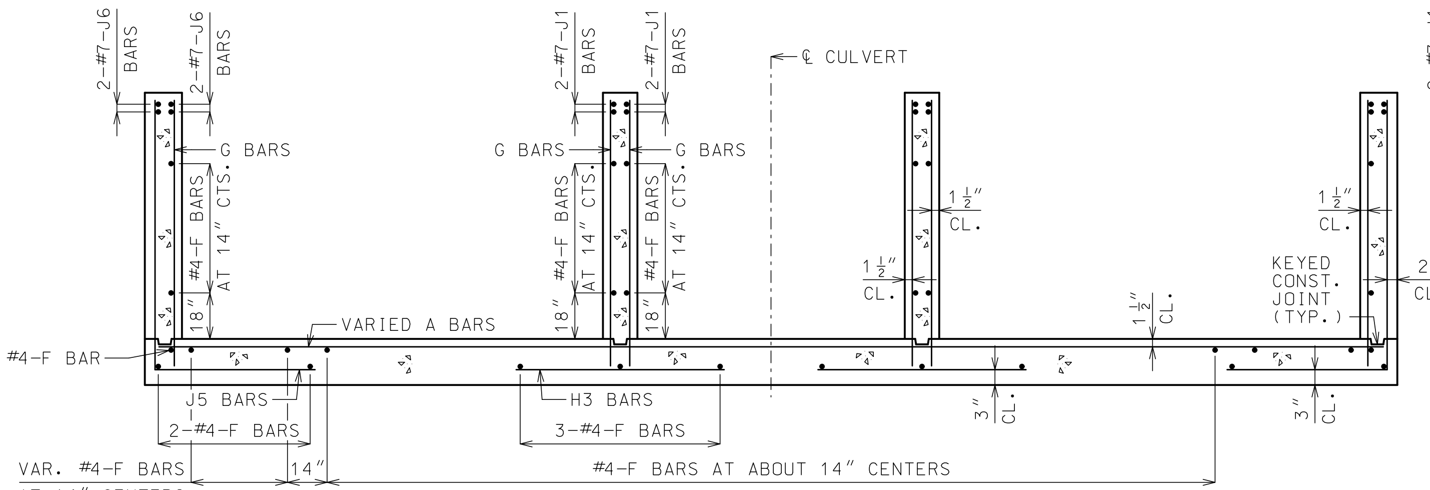
REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015
703.83H
SHEET NO. 2 OF 3

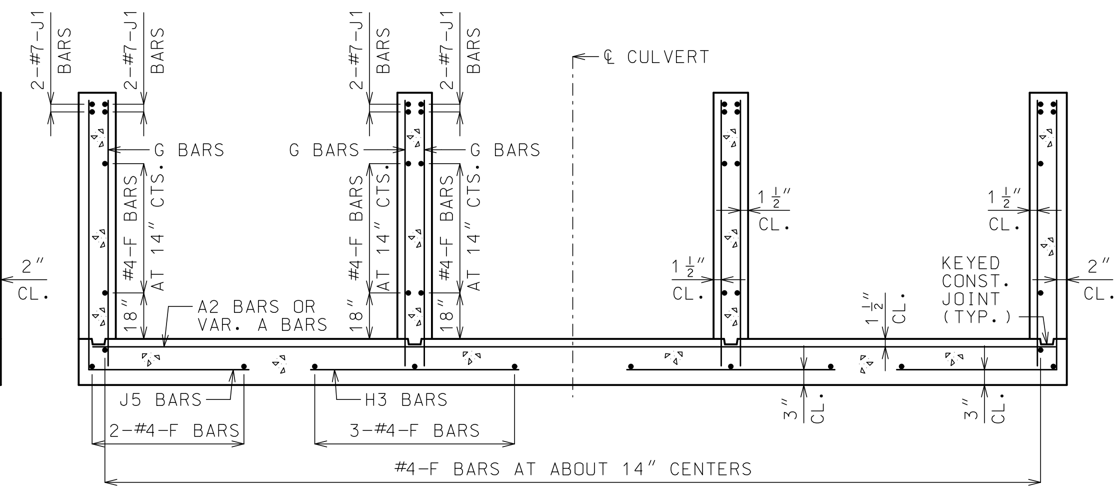


KEYED CONSTRUCTION JOINT

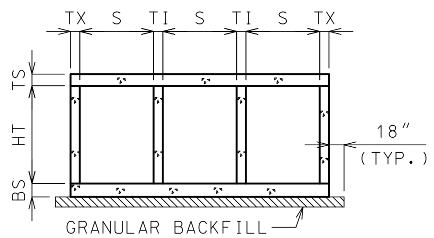
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



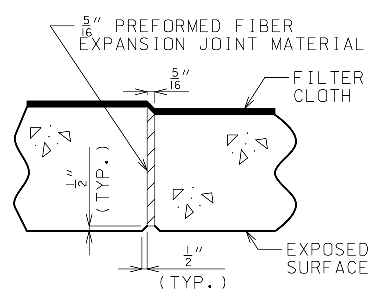
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



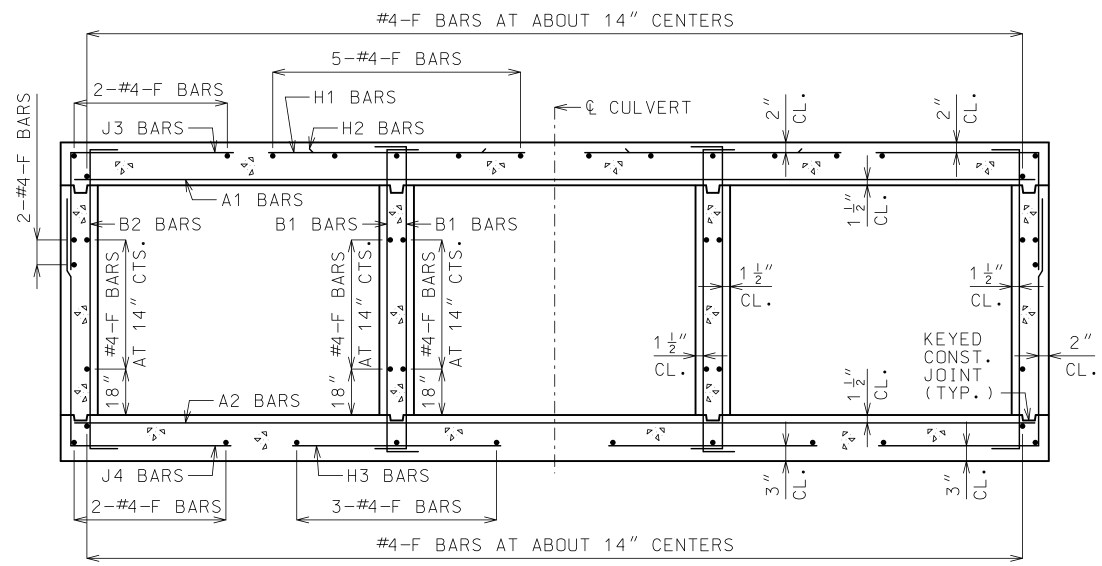
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

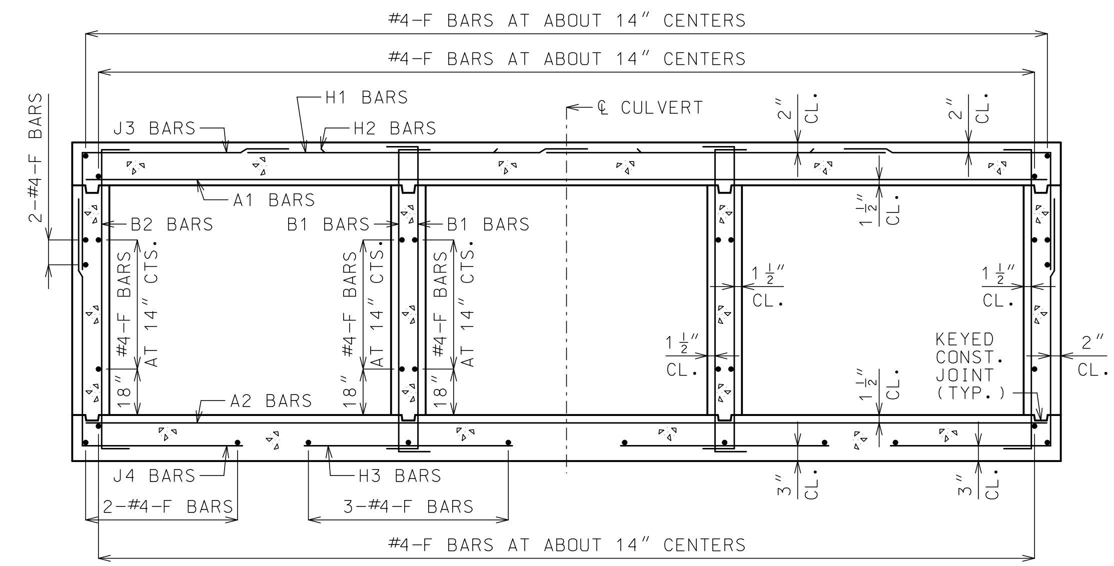
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

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.



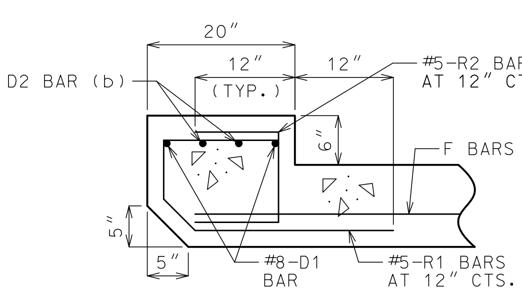
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



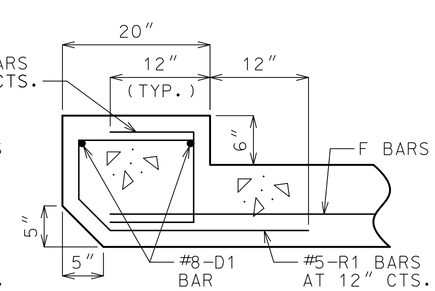
BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS



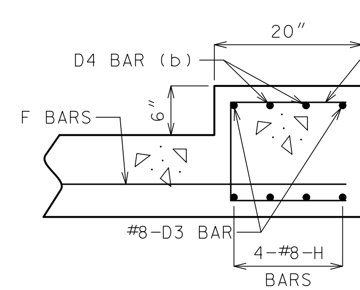
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



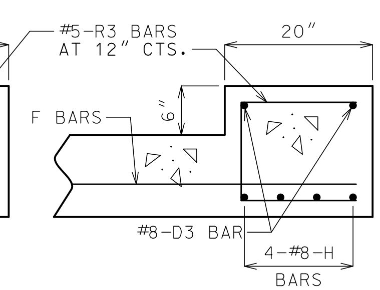
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 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 ℄ 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 703.87. 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".

MoDOT

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

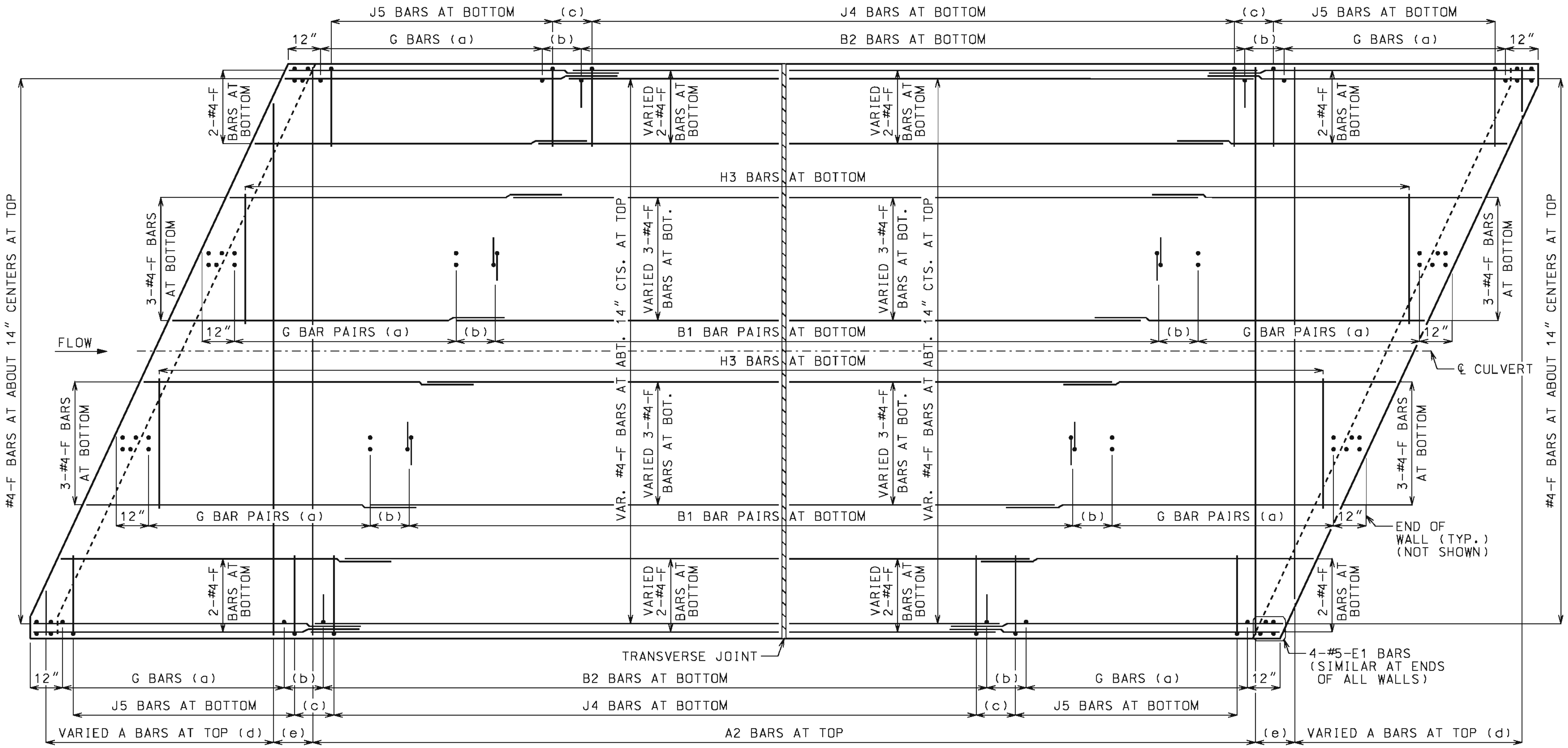
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

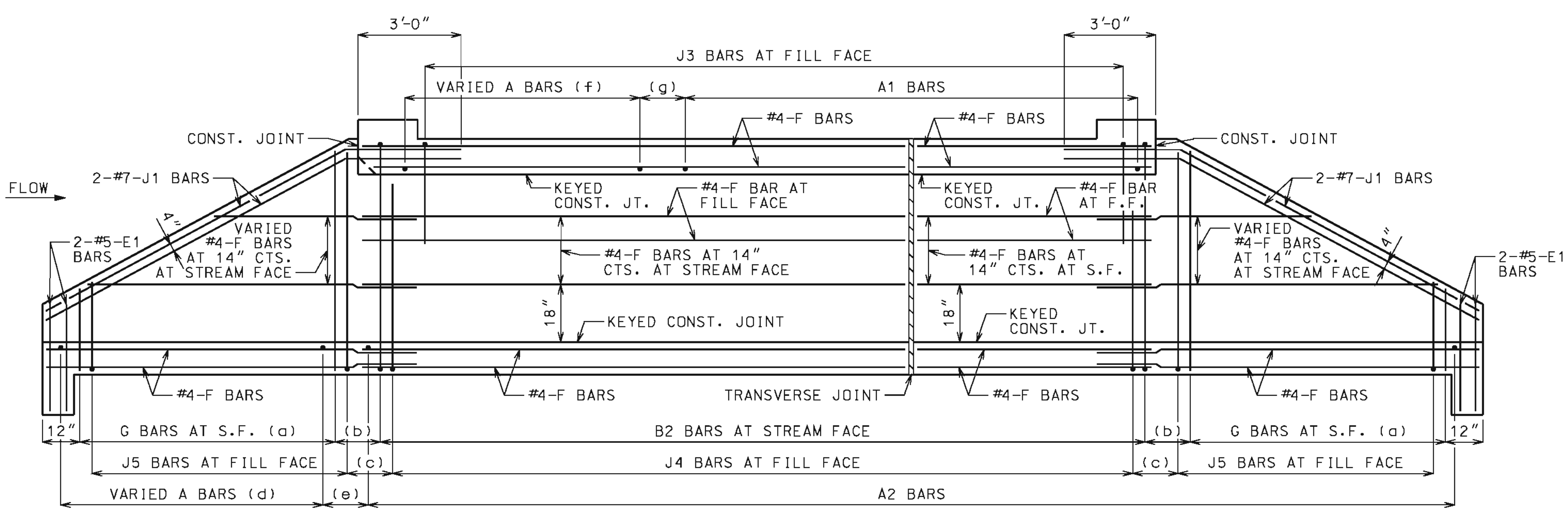
SKEW: LEFT ADVANCE
WINGS: FLARED

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.83H	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

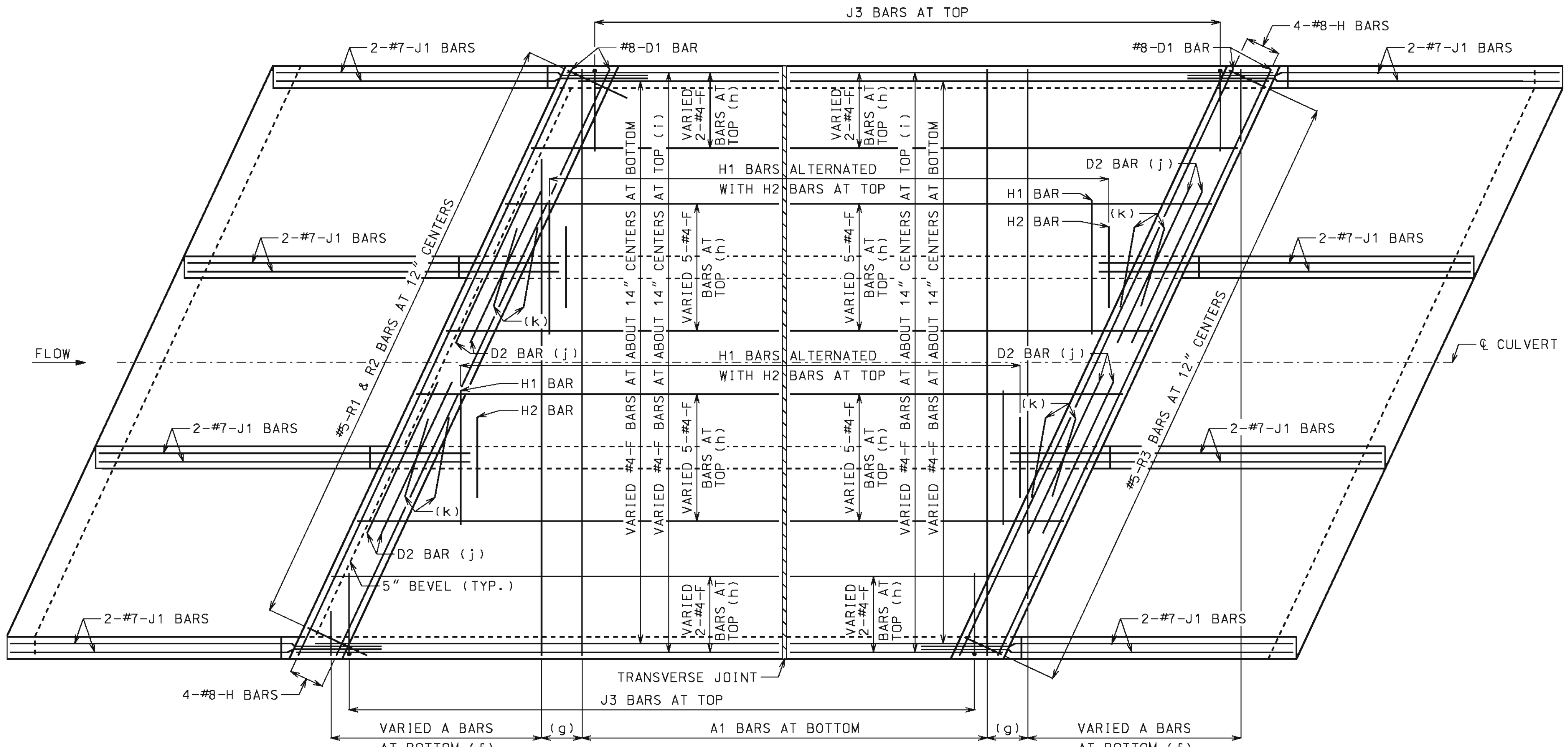
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

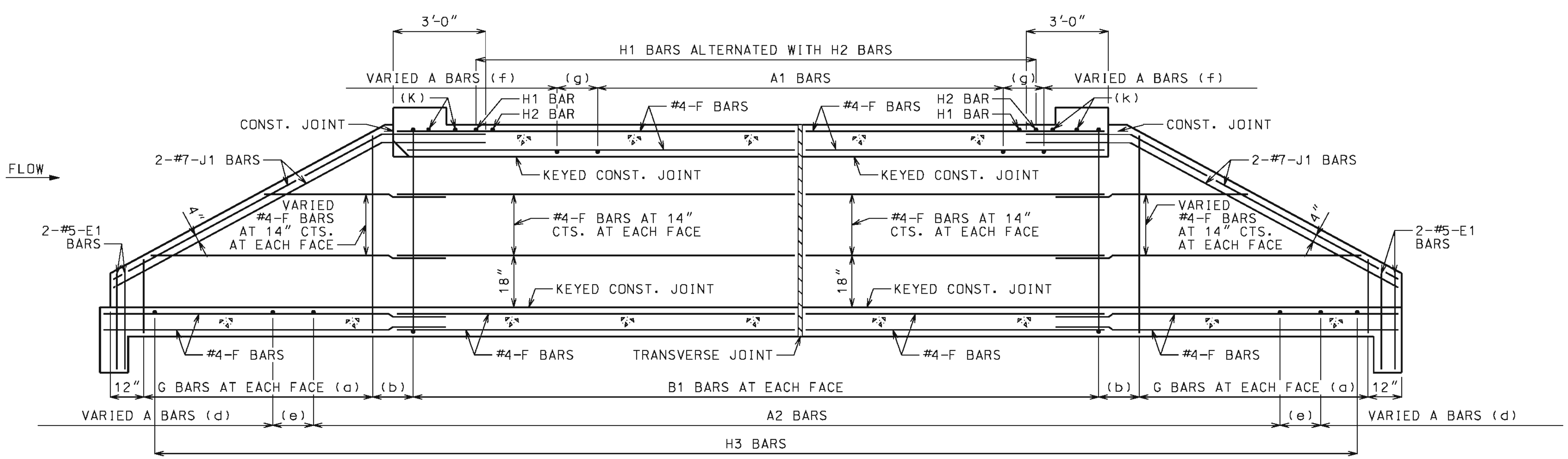
REINFORCEMENT

DATE EFFECTIVE:	12/01/2011	703.84H	SHEET NO. 1 OF 3
DATE PREPARED:	5/13/2015		



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

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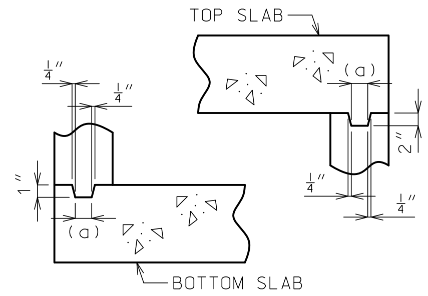
CONCRETE TRIPLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

REINFORCEMENT

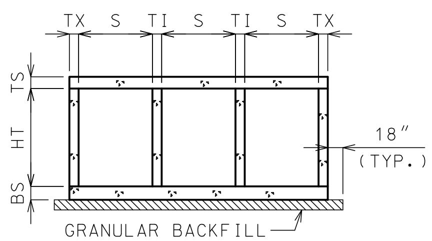
DATE EFFECTIVE:	12/01/2011	703.84H	SHEET NO.
DATE PREPARED:	5/13/2015		2 OF 3

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

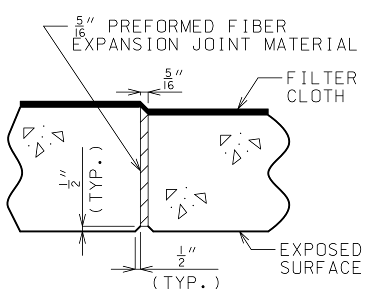


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



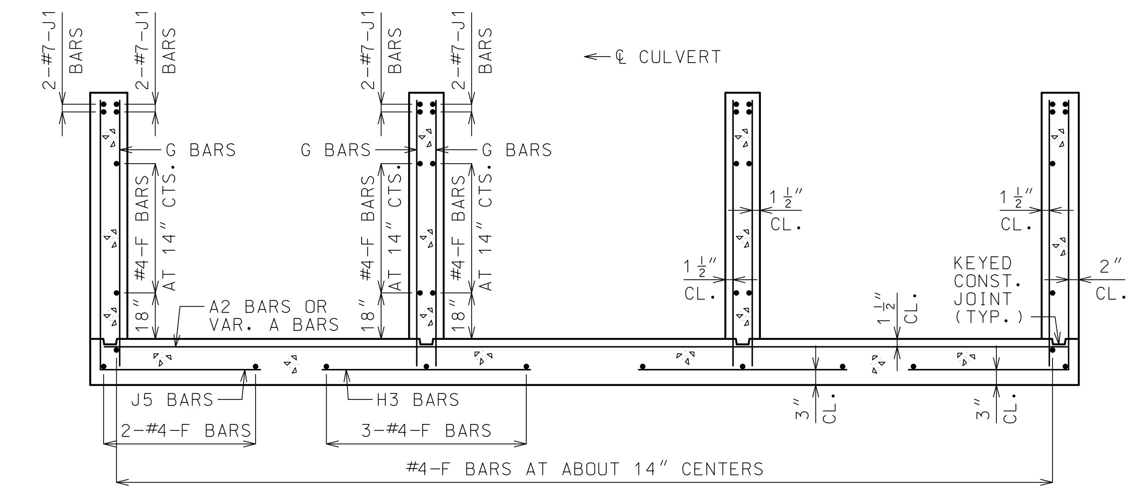
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



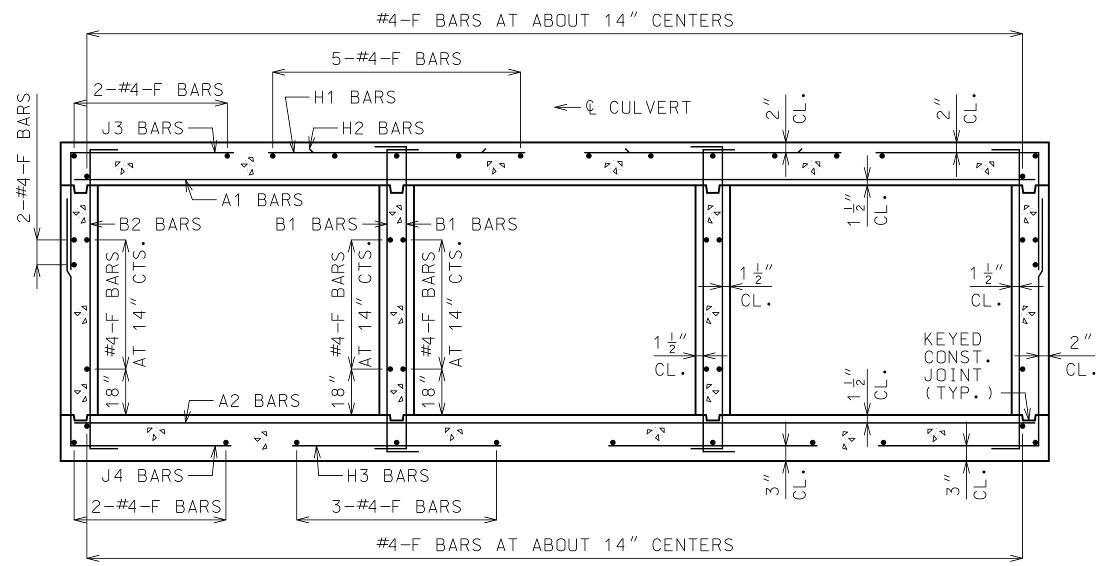
TRANSVERSE JOINT THRU BARREL

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.

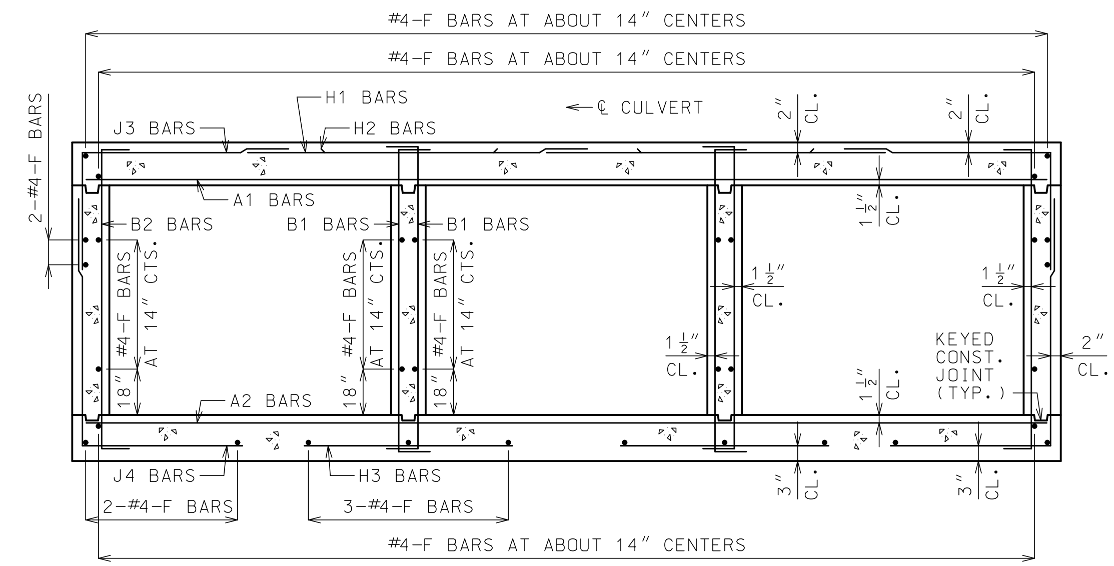


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



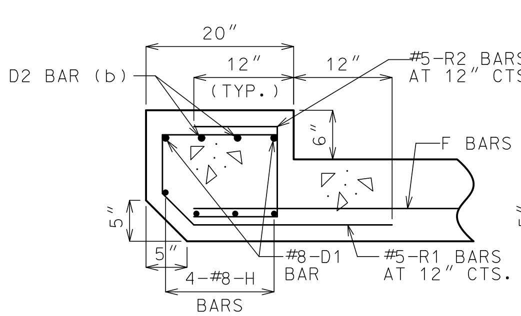
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2′-0″



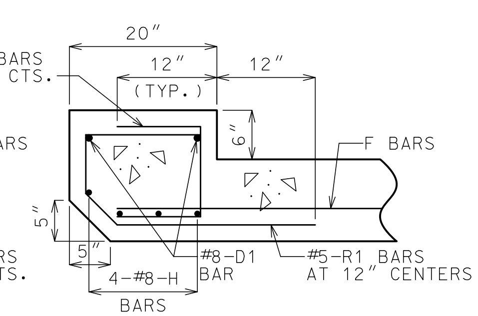
BARREL REINFORCEMENT

FOR DESIGN FILLS 2′-0″ OR LESS



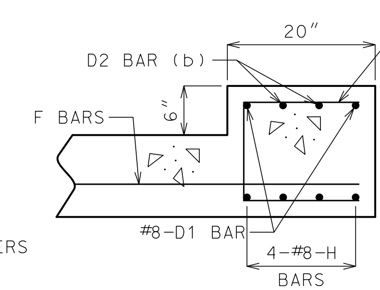
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



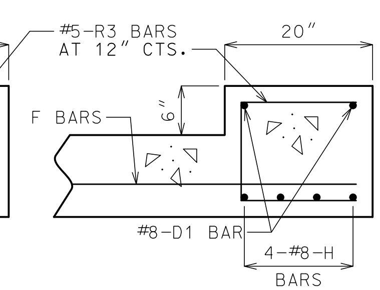
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) 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 ℄ 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 703.87. 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)

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

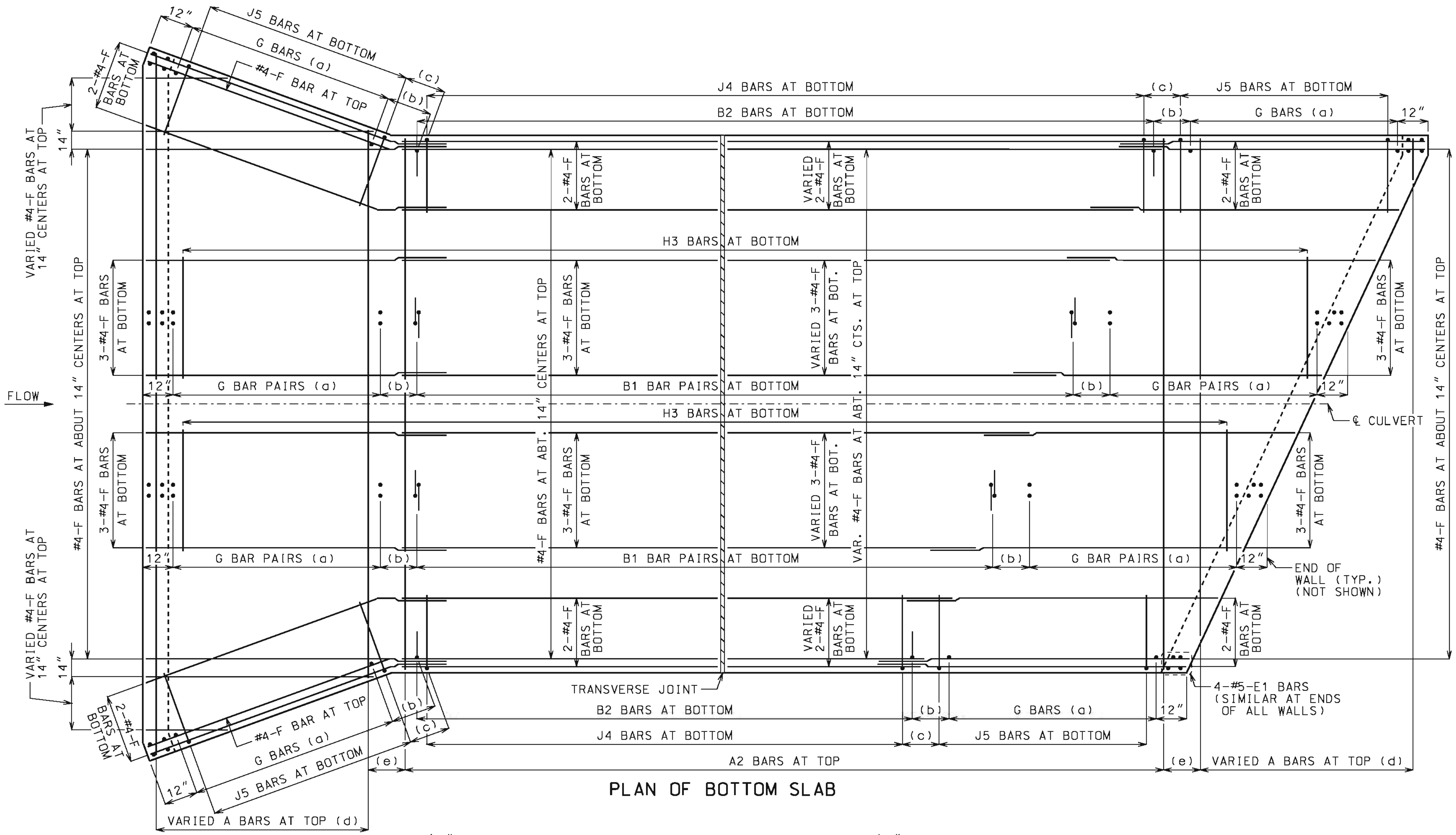
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

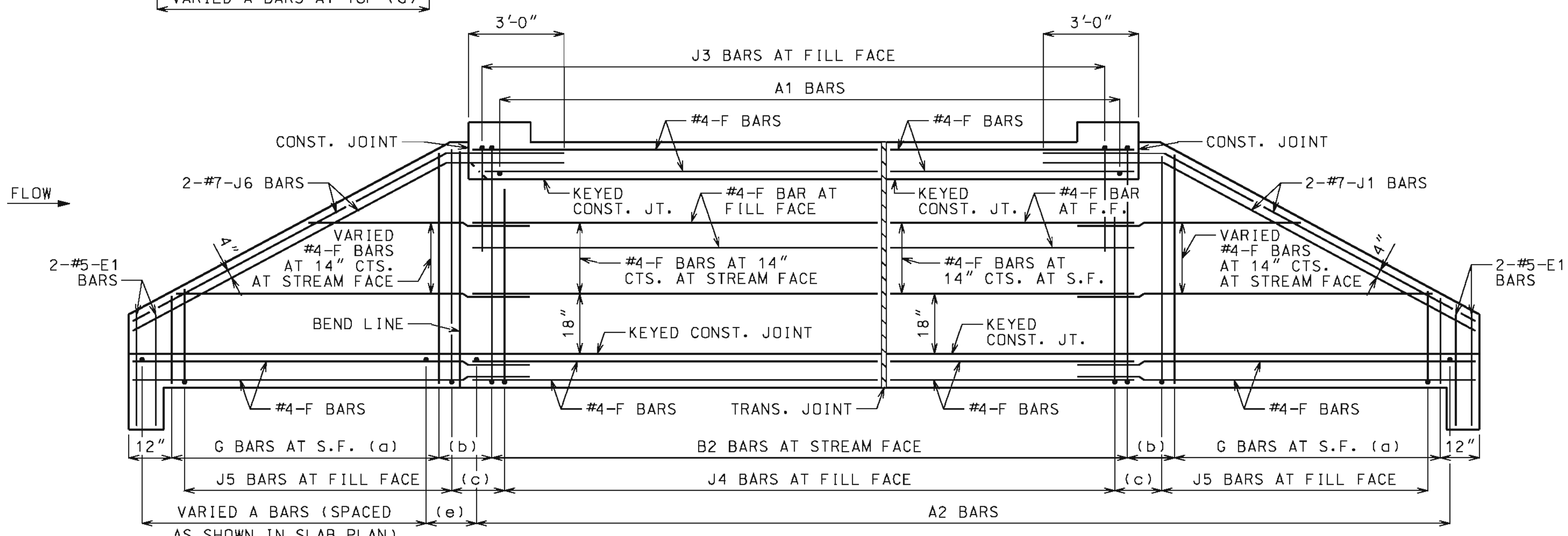
SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

SECTIONS

DATE EFFECTIVE:	01/01/2021	703.84H	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		



PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

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

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

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

CONCRETE TRIPLE BOX CULVERT

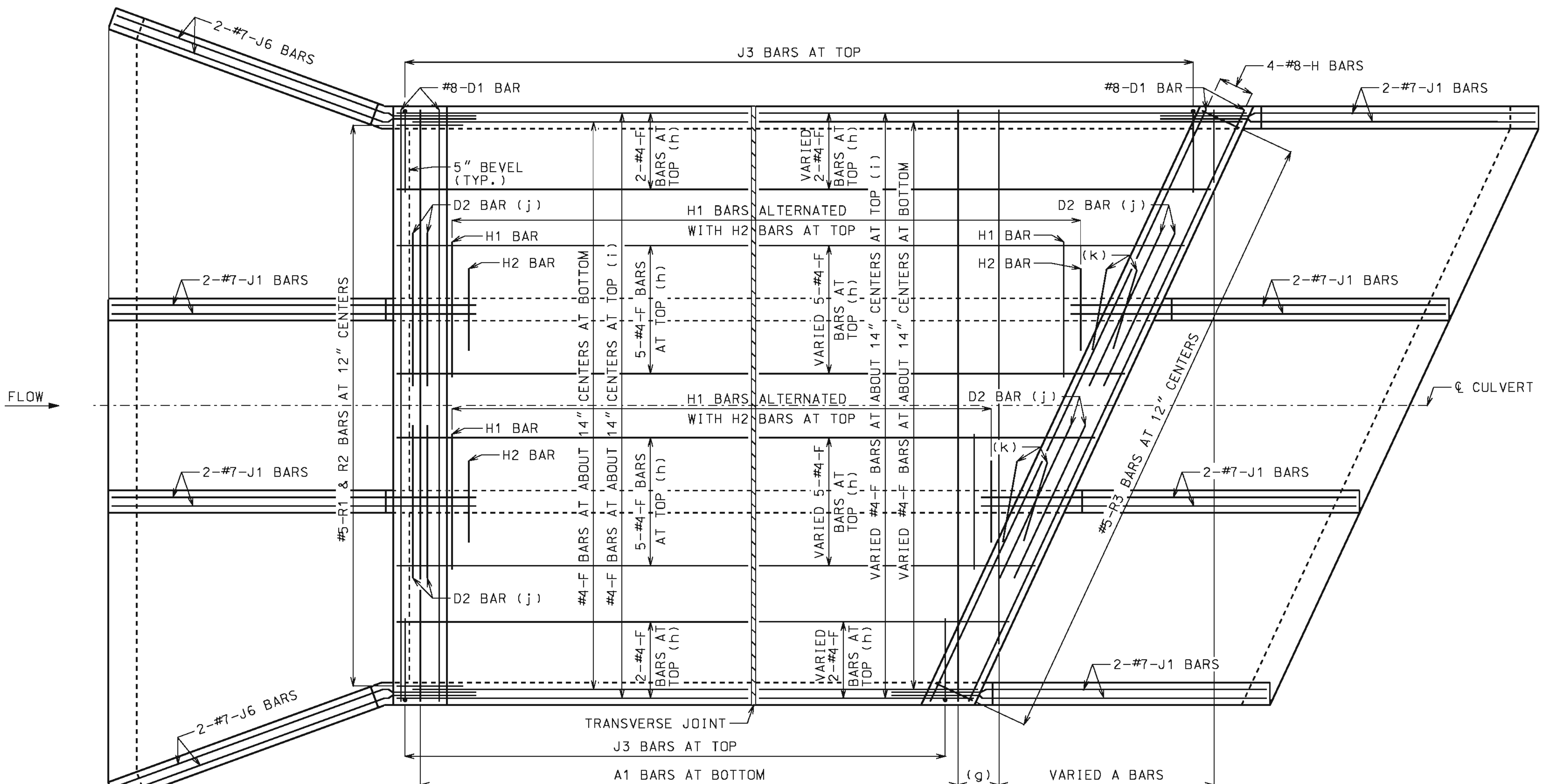
SKEW: RIGHT ADVANCE
WINGS: FLARED

REINFORCEMENT

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

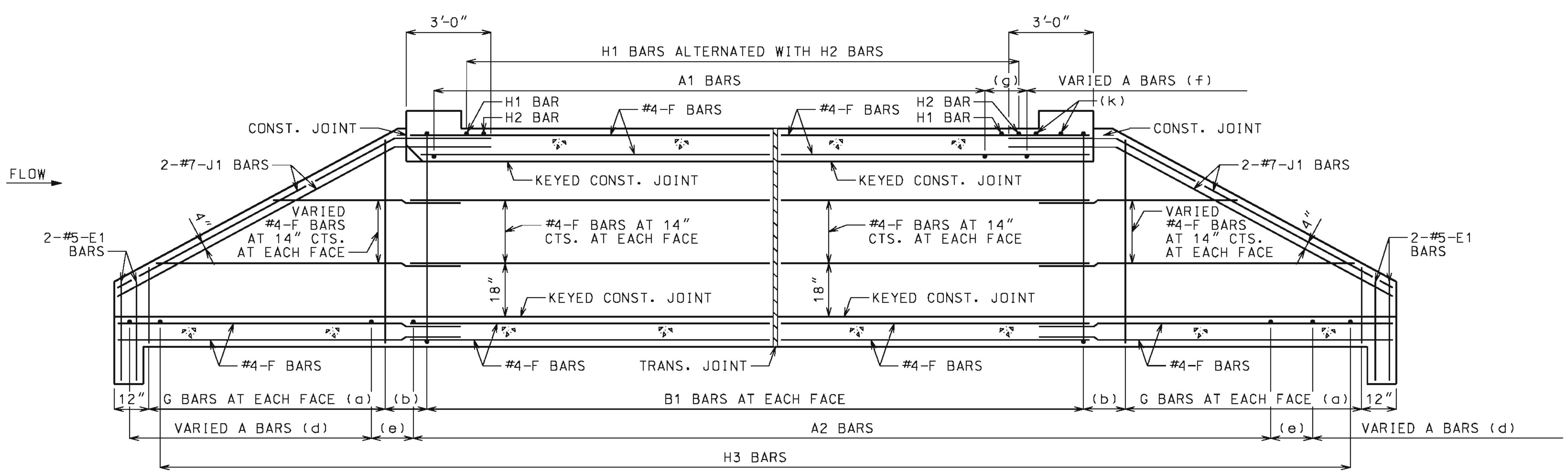
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE:	12/01/2011	703.85C	SHEET NO.
DATE PREPARED:	5/13/2015		1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

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

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ℄ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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DENNIS W. HECKMAN
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PROFESSIONAL ENGINEER
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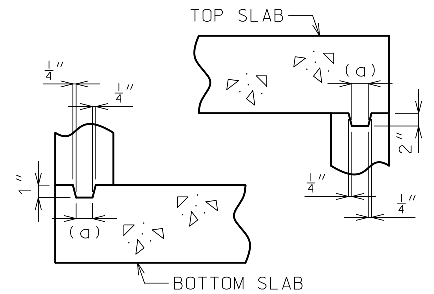
CONCRETE TRIPLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

REINFORCEMENT

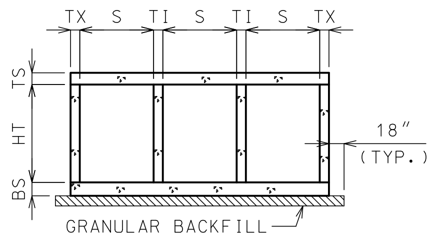
DATE EFFECTIVE:	12/01/2011
DATE PREPARED:	5/13/2015

703.85C

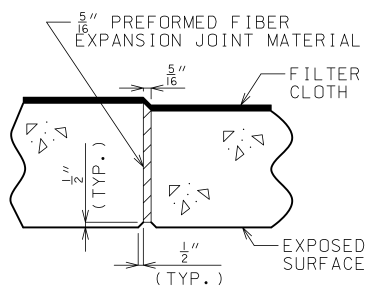


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



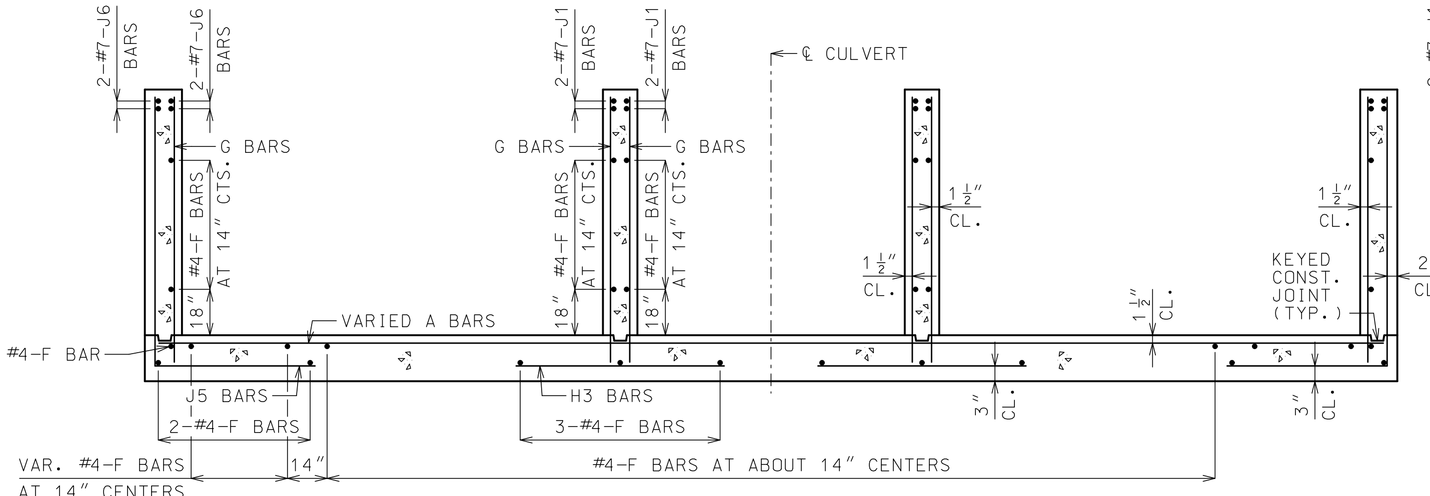
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



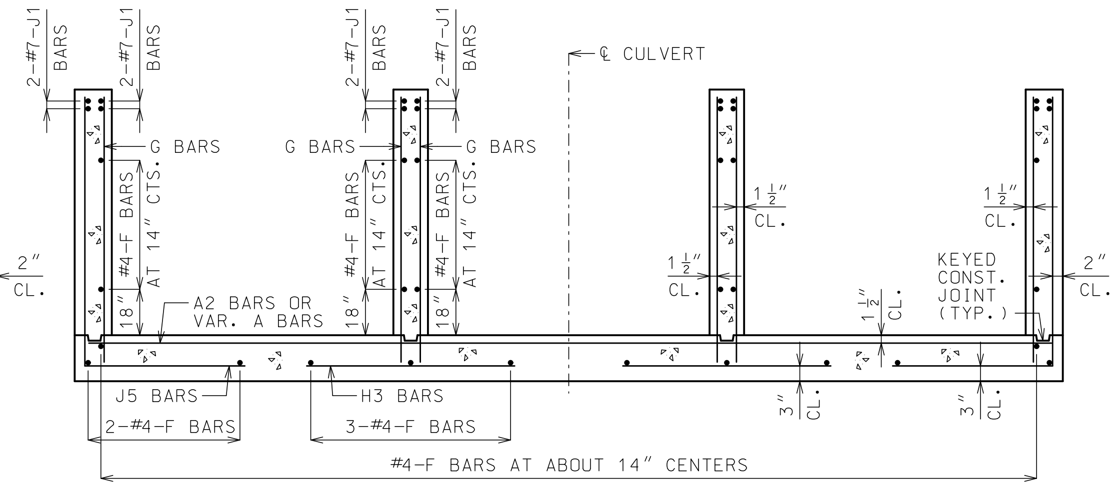
TRANSVERSE JOINT THRU BARREL

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.

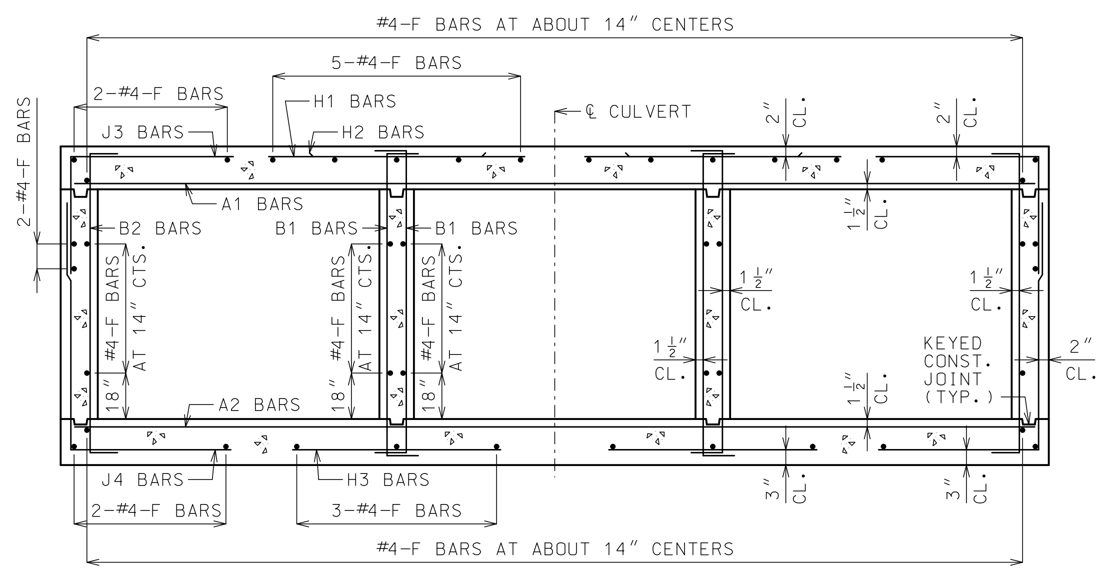
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED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



UPSTREAM FLARED WINGS REINFORCEMENT

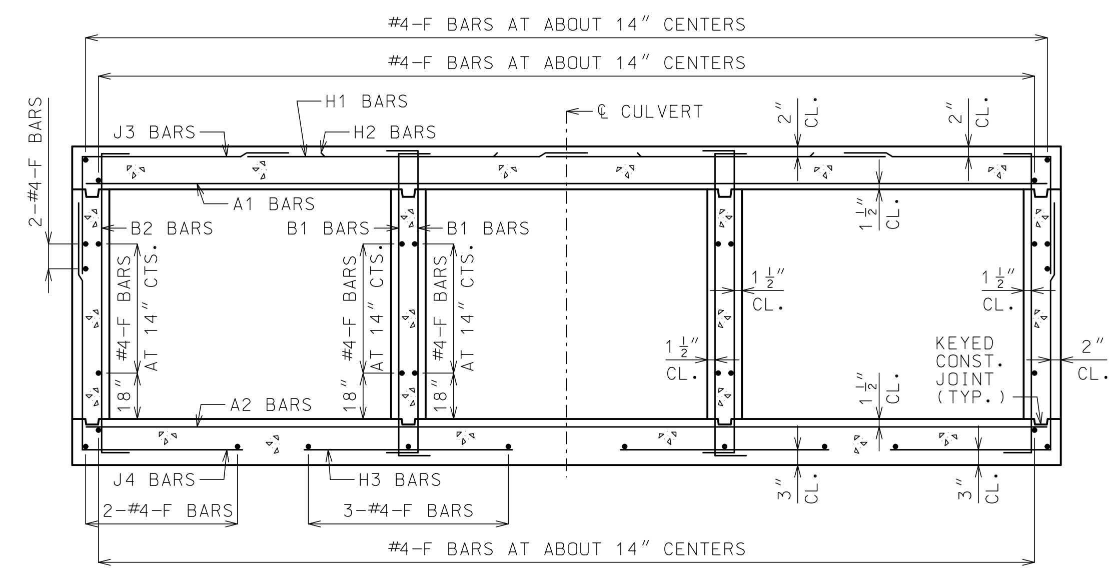


DOWNSTREAM WINGS REINFORCEMENT



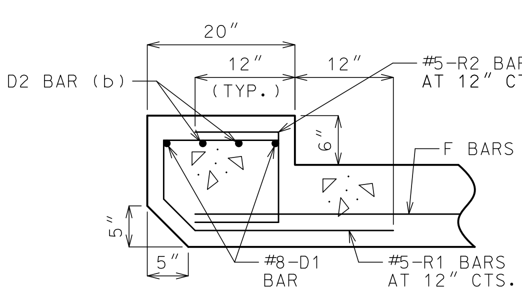
BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2′-0″



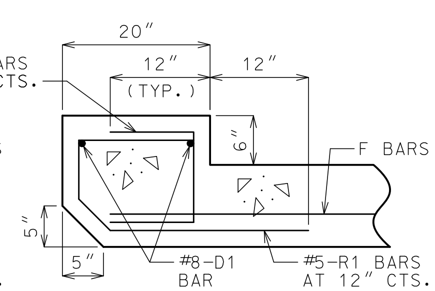
BARREL REINFORCEMENT

FOR DESIGN FILLS 2′-0″ OR LESS



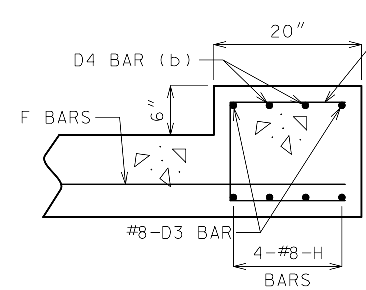
UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



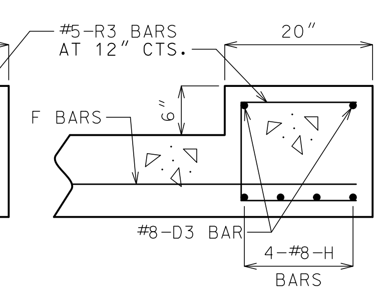
UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL



DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 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 ℄ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ 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 703.87. 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 1½″.

MoDOT
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.

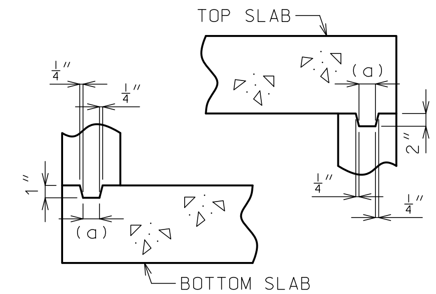
CONCRETE TRIPLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

SECTIONS

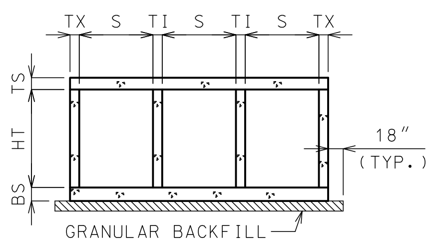
DATE EFFECTIVE:	01/01/2021	703.85C	SHEET NO. 3 OF 3
DATE PREPARED:	10/14/2020		

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

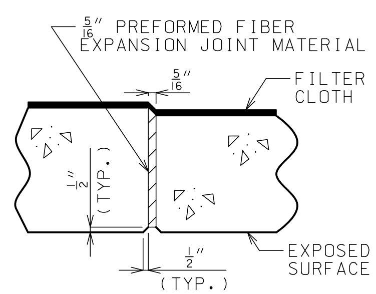


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



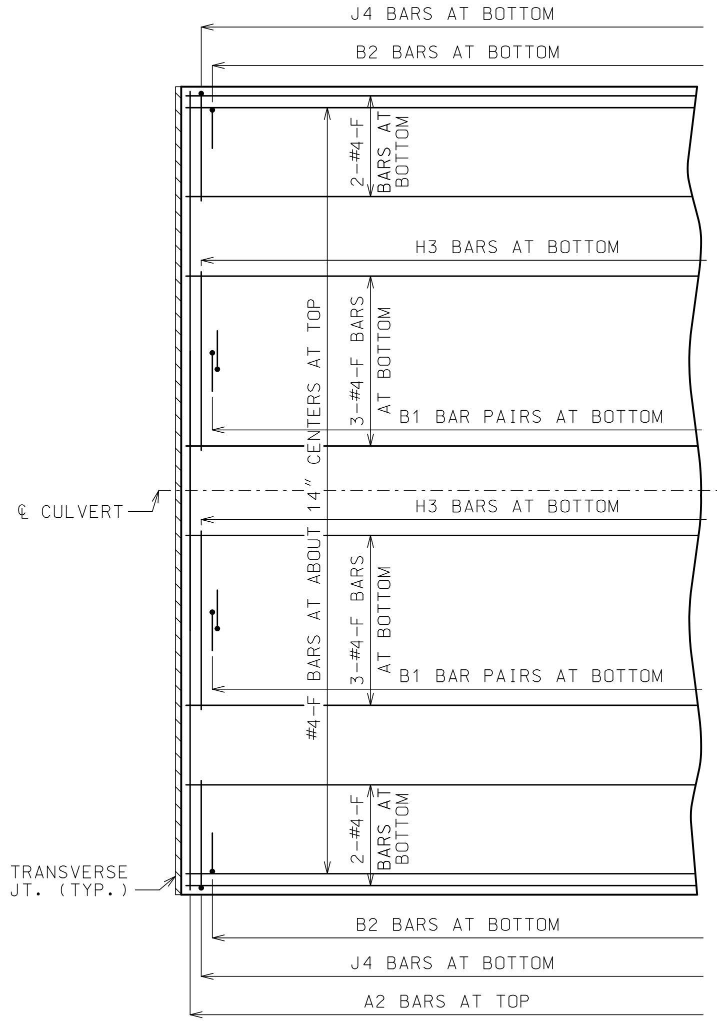
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



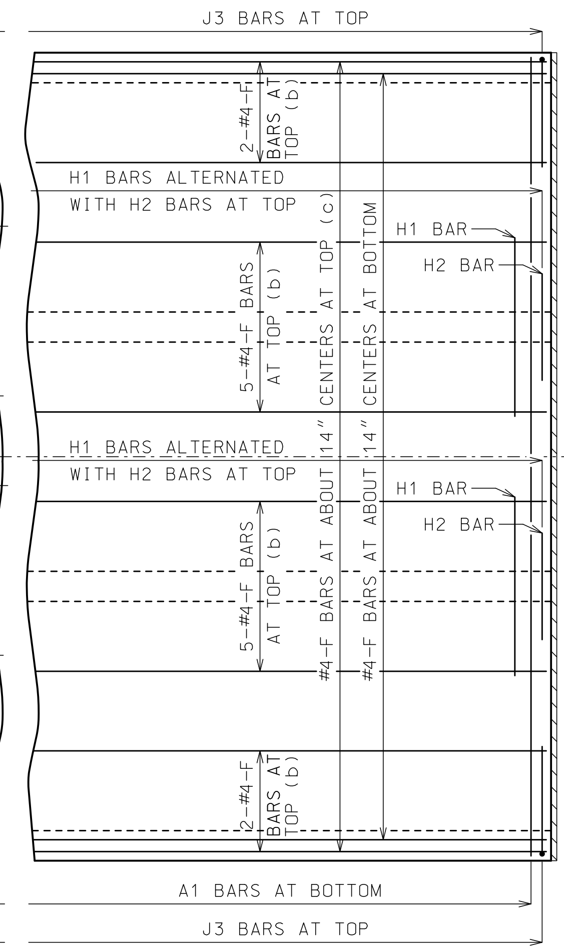
TRANSVERSE JOINT THRU BARREL

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.

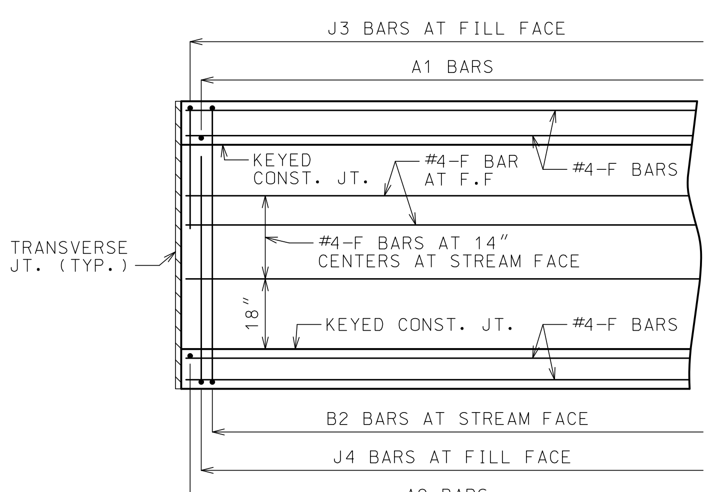


PART PLAN OF BOTTOM SLAB REINFORCEMENT

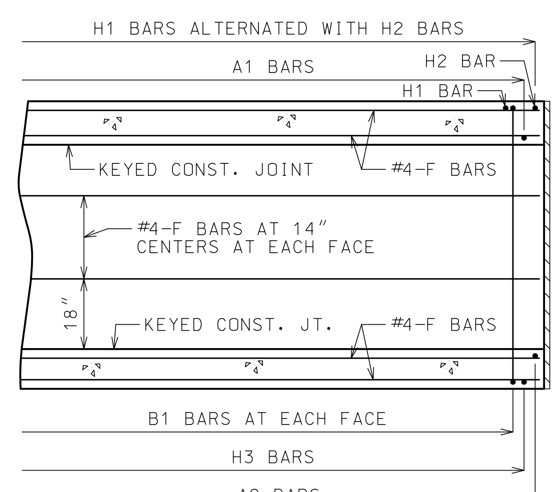


PART PLAN OF TOP SLAB REINFORCEMENT

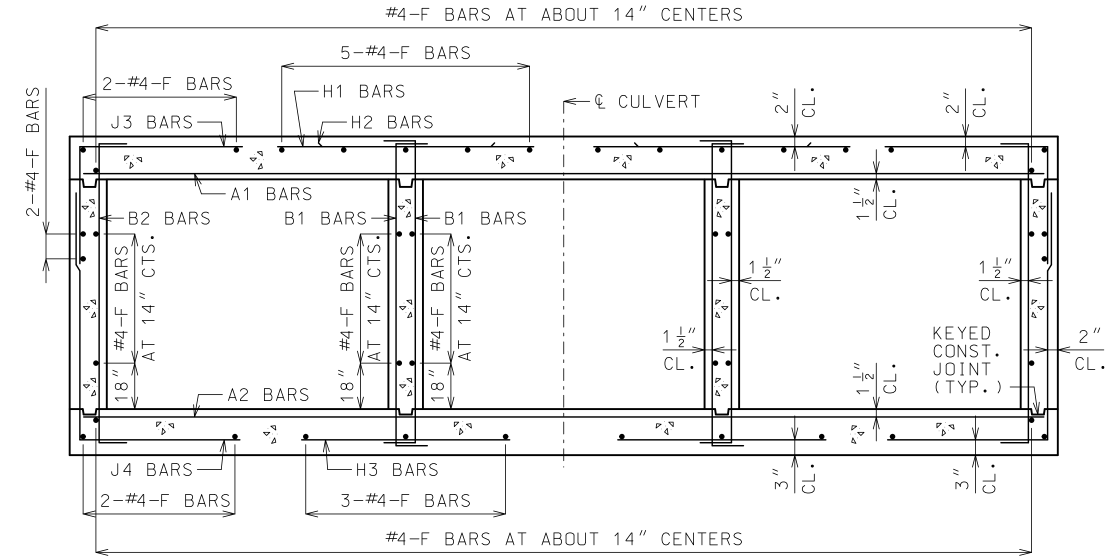
(b) FOR DESIGN FILLS OVER 2'-0"
(c) FOR DESIGN FILLS 2'-0" OR LESS



PART ELEVATION OF EXTERIOR WALL REINFORCEMENT

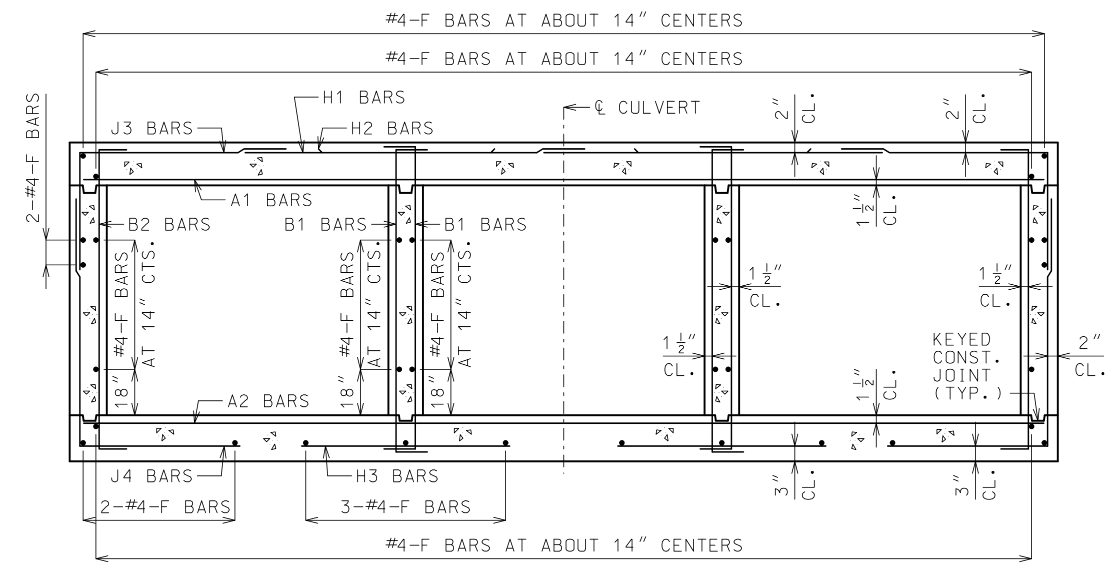


PART SECTION NEAR INTERIOR WALL REINFORCEMENT



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 SPECFICATIONS 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) fy = 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".

MoDOT
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

CUT SECTION

DATE EFFECTIVE:	01/01/2021	703.86	SHEET NO. 1 OF 1
DATE PREPARED:	10/14/2020		

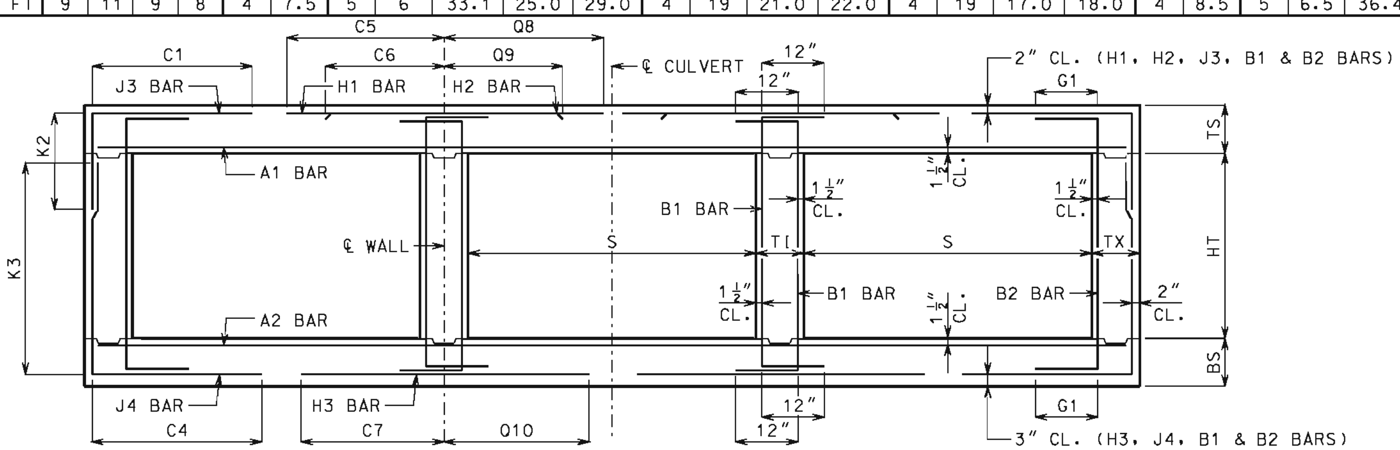
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 3 FT HEIGHT (HT) = 2 FT OR 3 FT OR 4 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS															WALL BARS				
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=2′	HT=3′	HT=4′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=2′	HT=3′	HT=4′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	12	36.0	28	40	52	4	12	25.0	25.0	5	12	5	12	12
2 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	12	35.0	28	40	52	4	12	24.0	24.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	24.0	4	24	39.5	34.0	4	24	19.0	19.0	4	12	4	12	31.1	28	40	52	4	12	23.0	24.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	31.1	24.0	24.0	24.0	4	24	26.0	26.0	4	24	18.0	18.0	4	12	4	12	28.9	28	40	52	4	12	22.0	23.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	28.5	24.0	24.0	24.0	4	24	24.0	24.0	4	24	18.0	18.0	4	12	4	12	27.3	28	40	52	4	12	22.0	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	27.1	24.0	24.0	24.0	4	24	23.0	24.0	4	24	18.0	18.0	4	12	4	12	26.5	28	40	52	4	12	22.0	23.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	25.0	24.0	24.0	24.0	4	24	21.0	23.0	4	24	18.0	18.0	4	12	4	12	24.5	28	40	52	4	12	22.0	23.0	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	24.9	24.0	24.0	24.0	4	24	21.0	23.0	4	24	18.0	18.0	4	12	4	12	24.5	28	40	52	4	12	22.0	23.0	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.4	28	40	52	4	11.5	22.0	23.0	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.4	28	40	52	4	11	22.0	23.0	5	12	5	12	0
20 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.3	28	40	52	4	10.5	22.0	23.0	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	12	4	12	24.3	28	40	52	4	9.5	22.0	23.0	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	11.5	4	12	24.3	28	40	52	4	9	22.0	23.0	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	10.5	4	11	24.1	28	40	52	4	9	22.0	23.0	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	11	24.5	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	10	4	10	24.1	28	40	52	4	8.5	22.0	23.0	5	12	5	12	0
30 FT	8	8	8	8	4	11	4	10.5	24.5	24.0	24.0	24.0	4	24	21.0	22.0	4	24	18.0	18.0	4	9	4	9.5	24.1	28	40	52	4	8	22.0	23.0	5	12	5	12	0
32 FT	8	9	8	8	4	10.5	4	9.5	24.5	24.0	24.0	24.0	4	23	21.0	22.0	4	23	18.0	18.0	4	9.5	4	12	24.5	29	41	53	4	9.5	21.0	23.0	5	12	5	12	0
34 FT	8	9	8	8	4	10	4	9	24.5	24.0	24.0	24.0	4	22	21.0	22.0	4	22	18.0	18.0	4	9	4	11	24.4	29	41	53	4	9	21.0	23.0	5	12	5	12	0
36 FT	8	9	8	8	4	9.5	4	8.5	24.5	24.0	24.0	24.0	4	21	21.0	22.0	4	21	18.0	18.0	4	8.5	4	10.5	24.4	29	41	53	4	8.5	21.0	23.0	5	12	5	12	0
38 FT	8	9	8	8	4	9	4	8	24.5	24.0	24.0	24.0	4	20	21.0	22.0	4	20	18.0	18.0	4	8	4	10	24.4	29	41	53	4	8.5	21.0	23.0	5	12	5	12	0
40 FT	8	10	8	8	4	8.5	4	7.5	24.5	24.0	24.0	24.0	4	19	21.0	22.0	4	19	18.0	18.0	4	8.5	4	12	24.8	30	42	54	4	9	21.0	23.0	5	12	5	12	0
42 FT	9	10	8	8	4	9	4	9	24.8	25.0	25.0	25.0	4	21	21.0	23.0	4	21	17.0	18.0	4	8	4	11.5	24.8	30	42	54	4	9	21.0	23.0	5	12	5	12	0
44 FT	9	10	8	8	4	8.5	4	8.5	24.8	25.0	25.0	25.0	4	20	21.0	23.0	4	20	17.0	18.0	4	8	4	11	24.8	30	42	54	4	9	21.0	23.0	5	12	5	12	0
46 FT	9	10	8	8	4	8	4	8	24.8	25.0	25.0	25.0	4	19	21.0	23.0	4	19	17.0	18.0	4	7.5	4	10.5	24.8	30	42	54	4	8.5	21.0	23.0	5	12	5	12	0
48 FT	9	11	8	8	4	8	4	7.5	24.9	25.0	25.0	25.0	4	19	21.0	22.0	4	19	18.0	18.0	4	8	4	10.5	25.0	31	43	55	4	9.5	21.0	23.0	5	12	5	12	0
50 FT	10	11	8	8	4	8	4	8	25.1	26.0	26.0	26.0	4	20	21.0	23.0	4	20	17.0	18.0	4	7.5	4	10.5	25.1	31	43	55	4	9	21.0	23.0	5	12	5	12	0

SPAN (S) = 3 FT HEIGHT (HT) = 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS														WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=5′	HT=6′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=5′	HT=6′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	30.5	4	24	21.0	20.0	4	12	4	11.5	36.0	64	76	4	12	34.0	25.0	5	12	5	12	12
2 FT	10	8	8	8	4	8.5	4	10.5	26.8	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	11	36.0	64	76	4	12	34.0	24.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	34.0	4	24	19.0	19.0	4	12	4	10	36.0	64	76	4	12	34.0	24.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	26.0	4	24	18.0	19.0	4	12	4	9.5	36.0	64	76	4	12	34.0	23.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	24.0	4	24	18.0	18.0	4	12	4	9	36.0	64	76	4	12	24.0	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	23.0	4	24	18.0	18.0	4	12	4	8.5	36.0	64	76	4	12	23.0	23.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	34.9	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	9	34.4	64	76	4	12	22.0	23.0	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	11	34.5	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	8.5	34.1	64	76	4	12	22.0	23.0	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	10	34.3	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	8	33.9	64	76	4	12	22.0	23.0	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	9	34.0	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	7.5	33.8	64	76	4	12	22.0	23.0	5	12	5	12	0
20 FT	8	8	8	8	4	12	4	8	33.8	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	7	33.6	64	76	4	11.5	22.0	23.0	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	7.5	33.6	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	6.5	33.5	64	76	4	10.5	22.0	23.0	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	7	33.5	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	11.5	4	6	33.4	64	76	4	10.5	22.0	23.0	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	6.5	33.4	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	10.5	5	6.5	33.3	64	76	4	10	22.0	22.0	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	6	33.3	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	10	5	6	33.1	64	76	4	9.5	22.0	22.0	5	12	5	12	0
30 FT	8	8	9	8	4	11.5	4	6.5	32.3	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	9.5	4	6	32.1	64	76	4	9	22.0	23.0	5	12	5	12	0
32 FT	8	9	9	8	4	11	4	6.5	32.1	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	10	4	6.5	34.1	65	77	4	10.5	22.0	23.0	5	12	5	12	0
34 FT	8	9	9	8	4	10	4	6	32.0	24.0	24.0	4	23	21.0	22.0	4	23	17.0	18.0	4	9.5	4	6	34.0	65	77	4	10	22.0	23.0	5	12	5	11.5	0
36 FT	8	9	9	8	4	9.5	5	7	32.0	24.0	24.0	4	22	21.0	22.0	4	22	17.0	18.0	4	9	4	6	34.0	65	77	4	10	22.0	23.0	5	12	5	11	0
38 FT	8	9	9	8	4	9	5	6.5	32.0	24.0	28.0	4	21	21.0	22.0	4	21	17.0	18.0	4	8.5	5	7	34.0	65	77	4	9.5	22.0	23.0	5	12	5	10	0
40 FT	8	10	9	8	4	8.5	5	6	31.9	24.0	24.0	4	20	21.0	22.0	4	20	17.0	18.0	4	9	4	6	35.5	66	78	4	10.5	23.0	23.0	5	12	5	10	0
42 FT	9	10	9	8	4	9.5	5	6.5	33.4	25.0	29.0	4	22	21.0	22.0	4	22	17.0	18.0	4	9	5	7	35.3	66	78	4	10	23.0	23.0	5	12	5	9.5	0
44 FT	9	10	9	8	4	9	5	6.5	33.3	25.0	29.0	4	21	21.0	22.0	4	21	17.0	18.0	4	8.5	5	6.5	35.3	66	78	4	10	23.0	23.0	5	12	5	9	0
46 FT	9	10	9	8	4	8.5	5	6	33.3	25.0	29.0	4	21	21.0	22.0	4	21	17.0	18.0	4	8	5	6.5	35.1	66	78	4	9.5	23.0	23.0	5	12	5	8.5	0
48 FT	9	11	9	8	4	8	5	6	33.1	25.0	29.0	4	20	21.0	22.0	4	20	17.0	18.0	4	8.5	5	6.5	36.4	67	79	4	10	23.0	23.0	5	12	5	8.5	0
50 FT	9	11	9	8	4	7.5	5	6	33.1	25.0	29.0	4	19	21.0	22.0	4	19	17.0	18.0	4	8.5	5	6.5	36.4	67	79	4	10	23.0	23.0	5	12	5	8.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 3 FEET
HEIGHT (HT): 2 THRU 6 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

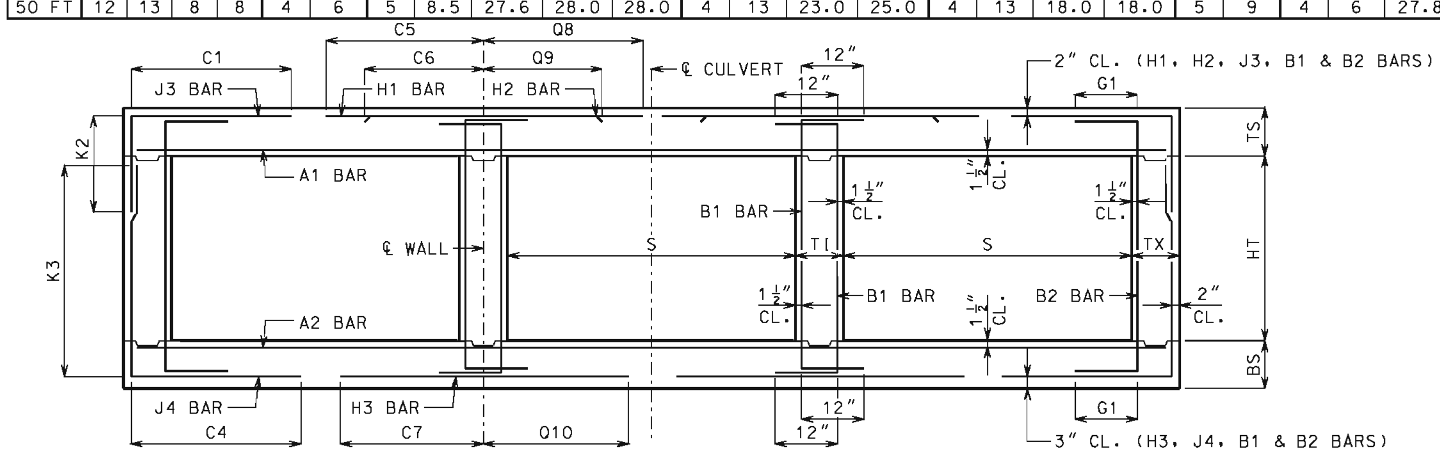
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 4 FT HEIGHT (HT) = 2 FT OR 3 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=2'	J3 K2 HT=3'	H1 BARS SIZE	H1 SPA.	H1 C5	H1 Q8	H2 BARS SIZE	H2 SPA.	H2 C6	H2 Q9	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=2'	J4 K3 HT=3'	H3 BARS SIZE	H3 SPA.	H3 C7	H3 Q10	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	20.0	4	12	4	12	29.4	28	40	4	12	27.0	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	20.0	4	12	4	12	27.3	28	40	4	11.5	27.0	27.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	28.6	24.0	24.0	4	24	33.0	36.0	4	24	20.0	20.0	4	12	4	12	25.0	28	40	4	11.5	26.0	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	26.0	24.0	24.0	4	24	28.0	29.0	4	24	19.0	19.0	4	12	4	12	24.1	28	40	4	10.5	25.0	26.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	26.0	28.0	4	24	19.0	19.0	4	12	4	12	23.5	28	40	4	10	25.0	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	24.1	24.0	24.0	4	24	26.0	27.0	4	24	19.0	19.0	4	12	4	12	23.1	28	40	4	9	25.0	26.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	23.6	24.0	24.0	4	23	25.0	26.0	4	23	18.0	19.0	4	12	4	12	22.9	28	40	4	8	25.0	26.0	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	23.4	24.0	24.0	4	22	25.0	26.0	4	22	18.0	18.0	4	11	4	12	22.6	28	40	4	7.5	24.0	26.0	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	21	24.0	25.0	4	21	18.0	18.0	4	10.5	4	12	22.1	28	40	4	7.5	24.0	25.0	5	12	5	12	0
18 FT	8	8	8	8	4	11.5	4	12	22.5	24.0	24.0	4	20	24.0	25.0	4	20	18.0	18.0	4	9.5	4	10.5	22.1	28	40	4	7	24.0	25.0	5	12	5	12	0
20 FT	8	8	8	8	4	10.5	4	11	22.4	24.0	24.0	4	18	24.0	25.0	4	18	18.0	18.0	4	8.5	4	9.5	22.1	28	40	4	6.5	24.0	25.0	5	12	5	12	0
22 FT	8	8	8	8	4	9.5	4	10	22.4	24.0	24.0	4	17	24.0	25.0	4	17	18.0	18.0	4	7.5	4	9	22.0	28	40	4	6	24.0	25.0	5	12	5	12	0
24 FT	8	9	8	8	4	8.5	4	9	22.6	24.0	24.0	4	15	24.0	25.0	4	15	18.0	18.0	4	8	4	11.5	21.4	29	41	4	7	24.0	26.0	5	12	5	12	0
26 FT	8	9	8	8	4	8	4	8.5	22.5	24.0	24.0	4	14	24.0	25.0	4	14	18.0	18.0	4	7	4	11	21.4	29	41	4	6.5	24.0	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	8	22.8	24.0	24.0	4	13	24.0	25.0	4	13	18.0	18.0	4	7.5	4	12	20.9	30	42	4	7	24.0	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	7.5	4	10	22.1	25.0	25.0	4	15	24.0	26.0	4	15	18.0	18.0	4	7	4	12	21.0	30	42	4	7	24.0	26.0	5	12	5	12	0
32 FT	9	10	8	8	4	7	4	9.5	22.1	25.0	25.0	4	14	24.0	26.0	4	14	18.0	18.0	4	6	4	12	21.0	30	42	4	6	24.0	26.0	5	12	5	12	0
34 FT	9	11	8	8	4	6.5	4	9	22.3	25.0	25.0	4	13	24.0	26.0	4	13	18.0	18.0	4	6.5	4	10.5	20.6	31	43	4	7	24.0	26.0	5	12	5	12	0
36 FT	10	11	8	8	4	7	4	10	21.9	26.0	26.0	4	14	24.0	26.0	4	14	18.0	19.0	4	6.5	4	10.5	20.9	31	43	4	7	24.0	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	6.5	4	9.5	22.0	26.0	26.0	4	13	24.0	26.0	4	13	18.0	19.0	4	6.5	4	9.5	20.5	32	44	4	7.5	24.0	27.0	5	12	5	12	0
40 FT	10	12	8	8	4	6	4	9	22.0	26.0	26.0	4	13	24.0	26.0	4	13	18.0	19.0	4	6.5	4	9.5	20.5	32	44	4	7	24.0	27.0	5	12	5	12	0
42 FT	11	12	8	8	4	6.5	4	9.5	21.6	27.0	27.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6	4	9.5	20.8	32	44	4	6.5	24.0	26.0	5	12	5	12	0
44 FT	11	12	8	8	4	6	4	9.5	21.6	27.0	27.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	9.5	20.8	32	44	4	6	24.0	26.0	5	12	5	12	0
46 FT	11	13	8	8	4	6	4	8.5	21.8	27.0	27.0	4	12	23.0	26.0	4	12	18.0	19.0	4	6	4	8.5	20.5	33	45	4	6.5	23.0	27.0	5	12	5	12	0
48 FT	12	13	8	8	4	6	4	8.5	21.5	28.0	28.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	8.5	20.8	33	45	4	6.5	24.0	27.0	5	12	5	12	0
50 FT	12	13	8	8	5	9	4	8.5	21.5	28.0	28.0	4	13	23.0	26.0	4	13	18.0	19.0	5	8.5	4	8.5	20.8	33	45	4	6	24.0	27.0	5	12	5	12	0

SPAN (S) = 4 FT HEIGHT (HT) = 4 FT OR 5 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=4'	J3 K2 HT=5'	H1 BARS SIZE	H1 SPA.	H1 C5	H1 Q8	H2 BARS SIZE	H2 SPA.	H2 C6	H2 Q9	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=4'	J4 K3 HT=5'	H3 BARS SIZE	H3 SPA.	H3 C7	H3 Q10	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	12	42.0	52	64	4	12	28.0	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	12	39.1	52	64	4	11	27.0	28.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	30.3	24.0	24.0	4	24	47.5	37.0	4	24	20.0	20.0	4	12	4	12	34.8	52	64	4	11	26.0	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	34.6	24.0	24.0	4	24	29.0	30.0	4	24	19.0	19.0	4	12	4	11.5	32.1	52	64	4	10.5	25.0	26.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	31.4	24.0	24.0	4	24	27.0	28.0	4	24	19.0	19.0	4	12	4	11	30.3	52	64	4	9.5	25.0	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	29.9	24.0	24.0	4	24	26.0	27.0	4	24	19.0	19.0	4	12	4	10.5	29.3	52	64	4	9	25.0	26.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	29.1	24.0	24.0	4	24	25.0	27.0	4	24	18.0	19.0	4	11.5	4	10	28.5	52	64	4	8.5	24.0	26.0	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	11	28.5	24.0	24.0	4	23	25.0	26.0	4	23	18.0	19.0	4	10.5	4	9.5	28.1	52	64	4	7.5	24.0	26.0	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	11	26.9	24.0	24.0	4	22	24.0	26.0	4	22	18.0	19.0	4	10	4	9.5	26.6	52	64	4	7.5	24.0	26.0	5	12	5	12	0
18 FT	8	8	8	8	4	11	4	10	26.8	24.0	24.0	4	21	24.0	26.0	4	21	18.0	19.0	4	9	4	8.5	26.5	52	64	4	7	24.0	26.0	5	12	5	12	0
20 FT	8	8	8	8	4	10	4	9	26.8	24.0	24.0	4	19	24.0	26.0	4	19	18.0	19.0	4	8	4	8	26.4	52	64	4	6.5	24.0	26.0	5	12	5	12	0
22 FT	8	8	8	8	4	9	4	8	26.6	24.0	24.0	4	17	24.0	26.0	4	17	18.0	18.0	4	7	4	7	26.4	52	64	4	6	24.0	26.0	5	12	5	12	0
24 FT	8	9	8	8	4	8.5	4	7.5	26.6	24.0	24.0	4	16	24.0	25.0	4	16	18.0	18.0	4	7.5	4	8.5	26.6	53	65	4	7	24.0	26.0	5	12	5	12	0
26 FT	8	9	8	8	4	8	4	7	26.6	24.0	24.0	4	14	24.0	25.0	4	14	18.0	18.0	4	7	4	8	26.5	53	65	4	6.5	24.0	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	6	26.6	24.0	24.0	4	13	24.0	25.0	4	13	18.0	18.0	4	7.5	4	9.5	26.8	54	66	4	7.5	24.0	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	7.5	4	7.5	26.9	25.0	25.0	4	15	24.0	26.0	4	15	18.0	19.0	4	7	4	9	26.9	54	66	4	7	24.0	26.0	5	12	5	12	0
32 FT	9	10	8	8	4	7	4	7	26.9	25.0	25.0	4	14	24.0	26.0	4	14	18.0	19.0	4	6	4	8	26.8	54	66	4	6	24.0	26.0	5	12	5	12	0
34 FT	9	11	8	8	4	6.5	4	6.5	26.9	25.0	25.0	4	13	24.0	26.0	4	13	18.0	18.0	4	6.5	4	8.5	27.0	55	67	4	7	24.0	26.0	5	12	5	12	0
36 FT	10	11	8	8	4	7	4	6.5	27.1	26.0	26.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6.5	4	8	27.1	55	67	4	7	24.0	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	6.5	4	6	27.3	26.0	26.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6.5	4	8	27.4	56	68	4	7.5	24.0	26.0	5	12	5	12	0
40 FT	10	12	8	8	4	6	5	8	27.1	26.0	26.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6.5	4	7.5	27.4	56	68	4	7	24.0	26.0	5	12	5	12	0
42 FT	11	12	8	8	4	6.5	5	9	27.4	27.0	27.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6	4	7	27.4	56	68	4	6.5	24.0	26.0	5	12	5	12	0
44 FT	11	12	8	8	4	6	5	8.5	27.4	27.0	27.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	6.5	27.4	56	68	4	6.5	24.0	26.0	5	12	5	12	0
46 FT	11	13	8	8	4	6	5	8.5	27.5	27.0	27.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	7	27.6	57	69	4	6.5	24.0	26.0	5	12	5	12	0
48 FT	12	13	8	8	4	6	5	8.5	27.6	28.0	28.0	4	14	23.0	25.0	4	14	18.0	18.0	4	6	4	6.5	27.8	57	69	4	6.5	24.0	26.0	5	12	5	11.5	0
50 FT	12	13	8	8	4	6	5	8.5	27.6	28.0	28.0	4	13	23.0	25.0	4	13	18.0	18.0	5	9	4	6	27.8	57	69	4	6	24.0	26.0	5	12	5	11	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

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SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 4 FEET
HEIGHT (HT): 2 THRU 5 FEET

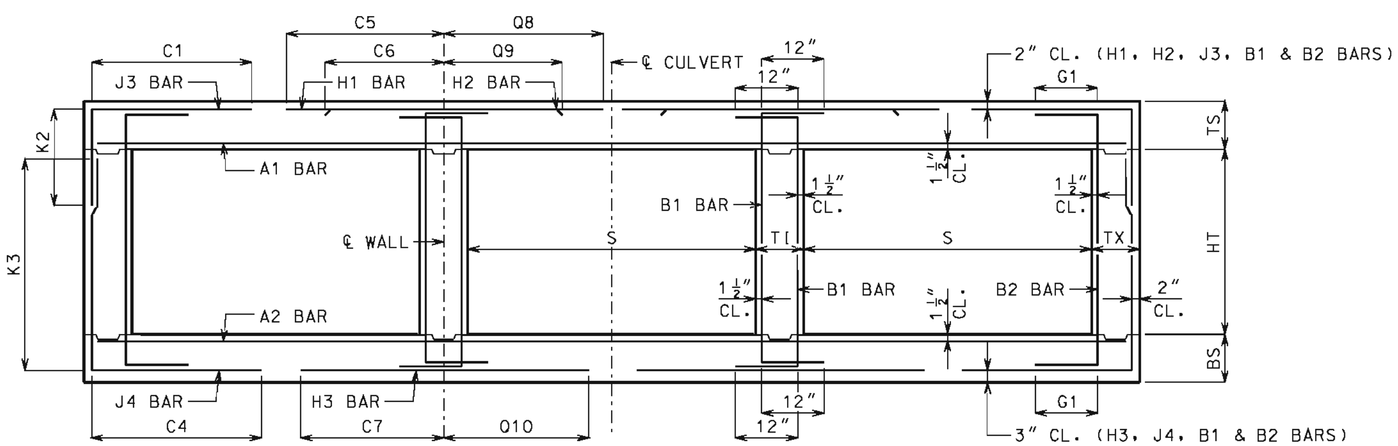
DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 4 FT HEIGHT (HT) = 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS														
					A1 BARS		J3 BARS					H1 BARS				H2 BARS			
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2 HT=6'	K2 HT=7'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9
1 FT	10	8	8	8	4	6.5	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	22.0	21.0
2 FT	10	8	8	8	4	6.5	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0
4 FT	8	8	8	8	4	12	4	10	30.3	24.0	24.0	4	24	47.5	37.0	4	24	20.0	20.0
6 FT	8	8	8	8	4	12	4	10	30.3	24.0	24.0	4	24	47.5	29.0	4	24	19.0	19.0
8 FT	8	8	8	8	4	12	4	9	30.3	24.0	24.0	4	24	47.5	28.0	4	24	19.0	19.0
10 FT	8	8	8	8	4	12	4	8	43.1	24.0	24.0	4	24	28.0	27.0	4	24	18.0	19.0
12 FT	8	8	8	8	4	12	4	7.5	40.5	24.0	24.0	4	24	27.0	26.0	4	24	18.0	19.0
14 FT	8	8	8	8	4	12	4	6.5	39.3	24.0	24.0	4	23	26.0	26.0	4	23	18.0	19.0
16 FT	8	8	8	8	4	12	4	6.5	35.5	24.0	24.0	4	23	24.0	25.0	4	23	18.0	19.0
18 FT	8	8	8	8	4	11.5	4	6	35.3	24.0	24.0	4	21	24.0	25.0	4	21	18.0	18.0
20 FT	8	8	8	8	4	10	5	6.5	35.0	24.0	28.0	4	19	24.0	25.0	4	19	18.0	18.0
22 FT	8	9	8	8	4	9.5	5	6	34.6	24.0	28.0	4	18	24.0	25.0	4	18	18.0	18.0
24 FT	8	9	9	8	4	8.5	5	6.5	34.1	24.0	28.0	4	16	24.0	25.0	4	16	18.0	18.0
26 FT	8	9	9	8	4	8	5	6	34.0	24.0	28.0	4	15	24.0	25.0	4	15	18.0	18.0
28 FT	8	10	9	8	4	7.5	6	7.5	36.8	24.0	28.0	4	14	24.0	25.0	4	14	18.0	18.0
30 FT	9	10	9	8	4	8	5	6	35.0	25.0	29.0	4	15	24.0	25.0	4	15	18.0	18.0
32 FT	9	10	9	8	4	7.5	5	6	35.0	25.0	29.0	4	14	24.0	25.0	4	14	18.0	18.0
34 FT	9	11	9	8	4	7	5	6	34.9	25.0	29.0	4	13	24.0	25.0	4	13	18.0	18.0
36 FT	10	11	9	8	4	7	5	6.5	35.9	26.0	30.0	4	15	24.0	25.0	4	15	18.0	18.0
38 FT	10	11	9	8	4	7	5	6	35.8	26.0	30.0	4	14	24.0	25.0	4	14	18.0	18.0
40 FT	10	12	9	8	4	6.5	5	6	35.6	26.0	30.0	4	13	24.0	25.0	4	13	18.0	18.0
42 FT	10	12	9	8	4	6	5	6	35.6	30.0	30.0	4	12	24.0	25.0	4	12	18.0	18.0
44 FT	11	12	9	8	4	6.5	6	7.5	39.5	31.0	35.0	4	14	24.0	25.0	4	14	18.0	18.0
46 FT	11	13	9	8	4	6	6	6.5	39.4	31.0	35.0	4	13	24.0	25.0	4	13	18.0	18.0
48 FT	11	13	10	8	4	6	5	6	36.3	27.0	31.0	4	13	23.0	25.0	4	13	18.0	18.0
50 FT	12	13	11	8	4	6	5	7	37.0	28.0	32.0	4	14	23.0	25.0	4	14	18.0	18.0

DESIGN FILL	BOTTOM SLAB BARS											WALL BARS				
	A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=6'	K3 HT=7'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	4	12	4	9	42.0	76	88	4	11.5	40.0	28.0	5	12	5	12	12
2 FT	4	12	4	8.5	42.0	76	88	4	11	40.0	28.0	5	12	5	12	12
4 FT	4	12	4	7.5	42.0	76	88	4	11	29.0	27.0	5	12	5	12	12
6 FT	4	12	4	7	42.0	76	88	4	10	27.0	26.0	5	12	5	12	12
8 FT	4	12	4	6.5	42.0	76	88	4	9.5	26.0	26.0	5	12	5	12	0
10 FT	4	12	4	6.5	40.6	76	88	4	9	25.0	26.0	5	12	5	12	0
12 FT	4	11.5	4	6	39.1	76	88	4	8.5	25.0	26.0	5	12	5	12	0
14 FT	4	10.5	5	6.5	38.4	76	88	4	8	25.0	26.0	5	12	5	12	0
16 FT	4	10	5	6.5	35.4	76	88	4	7.5	24.0	26.0	5	12	5	12	0
18 FT	4	9	5	6	35.1	76	88	4	7	24.0	26.0	5	12	5	12	0
20 FT	4	8	6	6.5	38.0	76	88	4	6.5	24.0	26.0	5	12	5	12	0
22 FT	4	8.5	5	6	36.1	77	89	4	8	25.0	26.0	5	12	5	11.5	0
24 FT	4	8	5	7	35.6	77	89	4	7.5	25.0	26.0	5	12	5	11.5	0
26 FT	4	7.5	5	6.5	35.5	77	89	4	7	25.0	26.0	5	12	5	11	0
28 FT	4	7.5	5	7	36.6	78	90	4	7.5	25.0	26.0	5	12	5	10.5	0
30 FT	4	7	5	6.5	36.4	78	90	4	7	25.0	26.0	5	12	5	10	0
32 FT	4	6.5	5	6	36.3	78	90	4	6.5	25.0	26.0	5	12	5	9.5	0
34 FT	4	7	5	6.5	37.4	79	91	4	7	25.0	26.0	5	12	5	9	0
36 FT	4	7	5	6	37.0	79	91	4	7	25.0	26.0	5	12	5	8.5	0
38 FT	4	6.5	6	7.5	40.0	79	91	4	6.5	25.0	26.0	5	12	5	8.5	0
40 FT	4	6.5	5	6	38.3	80	92	4	7	25.0	26.0	5	12	5	8.5	0
42 FT	4	6.5	6	7.5	41.1	80	92	4	6.5	25.0	26.0	5	12	5	8.5	0
44 FT	4	6	6	7	40.9	80	92	4	6.5	25.0	26.0	5	12	5	8.5	0
46 FT	4	6.5	6	7.5	42.0	81	93	4	6.5	26.0	26.0	5	12	5	8.5	0
48 FT	4	6	5	6.5	38.4	81	93	4	6.5	25.0	26.0	5	12	5	8	0
50 FT	4	6	5	7.5	37.9	81	93	4	6	25.0	26.0	5	12	5	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 4 FEET HEIGHT (HT): 6 THRU 7 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

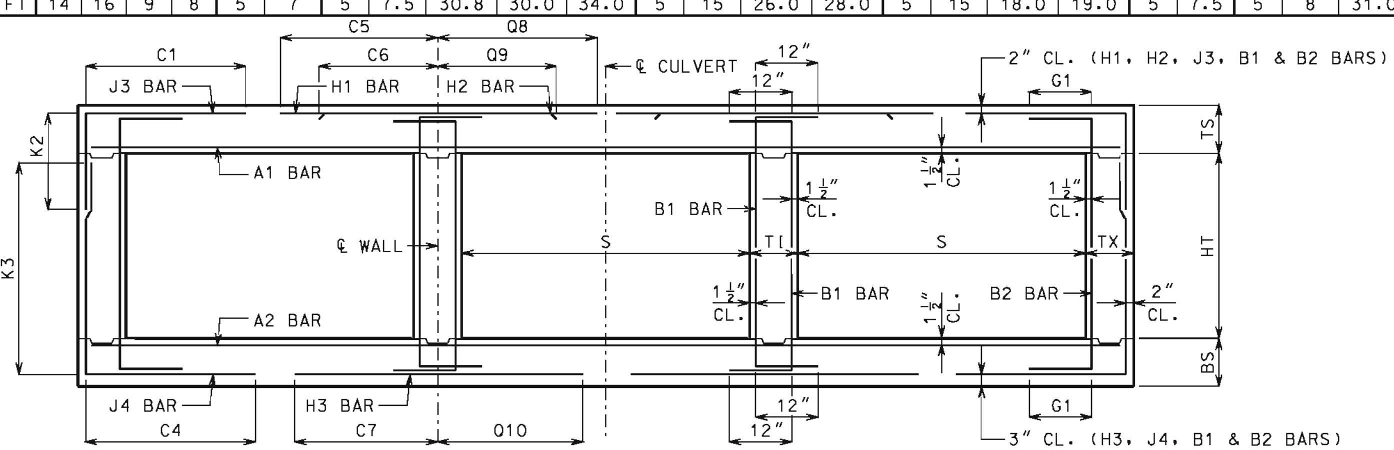
SHEET NO. 3 OF 27

SPAN (S) = 5 FT HEIGHT (HT) = 3 FT OR 4 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=3'	K2 HT=4'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=3'	K3 HT=4'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	10	8	8	8	5	9	4	10.5	33.9	26.0	26.0	4	19	56.5	42.5	4	19	22.0	21.0	4	12	4	12	33.9	40	52	4	8.5	30.0	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	22.0	21.0	4	12	4	12	31.1	40	52	4	8.5	30.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10.5	4	12	32.1	24.0	24.0	4	20	38.0	46.0	4	20	20.0	20.0	4	12	4	12	28.4	40	52	4	8.5	29.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	29.3	24.0	24.0	4	21	31.0	34.0	4	21	20.0	20.0	4	12	4	12	27.0	40	52	4	8	28.0	29.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	27.5	24.0	24.0	4	20	30.0	31.0	4	20	19.0	19.0	4	11	4	11	26.3	40	52	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	11	4	12	26.6	24.0	24.0	4	18	29.0	30.0	4	18	19.0	19.0	4	9.5	4	10.5	25.6	40	52	4	6.5	27.0	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	10	4	10.5	26.1	24.0	24.0	4	16	28.0	30.0	4	16	19.0	19.0	4	8	4	9.5	25.3	40	52	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	8	8	8	4	8.5	4	9.5	25.6	24.0	24.0	4	14	28.0	29.0	4	14	19.0	19.0	4	7	4	8.5	25.0	40	52	5	7	27.0	29.0	5	12	5	12	0
16 FT	8	9	8	8	4	8	4	8.5	25.6	24.0	24.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	4	11	24.3	41	53	4	6	27.0	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	7.5	4	8	24.8	24.0	24.0	4	12	27.0	28.0	4	12	19.0	19.0	4	7	4	10.5	23.5	41	53	4	6	27.0	29.0	5	12	5	12	0
20 FT	8	9	8	8	4	7	4	7.5	24.6	24.0	24.0	5	17	27.0	28.0	5	17	19.0	19.0	4	6	4	9.5	23.5	41	53	5	7	27.0	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	9	24.3	25.0	25.0	4	12	27.0	29.0	4	12	19.0	19.0	4	6.5	4	12	23.1	42	54	4	6	27.0	29.0	5	12	5	12	0
24 FT	9	11	8	8	4	6.5	4	8	24.4	25.0	25.0	5	17	27.0	29.0	5	17	19.0	19.0	4	6.5	4	10.5	22.6	43	55	4	6	26.0	30.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	4	8.5	23.9	26.0	26.0	5	18	26.0	29.0	5	18	19.0	19.0	4	6	4	10.5	22.9	43	55	5	8	26.0	29.0	5	12	5	12	0
28 FT	10	11	8	8	4	6	4	8	23.9	26.0	26.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	10.5	22.9	43	55	5	8	26.0	29.0	5	12	5	12	0
30 FT	10	12	8	8	5	8	4	7	24.0	26.0	26.0	5	16	26.0	29.0	5	16	19.0	19.0	5	9	4	9.5	22.5	44	56	5	8.5	26.0	30.0	5	12	5	12	0
32 FT	11	12	8	8	5	9	4	8	23.6	27.0	27.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	9.5	22.8	44	56	5	8	26.0	30.0	5	12	5	12	0
34 FT	11	13	8	8	5	8.5	4	7	23.8	27.0	27.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8.5	4	8.5	22.5	45	57	5	8.5	26.0	30.0	5	12	5	12	0
36 FT	12	13	8	8	5	8.5	4	8	23.5	28.0	28.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8	4	8.5	22.8	45	57	5	8	26.0	30.0	5	12	5	12	0
38 FT	12	14	8	8	5	8	4	7	23.6	28.0	28.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8	4	7.5	22.6	46	58	5	8.5	26.0	30.0	5	12	5	12	0
40 FT	13	14	8	8	5	8	4	7.5	23.4	29.0	29.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8	4	7.5	22.8	46	58	5	8	26.0	30.0	5	12	5	12	0
42 FT	13	14	8	8	5	7.5	4	7.5	23.4	29.0	29.0	5	16	26.0	29.0	5	16	19.0	19.0	5	7.5	4	7.5	22.8	46	58	5	7.5	26.0	30.0	5	12	5	12	0
44 FT	13	15	8	8	5	7.5	4	7	23.6	29.0	29.0	5	15	26.0	29.0	5	15	19.0	19.0	5	7.5	4	7	22.8	47	59	5	8	26.0	30.0	5	12	5	12	0
46 FT	14	15	8	8	5	7.5	4	7	23.4	30.0	30.0	5	16	25.0	29.0	5	16	18.0	19.0	5	7.5	4	7	22.9	47	59	5	7.5	26.0	30.0	5	12	5	12	0
48 FT	14	15	8	8	5	7	4	7	23.4	30.0	30.0	5	15	25.0	29.0	5	15	18.0	19.0	5	7	4	7	22.9	47	59	5	7	26.0	30.0	5	12	5	12	0
50 FT	14	16	8	8	5	7	4	6.5	23.6	30.0	30.0	5	15	25.0	29.0	5	15	18.0	19.0	5	7	4	6.5	22.9	48	60	5	7.5	26.0	30.0	5	12	5	12	0

SPAN (S) = 5 FT HEIGHT (HT) = 5 FT OR 6 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=5'	K2 HT=6'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=5'	K3 HT=6'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	22	56.5	42.5	4	22	23.0	23.0	4	12	4	10	47.5	64	76	4	8.5	31.0	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	22.0	22.0	4	11	4	9.5	42.8	64	76	4	8	30.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10	4	10	33.9	24.0	24.0	4	20	56.5	46.0	4	20	21.0	21.0	4	12	4	9	38.9	64	76	4	8.5	29.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10.5	38.3	24.0	24.0	4	21	33.0	35.0	4	21	20.0	20.0	4	12	4	8.5	35.5	64	76	4	7.5	28.0	30.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	10	34.4	24.0	24.0	4	20	30.0	31.0	4	20	19.0	20.0	4	10.5	4	8	33.5	64	76	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	10.5	4	9	32.9	24.0	24.0	4	18	29.0	30.0	4	18	19.0	19.0	4	9	4	7.5	32.3	64	76	4	6.5	27.0	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	9.5	4	8	31.9	24.0	24.0	4	16	28.0	30.0	4	16	19.0	19.0	4	7.5	4	7	31.3	64	76	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	8	8	8	4	8.5	4	7	31.1	24.0	24.0	4	14	28.0	29.0	4	14	19.0	19.0	4	7	4	6	30.8	64	76	5	7	27.0	29.0	5	12	5	12	0
16 FT	8	9	8	8	4	8	4	6.5	30.8	24.0	24.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	4	7	30.9	65	77	4	6	27.0	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	7.5	4	6.5	29.1	24.0	24.0	4	12	27.0	28.0	4	12	19.0	19.0	4	6.5	4	7	29.1	65	77	4	6	27.0	29.0	5	12	5	12	0
20 FT	8	9	8	8	4	7	5	7	29.0	24.0	24.0	5	17	27.0	28.0	5	17	19.0	19.0	4	6	4	6.5	29.0	65	77	5	7.5	27.0	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	6.5	29.1	25.0	25.0	4	12	26.0	29.0	4	12	19.0	19.0	4	6	4	7.5	29.3	66	78	4	6	27.0	29.0	5	12	5	12	0
24 FT	9	10	8	8	4	6.5	4	6	29.1	25.0	25.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	7	29.1	66	78	5	7.5	27.0	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	5	8	29.4	26.0	26.0	4	12	26.0	29.0	4	12	19.0	19.0	4	6	4	6.5	29.4	67	79	5	8.5	26.0	29.0	5	12	5	12	0
28 FT	10	11	8	8	4	6	5	7.5	29.3	26.0	26.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	6	29.4	67	79	5	8	26.0	29.0	5	12	5	12	0
30 FT	10	12	8	8	5	8.5	5	7.5	29.3	26.0	26.0	5	16	26.0	29.0	5	16	19.0	19.0	5	9	4	6	29.5	68	80	5	8.5	26.0	30.0	5	12	5	12	0
32 FT	11	12	8	8	5	9	5	8	29.5	27.0	31.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	5	8	29.6	68	80	5	8	26.0	30.0	5	12	5	12	0
34 FT	11	13	8	8	5	8.5	5	7.5	29.5	27.0	31.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8.5	5	8.5	29.8	69	81	5	8.5	26.0	30.0	5	12	5	11.5	0
36 FT	12	13	8	8	5	8.5	5	8	29.8	28.0	32.0	5	17	26.0	29.0	5	17	18.0	19.0	5	8	5	8	29.9	69	81	5	8	26.0	30.0	5	12	5	11	0
38 FT	12	14	8	8	5	8	5	7.5	29.8	28.0	32.0	5	16	26.0	29.0	5	16	18.0	19.0	5	8.5	5	8.5	30.1	70	82	5	8.5	26.0	30.0	5	12	5	10	0
40 FT	12	14	8	8	5	7.5	5	7	29.8	28.0	32.0	5	15	26.0	29.0	5	15	18.0	19.0	5	8	5	8	30.0	70	82	5	8	26.0	30.0	5	12	5	9.5	0
42 FT	13	14	8	8	5	8	5	7.5	29.9	29.0	33.0	5	16	26.0	29.0	5	16	18.0	19.0	5	7.5	5	7.5	30.1	70	82	5	7.5	26.0	30.0	5	12	5	9.5	0
44 FT	13	15	8	8	5	7.5	5	7	30.0	29.0	33.0	5	15	26.0	29.0	5	15	18.0	19.0	5	8	5	8	30.4	71	83	5	8	27.0	30.0	5	12	5	9.5	0
46 FT	14	15	8	8	5	7.5	5	6.5	30.1	30.0	34.0	5	16	26.0	28.0	5	16	18.0	19.0	5	7.5	5	7.5	30.5	71	83	5	7.5	27.0	30.0	5	12	5	9.5	0
48 FT	14	15	9	8	5	7.5	5	8	30.6	30.0	34.0	5	16	26.0	28.0	5	16	18.0	19.0	5	7.5	5	8	30.8	71	83	5	7.5	27.0	30.0	5	12	5	9	0
50 FT	14	16	9	8	5	7	5	7.5	30.8	30.0	34.0	5	15	26.0	28.0	5	15	18.0	19.0	5	7.5	5	8	31.0	72	84	5	7.5	27.0	30.0	5	12	5	8.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

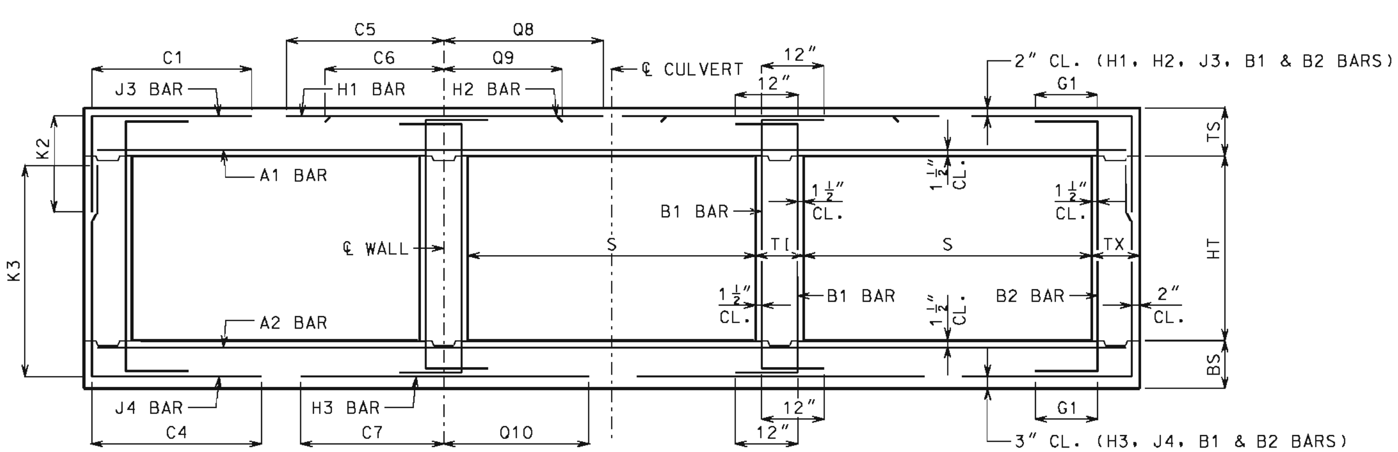
MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET
HEIGHT (HT): 3 THRU 6 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 5 FT HEIGHT (HT) = 7 FT OR 8 FT																																			
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6	4	9	33.9	27.0	27.0	4	22	56.5	42.5	4	22	23.0	23.0	4	11	4	7	48.0	88	100	4	8	46.0	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	8.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	23.0	23.0	4	10.5	4	6.5	48.0	88	100	4	8	32.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	9.5	4	7	33.9	24.0	24.0	4	20	56.5	46.0	4	20	21.0	21.0	4	11.5	4	6	48.0	88	100	4	8	31.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	7	33.9	24.0	24.0	4	21	56.5	35.0	4	21	20.0	20.0	4	11	5	6	48.0	88	100	4	7.5	29.0	30.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	6.5	51.8	24.0	24.0	4	20	34.0	31.0	4	20	19.0	20.0	4	10	5	6	46.0	88	100	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	9	8	4	11	4	7	43.8	24.0	24.0	4	18	30.0	30.0	4	18	19.0	20.0	4	9	4	6	41.6	88	100	4	6.5	28.0	29.0	5	12	5	12	0
12 FT	8	8	9	8	4	9.5	4	6	41.3	24.0	24.0	4	16	29.0	30.0	4	16	19.0	19.0	4	8	5	6	40.4	88	100	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	9	9	8	4	9	5	7	39.9	24.0	28.0	4	15	28.0	29.0	4	15	19.0	19.0	4	8	5	6.5	41.4	89	101	4	6.5	27.0	29.0	5	12	5	11.5	0
16 FT	8	9	9	8	4	8	5	6	39.1	24.0	28.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	5	6	40.8	89	101	4	6	27.0	29.0	5	12	5	11	0
18 FT	8	9	9	8	4	7.5	5	6	36.5	24.0	28.0	4	13	26.0	28.0	4	13	19.0	19.0	4	7	5	6	38.1	89	101	4	6	27.0	29.0	5	12	5	11.5	0
20 FT	8	9	9	8	4	7	6	7	39.1	24.0	32.0	5	18	26.0	28.0	5	18	19.0	19.0	4	6	6	7	40.9	89	101	5	7.5	27.0	29.0	5	12	5	10.5	0
22 FT	8	10	9	8	4	6.5	6	7	38.8	24.0	28.0	5	17	27.0	28.0	5	17	19.0	20.0	4	6.5	5	6	39.0	90	102	5	8	27.0	29.0	5	12	5	10	0
24 FT	9	11	9	8	4	6.5	5	6	37.0	25.0	29.0	5	18	26.0	28.0	5	18	19.0	19.0	4	6.5	5	6	39.8	91	103	4	6	27.0	29.0	5	12	5	9.5	0
26 FT	9	11	9	8	4	6	5	6	36.9	25.0	29.0	5	16	26.0	28.0	5	16	19.0	19.0	4	6	5	6	39.6	91	103	5	8.5	27.0	29.0	5	12	5	8.5	0
28 FT	10	12	9	8	4	6	5	6	37.9	30.0	30.0	5	17	26.0	28.0	5	17	19.0	19.0	4	6	5	6	40.3	92	104	4	6	27.0	29.0	5	12	5	8.5	0
30 FT	10	12	9	8	4	6	5	6	37.8	30.0	30.0	5	16	26.0	28.0	5	16	19.0	19.0	4	6	6	7.5	43.1	92	104	5	8.5	27.0	29.0	5	12	5	8.5	0
32 FT	11	12	10	8	4	6	5	6.5	38.4	31.0	31.0	5	17	26.0	28.0	5	17	18.0	19.0	5	9	5	6.5	39.6	92	104	5	8	27.0	29.0	5	12	5	8	0
34 FT	11	13	10	8	5	9	5	6.5	38.3	31.0	31.0	5	16	26.0	28.0	5	16	19.0	19.0	5	9	5	6.5	40.4	93	105	5	8.5	28.0	30.0	5	12	5	8	0
36 FT	12	13	10	8	5	9	5	6.5	39.1	32.0	32.0	5	17	26.0	28.0	5	17	18.0	19.0	5	8.5	5	6.5	40.3	93	105	5	8	27.0	30.0	5	12	5	8	0
38 FT	12	14	10	8	5	8.5	5	6	39.0	32.0	32.0	5	17	26.0	28.0	5	17	18.0	19.0	5	9	5	6.5	40.9	94	106	5	8.5	28.0	30.0	5	12	5	8	0
40 FT	12	14	11	8	5	8	5	7	38.9	32.0	32.0	5	16	26.0	28.0	5	16	18.0	19.0	5	8.5	5	7	40.8	94	106	5	8	28.0	30.0	5	12	5	7.5	0
42 FT	13	14	11	8	5	8.5	5	7	39.6	33.0	33.0	5	17	26.0	28.0	5	17	18.0	19.0	5	8	5	7	40.5	94	106	5	7.5	28.0	30.0	5	12	5	7.5	0
44 FT	13	15	11	8	5	8	5	6.5	39.5	33.0	33.0	5	16	26.0	28.0	5	16	18.0	19.0	5	8	5	7	41.3	95	107	5	8	28.0	30.0	5	12	5	7.5	0
46 FT	13	15	12	8	5	7.5	5	6.5	39.5	33.0	33.0	5	15	26.0	28.0	5	15	18.0	19.0	5	8	5	6.5	41.0	95	107	5	7.5	28.0	30.0	5	12	5	7	0
48 FT	14	15	12	8	5	8	5	6.5	40.3	34.0	34.0	5	17	26.0	27.0	5	17	18.0	19.0	5	7.5	5	6.5	40.9	95	107	5	7	28.0	30.0	5	12	5	7	0
50 FT	14	16	12	8	5	7.5	5	6.5	40.1	34.0	34.0	5	16	26.0	27.0	5	16	18.0	19.0	5	8	5	6.5	41.6	96	108	5	7.5	28.0	30.0	5	12	5	7	0



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SYMMETRICAL ABOUT ℄ CULVERT.

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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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET
HEIGHT (HT): 7 THRU 8 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

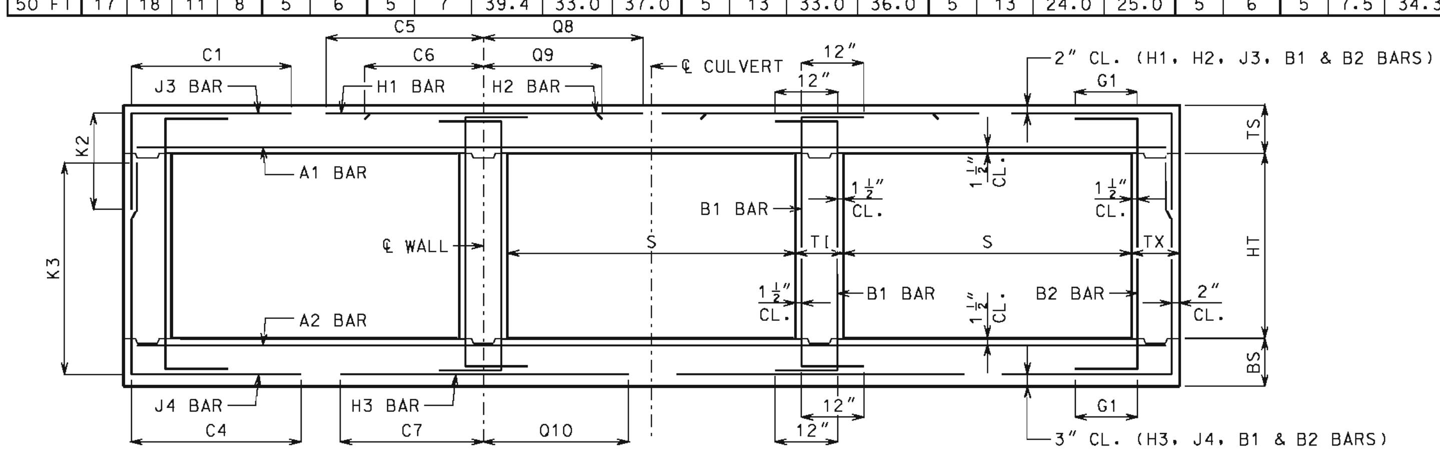
703.87

SPAN (S) = 6 FT HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=3'	K2 HT=4'	K2 HT=5'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=3'	K3 HT=4'	K3 HT=5'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	24.0	23.0	4	10	4	10	38.1	40	52	64	4	7.5	33.0	34.0	5	12	5	12	12
2 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	23.0	22.0	4	9.5	4	9	35.1	40	52	64	4	7	33.0	34.0	5	12	5	12	12
4 FT	8	8	8	8	4	7.5	4	8.5	35.8	24.0	24.0	24.0	4	14	43.0	52.0	4	14	21.0	21.0	4	9	4	9.5	32.1	40	52	64	4	6.5	32.0	33.0	5	12	5	12	12
6 FT	8	8	8	8	4	9	4	9.5	32.6	24.0	24.0	24.0	4	14	35.0	38.0	4	14	21.0	20.0	4	8.5	4	8.5	30.0	40	52	64	4	6	31.0	32.0	5	12	5	12	12
8 FT	8	8	8	8	4	9	4	9	30.4	24.0	24.0	24.0	4	13	33.0	35.0	4	13	20.0	20.0	4	8	4	8	29.0	40	52	64	5	7.5	30.0	32.0	5	12	5	12	0
10 FT	8	8	8	8	4	8	4	8	29.4	24.0	24.0	24.0	4	12	32.0	34.0	4	12	20.0	20.0	4	7	4	7	28.4	40	52	64	5	6.5	30.0	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	4	7	28.8	24.0	24.0	24.0	5	17	31.0	33.0	5	17	20.0	20.0	4	6.5	4	9	27.4	41	53	65	5	7	30.0	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	6.5	4	6.5	28.3	24.0	24.0	24.0	5	16	31.0	32.0	5	16	21.0	21.0	5	9	4	8	26.9	41	53	65	5	6.5	30.0	32.0	5	12	5	12	0
16 FT	9	10	8	8	4	6	4	7.5	27.6	25.0	25.0	25.0	5	16	30.0	33.0	5	16	20.0	20.0	5	9	4	9.5	26.5	42	54	66	5	7	29.0	32.0	5	12	5	12	0
18 FT	9	10	8	8	5	9	4	6.5	27.4	25.0	25.0	25.0	5	16	30.0	32.0	5	16	21.0	21.0	5	8	4	8.5	26.3	42	54	66	5	6.5	29.0	32.0	5	12	5	12	0
20 FT	10	11	8	8	5	9	4	7	27.0	26.0	26.0	26.0	5	15	30.0	33.0	5	15	20.0	20.0	5	8	4	8.5	26.0	43	55	67	5	7	29.0	33.0	5	12	5	12	0
22 FT	10	11	8	8	5	8.5	4	6.5	26.0	26.0	26.0	26.0	5	15	29.0	32.0	5	15	20.0	20.0	5	7.5	4	8.5	25.0	43	55	67	5	7	29.0	33.0	5	12	5	12	0
24 FT	11	12	8	8	5	8.5	4	6.5	25.8	27.0	27.0	27.0	5	15	29.0	32.0	5	15	20.0	20.0	5	8	4	8.5	24.9	44	56	68	5	7	29.0	33.0	5	12	5	12	0
26 FT	11	12	8	8	5	7.5	4	6	25.6	27.0	27.0	27.0	5	14	29.0	32.0	5	14	20.0	20.0	5	6.5	4	8	24.9	44	56	68	5	6.5	29.0	33.0	5	12	5	12	0
28 FT	12	13	8	8	5	7.5	4	6.5	25.5	28.0	28.0	28.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7.5	4	8	24.9	45	57	69	5	7	29.0	33.0	5	12	5	12	0
30 FT	12	14	8	8	5	7	4	6	25.6	28.0	28.0	28.0	5	13	29.0	32.0	5	13	19.0	20.0	5	7.5	4	7.5	24.8	46	58	70	5	7	28.0	33.0	5	12	5	12	0
32 FT	13	14	8	8	5	7	4	6	25.4	29.0	29.0	29.0	5	14	28.0	33.0	5	14	19.0	20.0	5	7	4	7.5	24.9	46	58	70	5	6.5	28.0	33.0	5	12	5	12	0
34 FT	13	15	8	8	5	7	5	8.5	25.6	29.0	29.0	29.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	4	7	24.8	47	59	71	5	7	28.0	33.0	5	12	5	12	0
36 FT	14	15	8	8	5	7	4	6	25.4	30.0	30.0	30.0	5	13	28.0	33.0	5	13	19.0	20.0	5	6.5	4	7	25.0	47	59	71	5	6.5	28.0	33.0	5	12	5	12	0
38 FT	14	16	8	8	5	6.5	5	8.5	25.5	30.0	30.0	30.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	4	6.5	24.9	48	60	72	5	6.5	28.0	33.0	5	12	5	12	0
40 FT	15	16	8	8	5	6.5	5	8	30.4	31.0	31.0	31.0	5	13	33.0	38.0	5	13	24.0	25.0	5	6.5	4	6.5	25.1	48	60	72	5	6.5	28.0	33.0	5	12	5	12	0
42 FT	15	17	8	8	5	6.5	5	8	30.6	31.0	31.0	31.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6.5	4	6	25.1	49	61	73	5	6.5	28.0	33.0	5	12	5	12	0
44 FT	16	17	8	8	5	6.5	5	7	30.5	32.0	32.0	32.0	5	13	33.0	37.0	5	13	24.0	25.0	5	6.5	4	6	25.3	49	61	73	5	6	28.0	33.0	5	12	5	12	0
46 FT	16	17	8	8	5	6	5	7	30.5	32.0	32.0	32.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6	4	6	25.3	49	61	73	5	6	28.0	33.0	5	12	5	12	0
48 FT	17	18	8	8	5	6	5	6.5	30.6	37.0	37.0	37.0	5	13	33.0	37.0	5	13	24.0	25.0	5	6	5	6.5	25.5	50	62	74	5	6	28.0	33.0	5	12	5	11	0
50 FT	17	18	8	8	5	6	5	6.5	30.6	37.0	37.0	37.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6	5	6.5	25.4	50	62	74	5	6	28.0	33.0	5	12	5	10.5	0

SPAN (S) = 6 FT HEIGHT (HT) = 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=6'	K2 HT=7'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=6'	K3 HT=7'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	4	17	64.5	48.5	4	17	24.0	24.0	4	9.5	4	7.5	52.8	76	88	4	7	34.0	34.0	5	12	5	12	12
2 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	4	17	64.5	48.5	4	17	23.0	23.0	4	8.5	4	7	47.3	76	88	4	6.5	33.0	34.0	5	12	5	12	12
4 FT	8	8	8	8	4	7	4	7	37.5	24.0	24.0	4	14	64.5	52.0	4	14	21.0	22.0	4	8.5	4	7	43.0	76	88	4	6.5	32.0	34.0	5	12	5	12	12
6 FT	8	8	8	8	4	8.5	4	7.5	41.9	24.0	24.0	4	14	37.0	39.0	4	14	21.0	21.0	4	8	4	6.5	39.1	76	88	4	6	31.0	33.0	5	12	5	12	12
8 FT	8	8	8	8	4	8.5	4	7	37.6	24.0	24.0	4	13	34.0	35.0	4	13	20.0	20.0	4	7.5	4	6	36.9	76	88	5	7	30.0	32.0	5	12	5	12	0
10 FT	8	8	8	8	4	8	4	6	36.0	24.0	24.0	4	12	32.0	34.0	4	12	20.0	20.0	4	6.5	5	6	35.4	76	88	5	6.5	30.0	32.0	5	12	5	12	0
12 FT	8	9	8	8	4	7	5	6.5	34.8	24.0	24.0	5	17	31.0	33.0	5	17	20.0	20.0	4	6.5	4	6	35.0	77	89	5	7	30.0	32.0	5	12	5	12	0
14 FT	8	9	8	8	4	6	5	6	33.9	24.0	28.0	5	16	31.0	33.0	5	16	21.0	21.0	5	8.5	5	6.5	34.1	77	89	5	6.5	30.0	32.0	5	12	5	12	0
16 FT	9	10	8	8	4	6	5	6.5	33.8	25.0	25.0	5	16	30.0	33.0	5	16	20.0	20.0	5	9	4	6	34.0	78	90	5	7	29.0	33.0	5	12	5	12	0
18 FT	9	10	8	8	5	9	5	6.5	33.4	25.0	29.0	5	16	30.0	32.0	5	16	21.0	21.0	5	8	5	6.5	33.6	78	90	5	6.5	29.0	32.0	5	12	5	12	0
20 FT	9	11	8	8	5	8	5	6	33.1	25.0	29.0	5	16	30.0	32.0	5	16	21.0	22.0	5	8	5	7	33.8	79	91	5	7.5	29.0	33.0	5	12	5	12	0
22 FT	10	11	8	8	5	8.5	5	7	31.6	26.0	30.0	5	15	29.0	32.0	5	15	20.0	20.0	5	7.5	5	7	31.9	79	91	5	7	29.0	33.0	5	12	5	12	0
24 FT	10	12	8	8	5	7.5	5	6.5	31.6	26.0	30.0	5	15	29.0	32.0	5	15	20.0	21.0	5	8	5	7.5	32.0	80	92	5	7	29.0	33.0	5	12	5	12	0
26 FT	11	13	8	8	5	8	5	6.5	31.9	27.0	31.0	5	14	29.0	32.0	5	14	20.0	20.0	5	8	5	7.5	32.3	81	93	5	7.5	29.0	33.0	5	12	5	11	0
28 FT	12	13	8	8	5	8	5	7	31.9	28.0	32.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7.5	5	7	32.3	81	93	5	7	29.0	33.0	5	12	5	10	0
30 FT	12	14	8	8	5	7.5	5	6.5	32.0	28.0	32.0	5	13	29.0	32.0	5	13	19.0	20.0	5	7.5	5	7.5	32.4	82	94	5	7	29.0	33.0	5	12	5	9.5	0
32 FT	13	14	8	8	5	7.5	5	6.5	32.0	33.0	33.0	5	14	28.0	32.0	5	14	19.0	20.0	5	7	5	7	32.5	82	94	5	6.5	29.0	33.0	5	12	5	9.5	0
34 FT	13	15	8	8	5	7	5	6.5	32.1	33.0	33.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	5	7	32.6	83	95	5	7	29.0	33.0	5	12	5	9.5	0
36 FT	14	15	8	8	5	7	5	6	32.3	34.0	34.0	5	14	28.0	32.0	5	14	19.0	20.0	5	7	5	6.5	32.8	83	95	5	6.5	29.0	33.0	5	12	5	9.5	0
38 FT	14	16	9	8	5	6.5	5	7	32.9	30.0	34.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	5	8	33.1	84	96	5	6.5	29.0	33.0	5	12	5	8.5	0
40 FT	14	16	10	8	5	6	5	7.5	33.3	30.0	34.0	5	12	28.0	32.0	5	12	19.0	20.0	5	6.5	5	7.5	33.4	84	96	5	6.5	29.0	33.0	5	12	5	9.5	0
42 FT	15	17	10	8	5	6.5	5	7.5	38.5	31.0	35.0	5	13	33.0	37.0	5	13	24.0	25.0	5	7	5	7.5	33.6	85	97	5	6.5	29.0	33.0	5	12	5	9	0
44 FT	15	17	10	8	5	6.5	5	7.5	38.5	31.0	35.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6.5	5	7.5	33.6	85	97	5	6	29.0	33.0	5	12	5	8.5	0
46 FT	16	17	10	8	5	6.5	5	7	38.6	32.0	36.0	5	13	33.0	36.0	5	13	24.0	25.0	5	6	5	7.5	33.8	85	97	5	6	29.0	33.0	5	12	5	8	0
48 FT	16	18	11	8	5	6	5	7	39.3	32.0	36.0	5	12	33.0	36.0	5	12	24.0	25.0	5	6.5	5	7.5	34.1	86	98	5	6	29.0	34.0	5	12	5	8.5	0
50 FT	17	18	11	8	5	6	5	7	39.4	33.0	37.0	5	13	33.0	36.0	5	13	24.0	25.0	5	6	5	7.5	34.3	86	98	5	6	29.0	33.0	5	12	5	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

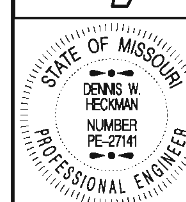
SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 6 FEET HEIGHT (HT): 3 THRU 7 FEET

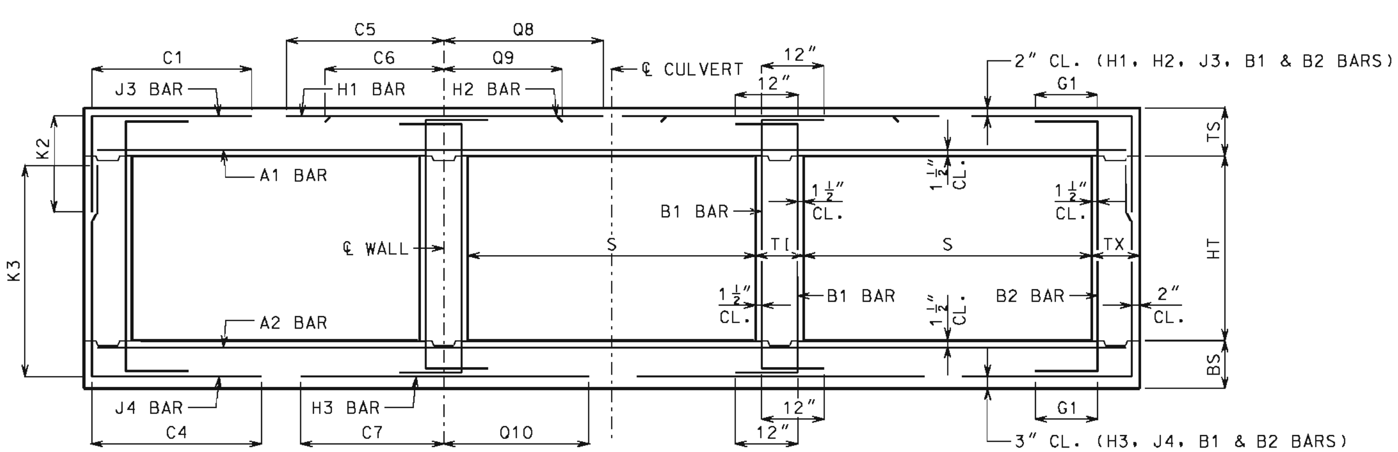
DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

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

SPAN (S) = 6 FT HEIGHT (HT) = 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	HT=9'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	HT=9'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	5	7.5	4	7	37.5	27.0	27.0	4	17	64.5	48.5	4	17	24.0	25.0	4	8.5	5	6.5	54.0	100	112	4	7	52.0	35.0	5	12	5	12	12
2 FT	11	8	8	8	5	7.5	4	6.5	37.5	27.0	27.0	4	17	64.5	48.5	4	17	23.0	24.0	4	8	5	6	54.0	100	112	4	6.5	35.0	34.0	5	12	5	12	12
4 FT	8	8	9	8	4	7	4	6	38.1	24.0	24.0	4	14	64.5	52.0	4	14	22.0	22.0	4	8	5	6.5	54.8	100	112	4	6	33.0	34.0	5	12	5	12	12
6 FT	8	8	9	8	4	8.5	4	6	38.1	24.0	24.0	4	14	64.5	40.0	4	14	21.0	21.0	4	8	5	6	50.8	100	112	4	6	32.0	33.0	5	12	5	12	12
8 FT	8	9	9	8	4	8.5	4	6	50.1	24.0	24.0	4	14	35.0	35.0	4	14	20.0	20.0	4	8.5	5	6.5	50.8	101	113	4	6.5	31.0	33.0	5	12	5	12	0
10 FT	8	9	9	8	4	8	5	6.5	45.8	24.0	28.0	4	12	33.0	33.0	4	12	20.0	20.0	4	7.5	5	6	47.5	101	113	4	6	31.0	33.0	5	12	5	11	0
12 FT	8	9	10	8	4	7	5	6.5	43.0	24.0	28.0	5	17	32.0	33.0	5	17	20.0	20.0	4	6.5	5	6.5	44.8	101	113	5	7	30.0	32.0	5	12	5	11	0
14 FT	8	9	10	8	4	6.5	5	6	41.6	28.0	28.0	5	17	31.0	32.0	5	17	21.0	21.0	4	6	5	6	43.5	101	113	5	6.5	30.0	32.0	5	12	5	10	0
16 FT	8	10	10	8	4	6	6	7	43.3	28.0	28.0	5	16	30.0	32.0	5	16	22.0	22.0	5	9	5	6	44.4	102	114	5	7	30.0	33.0	5	12	5	9.5	0
18 FT	9	10	10	8	4	6	5	6	41.8	29.0	29.0	5	16	30.0	32.0	5	16	20.0	21.0	5	8.5	6	7.5	46.4	102	114	5	7	30.0	32.0	5	12	5	9	0
20 FT	9	11	10	8	5	8.5	5	6	41.0	29.0	29.0	5	16	30.0	32.0	5	16	21.0	22.0	5	8.5	5	6	44.4	103	115	5	7	30.0	33.0	5	12	5	8.5	0
22 FT	10	11	10	8	5	9	5	6.5	39.9	30.0	30.0	5	15	29.0	32.0	5	15	20.0	20.0	5	8	5	6	41.4	103	115	5	7	30.0	33.0	5	12	5	9	0
24 FT	10	12	10	8	5	8	5	6.5	39.5	30.0	30.0	5	15	29.0	32.0	5	15	20.0	21.0	5	8	5	6	42.3	104	116	5	7	30.0	33.0	5	12	5	8.5	0
26 FT	11	12	10	8	5	8	5	6	40.5	31.0	31.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7	5	6	41.9	104	116	5	6.5	30.0	33.0	5	12	5	8	0
28 FT	11	13	10	8	5	7.5	5	6	40.3	31.0	31.0	5	14	29.0	32.0	5	14	20.0	20.0	5	7.5	5	6	42.8	105	117	5	7	30.0	33.0	5	12	5	8	0
30 FT	12	14	10	8	5	8	5	6	41.0	32.0	32.0	5	14	29.0	31.0	5	14	19.0	20.0	5	8	5	6	43.3	106	118	5	7	30.0	33.0	5	12	5	8	0
32 FT	12	14	11	8	5	7.5	5	6.5	40.8	32.0	32.0	5	13	29.0	31.0	5	13	19.0	20.0	5	7.5	5	7	42.9	106	118	5	6.5	30.0	33.0	5	12	5	7.5	0
34 FT	13	15	11	8	5	7.5	5	6.5	41.5	33.0	33.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7.5	5	7	43.5	107	119	5	7	30.0	33.0	5	12	5	7.5	0
36 FT	13	15	11	8	5	7	5	6	41.4	33.0	33.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.4	107	119	5	6.5	30.0	33.0	5	12	5	7.5	0
38 FT	14	16	12	8	5	7	5	6.5	42.1	34.0	34.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.8	108	120	5	6.5	30.0	33.0	5	12	5	7	0
40 FT	14	16	12	8	5	7	5	6	42.0	34.0	34.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.6	108	120	5	6.5	30.0	33.0	5	12	5	7	0
42 FT	15	17	12	8	5	7	5	6	47.6	35.0	35.0	5	13	33.0	36.0	5	13	24.0	25.0	5	7	5	6.5	44.3	109	121	5	6.5	30.0	33.0	5	12	5	7	0
44 FT	15	17	13	8	5	6.5	5	6	47.6	35.0	35.0	5	13	33.0	36.0	5	13	24.0	25.0	5	6.5	5	6	44.0	109	121	5	6	30.0	33.0	5	12	5	6.5	0
46 FT	15	17	13	8	5	6	5	6	47.6	35.0	35.0	5	12	33.0	36.0	5	12	24.0	25.0	5	6	5	6	43.9	109	121	5	6	30.0	33.0	5	12	5	6.5	0
48 FT	16	18	13	8	5	6.5	5	6	48.3	36.0	36.0	5	13	33.0	35.0	5	13	24.0	25.0	5	6.5	5	6	44.5	110	122	5	6	30.0	33.0	5	12	5	6.5	0
50 FT	16	18	14	8	5	6	5	6	48.3	36.0	36.0	5	12	33.0	35.0	5	12	24.0	25.0	5	6	5	6	44.3	110	122	6	8.5	32.0	37.0	5	12	5	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 6 FEET
HEIGHT (HT): 8 THRU 9 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

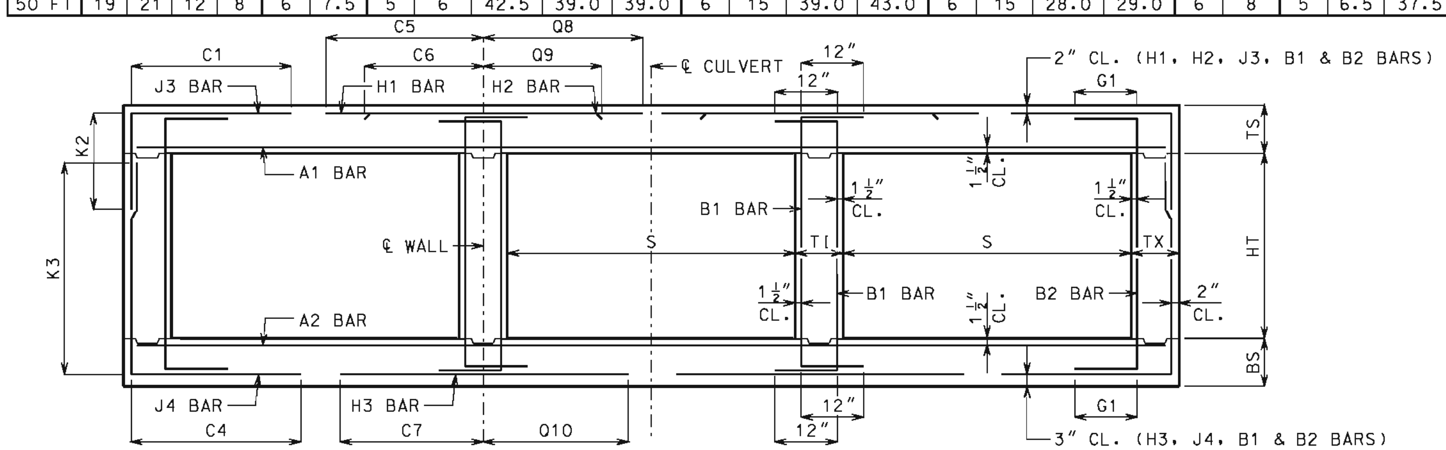
703.87

SPAN (S) = 7 FT HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT

DESIGN FILL	TS	BS	TX	TI	A1 SIZE	A1 SPA.	J3 SIZE	J3 SPA.	C1	K2 HT=4'	K2 HT=5'	K2 HT=6'	H1 SIZE	H1 SPA.	C5	Q8	H2 SIZE	H2 SPA.	C6	Q9	A2 SIZE	A2 SPA.	J4 SIZE	J4 SPA.	C4	K3 HT=4'	K3 HT=5'	K3 HT=6'	H3 SIZE	H3 SPA.	C7	Q10	B1 SIZE	B1 SPA.	B2 SIZE	B2 SPA.	G1
	MEMBER THICKNESS				TOP SLAB BARS: A1 BARS		J3 BARS						H1 BARS				H2 BARS				BOTTOM SLAB BARS: A2 BARS		J4 BARS						H3 BARS				WALL BARS: B1 BARS		B2 BARS		
1 FT	12	8	8	8	5	7.5	4	8.5	41.1	28.0	28.0	28.0	4	16	72.5	54.5	4	16	25.0	25.0	4	8.5	4	7.5	42.5	52	64	76	4	6	36.0	37.0	5	12	5	12	12
2 FT	12	8	8	8	5	7.5	4	8.5	41.1	28.0	28.0	28.0	4	15	72.5	54.5	4	15	24.0	24.0	4	7.5	4	7	39.0	52	64	76	5	7.5	35.0	37.0	5	12	5	12	12
4 FT	8	8	8	8	4	6	4	6.5	39.5	24.0	24.0	24.0	5	17	47.0	58.0	5	17	23.0	23.0	4	7	4	7	36.0	52	64	76	5	7	35.0	37.0	5	12	5	12	12
6 FT	8	8	8	8	4	6.5	4	7	36.0	24.0	24.0	24.0	5	17	38.0	42.0	5	17	22.0	22.0	4	6.5	4	6.5	33.4	52	64	76	5	6.5	34.0	36.0	5	12	5	12	12
8 FT	8	8	8	8	4	6.5	4	6.5	33.5	24.0	24.0	24.0	5	17	36.0	38.0	5	17	23.0	22.0	5	9	4	6	32.0	52	64	76	5	6	33.0	35.0	5	12	5	12	0
10 FT	8	9	8	8	4	6	5	7	32.3	24.0	24.0	24.0	5	16	35.0	37.0	5	16	23.0	23.0	5	9	4	7	30.9	53	65	77	5	6.5	33.0	35.0	5	12	5	12	0
12 FT	8	9	8	8	4	6	5	6	31.4	24.0	24.0	24.0	5	14	34.0	36.0	5	14	23.0	23.0	5	7.5	4	6	30.1	53	65	77	5	6	32.0	35.0	5	12	5	12	0
14 FT	9	10	8	8	5	8.5	4	6	30.5	25.0	25.0	25.0	5	15	33.0	36.0	5	15	23.0	23.0	5	7.5	4	7	29.5	54	66	78	5	6	32.0	36.0	5	12	5	12	0
16 FT	10	11	8	8	5	8	5	8	29.9	26.0	26.0	26.0	5	15	33.0	36.0	5	15	22.0	22.0	5	7.5	4	7	29.0	55	67	79	5	6.5	32.0	36.0	5	12	5	12	0
18 FT	10	11	8	8	5	8	5	7.5	29.5	26.0	26.0	26.0	5	15	33.0	36.0	5	15	23.0	24.0	5	6	4	6.5	28.6	55	67	79	5	6	32.0	36.0	5	12	5	12	0
20 FT	11	12	8	8	5	7.5	5	8.5	29.1	27.0	27.0	27.0	5	14	32.0	36.0	5	14	22.0	23.0	5	6.5	4	6.5	28.4	56	68	80	5	6	31.0	36.0	5	12	5	12	0
22 FT	12	13	8	8	5	7	5	8.5	28.9	28.0	28.0	28.0	5	13	32.0	36.0	5	13	21.0	22.0	5	6.5	4	6	28.3	57	69	81	5	6	31.0	36.0	5	12	5	12	0
24 FT	12	13	8	8	5	7	5	8.5	27.6	28.0	28.0	28.0	5	13	31.0	36.0	5	13	21.0	22.0	5	6	4	6	27.1	57	69	81	6	8	34.0	39.0	5	12	5	12	0
26 FT	13	14	8	8	5	6.5	5	8.5	27.5	29.0	29.0	29.0	5	12	31.0	36.0	5	12	20.0	21.0	5	6.5	4	6	27.1	58	70	82	5	6	31.0	36.0	5	12	5	12	0
28 FT	13	15	8	8	5	6.5	5	8.5	27.6	29.0	29.0	29.0	5	12	31.0	36.0	5	12	21.0	22.0	5	6.5	4	6.5	27.0	59	71	83	5	6	31.0	37.0	5	12	5	12	0
30 FT	14	15	8	8	5	6	5	8.5	27.5	30.0	30.0	34.0	5	12	31.0	36.0	5	12	20.0	21.0	5	6	5	8.5	27.1	59	71	83	6	8	34.0	39.0	5	12	5	12	0
32 FT	15	16	8	8	5	6	5	8	32.5	31.0	31.0	35.0	6	17	39.0	45.0	6	17	29.0	30.0	5	6	5	8	27.3	60	72	84	6	8	34.0	40.0	5	12	5	12	0
34 FT	15	17	8	8	5	6	5	8	32.6	31.0	31.0	31.0	6	16	39.0	45.0	6	16	29.0	30.0	5	6	4	6	27.3	61	73	85	6	8.5	34.0	40.0	5	12	5	11.5	0
36 FT	16	17	8	8	5	6	5	7	32.5	32.0	32.0	36.0	6	16	39.0	45.0	6	16	29.0	30.0	6	8.5	5	7	27.4	61	73	85	6	8	34.0	40.0	5	12	5	11	0
38 FT	16	18	8	8	6	8	5	7	32.6	32.0	36.0	36.0	6	15	39.0	45.0	6	15	29.0	30.0	5	6	5	6.5	27.4	62	74	86	6	8	34.0	40.0	5	12	5	10	0
40 FT	17	18	8	8	6	8	5	6.5	32.6	37.0	37.0	37.0	6	16	39.0	45.0	6	16	29.0	30.0	6	8	5	6.5	27.6	62	74	86	6	7.5	34.0	40.0	5	12	5	9.5	0
42 FT	17	19	8	8	6	7.5	5	6.5	32.8	37.0	37.0	37.0	6	15	39.0	45.0	6	15	29.0	30.0	6	8	5	6.5	27.6	63	75	87	6	8	34.0	40.0	5	12	5	9.5	0
44 FT	18	19	8	8	6	7.5	5	6.5	32.6	38.0	38.0	38.0	6	15	39.0	45.0	6	15	29.0	30.0	6	7.5	5	6.5	27.8	63	75	87	6	7.5	34.0	40.0	5	12	5	9.5	0
46 FT	18	20	8	8	6	7.5	5	6.5	32.8	38.0	38.0	38.0	6	15	39.0	44.0	6	15	29.0	30.0	6	8	5	6	27.8	64	76	88	6	7.5	34.0	40.0	5	12	5	9.5	0
48 FT	19	20	8	8	6	7.5	5	6	32.8	39.0	39.0	39.0	6	15	39.0	44.0	6	15	29.0	30.0	6	7.5	5	6	27.9	64	76	88	6	7	34.0	40.0	5	12	5	9.5	0
50 FT	19	21	8	8	6	7	5	6	32.9	39.0	39.0	39.0	6	14	39.0	44.0	6	14	29.0	30.0	6	7.5	6	7.5	31.0	65	77	89	6	7.5	34.0	40.0	5	12	5	9	0

SPAN (S) = 7 FT HEIGHT (HT) = 7 FT OR 8 FT

DESIGN FILL	TS	BS	TX	TI	A1 SIZE	A1 SPA.	J3 SIZE	J3 SPA.	C1	K2 HT=7'	K2 HT=8'	H1 SIZE	H1 SPA.	C5	Q8	H2 SIZE	H2 SPA.	C6	Q9	A2 SIZE	A2 SPA.	J4 SIZE	J4 SPA.	C4	K3 HT=7'	K3 HT=8'	H3 SIZE	H3 SPA.	C7	Q10	B1 SIZE	B1 SPA.	B2 SIZE	B2 SPA.	G1
	MEMBER THICKNESS				TOP SLAB BARS: A1 BARS		J3 BARS					H1 BARS				H2 BARS				BOTTOM SLAB BARS: A2 BARS		J4 BARS					H3 BARS				WALL BARS: B1 BARS		B2 BARS		
1 FT	12	8	8	8	5	7.5	4	8	41.1	28.0	28.0	4	16	72.5	54.5	4	16	25.0	26.0	4	8	4	6	57.4	88	100	4	6	37.0	37.0	5	12	5	12	12
2 FT	12	8	8	8	5	7.5	4	7.5	41.1	28.0	28.0	4	15	72.5	54.5	4	15	25.0	25.0	4	7	5	6.5	51.3	88	100	5	7	36.0	37.0	5	12	5	12	12
4 FT	8	8	9	8	4	6	4	6	41.8	24.0	24.0	5	17	73.5	58.0	5	17	23.0	23.0	4	7	4	6.5	45.9	88	100	5	7	35.0	37.0	5	12	5	12	12
6 FT	8	8	9	8	4	6.5	4	6	44.3	24.0	24.0	5	17	40.0	43.0	5	17	22.0	22.0	4	6.5	5	6.5	41.8	88	100	5	6.5	34.0	36.0	5	12	5	12	12
8 FT	8	8	9	8	4	6.5	4	6	40.9	24.0	24.0	5	17	37.0	38.0	5	17	22.0	23.0	5	9	5	6	39.9	88	100	5	6	33.0	35.0	5	12	5	12	0
10 FT	8	9	9	8	4	6	5	6.5	39.1	24.0	28.0	5	16	35.0	37.0	5	16	23.0	23.0	5	9	5	7	39.4	89	101	5	6.5	33.0	36.0	5	12	5	12	0
12 FT	8	9	9	8	4	6	6	7	41.0	24.0	28.0	5	15	34.0	36.0	5	15	23.0	24.0	5	7	5	6	38.3	89	101	5	6	32.0	35.0	5	12	5	12	0
14 FT	9	10	9	8	5	8.5	5	6	37.8	25.0	29.0	5	15	34.0	36.0	5	15	23.0	23.0	5	7.5	5	6.5	37.9	90	102	5	6	32.0	36.0	5	12	5	12	0
16 FT	10	11	9	8	5	8	5	7	37.4	26.0	30.0	5	15	33.0	36.0	5	15	22.0	22.0	5	7.5	5	7	37.6	91	103	5	6.5	32.0	36.0	5	12	5	12	0
18 FT	10	11	9	8	5	8	5	6.5	36.8	30.0	30.0	5	15	33.0	36.0	5	15	23.0	23.0	5	6	5	6.5	36.9	91	103	5	6	32.0	36.0	5	12	5	12	0
20 FT	11	12	9	8	5	7.5	5	6.5	36.8	31.0	31.0	5	14	32.0	36.0	5	14	21.0	22.0	5	7	5	6.5	37.0	92	104	5	6	32.0	36.0	5	12	5	11	0
22 FT	11	13	9	8	5	7	5	6	36.5	31.0	31.0	5	14	32.0	35.0	5	14	22.0	23.0	5	7	5	7	37.0	93	105	5	6	32.0	36.0	5	12	5	10	0
24 FT	12	13	9	8	5	7	5	7	34.8	32.0	32.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6	5	7	35.0	93	105	6	8	34.0	39.0	5	12	5	10.5	0
26 FT	13	14	9	8	5	7	5	7	34.9	33.0	33.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6.5	5	7.5	35.3	94	106	5	6	31.0	36.0	5	12	5	9.5	0
28 FT	13	15	9	8	5	6.5	5	6.5	34.9	33.0	33.0	5	12	31.0	35.0	5	12	21.0	22.0	5	6.5	5	7.5	35.4	95	107	5	6	31.0	36.0	5	12	5	9	0
30 FT	14	15	9	8	5	6.5	5	7	35.0	34.0	34.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6	5	7	35.4	95	107	6	8	34.0	39.0	5	12	5	8.5	0
32 FT	14	16	9	8	5	6	5	6	35.0	34.0	34.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6	5	7	35.5	96	108	6	8	35.0	39.0	5	12	5	8.5	0
34 FT	15	17	10	8	5	6	5	7	40.8	35.0	35.0	6	16	40.0	44.0	6	16	29.0	30.0	5	6	5	7.5	36.0	97	109	6	8.5	35.0	40.0	5	12	5	8.5	0
36 FT	16	17	10	8	5	6	5	7	40.8	36.0	36.0	6	17	39.0	44.0	6	17	29.0	30.0	5	6	5	7.5	36.0	97	109	6	8	35.0	40.0	5	12	5	8	0
38 FT	16	18	11	8	5	6	5	7	41.5	36.0	36.0	6	16	39.0	44.0	6	16	29.0	30.0	5	6	5	7	36.5	98	110	6	8	35.0	40.0	5	12	5	8.5	0
40 FT	17	18	11	8	5	6	5	7	41.5	37.0	37.0	6	16	39.0	43.0	6	16	29.0	30.0	6	8	5	7	36.5	98	110	6	7.5	35.0	40.0	5	12	5	8	0
42 FT	17	19	11	8	6	8	5	6.5	41.6	37.0	37.0	6	16	39.0	43.0	6	16	29.0	30.0	6	8.5	5	7	36.8	99	111	6	7.5	35.0	40.0	5	12	5	7.5	0
44 FT	18	19	12	8	6	8	5	6.5	42.3	38.0	38.0	6	16	39.0	43.0	6	16	29.0	29.0	6	8	5	6.5	37.0	99	111	6	7.5	35.0	40.0	5	12	5	8	0
46 FT	18	20	12	8	6	8	5	6.5	42.4	38.0	38.0	6	15	39.0	43.0	6	15	29.0	29.0	6	8	5	6.5	37.1	100	112	6	7.5	35.0	40.0	5	12	5	7.5	0
48 FT	18	20	12	8	6	7.5	5	6.5	42.4	38.0	38.0	6	15	39.0	43.0	6	15	29.0	29.0	6	7.5	5	6.5	37.1	100	112	6	7	35.0	40.0	5	12	5	7.5	0
50 FT	19	21	12	8	6	7.5	5	6	42.5	39.0	39.0	6	15	39.0	43.0	6	15	28.0	29.0	6	8	5	6.5	37.5	101	113	6	7.5	35.0	40.0	5	12	5	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

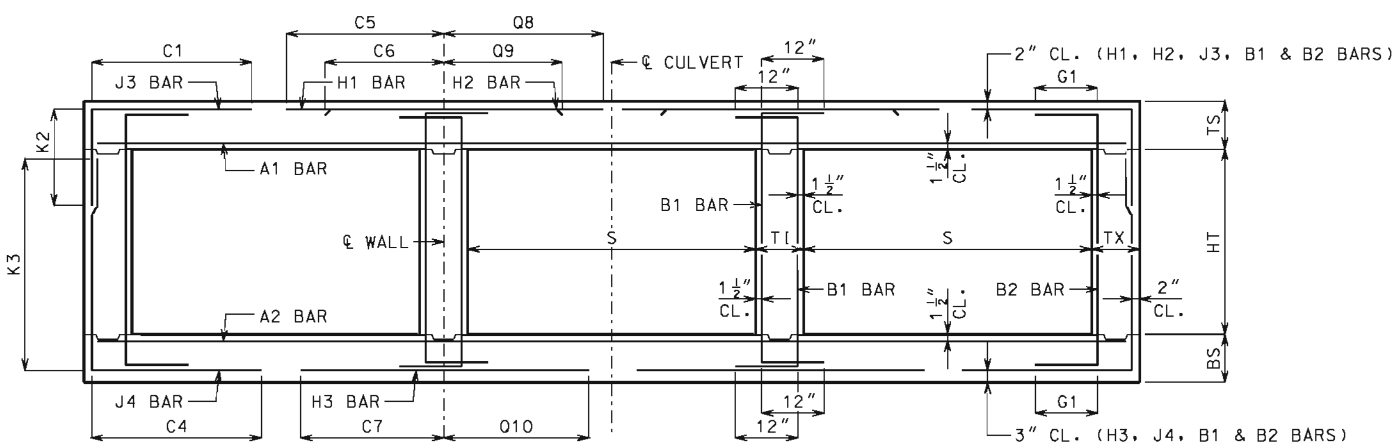
SPAN (S): 7 FEET HEIGHT (HT): 4 THRU 8 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 7 FT HEIGHT (HT) = 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	K2		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K3		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
										HT=9'	HT=10'														HT=9'	HT=10'									
1 FT	12	9	8	8	5	7.5	5	9	41.1	28.0	32.0	4	16	72.5	54.5	4	16	26.0	27.0	4	8	5	6	60.0	113	125	4	7	58.0	38.0	5	12	5	12	12
2 FT	12	9	8	8	5	7	5	8.5	41.1	28.0	32.0	4	15	72.5	54.5	4	15	25.0	26.0	4	7.5	6	7	63.0	113	125	4	6.5	39.0	38.0	5	12	5	12	12
4 FT	8	9	9	8	4	6	5	6	44.8	24.0	28.0	5	17	75.5	58.0	5	17	23.0	23.0	4	7	5	6	60.8	113	125	4	6	37.0	38.0	5	12	5	11	12
6 FT	8	9	10	8	4	6.5	5	6.5	59.1	24.0	28.0	5	17	45.0	43.0	5	17	22.0	22.0	4	7	5	6.5	56.3	113	125	5	7.5	34.0	37.0	5	12	5	11	12
8 FT	8	9	10	8	4	6.5	5	6.5	50.8	28.0	28.0	5	17	38.0	38.0	5	17	22.0	22.0	4	6.5	5	6	51.8	113	125	5	7	33.0	36.0	5	12	5	10.5	0
10 FT	8	9	10	8	4	6	6	7.5	50.9	28.0	32.0	5	16	36.0	37.0	5	16	23.0	23.0	5	9	6	6.5	52.6	113	125	5	6	33.0	36.0	5	12	5	9.5	0
12 FT	8	10	10	8	4	6	6	6.5	48.5	28.0	32.0	5	15	35.0	36.0	5	15	23.0	24.0	5	8.5	6	7	53.1	114	126	5	6.5	33.0	36.0	5	12	5	9	0
14 FT	9	10	10	8	5	8.5	5	6	46.4	29.0	29.0	5	16	34.0	36.0	5	16	23.0	23.0	5	8	6	7	51.3	114	126	5	6	33.0	36.0	5	12	5	8.5	0
16 FT	9	11	10	8	5	8	5	6	44.8	29.0	29.0	5	15	33.0	35.0	5	15	23.0	24.0	5	7.5	6	7	51.8	115	127	5	6	33.0	36.0	5	12	5	8	0
18 FT	10	12	10	8	5	8	5	6.5	45.3	30.0	30.0	5	15	33.0	35.0	5	15	22.0	23.0	5	7.5	6	7	51.8	116	128	5	6.5	33.0	36.0	5	12	5	8	0
20 FT	11	12	10	8	5	7.5	5	6	46.1	31.0	31.0	5	14	33.0	35.0	5	14	21.0	22.0	5	7	6	6.5	50.8	116	128	5	6	33.0	36.0	5	12	5	8	0
22 FT	11	13	10	8	5	7.5	5	6	45.4	31.0	31.0	5	14	32.0	35.0	5	14	22.0	23.0	5	7	6	6.5	51.4	117	129	5	6	33.0	36.0	5	12	5	8	0
24 FT	12	13	10	8	5	7	5	6	43.4	32.0	32.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6	6	6.5	48.0	117	129	6	8	35.0	39.0	5	12	5	8	0
26 FT	12	14	10	8	5	7	6	7.5	46.1	32.0	36.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6.5	6	7	48.6	118	130	6	8.5	35.0	39.0	5	12	5	8	0
28 FT	13	15	11	8	5	6.5	5	6	43.6	33.0	33.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6.5	5	6.5	45.9	119	131	5	6	32.0	36.0	5	12	5	7.5	0
30 FT	14	15	11	8	5	6.5	5	6	44.3	34.0	34.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6	5	6	45.5	119	131	6	8	35.0	39.0	5	12	5	7.5	0
32 FT	14	16	12	8	5	6.5	5	6	44.1	34.0	34.0	5	12	31.0	34.0	5	12	20.0	21.0	5	6.5	5	6	45.9	120	132	6	8	35.0	40.0	5	12	5	7	0
34 FT	15	17	12	8	5	6.5	5	6	49.6	35.0	35.0	6	17	40.0	43.0	6	17	29.0	30.0	5	6.5	5	6.5	46.5	121	133	6	8	36.0	40.0	5	12	5	7	0
36 FT	15	17	13	8	5	6	5	6	49.6	35.0	35.0	6	16	40.0	43.0	6	16	29.0	30.0	5	6	5	6	46.0	121	133	6	7.5	35.0	40.0	5	12	5	6.5	0
38 FT	16	18	13	8	5	6	6	8.5	54.1	36.0	36.0	6	16	40.0	43.0	6	16	29.0	29.0	5	6	5	6	46.6	122	134	6	8	36.0	40.0	5	12	5	6.5	0
40 FT	16	18	13	8	6	8.5	6	8	54.0	36.0	36.0	6	15	40.0	43.0	6	15	29.0	30.0	5	6	5	6	46.5	122	134	6	7.5	36.0	40.0	5	12	5	6.5	0
42 FT	17	19	14	8	5	6	6	8	54.8	37.0	37.0	6	16	39.0	42.0	6	16	29.0	29.0	5	6	5	6	46.9	123	135	6	7.5	36.0	40.0	5	12	5	6	0
44 FT	17	19	14	8	6	8	6	8	54.6	37.0	37.0	6	15	39.0	42.0	6	15	29.0	29.0	6	8	5	6	46.8	123	135	6	7	36.0	40.0	5	12	5	6	0
46 FT	18	20	14	8	6	8	6	7.5	55.3	38.0	38.0	6	16	39.0	42.0	6	16	28.0	29.0	6	8	5	6	47.3	124	136	6	7.5	36.0	40.0	5	12	5	6	0
48 FT	18	20	15	8	6	7.5	6	8	55.4	38.0	42.0	6	15	39.0	42.0	6	15	28.0	29.0	6	7.5	6	8	50.0	124	136	6	7	36.0	40.0	5	12	6	8.5	0
50 FT	18	21	15	8	6	7	6	7.5	55.4	38.0	42.0	6	14	39.0	42.0	6	14	28.0	29.0	6	8	6	8	50.6	125	137	6	7	36.0	40.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

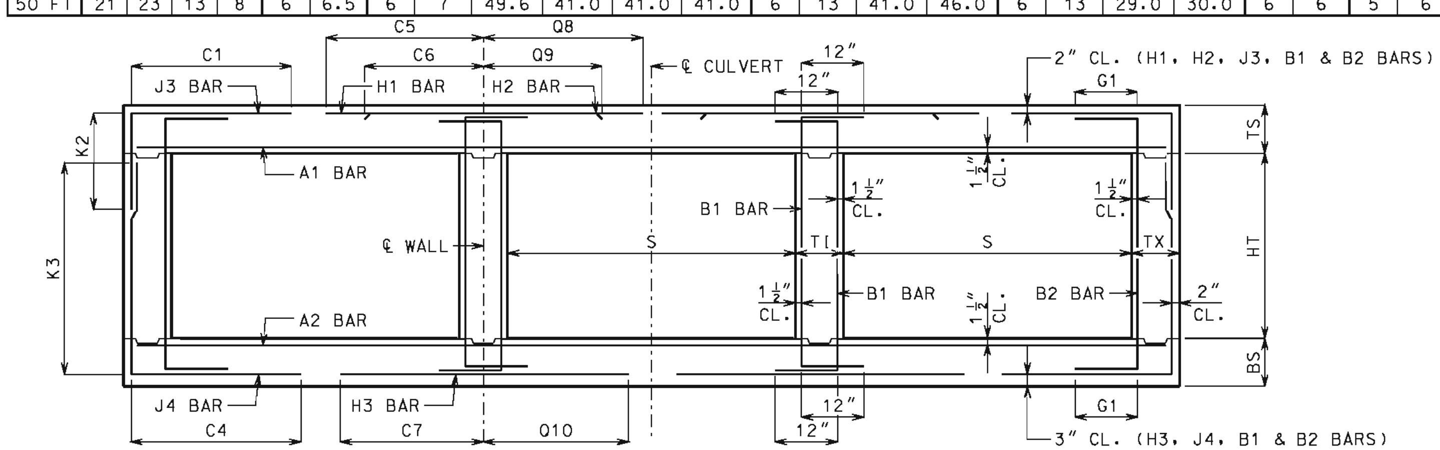
SPAN (S): 7 FEET
HEIGHT (HT): 9 THRU 10 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 8 FT HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT																																						
	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
DESIGN FILL	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=4′	HT=5′	HT=6′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=4′	HT=5′	HT=6′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	8	8	8	5	7	4	8.5	44.8	28.0	28.0	28.0	4	13	81.5	60.5	4	13	27.0	23.0	4	7.5	4	6.5	42.0	52	64	76	5	7	39.0	40.0	5	12	5	12	12
2 FT	12	8	8	8	5	7	4	8.5	44.8	28.0	28.0	28.0	4	12	81.5	60.5	4	12	26.0	25.0	4	6.5	4	6	38.8	52	64	76	5	6.5	38.0	40.0	5	12	5	12	12
4 FT	8	8	8	8	4	6	5	6	40.6	24.0	24.0	24.0	5	16	50.0	64.0	5	16	27.0	27.0	4	6	4	6	35.4	52	64	76	5	6	38.0	40.0	5	11	5	12	12
6 FT	8	8	8	8	4	6	5	6.5	36.5	28.0	24.0	28.0	5	15	42.0	45.0	5	15	26.0	26.0	5	8.5	5	6.5	33.5	52	64	76	6	7	39.0	41.0	5	12	5	12	12
8 FT	8	9	8	8	4	6	5	6	34.4	24.0	24.0	24.0	5	14	39.0	41.0	5	14	25.0	25.0	5	8	4	6.5	31.9	53	65	77	5	6	36.0	39.0	5	12	5	12	0
10 FT	9	10	8	8	5	8.5	4	6	32.6	25.0	25.0	25.0	5	15	38.0	41.0	5	15	25.0	25.0	5	8	4	7.5	30.5	54	66	78	5	6	35.0	39.0	5	12	5	12	0
12 FT	9	10	8	8	5	8.5	5	6.5	31.6	25.0	25.0	25.0	5	14	37.0	40.0	5	14	24.0	25.0	5	7	4	6.5	29.8	54	66	78	6	7	38.0	42.0	5	12	5	12	0
14 FT	10	11	8	8	5	8	5	7.5	30.5	26.0	26.0	26.0	5	14	36.0	40.0	5	14	24.0	25.0	5	6.5	4	6.5	29.0	55	67	79	5	6	34.0	39.0	5	12	5	12	0
16 FT	11	12	8	8	5	7.5	5	8.5	29.6	27.0	27.0	27.0	5	14	35.0	40.0	5	14	24.0	25.0	5	6.5	4	6.5	28.4	56	68	80	5	6	34.0	39.0	5	12	5	12	0
18 FT	11	13	8	8	5	7.5	5	8	29.5	27.0	27.0	27.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	4	6.5	27.6	57	69	81	6	8	37.0	43.0	5	12	5	12	0
20 FT	12	14	8	8	5	7	5	8.5	28.8	28.0	28.0	28.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	4	6.5	27.3	58	70	82	6	8	36.0	43.0	5	12	5	12	0
22 FT	13	14	8	8	5	6.5	5	8.5	28.1	29.0	29.0	29.0	5	12	34.0	40.0	5	12	23.0	24.0	6	8	4	6	27.4	58	70	82	6	7.5	37.0	43.0	5	12	5	12	0
24 FT	14	15	8	8	5	6	5	8.5	27.9	30.0	30.0	30.0	5	12	34.0	40.0	5	12	22.0	23.0	6	8	4	6	27.3	59	71	83	6	7.5	36.0	43.0	5	12	5	12	0
26 FT	15	16	8	8	6	8.5	5	8	32.6	31.0	31.0	31.0	6	16	42.0	49.0	6	16	30.0	32.0	6	8	4	6	27.3	60	72	84	6	7.5	36.0	43.0	5	12	5	12	0
28 FT	15	16	8	8	6	8	5	8	31.6	31.0	31.0	31.0	6	16	42.0	48.0	6	16	31.0	32.0	6	7.5	4	6	26.1	60	72	84	6	7	36.0	43.0	5	12	5	12	0
30 FT	16	17	8	8	6	8	5	7	31.5	32.0	32.0	32.0	6	15	42.0	48.0	6	15	30.0	31.0	6	7.5	4	6	26.3	61	73	85	6	7	36.0	43.0	5	12	5	12	0
32 FT	16	18	8	8	6	7.5	5	7	31.6	32.0	36.0	36.0	6	15	42.0	48.0	6	15	31.0	32.0	6	7.5	5	6.5	26.1	62	74	86	6	7	36.0	43.0	5	12	5	12	0
34 FT	17	19	8	8	6	7.5	5	6.5	31.6	37.0	37.0	37.0	6	14	42.0	48.0	6	14	30.0	31.0	6	7.5	5	6.5	26.3	63	75	87	6	7	36.0	43.0	5	12	5	11.5	0
36 FT	18	19	8	8	6	7.5	5	6.5	31.5	38.0	38.0	38.0	6	14	42.0	48.0	6	14	30.0	31.0	6	7.5	5	6.5	26.4	63	75	87	6	7	36.0	43.0	5	12	5	10.5	0
38 FT	18	20	8	8	6	7	5	6.5	31.6	38.0	38.0	38.0	6	13	42.0	48.0	6	13	30.0	31.0	6	7.5	5	6	26.4	64	76	88	6	7	36.0	43.0	5	12	5	10	0
40 FT	19	20	8	8	6	7	5	6	31.6	39.0	39.0	39.0	6	13	42.0	48.0	6	13	29.0	31.0	6	6.5	5	6	26.5	64	76	88	6	6.5	36.0	43.0	5	12	5	9.5	0
42 FT	19	21	8	8	6	6	5	6	31.8	39.0	39.0	39.0	6	12	42.0	48.0	6	12	30.0	31.0	6	7	6	7.5	29.6	65	77	89	6	6.5	36.0	43.0	5	12	5	9.5	0
44 FT	20	22	8	8	6	6.5	6	7.5	35.9	44.0	44.0	44.0	6	13	41.0	48.0	6	13	29.0	30.0	6	7	6	7	29.8	66	78	90	6	6.5	36.0	43.0	5	12	5	9.5	0
46 FT	21	22	8	8	6	6.5	6	7	35.8	45.0	45.0	45.0	6	13	41.0	48.0	6	13	29.0	30.0	6	6.5	6	7	29.9	66	78	90	6	6.5	36.0	43.0	5	12	5	9.5	0
48 FT	21	23	8	8	6	6.5	6	7	36.0	45.0	45.0	45.0	6	13	41.0	48.0	6	13	29.0	30.0	6	7	6	6.5	30.0	67	79	91	6	6.5	36.0	43.0	5	12	5	9.5	0
50 FT	22	23	8	8	6	6.5	6	6.5	35.9	46.0	46.0	46.0	6	13	41.0	47.0	6	13	29.0	30.0	6	6.5	6	6.5	30.1	67	79	91	6	6	36.0	43.0	5	12	5	9	0

SPAN (S) = 8 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT																																						
	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS												WALL BARS					
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
DESIGN FILL	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7′	HT=8′	HT=9′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=7′	HT=8′	HT=9′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7	4	6	44.8	28.0	28.0	28.0	4	13	81.5	60.5	4	13	27.0	25.0	4	7.5	4	6	66.0	89	101	113	5	8	41.0	41.0	5	12	5	12	12
2 FT	12	9	8	8	5	7	4	6	44.8	28.0	28.0	28.0	4	12	81.5	60.5	4	12	26.0	24.0	4	6.5	6	6.5	61.3	89	101	113	5	7.5	39.0	41.0	5	12	5	12	12
4 FT	8	8	8	8	4	6	6	7.5	47.8	28.0	32.0	32.0	5	16	83.5	64.0	5	16	27.0	28.0	5	8.5	6	6	55.0	88	100	112	5	6	38.0	40.0	5	12	5	12	12
6 FT	8	9	8	8	4	6	6	7.5	52.5	24.0	28.0	32.0	5	15	44.0	47.0	5	15	26.0	26.0	5	8.5	6	6.5	52.3	89	101	113	5	6.5	37.0	40.0	5	12	5	12	12
8 FT	8	9	8	8	4	6	6	7.5	47.4	24.0	28.0	32.0	5	14	40.0	42.0	5	14	25.0	25.0	5	7.5	6	6	48.1	89	101	113	5	6	36.0	39.0	5	12	5	11.5	0
10 FT	9	10	8	8	5	8.5	6	7	46.3	25.0	29.0	33.0	5	15	39.0	41.0	5	15	25.0	25.0	5	7.5	6	6.5	46.9	90	102	114	5	6	35.0	39.0	5	12	5	11	0
12 FT	9	10	8	8	5	8.5	6	7	44.8	29.0	33.0	33.0	5	14	37.0	40.0	5	14	24.0	25.0	5	6.5	6	6	45.4	90	102	114	6	7	38.0	42.0	5	12	5	10	0
14 FT	10	11	8	8	5	8	6	6.5	44.1	30.0	30.0	34.0	5	14	37.0	40.0	5	14	24.0	25.0	5	6.5	6	6	44.9	91	103	115	5	6	35.0	39.0	5	12	5	9.5	0
16 FT	11	12	8	8	5	7.5	6	6.5	43.6	31.0	31.0	35.0	5	14	36.0	40.0	5	14	24.0	25.0	5	6.5	6	6.5	44.4	92	104	116	5	6	34.0	39.0	5	12	5	9.5	0
18 FT	11	13	8	8	5	7.5	6	6	42.8	31.0	31.0	35.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	6	6.5	43.9	93	105	117	6	8	37.0	43.0	5	12	5	9.5	0
20 FT	12	14	8	8	5	7	6	6	42.4	32.0	32.0	36.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	6	6.5	43.4	94	106	118	6	8	37.0	43.0	5	12	5	9.5	0
22 FT	13	14	8	8	5	6.5	6	6	42.1	33.0	33.0	37.0	5	12	35.0	39.0	5	12	23.0	24.0	6	8	6	6	43.0	94	106	118	6	7.5	37.0	43.0	5	12	5	9	0
24 FT	14	15	10	8	5	6	5	6.5	40.0	34.0	34.0	34.0	5	12	34.0	39.0	5	12	22.0	23.0	6	8.5	5	7	40.4	95	107	119	6	7	37.0	43.0	5	12	5	8	0
26 FT	14	16	10	8	5	6	5	6	39.8	34.0	34.0	34.0	5	12	34.0	39.0	5	12	22.0	24.0	6	8	5	7	40.4	96	108	120	6	7.5	37.0	43.0	5	12	5	8	0
28 FT	15	16	10	8	6	8	5	6.5	43.0	35.0	35.0	35.0	6	16	42.0	48.0	6	16	30.0	32.0	6	7.5	5	7	38.4	96	108	120	6	7	37.0	43.0	5	12	5	8	0
30 FT	15	17	11	8	6	7.5	5	6.5	43.5	31.0	35.0	35.0	6	15	42.0	47.0	6	15	31.0	32.0	6	8	5	7	38.8	97	109	121	6	7	37.0	43.0	5	12	5	8.5	0
32 FT	16	18	11	8	6	8	5	6	43.8	32.0	36.0	36.0	6	15	42.0	47.0	6	15	30.0	32.0	6	8	5	7	39.0	98	110	122	6	7	37.0	43.0	5	12	5	8	0
34 FT	17	19	11	8	6	7.5	5	6	43.9	33.0	37.0	37.0	6	14	42.0	47.0	6	14	30.0	31.0	6	8	5	7	39.3	99	111	123	6	7	37.0	43.0	5	12	5	7.5	0
36 FT	17	19	12	8	6	7	5	6	44.4	33.0	37.0	37.0	6	14	42.0	47.0	6	14	30.0	31.0	6	7.5	5	6.5	39.3	99	111	123	6	6.5	37.0	43.0	5	12	5	8	0
38 FT	18	20	12	8	6	7.5	5	6	44.6	38.0	38.0	38.0	6	13	42.0	47.0	6	13	29.0	31.0	6	7.5	5	6.5	39.6	100	112	124	6	6.5	37.0	43.0	5	12	5	7.5	0
40 FT	19	20	12	8	6	7	5	6	44.6	39.0	39.0	39.0	6	14	42.0	47.0	6	14	29.0	30.0	6	6.5	5	6.5	39.6	100	112	124	6	6.5	37.0	43.0	5	12	5	7	0
42 FT	19	21	12	8	6	7	6	7.5	48.8	39.0	39.0	39.0	6	13	42.0	47.0	6	13	29.0	30.0	6	7	5	6.5	39.8	101	113	125	6	6.5	37.0	43.0	5	12	5	7	0
44 FT	20	22	13	8	6	7	5	6	45.5	40.0	40.0	40.0	6	14	41.0	46.0	6	14	29.0	30.0	6	7	5	6	40.3	102	114	126	6	6.5	37.0	44.0	5	12	5	7	0
46 FT	20	22	13	8	6	6.5	6	8	49.5	40.0	40.0	40.0	6	13	41.0	46.0	6	13	29.0	30.0	6	7	5	6	40.3	102	114	126	6	6	37.0	44.0	5	12	5	6.5	0
48 FT	21	23	13	8	6	6.5	6	8	49.6	41.0	41.0	41.0	6	13	41.0	46.0	6	13	29.0	30.0	6	7	5	6	40.5	103	115	127	6	6.5	37.0	44.0	5	12	5	6.5	0
50 FT	21	23	13	8	6	6.5	6	7	49.6	41.0	41.0	41.0	6	13	41.0	46.0	6	13	29.0	30.0	6	6	5	6	40.5	103	115	127	6	6	37.0	44.0	5	12	5	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 8 FEET
HEIGHT (HT): 4 THRU 9 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO. 10 OF 27

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

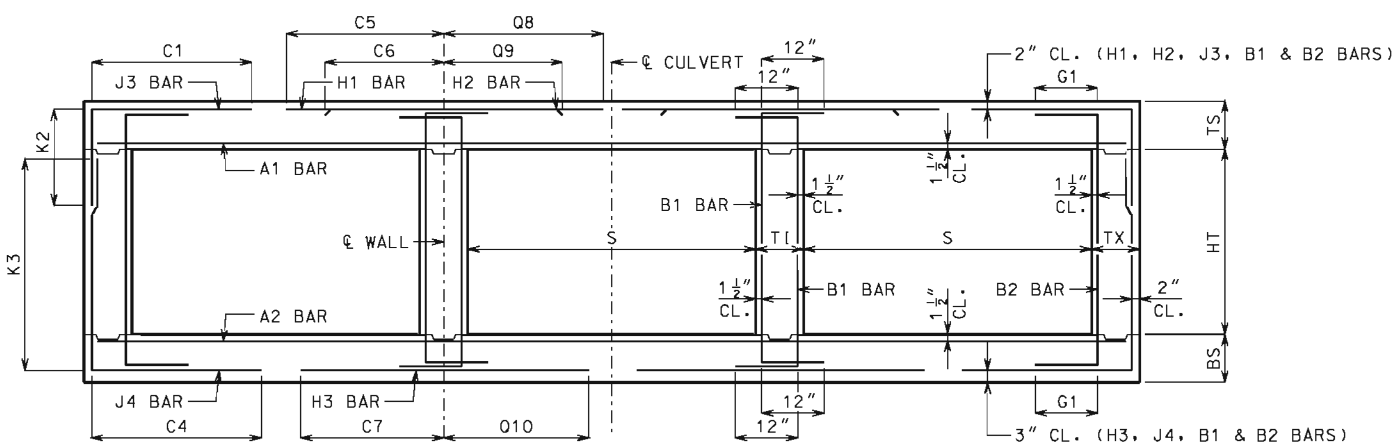
SPAN (S) = 8 FT HEIGHT (HT) = 10 FT OR 11 FT

TOP SLAB BARS

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	A1 BARS SIZE	A1 BARS SPA.	J3 BARS SIZE	J3 BARS SPA.	C1	K2 HT=10'	K2 HT=11'	H1 BARS SIZE	H1 BARS SPA.	C5	Q8	H2 BARS SIZE	H2 BARS SPA.	C6	Q9
1 FT	12	9	8	9	5	7	5	7	44.9	32.0	32.0	4	13	81.5	61.5	4	13	28.0	26.0
2 FT	12	9	9	9	5	7	5	8	45.5	32.0	32.0	4	12	82.5	61.5	4	12	27.0	24.0
4 FT	8	9	10	9	4	6	6	7	49.1	28.0	28.0	5	16	84.5	65.0	5	16	27.0	27.0
6 FT	8	9	11	9	4	6	5	6	57.1	28.0	28.0	5	16	44.0	44.0	5	16	26.0	26.0
8 FT	8	10	11	9	4	6	6	7	54.8	28.0	28.0	5	15	41.0	41.0	5	15	25.0	26.0
10 FT	8	10	11	9	4	6	6	6.5	51.9	28.0	28.0	5	14	39.0	40.0	5	14	25.0	25.0
12 FT	9	11	11	9	5	8.5	6	7	52.5	29.0	29.0	5	14	38.0	39.0	5	14	25.0	25.0
14 FT	10	11	11	9	5	8	5	6	50.1	30.0	30.0	5	15	37.0	39.0	5	15	25.0	25.0
16 FT	10	12	11	9	5	7.5	5	6	48.3	30.0	30.0	5	13	36.0	39.0	5	13	24.0	25.0
18 FT	11	13	11	9	5	7.5	5	6.5	48.6	31.0	31.0	5	14	36.0	39.0	5	14	24.0	25.0
20 FT	12	14	11	9	5	7	5	6	48.8	32.0	32.0	5	13	35.0	39.0	5	13	24.0	25.0
22 FT	13	15	11	9	5	6.5	6	8	52.1	33.0	37.0	5	12	35.0	39.0	5	12	23.0	24.0
24 FT	13	15	12	9	5	6.5	5	6	48.3	33.0	33.0	5	12	35.0	38.0	5	12	23.0	25.0
26 FT	14	16	12	9	5	6	6	8	51.8	34.0	38.0	5	12	35.0	38.0	5	12	22.0	24.0
28 FT	15	16	12	9	5	6	6	8	56.1	35.0	39.0	6	16	43.0	47.0	6	16	31.0	32.0
30 FT	15	17	12	9	6	8	6	7	55.9	35.0	39.0	6	16	43.0	47.0	6	16	31.0	32.0
32 FT	16	18	13	9	6	8	6	8	56.5	36.0	40.0	6	15	42.0	47.0	6	15	30.0	31.0
34 FT	17	19	13	9	6	8	6	7.5	56.9	37.0	41.0	6	14	42.0	47.0	6	14	30.0	31.0
36 FT	17	19	14	9	6	7.5	6	7.5	57.0	37.0	41.0	6	14	42.0	46.0	6	14	30.0	31.0
38 FT	18	20	14	9	6	7.5	6	7.5	57.4	38.0	42.0	6	14	42.0	46.0	6	14	30.0	31.0
40 FT	18	20	14	9	6	7	6	6.5	57.3	38.0	42.0	6	13	42.0	46.0	6	13	30.0	31.0
42 FT	19	21	15	9	6	7	6	7	57.9	43.0	43.0	6	14	42.0	46.0	6	14	30.0	30.0
44 FT	19	22	15	9	6	7	6	7	57.9	43.0	43.0	6	13	42.0	46.0	6	13	30.0	30.0
46 FT	20	22	15	9	6	7	6	6	58.1	44.0	44.0	6	14	42.0	45.0	6	14	30.0	30.0
48 FT	20	23	16	9	6	6.5	6	7	58.5	44.0	44.0	6	13	42.0	45.0	6	13	30.0	30.0
50 FT	21	23	16	9	6	6.5	6	6.5	58.9	45.0	45.0	6	13	42.0	45.0	6	13	29.0	30.0

BOTTOM SLAB BARS / WALL BARS

DESIGN FILL	A2 BARS SIZE	A2 BARS SPA.	J4 BARS SIZE	J4 BARS SPA.	C4	K3 HT=10'	K3 HT=11'	H3 BARS SIZE	H3 BARS SPA.	C7	Q10	B1 BARS SIZE	B1 BARS SPA.	B2 BARS SIZE	B2 BARS SPA.	G1
1 FT	4	6.5	6	6	69.3	125	137	5	7.5	43.0	42.0	5	11.5	5	10	12
2 FT	4	6.5	6	6.5	70.0	125	137	5	7	41.0	41.0	5	11.5	5	10.5	12
4 FT	4	6	5	6	65.8	125	137	5	7	39.0	41.0	5	11.5	5	9.5	12
6 FT	5	9	5	6	56.6	125	137	5	6.5	37.0	39.0	5	11.5	5	9.5	12
8 FT	5	9	5	6.5	56.4	126	138	5	6.5	37.0	39.0	5	12	5	9	0
10 FT	5	7.5	5	6	54.0	126	138	5	6	36.0	39.0	5	12	5	8.5	0
12 FT	5	7.5	5	6	53.9	127	139	5	6	36.0	39.0	5	12	5	8	0
14 FT	5	7	5	6	51.9	127	139	5	6	35.0	39.0	5	12	5	7.5	0
16 FT	5	6.5	5	6	52.3	128	140	5	6	35.0	39.0	5	12	5	7.5	0
18 FT	5	6.5	6	7	55.0	129	141	6	8	38.0	42.0	5	12	5	7.5	0
20 FT	5	6.5	6	7	54.9	130	142	6	8	38.0	43.0	5	12	5	7.5	0
22 FT	5	6	6	7	54.9	131	143	6	8	38.0	43.0	5	12	5	7.5	0
24 FT	5	6	6	7.5	53.9	131	143	6	7	38.0	43.0	5	12	5	7	0
26 FT	5	6	6	7.5	54.1	132	144	6	7.5	38.0	43.0	5	12	5	7	0
28 FT	6	7.5	6	8	51.0	132	144	6	7	38.0	43.0	5	12	5	7	0
30 FT	6	8	6	7.5	51.5	133	145	6	7	38.0	43.0	5	12	5	7	0
32 FT	6	8	6	8.5	51.8	134	146	6	7	38.0	43.0	5	12	5	6.5	0
34 FT	6	8	6	8.5	52.3	135	147	6	7	38.0	43.0	5	12	5	6.5	0
36 FT	6	7.5	6	8	51.9	135	147	6	6.5	38.0	43.0	5	12	5	6	0
38 FT	6	7.5	6	8	52.3	136	148	6	7	38.0	43.0	5	12	5	6	0
40 FT	6	6.5	6	8	52.1	136	148	6	6.5	38.0	43.0	5	12	5	6	0
42 FT	6	7	6	8	52.6	137	149	6	6.5	38.0	43.0	5	12	6	8	0
44 FT	6	7	6	8	53.0	138	150	6	6.5	38.0	43.0	5	12	6	8	0
46 FT	6	7	6	7.5	52.9	138	150	6	6.5	38.0	43.0	5	12	6	8	0
48 FT	6	7	6	7.5	53.3	139	151	6	6.5	38.0	44.0	5	12	6	8	0
50 FT	6	6.5	6	7.5	53.3	139	151	6	6	38.0	44.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 8 FEET
HEIGHT (HT): 10 THRU 11 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

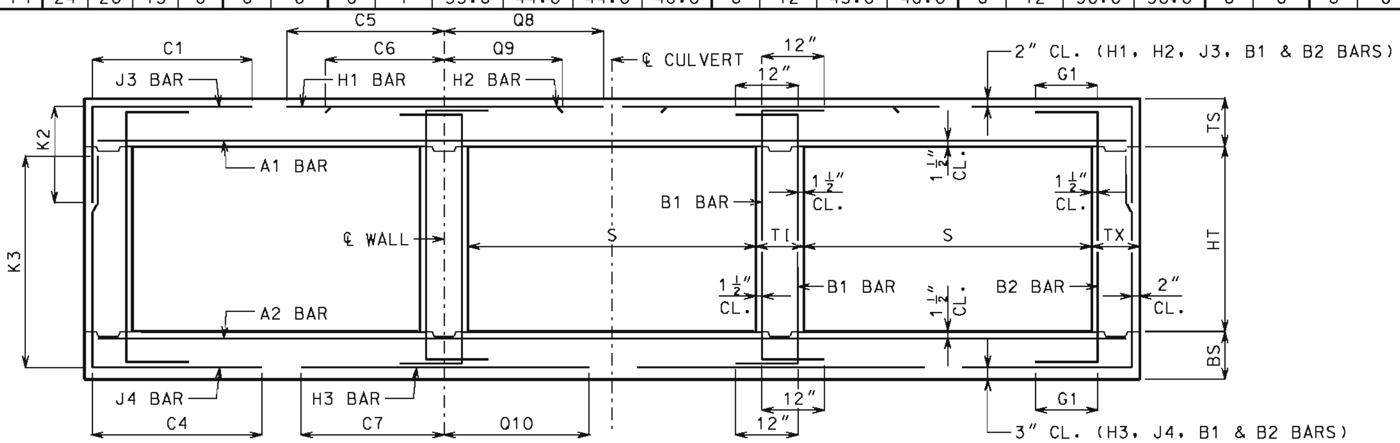
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 9 FT HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	SPA.	J3 BARS SIZE	SPA.	C1	K2 HT=5′	K2 HT=6′	K2 HT=7′	H1 BARS SIZE	SPA.	C5	Q8	H2 BARS SIZE	SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	SPA.	J4 BARS SIZE	SPA.	C4	K3 HT=5′	K3 HT=6′	K3 HT=7′	H3 BARS SIZE	SPA.	C7	Q10	WALL BARS B1 BARS SIZE	SPA.	B2 BARS SIZE	SPA.	G1
1 FT	13	8	8	8	5	6.5	4	7.5	48.3	29.0	29.0	29.0	4	12	89.5	66.5	4	12	28.0	26.0	4	6.5	5	6	46.1	64	76	88	5	6	42.0	43.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	4	7.5	48.3	29.0	29.0	29.0	5	17	89.5	68.5	5	17	27.0	27.0	4	6.5	4	6	43.9	65	77	89	5	6.5	41.0	43.0	5	12	5	12	12
4 FT	9	9	8	8	5	8.5	5	6.5	44.8	25.0	25.0	25.0	5	16	57.0	70.0	5	16	29.0	29.0	5	8.5	4	6	39.6	65	77	89	5	6	40.0	43.0	5	12	5	12	12
6 FT	9	9	8	8	5	8.5	5	6.5	39.6	25.0	25.0	29.0	5	15	46.0	52.0	5	15	27.0	28.0	5	7.5	5	6.5	36.5	65	77	89	6	7	42.0	45.0	5	12	5	12	12
8 FT	9	10	8	8	5	8.5	5	6.5	36.8	25.0	25.0	25.0	5	14	42.0	45.0	5	14	26.0	27.0	5	7.5	4	6.5	34.8	66	78	90	5	6	38.0	42.0	5	12	5	12	0
10 FT	9	10	8	8	5	8.5	5	6	35.4	25.0	25.0	29.0	5	12	41.0	44.0	5	12	26.0	26.0	5	7	5	7	33.5	66	78	90	6	6.5	41.0	45.0	5	12	5	12	0
12 FT	10	11	8	8	5	8	5	7	33.9	26.0	26.0	30.0	5	12	40.0	44.0	5	12	26.0	26.0	5	6.5	5	7.5	32.4	67	79	91	6	7	40.0	45.0	5	12	5	12	0
14 FT	11	12	8	8	5	7.5	5	7.5	32.8	27.0	27.0	31.0	5	13	39.0	43.0	5	13	25.0	26.0	5	6	5	8.5	31.6	68	80	92	6	7	40.0	46.0	5	12	5	12	0
16 FT	12	13	8	8	5	7	5	8	31.9	28.0	28.0	32.0	5	13	38.0	43.0	5	13	25.0	27.0	5	6	5	8.5	31.0	69	81	93	6	7	39.0	46.0	5	12	5	12	0
18 FT	13	14	8	8	5	6.5	5	8	31.3	29.0	29.0	33.0	5	12	37.0	43.0	5	12	25.0	26.0	6	8	5	8.5	30.6	70	82	94	6	7.5	39.0	46.0	5	12	5	12	0
20 FT	14	15	8	8	5	6	5	8.5	30.6	30.0	30.0	34.0	5	12	37.0	43.0	5	12	24.0	26.0	6	8	5	8.5	30.3	71	83	95	6	7	39.0	46.0	5	12	5	12	0
22 FT	15	16	8	8	6	8.5	5	8	35.3	31.0	31.0	35.0	6	16	45.0	52.0	6	16	32.0	34.0	6	7.5	5	8	30.0	72	84	96	6	7	39.0	46.0	5	12	5	12	0
24 FT	15	16	8	8	6	8	5	7.5	35.0	31.0	35.0	35.0	6	16	45.0	52.0	6	16	33.0	35.0	6	6.5	5	8	29.8	72	84	96	6	6.5	39.0	46.0	5	12	5	11.5	0
26 FT	16	17	8	8	6	8	5	7	34.9	32.0	36.0	36.0	6	15	45.0	52.0	6	15	32.0	34.0	6	7	5	7	29.8	73	85	97	6	6.5	39.0	46.0	5	12	5	10.5	0
28 FT	17	18	8	8	6	7.5	5	6.5	34.8	37.0	37.0	37.0	6	14	45.0	52.0	6	14	32.0	34.0	6	7	5	6.5	29.8	74	86	98	6	6.5	39.0	46.0	5	12	5	9.5	0
30 FT	18	19	8	8	6	7	5	6.5	33.6	38.0	38.0	38.0	6	13	44.0	52.0	6	13	31.0	32.0	6	7	5	6.5	28.8	75	87	99	6	6	39.0	46.0	5	12	5	9.5	0
32 FT	18	20	8	8	6	7	5	6.5	33.8	38.0	38.0	38.0	6	13	44.0	51.0	6	13	32.0	33.0	6	7	5	6	28.8	76	88	100	6	6.5	39.0	46.0	5	12	5	9.5	0
34 FT	19	20	8	8	6	6.5	5	6	33.6	39.0	39.0	39.0	6	13	44.0	51.0	6	13	31.0	33.0	6	6	5	6	28.9	76	88	100	6	6	39.0	46.0	5	12	5	9.5	0
36 FT	20	21	8	8	6	6.5	6	7.5	37.8	44.0	44.0	44.0	6	12	44.0	51.0	6	12	30.0	32.0	6	6.5	6	7.5	32.0	77	89	101	6	6	39.0	46.0	5	12	5	9.5	0
38 FT	20	22	8	8	6	6	6	7.5	37.9	44.0	44.0	44.0	6	12	44.0	51.0	6	12	31.0	32.0	6	6.5	6	7	32.0	78	90	102	6	6	39.0	46.0	5	12	5	9	0
40 FT	21	23	8	8	6	6	6	7	38.0	45.0	45.0	45.0	6	12	44.0	51.0	6	12	30.0	32.0	6	6.5	6	6.5	32.3	79	91	103	6	6	39.0	46.0	5	12	5	8.5	0
42 FT	22	23	8	8	6	6	6	6.5	37.9	46.0	46.0	46.0	6	12	44.0	51.0	6	12	30.0	31.0	6	6	6	6.5	32.3	79	91	103	7	8	42.0	49.0	5	12	5	8	0
44 FT	23	24	9	8	6	6	6	7	38.8	47.0	47.0	47.0	6	12	44.0	50.0	6	12	30.0	31.0	6	6	6	7	33.0	80	92	104	7	8	42.0	50.0	5	12	5	8.5	0
46 FT	23	25	9	8	7	8	6	7	38.9	47.0	47.0	47.0	7	16	49.0	55.0	7	16	35.0	36.0	6	6	6	7	33.0	81	93	105	7	8	42.0	50.0	5	12	5	8.5	0
48 FT	24	25	9	8	7	8	6	7	38.9	48.0	48.0	48.0	6	12	43.0	50.0	6	12	30.0	31.0	6	6	6	7	33.1	81	93	105	7	7.5	42.0	50.0	5	12	5	8	0
50 FT	24	26	9	8	7	7.5	6	6.5	39.0	48.0	48.0	48.0	7	15	48.0	55.0	7	15	35.0	36.0	6	6	6	6.5	33.3	82	94	106	7	7.5	42.0	50.0	5	12	5	7.5	0

SPAN (S) = 9 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	SPA.	J3 BARS SIZE	SPA.	C1	K2 HT=8′	K2 HT=9′	K2 HT=10′	H1 BARS SIZE	SPA.	C5	Q8	H2 BARS SIZE	SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	SPA.	J4 BARS SIZE	SPA.	C4	K3 HT=8′	K3 HT=9′	K3 HT=10′	H3 BARS SIZE	SPA.	C7	Q10	WALL BARS B1 BARS SIZE	SPA.	B2 BARS SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	5	8.5	48.3	29.0	29.0	33.0	4	12	89.5	66.5	4	12	29.0	27.0	4	6.5	6	6.5	75.0	101	113	125	5	7	43.0	44.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	5	8.5	51.3	29.0	33.0	33.0	5	18	91.5	68.5	5	18	28.0	25.0	5	9	6	6.5	69.0	101	113	125	5	6.5	42.0	44.0	5	12	5	11.5	12
4 FT	9	9	8	8	5	8.5	6	7	51.3	29.0	33.0	33.0	5	16	91.5	70.0	5	16	29.0	30.0	5	8	6	6	62.0	101	113	125	5	6	41.0	44.0	5	12	5	10	12
6 FT	9	10	9	8	5	8.5	5	6	54.9	25.0	25.0	29.0	5	15	49.0	53.0	5	15	27.0	28.0	5	8	5	6	53.9	102	114	126	5	6.5	39.0	43.0	5	12	5	11	12
8 FT	9	10	9	8	5	8.5	5	6	48.8	25.0	29.0	29.0	5	14	44.0	46.0	5	14	26.0	27.0	5	7	6	6.5	52.4	102	114	126	6	7	41.0	46.0	5	12	5	10.5	0
10 FT	9	11	9	8	5	8.5	5	6	46.5	25.0	29.0	29.0	5	12	42.0	44.0	5	12	26.0	26.0	5	6.5	6	7	51.4	103	115	127	5	6	38.0	43.0	5	12	5	9.5	0
12 FT	10	11	9	8	5	8	5	6	45.8	30.0	30.0	30.0	5	13	40.0	43.0	5	13	26.0	27.0	5	6.5	6	6	49.5	103	115	127	6	7	40.0	45.0	5	12	5	9	0
14 FT	11	12	9	8	5	7.5	6	7	48.1	31.0	31.0	35.0	5	13	39.0	43.0	5	13	25.0	27.0	5	6	6	6.5	48.8	104	116	128	6	7	40.0	46.0	5	12	5	8.5	0
16 FT	12	13	9	8	5	7	6	6.5	47.4	32.0	32.0	36.0	5	13	39.0	43.0	5	13	25.0	27.0	5	6	6	6.5	48.3	105	117	129	6	7	40.0	46.0	5	12	5	8.5	0
18 FT	13	14	9	8	5	6.5	6	7	46.9	33.0	33.0	37.0	5	12	38.0	43.0	5	12	24.0	26.0	6	8	6	6.5	47.6	106	118	130	6	7.5	40.0	46.0	5	12	5	8.5	0
20 FT	13	15	9	8	5	6.5	6	6	46.0	33.0	33.0	37.0	5	12	38.0	43.0	5	12	25.0	27.0	6	8	6	6.5	47.1	107	119	131	6	7	40.0	46.0	5	12	5	8.5	0
22 FT	14	16	11	8	5	6	5	6	43.5	34.0	34.0	34.0	5	12	37.0	42.0	5	12	25.0	26.0	6	7.5	5	7	44.0	108	120	132	6	7	40.0	46.0	5	12	5	8	0
24 FT	15	17	11	8	6	8	5	6	48.4	35.0	35.0	35.0	6	16	46.0	51.0	6	16	33.0	35.0	6	7.5	5	7	44.0	109	121	133	6	6.5	40.0	46.0	5	12	5	7.5	0
26 FT	16	17	11	8	6	8	6	8	52.1	36.0	36.0	36.0	6	15	45.0	51.0	6	15	32.0	34.0	6	6.5	5	6	43.6	109	121	133	6	6.5	40.0	46.0	5	12	5	7.5	0
28 FT	17	18	12	8	6	7.5	5	6	48.8	37.0	37.0	37.0	6	14	45.0	51.0	6	14	31.0	33.0	6	7	5	6.5	43.9	110	122	134	6	6.5	40.0	46.0	5	12	5	7	0
30 FT	17	19	12	8	6	7.5	5	6	46.9	37.0	37.0	37.0	6	14	44.0	51.0	6	14	32.0	33.0	6	7	5	6.5	42.0	111	123	135	6	6	40.0	47.0	5	12	5	7.5	0
32 FT	18	20	12	8	6	7	6	8	51.0	38.0	38.0	38.0	6	13	44.0	50.0	6	13	31.0	33.0	6	7	5	6.5	42.3	112	124	136	6	6	40.0	47.0	5	12	5	7	0
34 FT	19	20	12	8	6	7	6	8	50.9	39.0	39.0	39.0	6	13	44.0	50.0	6	13	30.0	32.0	6	6	5	6.5	42.3	112	124	136	6	6	40.0	47.0	5	12	5	7	0
36 FT	19	21	13	8	6	6.5	6	8	51.6	39.0	39.0	39.0	6	13	44.0	50.0	6	13	31.0	32.0	6	6.5	5	6	42.5	113	125	137	6	6	40.0	47.0	5	12	5	7	0
38 FT	20	22	13	8	6	6.5	6	7.5	51.8	40.0	40.0	40.0	6	12	44.0	50.0	6	12	30.0	31.0	6	6.5	5	6	42.8	114	126	138	6	6	40.0	47.0	5	12	5	6.5	0
40 FT	21	23	13	8	6	6.5	6	7.5	51.9	41.0	41.0	41.0	6	12	44.0	49.0	6	12	30.0	31.0	6	6.5	5	6	43.0	115	127	139	6	6	40.0	47.0	5	12	5	6.5	0
42 FT	21	24	14	8	6	6	6	7.5	52.6	41.0	41.0	41.0	6	12	44.0	49.0	6	12	30.0	31.0	6	6.5	5	6	43.4	116	128	140	6	6	40.0	47.0	5	12	5	6.5	0
44 FT	22	24	14	8	6	6	6	7.5	52.6	42.0	42.0	42.0	6	12	44.0	49.0	6	12	30.0	31.0	6	6	5	6	43.4	116	128	140	7	7.5	43.0	50.0	5	12	5	6	0
46 FT	23	25	14	8	6	6	6	7	52.8	43.0	43.0	43.0	6	12	43.0	48.0	6	12	30.0	31.0	6	6	5	6	43.6	117	129	141	7	7.5	43.0	50.0	5	12	5	6	0
48 FT	23	26	15	8	6	6	6	7	53.6	43.0	43.0	47.0	6	12	44.0	48.0	6	12	30.0	31.0	6	6	6	8	47.0	118	130	142	7	7.5	43.0	50.0	5	12	5	6	0
50 FT	24	26	15	8	6	6	6	7	53.6	44.0	44.0	48.0	6	12	43.0	48.0	6	12	30.0	30.0	6	6	6	8	47.1	118	130	142	7	7.5	43.0	50.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL. EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS. AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

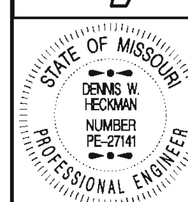
SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

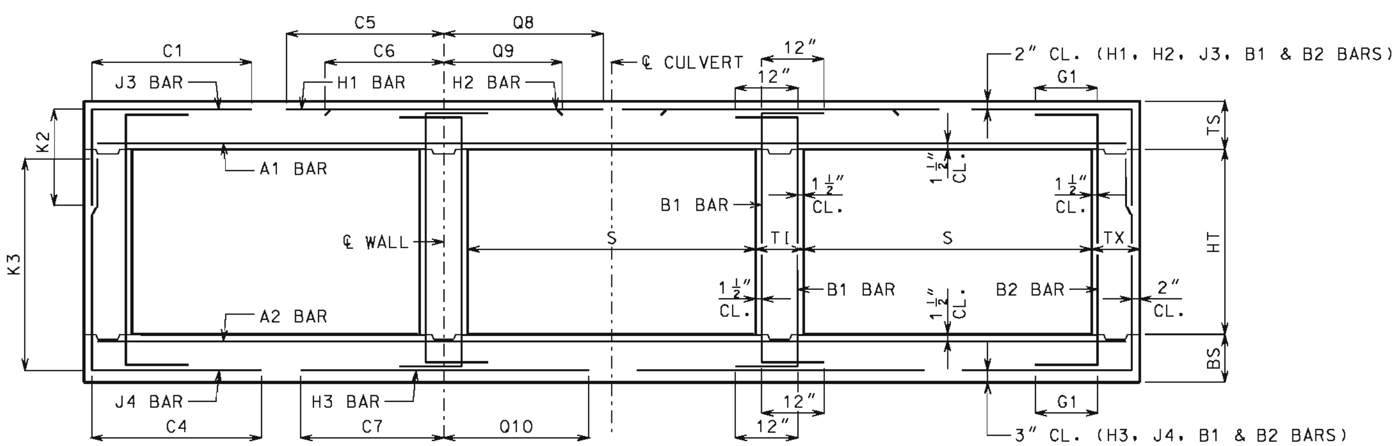
SPAN (S): 9 FEET
HEIGHT (HT): 5 THRU 10 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 9 FT HEIGHT (HT) = 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS													WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	9	10	5	6.5	5	7.5	49.3	33.0	33.0	4	12	90.5	67.5	4	12	29.0	27.0	4	6	6	6	76.3	137	149	5	6.5	44.0	44.0	5	10	5	9	12
2 FT	13	10	9	10	5	6.5	5	7	52.3	33.0	33.0	5	18	92.5	69.5	5	18	28.0	25.0	4	6	6	6.5	76.3	138	150	5	7	44.0	45.0	5	11.5	5	9	12
4 FT	9	10	9	10	5	8.5	5	6	52.3	29.0	29.0	5	16	92.5	71.0	5	16	29.0	30.0	5	8.5	6	6	76.3	138	150	5	7	43.0	45.0	5	11.5	5	8.5	12
6 FT	9	10	10	10	5	8.5	5	6	69.4	29.0	29.0	5	16	51.0	49.0	5	16	28.0	28.0	5	7.5	6	6.5	68.8	138	150	5	6	41.0	43.0	5	12	5	8	12
8 FT	9	10	10	10	5	8.5	5	6	60.0	29.0	29.0	5	14	45.0	45.0	5	14	27.0	27.0	5	7	6	6	63.9	138	150	6	7	43.0	45.0	5	12	5	8	0
10 FT	9	11	10	10	5	8.5	6	7	59.0	29.0	33.0	5	13	42.0	43.0	5	13	27.0	27.0	5	6.5	6	6	63.6	139	151	5	6	39.0	43.0	5	12	5	8	0
12 FT	10	12	10	10	5	8	6	7	58.6	30.0	34.0	5	13	41.0	43.0	5	13	26.0	27.0	5	6.5	6	6.5	62.8	140	152	5	6	39.0	43.0	5	12	5	8	0
14 FT	11	12	10	10	5	7.5	6	7.5	58.5	31.0	35.0	5	13	41.0	43.0	5	13	26.0	27.0	5	6	6	6	60.4	140	152	6	7	41.0	45.0	5	12	5	8	0
16 FT	12	13	11	10	5	7	5	6	54.4	32.0	32.0	5	13	40.0	42.0	5	13	26.0	27.0	5	6	6	7	59.1	141	153	6	7	41.0	45.0	5	12	5	7.5	0
18 FT	12	14	11	10	5	7	6	7.5	55.6	32.0	36.0	5	12	39.0	42.0	5	12	26.0	27.0	6	8	6	6.5	59.0	142	154	6	7.5	41.0	46.0	5	12	5	7.5	0
20 FT	13	15	12	10	5	6.5	6	8	55.0	33.0	37.0	5	12	38.0	42.0	5	12	26.0	27.0	6	8	6	7	58.1	143	155	6	7	41.0	46.0	5	12	5	7	0
22 FT	14	16	12	10	5	6	6	7.5	55.0	34.0	38.0	5	12	38.0	42.0	5	12	25.0	27.0	6	7.5	6	7	57.9	144	156	6	7	41.0	46.0	5	12	5	7	0
24 FT	15	17	13	10	6	8	6	7.5	61.0	35.0	39.0	6	16	47.0	51.0	6	16	33.0	35.0	6	7.5	6	7.5	57.4	145	157	6	6.5	41.0	46.0	5	12	5	6.5	0
26 FT	16	17	13	10	6	8	6	7	61.3	40.0	40.0	6	15	46.0	51.0	6	15	33.0	34.0	6	6.5	6	7	56.6	145	157	6	6.5	41.0	46.0	5	12	5	6.5	0
28 FT	16	18	14	10	6	8	6	7.5	61.0	36.0	40.0	6	15	46.0	51.0	6	15	33.0	35.0	6	7	6	7	56.6	146	158	6	6.5	41.0	46.0	5	12	5	6	0
30 FT	17	19	14	10	6	7.5	6	7.5	59.6	37.0	41.0	6	14	45.0	50.0	6	14	32.0	34.0	6	7	6	7.5	54.8	147	159	6	6	41.0	46.0	5	12	5	6	0
32 FT	18	20	14	10	6	7	6	7	59.9	38.0	42.0	6	13	45.0	50.0	6	13	32.0	33.0	6	7	6	7.5	55.0	148	160	6	6	41.0	46.0	5	12	5	6	0
34 FT	18	20	14	10	6	6.5	6	6.5	59.8	38.0	42.0	6	13	45.0	50.0	6	13	32.0	34.0	6	6	6	7.5	54.9	148	160	6	6	41.0	46.0	5	12	5	6	0
36 FT	19	21	15	10	6	6.5	6	7	60.3	43.0	43.0	6	13	45.0	50.0	6	13	31.0	33.0	6	6.5	6	7.5	55.3	149	161	6	6	41.0	47.0	5	12	6	8	0
38 FT	20	22	15	10	6	6.5	6	6.5	60.6	44.0	44.0	6	12	45.0	50.0	6	12	31.0	32.0	6	6.5	6	7.5	55.5	150	162	6	6	41.0	47.0	5	12	6	8	0
40 FT	20	23	16	10	6	6.5	6	6.5	60.9	44.0	44.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6.5	6	7.5	55.9	151	163	6	6	41.0	47.0	5	12	6	8	0
42 FT	21	23	16	10	6	6.5	6	6.5	61.1	45.0	45.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6	6	7.5	55.8	151	163	7	7.5	44.0	50.0	5	12	6	8	0
44 FT	22	24	17	10	6	6	6	6.5	61.9	46.0	46.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6	6	7	56.3	152	164	7	7.5	44.0	50.0	5	12	6	7.5	0
46 FT	22	25	17	10	6	6	6	6	61.9	46.0	46.0	6	12	45.0	48.0	6	12	31.0	32.0	6	6	6	7	56.5	153	165	7	8	44.0	50.0	5	12	6	7.5	0
48 FT	23	26	18	10	6	6	6	6.5	62.5	47.0	47.0	6	12	44.0	48.0	6	12	31.0	31.0	6	6	6	6.5	57.0	154	166	7	8	44.0	50.0	5	12	6	7	0
50 FT	23	26	18	10	7	8	6	6	62.5	47.0	47.0	6	12	44.0	48.0	6	12	31.0	31.0	6	6	6	6.5	56.9	154	166	7	7.5	44.0	50.0	5	12	6	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 9 FEET
HEIGHT (HT): 11 THRU 12 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

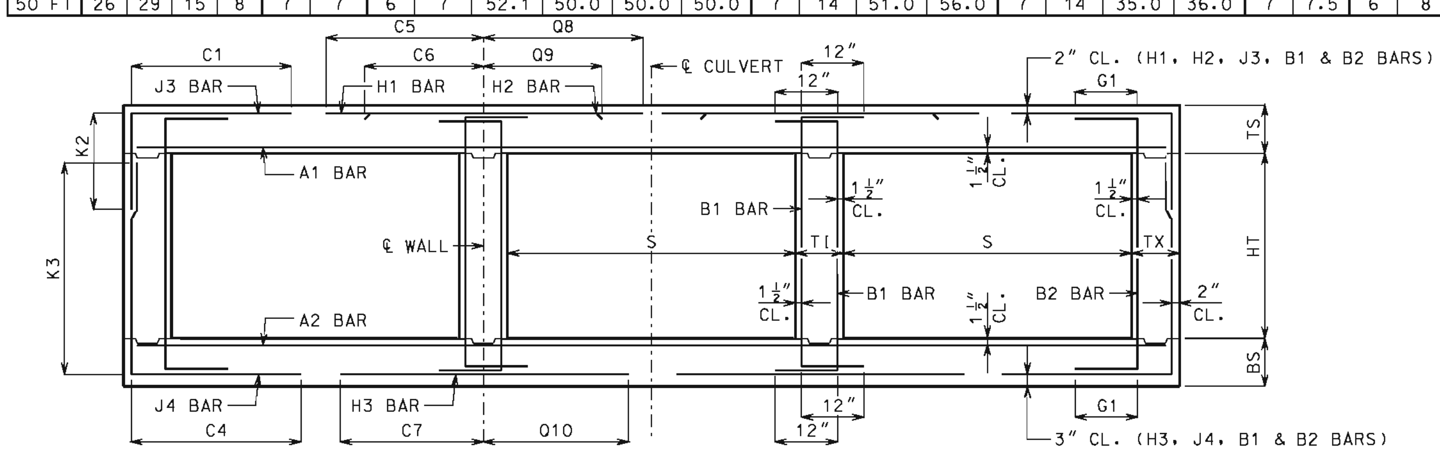
703.87

SPAN (S) = 10 FT HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	HT=6'	HT=7'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=5'	HT=6'	HT=7'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	4	7	51.9	29.0	29.0	29.0	5	16	98.5	74.5	5	16	29.0	27.0	4	6	4	6	47.4	65	77	89	5	6.5	45.0	47.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	4	6.5	51.9	29.0	29.0	29.0	5	14	98.5	74.5	5	14	28.0	29.0	5	8.5	5	6.5	43.3	65	77	89	5	6	44.0	46.0	5	12	5	12	12
4 FT	9	9	8	8	5	7.5	6	7.5	48.4	25.0	29.0	29.0	5	13	59.0	76.0	5	13	30.0	30.0	5	7.5	5	6.5	39.0	65	77	89	6	6.5	46.0	49.0	5	10	5	12	12
6 FT	9	9	8	8	5	8	5	6	39.8	29.0	29.0	29.0	5	13	49.0	55.0	5	13	28.0	29.0	5	7.5	6	7	39.8	65	77	89	6	6	45.0	48.0	5	12	5	12	12
8 FT	10	10	8	8	5	8	5	7.5	36.8	26.0	26.0	30.0	5	13	45.0	50.0	5	13	28.0	28.0	5	7	5	6.5	34.8	66	78	90	6	6.5	44.0	48.0	5	12	5	12	0
10 FT	10	11	8	8	5	8	5	6.5	35.4	26.0	26.0	30.0	6	15	47.0	51.0	6	15	30.0	31.0	5	6.5	5	7.5	32.9	67	79	91	6	6.5	43.0	49.0	5	12	5	12	0
12 FT	11	12	8	8	5	7.5	5	7	33.6	27.0	27.0	31.0	6	16	45.0	50.0	6	16	30.0	31.0	5	6	5	8.5	31.6	68	80	92	6	6.5	42.0	49.0	5	12	5	12	0
14 FT	12	13	8	8	5	7	5	8	32.4	28.0	28.0	32.0	6	16	44.0	50.0	6	16	29.0	31.0	5	6	5	8.5	30.9	69	81	93	6	6.5	42.0	49.0	5	12	5	12	0
16 FT	13	14	8	8	5	6.5	5	8	31.3	29.0	29.0	33.0	6	16	44.0	50.0	6	16	29.0	31.0	6	8	5	8.5	30.3	70	82	94	6	7	42.0	49.0	5	12	5	12	0
18 FT	14	15	8	8	5	6	5	8.5	30.5	30.0	30.0	34.0	6	16	43.0	50.0	6	16	29.0	31.0	6	7.5	5	8.5	29.8	71	83	95	6	7	41.0	49.0	5	12	5	12	0
20 FT	15	16	8	8	6	8	5	8	34.9	31.0	31.0	35.0	6	16	48.0	56.0	6	16	35.0	37.0	6	7	5	8	29.4	72	84	96	6	7	41.0	49.0	5	12	5	12	0
22 FT	16	17	8	8	6	8	5	7	34.4	32.0	32.0	36.0	6	15	48.0	56.0	6	15	34.0	37.0	6	7	5	7	29.0	73	85	97	6	6.5	41.0	50.0	5	12	5	12	0
24 FT	17	18	8	8	6	7.5	5	6.5	34.0	37.0	37.0	37.0	6	14	48.0	56.0	6	14	34.0	36.0	6	6.5	5	6.5	28.9	74	86	98	6	6.5	41.0	50.0	5	12	5	11	0
26 FT	18	19	8	8	6	7	5	6.5	33.9	38.0	38.0	38.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6.5	28.8	75	87	99	6	6	41.0	50.0	5	12	5	10	0
28 FT	19	20	8	8	6	6.5	5	6	33.8	39.0	39.0	39.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6	28.8	76	88	100	6	6	41.0	50.0	5	12	5	9.5	0
30 FT	19	21	8	8	6	6	5	6	33.8	39.0	39.0	39.0	6	12	47.0	55.0	6	12	33.0	36.0	6	6	6	7.5	31.6	77	89	101	7	7.5	44.0	53.0	5	12	5	9.5	0
32 FT	20	22	8	8	6	6.5	6	7.5	37.8	44.0	44.0	44.0	6	12	47.0	55.0	6	12	33.0	35.0	6	6	6	7	31.8	78	90	102	7	7.5	44.0	53.0	5	12	5	9.5	0
34 FT	21	23	8	8	6	6	6	7	36.8	45.0	45.0	45.0	6	12	46.0	55.0	6	12	32.0	34.0	6	6	6	6.5	30.9	79	91	103	7	7.5	44.0	53.0	5	12	5	9.5	0
36 FT	22	23	8	8	6	6	6	6.5	36.8	46.0	46.0	46.0	7	15	51.0	60.0	7	15	36.0	38.0	6	6	6	6.5	31.0	79	91	103	7	7	44.0	53.0	5	12	5	9.5	0
38 FT	23	24	8	8	7	7.5	6	6	36.8	47.0	47.0	47.0	7	15	51.0	59.0	7	15	36.0	37.0	6	6	6	6	31.1	80	92	104	7	7	44.0	53.0	5	12	5	8.5	0
40 FT	23	25	8	8	7	7.5	6	6	36.9	47.0	47.0	47.0	7	15	51.0	59.0	7	15	36.0	38.0	6	6	6	6	31.1	81	93	105	7	7	44.0	53.0	5	12	5	8	0
42 FT	24	26	8	8	7	7.5	6	6	37.0	48.0	48.0	48.0	7	14	51.0	59.0	7	14	36.0	37.0	7	8	7	6.5	34.4	82	94	106	7	7	44.0	53.0	5	12	5	7.5	0
44 FT	25	26	9	8	7	7	6	6.5	37.8	49.0	49.0	49.0	7	14	51.0	59.0	7	14	36.0	37.0	7	7.5	6	6.5	32.0	82	94	106	7	7	44.0	53.0	5	12	5	8.5	0
46 FT	25	27	9	8	7	7	6	6.5	37.9	49.0	49.0	49.0	7	14	51.0	59.0	7	14	36.0	37.0	7	7.5	6	6.5	32.0	83	95	107	7	7	44.0	53.0	5	12	5	8	0
48 FT	26	28	9	8	7	7	6	6.5	38.0	50.0	50.0	50.0	7	14	51.0	58.0	7	14	35.0	37.0	7	7.5	6	6	32.3	84	96	108	7	7	44.0	53.0	5	12	5	7.5	0
50 FT	27	28	9	8	7	7	6	6	38.0	51.0	51.0	51.0	7	14	51.0	58.0	7	14	35.0	37.0	7	7	6	6	32.4	84	96	108	7	6.5	44.0	53.0	5	12	5	7	0

SPAN (S) = 10 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	HT=9'	HT=10'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	HT=9'	HT=10'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	5	8.5	54.9	29.0	33.0	33.0	5	16	100.5	74.5	5	16	30.0	30.0	5	8.5	6	6.5	74.1	101	113	125	5	6	46.0	47.0	5	12	5	12	12
2 FT	13	9	8	8	5	6.5	5	8	54.9	29.0	33.0	33.0	5	14	100.5	74.5	5	14	28.0	28.0	5	7.5	6	6	65.8	101	113	125	6	7	47.0	50.0	5	12	5	11.5	12
4 FT	9	9	9	8	5	7	5	6	65.9	29.0	29.0	29.0	5	13	74.0	76.0	5	13	30.0	31.0	5	7.5	6	6.5	57.6	101	113	125	6	6.5	46.0	50.0	5	12	5	11.5	12
6 FT	9	9	9	8	5	8	5	6	51.8	29.0	29.0	29.0	5	13	51.0	57.0	5	13	29.0	29.0	5	7	6	6	52.9	101	113	125	6	6	45.0	48.0	5	12	5	11.5	12
8 FT	9	10	9	8	5	8	5	6	48.1	29.0	29.0	29.0	6	15	49.0	52.0	6	15	30.0	31.0	5	7	6	6.5	51.0	102	114	126	6	6	44.0	49.0	5	12	5	11	0
10 FT	10	11	9	8	5	8	5	6	46.5	30.0	30.0	30.0	5	12	44.0	48.0	5	12	27.0	28.0	5	6.5	6	6.5	49.5	103	115	127	6	6.5	43.0	49.0	5	12	5	10.5	0
12 FT	11	12	9	8	5	7.5	6	7	48.1	31.0	31.0	35.0	6	16	45.0	50.0	6	16	30.0	31.0	5	6	6	6.5	48.4	104	116	128	6	6.5	43.0	49.0	5	12	5	9.5	0
14 FT	12	13	9	8	5	7	6	7	47.0	32.0	32.0	36.0	6	16	45.0	50.0	6	16	29.0	31.0	5	6	6	7	47.4	105	117	129	6	6.5	42.0	49.0	5	12	5	8.5	0
16 FT	13	14	9	8	5	6.5	6	7	46.0	33.0	33.0	37.0	6	16	44.0	50.0	6	16	29.0	31.0	6	8	6	7	46.5	106	118	130	6	7	42.0	49.0	5	12	5	8.5	0
18 FT	14	15	9	8	5	6	6	7	45.3	34.0	34.0	38.0	6	16	43.0	49.0	6	16	29.0	31.0	6	7.5	6	7	45.9	107	119	131	6	7	42.0	49.0	5	12	5	8.5	0
20 FT	15	16	9	8	6	8	6	7	50.5	35.0	35.0	39.0	6	16	49.0	55.0	6	16	35.0	37.0	6	7	6	6.5	45.3	108	120	132	6	7	42.0	49.0	5	12	5	8.5	0
22 FT	15	17	11	8	6	7.5	5	6	47.1	35.0	35.0	35.0	6	15	48.0	55.0	6	15	35.0	37.0	6	7	5	7	42.1	109	121	133	6	6.5	42.0	50.0	5	12	5	8	0
24 FT	17	18	11	8	6	7.5	6	8.5	50.8	37.0	37.0	37.0	6	14	48.0	55.0	6	14	33.0	36.0	6	6.5	5	6.5	42.0	110	122	134	6	6.5	42.0	50.0	5	12	5	7.5	0
26 FT	18	19	11	8	6	7	6	8	50.4	38.0	38.0	38.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6	41.8	111	123	135	6	6	42.0	50.0	5	12	5	7.5	0
28 FT	18	20	12	8	6	7	6	8	51.0	38.0	38.0	38.0	6	13	47.0	54.0	6	13	34.0	36.0	6	6.5	5	6.5	41.9	112	124	136	6	6	42.0	50.0	5	12	5	7.5	0
30 FT	19	21	12	8	6	6.5	6	7.5	50.9	39.0	39.0	39.0	6	13	47.0	54.0	6	13	33.0	35.0	6	6.5	5	6.5	41.9	113	125	137	7	7.5	45.0	53.0	5	12	5	7	0
32 FT	20	22	12	8	6	6.5	6	7	50.9	40.0	40.0	40.0	6	12	47.0	54.0	6	12	32.0	34.0	6	6	5	6.5	42.0	114	126	138	7	7.5	45.0	53.0	5	12	5	7	0
34 FT	21	23	12	8	6	6	6	7.5	49.6	41.0	41.0	41.0	6	12	46.0	53.0	6	12	31.0	33.0	6	6	5	6.5	40.8	115	127	139	7	7.5	45.0	53.0	5	12	5	7	0
36 FT	22	24	12	8	6	6	6	7	49.8	42.0	42.0	42.0	7	15	51.0	58.0	7	15	36.0	37.0	6	6	5	6.5	40.9	116	128	140	7	7.5	45.0	53.0	5	12	5	7	0
38 FT	22	24	13	8	6	6	6	7.5	50.4	42.0	42.0	42.0	7	15	51.0	58.0	7	15	36.0	38.0	6	6	5	6	41.1	116	128	140	7	7	45.0	53.0	5	12	5	6.5	0
40 FT	23	25	13	8	7	7.5	6	7.5	50.4	43.0	43.0	43.0	7	15	51.0	58.0	7	15	36.0	37.0	6	6	5	6	41.4	117	129	141	7	7	45.0	53.0	5	12	5	6.5	0
42 FT	24	26	13	8	7	7.5	6	6.5	50.5	44.0	44.0	44.0	7	15	51.0	57.0	7	15	35.0	36.0	7	8	5	6	41.5	118	130	142	7	7	45.0	53.0	5	12	5	6.5	0
44 FT	24	27	14	8	7	7.5	6	7	51.3	44.0	44.0	44.0	7	14	51.0	57.0	7	14	36.0	37.0	7	8	5	6	41.9	119	131	143	7	7	45.0	54.0	5	12	5	6	0
46 FT	25	27	14	8	7	7	6	7	51.3	45.0	45.0	45.0	7	14	51.0	57.0	7	14	35.0	36.0	7	7.5	5	6	42.0	119	131	143	7	6.5	45.0	53.0	5	12	5	6	0
48 FT	26	28	14	8	7	7	6	7	51.4	46.0	46.0	46.0	7	15	51.0	56.0	7	15	35.0	36.0	7	7.5	5	6	42.1	120	132	144	7	6.5	45.0	53.0	5	12	5	6	0
50 FT	26	29	15	8	7	7	6	7	52.1	50.0	50.0	50.0	7	14	51.0	56.0	7	14	35.0	36.0	7	7.5	6	8	45.5	121	133	145	7	6.5	45.0	54.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 10 FEET
HEIGHT (HT): 5 THRU 10 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

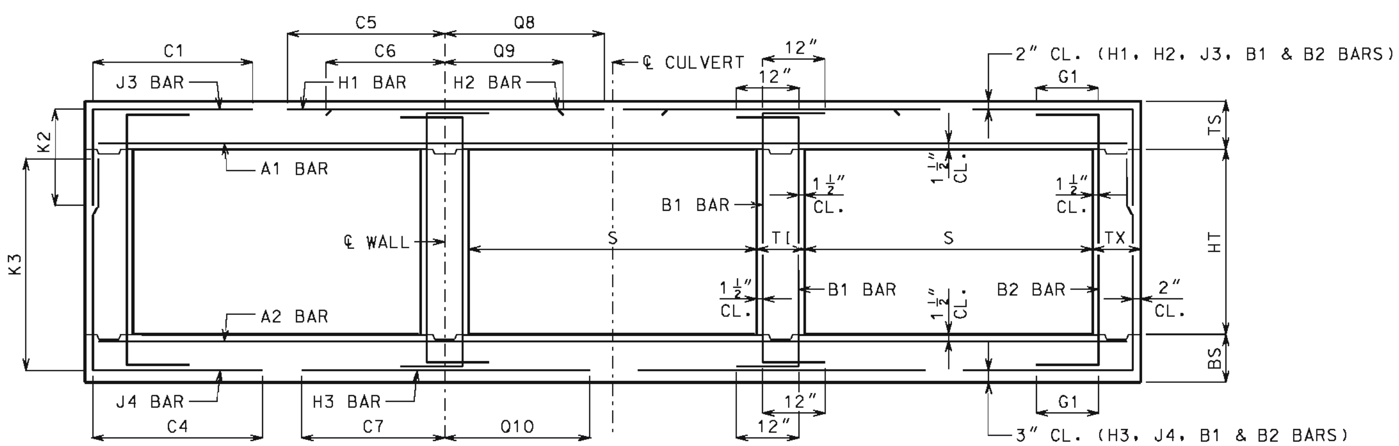
SPAN (S) = 10 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT

TOP SLAB BARS

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=11'	K2 HT=12'	K2 HT=13'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9
1 FT	13	10	9	10	5	6.5	5	6.5	55.9	33.0	33.0	33.0	5	16	101.5	75.5	5	16	30.0	29.0
2 FT	13	10	10	10	5	6.5	5	6.5	56.5	33.0	33.0	33.0	5	14	101.5	75.5	5	14	29.0	29.0
4 FT	9	10	10	10	5	7	6	7	56.5	29.0	29.0	33.0	5	13	101.5	77.0	5	13	31.0	31.0
6 FT	9	11	10	10	5	8	6	7	75.6	29.0	29.0	33.0	5	13	54.0	53.0	5	13	29.0	29.0
8 FT	9	11	11	10	5	8	6	7	64.6	29.0	29.0	33.0	5	12	47.0	48.0	5	12	28.0	28.0
10 FT	10	11	11	10	5	8	5	6	61.1	30.0	30.0	30.0	5	12	46.0	47.0	5	12	28.0	28.0
12 FT	11	12	11	10	5	7.5	5	6	60.3	31.0	31.0	31.0	5	12	44.0	47.0	5	12	27.0	28.0
14 FT	12	13	11	10	5	7	6	7.5	62.6	32.0	32.0	36.0	5	12	43.0	46.0	5	12	27.0	28.0
16 FT	13	14	12	10	5	6.5	6	8	61.3	33.0	33.0	37.0	5	12	42.0	46.0	5	12	27.0	28.0
18 FT	13	15	12	10	5	6.5	6	7	59.3	33.0	37.0	37.0	6	15	45.0	48.0	6	15	30.0	31.0
20 FT	14	16	13	10	5	6	6	7.5	58.8	34.0	38.0	38.0	6	15	44.0	48.0	6	15	30.0	31.0
22 FT	15	17	13	10	6	8	6	6.5	64.6	35.0	39.0	39.0	6	15	50.0	54.0	6	15	36.0	37.0
24 FT	16	18	14	10	6	8	6	7	64.6	36.0	40.0	40.0	6	15	49.0	54.0	6	15	35.0	37.0
26 FT	17	19	14	10	6	7.5	6	6.5	64.5	37.0	41.0	41.0	6	14	49.0	54.0	6	14	35.0	37.0
28 FT	18	20	15	10	6	7	6	6.5	64.9	42.0	42.0	42.0	6	13	48.0	54.0	6	13	34.0	36.0
30 FT	19	21	15	10	6	6.5	6	6.5	65.1	43.0	43.0	43.0	6	13	48.0	54.0	6	13	33.0	35.0
32 FT	20	22	16	10	6	6.5	6	6.5	65.5	44.0	44.0	44.0	6	12	48.0	53.0	6	12	33.0	34.0
34 FT	20	23	16	10	6	6.5	6	6.5	63.5	44.0	44.0	44.0	6	12	47.0	53.0	6	12	33.0	35.0
36 FT	21	24	16	10	6	6	6	6	63.9	45.0	45.0	45.0	6	12	47.0	53.0	6	12	32.0	34.0
38 FT	22	24	17	10	6	6	6	6	64.4	46.0	46.0	46.0	7	15	52.0	58.0	7	15	37.0	38.0
40 FT	23	25	17	10	6	6	6	6	64.6	47.0	47.0	47.0	7	15	52.0	57.0	7	15	36.0	37.0
42 FT	23	26	18	10	7	7.5	6	6	65.0	47.0	47.0	47.0	7	15	52.0	57.0	7	15	37.0	38.0
44 FT	24	27	19	10	7	7.5	6	6	65.8	44.0	48.0	48.0	7	15	52.0	57.0	7	15	36.0	37.0
46 FT	24	27	19	10	7	7	6	6	65.6	48.0	48.0	48.0	7	14	52.0	57.0	7	14	36.0	38.0
48 FT	25	28	20	10	7	7	6	6	66.4	45.0	49.0	49.0	7	14	52.0	56.0	7	14	36.0	37.0
50 FT	26	29	20	10	7	7	7	7.5	71.6	50.0	50.0	50.0	7	15	51.0	55.0	7	15	36.0	37.0

BOTTOM SLAB BARS / WALL BARS

DESIGN FILL	A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=11'	K3 HT=12'	K3 HT=13'	H3 BARS SIZE	H3 SPA.	C7	Q10	B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	5	8.5	6	6	82.3	138	150	162	5	6.5	49.0	49.0	5	10	5	8.5	12
2 FT	5	8	6	6.5	83.0	138	150	162	5	6.5	47.0	48.0	5	12	5	8	12
4 FT	5	7	6	6	81.3	138	150	162	5	6	46.0	48.0	5	11	5	8	12
6 FT	5	7	6	6	77.8	139	151	163	5	6	44.0	47.0	5	12	5	8	12
8 FT	5	6.5	6	6.5	69.5	139	151	163	6	7	45.0	49.0	5	12	5	7.5	0
10 FT	5	6	6	6	65.8	139	151	163	6	6.5	45.0	48.0	5	12	5	7.5	0
12 FT	5	6	6	6	65.1	140	152	164	6	6.5	44.0	49.0	5	12	5	7.5	0
14 FT	5	6	6	6.5	64.4	141	153	165	6	6.5	44.0	49.0	5	12	5	7	0
16 FT	6	8	6	7	63.0	142	154	166	6	7	44.0	49.0	5	12	5	7	0
18 FT	6	7.5	6	6.5	62.8	143	155	167	6	7	44.0	49.0	5	12	5	7	0
20 FT	6	7	6	7	61.8	144	156	168	6	7	44.0	49.0	5	12	5	6.5	0
22 FT	6	7	6	6.5	61.4	145	157	169	6	6.5	44.0	50.0	5	12	5	6.5	0
24 FT	6	6.5	6	6.5	60.5	146	158	170	6	6.5	44.0	50.0	5	12	5	6	0
26 FT	6	6.5	6	6.5	60.4	147	159	171	6	6	44.0	50.0	5	12	5	6	0
28 FT	6	6.5	6	6.5	60.3	148	160	172	6	6	44.0	50.0	5	12	6	8	0
30 FT	6	6.5	6	6.5	60.4	149	161	173	7	7.5	47.0	53.0	5	12	6	8	0
32 FT	6	6	6	7	60.5	150	162	174	7	7.5	47.0	53.0	5	12	6	8	0
34 FT	6	6	6	7.5	58.9	151	163	175	7	7.5	46.0	53.0	5	12	6	8	0
36 FT	6	6	6	7	59.1	152	164	176	7	7.5	46.0	53.0	5	12	6	8	0
38 FT	6	6	6	7	59.0	152	164	176	7	7	46.0	53.0	5	12	6	7.5	0
40 FT	6	6	6	7	59.3	153	165	177	7	7	46.0	53.0	5	12	6	7.5	0
42 FT	7	8	6	6.5	59.6	154	166	178	7	7	46.0	54.0	5	12	6	7	0
44 FT	7	8	6	6.5	60.0	155	167	179	7	7	46.0	54.0	5	12	6	7	0
46 FT	7	7.5	6	6.5	59.9	155	167	179	7	6.5	46.0	54.0	5	12	6	6.5	0
48 FT	7	7.5	6	6	60.4	156	168	180	7	6.5	46.0	54.0	5	12	6	6.5	0
50 FT	7	7.5	6	6	60.6	157	169	181	7	6.5	47.0	54.0	5	12	6	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

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DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 10 FEET
HEIGHT (HT): 11 THRU 13 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

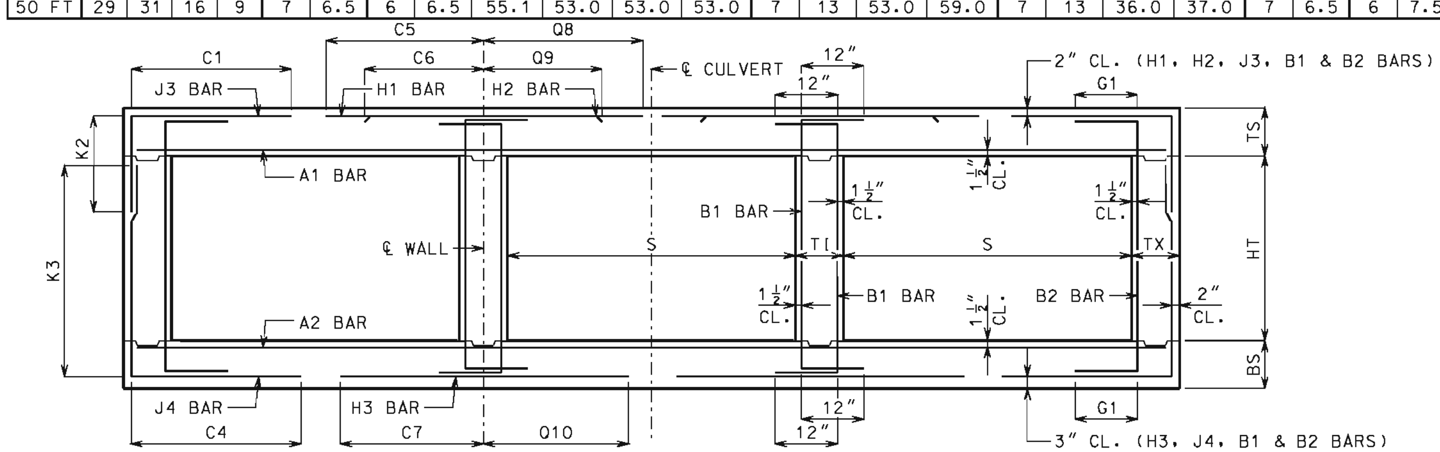
SHEET NO.

SPAN (S) = 11 FT HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=6′	K2 HT=7′	K2 HT=8′	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=6′	K3 HT=7′	K3 HT=8′	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	13	9	8	8	5	6.5	5	9	58.5	29.0	29.0	33.0	5	13	108.5	80.5	5	13	30.0	33.0	5	8.5	5	6	52.6	77	89	101	6	7	50.0	53.0	5	12	5	12	12
2 FT	14	9	8	8	5	6	4	6	55.5	30.0	30.0	30.0	5	14	106.5	80.5	5	14	29.0	28.0	5	7.5	6	6.5	50.8	77	89	101	6	6.5	49.0	52.0	5	12	5	12	12
4 FT	10	9	8	8	5	6.5	5	6	49.1	30.0	30.0	30.0	5	12	66.0	82.0	5	12	32.0	33.0	5	7.5	6	6.5	45.9	77	89	101	6	6	49.0	52.0	5	11.5	5	12	12
6 FT	10	10	8	8	5	7	5	6	42.8	30.0	30.0	30.0	5	12	53.0	63.0	5	12	30.0	31.0	5	7	5	6	39.8	78	90	102	6	6	47.0	52.0	5	12	5	12	12
8 FT	10	11	8	8	5	7	6	7	43.0	26.0	30.0	30.0	6	15	52.0	56.0	6	15	32.0	32.0	5	6.5	5	6.5	37.4	79	91	103	6	6.5	46.0	52.0	5	12	5	12	0
10 FT	11	12	8	8	5	7	5	6	37.6	27.0	31.0	31.0	6	15	50.0	55.0	6	15	31.0	32.0	5	6	5	7	35.6	80	92	104	6	6.5	45.0	52.0	5	12	5	12	0
12 FT	12	13	8	8	5	7	5	6.5	36.0	28.0	32.0	32.0	6	15	48.0	54.0	6	15	31.0	32.0	5	6	5	7.5	34.6	81	93	105	6	6.5	45.0	52.0	5	12	5	12	0
14 FT	13	14	8	8	5	6.5	5	7	34.6	33.0	33.0	33.0	6	15	47.0	54.0	6	15	31.0	32.0	6	8	5	7.5	33.8	82	94	106	6	6.5	44.0	53.0	5	12	5	12	0
16 FT	14	15	8	8	5	6	5	7	33.6	34.0	34.0	34.0	6	14	46.0	53.0	6	14	30.0	32.0	6	7.5	5	7.5	33.1	83	95	107	6	6.5	44.0	53.0	5	12	5	12	0
18 FT	15	16	8	8	6	8	5	6.5	37.9	35.0	35.0	35.0	6	14	51.0	59.0	6	14	36.0	38.0	6	7	5	7.5	32.6	84	96	108	6	6.5	44.0	53.0	5	12	5	11	0
20 FT	16	17	8	8	6	8	5	6.5	37.3	36.0	36.0	36.0	6	14	51.0	59.0	6	14	36.0	38.0	6	7	5	7	32.1	85	97	109	6	6.5	44.0	53.0	5	12	5	10	0
22 FT	17	18	8	8	6	7.5	5	6	36.9	37.0	37.0	37.0	6	14	50.0	59.0	6	14	36.0	38.0	6	6.5	5	6.5	31.9	86	98	110	6	6.5	44.0	53.0	5	12	5	9.5	0
24 FT	18	19	8	8	6	7	5	6	36.5	38.0	38.0	38.0	6	13	50.0	59.0	6	13	36.0	38.0	6	6	5	6.5	31.6	87	99	111	6	6	44.0	53.0	5	12	5	9.5	0
26 FT	19	21	8	8	6	6.5	6	7.5	40.4	39.0	39.0	43.0	6	13	50.0	59.0	6	13	35.0	38.0	6	6	6	7.5	34.4	89	101	113	7	7.5	47.0	56.0	5	12	5	9.5	0
28 FT	20	22	9	8	6	6.5	5	6	37.1	40.0	40.0	40.0	6	12	49.0	58.0	6	12	35.0	37.0	6	6	5	6	31.9	90	102	114	7	7.5	47.0	56.0	5	12	5	8.5	0
30 FT	21	23	10	8	6	6	5	6.5	37.9	41.0	41.0	41.0	6	12	49.0	58.0	6	12	34.0	37.0	7	8	5	6.5	32.4	91	103	115	7	7	47.0	56.0	5	12	5	8.5	0
32 FT	22	24	10	8	6	6	5	6.5	37.8	42.0	42.0	42.0	7	15	54.0	63.0	7	15	39.0	41.0	7	7.5	5	6.5	32.5	92	104	116	7	7	47.0	57.0	5	12	5	8	0
34 FT	23	25	10	8	7	7.5	5	6.5	37.8	43.0	43.0	43.0	7	15	54.0	63.0	7	15	38.0	40.0	7	7.5	5	6	32.5	93	105	117	7	6.5	47.0	57.0	5	12	5	8	0
36 FT	24	25	10	8	7	7.5	5	6	36.5	44.0	44.0	44.0	7	14	54.0	62.0	7	14	37.0	39.0	7	7	5	6	31.6	93	105	117	7	6.5	47.0	56.0	5	12	5	8	0
38 FT	25	26	10	8	7	7	5	6	36.6	45.0	45.0	45.0	7	14	53.0	62.0	7	14	37.0	38.0	7	7	5	6	31.8	94	106	118	7	6.5	47.0	56.0	5	12	5	8	0
40 FT	25	27	10	8	7	6.5	5	6	36.8	45.0	45.0	45.0	7	13	53.0	62.0	7	13	37.0	39.0	7	7	6	7	34.6	95	107	119	7	6.5	46.0	56.0	5	12	5	8	0
42 FT	26	28	10	8	7	7	6	7	40.8	50.0	50.0	50.0	7	13	53.0	62.0	7	13	37.0	38.0	7	7	6	7	34.9	96	108	120	7	6.5	46.0	56.0	5	12	5	8	0
44 FT	27	29	10	8	7	6.5	6	7	40.9	51.0	51.0	51.0	7	13	53.0	61.0	7	13	36.0	37.0	7	7	6	6.5	35.0	97	109	121	7	6.5	46.0	56.0	5	12	5	7.5	0
46 FT	28	29	11	8	7	6.5	6	7.5	41.6	52.0	52.0	52.0	7	13	53.0	61.0	7	13	36.0	37.0	7	6	6	7.5	35.6	97	109	121	7	6	47.0	57.0	5	12	5	7.5	0
48 FT	28	30	11	8	7	6	6	7.5	41.8	52.0	52.0	52.0	7	12	53.0	61.0	7	12	36.0	37.0	7	6.5	6	7	35.6	98	110	122	7	6	47.0	57.0	5	12	5	7.5	0
50 FT	29	31	11	8	7	6	6	7	41.9	53.0	53.0	53.0	7	12	53.0	60.0	7	12	36.0	37.0	7	6.5	6	7	35.9	99	111	123	7	6	47.0	57.0	5	12	5	7.5	0

SPAN (S) = 11 FT HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=9′	K2 HT=10′	K2 HT=11′	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=9′	K3 HT=10′	K3 HT=11′	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	13	9	9	9	5	6.5	5	8	59.3	33.0	33.0	33.0	5	13	109.5	81.5	5	13	31.0	33.0	5	7.5	6	6	74.5	113	125	137	6	7	51.0	53.0	5	11.5	5	10.5	12
2 FT	14	10	9	9	5	6	5	8	59.3	34.0	34.0	34.0	5	14	109.5	81.5	5	14	29.0	28.0	5	7.5	6	7	70.6	114	126	138	5	6	47.0	50.0	5	12	5	10.5	12
4 FT	10	10	9	9	5	6.5	5	6	59.3	30.0	30.0	30.0	5	13	109.5	83.0	5	13	32.0	33.0	5	7	6	6.5	64.1	114	126	138	6	6.5	50.0	53.0	5	11.5	5	9.5	12
6 FT	10	10	9	9	5	7	5	6	56.6	30.0	30.0	30.0	5	12	55.0	61.0	5	12	30.0	31.0	5	7	6	6	57.8	114	126	138	6	6	48.0	52.0	5	12	5	9.5	12
8 FT	10	11	9	9	5	7	6	7.5	55.5	30.0	30.0	34.0	6	15	53.0	56.0	6	15	32.0	33.0	5	6.5	6	6	55.6	115	127	139	6	6	47.0	52.0	5	12	5	9	0
10 FT	11	12	9	9	5	7	6	7	53.5	31.0	35.0	35.0	6	15	51.0	55.0	6	15	32.0	33.0	5	6	6	6	53.8	116	128	140	6	6.5	46.0	52.0	5	12	5	8.5	0
12 FT	12	13	9	9	5	7	6	6.5	51.9	32.0	36.0	36.0	6	15	49.0	54.0	6	15	31.0	33.0	5	6	6	6	52.4	117	129	141	6	6.5	46.0	52.0	5	12	5	8.5	0
14 FT	13	14	9	9	5	6.5	6	6	50.5	33.0	37.0	37.0	6	15	48.0	53.0	6	15	31.0	33.0	6	8	6	6	51.3	118	130	142	6	6.5	45.0	52.0	5	12	5	8.5	0
16 FT	14	15	10	9	5	6	6	7	49.9	34.0	34.0	38.0	6	15	47.0	53.0	6	15	31.0	33.0	6	7.5	6	7	50.4	119	131	143	6	6.5	45.0	52.0	5	12	5	8	0
18 FT	15	16	10	9	6	8	6	7	54.9	35.0	35.0	39.0	6	15	52.0	59.0	6	15	37.0	39.0	6	7	6	7	49.6	120	132	144	6	6.5	45.0	53.0	5	12	5	8	0
20 FT	16	17	11	9	6	8	6	7.5	54.8	36.0	36.0	40.0	6	14	52.0	58.0	6	14	36.0	39.0	6	7	6	8	49.3	121	133	145	6	6.5	45.0	53.0	5	12	5	7.5	0
22 FT	17	18	12	9	6	7.5	6	8	54.8	37.0	37.0	37.0	6	14	51.0	58.0	6	14	36.0	39.0	6	6.5	5	6	45.9	122	134	146	6	6.5	45.0	53.0	5	12	5	7.5	0
24 FT	18	20	12	9	6	7	6	7.5	54.4	38.0	38.0	38.0	6	13	51.0	58.0	6	13	36.0	38.0	6	6	5	6	45.8	124	136	148	6	6	45.0	53.0	5	12	5	7	0
26 FT	19	21	12	9	6	6.5	6	7	53.9	39.0	39.0	43.0	6	13	50.0	58.0	6	13	35.0	38.0	6	6	6	8.5	48.4	125	137	149	7	7.5	48.0	56.0	5	12	5	7	0
28 FT	20	22	13	9	6	6.5	6	7.5	54.3	40.0	40.0	40.0	6	12	50.0	58.0	6	12	35.0	37.0	6	6	5	6	45.4	126	138	150	7	7.5	48.0	57.0	5	12	5	6.5	0
30 FT	21	23	13	9	6	6	6	7	54.1	41.0	41.0	41.0	6	12	50.0	57.0	6	12	34.0	36.0	7	8	5	6	45.4	127	139	151	7	7	48.0	57.0	5	12	5	6.5	0
32 FT	22	24	13	9	6	6	6	6.5	54.1	42.0	42.0	46.0	7	15	54.0	62.0	7	15	39.0	41.0	7	7.5	6	8	48.4	128	140	152	7	7	48.0	57.0	5	12	5	6.5	0
34 FT	23	25	14	9	7	7.5	6	7	54.0	43.0	43.0	43.0	7	15	54.0	62.0	7	15	38.0	40.0	7	7.5	5	6	45.8	129	141	153	7	6.5	48.0	57.0	5	12	5	6	0
36 FT	23	25	14	9	7	7	6	7	53.3	43.0	43.0	43.0	7	14	54.0	62.0	7	14	38.0	40.0	7	7	5	6	44.1	129	141	153	7	6.5	48.0	57.0	5	12	5	6	0
38 FT	24	26	14	9	7	7.5	6	7	53.4	44.0	44.0	44.0	7	14	54.0	61.0	7	14	38.0	40.0	7	7	5	6	44.3	130	142	154	7	6.5	48.0	57.0	5	12	5	6	0
40 FT	25	27	14	9	7	7	6	6.5	53.4	45.0	45.0	45.0	7	14	54.0	61.0	7	14	37.0	39.0	7	7	5	6	44.5	131	143	155	7	6.5	48.0	57.0	5	12	5	6	0
42 FT	26	28	15	9	7	7	6	7	54.3	46.0	50.0	50.0	7	13	54.0	60.0	7	13	37.0	38.0	7	7	6	8	48.0	132	144	156	7	6	48.0	57.0	5	12	6	8	0
44 FT	27	29	15	9	7	6.5	6	6.5	54.3	51.0	51.0	51.0	7	13	53.0	60.0	7	13	36.0	38.0	7	7	6	8	48.1	133	145	157	7	6	48.0	57.0	5	12	6	8	0
46 FT	27	30	15	9	7	6.5	6	6	54.4	51.0	51.0	51.0	7	13	53.0	60.0	7	13	37.0	38.0	7	7	6	8	48.1	134	146	158	7	6	48.0	57.0	5	12	6	8	0
48 FT	28	30	16	9	7	6.5	6	6.5	55.0	52.0	52.0	52.0	7	13	53.0	59.0	7	13	36.0	37.0	7	6	6	7.5	48.5	134	146	158	7	6	48.0	57.0	5	12	6	8	0
50 FT	29	31	16	9	7	6.5	6	6.5	55.1	53.0	53.0	53.0	7	13	53.0	59.0	7	13	36.0	37.0	7	6.5	6	7.5	48.8	135	147	159	7	6	48.0	57.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 11 FEET
HEIGHT (HT): 6 THRU 11 FEET

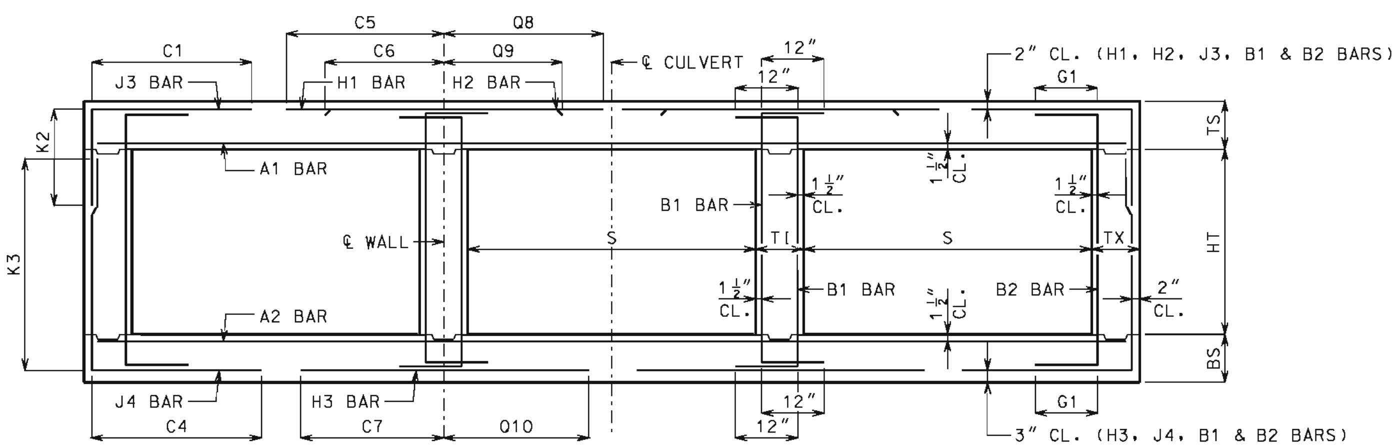
DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 11 FT   HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																
					A1 BARS		J3 BARS						H1 BARS				H2 BARS			
										K2										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=12'	HT=13'	HT=14'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9
1 FT	13	10	10	11	5	6.5	5	6	60.3	33.0	33.0	33.0	5	13	110.5	82.5	5	13	31.0	33.0
2 FT	14	11	10	11	5	6	5	6	60.3	34.0	34.0	34.0	5	14	110.5	82.5	5	14	30.0	32.0
4 FT	10	11	11	11	5	7	5	6	60.9	30.0	30.0	30.0	5	13	110.5	80.0	5	13	33.0	33.0
6 FT	10	11	11	11	5	7.5	5	6	79.0	30.0	30.0	30.0	5	12	58.0	57.0	5	12	31.0	31.0
8 FT	10	11	12	11	5	7.5	6	7.5	70.1	30.0	30.0	34.0	6	15	54.0	55.0	6	15	33.0	33.0
10 FT	11	12	12	11	5	7.5	6	8	68.5	31.0	31.0	35.0	6	16	52.0	54.0	6	16	32.0	33.0
12 FT	12	13	12	11	5	7	6	8	67.4	32.0	32.0	36.0	6	16	50.0	53.0	6	16	32.0	33.0
14 FT	13	14	12	11	5	6.5	6	7	66.4	33.0	37.0	37.0	6	16	49.0	53.0	6	16	32.0	33.0
16 FT	14	15	13	11	5	6	6	7	64.9	34.0	38.0	38.0	6	15	48.0	52.0	6	15	32.0	33.0
18 FT	15	16	13	11	6	8	6	6.5	70.3	39.0	39.0	39.0	6	15	54.0	58.0	6	15	37.0	39.0
20 FT	15	17	14	11	6	8	6	6.5	68.4	39.0	39.0	39.0	6	14	53.0	58.0	6	14	37.0	39.0
22 FT	17	18	14	11	6	7.5	6	6.5	69.0	41.0	41.0	41.0	6	14	53.0	58.0	6	14	37.0	39.0
24 FT	18	20	15	11	6	7	6	6.5	68.9	42.0	42.0	42.0	6	13	52.0	58.0	6	13	36.0	38.0
26 FT	19	21	15	11	6	6.5	6	6	68.6	43.0	43.0	43.0	6	13	52.0	57.0	6	13	36.0	38.0
28 FT	20	22	16	11	6	6.5	6	6	68.6	44.0	44.0	44.0	6	12	51.0	57.0	6	12	35.0	37.0
30 FT	21	23	17	11	6	6	6	6	69.0	45.0	45.0	45.0	6	12	51.0	57.0	6	12	34.0	36.0
32 FT	21	24	17	11	6	6	6	6	68.6	45.0	45.0	45.0	6	12	51.0	57.0	6	12	35.0	37.0
34 FT	22	25	18	11	6	6	6	6	69.1	46.0	46.0	46.0	7	15	55.0	62.0	7	15	40.0	41.0
36 FT	23	26	18	11	7	7.5	7	7.5	74.3	47.0	47.0	47.0	7	15	55.0	61.0	7	15	39.0	41.0
38 FT	24	26	18	11	7	7.5	7	8	72.6	48.0	48.0	48.0	7	14	55.0	61.0	7	14	38.0	40.0
40 FT	25	27	18	11	7	7	7	7	72.9	49.0	49.0	49.0	7	14	55.0	61.0	7	14	38.0	39.0
42 FT	25	28	19	11	7	7	7	7	73.3	49.0	49.0	49.0	7	14	55.0	60.0	7	14	38.0	40.0
44 FT	26	29	20	11	7	7	7	7.5	74.0	50.0	50.0	50.0	7	13	54.0	60.0	7	13	38.0	39.0
46 FT	27	30	21	11	7	6.5	7	7.5	74.6	51.0	51.0	51.0	7	13	54.0	59.0	7	13	37.0	38.0
48 FT	27	30	21	11	7	6	7	7	74.5	51.0	51.0	51.0	7	12	54.0	59.0	7	12	37.0	39.0
50 FT	28	31	22	11	7	6.5	7	7	75.3	52.0	52.0	58.0	7	13	54.0	59.0	7	13	37.0	38.0

DESIGN FILL	BOTTOM SLAB BARS												WALL BARS				
	A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
						K3											
	SIZE	SPA.	SIZE	SPA.	C4	HT=12'	HT=13'	HT=14'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	5	7.5	6	6	89.3	150	162	174	5	6	51.0	51.0	5	10	5	8	12
2 FT	5	7.5	6	6	89.3	151	163	175	5	6	50.0	51.0	5	12	5	8	12
4 FT	5	7	6	6.5	85.9	151	163	175	5	6	49.0	51.0	5	12	5	7.5	12
6 FT	5	6.5	6	6	77.5	151	163	175	6	6.5	50.0	53.0	5	12	5	7.5	12
8 FT	5	6.5	6	6	70.9	151	163	175	6	6	48.0	52.0	5	12	5	7	0
10 FT	5	6	6	6	69.9	152	164	176	6	6	47.0	52.0	5	12	5	7	0
12 FT	5	6	6	6.5	69.0	153	165	177	6	6	47.0	52.0	5	12	5	7	0
14 FT	6	8	6	6.5	68.3	154	166	178	6	6.5	47.0	52.0	5	12	5	6.5	0
16 FT	6	7.5	6	7	66.6	155	167	179	6	6.5	47.0	52.0	5	12	5	6.5	0
18 FT	6	7	6	6	66.0	156	168	180	6	6.5	47.0	52.0	5	12	5	6.5	0
20 FT	6	7	6	6.5	65.1	157	169	181	6	6.5	46.0	53.0	5	12	5	6	0
22 FT	6	6	6	6	64.5	158	170	182	6	6	46.0	53.0	5	12	5	6	0
24 FT	6	6	6	6	64.6	160	172	184	6	6	46.0	53.0	5	12	6	8	0
26 FT	6	6	6	6	64.3	161	173	185	7	7.5	49.0	56.0	5	12	6	8	0
28 FT	6	6	6	6	63.9	162	174	186	7	7.5	49.0	56.0	5	12	6	8	0
30 FT	7	8	6	6.5	64.0	163	175	187	7	7	49.0	57.0	5	12	6	7.5	0
32 FT	7	7.5	6	6.5	64.1	164	176	188	7	7	49.0	57.0	5	12	6	7.5	0
34 FT	7	7.5	6	6.5	64.4	165	177	189	7	6.5	49.0	57.0	5	12	6	7	0
36 FT	7	7.5	6	6	64.5	166	178	190	7	6.5	49.0	57.0	5	12	6	7	0
38 FT	7	7	6	6.5	62.4	166	178	190	7	6.5	49.0	57.0	5	12	6	7	0
40 FT	7	7	6	6	62.6	167	179	191	7	6.5	49.0	57.0	5	12	6	7	0
42 FT	7	7	6	6	62.9	168	180	192	7	6.5	49.0	57.0	5	12	6	6.5	0
44 FT	7	7	6	6	63.3	169	181	193	7	6	49.0	57.0	5	12	6	6.5	0
46 FT	7	7	6	6	63.6	170	182	194	7	6	49.0	57.0	5	12	6	6	0
48 FT	7	6	6	6	63.5	170	182	194	7	6	49.0	57.0	5	12	6	6	0
50 FT	7	6.5	7	7.5	67.0	171	183	195	7	6	49.0	58.0	5	12	6	6	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

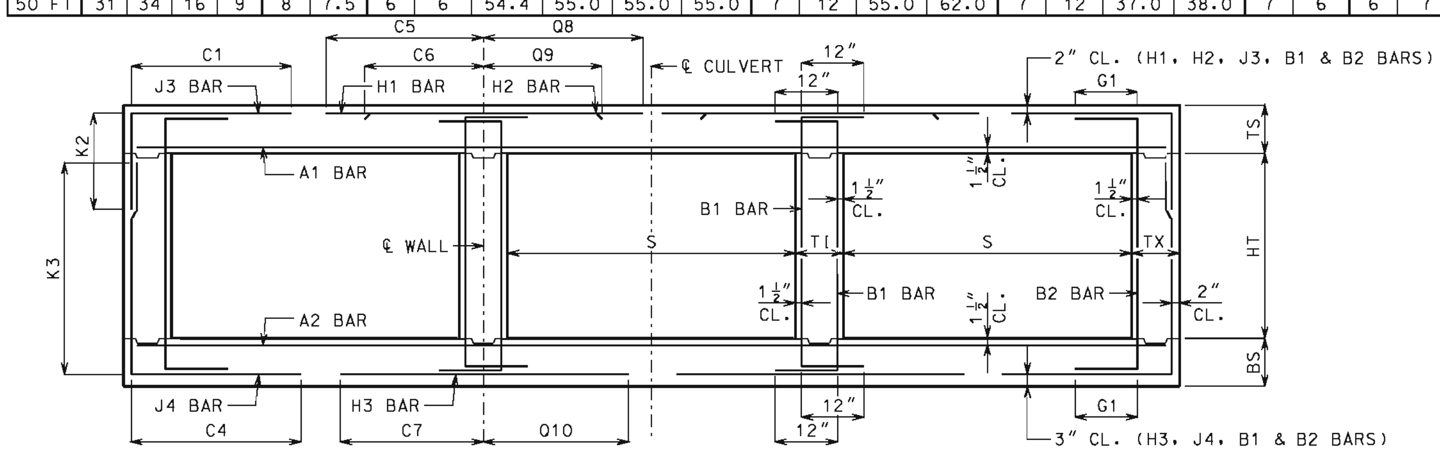
SPAN (S): 11 FEET
HEIGHT (HT): 12 THRU 14 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 12 FT HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT																																								
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS															WALL BARS				
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	HT=7'	HT=8'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=6'	HT=7'	HT=8'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	9	8	8	5	6	4	6	59.1	30.0	30.0	30.0	5	12	114.5	86.5	5	12	31.0	34.0	5	7.5	6	7	54.6	77	89	101	6	6.5	53.0	56.0	5	12	5	12	12
2 FT	14	9	8	8	5	6	5	8.5	62.1	30.0	30.0	34.0	5	12	116.5	86.5	5	12	30.0	33.0	5	7.5	6	6.5	50.3	77	89	101	6	6	52.0	55.0	5	12	5	12	12
4 FT	11	10	8	8	5	6	5	6.5	48.9	31.0	31.0	31.0	5	12	69.0	88.0	5	12	33.0	35.0	5	7	5	6	42.6	78	90	102	6	6	51.0	56.0	5	12	5	12	12
6 FT	11	11	8	8	5	6.5	5	6.5	42.8	31.0	31.0	31.0	6	16	59.0	71.0	6	16	34.0	36.0	5	6.5	5	6.5	39.3	79	91	103	6	6.5	49.0	56.0	5	12	5	12	12
8 FT	11	12	8	8	5	6.5	5	6	39.9	31.0	31.0	31.0	6	14	55.0	61.0	6	14	33.0	34.0	5	6	5	7.5	36.6	80	92	104	6	6.5	48.0	56.0	5	12	5	12	0
10 FT	12	13	8	8	5	6.5	5	6.5	37.3	32.0	32.0	32.0	6	14	52.0	59.0	6	14	32.0	34.0	5	6	5	7.5	34.9	81	93	105	6	6	47.0	56.0	5	12	5	12	0
12 FT	13	14	8	8	5	6	5	7	35.4	33.0	33.0	33.0	6	14	51.0	58.0	6	14	32.0	34.0	6	8	5	8	33.8	82	94	106	6	6	47.0	56.0	5	12	5	12	0
14 FT	14	15	8	8	5	6	5	7	33.9	34.0	34.0	34.0	6	13	49.0	57.0	6	13	32.0	34.0	6	7.5	5	8	32.8	83	95	107	6	6	47.0	56.0	5	12	5	12	0
16 FT	15	16	8	8	6	8	5	6.5	37.9	35.0	35.0	35.0	6	13	55.0	63.0	6	13	37.0	40.0	6	7	5	8	32.1	84	96	108	6	6	46.0	56.0	5	12	5	12	0
18 FT	16	17	8	8	6	8	5	6.5	37.0	36.0	36.0	36.0	6	13	54.0	63.0	6	13	37.0	40.0	6	7	5	7	31.6	85	97	109	6	6	46.0	56.0	5	12	5	11.5	0
20 FT	17	18	8	8	6	7.5	5	6.5	36.4	37.0	37.0	37.0	6	12	53.0	63.0	6	12	37.0	40.0	6	6.5	5	6.5	31.1	86	98	110	6	6	46.0	56.0	5	12	5	10	0
22 FT	18	20	8	8	6	6.5	5	6	36.1	38.0	38.0	38.0	6	12	53.0	62.0	6	12	37.0	40.0	6	6	5	6	30.8	88	100	112	6	6	46.0	57.0	5	12	5	9.5	0
24 FT	20	21	8	8	6	6.5	6	7.5	39.5	44.0	44.0	44.0	6	12	52.0	62.0	6	12	36.0	39.0	7	8	6	7.5	33.8	89	101	113	7	7.5	49.0	59.0	5	12	5	9.5	0
26 FT	21	22	8	8	6	6	6	7	39.3	45.0	45.0	45.0	6	12	52.0	62.0	6	12	36.0	39.0	7	7.5	6	7	33.6	90	102	114	7	7.5	49.0	60.0	5	12	5	9.5	0
28 FT	22	23	8	8	6	6	6	6.5	39.0	46.0	46.0	46.0	7	15	57.0	67.0	7	15	41.0	44.0	7	7	6	6.5	33.4	91	103	115	7	7	49.0	60.0	5	12	5	8.5	0
30 FT	23	24	8	8	7	7.5	6	6	38.9	47.0	47.0	47.0	7	15	56.0	67.0	7	15	40.0	43.0	7	6.5	6	6	33.4	92	104	116	7	6.5	49.0	60.0	5	12	5	8	0
32 FT	24	25	9	8	7	7.5	6	7	39.8	48.0	48.0	48.0	7	14	56.0	66.0	7	14	40.0	42.0	7	6.5	6	7	34.0	93	105	117	7	6.5	49.0	60.0	5	12	5	8.5	0
34 FT	25	26	9	8	7	7	6	6.5	39.8	49.0	49.0	49.0	7	14	56.0	66.0	7	14	39.0	42.0	7	6	6	6.5	34.0	94	106	118	7	6	49.0	60.0	5	12	5	8	0
36 FT	26	27	9	8	7	7	6	6.5	39.8	50.0	50.0	50.0	7	13	56.0	66.0	7	13	39.0	41.0	7	6	6	6.5	34.1	95	107	119	7	6	49.0	60.0	5	12	5	7.5	0
38 FT	27	28	9	8	7	6.5	6	6	39.8	51.0	51.0	51.0	7	13	56.0	66.0	7	13	38.0	40.0	7	6	6	6	34.3	96	108	120	7	6	49.0	60.0	5	12	5	7	0
40 FT	28	29	9	8	7	6.5	6	6	38.9	52.0	52.0	52.0	7	12	56.0	65.0	7	12	37.0	39.0	7	6.5	6	6	33.4	97	109	121	8	7.5	55.0	66.0	5	12	5	7	0
42 FT	28	30	10	8	7	6	6	6.5	39.8	52.0	52.0	52.0	7	12	56.0	65.0	7	12	38.0	40.0	7	6.5	6	6.5	33.9	98	110	122	8	7.5	55.0	66.0	5	12	5	8	0
44 FT	29	31	10	8	7	6	6	6.5	39.9	53.0	53.0	53.0	7	12	55.0	64.0	7	12	38.0	39.0	7	6.5	6	6	34.0	99	111	123	8	7.5	55.0	66.0	5	12	5	7	0
46 FT	30	32	10	8	7	6	6	6	40.0	54.0	54.0	54.0	7	12	55.0	64.0	7	12	37.0	38.0	7	6	6	6	34.3	100	112	124	8	7.5	55.0	66.0	5	12	5	6.5	0
48 FT	31	33	10	8	8	7.5	6	6	40.1	55.0	55.0	55.0	8	15	63.0	71.0	8	15	45.0	46.0	7	6	7	6.5	37.5	101	113	125	8	7.5	55.0	66.0	5	12	5	6.5	0
50 FT	32	34	11	8	8	7.5	6	6.5	41.0	56.0	56.0	56.0	7	12	55.0	63.0	7	12	37.0	38.0	7	6	6	6	35.1	102	114	126	8	7	55.0	66.0	5	12	5	7	0

SPAN (S) = 12 FT HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT																																								
DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS															WALL BARS				
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=9'	HT=10'	HT=11'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=9'	HT=10'	HT=11'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8	9	5	6	5	7.5	62.3	34.0	34.0	34.0	5	12	117.5	87.5	5	12	31.0	35.0	5	7.5	6	6	79.4	114	126	138	5	6	51.0	54.0	5	12	5	10	12
2 FT	14	10	9	9	5	6	5	8	62.9	34.0	34.0	34.0	5	12	117.5	87.5	5	12	30.0	33.0	5	7	6	6.5	68.6	114	126	138	6	6.5	53.0	56.0	5	12	5	10.5	12
4 FT	11	10	9	9	5	6	6	7	75.1	31.0	31.0	35.0	5	12	82.0	89.0	5	12	34.0	36.0	5	7	6	6	61.3	114	126	138	6	6	52.0	56.0	5	12	5	10	12
6 FT	11	11	9	9	5	6.5	6	7	59.8	31.0	35.0	35.0	6	16	61.0	70.0	6	16	35.0	36.0	5	6.5	6	6	57.5	115	127	139	6	6	50.0	56.0	5	12	5	9.5	12
8 FT	11	12	9	9	5	6.5	6	7	55.3	31.0	31.0	35.0	6	15	56.0	60.0	6	15	33.0	34.0	5	6	6	6.5	54.5	116	128	140	6	6	49.0	56.0	5	12	5	9	0
10 FT	12	13	9	9	5	6.5	6	6.5	52.5	32.0	32.0	36.0	6	14	54.0	59.0	6	14	33.0	34.0	5	6	6	6.5	52.4	117	129	141	6	6	48.0	56.0	5	12	5	8.5	0
12 FT	13	14	9	9	5	6	6	6.5	50.4	33.0	33.0	37.0	6	14	52.0	58.0	6	14	32.0	34.0	6	8	6	6.5	50.6	118	130	142	6	6	48.0	56.0	5	12	5	8.5	0
14 FT	14	15	9	9	5	6	6	6.5	48.8	34.0	34.0	38.0	6	14	51.0	57.0	6	14	32.0	34.0	6	7.5	6	6.5	49.4	119	131	143	6	6	48.0	56.0	5	12	5	8.5	0
16 FT	15	16	10	9	6	8	6	7.5	54.3	35.0	35.0	39.0	6	13	55.0	63.0	6	13	38.0	40.0	6	7	6	7.5	48.5	120	132	144	6	6	47.0	56.0	5	12	5	8	0
18 FT	16	17	11	9	6	8	6	8	54.3	36.0	36.0	36.0	6	13	55.0	62.0	6	13	38.0	40.0	6	7	5	6	45.4	121	133	145	6	6	47.0	56.0	5	12	5	8	0
20 FT	17	18	11	9	6	7.5	6	7.5	53.6	37.0	37.0	41.0	6	13	54.0	62.0	6	13	37.0	40.0	6	6	6	8	47.8	122	134	146	6	6	47.0	56.0	5	12	5	7.5	0
22 FT	18	20	11	9	6	7	6	6.5	53.3	38.0	38.0	42.0	6	12	54.0	62.0	6	12	37.0	40.0	6	6	6	7.5	47.5	124	136	148	6	6	47.0	57.0	5	12	5	7.5	0
24 FT	19	21	12	9	6	6.5	6	7	53.5	39.0	39.0	39.0	6	12	53.0	62.0	6	12	37.0	40.0	7	8	5	6	44.5	125	137	149	7	7.5	50.0	60.0	5	12	5	7	0
26 FT	20	22	13	9	6	6	6	7.5	53.9	40.0	40.0	40.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7.5	5	6	44.6	126	138	150	7	7.5	50.0	60.0	5	12	5	7	0
28 FT	22	23	13	9	6	6	6	7.5	53.5	42.0	42.0	42.0	7	15	57.0	66.0	7	15	40.0	43.0	7	7	5	6	44.5	127	139	151	7	7	50.0	60.0	5	12	5	6.5	0
30 FT	23	25	13	9	7	7.5	6	7	53.4	43.0	43.0	43.0	7	15	57.0	66.0	7	15	40.0	42.0	7	7	5	6	44.4	129	141	153	7	6.5	50.0	60.0	5	12	5	6.5	0
32 FT	24	26	13	9	7	7.5	6	6.5	53.3	44.0	44.0	48.0	7	14	57.0	66.0	7	14	40.0	42.0	7	7	6	8.5	47.4	130	142	154	7	6.5	50.0	60.0	5	12	5	6.5	0
34 FT	25	26	13	9	7	7	6	6	53.0	45.0	45.0	49.0	7	14	57.0	65.0	7	14	39.0	41.0	7	6	6	7.5	47.3	130	142	154	7	6	50.0	60.0	5	12	5	6.5	0
36 FT	26	28	14	9	7	7	6	6.5	53.9	46.0	46.0	46.0	7	13	56.0	65.0	7	13	38.0	40.0	7	7	5	6	44.9	132	144	156	7	6	50.0	60.0	5	12	5	6	0
38 FT	26	29	15	9	7	6.5	6	6.5	54.6	50.0	50.0	50.0	7	13	56.0	65.0	7	13	39.0	41.0	7	6.5	6	8	48.1	133	145	157	7	6	50.0	60.0	5	12	6	8.5	0
40 FT	27	29	15	9	7	6.5	6	7	53.4	51.0	51.0	51.0	7	13	56.0	64.0	7	13	38.0	40.0	7	6	6	8	46.9	133	145	157	8	7.5	56.0	66.0	5	12	5	6	0
42 FT	28	30	15	9	7	6.5	6	6.5	53.4	52.0	52.0	52.0	7	12	56.0	64.0	7	12	38.0	39.0	7	6	6	8	47.0	134	146	158	8	7.5	56.0	66.0	5	12	6	8	0
44 FT	29	31	15	9	7	6	6	6.5	53.4	53.0	53.0	53.0	7	12	56.0	63.0	7	12	37.0	39.0	7	6	6	7.5	47.1	135	147	159	8	7.5	56.0	66.0	5	12	6	8	0
46 FT	30	32	15	9	7	6	6	6.5	53.5	54.0	54.0	54.0	7	12	55.0	63.0	7	12	37.0	38.0	7	6	6	7.5	47.4	136	148	160	8	7.5	56.0	66.0	5	12	6	8	0
48 FT	31	33	15	9	7	6	6	6	53.5	55.0	55.0	55.0	7	12	55.0	62.0	7	12	37.0	38.0	7	6	6	7	47.5	137	149	161	8	7	56.0	66.0	5	12	6	8	0
50 FT	31	34	16	9	8	7.5	6	6	54.4	55.0	55.0	55.0	7	12	55.0	62.0	7	12	37.0	38.0	7	6	6	7	47.9	138	150	162	8	7	56.0	67.0	5	12	6	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

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SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 12 FEET
HEIGHT (HT): 6 THRU 11 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO.
18 OF 27

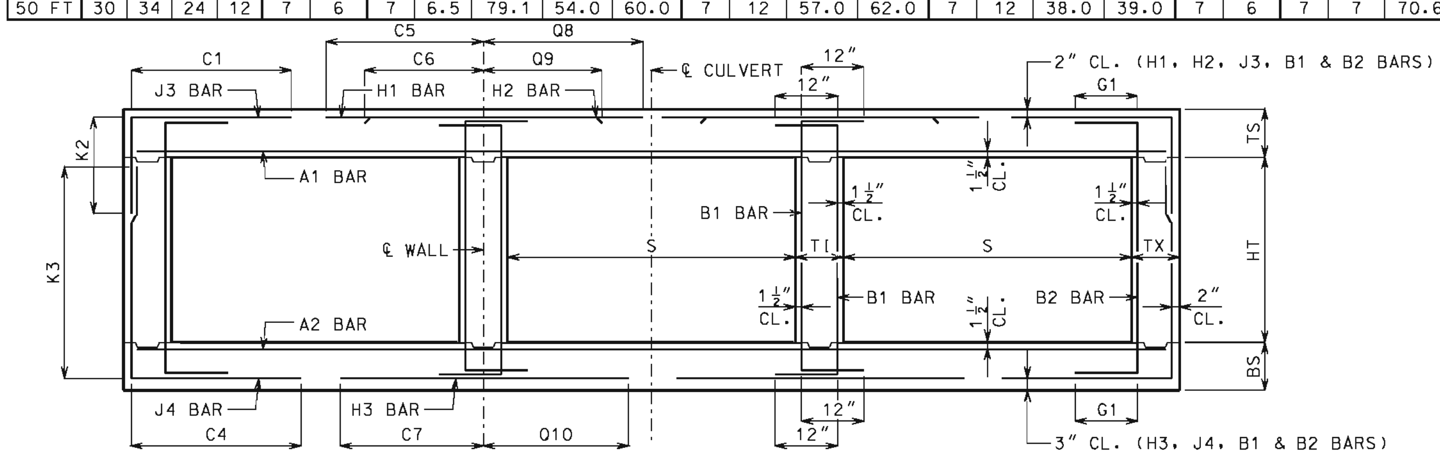
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 12 FT HEIGHT (HT) = 12 FT OR 13 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=12′	HT=13′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=12′	HT=13′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	10	10	5	6	5	7	63.8	34.0	34.0	5	12	118.5	87.5	5	12	32.0	35.0	5	7	6	6.5	89.1	150	162	6	7	55.0	57.0	5	12	5	8.5	12
2 FT	14	10	10	10	5	6	5	7	63.8	34.0	34.0	5	12	118.5	87.5	5	12	31.0	33.0	5	7	6	6	79.6	150	162	6	6.5	54.0	56.0	5	12	5	8	12
4 FT	11	11	10	10	5	6.5	5	6	63.8	31.0	31.0	5	12	118.5	89.0	5	12	34.0	35.0	5	6.5	6	6.5	76.3	151	163	6	6.5	53.0	57.0	5	12	5	8	12
6 FT	11	11	10	10	5	6.5	5	6	71.3	31.0	31.0	6	16	65.0	69.0	6	16	35.0	36.0	5	6.5	6	6	69.1	151	163	6	6	51.0	56.0	5	12	5	8	12
8 FT	11	12	10	10	5	6.5	6	7	65.4	31.0	35.0	6	15	57.0	60.0	6	15	34.0	35.0	5	6	6	6	66.4	152	164	6	6	50.0	56.0	5	12	5	8	0
10 FT	12	13	10	10	5	6.5	6	7	62.9	36.0	36.0	6	15	55.0	58.0	6	15	33.0	34.0	5	6	6	6	63.8	153	165	6	6	49.0	56.0	5	12	5	8	0
12 FT	13	14	11	10	5	6.5	6	7.5	61.1	33.0	37.0	6	14	53.0	57.0	6	14	33.0	34.0	6	8	6	7	62.0	154	166	6	6	49.0	56.0	5	12	5	7.5	0
14 FT	14	15	11	10	5	6	6	7	59.9	38.0	38.0	6	14	51.0	57.0	6	14	32.0	34.0	6	7.5	6	6	60.9	155	167	6	6	48.0	56.0	5	12	5	7.5	0
16 FT	15	16	12	10	6	8	6	7	65.0	39.0	39.0	6	14	56.0	62.0	6	14	38.0	40.0	6	7	6	7	59.9	156	168	6	6	48.0	56.0	5	12	5	7	0
18 FT	16	17	12	10	6	8	6	6.5	64.1	40.0	40.0	6	13	55.0	62.0	6	13	38.0	40.0	6	7	6	6	59.1	157	169	6	6	48.0	56.0	5	12	5	7	0
20 FT	17	18	13	10	6	7.5	6	6.5	63.8	41.0	41.0	6	13	55.0	61.0	6	13	38.0	40.0	6	6	6	7	58.5	158	170	6	6	48.0	56.0	5	12	5	6.5	0
22 FT	18	20	13	10	6	7	6	6	63.3	42.0	42.0	6	13	54.0	61.0	6	13	38.0	40.0	6	6	6	6.5	58.4	160	172	6	6	48.0	56.0	5	12	5	6.5	0
24 FT	19	21	14	10	6	6.5	6	6.5	63.1	39.0	43.0	6	12	54.0	61.0	6	12	37.0	40.0	7	8	6	7	58.0	161	173	7	7.5	51.0	60.0	5	12	5	6	0
26 FT	20	22	14	10	6	6.5	6	6	62.8	44.0	44.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7.5	6	6.5	57.6	162	174	7	7.5	51.0	60.0	5	12	5	6	0
28 FT	21	23	15	10	6	6	6	6	62.9	45.0	45.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7	6	7	57.4	163	175	7	7	51.0	60.0	5	12	6	8	0
30 FT	23	25	15	10	7	7.5	6	6	62.8	47.0	47.0	7	15	57.0	65.0	7	15	40.0	42.0	7	7	6	7	57.5	165	177	7	6.5	51.0	60.0	5	12	6	8	0
32 FT	23	26	16	10	7	7	6	6	63.1	47.0	47.0	7	14	57.0	65.0	7	14	41.0	43.0	7	7	6	7.5	57.5	166	178	7	6.5	51.0	60.0	5	12	6	8	0
34 FT	24	27	16	10	7	7	7	7.5	68.1	48.0	48.0	7	14	57.0	65.0	7	14	40.0	42.0	7	7	6	7	57.5	167	179	7	6	51.0	60.0	5	12	6	8	0
36 FT	25	28	17	10	7	7	6	6	63.6	49.0	49.0	7	14	57.0	64.0	7	14	40.0	42.0	7	7	6	7	57.8	168	180	7	6	51.0	60.0	5	12	6	7.5	0
38 FT	26	29	17	10	7	7	7	7.5	68.6	50.0	50.0	7	13	57.0	64.0	7	13	39.0	41.0	7	6.5	6	7	57.9	169	181	7	6	51.0	60.0	5	12	6	7.5	0
40 FT	27	29	17	10	7	6.5	7	8	66.8	51.0	51.0	7	13	56.0	63.0	7	13	38.0	40.0	7	6	6	7	55.9	169	181	8	7.5	57.0	66.0	5	12	6	7.5	0
42 FT	28	30	17	10	7	6.5	7	7	66.9	52.0	52.0	7	12	56.0	63.0	7	12	38.0	39.0	7	6	6	7	56.0	170	182	8	7.5	57.0	66.0	5	12	6	7.5	0
44 FT	29	31	18	10	7	6	7	7.5	67.8	53.0	53.0	7	12	56.0	62.0	7	12	37.0	38.0	7	6	6	6.5	56.4	171	183	8	7.5	57.0	66.0	5	12	6	7	0
46 FT	29	32	19	10	7	6	7	7.5	68.5	53.0	53.0	7	12	56.0	62.0	7	12	38.0	39.0	7	6	6	6.5	56.8	172	184	8	7	57.0	67.0	5	12	6	6.5	0
48 FT	30	33	19	10	7	6	7	7	68.5	54.0	54.0	7	12	56.0	61.0	7	12	37.0	38.0	7	6	6	6.5	56.9	173	185	8	7	57.0	67.0	5	12	6	6.5	0
50 FT	31	34	19	10	7	6	7	6.5	68.6	55.0	55.0	7	12	56.0	61.0	7	12	37.0	38.0	7	6	6	6.5	57.3	174	186	8	7	57.0	67.0	5	12	6	6.5	0

SPAN (S) = 12 FT HEIGHT (HT) = 14 FT OR 15 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=14′	HT=15′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=14′	HT=15′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	11	10	12	5	6	6	7.5	64.0	34.0	38.0	5	12	119.5	88.5	5	12	32.0	35.0	5	7	6	6	95.5	175	187	5	6	55.0	55.0	5	12	5	8	12
2 FT	14	12	10	12	5	6	6	7	64.0	34.0	38.0	5	12	119.5	88.5	5	12	31.0	34.0	5	7	6	6	95.5	176	188	5	6	54.0	55.0	5	12	5	8	12
4 FT	10	11	12	12	5	6	6	7.5	68.3	34.0	34.0	6	15	121.5	77.0	6	15	37.0	37.0	5	6.5	6	6	86.8	175	187	6	6.5	55.0	57.0	5	11	5	7	12
6 FT	10	12	12	12	5	6.5	6	7	80.0	34.0	34.0	6	15	61.0	61.0	6	15	35.0	35.0	5	6	6	6.5	83.1	176	188	6	6.5	53.0	57.0	5	12	5	7	12
8 FT	11	12	12	12	5	7	6	7.5	76.8	35.0	35.0	6	15	58.0	59.0	6	15	35.0	35.0	5	6	6	6	77.1	176	188	6	6	52.0	55.0	5	12	5	7	0
10 FT	12	13	12	12	5	6.5	6	7.5	74.4	36.0	36.0	6	15	56.0	58.0	6	15	34.0	35.0	5	6	6	6	75.5	177	189	6	6	51.0	55.0	5	12	5	6.5	0
12 FT	13	14	13	12	5	6.5	6	7.5	71.5	37.0	37.0	6	15	54.0	57.0	6	15	34.0	35.0	6	8	6	6	73.0	178	190	6	6	50.0	55.0	5	12	5	6.5	0
14 FT	14	15	13	12	5	6	6	6.5	70.3	38.0	38.0	6	14	52.0	56.0	6	14	33.0	35.0	6	7.5	6	6	72.0	179	191	6	6	50.0	55.0	5	12	5	6.5	0
16 FT	15	16	14	12	6	8	6	6.5	74.5	39.0	39.0	6	14	57.0	62.0	6	14	39.0	41.0	6	7	6	6.5	70.3	180	192	6	6	49.0	55.0	5	12	5	6	0
18 FT	15	17	15	12	6	7.5	6	6.5	72.4	39.0	39.0	6	13	56.0	61.0	6	13	39.0	40.0	6	6.5	6	6.5	69.0	181	193	6	6	49.0	56.0	5	12	6	8	0
20 FT	17	19	15	12	6	7.5	6	6	73.0	41.0	41.0	6	13	56.0	61.0	6	13	39.0	41.0	6	6	6	6	69.6	183	195	6	6	49.0	56.0	5	12	6	8	0
22 FT	18	20	16	12	6	7	6	6.5	72.8	42.0	42.0	6	13	55.0	61.0	6	13	39.0	41.0	6	6	6	6	68.4	184	196	6	6	49.0	56.0	5	12	6	8	0
24 FT	19	21	16	12	6	6.5	6	6	72.4	43.0	43.0	6	13	55.0	61.0	6	13	38.0	41.0	7	8	7	7.5	71.1	185	197	7	7.5	52.0	59.0	5	12	6	8	0
26 FT	20	22	16	12	6	6.5	7	7.5	77.1	44.0	50.0	6	12	55.0	61.0	6	12	38.0	40.0	7	7.5	7	7	70.8	186	198	7	7.5	52.0	60.0	5	12	6	8	0
28 FT	21	23	17	12	6	6	7	7.5	77.1	45.0	51.0	6	12	54.0	60.0	6	12	37.0	40.0	7	6.5	7	7.5	70.5	187	199	7	6.5	52.0	60.0	5	12	6	7.5	0
30 FT	22	25	18	12	6	6	7	7.5	77.3	46.0	46.0	7	15	59.0	65.0	7	15	42.0	44.0	7	7	6	6	67.8	189	201	7	6.5	52.0	60.0	5	12	6	7	0
32 FT	23	26	19	12	7	7.5	7	7.5	77.5	47.0	47.0	7	15	58.0	65.0	7	15	41.0	44.0	7	7	6	6	67.8	190	202	7	6.5	52.0	60.0	5	12	6	6.5	0
34 FT	24	27	19	12	7	7.5	7	7	77.6	48.0	48.0	7	14	58.0	65.0	7	14	41.0	43.0	7	7	6	6	67.9	191	203	7	6	52.0	60.0	5	12	6	6.5	0
36 FT	25	28	20	12	7	7	7	7.5	78.1	49.0	49.0	7	14	58.0	64.0	7	14	40.0	42.0	7	7	6	6	68.1	192	204	7	6	52.0	60.0	5	12	6	6.5	0
38 FT	26	29	21	12	7	7	7	7.5	78.6	50.0	50.0	7	13	58.0	64.0	7	13	40.0	41.0	7	6.5	6	6	68.3	193	205	7	6	52.0	61.0	5	12	6	6	0
40 FT	27	30	21	12	7	6.5	7	7.5	77.1	51.0	51.0	7	13	57.0	63.0	7	13	39.0	40.0	7	6.5	6	6	66.5	194	206	7	6	52.0	61.0	5	12	6	6	0
42 FT	27	31	21	12	7	6	7	7	77.0	51.0	51.0	7	12	57.0	63.0	7	12	40.0	41.0	7	6.5	6	6	66.8	195	207	7	6	52.0	61.0	5	12	6	6	0
44 FT	28	31	22	12	7	6.5	7	7	77.6	52.0	58.0	7	12	57.0	63.0	7	12	39.0	40.0	7	6	7	7.5	69.6	195	207	8	7.5	58.0	67.0	5	12	6	6	0
46 FT	29	32	22	12	7	6	7	6.5	77.9	59.0	59.0	7	12	57.0	62.0	7	12	38.0	40.0	7	6	7	7.5	70.0	196	208	8	7.5	58.0	67.0	5	12	6	6	0
48 FT	30	33	23	12	7	6	7	6.5	78.6	54.0	60.0	7	12	57.0	62.0	7	12	38.0	39.0	7	6	7	7.5	70.4	197	209	8	7	58.0	67.0	5	12	7	8	0
50 FT	30	34	24	12	7	6	7	6.5	79.1	54.0	60.0	7	12	57.0	62.0	7	12	38.0	39.0	7	6	7	7	70.6	198	210	8	7	58.0	67.0	5	12	7	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

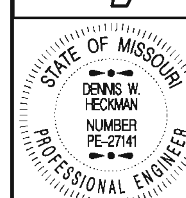
SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 12 FEET
HEIGHT (HT): 12 THRU 15 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO. 19 OF 27

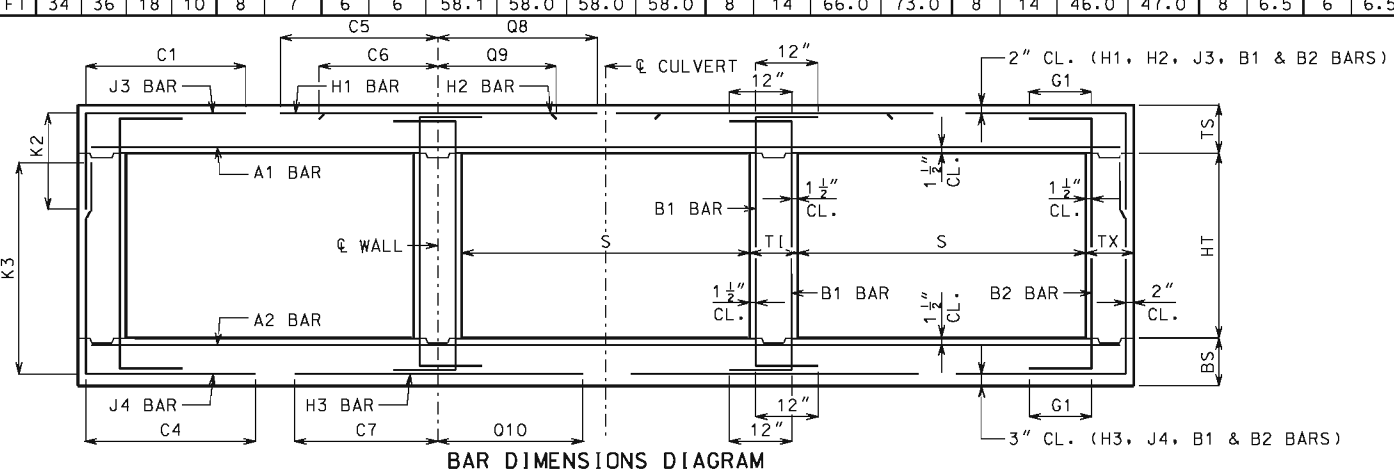
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

SPAN (S) = 13 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=7′	K2 HT=8′	K2 HT=9′	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=7′	K3 HT=8′	K3 HT=9′	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	9	8	8	5	6	5	8.5	65.8	34.0	34.0	34.0	5	12	125.5	92.5	5	12	34.0	38.0	5	7.5	6	6	60.0	89	101	113	6	6	56.0	59.0	5	12	5	12	12
2 FT	15	10	8	8	6	8	5	8	65.8	31.0	35.0	35.0	6	16	129.5	99.5	6	16	40.0	44.0	5	7	6	6.5	55.5	90	102	114	6	6	54.0	59.0	5	12	5	12	12
4 FT	11	10	8	8	6	8	6	7	56.4	31.0	35.0	35.0	6	14	77.0	97.0	6	14	38.0	40.0	5	7	6	6	49.5	90	102	114	7	6.5	57.0	62.0	5	12	5	12	12
6 FT	11	11	8	8	6	8.5	6	7	49.0	31.0	31.0	35.0	6	13	63.0	75.0	6	13	35.0	37.0	5	6.5	6	7	45.9	91	103	115	7	7	55.0	62.0	5	12	5	12	12
8 FT	12	12	8	8	5	6	5	6	42.0	32.0	32.0	32.0	6	14	58.0	67.0	6	14	34.0	36.0	5	6	6	7	43.3	92	104	116	7	7	54.0	62.0	5	12	5	12	0
10 FT	13	14	8	8	5	6	5	6	39.8	33.0	33.0	33.0	6	13	55.0	63.0	6	13	33.0	36.0	6	8	5	6.5	38.1	94	106	118	6	6	50.0	59.0	5	12	5	12	0
12 FT	14	15	8	8	6	8	5	6	37.9	34.0	34.0	34.0	6	13	53.0	62.0	6	13	33.0	35.0	6	7.5	5	6.5	36.9	95	107	119	6	6	49.0	59.0	5	12	5	12	0
14 FT	15	16	8	8	6	7.5	5	6	41.4	35.0	35.0	35.0	6	12	58.0	67.0	6	12	39.0	41.0	6	7	5	6.5	35.9	96	108	120	6	6	49.0	59.0	5	12	5	10.5	0
16 FT	16	17	8	8	6	7.5	6	8	44.4	36.0	36.0	36.0	6	12	57.0	67.0	6	12	38.0	41.0	6	7	5	6.5	35.1	97	109	121	6	6	49.0	60.0	5	12	5	9.5	0
18 FT	17	18	8	8	6	7	6	7.5	43.5	37.0	37.0	37.0	6	12	56.0	66.0	6	12	38.0	41.0	6	6.5	5	6	34.5	98	110	122	7	7	52.0	63.0	5	12	5	9.5	0
20 FT	18	20	9	8	6	6.5	6	8	44.3	38.0	38.0	38.0	7	15	61.0	71.0	7	15	43.0	46.0	6	6	5	7	34.6	100	112	124	6	6	49.0	60.0	5	12	5	9	0
22 FT	20	21	9	8	6	6.5	6	8	43.4	40.0	40.0	40.0	6	12	55.0	66.0	6	12	38.0	41.0	7	8	5	6.5	34.5	101	113	125	7	7	52.0	63.0	5	12	5	8.5	0
24 FT	21	22	9	8	6	6	6	7.5	43.0	41.0	41.0	41.0	7	15	60.0	71.0	7	15	43.0	46.0	7	7.5	5	6	34.3	102	114	126	7	7	51.0	63.0	5	12	5	8.5	0
26 FT	22	24	10	8	6	6	6	8	43.8	42.0	42.0	42.0	7	15	59.0	70.0	7	15	42.0	46.0	7	7	5	6.5	34.5	104	116	128	7	7	51.0	63.0	5	12	5	8	0
28 FT	23	25	11	8	7	7	5	6	40.5	43.0	43.0	43.0	7	14	59.0	70.0	7	14	42.0	46.0	7	6.5	5	7	34.9	105	117	129	7	6.5	51.0	63.0	5	12	5	8.5	0
30 FT	25	26	11	8	7	7	5	6	40.0	45.0	45.0	45.0	7	14	59.0	70.0	7	14	41.0	44.0	7	6.5	5	6.5	34.9	106	118	130	7	6.5	51.0	63.0	5	12	5	7.5	0
32 FT	26	27	11	8	7	7	5	6	39.8	46.0	46.0	46.0	7	13	59.0	69.0	7	13	40.0	43.0	7	6	5	6	34.8	107	119	131	7	6	51.0	63.0	5	12	5	7.5	0
34 FT	27	29	11	8	7	6.5	6	8	43.9	47.0	47.0	51.0	7	13	58.0	69.0	7	13	40.0	42.0	7	6.5	6	7.5	37.9	109	121	133	8	7.5	57.0	69.0	5	12	5	7.5	0
36 FT	28	30	11	8	7	6.5	6	7.5	43.9	52.0	52.0	52.0	7	12	58.0	68.0	7	12	40.0	42.0	7	6	6	7	37.9	110	122	134	8	7.5	57.0	69.0	5	12	5	7.5	0
38 FT	29	31	11	8	7	6	6	6.5	43.9	53.0	53.0	53.0	7	12	58.0	68.0	7	12	39.0	41.0	7	6	6	7	38.0	111	123	135	8	7	57.0	69.0	5	12	5	7	0
40 FT	30	32	12	8	7	6	6	7.5	44.8	54.0	54.0	54.0	7	12	58.0	68.0	7	12	38.0	40.0	7	6	6	7.5	38.5	112	124	136	8	7	57.0	70.0	5	12	5	7	0
42 FT	31	33	12	8	8	7.5	6	7.5	43.8	55.0	55.0	55.0	8	15	66.0	75.0	8	15	46.0	47.0	7	6	6	7	37.6	113	125	137	8	7	57.0	69.0	5	12	5	7	0
44 FT	32	34	12	8	8	7.5	6	7	43.9	56.0	56.0	56.0	8	14	65.0	74.0	8	14	45.0	47.0	7	6	6	7	37.8	114	126	138	8	7	57.0	69.0	5	12	5	7	0
46 FT	32	35	12	8	8	7	6	7	43.9	56.0	56.0	56.0	8	14	65.0	74.0	8	14	46.0	47.0	7	6	6	6.5	37.8	115	127	139	8	7	57.0	69.0	5	12	5	7	0
48 FT	33	35	12	8	8	7	6	7	43.9	57.0	57.0	57.0	8	14	65.0	74.0	8	14	45.0	47.0	8	7	6	6.5	37.9	115	127	139	8	6.5	57.0	69.0	5	12	5	6.5	0
50 FT	34	36	12	8	8	7	6	6.5	43.9	58.0	58.0	58.0	8	14	65.0	73.0	8	14	45.0	46.0	8	7	6	6.5	38.1	116	128	140	8	6.5	57.0	69.0	5	12	5	6	0

SPAN (S) = 13 FT HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=10′	K2 HT=11′	K2 HT=12′	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=10′	K3 HT=11′	K3 HT=12′	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	10	9	10	5	6	5	7	66.6	34.0	34.0	34.0	5	12	126.5	93.5	5	12	35.0	38.0	5	7	6	6	81.5	126	138	150	6	6.5	57.0	60.0	5	12	5	9	12
2 FT	15	10	10	10	6	8	5	7.5	67.3	35.0	35.0	35.0	6	16	130.5	100.5	6	16	41.0	44.0	5	7	6	6	70.1	126	138	150	6	6	56.0	58.0	5	12	5	9.5	12
4 FT	11	10	10	10	6	8	5	6	72.3	31.0	31.0	31.0	6	15	82.0	97.0	6	15	38.0	39.0	5	7	6	6	64.6	126	138	150	7	6.5	58.0	61.0	5	9.5	5	9	12
6 FT	11	11	10	10	5	6	5	6	60.5	31.0	31.0	31.0	6	14	64.0	71.0	6	14	36.0	37.0	5	6.5	6	6	61.0	127	139	151	7	6.5	57.0	61.0	5	12	5	9	12
8 FT	12	13	10	10	5	6	5	6	56.8	32.0	32.0	32.0	6	14	60.0	64.0	6	14	35.0	36.0	5	6	6	6.5	59.1	129	141	153	6	6	52.0	59.0	5	12	5	8.5	0
10 FT	13	14	10	10	5	6	6	7	56.9	33.0	33.0	37.0	6	13	57.0	62.0	6	13	34.0	36.0	6	8	6	6.5	56.8	130	142	154	6	6	51.0	59.0	5	12	5	8	0
12 FT	14	15	10	10	5	6	6	6.5	54.6	34.0	34.0	38.0	6	13	55.0	61.0	6	13	34.0	36.0	6	7.5	6	6.5	54.9	131	143	155	6	6	51.0	59.0	5	12	5	8	0
14 FT	15	16	10	10	6	8	6	6.5	58.9	35.0	35.0	39.0	6	13	60.0	66.0	6	13	39.0	42.0	6	7	6	6	53.5	132	144	156	6	6	50.0	59.0	5	12	5	8	0
16 FT	16	17	11	10	6	7.5	6	7	58.0	36.0	36.0	40.0	6	12	58.0	66.0	6	12	39.0	42.0	6	7	6	7.5	52.5	133	145	157	6	6	50.0	59.0	5	12	5	7.5	0
18 FT	17	18	12	10	6	7.5	6	7	57.9	37.0	37.0	41.0	6	12	58.0	66.0	6	12	39.0	42.0	6	6	6	7.5	52.0	134	146	158	7	7	53.0	62.0	5	12	5	7	0
20 FT	18	20	12	10	6	7	6	6.5	57.3	38.0	38.0	42.0	6	12	57.0	65.0	6	12	39.0	42.0	6	6	6	7.5	51.5	136	148	160	6	6	50.0	60.0	5	12	5	7	0
22 FT	19	21	12	10	6	6	6	6.5	56.8	39.0	39.0	43.0	7	15	62.0	70.0	7	15	44.0	47.0	7	8	6	7	51.0	137	149	161	7	7	53.0	63.0	5	12	5	7	0
24 FT	21	22	13	10	6	6	6	6.5	56.9	41.0	41.0	45.0	6	12	56.0	65.0	6	12	38.0	42.0	7	7	6	7.5	51.1	138	150	162	7	7	53.0	63.0	5	12	5	6.5	0
26 FT	22	24	13	10	6	6	6	6.5	56.6	42.0	42.0	46.0	7	15	60.0	70.0	7	15	43.0	46.0	7	7	6	7.5	50.9	140	152	164	7	7	53.0	63.0	5	12	5	6.5	0
28 FT	23	25	14	10	7	7.5	6	6.5	57.0	43.0	43.0	47.0	7	15	60.0	69.0	7	15	43.0	46.0	7	6.5	6	8	51.0	141	153	165	7	6.5	53.0	63.0	5	12	5	6	0
30 FT	24	26	14	10	7	7	6	6.5	56.6	44.0	44.0	48.0	7	14	60.0	69.0	7	14	42.0	45.0	7	6.5	6	7.5	50.8	142	154	166	7	6.5	53.0	63.0	5	12	5	6	0
32 FT	26	28	14	10	7	7	6	6	56.5	46.0	46.0	50.0	7	13	59.0	69.0	7	13	41.0	43.0	7	6.5	6	7.5	50.8	144	156	168	7	6	53.0	63.0	5	12	5	6	0
34 FT	27	29	15	10	7	6.5	6	6.5	57.1	51.0	51.0	51.0	7	13	59.0	68.0	7	13	40.0	43.0	7	6.5	6	8	51.1	145	157	169	8	7.5	59.0	70.0	5	12	6	8	0
36 FT	28	30	15	10	7	6.5	6	6	57.1	52.0	52.0	52.0	7	12	59.0	68.0	7	12	40.0	42.0	7	6	6	7.5	51.1	146	158	170	8	7.5	59.0	70.0	5	12	6	8	0
38 FT	29	31	16	10	7	6	6	6	57.8	53.0	53.0	53.0	7	12	59.0	68.0	7	12	39.0	41.0	7	6	6	7.5	51.6	147	159	171	8	7	59.0	70.0	5	12	6	8	0
40 FT	30	32	16	10	7	6	6	6	57.8	54.0	54.0	54.0	7	12	59.0	67.0	7	12	39.0	40.0	7	6	6	7.5	51.6	148	160	172	8	7	59.0	70.0	5	12	6	8	0
42 FT	30	33	17	10	7	6	6	6	58.5	54.0	54.0	54.0	7	12	59.0	67.0	7	12	40.0	41.0	7	6	6	7	51.9	149	161	173	8	7	59.0	70.0	5	12	6	7.5	0
44 FT	31	34	17	10	8	7.5	6	6	57.4	55.0	55.0	55.0	8	15	66.0	74.0	8	15	47.0	48.0	7	6	6	7	50.8	150	162	174	8	7	59.0	70.0	5	12	6	7.5	0
46 FT	32	35	17	10	8	7.5	6	6	57.4	56.0	56.0	56.0	8	14	66.0	74.0	8	14	46.0	48.0	8	7.5	6	6.5	50.9	151	163	175	8	7	59.0	70.0	5	12	6	7.5	0
48 FT	33	36	17	10	8	7	6	6	57.4	57.0	57.0	57.0	8	14	66.0	73.0	8	14	46.0	47.0	8	7.5	6	6.5	51.1	152	164	176	8	6.5	59.0	70.0	5	12	6	7.5	0
50 FT	34	36	18	10	8	7	6	6	58.1	58.0	58.0	58.0	8	14	66.0	73.0	8	14	46.0	47.0	8	6.5	6	6.5	51.5	152	164	176	8	6.5	59.0	70.0	5	12	6	7	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET
HEIGHT (HT): 7 THRU 12 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

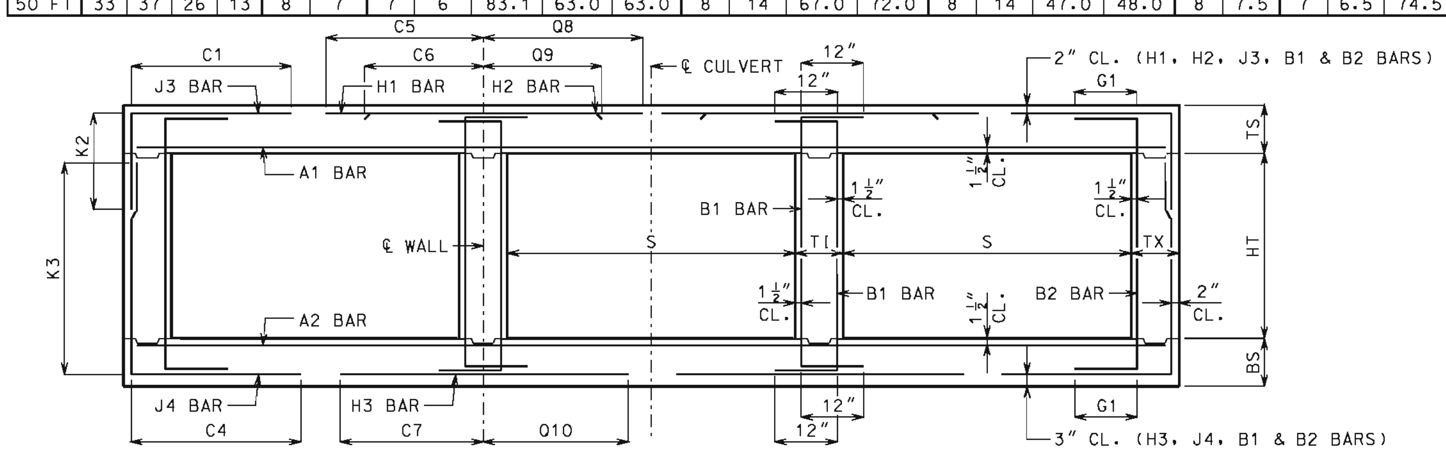
SHEET NO. 20 OF 27

SPAN (S) = 13 FT HEIGHT (HT) = 13 FT OR 14 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=13'	J3 K2 HT=14'	H1 BARS SIZE	H1 SPA.	H1 C5	H1 Q8	H2 BARS SIZE	H2 SPA.	H2 C6	H2 Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=13'	J4 K3 HT=14'	H3 BARS SIZE	H3 SPA.	H3 C7	H3 Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	11	10	11	5	6	5	6	67.5	34.0	34.0	5	12	127.5	94.5	5	12	35.0	38.0	5	7	6	6.5	100.1	163	175	5	6	56.0	58.0	5	12	5	8	12
2 FT	15	11	10	11	6	8	5	6	67.5	35.0	35.0	6	16	131.5	101.5	6	16	41.0	44.0	5	6.5	6	6	88.9	163	175	6	6.5	57.0	60.0	5	12	5	8	12
4 FT	11	11	11	11	6	8	5	6	68.1	31.0	31.0	6	15	127.5	92.0	6	15	38.0	39.0	5	6.5	6	6	78.6	163	175	6	6	56.0	60.0	5	12	5	7.5	12
6 FT	11	12	11	11	5	6	6	7.5	75.9	31.0	35.0	6	14	65.0	69.0	6	14	36.0	37.0	5	6	6	6.5	74.6	164	176	6	6	54.0	59.0	5	12	5	7.5	12
8 FT	12	13	11	11	5	6	6	7.5	70.1	32.0	36.0	6	14	61.0	64.0	6	14	35.0	36.0	5	6	6	6.5	70.9	165	177	6	6	53.0	59.0	5	12	5	7.5	0
10 FT	12	14	12	11	5	6	6	7.5	65.9	36.0	36.0	6	12	58.0	61.0	6	12	35.0	35.0	6	8	6	7	67.9	166	178	6	6	52.0	59.0	5	12	5	7	0
12 FT	13	15	12	11	6	8	6	7	64.4	37.0	37.0	6	12	56.0	60.0	6	12	34.0	35.0	6	7.5	6	7	66.3	167	179	6	6	52.0	59.0	5	12	5	7	0
14 FT	15	16	12	11	6	8	6	6.5	69.9	39.0	39.0	6	13	60.0	66.0	6	13	40.0	42.0	6	7	6	6	64.9	168	180	6	6	51.0	59.0	5	12	5	7	0
16 FT	16	17	13	11	6	8	6	6.5	68.9	40.0	40.0	6	13	59.0	65.0	6	13	40.0	42.0	6	7	6	6.5	63.8	169	181	6	6	51.0	59.0	5	12	5	6.5	0
18 FT	17	19	14	11	6	7.5	6	6.5	68.3	41.0	41.0	6	12	58.0	65.0	6	12	40.0	42.0	6	6	6	6.5	63.5	171	183	6	6	51.0	60.0	5	12	5	6	0
20 FT	18	20	14	11	6	7	6	6	67.5	42.0	42.0	6	12	58.0	65.0	6	12	39.0	42.0	6	6	6	6.5	62.8	172	184	6	6	51.0	60.0	5	12	5	6	0
22 FT	19	21	14	11	6	6.5	6	6	66.9	43.0	43.0	6	12	57.0	65.0	6	12	39.0	42.0	7	8	6	6	62.1	173	185	7	7	54.0	63.0	5	12	5	6	0
24 FT	20	22	16	11	6	6	6	6	67.3	44.0	44.0	7	15	62.0	69.0	7	15	44.0	47.0	7	7	6	6.5	61.8	174	186	7	7	54.0	63.0	5	12	6	8	0
26 FT	22	24	16	11	6	6	6	6	67.1	46.0	46.0	7	15	61.0	69.0	7	15	43.0	46.0	7	7	6	7	61.8	176	188	7	7	54.0	63.0	5	12	6	8	0
28 FT	23	25	16	11	7	7.5	7	8	71.6	47.0	47.0	7	15	61.0	69.0	7	15	43.0	46.0	7	6.5	6	6.5	61.4	177	189	7	6.5	54.0	63.0	5	12	6	8	0
30 FT	24	26	16	11	7	7.5	7	7	71.3	48.0	48.0	7	14	60.0	69.0	7	14	42.0	45.0	7	6.5	6	6	61.0	178	190	7	6.5	54.0	63.0	5	12	6	8	0
32 FT	25	28	17	11	7	7	7	7.5	71.6	49.0	49.0	7	14	60.0	68.0	7	14	42.0	45.0	7	6.5	6	6.5	61.1	180	192	7	6	54.0	64.0	5	12	6	7.5	0
34 FT	26	29	17	11	7	6.5	7	6.5	71.4	50.0	50.0	7	13	60.0	68.0	7	13	42.0	44.0	7	6.5	6	6.5	61.0	181	193	8	7.5	60.0	70.0	5	12	6	7.5	0
36 FT	27	30	18	11	7	6.5	7	7	72.0	51.0	51.0	7	13	60.0	68.0	7	13	41.0	43.0	7	6	6	6.5	61.3	182	194	8	7.5	60.0	70.0	5	12	6	7	0
38 FT	28	31	19	11	7	6.5	7	7.5	72.5	52.0	52.0	7	12	59.0	67.0	7	12	41.0	43.0	7	6	6	6.5	61.5	183	195	8	7	60.0	70.0	5	12	6	6.5	0
40 FT	29	32	19	11	7	6	7	6.5	72.6	53.0	53.0	7	12	59.0	67.0	7	12	40.0	42.0	7	6	6	6	61.5	184	196	8	7	60.0	70.0	5	12	6	6.5	0
42 FT	30	33	20	11	7	6	7	7	73.3	54.0	54.0	7	12	59.0	66.0	7	12	39.0	41.0	7	6	6	6	61.9	185	197	8	7	60.0	70.0	5	12	6	6.5	0
44 FT	31	34	20	11	8	7.5	7	7	71.6	55.0	55.0	8	15	67.0	73.0	8	15	47.0	48.0	7	6	6	6	60.1	186	198	8	7	60.0	70.0	5	12	6	6.5	0
46 FT	32	35	20	11	8	7.5	7	6.5	71.6	56.0	56.0	8	15	67.0	73.0	8	15	46.0	48.0	8	7.5	6	6	60.3	187	199	8	7	60.0	70.0	5	12	6	6.5	0
48 FT	32	36	21	11	8	7	7	7	72.4	56.0	56.0	8	14	67.0	73.0	8	14	47.0	48.0	8	7.5	6	6	60.5	188	200	8	6.5	60.0	70.0	5	12	6	6	0
50 FT	33	36	22	11	8	7	7	7	73.1	57.0	63.0	8	14	66.0	72.0	8	14	46.0	47.0	8	6.5	7	7.5	63.8	188	200	8	6.5	60.0	70.0	5	12	6	6	0

SPAN (S) = 13 FT HEIGHT (HT) = 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=15'	J3 K2 HT=16'	H1 BARS SIZE	H1 SPA.	H1 C5	H1 Q8	H2 BARS SIZE	H2 SPA.	H2 C6	H2 Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=15'	J4 K3 HT=16'	H3 BARS SIZE	H3 SPA.	H3 C7	H3 Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	14	11	12	13	5	6	5	6	69.0	34.0	34.0	5	12	128.5	95.5	5	12	35.0	37.0	5	6.5	6	6.5	103.3	187	199	6	7	60.0	61.0	5	10.5	5	7	12
2 FT	15	11	12	13	6	8	6	8	72.0	35.0	39.0	6	16	135.5	102.5	6	16	41.0	44.0	5	6.5	6	6	95.4	187	199	6	6.5	58.0	59.0	5	12	5	7	12
4 FT	11	11	12	13	6	8	6	7	72.0	35.0	35.0	6	15	130.5	82.0	6	15	39.0	39.0	5	6.5	7	6	92.5	187	199	6	6	57.0	59.0	5	12	5	6.5	12
6 FT	11	12	12	13	5	6	6	6.5	90.4	35.0	35.0	6	14	65.0	66.0	6	14	37.0	37.0	5	6	7	6	88.9	188	200	6	6	56.0	59.0	5	12	5	6.5	12
8 FT	11	13	13	13	5	6	6	6.5	78.1	35.0	35.0	6	13	60.0	62.0	6	13	36.0	36.0	5	6	6	6	82.4	189	201	6	6	55.0	59.0	5	12	5	6.5	0
10 FT	12	14	13	13	5	6	6	6.5	76.0	36.0	36.0	6	13	58.0	60.0	6	13	35.0	36.0	6	8	6	6	80.4	190	202	6	6	54.0	59.0	5	12	5	6	0
12 FT	13	15	14	13	5	6	6	6.5	73.3	37.0	37.0	6	12	57.0	59.0	6	12	35.0	36.0	6	7.5	6	6	77.5	191	203	6	6	53.0	59.0	5	12	5	6	0
14 FT	14	16	14	13	6	8	6	6	72.3	38.0	38.0	6	12	55.0	59.0	6	12	35.0	36.0	6	7	6	6	76.3	192	204	7	7	55.0	62.0	5	12	5	6	0
16 FT	15	17	16	13	6	7.5	6	6.5	76.6	39.0	39.0	6	12	60.0	64.0	6	12	41.0	42.0	6	6.5	6	6.5	73.3	193	205	7	7	55.0	62.0	5	12	6	8	0
18 FT	16	19	16	13	6	7	6	6	76.3	40.0	40.0	6	12	59.0	64.0	6	12	40.0	42.0	6	6	6	6	74.1	195	207	6	6	52.0	60.0	5	12	6	8	0
20 FT	18	20	16	13	6	7	6	6	76.8	42.0	42.0	6	12	59.0	64.0	6	12	40.0	42.0	6	6	6	6	73.0	196	208	6	6	52.0	60.0	5	12	6	8	0
22 FT	19	21	17	13	6	6.5	6	6	76.4	43.0	43.0	6	12	58.0	64.0	6	12	40.0	42.0	7	7.5	7	7.5	75.1	197	209	7	7	55.0	63.0	5	12	6	7.5	0
24 FT	20	23	17	13	6	6.5	7	7.5	81.1	44.0	50.0	6	12	58.0	64.0	6	12	40.0	42.0	7	7	7	7	75.4	199	211	7	7	55.0	63.0	5	12	6	7.5	0
26 FT	22	24	18	13	6	6	7	7.5	81.5	46.0	52.0	7	15	62.0	69.0	7	15	44.0	46.0	7	7	7	7.5	74.9	200	212	7	7	55.0	63.0	5	12	6	7	0
28 FT	23	25	18	13	7	7.5	7	6.5	81.3	47.0	53.0	7	15	62.0	69.0	7	15	43.0	46.0	7	6.5	7	6.5	74.6	201	213	7	6.5	55.0	63.0	5	12	6	7	0
30 FT	24	26	19	13	7	7.5	7	7	81.3	48.0	54.0	7	14	61.0	69.0	7	14	43.0	46.0	7	6.5	7	7	74.4	202	214	7	6.5	55.0	63.0	5	12	6	6.5	0
32 FT	25	28	20	13	7	7	7	7	81.4	49.0	55.0	7	14	61.0	68.0	7	14	42.0	45.0	7	6.5	7	7.5	74.6	204	216	7	6	55.0	64.0	5	12	6	6.5	0
34 FT	26	29	21	13	7	7	7	7	81.6	50.0	56.0	7	13	61.0	68.0	7	13	42.0	44.0	7	6.5	7	7.5	74.5	205	217	8	7.5	61.0	70.0	5	12	6	6	0
36 FT	27	30	22	13	7	6.5	7	7	82.0	57.0	57.0	7	13	60.0	68.0	7	13	42.0	44.0	7	6	7	7.5	74.8	206	218	8	7.5	61.0	70.0	5	12	6	6	0
38 FT	28	31	22	13	7	6.5	7	6.5	82.1	58.0	58.0	7	12	60.0	67.0	7	12	41.0	43.0	7	6	7	7	74.8	207	219	8	7	61.0	70.0	5	12	6	6	0
40 FT	29	32	23	13	7	6	7	6.5	82.6	59.0	59.0	7	12	60.0	67.0	7	12	41.0	42.0	7	6	7	7	75.0	208	220	8	7	61.0	70.0	5	12	7	7.5	0
42 FT	30	33	24	13	7	6	7	6.5	83.3	60.0	60.0	7	12	60.0	66.0	7	12	40.0	42.0	7	6	7	7	75.3	209	221	8	7	61.0	70.0	5	12	7	7.5	0
44 FT	31	34	24	13	7	6	7	7	81.8	61.0	61.0	8	15	68.0	74.0	8	15	47.0	49.0	7	6	7	7	73.5	210	222	8	7	61.0	70.0	5	12	7	7.5	0
46 FT	31	35	24	13	8	7.5	7	6	81.6	61.0	61.0	8	15	68.0	74.0	8	15	48.0	49.0	8	7.5	7	7	73.8	211	223	8	7	61.0	70.0	5	12	7	7.5	0
48 FT	32	36	25	13	8	7.5	7	6	82.4	62.0	62.0	8	14	67.0	73.0	8	14	47.0	49.0	8	7.5	7	7	74.1	212	224	8	6.5	61.0	71.0	5	12	7	7.5	0
50 FT	33	37	26	13	8	7	7	6	83.1	63.0	63.0	8	14	67.0	72.0	8	14	47.0	48.0	8	7.5	7	6.5	74.5	213	225	8	6.5	61.0	71.0	5	12	7	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET
HEIGHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

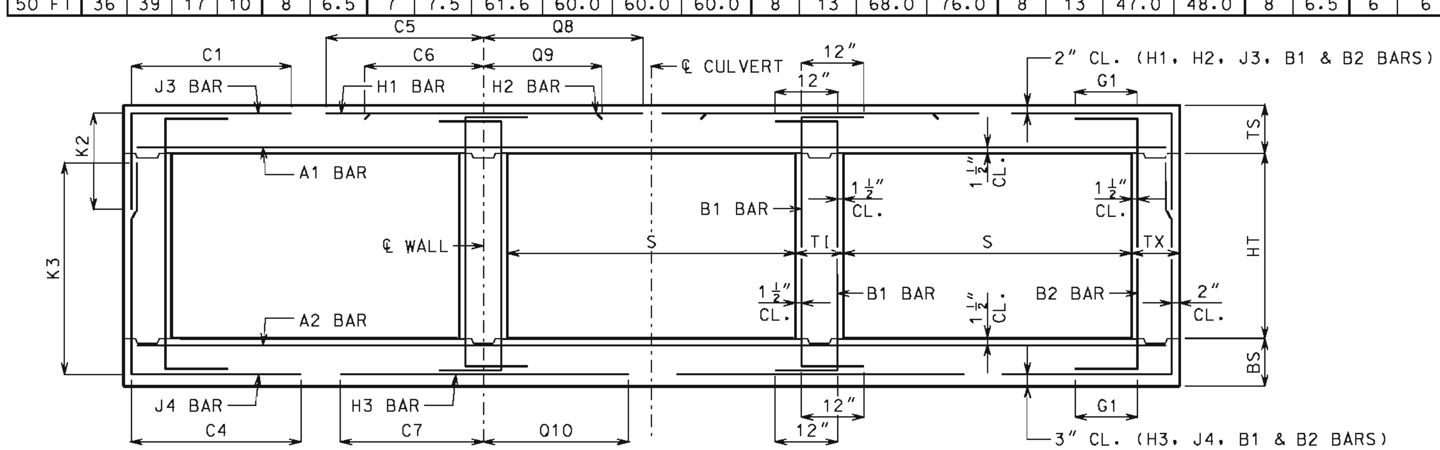
703.87

SPAN (S) = 14 FT HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	HT=9'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8	8	6	8.5	5	8.5	69.3	34.0	34.0	34.0	5	12	133.5	98.5	5	12	39.0	43.0	5	7	6	7	60.9	90	102	114	6	6.5	58.0	63.0	5	12	5	12	12
2 FT	15	10	8	8	6	8	5	8	69.3	35.0	35.0	35.0	6	16	137.5	105.5	6	16	45.0	49.0	5	7	6	6	54.8	90	102	114	7	7	60.0	64.0	5	12	5	12	12
4 FT	12	11	8	8	6	7.5	5	6	52.4	32.0	32.0	32.0	6	14	80.0	103.0	6	14	39.0	42.0	5	6.5	6	7	49.1	91	103	115	6	6	56.0	62.0	5	12	5	12	12
6 FT	12	12	8	8	6	8	6	7.5	48.9	32.0	32.0	32.0	6	13	66.0	81.0	6	13	37.0	39.0	5	6	5	6	42.1	92	104	116	7	7	57.0	65.0	5	12	5	12	12
8 FT	12	13	8	8	6	7.5	6	7	45.5	32.0	32.0	32.0	6	12	61.0	69.0	6	12	35.0	37.0	6	8.5	5	6	39.1	93	105	117	7	7	56.0	66.0	5	12	5	12	0
10 FT	13	14	9	8	6	7	5	6	41.3	33.0	33.0	33.0	7	15	61.0	69.0	7	15	38.0	40.0	6	8	5	7	38.4	94	106	118	7	6.5	55.0	65.0	5	12	5	12	0
12 FT	15	16	9	8	6	7.5	5	6.5	43.5	35.0	35.0	35.0	6	12	62.0	71.0	6	12	40.0	43.0	6	7	5	8	36.8	96	108	120	6	6	52.0	63.0	5	12	5	12	0
14 FT	16	17	9	8	6	7	5	6	41.9	36.0	36.0	36.0	6	12	61.0	70.0	6	12	40.0	43.0	6	7	5	7.5	35.8	97	109	121	7	7	54.0	66.0	5	12	5	12	0
16 FT	17	18	9	8	6	7	5	6	40.8	37.0	37.0	37.0	7	15	65.0	75.0	7	15	44.0	48.0	6	6.5	5	7	34.9	98	110	122	7	7	54.0	66.0	5	12	5	12	0
18 FT	18	20	9	8	6	6.5	6	8	44.0	38.0	38.0	38.0	7	15	64.0	75.0	7	15	44.0	47.0	6	6	5	7	34.0	100	112	124	7	7	54.0	66.0	5	12	5	10	0
20 FT	20	21	9	8	6	6.5	5	6	38.9	40.0	40.0	40.0	7	15	63.0	75.0	7	15	44.0	48.0	7	8	5	6.5	33.9	101	113	125	7	7	54.0	66.0	5	12	5	9	0
22 FT	21	22	9	8	6	6	6	8	42.4	41.0	41.0	41.0	7	14	63.0	74.0	7	14	44.0	47.0	7	7	5	6	33.5	102	114	126	7	6.5	54.0	66.0	5	12	5	8.5	0
24 FT	23	24	9	8	7	7.5	6	7	42.0	47.0	47.0	47.0	7	15	62.0	74.0	7	15	44.0	47.0	7	7	6	7	36.4	104	116	128	7	7	54.0	66.0	5	12	5	8.5	0
26 FT	24	25	9	8	7	7.5	6	7	41.6	48.0	48.0	48.0	7	14	62.0	74.0	7	14	43.0	47.0	7	6.5	6	7	36.1	105	117	129	7	6.5	54.0	66.0	5	12	5	8.5	0
28 FT	25	26	9	8	7	7	6	6	41.4	49.0	49.0	49.0	7	14	61.0	73.0	7	14	43.0	47.0	7	6	6	6.5	35.9	106	118	130	7	6	54.0	66.0	5	12	5	7.5	0
30 FT	27	28	10	8	7	6.5	6	7	42.3	51.0	51.0	51.0	7	13	61.0	73.0	7	13	42.0	45.0	7	6	6	7	36.5	108	120	132	7	6	54.0	67.0	5	12	5	8	0
32 FT	28	29	10	8	7	6.5	6	6.5	42.0	52.0	52.0	52.0	7	12	61.0	73.0	7	12	41.0	44.0	7	6	6	6.5	36.4	109	121	133	8	7.5	60.0	73.0	5	12	5	7.5	0
34 FT	29	30	10	8	7	6	6	6	41.9	53.0	53.0	53.0	7	12	61.0	72.0	7	12	41.0	44.0	8	7	6	6.5	36.4	110	122	134	8	7	60.0	73.0	5	12	5	7	0
36 FT	30	32	11	8	7	6	6	7	42.9	54.0	54.0	54.0	7	12	61.0	72.0	7	12	41.0	43.0	7	6	6	6.5	36.9	112	124	136	8	7	60.0	73.0	5	12	5	7.5	0
38 FT	31	33	11	8	8	7.5	6	6.5	42.9	55.0	55.0	55.0	8	15	68.0	79.0	8	15	48.0	51.0	8	7.5	6	6.5	37.0	113	125	137	8	6.5	60.0	73.0	5	12	5	7	0
40 FT	32	34	11	8	8	7.5	6	6.5	42.9	56.0	56.0	56.0	8	14	68.0	79.0	8	14	48.0	50.0	8	7.5	6	6	37.1	114	126	138	8	6.5	60.0	73.0	5	12	5	6.5	0
42 FT	33	35	12	8	8	7	6	7	43.8	57.0	57.0	57.0	8	14	68.0	78.0	8	14	47.0	49.0	8	7	6	6.5	37.6	115	127	139	8	6.5	60.0	73.0	5	12	5	7	0
44 FT	34	36	12	8	8	7	6	6.5	43.8	58.0	58.0	58.0	8	14	68.0	78.0	8	14	47.0	48.0	8	7	6	6.5	37.8	116	128	140	8	6	60.0	73.0	5	12	5	6.5	0
46 FT	35	37	12	8	8	6.5	6	6.5	42.9	59.0	59.0	59.0	8	13	67.0	77.0	8	13	46.0	47.0	8	7	6	6.5	37.0	117	129	141	8	6	60.0	73.0	5	12	5	6.5	0
48 FT	36	38	12	8	8	6.5	6	6.5	43.0	60.0	60.0	60.0	8	13	67.0	76.0	8	13	46.0	47.0	8	7	6	6	37.1	118	130	142	8	6	60.0	73.0	5	12	5	6	0
50 FT	37	39	12	8	8	6.5	6	6	43.1	61.0	61.0	61.0	8	13	67.0	75.0	8	13	46.0	47.0	8	7	6	6	37.4	119	131	143	8	6	60.0	73.0	5	12	5	6	0

SPAN (S) = 14 FT HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS																BOTTOM SLAB BARS												WALL BARS				
					A1 BARS		J3 BARS						H1 BARS				H2 BARS				A2 BARS		J4 BARS						H3 BARS				B1 BARS		B2 BARS		
										K2																K3											
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	HT=11'	HT=12'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	9	10	6	8.5	5	7	70.3	34.0	34.0	34.0	5	12	134.5	99.5	5	12	39.0	43.0	5	7	6	6	80.1	126	138	150	6	6	60.0	63.0	5	10.5	5	9	12
2 FT	15	11	9	10	6	8	5	7	70.3	35.0	35.0	35.0	6	16	138.5	106.5	6	16	45.0	48.0	5	6.5	6	6	73.6	127	139	151	6	6.5	59.0	62.0	5	12	5	9	12
4 FT	11	11	11	10	6	7	5	6	66.6	31.0	31.0	31.0	6	13	81.0	94.0	6	13	39.0	40.0	5	6.5	5	6	61.8	127	139	151	7	7	61.0	65.0	5	9.5	5	10	12
6 FT	12	12	11	10	6	8	5	6.5	60.6	32.0	32.0	32.0	6	13	67.0	75.0	6	13	37.0	39.0	5	6	5	6	57.3	128	140	152	7	7	59.0	65.0	5	12	5	10.5	12
8 FT	12	13	11	10	6	8	5	6	56.3	32.0	32.0	32.0	6	12	62.0	67.0	6	12	36.0	37.0	5	6	6	7	57.4	129	141	153	7	6.5	57.0	65.0	5	12	5	10	0
10 FT	13	14	11	10	6	7.5	6	8	56.3	33.0	33.0	37.0	6	12	59.0	65.0	6	12	35.0	37.0	6	7.5	6	7	55.0	130	142	154	7	6.5	57.0	65.0	5	12	5	9.5	0
12 FT	14	16	12	10	6	7.5	6	8	54.9	34.0	34.0	34.0	7	15	61.0	67.0	7	15	38.0	39.0	6	7	5	6	50.9	132	144	156	7	7	56.0	66.0	5	12	5	9.5	0
14 FT	16	17	12	10	6	7.5	6	8	59.3	36.0	36.0	36.0	6	12	62.0	70.0	6	12	41.0	43.0	6	7	5	6	49.9	133	145	157	7	7	56.0	66.0	5	12	5	9	0
16 FT	17	18	12	10	6	7	6	7.5	58.1	37.0	37.0	41.0	7	16	66.0	74.0	7	16	45.0	48.0	6	6.5	6	8	52.0	134	146	158	7	7	56.0	66.0	5	12	5	8	0
18 FT	18	20	12	10	6	7	6	7	57.5	38.0	38.0	42.0	7	15	65.0	74.0	7	15	45.0	48.0	6	6	6	8	51.3	136	148	160	7	7	55.0	66.0	5	12	5	7.5	0
20 FT	19	21	12	10	6	6	6	6.5	56.6	39.0	39.0	43.0	7	14	64.0	74.0	7	14	45.0	48.0	7	8	6	7.5	50.6	137	149	161	7	7	55.0	66.0	5	12	5	7	0
22 FT	21	22	12	10	6	6	6	6.5	55.9	41.0	41.0	45.0	7	15	64.0	74.0	7	15	45.0	48.0	7	7	6	6.5	50.3	138	150	162	7	7	55.0	66.0	5	12	5	7	0
24 FT	22	24	13	10	6	6	6	6.5	56.4	42.0	42.0	46.0	7	14	63.0	73.0	7	14	44.0	48.0	7	7	6	7.5	50.4	140	152	164	7	7	55.0	67.0	5	12	5	6.5	0
26 FT	23	25	14	10	7	7	6	6.5	56.6	43.0	43.0	47.0	7	14	63.0	73.0	7	14	44.0	48.0	7	6.5	6	8	50.4	141	153	165	7	6.5	55.0	67.0	5	12	5	6.5	0
28 FT	25	27	14	10	7	7	6	6.5	56.4	45.0	45.0	49.0	7	14	62.0	73.0	7	14	43.0	47.0	7	6.5	6	8	50.3	143	155	167	7	6	55.0	67.0	5	12	5	6	0
30 FT	26	28	14	10	7	7	6	6.5	56.0	46.0	46.0	50.0	7	13	62.0	73.0	7	13	43.0	47.0	7	6	6	7.5	50.0	144	156	168	7	6	55.0	67.0	5	12	5	6	0
32 FT	27	29	14	10	7	6	6	6	55.6	51.0	51.0	51.0	7	12	62.0	72.0	7	12	43.0	46.0	7	6	6	7.5	49.8	145	157	169	8	7.5	61.0	73.0	5	12	5	6	0
34 FT	29	31	15	10	7	6	6	6.5	56.3	53.0	53.0	53.0	7	12	61.0	72.0	7	12	41.0	44.0	7	6	6	7.5	50.3	147	159	171	8	7	61.0	73.0	5	12	6	8	0
36 FT	30	32	15	10	7	6	6	6	56.1	54.0	54.0	54.0	7	12	61.0	71.0	7	12	41.0	43.0	8	7.5	6	7.5	50.3	148	160	172	8	7	61.0	73.0	5	12	6	8	0
38 FT	31	33	16	10	8	7.5	6	6	56.9	55.0	55.0	55.0	8	15	69.0	79.0	8	15	49.0	51.0	8	7.5	6	7	50.6	149	161	173	8	6.5	61.0	73.0	5	12	6	8	0
40 FT	32	34	16	10	8	7.5	6	6	56.9	56.0	56.0	56.0	8	14	69.0	78.0	8	14	48.0	50.0	8	7	6	7	50.6	150	162	174	8	6.5	61.0	73.0	5	12	6	8	0
42 FT	33	35	16	10	8	7	6	6	56.9	57.0	57.0	57.0	8	14	69.0	78.0	8	14	48.0	49.0	8	7	6	6.5	50.8	151	163	175	8	6.5	61.0	73.0	5	12	6	8	0
44 FT	34	36	17	10	8	7	6	6	57.6	58.0	58.0	58.0	8	14	68.0	77.0	8	14	47.0	49.0	8	7	6	6.5	51.3	152	164	176	8	6	61.0	73.0	5	12	6	7.5	0
46 FT	35	37	17	10	8	6.5	6	6	56.5	59.0	59.0	59.0	8	13	68.0	77.0	8	13	47.0	48.0	8	7	6	6.5	50.1	153	165	177	8	6	61.0	73.0	5	12	6	7.5	0
48 FT	35	38	17	10	8	6.5	6	6	56.5	59.0	59.0	59.0	8	13	68.0	77.0	8	13	47.0	49.0	8	7	6	6	50.1	154	166	178	8	6	61.0	73.0	5	12	6	7.5	0
50 FT	36	39	17	10	8	6.5	7	7.5	61.6	60.0	60.0	60.0	8	13	68.0	76.0	8	13	47.0	48.0	8	6.5	6	6	50.3	155	167	179	8	6	61.0	73.0	5	12	6	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET
HEIGHT (HT): 7 THRU 12 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

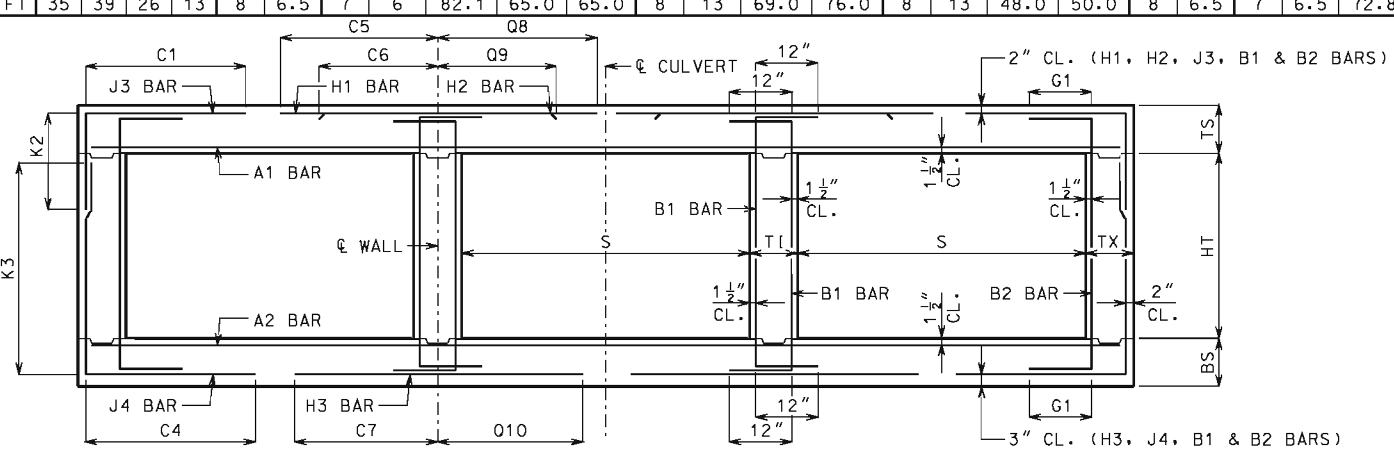
703.87

SPAN (S) = 14 FT HEIGHT (HT) = 13 FT OR 14 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=13′	HT=14′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=13′	HT=14′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	11	11	5	6	5	6.5	71.8	34.0	34.0	5	12	135.5	100.5	5	12	39.0	42.0	5	7	6	6	87.3	162	174	6	6	60.0	62.0	5	12	5	7.5	12
2 FT	15	11	11	11	6	8	5	6.5	71.8	35.0	35.0	6	16	139.5	107.5	6	16	45.0	48.0	5	6.5	6	6.5	83.4	163	175	6	6	59.0	62.0	5	12	5	7.5	12
4 FT	11	11	11	11	6	6.5	6	7	88.0	31.0	35.0	6	13	86.0	92.0	6	13	40.0	40.0	5	6.5	6	6	76.4	163	175	7	6.5	62.0	66.0	5	10.5	5	7.5	12
6 FT	12	12	11	11	6	8	6	7.5	74.5	32.0	36.0	6	13	68.0	75.0	6	13	38.0	39.0	5	6	6	6	71.3	164	176	7	6.5	60.0	65.0	5	12	5	7.5	12
8 FT	12	13	11	11	6	8	6	7	68.5	36.0	36.0	6	12	63.0	67.0	6	12	36.0	37.0	6	8	6	6.5	68.8	165	177	7	6.5	58.0	65.0	5	12	5	7.5	0
10 FT	13	15	11	11	6	7.5	6	6.5	66.0	37.0	37.0	6	12	60.0	65.0	6	12	36.0	37.0	6	7.5	6	6	67.4	167	179	6	6	55.0	63.0	5	12	5	7.5	0
12 FT	14	16	12	11	6	7.5	6	6.5	64.0	38.0	38.0	7	16	61.0	67.0	7	16	38.0	40.0	6	7	6	7	65.3	168	180	7	7	57.0	66.0	5	12	5	7	0
14 FT	16	17	13	11	6	7.5	6	7	69.1	40.0	40.0	6	12	63.0	69.0	6	12	41.0	43.0	6	7	6	6.5	63.6	169	181	7	7	57.0	65.0	5	12	5	6.5	0
16 FT	17	18	13	11	6	7	6	6.5	67.8	41.0	41.0	6	12	62.0	69.0	6	12	41.0	43.0	6	6	6	6.5	62.4	170	182	7	6.5	56.0	66.0	5	12	5	6.5	0
18 FT	18	20	13	11	6	7	6	6	66.6	42.0	42.0	7	15	66.0	74.0	7	15	46.0	48.0	6	6	6	6	61.9	172	184	7	7	56.0	66.0	5	12	5	6.5	0
20 FT	19	21	14	11	6	6.5	6	6	66.3	43.0	43.0	7	15	65.0	73.0	7	15	45.0	48.0	7	8	6	6.5	61.0	173	185	7	7	56.0	66.0	5	12	5	6	0
22 FT	21	23	14	11	6	6	7	8	70.6	45.0	45.0	7	15	64.0	73.0	7	15	45.0	48.0	7	7	6	6	60.8	175	187	7	7	56.0	66.0	5	12	5	6	0
24 FT	22	24	15	11	6	6	7	8	70.5	46.0	46.0	7	15	64.0	73.0	7	15	45.0	48.0	7	7	6	6.5	60.3	176	188	7	7	56.0	66.0	5	12	6	8	0
26 FT	23	25	15	11	7	7.5	7	7.5	69.9	47.0	47.0	7	14	64.0	73.0	7	14	45.0	48.0	7	6.5	6	6	59.6	177	189	7	6.5	56.0	67.0	5	12	6	8	0
28 FT	25	27	16	11	7	7	7	7.5	70.3	49.0	49.0	7	14	63.0	72.0	7	14	44.0	47.0	7	6.5	6	6.5	59.9	179	191	7	6	56.0	67.0	5	12	6	8	0
30 FT	26	28	16	11	7	7	7	7	69.8	50.0	50.0	7	13	62.0	72.0	7	13	43.0	46.0	7	6	6	6	59.4	180	192	7	6	56.0	67.0	5	12	6	8	0
32 FT	27	30	17	11	7	6.5	7	7.5	70.1	51.0	51.0	7	13	62.0	72.0	7	13	43.0	46.0	7	6	6	6.5	59.5	182	194	8	7.5	62.0	73.0	5	12	6	7.5	0
34 FT	28	31	17	11	7	6	7	6.5	69.8	52.0	52.0	7	12	62.0	71.0	7	12	43.0	45.0	7	6	6	6.5	59.1	183	195	8	7	62.0	73.0	5	12	6	7.5	0
36 FT	29	32	18	11	7	6	7	7	70.3	53.0	53.0	7	12	62.0	71.0	7	12	42.0	45.0	8	7.5	6	6.5	59.3	184	196	8	7	62.0	73.0	5	12	6	7	0
38 FT	31	33	19	11	8	7.5	7	7.5	71.0	55.0	55.0	8	15	70.0	78.0	8	15	48.0	50.0	8	7.5	6	6.5	59.6	185	197	8	6.5	62.0	73.0	5	12	6	6.5	0
40 FT	31	34	19	11	8	7	7	6.5	70.9	55.0	55.0	8	14	70.0	78.0	8	14	49.0	51.0	8	7	6	6.5	59.5	186	198	8	6.5	62.0	73.0	5	12	6	6.5	0
42 FT	32	35	20	11	8	7	7	7	71.5	56.0	56.0	8	14	69.0	77.0	8	14	49.0	51.0	8	7	6	6	59.8	187	199	8	6.5	62.0	74.0	5	12	6	6.5	0
44 FT	33	36	20	11	8	7	7	6.5	71.5	57.0	57.0	8	14	69.0	77.0	8	14	48.0	50.0	8	7	6	6	59.9	188	200	8	6	62.0	74.0	5	12	6	6.5	0
46 FT	34	37	20	11	8	7	7	7	70.1	58.0	58.0	8	14	69.0	76.0	8	14	47.0	49.0	8	7	6	6	58.5	189	201	8	6	62.0	74.0	5	12	6	6.5	0
48 FT	35	38	21	11	8	6.5	7	7	70.9	59.0	59.0	8	13	68.0	75.0	8	13	47.0	48.0	8	7	6	6	59.0	190	202	8	6	62.0	74.0	5	12	6	6	0
50 FT	36	39	21	11	8	6.5	7	6.5	70.9	60.0	60.0	8	13	68.0	75.0	8	13	47.0	48.0	8	6.5	6	6	59.1	191	203	8	6	62.0	74.0	5	12	6	6	0

SPAN (S) = 14 FT HEIGHT (HT) = 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS				TOP SLAB BARS															BOTTOM SLAB BARS											WALL BARS				
					A1 BARS		J3 BARS					H1 BARS				H2 BARS				A2 BARS		J4 BARS					H3 BARS				B1 BARS		B2 BARS		
										K2															K3										
	TS	BS	TX	TI	SIZE	SPA.	SIZE	SPA.	C1	HT=15′	HT=16′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=15′	HT=16′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	11	12	13	5	6	5	6	72.6	34.0	34.0	5	12	136.5	101.5	5	12	38.0	41.0	5	6.5	6	6	103.4	187	199	6	6.5	62.0	63.0	5	11.5	5	7	12
2 FT	15	12	12	13	6	8	6	8	75.6	35.0	39.0	6	16	143.5	108.5	6	16	45.0	48.0	5	6	6	6.5	99.0	188	200	6	6.5	61.0	63.0	5	12	5	7	12
4 FT	12	12	12	13	6	8	6	7.5	75.6	36.0	36.0	6	15	138.5	89.0	6	15	40.0	41.0	5	6	6	6	90.1	188	200	6	6	60.0	63.0	5	12	5	7	12
6 FT	12	13	12	13	6	8	6	7	89.3	36.0	36.0	6	14	69.0	71.0	6	14	38.0	39.0	5	6	6	6	86.4	189	201	6	6	58.0	63.0	5	12	5	6.5	12
8 FT	12	14	13	13	6	8	6	6.5	78.1	36.0	36.0	6	12	64.0	66.0	6	12	37.0	37.0	6	8	6	6	81.9	190	202	6	6	57.0	62.0	5	12	5	6.5	0
10 FT	13	15	13	13	6	8	6	6.5	75.1	37.0	37.0	6	12	61.0	64.0	6	12	37.0	37.0	6	7.5	6	6.5	79.1	191	203	7	7	59.0	65.0	5	12	5	6.5	0
12 FT	14	16	14	13	6	7.5	6	6.5	72.9	38.0	38.0	6	12	59.0	63.0	6	12	36.0	37.0	6	7	6	6.5	75.6	192	204	7	7	58.0	65.0	5	12	5	6	0
14 FT	15	17	15	13	6	7.5	6	6.5	77.6	39.0	39.0	7	16	69.0	73.0	7	16	47.0	48.0	6	7	6	6.5	73.6	193	205	7	7	58.0	65.0	5	12	6	8	0
16 FT	17	19	15	13	6	7.5	6	6	77.6	41.0	41.0	6	12	63.0	68.0	6	12	42.0	44.0	6	6	6	6	73.5	195	207	6	6	55.0	63.0	5	12	6	8	0
18 FT	18	20	15	13	6	7	7	7.5	81.8	42.0	48.0	7	16	67.0	73.0	7	16	46.0	49.0	6	6	7	7	75.6	196	208	7	7	57.0	66.0	5	12	6	8	0
20 FT	19	21	16	13	6	6.5	7	7.5	81.1	43.0	49.0	7	15	66.0	73.0	7	15	46.0	49.0	7	7.5	7	7.5	74.8	197	209	7	7	57.0	66.0	5	12	6	8	0
22 FT	20	23	17	13	6	6	7	7.5	80.8	44.0	50.0	7	15	65.0	73.0	7	15	46.0	49.0	7	7	7	7.5	74.6	199	211	7	7	57.0	66.0	5	12	6	7.5	0
24 FT	22	24	17	13	6	6	7	7	80.8	46.0	52.0	7	15	65.0	73.0	7	15	46.0	49.0	7	7	7	7	74.1	200	212	7	7	57.0	66.0	5	12	6	7.5	0
26 FT	23	25	18	13	7	7.5	7	7	80.5	47.0	53.0	7	15	65.0	72.0	7	15	46.0	49.0	7	6	7	7.5	73.6	201	213	7	6	57.0	67.0	5	12	6	7	0
28 FT	24	27	19	13	7	7.5	7	7	80.5	48.0	54.0	7	14	64.0	72.0	7	14	45.0	48.0	7	6.5	7	8	73.8	203	215	7	6	57.0	67.0	5	12	6	6.5	0
30 FT	25	28	20	13	7	6.5	7	7	80.6	49.0	55.0	7	13	64.0	72.0	7	13	45.0	48.0	7	6	7	8	73.5	204	216	7	6	57.0	67.0	5	12	6	6.5	0
32 FT	27	30	21	13	7	6.5	7	7	81.1	51.0	51.0	7	13	63.0	71.0	7	13	43.0	46.0	7	6	6	6	70.8	206	218	8	7.5	63.0	73.0	5	12	6	6	0
34 FT	28	31	21	13	7	6.5	7	7	80.9	52.0	52.0	7	12	63.0	71.0	7	12	43.0	46.0	7	6	6	6	70.4	207	219	8	7	63.0	73.0	5	12	6	6	0
36 FT	29	32	22	13	7	6	7	7	81.1	59.0	59.0	7	12	63.0	71.0	7	12	43.0	45.0	8	7.5	7	7.5	73.3	208	220	8	7	63.0	73.0	5	12	6	6	0
38 FT	30	33	22	13	7	6	7	6	81.1	60.0	60.0	7	12	63.0	71.0	7	12	42.0	45.0	8	7.5	7	7	73.4	209	221	8	6.5	63.0	74.0	5	12	6	6	0
40 FT	31	34	23	13	8	7.5	7	6.5	81.8	61.0	61.0	8	15	70.0	78.0	8	15	50.0	52.0	8	7	7	7.5	73.5	210	222	8	6.5	63.0	74.0	5	12	7	7.5	0
42 FT	32	35	24	13	8	7.5	7	6.5	82.3	62.0	62.0	8	14	70.0	78.0	8	14	49.0	51.0	8	6.5	7	7	73.8	211	223	8	6.5	63.0	74.0	5	12	7	7.5	0
44 FT	33	36	24	13	8	7	7	6	82.4	63.0	63.0	8	14	70.0	77.0	8	14	49.0	50.0	8	6.5	7	7	73.9	212	224	8	6	63.0	74.0	5	12	7	7.5	0
46 FT	34	38	26	13	8	7	7	6	83.8	64.0	64.0	8	14	70.0	76.0	8	14	48.0	49.0	8	7	7	7	74.6	214	226	8	6.5	63.0	74.0	5	12	7	7.5	0
48 FT	35	38	26	13	8	6.5	7	6.5	82.1	65.0	65.0	8	13	69.0	76.0	8	13	48.0	49.0	8	6.5	7	7	72.6	214	226	8	6	63.0	74.0	5	12	7	8	0
50 FT	35	39	26	13	8	6.5	7	6	82.1	65.0	65.0	8	13	69.0	76.0	8	13	48.0	50.0	8	6.5	7	6.5	72.8	215	227	8	6	63.0	74.0	5	12	7	7.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

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SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT

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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET
HEIGHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

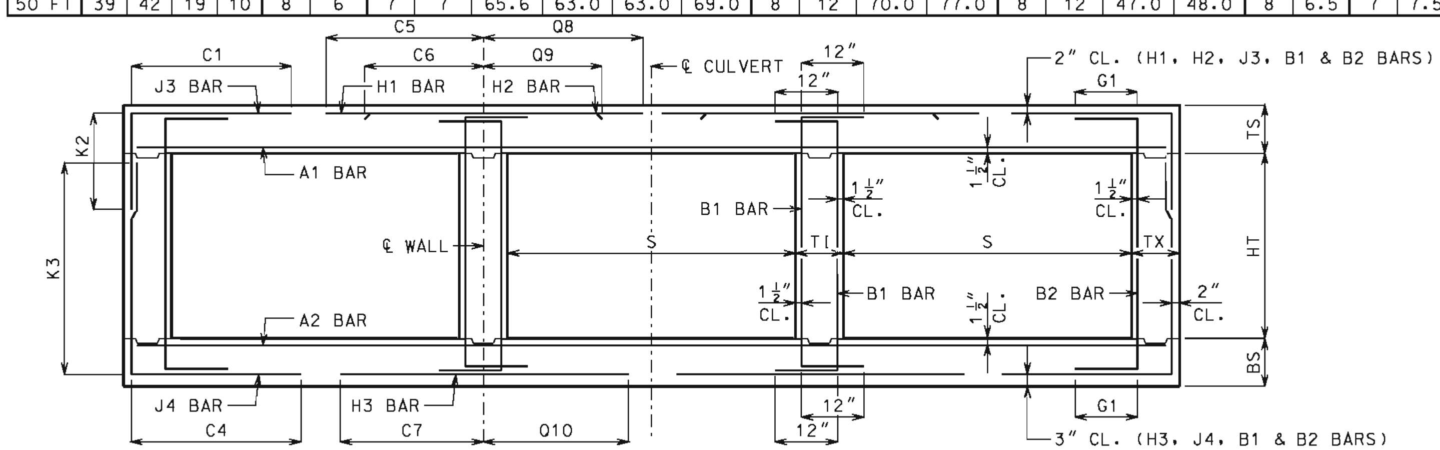
703.87

SPAN (S) = 15 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=8'	K2 HT=9'	K2 HT=10'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=8'	K3 HT=9'	K3 HT=10'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	15	10	8	8	6	8	5	8	72.9	35.0	35.0	35.0	6	16	146.5	111.5	6	16	48.0	53.0	5	7	7	6.5	69.0	102	114	126	6	6	61.0	65.0	5	12	5	12	12
2 FT	15	11	9	8	6	7.5	5	8	73.5	35.0	35.0	35.0	6	16	146.5	111.5	6	16	49.0	53.0	5	6.5	6	7	60.4	103	115	127	6	6	59.0	65.0	5	12	5	12	12
4 FT	12	11	9	8	6	6.5	6	7	60.8	32.0	36.0	36.0	6	12	84.0	109.0	6	12	40.0	43.0	5	6.5	6	6.5	53.9	103	115	127	7	6.5	61.0	68.0	5	11.5	5	12	12
6 FT	12	12	9	8	6	7	6	6.5	53.5	32.0	32.0	36.0	7	16	72.0	86.0	7	16	41.0	43.0	6	8	6	7	49.9	104	116	128	7	6.5	60.0	68.0	5	12	5	12	12
8 FT	13	14	9	8	6	7	6	7	49.5	33.0	33.0	33.0	7	15	67.0	77.0	7	15	39.0	42.0	6	8	5	6.5	43.4	106	118	130	7	7	58.0	69.0	5	12	5	12	0
10 FT	14	15	9	8	6	7	6	7.5	46.6	34.0	34.0	34.0	7	15	64.0	73.0	7	15	39.0	41.0	6	7.5	5	6.5	41.5	107	119	131	7	6.5	58.0	69.0	5	12	5	12	0
12 FT	15	16	9	8	6	6	6	7.5	50.4	35.0	35.0	35.0	7	14	70.0	80.0	7	14	46.0	49.0	6	6	5	6	40.0	108	120	132	7	6.5	57.0	69.0	5	12	5	11.5	0
14 FT	17	18	9	8	6	6.5	6	7.5	48.4	37.0	37.0	37.0	7	15	68.0	79.0	7	15	46.0	49.0	6	6.5	5	6	38.9	110	122	134	7	6.5	57.0	69.0	5	12	5	9.5	0
16 FT	18	19	9	8	6	6.5	6	7.5	47.1	38.0	38.0	42.0	7	14	67.0	79.0	7	14	45.0	49.0	6	6	6	8.5	41.0	111	123	135	7	6.5	57.0	69.0	5	12	5	8.5	0
18 FT	19	21	10	8	6	6	6	7.5	47.8	39.0	39.0	39.0	7	14	66.0	78.0	7	14	45.0	49.0	7	8	5	6.5	37.9	113	125	137	7	6.5	57.0	70.0	5	12	5	9.5	0
20 FT	21	22	10	8	6	6	6	7.5	46.6	41.0	41.0	41.0	7	14	66.0	78.0	7	14	45.0	49.0	7	7.5	5	6	37.5	114	126	138	7	6.5	56.0	70.0	5	12	5	8	0
22 FT	23	24	10	8	7	7.5	6	7.5	46.0	43.0	43.0	43.0	7	14	65.0	77.0	7	14	45.0	49.0	7	7	5	6	37.3	116	128	140	7	6.5	56.0	70.0	5	12	5	8	0
24 FT	24	25	11	8	7	7.5	6	8	46.5	44.0	44.0	44.0	7	13	64.0	77.0	7	13	45.0	49.0	7	6.5	5	6.5	37.5	117	129	141	7	6.5	56.0	70.0	5	12	5	7.5	0
26 FT	25	27	11	8	7	7	6	7.5	46.4	45.0	45.0	45.0	7	13	64.0	77.0	7	13	44.0	48.0	7	6.5	5	6	37.1	119	131	143	7	6	56.0	70.0	5	12	5	7.5	0
28 FT	27	28	11	8	7	6.5	6	7.5	45.8	47.0	47.0	47.0	7	13	64.0	76.0	7	13	44.0	48.0	7	6	5	6	37.1	120	132	144	7	6	56.0	70.0	5	12	5	7.5	0
30 FT	28	30	12	8	7	6.5	6	7.5	46.8	52.0	52.0	52.0	7	12	63.0	76.0	7	12	43.0	47.0	8	7.5	6	8	40.4	122	134	146	8	7.5	62.0	76.0	5	12	5	7	0
32 FT	30	31	12	8	7	6	6	7.5	46.3	54.0	54.0	54.0	7	12	63.0	75.0	7	12	42.0	45.0	8	7.5	6	7.5	40.5	123	135	147	8	7	62.0	76.0	5	12	5	7	0
34 FT	31	32	12	8	8	7.5	6	7.5	46.1	55.0	55.0	55.0	8	15	71.0	83.0	8	15	50.0	53.0	8	6.5	6	7.5	40.3	124	136	148	8	6.5	62.0	76.0	5	12	5	7	0
36 FT	32	34	12	8	8	7.5	6	7	46.1	56.0	56.0	56.0	8	14	71.0	82.0	8	14	49.0	52.0	8	7	6	7	40.3	126	138	150	8	6.5	62.0	76.0	5	12	5	7	0
38 FT	33	35	13	8	8	7	6	7	47.0	57.0	57.0	57.0	8	14	71.0	82.0	8	14	49.0	51.0	8	7	6	6.5	40.8	127	139	151	8	6.5	62.0	76.0	5	12	5	6.5	0
40 FT	34	36	13	8	8	7	6	6.5	46.9	58.0	58.0	58.0	8	14	70.0	81.0	8	14	49.0	51.0	8	6.5	6	6.5	40.8	128	140	152	8	6	62.0	76.0	5	12	5	6.5	0
42 FT	35	37	13	8	8	6.5	6	6.5	46.9	59.0	59.0	59.0	8	13	70.0	81.0	8	13	48.0	50.0	8	6	6	6.5	40.9	129	141	153	8	6	62.0	76.0	5	12	5	6.5	0
44 FT	36	38	13	8	8	6.5	6	6.5	46.9	60.0	60.0	60.0	8	13	70.0	80.0	8	13	48.0	49.0	8	6	6	6	41.0	130	142	154	8	6	62.0	76.0	5	12	5	6	0
46 FT	37	39	13	8	8	6.5	6	6	46.9	61.0	61.0	61.0	8	12	70.0	79.0	8	12	47.0	49.0	8	6	6	6	41.1	131	143	155	8	6	62.0	76.0	5	12	6	8	0
48 FT	38	41	13	8	8	6	6	6	46.1	62.0	62.0	62.0	8	12	69.0	78.0	8	12	46.0	48.0	8	6.5	7	7	43.3	133	145	157	9	7.5	68.0	82.0	5	12	6	8	0
50 FT	39	42	14	8	8	6	6	6	47.1	63.0	63.0	63.0	8	12	69.0	77.0	8	12	46.0	47.0	8	6.5	7	7.5	43.9	134	146	158	9	7	68.0	82.0	5	12	5	6	0

SPAN (S) = 15 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=11'	K2 HT=12'	K2 HT=13'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=11'	K3 HT=12'	K3 HT=13'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	15	11	9	10	6	8	5	6.5	73.9	35.0	35.0	35.0	6	16	147.5	112.5	6	16	48.0	52.0	5	6.5	6	6	89.3	139	151	163	6	6.5	63.0	67.0	5	12	5	8.5	12
2 FT	15	11	10	10	6	7.5	5	6.5	74.5	35.0	35.0	35.0	6	16	147.5	112.5	6	16	49.0	53.0	5	6.5	6	6	77.1	139	151	163	6	6	61.0	65.0	5	12	5	8	12
4 FT	12	12	10	10	6	7	6	7.5	77.5	32.0	36.0	36.0	6	13	89.0	107.0	6	13	41.0	43.0	5	6	6	6.5	71.3	140	152	164	6	6	60.0	67.0	5	10	5	8	12
6 FT	12	12	10	10	6	7	6	7	67.9	32.0	36.0	36.0	7	16	74.0	83.0	7	16	41.0	43.0	6	8	6	6	65.1	140	152	164	7	6	61.0	68.0	5	12	5	8	12
8 FT	13	14	10	10	6	7.5	6	6.5	63.0	33.0	37.0	37.0	7	16	69.0	75.0	7	16	40.0	42.0	6	7.5	6	6	62.3	142	154	166	7	6.5	60.0	69.0	5	12	5	8	0
10 FT	14	15	10	10	6	7	6	6.5	59.4	34.0	38.0	38.0	7	15	66.0	73.0	7	15	40.0	42.0	6	7	7	6.5	62.4	143	155	167	7	6.5	59.0	69.0	5	12	5	8	0
12 FT	15	17	11	10	6	7	6	6.5	63.5	35.0	35.0	39.0	7	14	71.0	79.0	7	14	47.0	49.0	6	7	6	7	57.5	145	157	169	7	7	59.0	69.0	5	12	5	7.5	0
14 FT	17	18	12	10	6	7	6	6.5	62.4	37.0	41.0	41.0	7	15	70.0	78.0	7	15	47.0	49.0	6	6.5	6	7	56.4	146	158	170	7	6.5	58.0	69.0	5	12	5	7	0
16 FT	18	19	12	10	6	6.5	6	6.5	61.1	38.0	42.0	42.0	7	14	68.0	78.0	7	14	46.0	49.0	6	6	6	7	55.4	147	159	171	7	6.5	58.0	69.0	5	12	5	7	0
18 FT	19	21	12	10	6	6	6	6	60.4	39.0	43.0	43.0	7	14	68.0	77.0	7	14	46.0	49.0	7	8	6	6	54.6	149	161	173	7	6.5	58.0	70.0	5	12	5	7	0
20 FT	21	22	13	10	6	6	6	6	60.3	41.0	45.0	45.0	7	14	67.0	77.0	7	14	46.0	49.0	7	7	6	6.5	54.5	150	162	174	7	6.5	58.0	70.0	5	12	5	6.5	0
22 FT	22	24	13	10	6	6	6	6	59.6	42.0	46.0	46.0	7	14	66.0	77.0	7	14	46.0	49.0	7	7	6	6.5	54.0	152	164	176	7	6.5	58.0	70.0	5	12	5	6.5	0
24 FT	24	25	14	10	7	7.5	6	6	59.8	44.0	48.0	48.0	7	14	66.0	77.0	7	14	45.0	49.0	7	6.5	6	7	54.1	153	165	177	7	6.5	58.0	70.0	5	12	5	6	0
26 FT	25	27	14	10	7	7	6	6	59.5	45.0	49.0	49.0	7	13	65.0	76.0	7	13	45.0	49.0	7	6.5	6	7	53.8	155	167	179	7	6	58.0	70.0	5	12	5	6	0
28 FT	26	28	15	10	7	6.5	6	6	59.9	50.0	50.0	50.0	7	13	65.0	76.0	7	13	45.0	49.0	7	6	6	7	53.9	156	168	180	7	6	58.0	70.0	5	12	6	8	0
30 FT	28	30	15	10	7	6.5	7	8	64.5	52.0	52.0	52.0	7	12	64.0	76.0	7	12	44.0	47.0	8	7.5	6	7	53.8	158	170	182	8	7.5	64.0	76.0	5	12	6	8	0
32 FT	29	31	15	10	7	6	7	7	64.3	53.0	53.0	53.0	7	12	64.0	75.0	7	12	44.0	47.0	8	7.5	6	6.5	53.5	159	171	183	8	7	64.0	76.0	5	12	6	8	0
34 FT	31	32	16	10	8	7.5	6	6	59.6	55.0	55.0	55.0	8	15	72.0	83.0	8	15	50.0	53.0	8	6.5	6	7	53.8	160	172	184	8	6.5	64.0	76.0	5	12	6	8	0
36 FT	32	34	16	10	8	7.5	7	7	64.5	56.0	56.0	56.0	8	14	72.0	82.0	8	14	50.0	52.0	8	7	6	7	53.8	162	174	186	8	6.5	63.0	77.0	5	12	6	8	0
38 FT	33	35	17	10	8	7	7	7.5	65.1	57.0	57.0	57.0	8	14	71.0	82.0	8	14	49.0	52.0	8	7	6	6.5	54.0	163	175	187	8	6.5	63.0	77.0	5	12	6	7.5	0
40 FT	34	36	17	10	8	7	7	7	65.1	58.0	58.0	58.0	8	14	71.0	81.0	8	14	49.0	51.0	8	6.5	6	6.5	54.0	164	176	188	8	6	63.0	77.0	5	12	6	7.5	0
42 FT	35	37	18	10	8	6.5	7	7.5	65.9	59.0	59.0	59.0	8	13	71.0	80.0	8	13	49.0	50.0	8	6	6	6.5	54.4	165	177	189	8	6	64.0	77.0	5	12	6	7	0
44 FT	36	39	18	10	8	6.5	7	7	66.0	60.0	60.0	60.0	8	13	71.0	80.0	8	13	48.0	50.0	8	6.5	6	6	54.6	167	179	191	8	6	63.0	77.0	5	12	6	7	0
46 FT	37	40	19	10	8	6.5	7	7.5	66.8	61.0	61.0	61.0	8	12	70.0	79.0	8	12	48.0	49.0	8	6.5	6	6	55.0	168	180	192	9	7.5	70.0	83.0	5	12	6	6.5	0
48 FT	38	41	19	10	8	6	7	6.5	66.8	62.0	62.0	68.0	8	12	70.0	78.0	8	12	47.0	48.0	8	6.5	7	8	58.1	169	181	193	9	7	70.0	83.0	5	12	6	6.5	0
50 FT	39	42	19	10	8	6	7	7	65.6	63.0	63.0	69.0	8	12	70.0	77.0	8	12	47.0	48.0	8	6.5	7	7.5	57.0	170	182	194	9	7	69.0	83.0	5	12	6	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

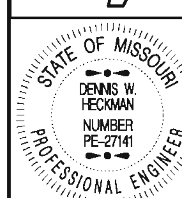
SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 15 FEET
HEIGHT (HT): 8 THRU 13 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

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

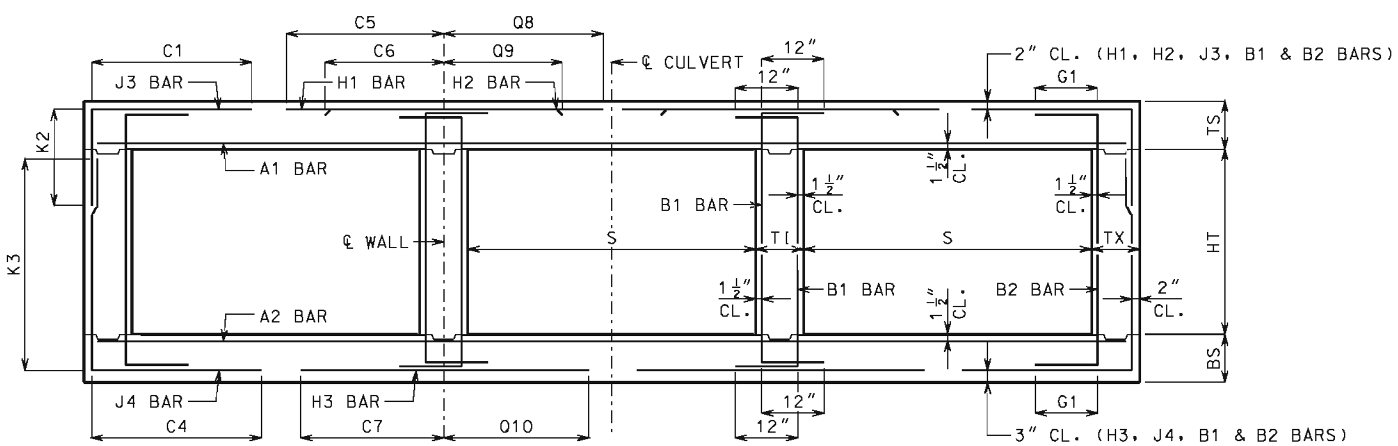
SPAN (S) = 15 FT — HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT

TOP SLAB BARS

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	J3 C1	J3 K2 HT=14'	K2 HT=15'	K2 HT=16'	H1 BARS SIZE	H1 SPA.	H1 C5	H1 Q8	H2 BARS SIZE	H2 SPA.	H2 C6	H2 Q9
1 FT	15	11	12	13	6	8	6	8	79.3	35.0	35.0	39.0	6	16	152.5	114.5	6	16	48.0	51.0
2 FT	15	12	12	13	6	8	6	8	79.3	35.0	35.0	39.0	6	16	152.5	114.5	6	16	49.0	52.0
4 FT	12	12	12	13	6	7	6	7	111.5	36.0	36.0	36.0	6	13	99.0	91.0	6	13	41.0	42.0
6 FT	12	13	12	13	6	7.5	6	6.5	85.6	36.0	36.0	36.0	6	12	71.0	73.0	6	12	40.0	40.0
8 FT	13	14	13	13	6	7.5	6	7	77.4	37.0	37.0	37.0	6	12	67.0	70.0	6	12	38.0	39.0
10 FT	14	16	13	13	6	7.5	6	6	75.0	38.0	38.0	38.0	7	15	67.0	71.0	7	15	41.0	42.0
12 FT	15	17	14	13	6	7	6	6	78.9	39.0	39.0	39.0	7	15	73.0	78.0	7	15	48.0	50.0
14 FT	16	18	15	13	6	7	6	6	77.5	40.0	40.0	40.0	7	14	71.0	77.0	7	14	48.0	49.0
16 FT	18	20	15	13	6	7	7	8	81.9	42.0	42.0	42.0	7	15	70.0	77.0	7	15	48.0	50.0
18 FT	19	21	15	13	6	6.5	7	7	80.8	43.0	43.0	49.0	7	14	69.0	77.0	7	14	48.0	50.0
20 FT	20	23	16	13	6	6	7	7	80.3	44.0	44.0	50.0	7	14	69.0	76.0	7	14	47.0	50.0
22 FT	22	24	17	13	6	6	7	7.5	80.1	46.0	46.0	52.0	7	14	68.0	76.0	7	14	47.0	50.0
24 FT	23	25	17	13	7	7.5	7	7	79.4	47.0	47.0	53.0	7	14	67.0	76.0	7	14	47.0	50.0
26 FT	25	27	18	13	7	7	7	7	79.6	49.0	49.0	55.0	7	14	67.0	76.0	7	14	47.0	50.0
28 FT	26	29	19	13	7	7	7	7	79.6	50.0	50.0	50.0	7	13	66.0	76.0	7	13	46.0	50.0
30 FT	27	30	19	13	7	6.5	7	6.5	79.3	51.0	51.0	57.0	7	13	66.0	76.0	7	13	46.0	49.0
32 FT	29	31	20	13	7	6	7	7	79.5	53.0	53.0	59.0	7	12	65.0	75.0	7	12	44.0	47.0
34 FT	30	33	21	13	7	6	7	7	79.9	54.0	54.0	54.0	7	12	65.0	75.0	7	12	44.0	47.0
36 FT	31	34	22	13	8	7.5	7	6.5	80.1	55.0	61.0	61.0	8	15	73.0	82.0	8	15	52.0	55.0
38 FT	32	35	22	13	8	7	7	6	79.8	56.0	62.0	62.0	8	14	73.0	82.0	8	14	52.0	54.0
40 FT	33	36	23	13	8	6.5	7	6.5	80.4	57.0	63.0	63.0	8	13	73.0	82.0	8	13	51.0	54.0
42 FT	34	38	24	13	8	6.5	7	6.5	81.1	58.0	64.0	64.0	8	13	72.0	81.0	8	13	51.0	53.0
44 FT	35	39	25	13	8	6.5	7	6.5	81.9	59.0	65.0	65.0	8	13	72.0	81.0	8	13	50.0	52.0
46 FT	36	40	26	13	8	6.5	7	6.5	82.5	60.0	66.0	66.0	8	13	72.0	80.0	8	13	50.0	52.0
48 FT	37	41	27	13	8	6.5	7	6	83.3	67.0	67.0	67.0	8	12	72.0	79.0	8	12	49.0	51.0
50 FT	38	42	27	13	8	6	7	6.5	81.8	68.0	68.0	68.0	8	12	71.0	79.0	8	12	49.0	50.0

BOTTOM SLAB BARS / WALL BARS

DESIGN FILL	A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	J4 C4	J4 K3 HT=14'	K3 HT=15'	K3 HT=16'	H3 BARS SIZE	H3 SPA.	H3 C7	H3 Q10	B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	5	6.5	6	6	99.0	175	187	199	6	6	64.0	65.0	5	11.5	5	7	12
2 FT	5	6	6	6.5	95.5	176	188	200	6	6	63.0	66.0	5	11.5	5	7	12
4 FT	5	6	6	6	88.6	176	188	200	7	6.5	65.0	69.0	5	9.5	5	7	12
6 FT	6	8	6	6	84.0	177	189	201	7	6.5	64.0	69.0	5	12	5	6.5	12
8 FT	6	7.5	6	6	78.1	178	190	202	7	6.5	62.0	68.0	5	12	5	6.5	0
10 FT	6	7	6	6	77.0	180	192	204	7	7	61.0	69.0	5	12	5	6.5	0
12 FT	6	7	6	6.5	74.8	181	193	205	7	6.5	60.0	69.0	5	12	5	6	0
14 FT	6	6.5	6	6.5	73.0	182	194	206	7	6.5	60.0	69.0	5	12	6	8	0
16 FT	6	6	6	6	72.4	184	196	208	7	7	60.0	69.0	5	12	6	8	0
18 FT	7	8	7	7	74.4	185	197	209	7	6.5	60.0	69.0	5	12	6	8	0
20 FT	7	7	7	7.5	74.0	187	199	211	7	7	59.0	70.0	5	12	6	8	0
22 FT	7	7	7	7.5	73.3	188	200	212	7	6.5	59.0	70.0	5	12	6	7.5	0
24 FT	7	6	7	7	72.5	189	201	213	7	6	59.0	70.0	5	12	6	7.5	0
26 FT	7	6.5	7	7.5	72.5	191	203	215	7	6	59.0	70.0	5	12	6	7	0
28 FT	7	6	6	6	69.5	193	205	217	8	7.5	65.0	76.0	5	12	6	6.5	0
30 FT	8	7.5	7	7.5	72.1	194	206	218	8	7.5	65.0	77.0	5	12	6	6.5	0
32 FT	8	7	7	8	71.9	195	207	219	8	7	65.0	77.0	5	12	6	6.5	0
34 FT	8	7	6	6	69.0	197	209	221	8	6.5	65.0	77.0	5	12	6	6	0
36 FT	8	7	7	7.5	71.9	198	210	222	8	6.5	65.0	77.0	5	12	6	6	0
38 FT	8	6.5	7	7.5	71.6	199	211	223	8	6.5	65.0	77.0	5	12	6	6	0
40 FT	8	6	7	7.5	71.8	200	212	224	8	6	65.0	77.0	5	12	7	7.5	0
42 FT	8	6.5	7	7	72.4	202	214	226	8	6	65.0	78.0	5	12	7	7.5	0
44 FT	8	6.5	7	7	72.5	203	215	227	8	6	65.0	78.0	5	12	7	7.5	0
46 FT	8	6.5	7	7	72.9	204	216	228	9	7.5	71.0	84.0	5	12	7	8	0
48 FT	8	6.5	7	7	73.1	205	217	229	9	7	71.0	84.0	5	12	7	8	0
50 FT	8	6	7	7	71.4	206	218	230	9	7	71.0	84.0	5	12	6	6	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 15 FEET
HEIGHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

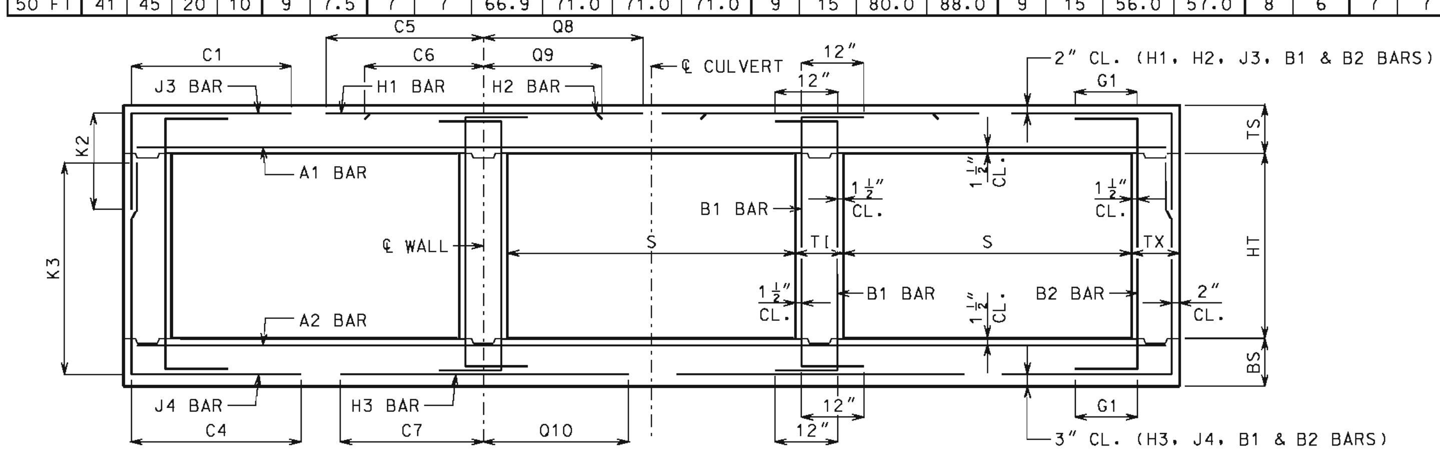
703.87

SPAN (S) = 16 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=8'	K2 HT=9'	K2 HT=10'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=8'	K3 HT=9'	K3 HT=10'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	15	10	9	8	6	7.5	5	8	77.1	35.0	35.0	35.0	6	16	154.5	117.5	6	16	52.0	57.0	5	7	6	6	64.6	102	114	126	7	6.5	66.0	71.0	5	12	5	12	12
2 FT	16	11	9	8	6	7	5	8	77.1	36.0	36.0	36.0	6	14	154.5	117.5	6	14	48.0	53.0	5	6.5	6	6.5	59.3	103	115	127	7	7	65.0	71.0	5	12	5	12	12
4 FT	13	11	9	8	6	6.5	5	6	55.9	33.0	33.0	33.0	6	12	87.0	115.0	6	12	42.0	45.0	6	8	6	6	54.0	103	115	127	7	6	64.0	71.0	5	12	5	12	12
6 FT	13	12	10	8	6	7	5	6	51.4	33.0	33.0	33.0	7	15	75.0	91.0	7	15	42.0	45.0	6	7	6	6.5	51.4	104	116	128	7	6	62.0	70.0	5	12	5	12	12
8 FT	14	14	10	8	6	7	5	6	47.3	34.0	34.0	34.0	7	15	70.0	81.0	7	15	41.0	43.0	6	7.5	5	6.5	44.5	106	118	130	7	6	61.0	71.0	5	12	5	12	0
10 FT	15	16	10	8	6	6.5	6	8	53.6	35.0	35.0	35.0	7	14	75.0	85.0	7	14	48.0	51.0	6	7	5	7	41.6	108	120	132	7	6.5	60.0	72.0	5	12	5	12	0
12 FT	16	17	10	8	6	6.5	6	8	51.3	36.0	36.0	36.0	7	13	73.0	83.0	7	13	47.0	50.0	6	6.5	5	6.5	40.1	109	121	133	7	6	60.0	72.0	5	12	5	12	0
14 FT	18	19	10	8	6	6	6	8	49.0	38.0	38.0	38.0	7	14	71.0	83.0	7	14	47.0	50.0	6	6	5	6.5	38.8	111	123	135	7	6.5	59.0	73.0	5	12	5	12	0
16 FT	19	20	10	8	6	6	6	7.5	47.6	39.0	39.0	39.0	7	13	69.0	82.0	7	13	46.0	50.0	6	6	5	6.5	37.8	112	124	136	7	6	59.0	73.0	5	12	5	11	0
18 FT	20	22	10	8	7	7	6	7.5	46.9	40.0	40.0	40.0	7	13	69.0	81.0	7	13	46.0	50.0	7	7.5	5	6.5	36.8	114	126	138	7	6.5	59.0	73.0	5	12	5	9.5	0
20 FT	22	23	10	8	7	7.5	6	7.5	45.6	42.0	42.0	42.0	7	13	68.0	81.0	7	13	46.0	50.0	7	6.5	5	6	36.5	115	127	139	7	6	59.0	73.0	5	12	5	8	0
22 FT	24	25	10	8	7	7.5	6	7.5	45.0	44.0	44.0	44.0	7	13	67.0	81.0	7	13	46.0	50.0	7	6.5	5	6	36.3	117	129	141	7	6.5	59.0	73.0	5	12	5	8	0
24 FT	25	27	11	8	7	7	6	7.5	45.9	45.0	45.0	45.0	7	12	67.0	80.0	7	12	46.0	50.0	7	6.5	5	6	36.4	119	131	143	7	6	59.0	73.0	5	12	5	7.5	0
26 FT	27	28	11	8	7	6.5	6	7.5	45.1	47.0	47.0	47.0	7	12	66.0	80.0	7	12	45.0	50.0	7	6	5	6	36.4	120	132	144	7	6	59.0	73.0	5	12	5	7.5	0
28 FT	28	30	11	8	7	6	6	7	45.0	52.0	52.0	52.0	7	12	66.0	80.0	7	12	45.0	50.0	8	7.5	6	7	39.0	122	134	146	8	7.5	65.0	79.0	5	12	5	7.5	0
30 FT	30	31	11	8	7	6	6	6.5	44.6	54.0	54.0	54.0	7	12	66.0	79.0	7	12	44.0	48.0	8	7	6	7	39.0	123	135	147	8	7	65.0	79.0	5	12	5	7.5	0
32 FT	31	33	12	8	8	7.5	6	7.5	45.5	55.0	55.0	55.0	8	15	74.0	87.0	8	15	52.0	56.0	8	7	6	7	39.4	125	137	149	8	6.5	65.0	80.0	5	12	5	7	0
34 FT	33	34	12	8	8	7	6	7	45.3	57.0	57.0	57.0	8	14	73.0	86.0	8	14	51.0	54.0	8	6.5	6	7	39.5	126	138	150	8	6.5	65.0	80.0	5	12	5	7	0
36 FT	34	36	12	8	8	7	6	6.5	45.3	58.0	58.0	58.0	8	14	73.0	85.0	8	14	50.0	53.0	8	6.5	6	6.5	39.4	128	140	152	8	6	65.0	80.0	5	12	5	6.5	0
38 FT	35	37	12	8	8	6.5	6	6.5	45.3	59.0	59.0	59.0	8	13	73.0	85.0	8	13	50.0	53.0	8	6.5	6	6.5	39.4	129	141	153	8	6	65.0	80.0	5	12	5	6	0
40 FT	36	39	13	8	8	6	6	6.5	46.1	60.0	60.0	60.0	8	12	73.0	84.0	8	12	50.0	52.0	8	6.5	6	6	39.9	131	143	155	8	6	65.0	80.0	5	12	5	6.5	0
42 FT	38	40	13	8	8	6	6	6	46.0	62.0	62.0	62.0	8	12	72.0	83.0	8	12	48.0	50.0	8	6.5	6	6	40.1	132	144	156	9	7	71.0	86.0	5	12	5	6	0
44 FT	39	41	13	8	8	6	6	6	46.0	63.0	63.0	63.0	8	12	72.0	82.0	8	12	48.0	49.0	8	6	7	7	43.3	133	145	157	9	7	71.0	86.0	5	12	6	8	0
46 FT	40	42	13	8	8	6	7	7	51.1	70.0	70.0	70.0	8	12	72.0	82.0	8	12	47.0	48.0	8	6	7	7	43.4	134	146	158	9	7	71.0	86.0	5	12	6	7.5	0
48 FT	41	43	13	8	9	7.5	7	7	51.1	71.0	71.0	71.0	9	15	79.0	89.0	9	15	55.0	56.0	8	6	7	6.5	43.5	135	147	159	9	7	70.0	86.0	5	12	6	7.5	0
50 FT	42	45	13	8	9	7	7	6	51.4	72.0	72.0	72.0	9	15	79.0	88.0	9	15	55.0	56.0	8	6	7	6.5	43.8	137	149	161	9	7	70.0	86.0	5	10.5	6	7	0

SPAN (S) = 16 FT HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=11'	K2 HT=12'	K2 HT=13'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9	BOTTOM SLAB BARS A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=11'	K3 HT=12'	K3 HT=13'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	15	11	9	10	6	7.5	5	6	77.5	35.0	35.0	35.0	6	16	155.5	118.5	6	16	52.0	57.0	5	6.5	6	6	87.6	139	151	163	6	6	65.0	69.0	5	12	5	8.5	12
2 FT	16	12	9	10	6	7	5	6	77.5	36.0	36.0	36.0	6	14	155.5	118.5	6	14	49.0	54.0	5	6	6	6	79.0	140	152	164	6	6	64.0	69.0	5	12	5	8.5	12
4 FT	13	12	10	10	6	6.5	6	7	76.3	37.0	37.0	37.0	6	12	91.0	115.0	6	12	42.0	45.0	5	6	6	6	69.6	140	152	164	7	6.5	65.0	72.0	5	10.5	5	8	12
6 FT	13	13	10	10	6	6.5	6	7	67.3	37.0	37.0	37.0	7	15	77.0	88.0	7	15	43.0	45.0	6	7.5	6	6.5	64.3	141	153	165	7	6	64.0	72.0	5	12	5	8	12
8 FT	14	14	10	10	6	7	6	6.5	61.5	38.0	38.0	38.0	7	15	71.0	79.0	7	15	41.0	44.0	6	7	6	6	60.3	142	154	166	7	6	62.0	72.0	5	12	5	8	0
10 FT	15	16	10	10	6	6.5	6	6	63.9	35.0	39.0	39.0	7	14	76.0	85.0	7	14	49.0	51.0	6	6.5	6	6	57.6	144	156	168	7	6.5	61.0	72.0	5	12	5	8	0
12 FT	16	18	11	10	6	6.5	6	6	62.9	36.0	40.0	40.0	7	14	74.0	83.0	7	14	48.0	51.0	6	6.5	6	7	56.4	146	158	170	7	6.5	61.0	73.0	5	12	5	7.5	0
14 FT	18	19	12	10	6	6.5	6	6.5	61.8	38.0	42.0	42.0	7	14	72.0	82.0	7	14	48.0	51.0	6	6	6	7	55.8	147	159	171	7	6.5	61.0	73.0	5	12	5	7	0
16 FT	19	21	12	10	6	6	6	6	60.8	39.0	43.0	43.0	7	13	71.0	81.0	7	13	47.0	51.0	7	8	6	7	54.6	149	161	173	7	6.5	60.0	73.0	5	12	5	7	0
18 FT	20	22	12	10	7	8	7	8	64.6	40.0	44.0	44.0	7	13	70.0	81.0	7	13	47.0	51.0	7	7.5	6	6	53.8	150	162	174	7	6.5	60.0	73.0	5	12	5	7	0
20 FT	22	24	13	10	7	8	6	6	59.6	42.0	46.0	46.0	7	13	69.0	81.0	7	13	47.0	51.0	7	7	6	7	53.6	152	164	176	7	6.5	60.0	73.0	5	12	5	6.5	0
22 FT	23	25	14	10	7	7	6	6	59.8	43.0	47.0	47.0	7	12	69.0	80.0	7	12	47.0	50.0	7	6.5	6	7	53.5	153	165	177	7	6.5	60.0	73.0	5	12	5	6.5	0
24 FT	25	27	14	10	7	7	6	6	59.1	45.0	49.0	49.0	7	13	68.0	80.0	7	13	46.0	50.0	7	6.5	6	7	53.3	155	167	179	7	6	60.0	74.0	5	12	5	6	0
26 FT	27	29	14	10	7	6.5	6	6	58.6	51.0	51.0	51.0	7	13	67.0	80.0	7	13	46.0	50.0	7	6	6	7	53.0	157	169	181	8	7.5	66.0	80.0	5	12	5	6	0
28 FT	28	30	15	10	7	6.5	6	6	59.1	52.0	52.0	52.0	7	12	67.0	79.0	7	12	46.0	50.0	8	7.5	6	7	53.1	158	170	182	8	7.5	66.0	80.0	5	12	6	8	0
30 FT	30	32	15	10	7	6	6	6	58.8	54.0	54.0	54.0	7	12	67.0	79.0	7	12	45.0	48.0	8	7	6	7	53.0	160	172	184	8	7	66.0	80.0	5	12	6	8	0
32 FT	31	33	15	10	8	7.5	7	7	63.4	55.0	55.0	55.0	8	15	74.0	87.0	8	15	53.0	56.0	8	7	6	7	52.8	161	173	185	8	6.5	66.0	80.0	5	12	6	8	0
34 FT	32	34	16	10	8	7	7	7.5	63.9	56.0	56.0	56.0	8	14	74.0	86.0	8	14	52.0	56.0	8	6	6	7	52.9	162	174	186	8	6	66.0	80.0	5	12	6	8	0
36 FT	34	36	16	10	8	7	7	7.5	63.8	58.0	58.0	58.0	8	14	74.0	85.0	8	14	51.0	54.0	8	6.5	6	6.5	52.9	164	176	188	8	6	66.0	80.0	5	12	6	8	0
38 FT	35	37	17	10	8	6.5	7	7.5	64.4	59.0	59.0	59.0	8	13	74.0	85.0	8	13	51.0	53.0	8	6	6	6.5	53.1	165	177	189	8	6	66.0	80.0	5	12	6	7.5	0
40 FT	36	39	17	10	8	6.5	7	7	64.4	60.0	60.0	60.0	8	13	73.0	84.0	8	13	50.0	53.0	8	6.5	6	6	53.1	167	179	191	8	6	66.0	80.0	5	12	6	7.5	0
42 FT	37	40	17	10	8	6	7	6.5	64.3	61.0	61.0	61.0	8	12	73.0	84.0	8	12	50.0	52.0	8	6	6	6	53.1	168	180	192	9	7	72.0	86.0	5	12	6	7.5	0
44 FT	38	41	18	10	8	6	7	7	65.0	62.0	62.0	68.0	8	12	73.0	83.0	8	12	49.0	51.0	8	6	7	8	56.6	169	181	193	9	7	72.0	86.0	5	12	6	7	0
46 FT	39	43	19	10	8	6	7	7.5	66.0	63.0	63.0	69.0	8	12	73.0	82.0	8	12	49.0	51.0	8	6	7	7.5	57.1	171	183	195	9	7	72.0	87.0	5	12	6	6.5	0
48 FT	40	44	19	10	8	6	7	6.5	66.0	70.0	70.0	70.0	8	12	72.0	81.0	8	12	48.0	50.0	8	6	7	7	57.3	172	184	196	9	7	72.0	87.0	5	12	6	6.5	0
50 FT	41	45	20	10	9	7.5	7	7	66.9	71.0	71.0	71.0	9	15	80.0	88.0	9	15	56.0	57.0	8	6	7	7	57.6	173	185	197	9	6.5	72.0	87.0	5	12	6	6.5	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

MoDOT
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

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 16 FEET HEIGHT (HT): 8 THRU 13 FEET

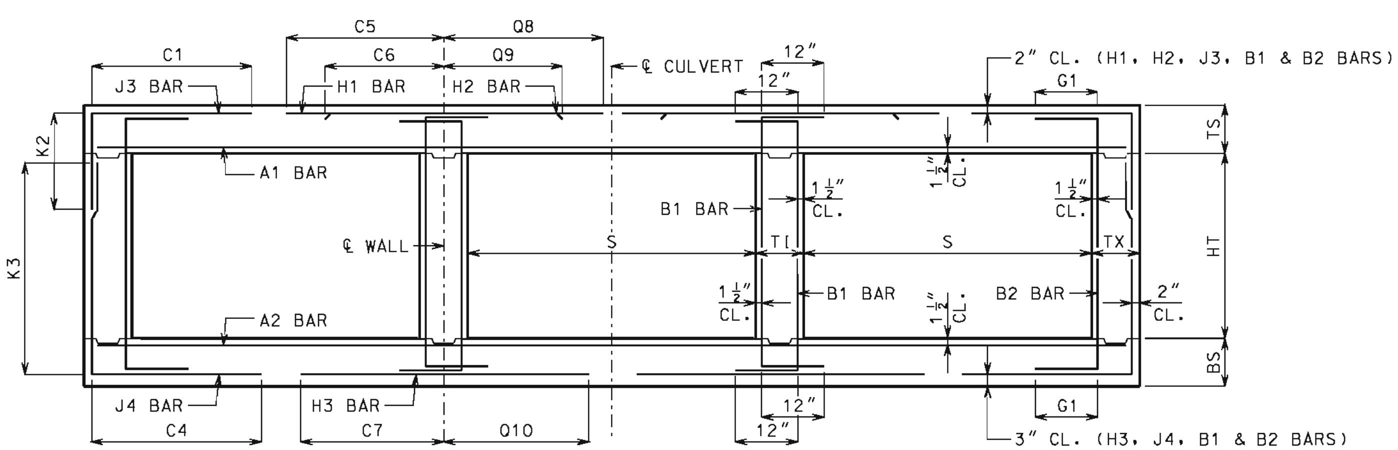
DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SPAN (S) = 16 FT HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT

DESIGN FILL	MEMBER THICKNESS TS	BS	TX	TI	TOP SLAB BARS: A1 BARS SIZE	A1 SPA.	J3 BARS SIZE	J3 SPA.	C1	K2 HT=14'	K2 HT=15'	K2 HT=16'	H1 BARS SIZE	H1 SPA.	C5	Q8	H2 BARS SIZE	H2 SPA.	C6	Q9
1 FT	15	11	12	13	6	7.5	6	8	82.9	35.0	35.0	39.0	6	16	160.5	120.5	6	16	51.0	55.0
2 FT	16	12	12	13	6	7.5	6	8	82.9	36.0	36.0	40.0	6	15	160.5	120.5	6	15	49.0	52.0
4 FT	12	13	13	13	6	6.5	6	6.5	94.8	36.0	36.0	36.0	7	16	92.0	94.0	7	16	46.0	46.0
6 FT	13	13	13	13	6	7	6	7	82.5	37.0	37.0	37.0	7	16	77.0	81.0	7	16	44.0	45.0
8 FT	14	15	13	13	6	7	6	6.5	77.9	38.0	38.0	38.0	7	15	73.0	77.0	7	15	43.0	44.0
10 FT	15	16	13	13	6	7	6	6	80.9	39.0	39.0	39.0	7	15	78.0	83.0	7	15	50.0	51.0
12 FT	16	18	14	13	6	6.5	6	6	78.5	40.0	40.0	40.0	7	14	76.0	82.0	7	14	49.0	51.0
14 FT	17	19	14	13	6	6	7	7.5	81.6	41.0	41.0	47.0	7	13	74.0	81.0	7	13	49.0	51.0
16 FT	19	21	15	13	6	6.5	7	7.5	80.9	43.0	43.0	49.0	7	14	73.0	81.0	7	14	49.0	51.0
18 FT	20	22	16	13	6	6	7	7.5	80.0	44.0	44.0	50.0	7	13	72.0	80.0	7	13	49.0	51.0
20 FT	22	24	16	13	6	6	7	7	79.1	46.0	46.0	52.0	7	13	71.0	80.0	7	13	48.0	51.0
22 FT	23	25	17	13	7	7.5	7	7	78.8	47.0	47.0	53.0	7	13	70.0	80.0	7	13	48.0	51.0
24 FT	25	27	17	13	7	7	7	7	78.1	49.0	49.0	55.0	7	13	70.0	80.0	7	13	48.0	51.0
26 FT	26	29	18	13	7	7	7	7	78.1	50.0	50.0	56.0	7	12	69.0	79.0	7	12	48.0	51.0
28 FT	28	30	19	13	7	6.5	7	7	78.3	52.0	52.0	52.0	7	12	68.0	79.0	7	12	47.0	51.0
30 FT	29	32	19	13	7	6	7	6.5	77.9	53.0	53.0	59.0	7	12	68.0	79.0	7	12	47.0	51.0
32 FT	31	33	20	13	8	7.5	7	6.5	78.1	55.0	55.0	61.0	8	15	76.0	87.0	8	15	53.0	57.0
34 FT	32	34	20	13	8	7.5	7	6	77.6	56.0	56.0	62.0	8	14	75.0	86.0	8	14	53.0	56.0
36 FT	33	36	22	13	8	7	7	6.5	78.8	57.0	63.0	63.0	8	14	75.0	86.0	8	14	53.0	56.0
38 FT	34	37	23	13	8	6.5	7	6.5	79.1	58.0	64.0	64.0	8	13	75.0	85.0	8	13	53.0	56.0
40 FT	36	39	23	13	8	6.5	7	6.5	79.0	60.0	66.0	66.0	8	13	75.0	85.0	8	13	51.0	54.0
42 FT	37	40	23	13	8	6.5	7	6	78.9	61.0	67.0	67.0	8	12	74.0	84.0	8	12	51.0	53.0
44 FT	38	42	24	13	8	6	7	6	79.8	68.0	68.0	68.0	8	12	74.0	83.0	8	12	50.0	52.0
46 FT	39	43	26	13	8	6	7	6.5	81.4	69.0	69.0	69.0	8	12	74.0	83.0	8	12	50.0	52.0
48 FT	40	44	27	13	8	6	7	6	82.1	70.0	70.0	70.0	8	12	74.0	82.0	8	12	49.0	51.0
50 FT	41	45	28	13	9	7.5	7	6	83.0	71.0	71.0	71.0	9	15	82.0	89.0	9	15	57.0	58.0

DESIGN FILL	BOTTOM SLAB BARS: A2 BARS SIZE	A2 SPA.	J4 BARS SIZE	J4 SPA.	C4	K3 HT=14'	K3 HT=15'	K3 HT=16'	H3 BARS SIZE	H3 SPA.	C7	Q10	WALL BARS: B1 BARS SIZE	B1 SPA.	B2 BARS SIZE	B2 SPA.	G1
1 FT	5	6.5	6	6	97.5	175	187	199	7	7	70.0	71.0	5	10.5	5	7	12
2 FT	5	6	6	6	93.3	176	188	200	7	7	69.0	71.0	5	12	5	7	12
4 FT	5	6	6	6.5	87.8	177	189	201	7	7	68.0	73.0	5	8.5	5	6.5	12
6 FT	6	7.5	6	6	79.3	177	189	201	7	6	66.0	71.0	5	12	5	6.5	12
8 FT	6	7.5	6	6.5	77.8	179	191	203	7	6.5	64.0	72.0	5	12	5	6.5	0
10 FT	6	6.5	6	6	75.3	180	192	204	7	6	63.0	72.0	5	12	5	6.5	0
12 FT	6	6.5	6	6	73.8	182	194	206	7	6.5	63.0	72.0	5	12	5	6	0
14 FT	6	6	7	7.5	75.0	183	195	207	7	6.5	62.0	72.0	5	12	5	6	0
16 FT	7	8	7	7.5	74.0	185	197	209	7	6.5	62.0	73.0	5	12	6	8	0
18 FT	7	7.5	7	7.5	72.9	186	198	210	7	6.5	62.0	73.0	5	12	6	8	0
20 FT	7	7	7	7.5	72.3	188	200	212	7	6.5	62.0	73.0	5	12	6	8	0
22 FT	7	6	7	8	71.5	189	201	213	7	6	62.0	73.0	5	12	6	7.5	0
24 FT	7	6.5	7	7	71.3	191	203	215	7	6	61.0	73.0	5	12	6	7.5	0
26 FT	7	6	7	8	71.0	193	205	217	8	7.5	67.0	80.0	5	12	6	7	0
28 FT	8	7.5	6	6	67.8	194	206	218	8	7.5	67.0	80.0	5	12	6	6.5	0
30 FT	8	7	7	7.5	70.5	196	208	220	8	7	67.0	80.0	5	12	6	6.5	0
32 FT	8	7	7	8	70.4	197	209	221	8	6.5	67.0	80.0	5	12	6	6.5	0
34 FT	8	6	7	7	70.0	198	210	222	8	6	67.0	80.0	5	12	6	6.5	0
36 FT	8	6.5	7	7.5	70.3	200	212	224	8	6	67.0	81.0	5	12	6	6	0
38 FT	8	6	7	7.5	70.3	201	213	225	8	6	67.0	81.0	5	12	6	6	0
40 FT	8	6.5	7	7.5	70.3	203	215	227	8	6	67.0	81.0	5	12	7	7.5	0
42 FT	8	6	7	7	70.3	204	216	228	9	7	73.0	87.0	5	12	7	7.5	0
44 FT	8	6	7	7	70.8	206	218	230	9	7	73.0	87.0	5	12	7	7.5	0
46 FT	8	6	7	7	71.3	207	219	231	9	7	73.0	87.0	5	12	7	7.5	0
48 FT	8	6	7	7	71.6	208	220	232	9	7	73.0	88.0	5	12	7	8	0
50 FT	8	6	7	7	72.0	209	221	233	9	6.5	73.0	88.0	5	12	7	8	0



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ℄ CULVERT.

GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.

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

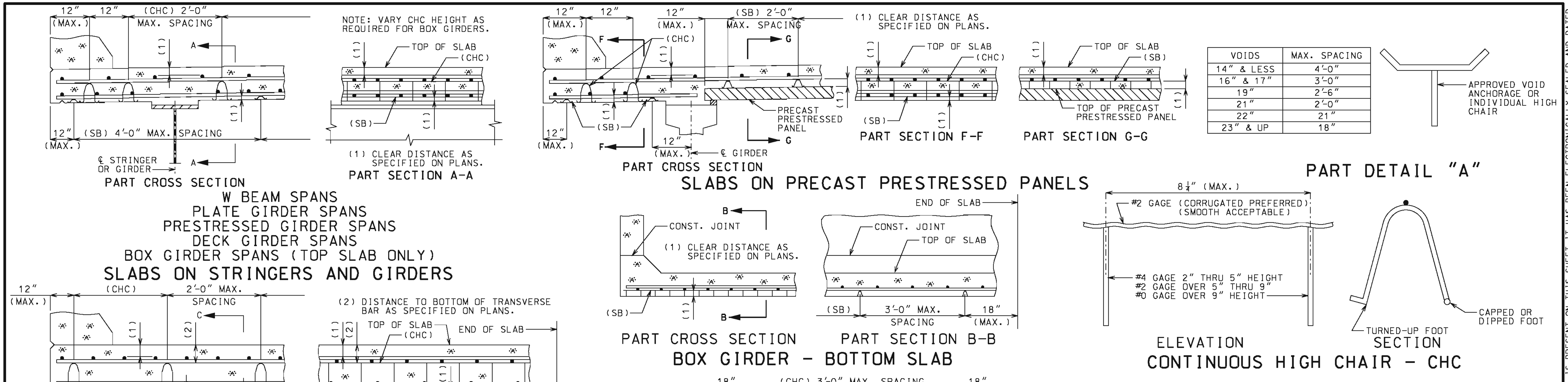
CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

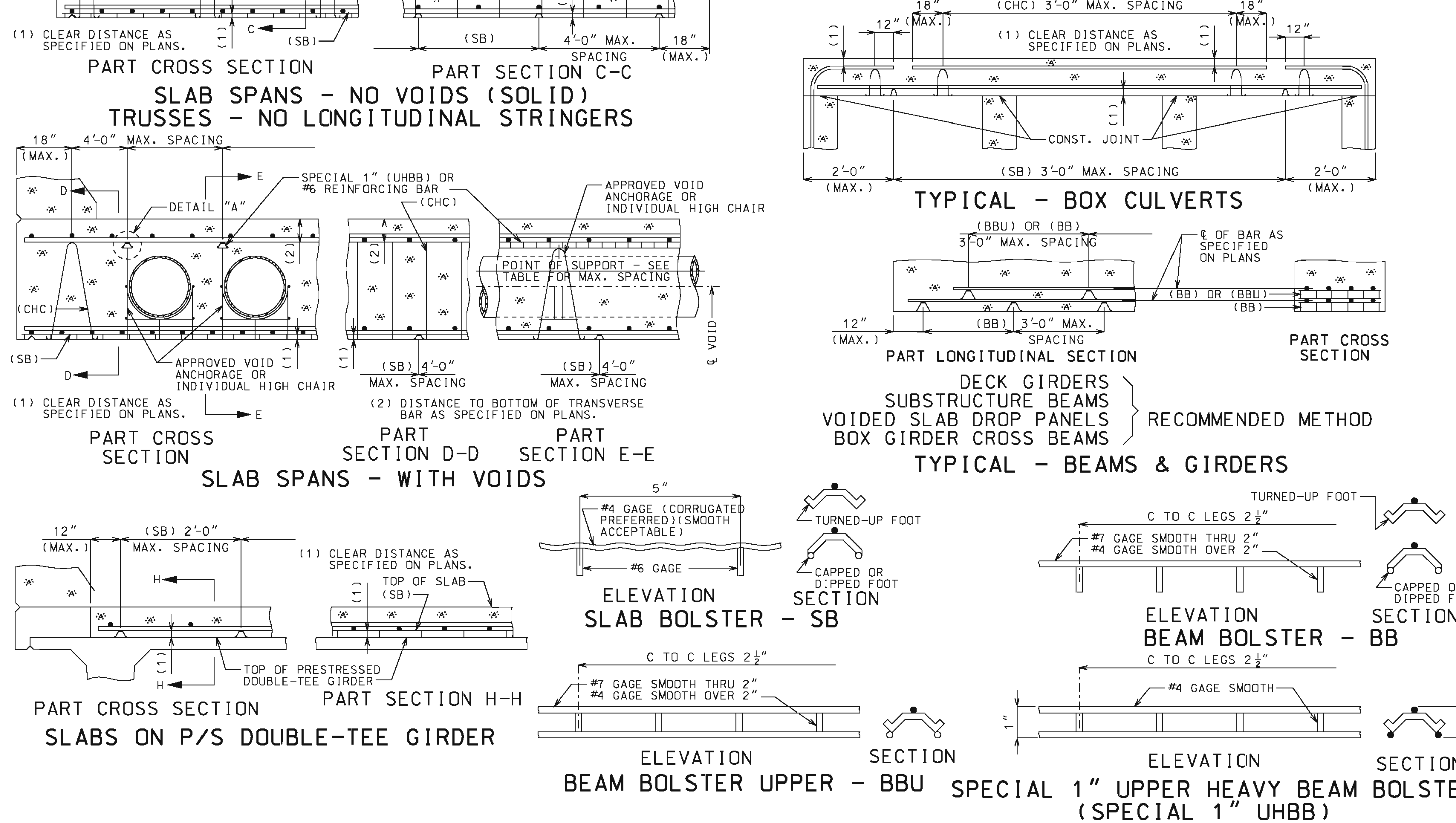
SPAN (S): 16 FEET
HEIGHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87



VOIDS	MAX. SPACING
14" & LESS	4'-0"
16" & 17"	3'-0"
19"	2'-6"
21"	2'-0"
22"	21"
23" & UP	18"



ALL CONTACT POINTS ON WIRE BAR SUPPORTS SHALL BE SECURELY WELDED.

A TURNED-UP, CAPPED OR DIPPED FOOT SHALL BE ON ALL BAR SUPPORTS BEARING ON FORMS. WHERE BAR SUPPORTS ARE USED ON EARTH OR AGGREGATE SUBGRADES, SUITABLE PLATES, CONTINUOUS BARS OR PRECAST CONCRETE BAR SUPPORTS SHALL BE PROVIDED TO PREVENT DISPLACEMENT OF THE SUPPORT FOOT.

ALL DIMENSIONS TO REINFORCING STEEL ARE TO ℄ BAR EXCEPT WHERE CLEAR DISTANCE FROM FACE OF CONCRETE IS INDICATED. HEIGHT OF BAR SUPPORTS TO BE THAT REQUIRED TO SUPPORT BARS IN EXACT POSITIONS SHOWN ON PLANS.

SPIRAL REINFORCING SHALL BE SUPPORTED BY USE OF APPROVED SPIRAL SPACERS AT NOT MORE THAN 3'-0" CENTERS. PAYMENT FOR SPACERS AND ALL OTHER BAR SUPPORTS WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

WHEN BARS OF DIFFERENT SIZES ARE USED IN THE SAME MEMBERS, THE SELECTION OF BAR SUPPORTS SHALL BE BASED ON THE LARGER SIZE.

SUPPORTS FOR THE UPPER LAYERS NEED NOT BE DIRECTLY OVER THE SUPPORTS BELOW.

ALL BAR SUPPORTS SHALL BE IN ACCORDANCE WITH C.R.S.I. MANUAL OF STANDARD PRACTICE, EXCEPT AS SHOWN.

WIRE BAR AND REINFORCING BAR SUPPORTS USED WITH EPOXY COATED REINFORCING STEEL SHALL BE COATED ENTIRELY WITH AN EPOXY OR PLASTIC MATERIAL.

ALL UNCOATED WIRE BAR SUPPORTS SHALL HAVE CAPPED OR DIPPED FEET FOR THOSE APPLICATIONS WHERE MINIMIZING RUST SPOTS AND SURFACE BLEMISHES ARE EXPECTED TO BECOME VISIBLE. COLOR SHALL MATCH CONCRETE.

INDIVIDUAL HIGH CHAIRS AND SPACING WILL BE PERMITTED AS APPROVED BY THE ENGINEER. INDIVIDUAL HIGH CHAIRS SHALL NOT BE PERMITTED FOR USE ON SOLID SLAB AND VOIDED SLAB BRIDGES, EXCEPT AS SHOWN.

PLASTIC BAR SUPPORTS SHALL MEET OR EXCEED THE LOAD CARRYING CAPACITY OF AND BE PLACED AT THE SAME SPACING FOR STEEL WIRE BAR SUPPORTS AS SHOWN.

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

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

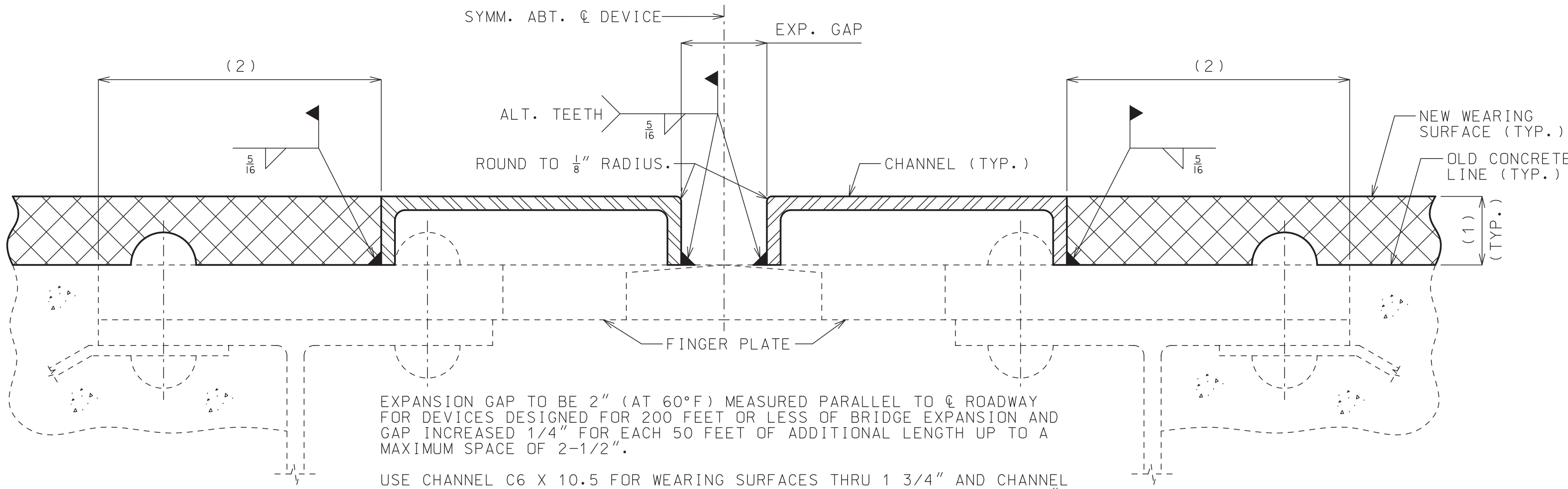
BAR SUPPORTS FOR CONCRETE REINFORCEMENT

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 9/3/2009

706.35H

SHEET NO. 1 OF 1

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

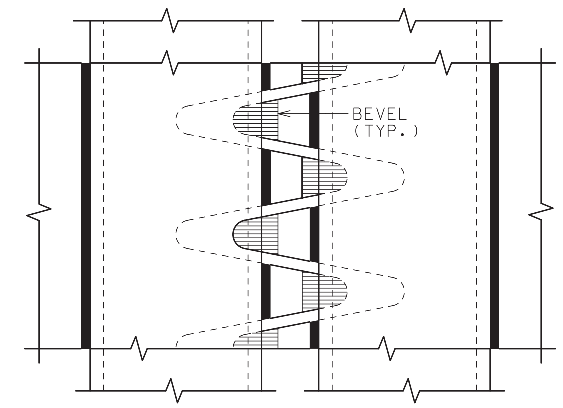


EXPANSION GAP TO BE 2" (AT 60°F) MEASURED PARALLEL TO ℄ ROADWAY FOR DEVICES DESIGNED FOR 200 FEET OR LESS OF BRIDGE EXPANSION AND GAP INCREASED 1/4" FOR EACH 50 FEET OF ADDITIONAL LENGTH UP TO A MAXIMUM SPACE OF 2-1/2".

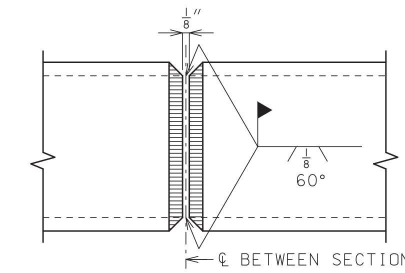
USE CHANNEL C6 X 10.5 FOR WEARING SURFACES THRU 1 3/4" AND CHANNEL C7 X 14.75 OR MC6 X 15.1 FOR WEARING SURFACES GREATER THAN 1 3/4" TO 2 1/4". CUT FLANGES TO MATCH REQUIRED WEARING SURFACE THICKNESS AND NOTCH FLANGE WHERE NESSARY TO CLEAR RIVET HEADS.

PART SECTION THRU EXPANSION DEVICE

TOP SURFACE AT ENDS OF ALL TEETH TO BE BEVELED 1/8" IN 1 1/2" TO PERMIT FREE MOVEMENT UNDER NEW CHANNEL.

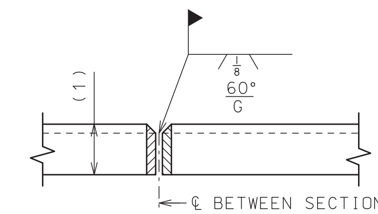


PART PLAN AT EXPANSION DEVICE



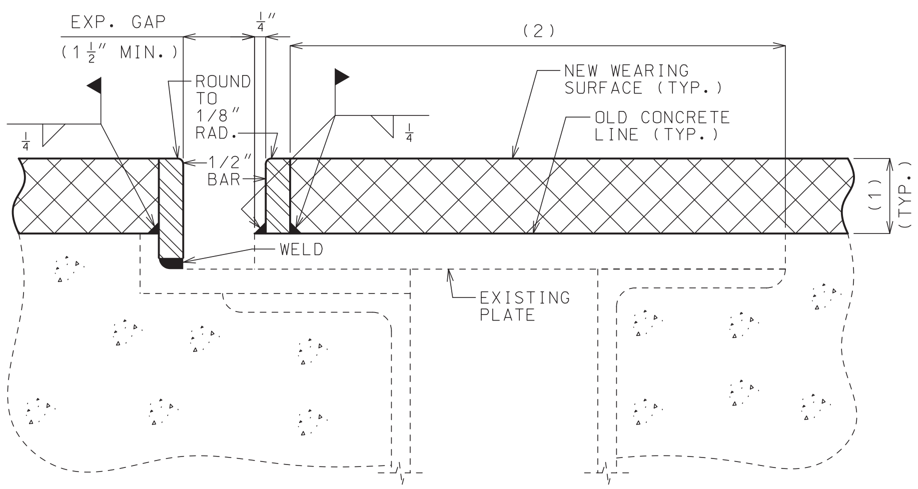
PLAN OF CHANNEL SPLICE

SPLICE TO BE AT ℄ ROADWAY FOR TWO LANE BRIDGES.



ELEVATION OF CHANNEL SPLICE

TYPE A – FINGER TYPE EXPANSION DEVICES

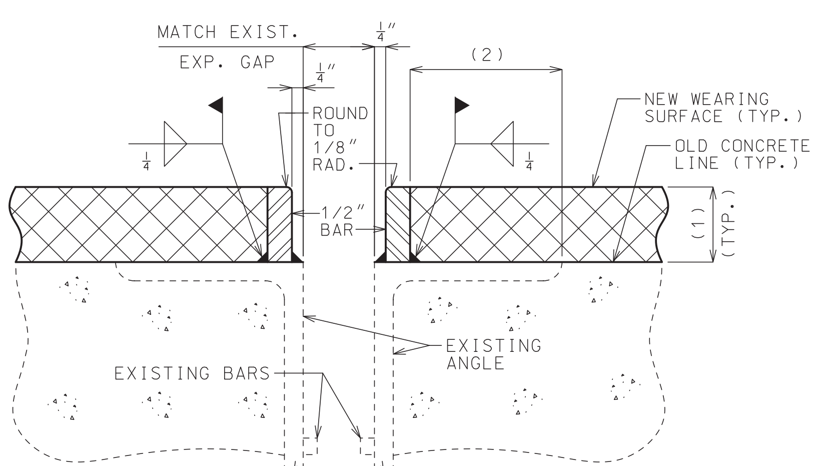


PART SECTION AT EXPANSION DEVICE

TYPE B – PLATE TYPE EXPANSION DEVICES

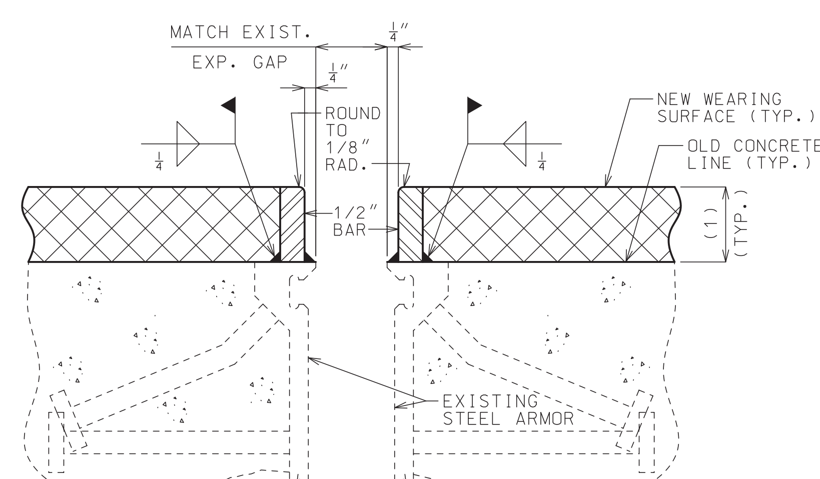
(1) WEARING SURFACE THICKNESS

(2) WHEN THIS DIMENSION EXCEEDS 3" AND A CONCRETE WEARING SURFACE IS USED, TACK WELD A ONE INCH BAR CHAIR TO THE PLATE OR ANGLE FOR EACH 3" OF PLATE OR ANGLE TO BE COVERED BY WEARING SURFACE.



PART SECTION AT EXPANSION DEVICE

TYPE C – ANGLE TYPE EXPANSION DEVICES



PART SECTION AT EXPANSION DEVICE

TYPE D – STRIP SEAL TYPE EXPANSION DEVICES

GENERAL NOTES:

OUTLINE OF OLD WORK IS INDICATED BY LIGHT DASHED LINES. HEAVY LINES INDICATE NEW WORK.

THE EXISTING EXPANSION DEVICE PLATES SHALL BE CHECKED FOR LOOSENESS AND SECURED BEFORE THE NEW BAR DAM IS INSTALLED.

STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH ASTM A70 GRADE 36.

QUALIFICATION OF WELDING OPERATORS WILL BE REQUIRED.

E7016 OR E7018 ELECTRODES SHALL BE USED.

THE STEEL DAMS SHALL EXTEND FULL ROADWAY WIDTH BETWEEN CURBS, BUT SHALL BE INSTALLED IN SECTIONS OF SUCH LENGTHS TO PERMIT AT LEAST ONE WAY TRAFFIC AT ALL TIMES. BEFORE TRAFFIC IS PERMITTED TO CROSS OVER SECTIONS OF DAMS IN PLACE, SUFFICIENT WEARING SURFACE SHALL BE PLACED ON ROADWAY SLAB ADJACENT TO BOTH SIDES OF EXPANSION DEVICE TO PREVENT ANY DAMAGE TO EITHER THE STEEL DAMS OR TIRES OF VEHICLES.

STEEL DAMS SHALL BE FABRICATED AND INSTALLED TO THE CROWN AND GRADE OF THE ROADWAY.

STEEL CHANNELS OR BARS ON BOTH SIDES OF EXPANSION JOINT, FOR FULL WIDTH OF ROADWAY, WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR STEEL BAR DAM.

PAINT INSIDE SURFACE OF CHANNEL 5.0 MILS THICKNESS OF INORGANIC ZINC PRIMER.

SHOP DRAWINGS WILL NOT BE REQUIRED FOR STEEL BAR DAMS.

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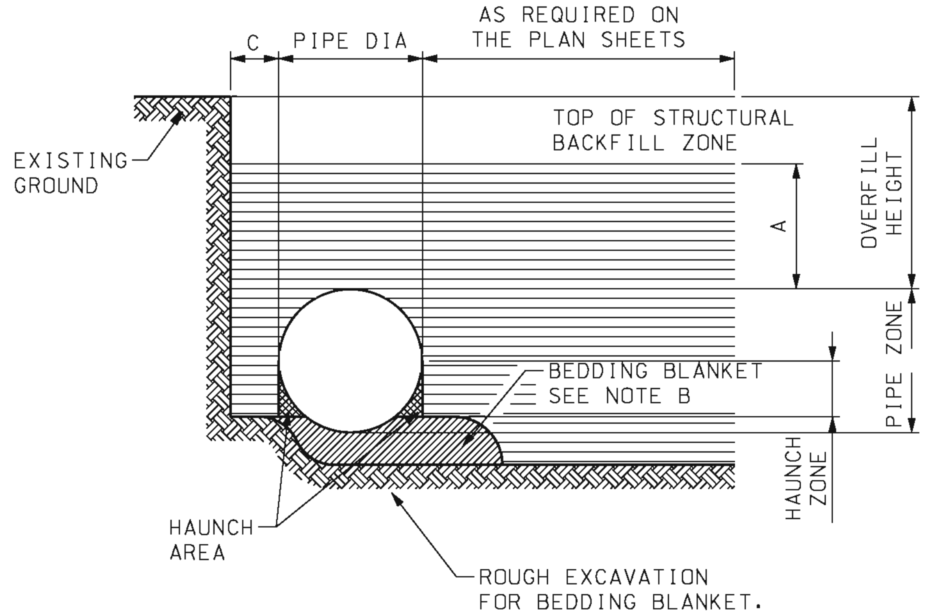
STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

STEEL DAMS

AT EXPANSION DEVICES FOR RESURFACING BRIDGE FLOORS

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019
712.40L
SHEET NO. 1 OF 1



TYPICAL TRENCH DETAIL

PIPE INSTALLATION AND BEDDING

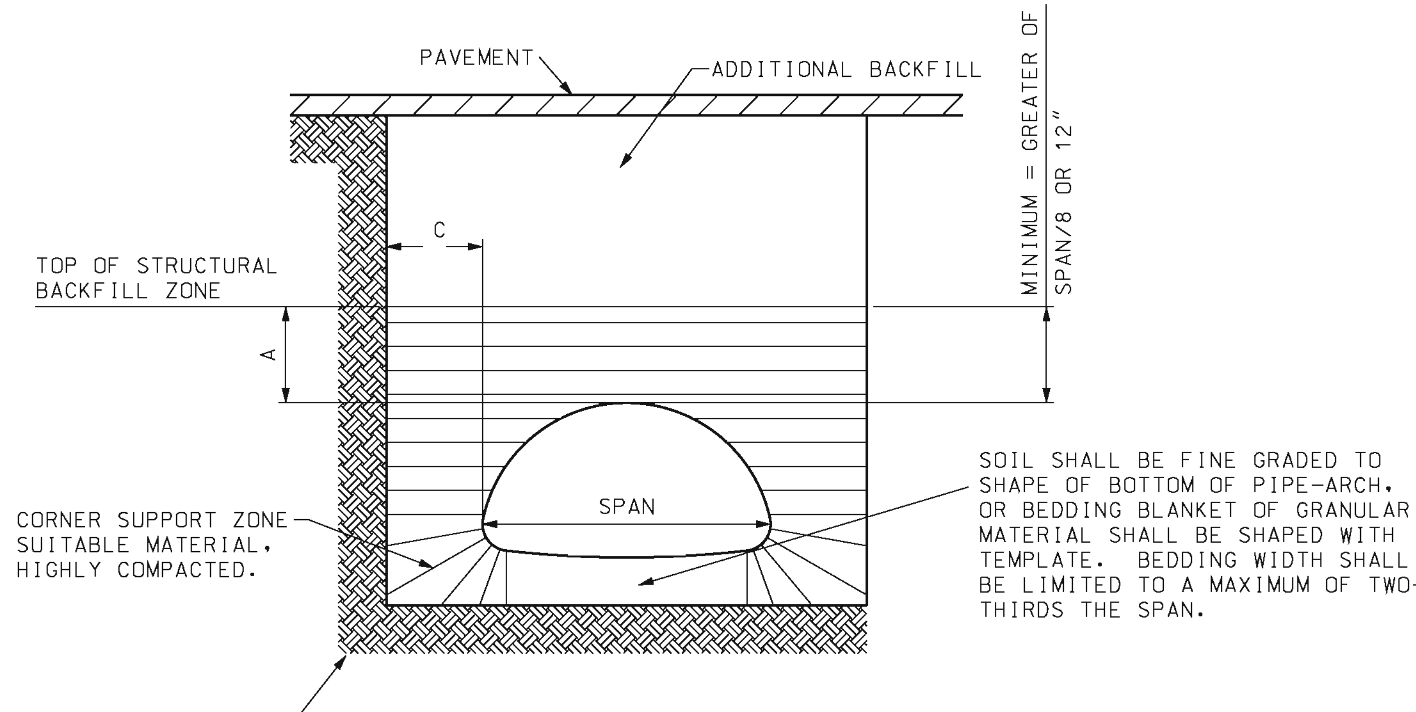
NOTE:

A) MINIMUM STRUCTURAL BACKFILL OVER TOP OF PIPE SHALL BE ONE-EIGHTH DIAMETER OR SPAN OF PIPE OR ONE FOOT WHICHEVER IS GREATER.

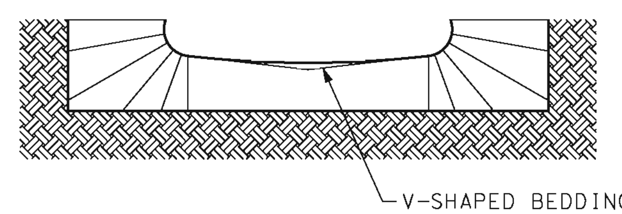
B) BEDDING BLANKET OF LOOSE FILL SHALL BE ROUGHLY SHAPED TO FIT BOTTOM OF PIPE. MINIMUM THICKNESS BEFORE PLACING PIPE SHALL BE AS FOLLOWS:

DEPTH OF CORRUGATION	MIN. BEDDING THICKNESS
½″	1″
1″	2″
2″	3″

C) TRENCH INSTALLATIONS - 2 FEET MINIMUM EACH SIDE OF CULVERT. THIS RECOMMENDED LIMIT SHOULD BE MODIFIED AS NECESSARY TO ACCOUNT FOR VARIABLES SUCH AS POOR IN-SITU SOILS. EMBANKMENT INSTALLATIONS - ONE DIAMETER OR SPAN EACH SIDE OF CULVERT.



SHAPED BEDDING



ALTERNATIVE-SHAPED BEDDING

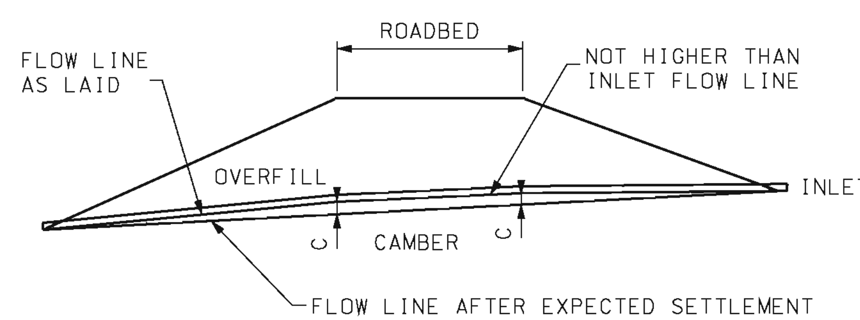
PIPE-ARCH TRENCH DETAIL

BEDDING AND CORNER ZONE TREATMENT FOR PIPE ARCH STRUCTURES

PIPE	
DIAMETER	SPACE S
UP TO 24″	12″
24″ TO 72″	½ PIPE DIA
72″ AND OVER	36″

PIPE-ARCHES	
SPAN	SPACE X
UP TO 36″	12″
36″ TO 108″	1/3 ARCH SPAN
108″ TO 189″	36″

MULTIPLE STRUCTURE SPACING



TYPICAL CAMBERED FLOW LINE

NOTE:

ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITIONS AND WILL BE SPECIFIED ON THE DESIGN PLANS.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 3/10/2011

725.00C

SHEET NO. 1 OF 5

CORRUGATED METALLIC-COATED STEEL CIRCULAR PIPE LOCK SEAM

MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER CORRUGATED	MINIMUM COVER SPIRAL RIB	0.064 A	0.064 B	0.064 C	0.064 D	0.079 A	0.079 B	0.079 C	0.079 D	0.109 A	0.109 B	0.109 C	0.109 D	0.138 A	0.138 B	0.138 C	0.138 D	0.168 A	0.168 B	0.168 C	0.168 D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	219	251	224	144	273	314	280	201	382	440	392	334	492	566	504	484	602	693	617	
15	1	1	175	201	179	115	218	251	224	161	306	352	314	267	394	453	403	387	481	555	493	
18	1	1	146	167	149	96	182	209	187	134	255	293	261	223	328	378	336	323	401	462	411	
21	1	1	125	143	128	82	156	179	160	115	219	251	224	191	281	324	288	277	344	396	352	
24	1	1	109	126	112	72	137	157	140	100	191	220	196	167	246	283	252	242	301	347	308	
30	1	1	87	100	90	57	109	126	112	80	153	176	157	134	197	227	202	194	241	277	247	
36	1	1	73	84	75	48	91	105	93	67	127	147	131	111	164	189	168	161	201	231	206	
42	1	1	62	72	64	41	78	90	80	57	109	126	112	95	141	162	144	138	172	198	176	
48	1	1	55	63	56	36	68	78	70	50	96	110	98	83	123	142	126	121	150	173	154	
54	1	2		56	50	32*	61	70	62	45	85	98	87	74	109	126	112	108	134	154	137	
60	1	2		50	45			63	56	40	76	88	78	67	98	113	101	97	120	139	123	
66	1	2		46	41			57	51	37*		80	71	61	89	103	92	88	109	126	112	
72	1	2		42	37			52	47			73	65	56	82	94	84	81	100	116	103	
78	1	2		39	34			48	43			68	60	51		87	78	75	89	107	95	
84	1	2		36	32			45	40			63	56	48*		81	72	69	77	99	88	
90	1	2		33	30			42	37			59	52			76	67	65		92	82	
96	1	2						39	35			55	49			71	63	60*		87	77	
102	2	3						37	33			52	46			67	59	53*		82	73	
108	2	3										49	44			63	56			77	69	
114	2	3										46	41			60	53			73	65	
120	2	3										44	39			57	50			69	62	
126	2	3														54	48			66	59	

(Thickness columns: SPECIFIED THICKNESS OF COATED SHEET (IN.))

CORRUGATED METALLIC-COATED STEEL CIRCULAR PIPE RIVETED SEAM

MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER CORRUGATED	MINIMUM COVER SPIRAL RIB	0.064 SINGLE RIVET A	0.064 SINGLE RIVET B	0.064 DOUBLE RIVET A	0.064 DOUBLE RIVET B	0.079 SINGLE RIVET A	0.079 SINGLE RIVET B	0.079 DOUBLE RIVET A	0.079 DOUBLE RIVET B	0.109 SINGLE RIVET A	0.109 SINGLE RIVET B	0.109 DOUBLE RIVET A	0.109 DOUBLE RIVET B	0.138 SINGLE RIVET A	0.138 SINGLE RIVET B	0.138 DOUBLE RIVET A	0.138 DOUBLE RIVET B	0.168 SINGLE RIVET A	0.168 SINGLE RIVET B	0.168 DOUBLE RIVET A	0.168 DOUBLE RIVET B
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	143		185	245	156		255	305	200		382	440	209		419	544	219		438	604
15	1	1	114		148	196	124		204	244	160		306	352	168		335	436	175		351	483
18	1	1	95		123	164	104		170	203	133		255	293	140		279	363	146		292	403
21	1	1	82		105	140	89		146	174	114		219	251	120		239	311	125		251	345
24	1	1	71		92	123	78		127	153	100		191	220	105		209	272	109		219	302
30	1	1	57		74	98	62		102	122	80		153	176	84		168	218	88		175	242
36	1	1	48		62	82	52		85	102	67		127	147	70		140	181	73		146	201
42	1	1	41		53	70	44		73	87	57		109	126	60		120	156	63		125	173
48	1	1	36		46	61	39		64	76	50		96	110	52		105	136	55		110	151
54	1	2				55	35		57	68	44		85	98	47		93	121	49		97	134
60	1	2				49				61	40		76	88	42		84	109	44		88	121
66	1	2				45				55				80	38		76	99	40		80	110
72	1	2				41				51				73	35		70	91	36		73	101
78	1	2				38				47				68				84	34		67	93
84	1	2				35				44				63				78	31		63	86
90	1	2				33				41				59				73				81
96	1	2								38				55				68				76
102	2	3								36				52				64				71
108	2	3												49				60				67
114	2	3												46				57				64
120	2	3												44				54				60
126	2	3																52				58

(Thickness columns: SPECIFIED THICKNESS OF COATED SHEET (IN.))

* FOR TRENCH INSTALLATION ONLY

A = 2-2/3" X 1/2" CORRUGATIONS
B = 3" X 1" CORRUGATIONS
C = 5" X 1" CORRUGATIONS
D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.

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.

CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 3/22/2022

725.00C

CORRUGATED H32 ALUMINUM CIRCULAR PIPE LOCK SEAM

MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.) 0.06				0.075				0.105				0.135				0.164			
	CORRUGATED	SPIRAL RIB	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	132	152		71	165	191		97	232	267		156	298	357		221	364	420		
15	1	1	106	122		57	132	153		78	185	213		125	239	286		176	291	336		
18	1	1	88	101		47	110	127		65	155	178		104	199	238		147	243	280		
21	1	1	76	87		41	95	109		56	132	152		89	170	204		126	208	240		
24	1	1	66	76		35	83	96		49	116	133		78	149	178		110	182	210		
30	1	2		61		28	66	76		39	93	107		62	119	143		88	146	168		
36	1	2		51		24✳	55	64		32	77	89		52	99	119		74	121	140		
42	1	2		43				55		28✳	66	76		45	85	102		63	104	120		
48	1	2		38				48			58	67		39	75	89		55	91	105		
54	1	2		34				42			51	59		35	66	79		49	81	93		
60	1	2		30				38				53		31✳	55	71		44	68	84		
66	1	2		28				35				48				65		40	56	76		
72	1	3		25				32				44				59		37✳	46	70		
78	1	3						29				41				55				65		
84	1	3										38				51				60		
90	1	3										36				48				56		
96	1	3										33				45				53		
102	2	4														42				49		
108	2	4														39				47		
114	2	4																		42		
120	2	4																		39		
126	2	4																				

✳ FOR TRENCH INSTALLATION ONLY

CORRUGATED H32 ALUMINUM CIRCULAR PIPE RIVETED SEAM

MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.) 0.06				0.075				0.105				0.135				0.164			
			SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET	
	CORRUGATED	SPIRAL RIB	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	77		120	141	77		154	175	133		269	239	138		282	359	144		291	466
15	1	1	62		96	113	62		123	140	107		215	191	111		226	287	115		232	373
18	1	1	51		80	94	51		103	117	89		179	160	92		188	239	96		194	311
21	1	1	44		68	81	44		88	100	76		154	137	79		161	205	82		166	266
24	1	1	38		60	71	38		77	88	67		135	120	69		141	179	72		145	233
30	1	2				56	31		62	70	53		108	96	55		113	144	57		116	186
36	1	2				47	26		51	58	44		90	80	46		94	120	48		97	155
42	1	2				40				50	38		77	68	40		81	103	41		83	133
48	1	2				35				44	33		67	60	35		71	90	36		73	116
54	1	2				31				39	30		56	53	31		63	80	32		65	104
60	1	2				28				35				48	28		56	72	29		58	93
66	1	2				26				32				44				65	26		53	85
72	1	3				24				29				40				60	24		47	78
78	1	3								27				37				55				72
84	1	3												34				51				67
90	1	3												32				48				62
96	1	3												30				45				58
102	2	4																42				55
108	2	4																40				51
114	2	4																				46
120	2	4																				41
126	2	4																				

A = 2-2/3" X 1/2" CORRUGATIONS
B = 3" X 1" CORRUGATIONS
C = 5" X 1" CORRUGATIONS
D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.

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

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.

CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 3/22/2022
725.00C

CORRUGATED H34 ALUMINUM CIRCULAR PIPE LOCK SEAM

MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.06				0.075				0.105				0.135				0.164			
	CORRUGATED	SPIRAL RIB	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	159	183		85	199	229		117	278	320		187	358	428		265	437	504		
15	1	1	127	146		68	159	183		93	223	256		150	286	343		212	350	403		
18	1	1	106	122		57	132	153		78	185	213		125	239	286		176	291	336		
21	1	1	91	104		49	113	131		67	159	183		107	205	245		151	250	288		
24	1	1	79	91		43	99	115		58	139	160		94	179	214		132	218	252		
30	1	2		73		34	79	92		47	111	128		75	143	171		106	175	202		
36	1	2		61		28*	66	76		39	93	107		62	119	143		88	146	168		
42	1	2		52				66		33*	79	91		54	102	122		76	125	144		
48	1	2		46				57			68	80		47	89	107		66	109	126		
54	1	2		41				51			56	71		42	73	95		59	90	112		
60	1	2		37				46				64		37*	59	86		53	73	101		
66	1	2		33				42				58				78		48	59	92		
72	1	3		30				38				53				71		42*	47	84		
78	1	3						35				49				66				78		
84	1	3										46				61				72		
90	1	3										43				57				67		
96	1	3										39				53				62		
102	2	4														48				56		
108	2	4														43				51		
114	2	4																		46		
120	2	4																		41		
126	2	4																				

CORRUGATED H34 ALUMINUM CIRCULAR PIPE RIVETED SEAM

MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

SPECIFIED DIAMETER OF PIPE	MINIMUM COVER		SPECIFIED THICKNESS OF COATED SHEET (IN.)																			
			0.06				0.075				0.105				0.135				0.164			
			SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET		SINGLE RIVET		DOUBLE RIVET	
	CORRUGATED	SPIRAL RIB	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	77		120	141	77		154	175	133		269	239	138		282	359	144		291	466
15	1	1	62		96	113	62		123	140	107		215	191	111		226	287	115		232	373
18	1	1	51		80	94	51		103	117	89		179	160	92		188	239	96		194	311
21	1	1	44		68	81	44		88	100	76		154	137	79		161	205	82		166	266
24	1	1	38		60	71	38		77	88	67		135	120	69		141	179	72		145	233
30	1	2				56	31		62	70	53		108	96	55		113	144	57		116	186
36	1	2				47	26		51	58	44		90	80	46		94	120	48		97	155
42	1	2				40				50	38		77	68	40		81	103	41		83	133
48	1	2				35				44	33		67	60	35		71	90	36		73	116
54	1	2				31				39	30		56	53	31		63	80	32		65	104
60	1	2				28				35				48	28		56	72	29		58	93
66	1	2				26				32				44				65	26		53	85
72	1	3				24				29				40				60	24		47	78
78	1	3								27				37				55				72
84	1	3												34				51				67
90	1	3												32				48				62
96	1	3												30				45				58
102	2	4																42				55
108	2	4																40				51
114	2	4																				46
120	2	4																				41
126	2	4																				

* FOR TRENCH INSTALLATION ONLY

A = 2-2/3" X 1/2" CORRUGATIONS
B = 3" X 1" CORRUGATIONS
C = 5" X 1" CORRUGATIONS
D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.

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.

CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 3/22/2022

725.00C

MINIMUM COVER FOR CONSTRUCTION LOADS (ROUND AND PIPE-ARCH)				
DIAMETER OR PIPE SPAN	MINIMUM COVER (FT.) FOR INDICATED AXLE LOADS (2)			
	18K LBS.- 50K LBS.	50K LBS.- 75K LBS.	75K LBS.- 110K LBS.	110K LBS.- 150K LBS.
IN.	FT.	FT.	FT.	FT.
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.

PIPE-ARCH REQUIREMENTS 2-2/3" X 1/2" CORRUGATIONS				
TYPE	SPAN (3)	RISE (3)	GALVANIZED SHEET	
	(IN.)	(IN.)	THICKNESS (IN.)	GAUGE
B1	17	13	0.064	16
B2	21	15	0.064	16
B3	24	18	0.064	16
B4	28	20	0.064	16
B5	35	24	0.064	16
B6	42	29	0.079	14
B7	49	33	0.109	12
B8	57	38	0.109	12
B9	64	43	0.109	12
B10	71	47	0.138	10
B11	77	52	0.168	8
B12	83	57	0.168	8

PIPE-ARCH REQUIREMENTS							
TYPE	SPAN (4)	RISE (4)	GALVANIZED SHEET 3" X 1" CORRUGATIONS		GALVANIZED SHEET 5" X 1" CORRUGATIONS		MINIMUM COVER (2)
	(IN.)	(IN.)	THICKNESS (IN.)	GAUGE	THICKNESS (IN.)	GAUGE	(IN.)
B8A	53 (-2.4)	41 (+2.4)	0.079	14	0.109	12	12
B9A	60 (-2.7)	46 (+2.7)	0.079	14	0.109	12	15
B10A	66 (-3.0)	51 (+3.0)	0.079	14	0.109	12	15
B11A	73 (-3.3)	55 (+3.3)	0.079	14	0.109	12	18
B12A	81 (-3.6)	59 (+3.6)	0.079	14	0.109	12	18
B13A	87 (-4.4)	63 (+4.4)	0.079	14	0.109	12	18
B14A	95 (-4.8)	67 (+4.8)	0.079	14	0.109	12	18
B15A	103 (-5.2)	71 (+5.2)	0.079	14	0.109	12	18
B16A	112 (-5.6)	75 (+5.6)	0.109	12	0.109	12	21
B17A	117 (-5.9)	79 (+5.9)	0.109	12	0.109	12	21
B18A	128 (-6.4)	83 (+6.4)	0.109	12	0.109	12	24
B19A	137 (-6.9)	87 (+6.9)	0.109	12	0.109	12	24
B20A	142 (-7.1)	91 (+7.1)	0.138	10	0.138	10	24

(2) MINIMUM COVER MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.

(3) A TOLERANCE OF PLUS OR MINUS ONE INCH OR 2 PERCENT OF EQUIVALENT CIRCULAR DIAMETER, WHICHEVER IS GREATER, WILL BE PERMISSIBLE IN SPAN AND RISE.

(4) TOLERANCES IN PARENTHESES. NO TOLERANCE IN OPPOSITE DIRECTION.

MoDOT
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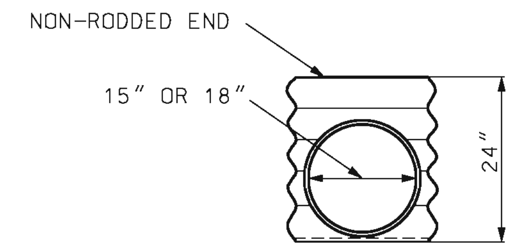
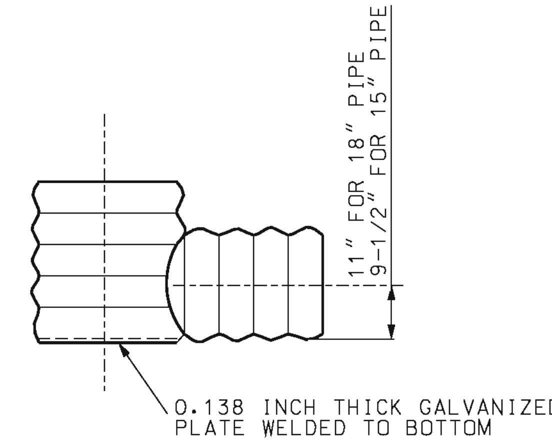
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CORRUGATED METAL PIPE INSTALLATION METHODS

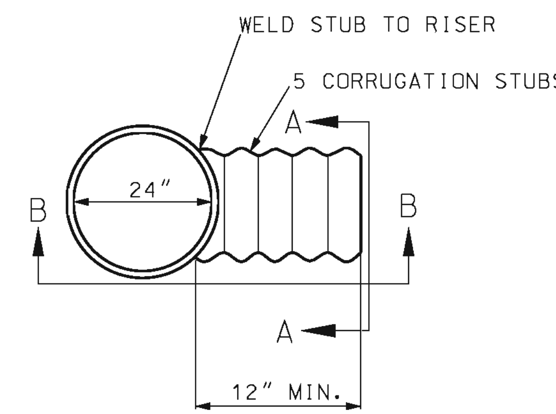
DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 8/24/2015
725.00C



SECTION A-A

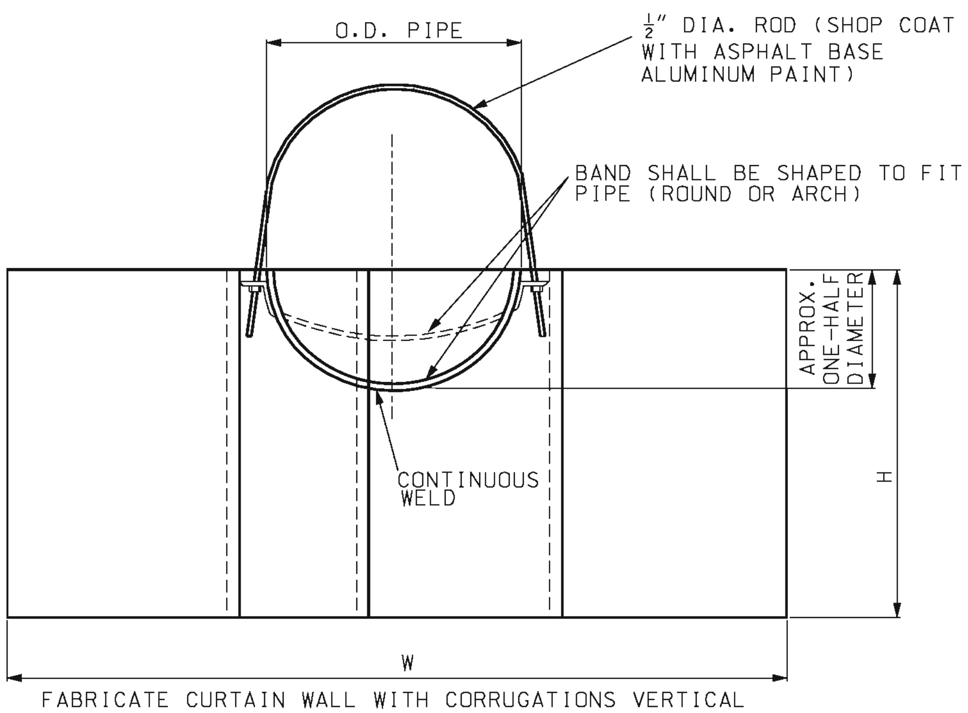


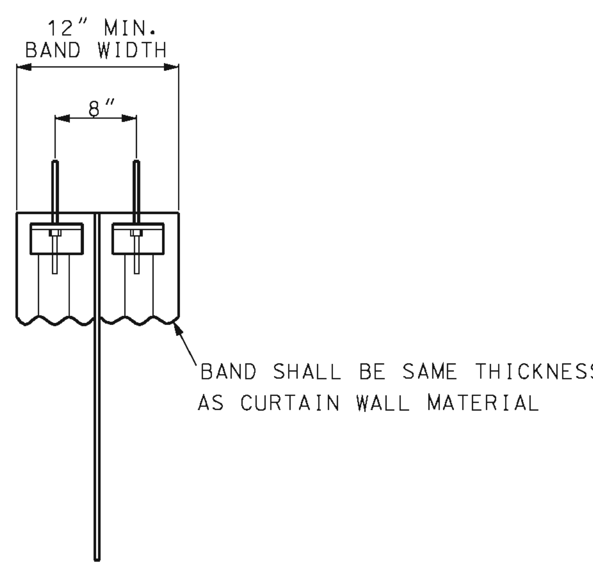
SECTION B-B



PLAN

METAL INLETS





METAL CURTAIN WALL

TABLE FOR METAL CURTAIN WALL

DIA. IN.	GALV.SHT. THICK IN.	W IN.	H IN.
FOR ROUND OR ELLIPTICAL PIPE			
18	0.064	72	35
21	0.064	72	35
24	0.064	72	40
30	0.064	84	40
36	0.079	84	49
42	0.079	96	49
48	0.079	96	49
54	0.079	120	58-1/2
60	0.109	120	58-1/2
66	0.109	132	58-1/2
72	0.109	132	68-1/2
78	0.138	132	68-1/2
84	0.138	144	68-1/2
FOR PIPE ARCH			
B-2	0.064	72	30
B-3	0.064	72	30
B-4	0.079	84	30
B-5	0.079	84	30
B-6	0.109	96	35
B-7	0.109	96	35
B-8	0.109	108	35
B-9	0.109	120	35
B-10	0.138	120	40
B-11	0.168	125	50
B-12	0.168	131	54

GENERAL NOTES:

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

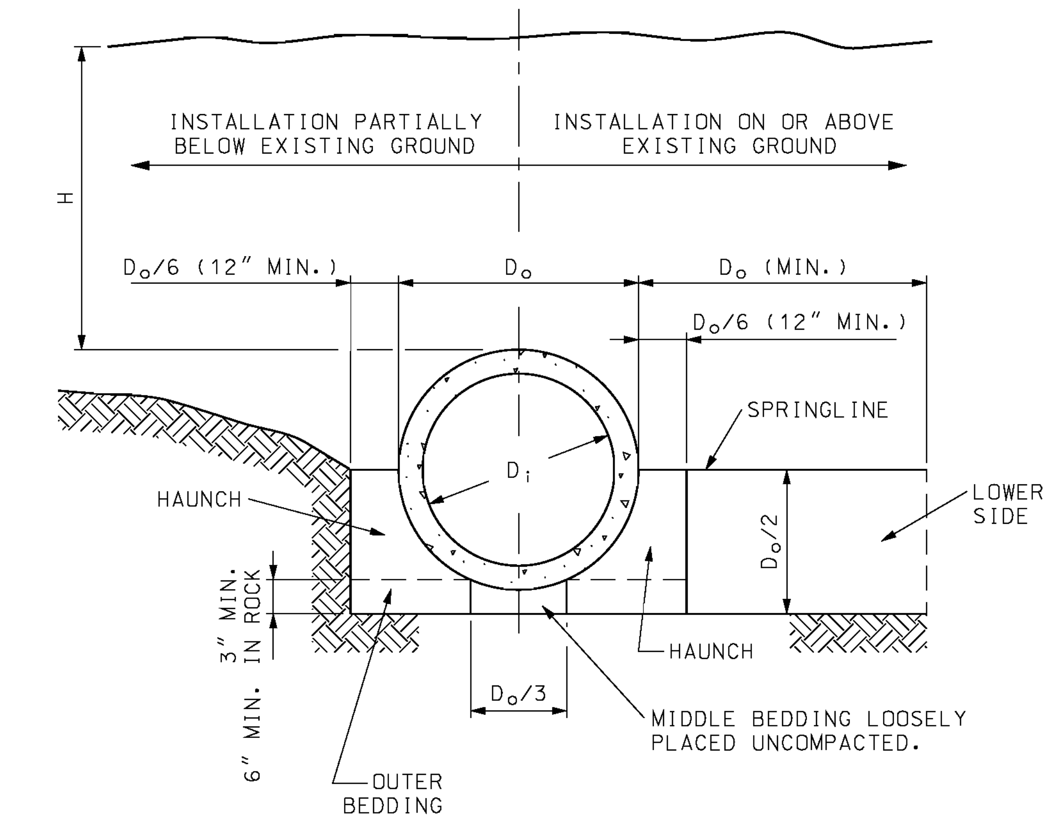
METAL CURTAIN WALL AND METAL INLETS

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 8/21/2009

725.31C

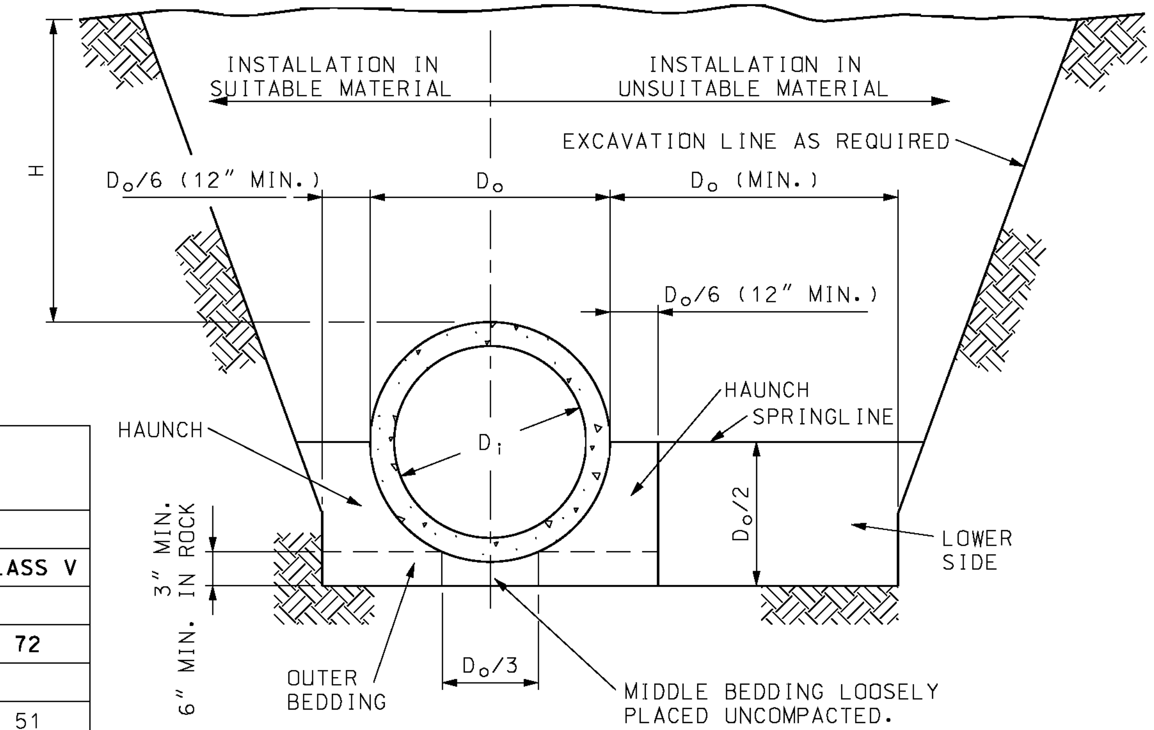
SHEET NO. 1 OF 1

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



EMBANKMENT INSTALLATIONS

CONSTRUCTION SEQUENCE
1. PLACE BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE SPRINGLINE.
5. COMPLETE BACKFILL ACCORDING TO SPECIFICATIONS.



TRENCH INSTALLATION

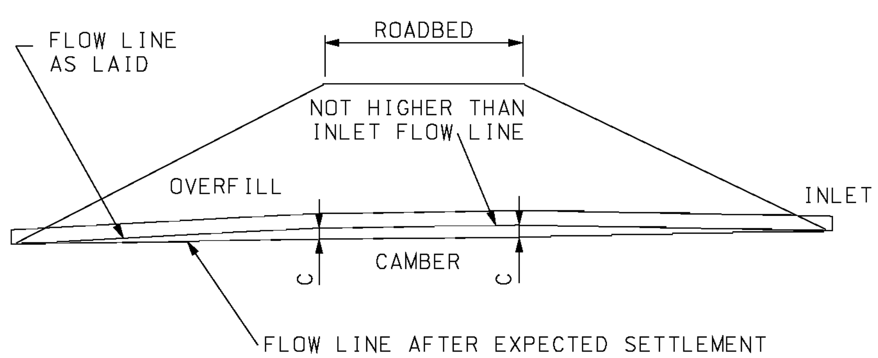
MAXIMUM DIAMETER AND MAXIMUM FILL HEIGHT

INSTALLATION TYPE	CLASS OF PIPE				
	CLASS I	CLASS II	CLASS III	CLASS IV	CLASS V
	MAXIMUM DIAMETER (INCHES)				
	108	108	108	84	72
	MAXIMUM FILL HEIGHT IN (FEET)				
TYPE 1	12	15	21	33	51
TYPE 2	9	12	17	26	39
TYPE 3	7	9	13	20	30
TYPE 4	4	6	9	13	20

IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS 36 INCHES OR LESS A SPECIAL PIPE DESIGN AND INSTALLATION PROCEDURE SHALL BE REQUIRED. IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS GREATER THAN 36 INCHES A SPECIAL DESIGN PIPE IS NOT ALLOWED.

- LEGEND -

D_i = NORMAL INSIDE DIAMETER OF PIPE.
D_o = OUTSIDE DIAMETER OF PIPE.
H = FILL COVER HEIGHT OVER PIPE (FEET)
MIN. = MINIMUM
= UNDISTURBED SOIL



NOTE:
ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND SHALL BE SPECIFIED ON THE DESIGN PLANS.

TYPICAL CAMBERED FLOW LINE

BEDDING AND COMPACTION REQUIREMENTS

INSTALLATION TYPE	BEDDING THICKNESS	COMPACTION REQUIREMENTS (MIN. STANDARD PROCTOR %)					
		HAUNCH AND OUTER BEDDING			LOWER SIDE BEDDING		
		CATEGORY 1 SOIL (A)	CATEGORY 2 SOIL (B)	CATEGORY 3 SOIL (C)	CATEGORY 1 SOIL (A)	CATEGORY 2 SOIL (B)	CATEGORY 3 SOIL (C)
1	D_o/24 MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE D_o/12 MIMIMUM, NOT LESS THAN 6".	95	N/A	N/A	90	95	100
2	D_o/24 MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE D_o/12 MIMIMUM, NOT LESS THAN 6".	90	95	N/A	85	90	95
3	D_o/24 MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE D_o/12 MIMIMUM, NOT LESS THAN 6".	85	90	95	85	90	95
4	D_o/24 MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE D_o/12 MIMIMUM, NOT LESS THAN 6".	NO COMPACTION REQUIRED	NO COMPACTION REQUIRED	85	NO COMPACTION REQUIRED	NO COMPACTION REQUIRED	85

(A) GRAVELLY SAND
(B) SANDY-SILT
(C) SILTY CLAY

GENERAL NOTES:

MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF ½ D_o OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".

CLASS I AND CLASS II REINFORCED CONCRETE PIPE SHALL ONLY BE USED FOR SEWERS IN TRENCHES OUTSIDE ROADBED AND STREET LIMITS.

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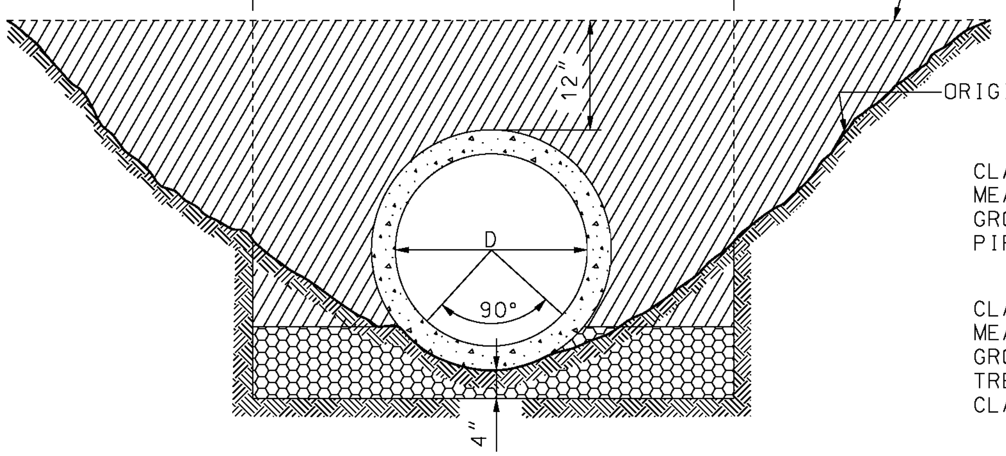
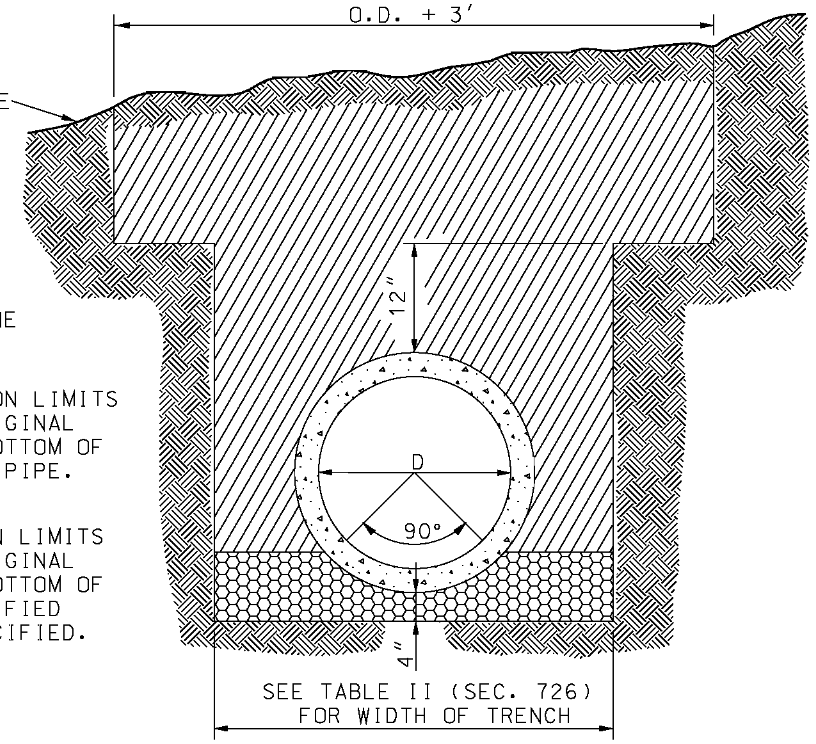
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

RIGID CULVERT INSTALLATION METHODS
REINFORCED CONCRETE PIPE CULVERTS

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015
726.30J



EXTRA STRENGTH



STANDARD STRENGTH

LEGEND

- COMPACTED ROADWAY EMBANKMENT
- SUITABLE BACKFILL
- LOOSE DRY MATERIAL
- COMPACTED SAND

HEIGHT OF FILL OVER V.C. PIPE CULVERTS						
	STANDARD STRENGTH			EXTRA STRENGTH		
NOMINAL PIPE DIAMETER (INCH)	TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET)	MINIMUM FILL HEIGHT (FEET)	MAXIMUM FILL HEIGHT (FEET)	TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET)	MINIMUM FILL HEIGHT (FEET)	MAXIMUM FILL HEIGHT (FEET)
6	2.0	1.0	9.0			
8	2.0	1.0	7.0	2.5	4.0	12.0
10	2.5	1.0	7.0	2.5	4.0	12.0
12	2.7	1.0	6.0	3.0	4.0	13.0
15	3.5	1.0	6.0	3.0	4.0	17.0
18	3.5	1.0	6.0	3.5	4.0	17.0
21	4.0	1.0	6.0	4.0	4.0	17.0
24	4.0	1.0	8.0	4.0	3.0	19.0
30	4.5	1.0	10.0	4.5	3.0	19.0
36	5.0	1.0	11.0	5.0	3.0	19.0

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STATE OF MISSOURI
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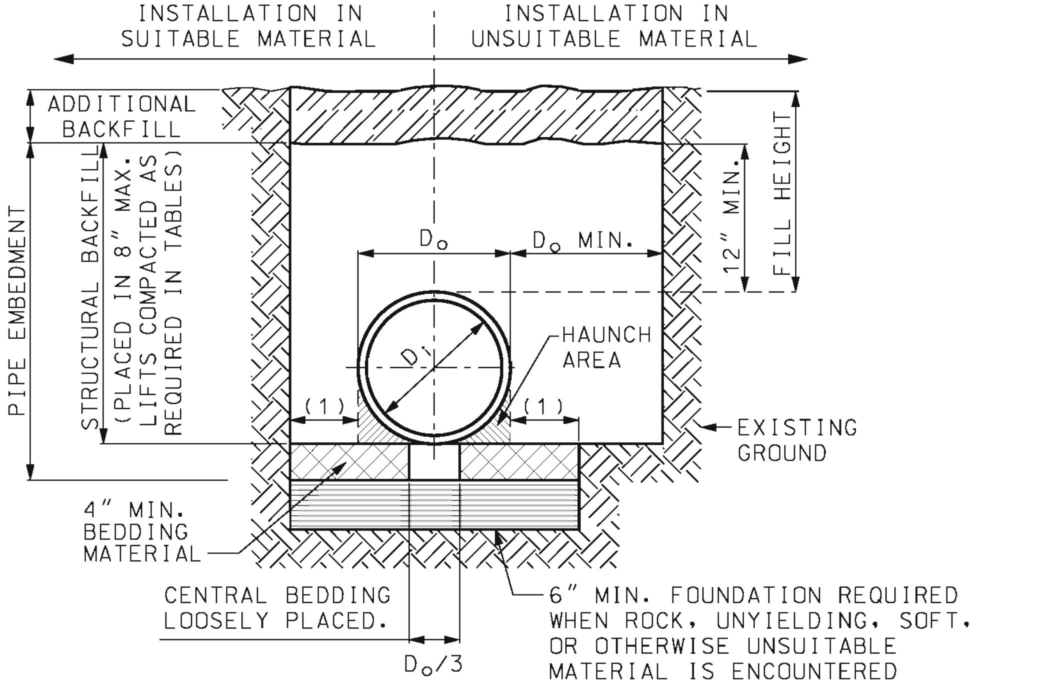
RIGID CULVERT INSTALLATION METHODS

VITRIFIED CLAY PIPE CULVERTS

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

726.30J

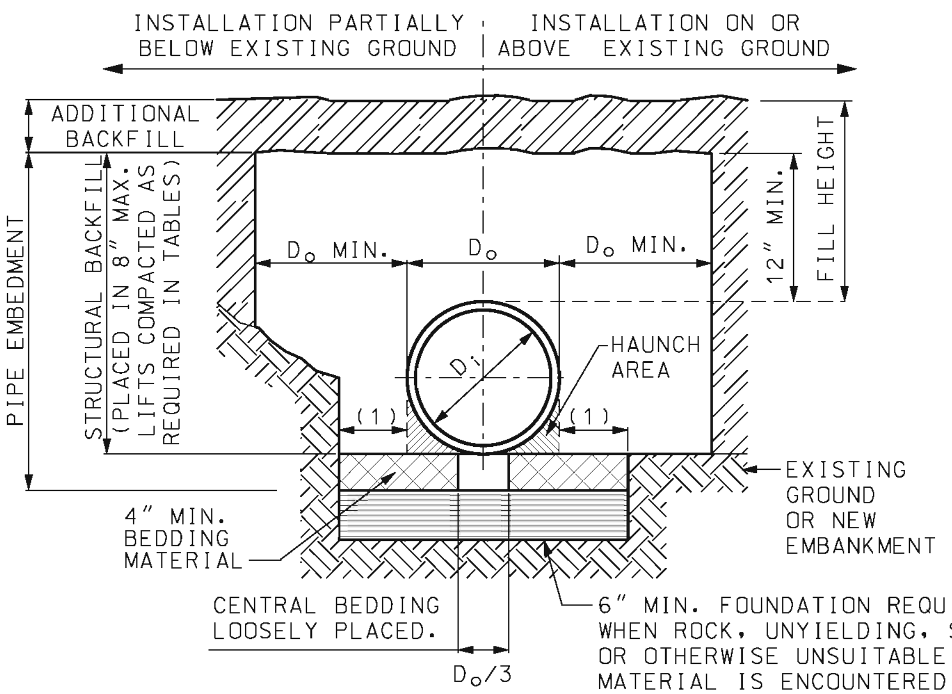


TRENCH INSTALLATION

LEGEND

D_i = INSIDE DIAMETER OF PIPE.
D_o = OUTSIDE DIAMETER OF PIPE.
(1) = $(D_o/4)+6"$ (MIN.)

NOTE:
MULTIPLE PIPE SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF $\frac{1}{2} D_o$ OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".



EMBANKMENT INSTALLATION

CONSTRUCTION SEQUENCE

1. PLACE BEDDING MATERIAL TO GRADE.
2. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
3. INSTALL PIPE TO GRADE.
4. COMPLETE STRUCTURAL BACKFILL ACCORDING TO SPECIFICATIONS.

FILL HEIGHT LIMITS

STRUCTURAL BACKFILL	SPECIFIED NOMINAL DIA OF PIPE (IN.)	POLYETHYLENE				STEEL REINFORCED POLYETHYLENE		POLYVINYL				DOUBLE WALL POLYPROPYLENE				TRIPLE WALL POLYPROPYLENE			
		COMPACTION 90% SPD		COMPACTION 95% SPD		COMPACTION 90% SPD		COMPACTION 90% SPD		COMPACTION 95% SPD		COMPACTION 90% SPD		COMPACTION 95% SPD		COMPACTION 90% SPD		COMPACTION 95% SPD	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
GRAVEL (AASHTO M145 SOIL TYPE A1 & A3)	12	2'	19'	2'	26'	--	--	2'	32'	2'	61'	2'	21'	2'	29'	--	--	--	--
	15	2'	19'	2'	27'	--	--	2'	32'	2'	55'	2'	22'	2'	31'	--	--	--	--
	18	2'	17'	2'	25'	--	--	2'	31'	2'	60'	2'	19'	2'	27'	--	--	--	--
	24	2'	15'	2'	21'	2'	50'	2'	30'	2'	54'	2'	16'	2'	22'	--	--	--	--
	30	2'	17'	2'	24'	2'	50'	2'	31'	2'	52'	2'	11'	2'	15'	2'	17'	2'	23'
	36	2'	13'	2'	19'	2'	50'	2'	30'	2'	53'	--	--	--	--	2'	15'	2'	21'
	42	2'	13'	2'	19'	2'	50'	--	--	--	--	--	--	--	--	2'	19'	2'	27'
	48	2'	12'	2'	18'	2'	30'	--	--	--	--	--	--	--	--	2'	12'	2'	17'
	60	2'	13'	2'	20'	2'	30'	--	--	--	--	--	--	--	--	2'	16'	2'	23'
COURSE SAND (AASHTO M145 SOIL TYPE A-1-b)	12	2'	17'	2'	23'	--	--	2'	32'	2'	55'	2'	18'	2'	24'	--	--	--	--
	15	2'	16'	2'	22'	--	--	2'	32'	2'	49'	2'	22'	2'	31'	--	--	--	--
	18	2'	15'	2'	21'	--	--	2'	31'	2'	53'	2'	16'	2'	21'	--	--	--	--
	24	2'	14'	2'	20'	2'	50'	2'	30'	2'	48'	2'	13'	2'	17'	--	--	--	--
	30	2'	13'	2'	19'	2'	50'	2'	31'	2'	46'	2'	7'	2'	10'	2'	17'	2'	23'
	36	2'	12'	2'	17'	2'	50'	2'	30'	2'	46'	--	--	--	--	2'	15'	2'	21'
	42	2'	13'	2'	18'	2'	50'	--	--	--	--	--	--	--	--	2'	19'	2'	27'
	48	2'	12'	2'	17'	2'	30'	--	--	--	--	--	--	--	--	2'	12'	2'	17'
	60	2'	13'	2'	20'	2'	30'	--	--	--	--	--	--	--	--	2'	16'	2'	23'
SILTY SAND OR SILTY GRAVEL (AASHTO M145 SOIL TYPES A-2-4 & A-2-5)	12	3.3'	10'	2'	17'	--	--	2.7'	16'	2'	33'	2.8'	11'	2'	19'	--	--	--	--
	15	3.4'	10'	2'	16'	--	--	2.7'	16'	2'	33'	2.8'	11'	2'	23'	--	--	--	--
	18	3.6'	10'	2'	15'	--	--	2.7'	15'	2'	32'	3'	11'	2'	16'	--	--	--	--
	24	3.8'	9'	2'	14'	2'	50'	2.7'	15'	2'	31'	3.3'	10'	2'	13'	--	--	--	--
	30	3.7'	10'	2'	14'	2'	50'	2.8'	15'	2'	31'	3.4'	6'	2'	7'	3'	10'	2'	17'
	36	4.2'	7'	2'	12'	2'	50'	2.8'	14'	2'	31'	--	--	--	--	3.3'	10'	2'	15'
	42	4.2'	7'	2'	13'	2'	50'	--	--	--	--	--	--	--	--	3.2'	11'	2'	20'
	48	4.5'	6'	2'	12'	2'	30'	--	--	--	--	--	--	--	--	3.1'	9'	2'	13'
	60	3.3'	7'	2'	14'	2'	30'	--	--	--	--	--	--	--	--	2'	10'	2'	17'

NOTE:

SPD = STANDARD PROCTOR DENSITY.

FILL HEIGHT MEASURED FROM THE TOP OF PIPE TO SURFACE.

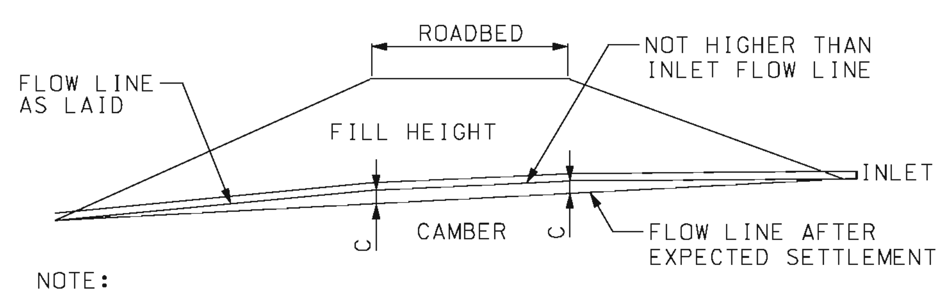
LIMITS ACCOUNT FOR SHORT-TERM TEMPORARY WATER TABLE DEPTHS OF FIVE FEET ABOVE SPRINGLINE. TABLES ARE NOT APPLICABLE FOR LONG-TERM PERMANENT WATER TABLE DEPTHS ABOVE SPRINGLINE.

WHEN PIPES ARE USED AS GROUP A, FILL HEIGHTS ARE LIMITED TO SHADED VALUES.

MINIMUM COVER FOR CONSTRUCTION LOADS

NOMINAL PIPE DIA. (IN.)	MINIMUM COVER (FT) FOR INDICATED AXLE LOADS (THOUSANDS OF POUNDS)			
	18-50	50-75	75-110	110-150
12-36	2.0	2.5	3.0	3.0
42-60	3.0	3.0	3.5	4.0

MINIMUM COVER LIMITS ARE NOT SUFFICIENT FOR SILTY SAND OR SILTY GRAVEL STRUCTURAL BACKFILL COMPACTED TO 90% STANDARD PROCTOR DENSITY. THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.



NOTE:
ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND WILL BE SPECIFIED ON THE DESIGN PLANS.

TYPICAL CAMBERED FLOW LINE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

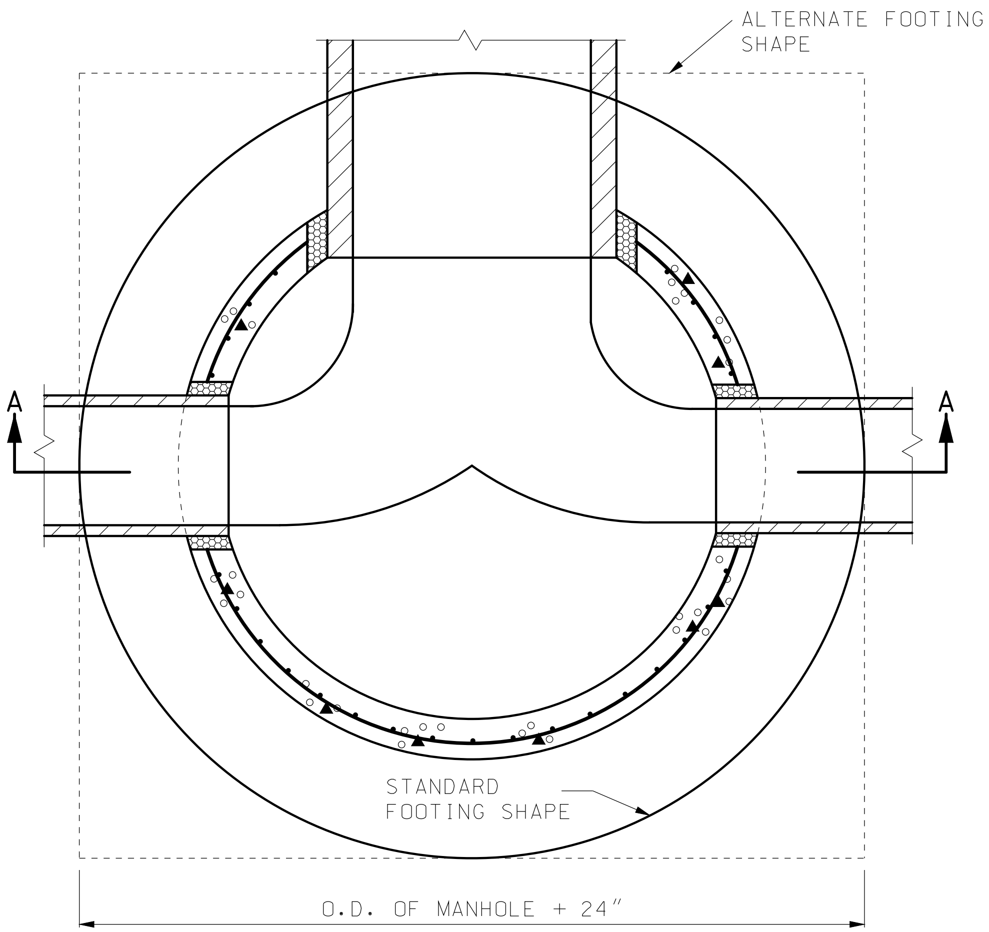
THERMOPLASTIC PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/27/2015

730.00E

SHEET NO. 1 OF 1

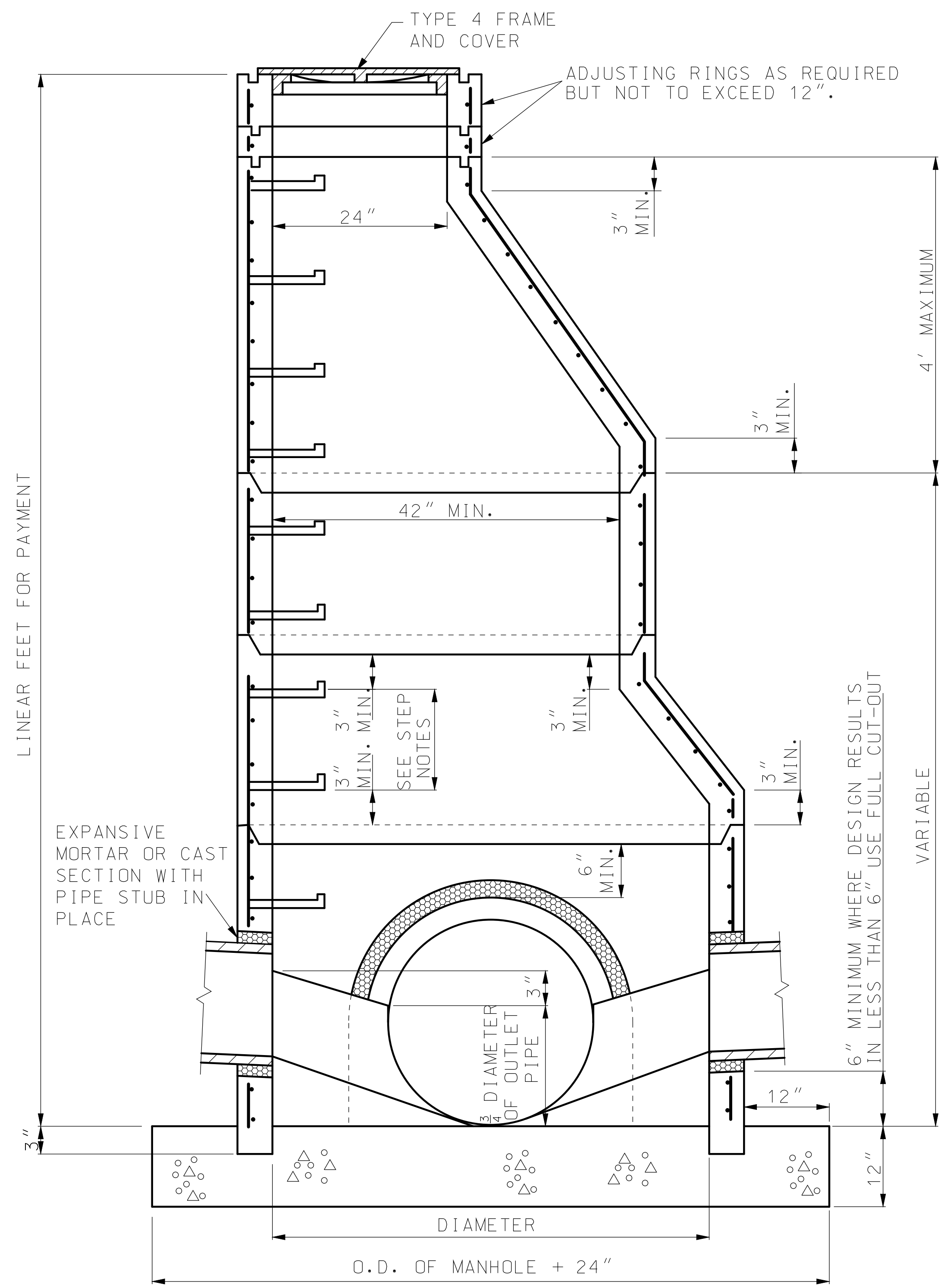
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN OF FOOTING

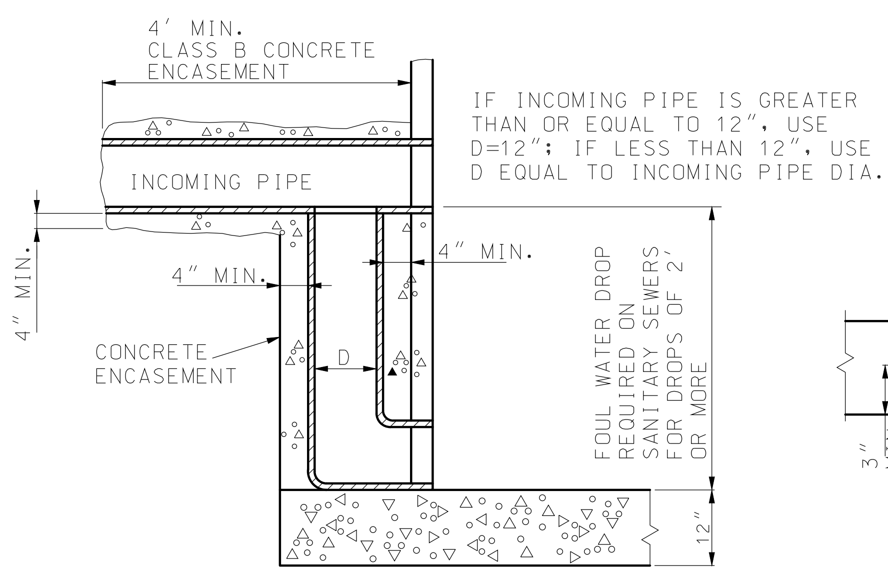
BASE SECTION DIMENSIONS*	
SIZE OF PIPE	MIN. DIA.
24" OR SMALLER	48"
30" - 36"	60"
42" - 48"	72"

* RISER SECTIONS SHALL NOT BE LESS THAN 42" DIAMETER.

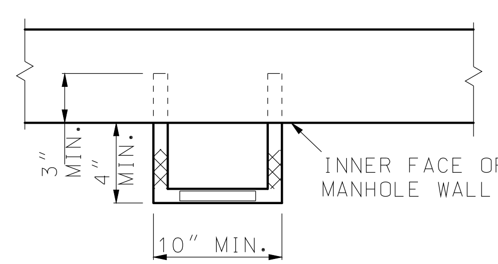


PRECAST BASE SECTION SET ON CONCRETE BLOCKS FOUNDATION SLAB AND INVERT POURED MONOLITHIC.

SECTION A-A



FOUL WATER DROP



STEP INSTALLATION

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL MANHOLES HAVING A DEPTH OF MORE THAN 4'. STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE LEVEL AND IN VERTICAL ALIGNMENT.

NO DIRECT PAYMENT WILL BE MADE FOR MANHOLE STEPS.

GENERAL NOTES:

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE MANHOLES, IN ACCORDANCE WITH THE CONCRETE MANHOLE STANDARD.

IF THE CONTRACTOR ELECTS TO CAST IN PLACE THE MANHOLES, PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE FOR PRECAST MANHOLES.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH AN ESTABLISHED MANUFACTURING PROCEDURE.

FORMED OR CUT OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

THE TOP OF THE INLET SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.

REINFORCEMENT SHALL BE CUT AT PIPE OPENINGS.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE, NOR FOR CUTTING AND BENDING REINFORCING STEEL.

WHERE THE WIDTH OF THE BASE SECTION IS GREATER THAN 42" AN ECCENTRIC TAPER SECTION MAY BE USED TO ALLOW THE USE OF 42" RISER SECTIONS.

THE LOWER TRANSITION SECTION AS SHOWN ON SECTION A-A IS OPTIONAL.

FOUL WATER DROPS ARE REQUIRED WHEN SPECIFIED IN THE PLANS. NO DIRECT PAYMENT WILL BE MADE FOR THE FOUL WATER DROP OR ITS ENCASEMENT.

SEE STANDARD PLAN 614.30 FOR MANHOLE FRAMES AND COVERS.

WHERE PIPES DO NOT ENTER OR EXIT RADIALLY, USE NEXT LARGER SIZE MANHOLE. CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL LIMITS 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION ON THE MANHOLE. CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

ALL PIPE CONNECTED WITH A MANHOLE WILL BE MEASURED AND PAID FOR TO THE INSIDE WALL OF THE MANHOLE.

CIRCUMFERENTIAL REINFORCEMENT SIZE AND PLACEMENT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS TO A MAXIMUM DEPTH OF 20 FEET. OVER 20 FOOT DEPTH CIRCUMFERENTIAL REINFORCEMENT IS INCREASED TO 0.24 SQUARE INCHES STEEL REQUIRED PER LINEAR FOOT, TO A MAXIMUM DEPTH OF 30 FEET.

FOR PIPE CONNECTIONS, A RUBBER GASKET IN ACCORDANCE WITH ASTM RUBBER GASKET SPECIFICATIONS C-443 OR C-923 AND CAST INTEGRALLY IN MANHOLE MAY BE USED AS AN ALTERNATE TO EXPANSIVE MORTAR.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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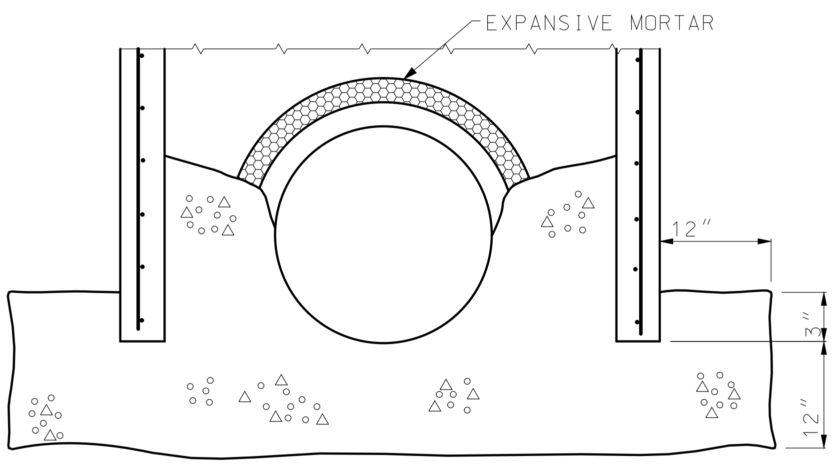
PRECAST MANHOLES

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016
731.00U



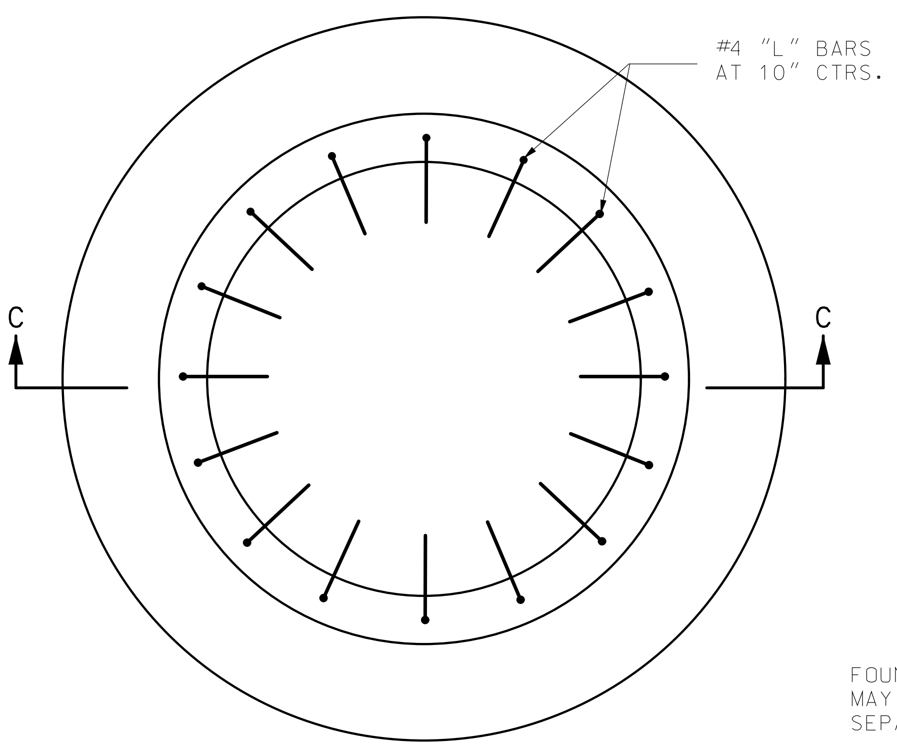
ALTERNATE FOOTING

PRECAST BASE SECTION SET ON CONCRETE BLOCKS FOUNDATION SLAB AND INVERT POURED MONOLITHIC.

SECTION C–C

S = 0 FOR DEPTHS LESS THAN OR EQUAL TO 6';
S = 9" FOR DEPTHS GREATER THAN 6'.

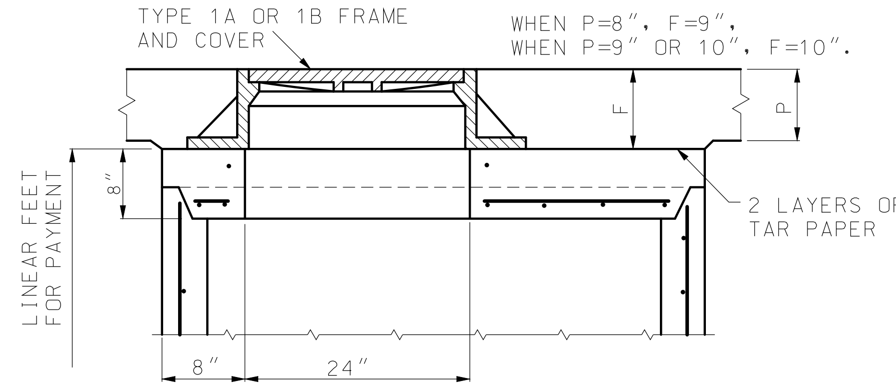
T = 6" FOR DEPTHS OR LESS THAN OR EQUAL TO 6';
T = 9" FOR DEPTHS GREATER THAN 6'.



PRECAST FOUNDATION SLAB

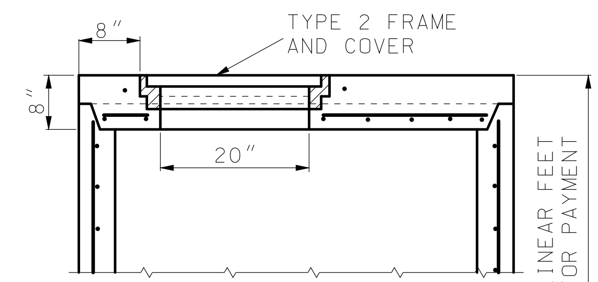
FOUNDATION SLAB AND BASE SECTION MAY BE POURED MONOLITHIC OR SEPARATELY WITH A KEYWAY.

INVERT SHALL BE POURED AFTER PLACEMENT OF MANHOLE.



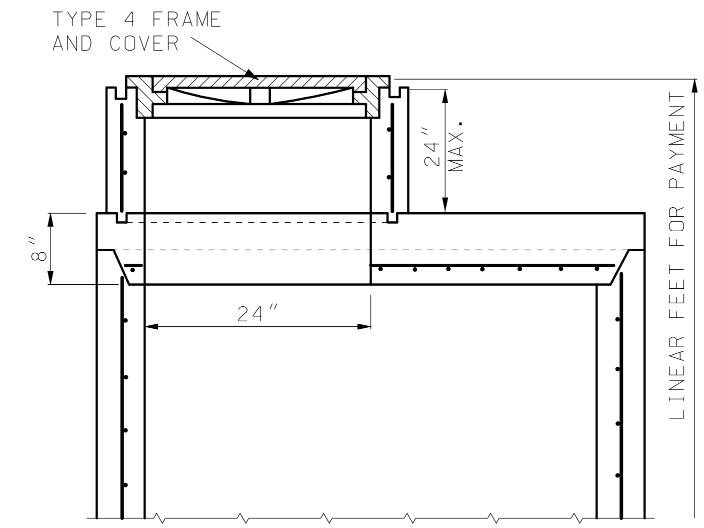
FLAT SLAB MANHOLE TOP (PAVED AREA)

SECTION B–B

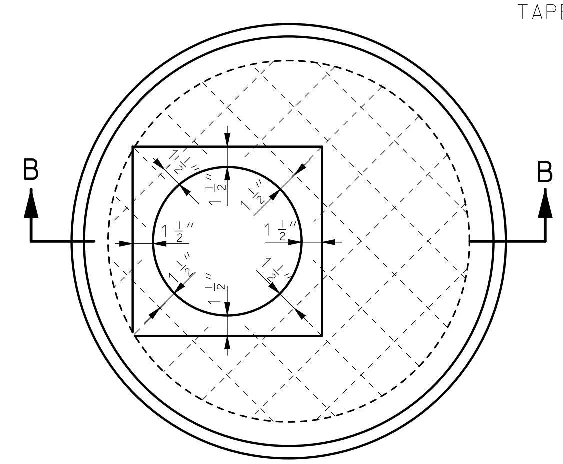


ALTERNATE SECTION B–B

ALTERNATE FLAT SLAB MANHOLE TOP (UNPAVED AREA) USED WHERE DEPTH OF MANHOLE WILL NOT PERMIT USE OF CONE AND TAPER SECTIONS.



ALTERNATE MANHOLE TOP



PLAN OF FLAT SLAB MANHOLE TOP

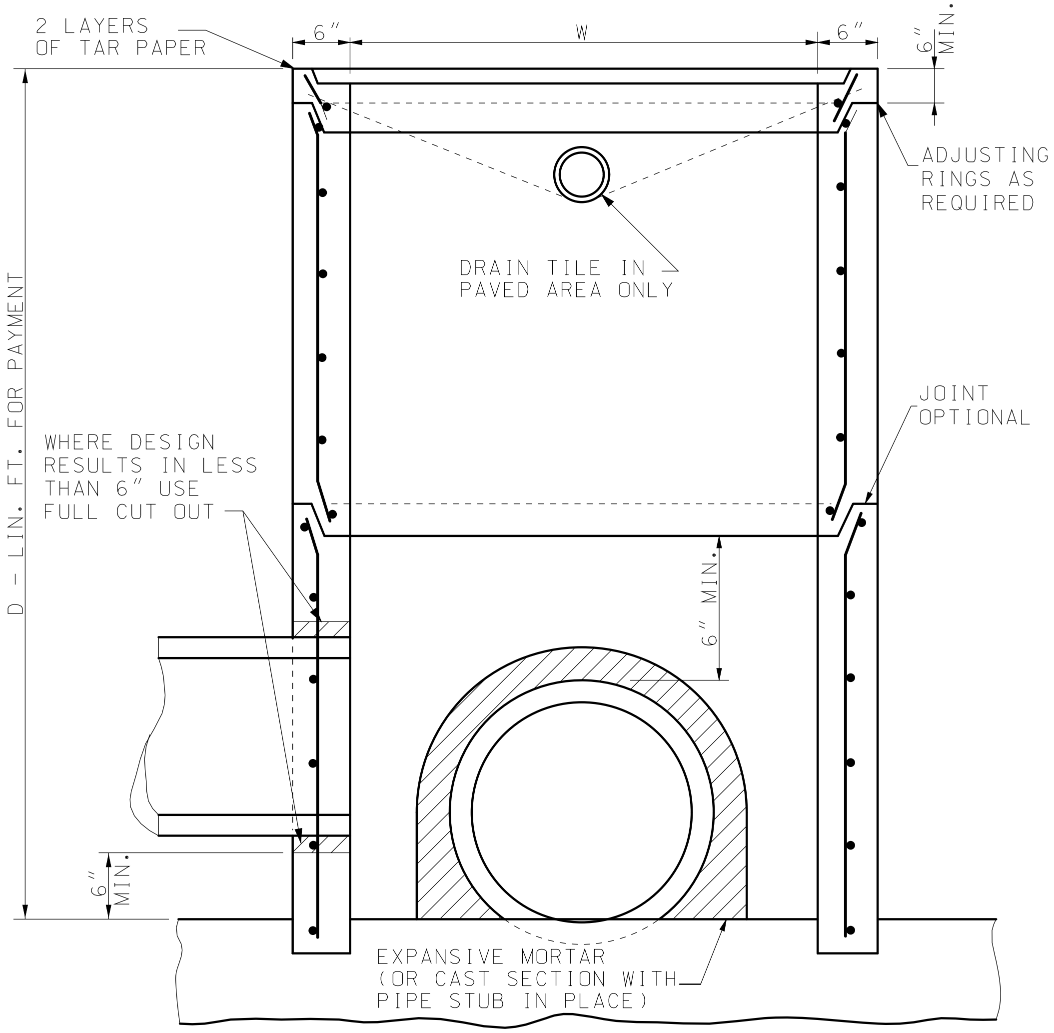
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

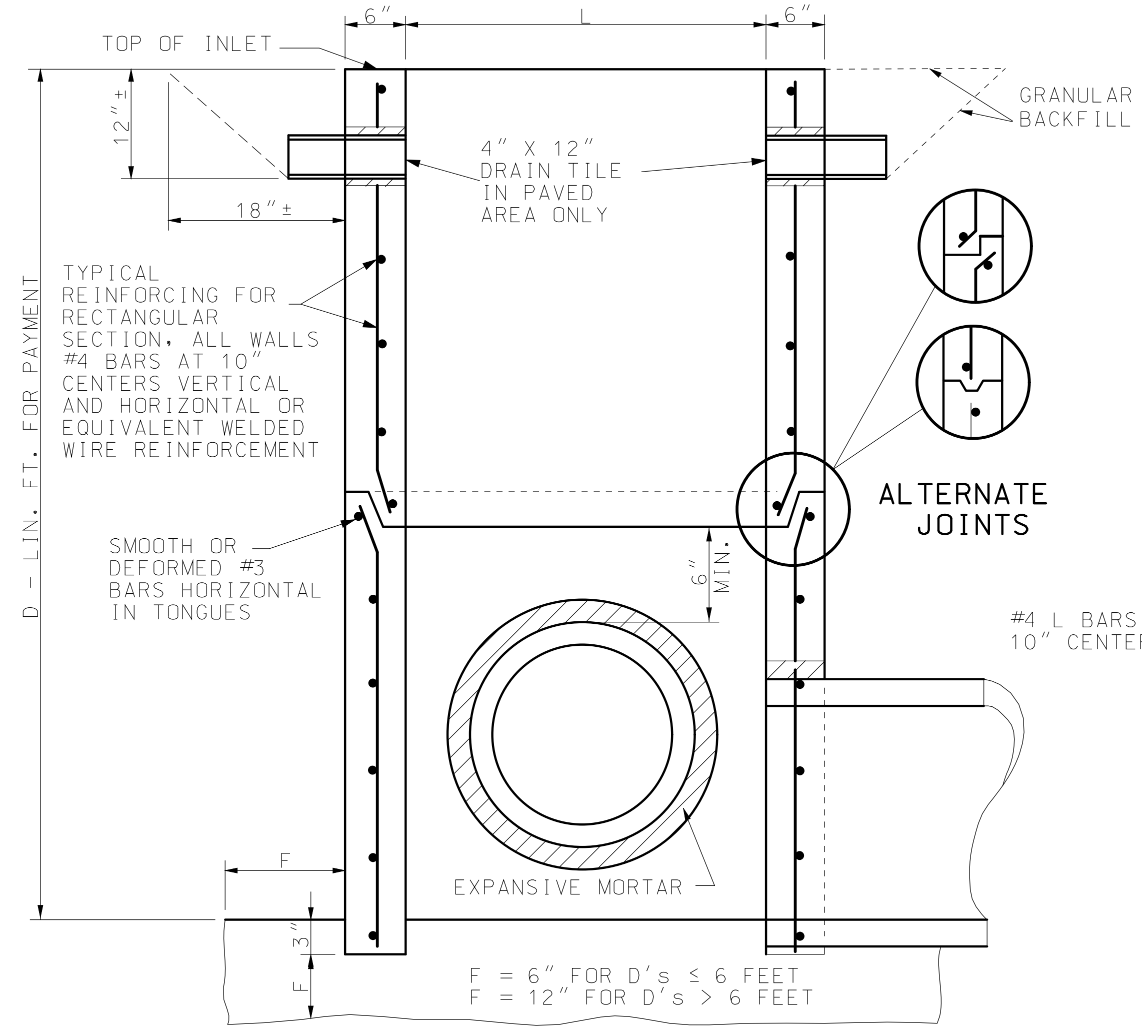
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PRECAST MANHOLES

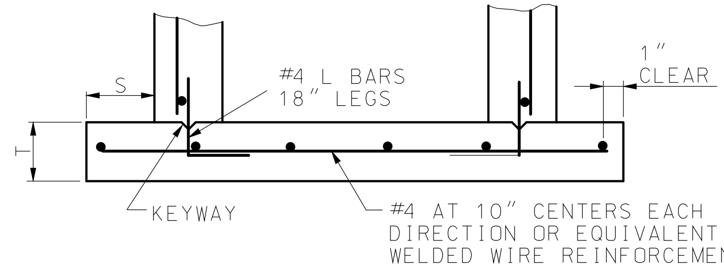
DATE EFFECTIVE:	07/01/2016	731.00U	SHEET NO. 2 OF 2
DATE PREPARED:	5/13/2016		



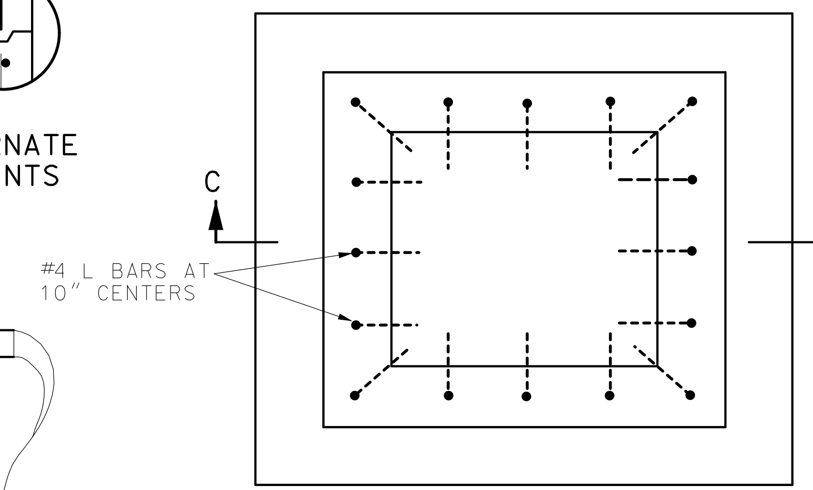
SECTION A-A



SECTION B-B



SECTION C-C

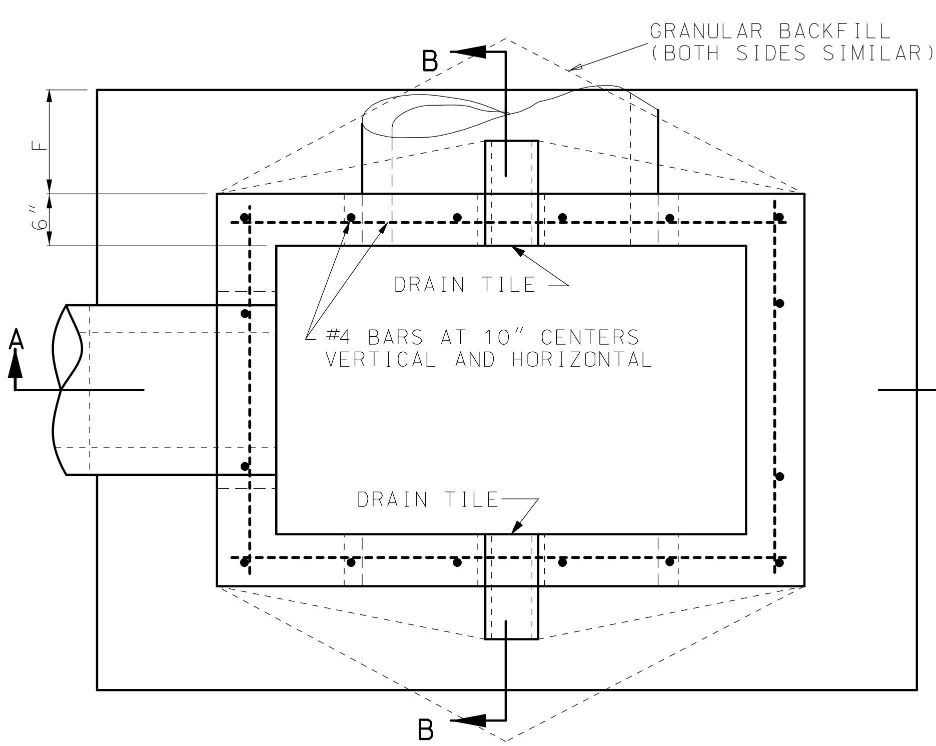


S = 0 FOR D ≤ 6 FEET AND 9" FOR D > 6 FEET

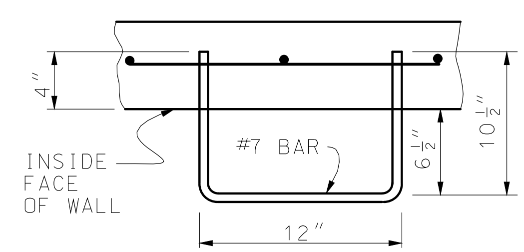
T = 6" FOR D ≤ 6 FEET AND 9" FOR D > 6 FEET

FOUNDATION SLAB AND BASE SECTION MAY BE POURED MONOLITHIC OR SEPARATELY WITH A KEYWAY.

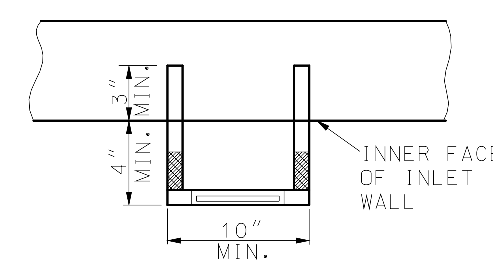
PRECAST FOUNDATION SLAB



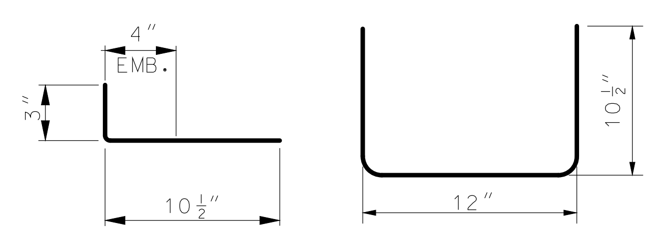
INLET PLAN



STEPS



STEP INSTALLATION (OTHER THAN STEEL BAR)



S - BARS

BENDING DIAGRAM
STEEL STEP BAR

GENERAL NOTES:

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL INLETS HAVING A DEPTH OF MORE THAN 4 FEET. STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE SET LEVEL AND IN VERTICAL ALIGNMENT AND NOT NEARER THAT 3" TO A JOINT.

NO DIRECT PAYMENT WILL BE MADE FOR INLET STEPS.

STEPS ARE NOT REQUIRED FOR TYPE D INLETS.

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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
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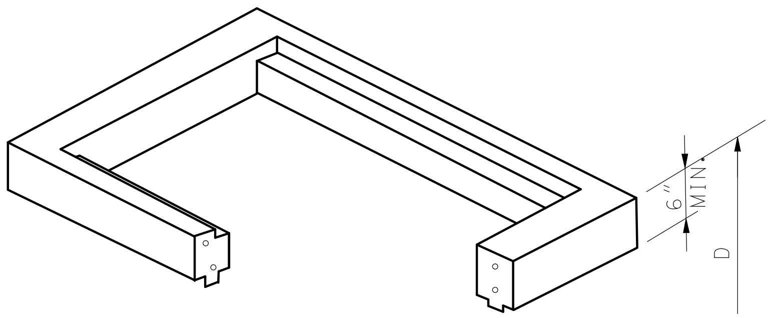
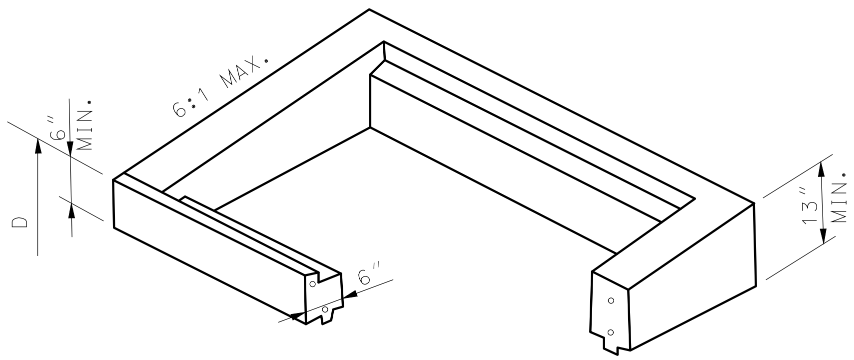
PRECAST DROP INLET

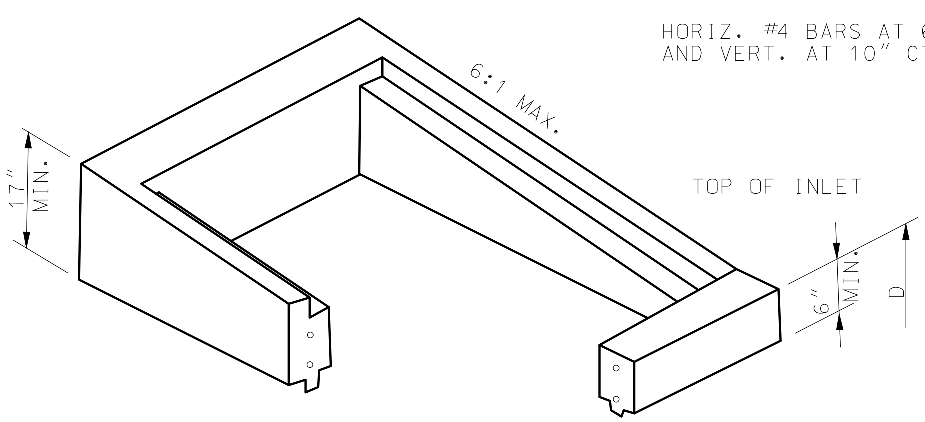
DATE EFFECTIVE:	07/01/2016	731.10S	SHEET NO. 1 OF 8
DATE PREPARED:	5/13/2016		



TYPE S-1



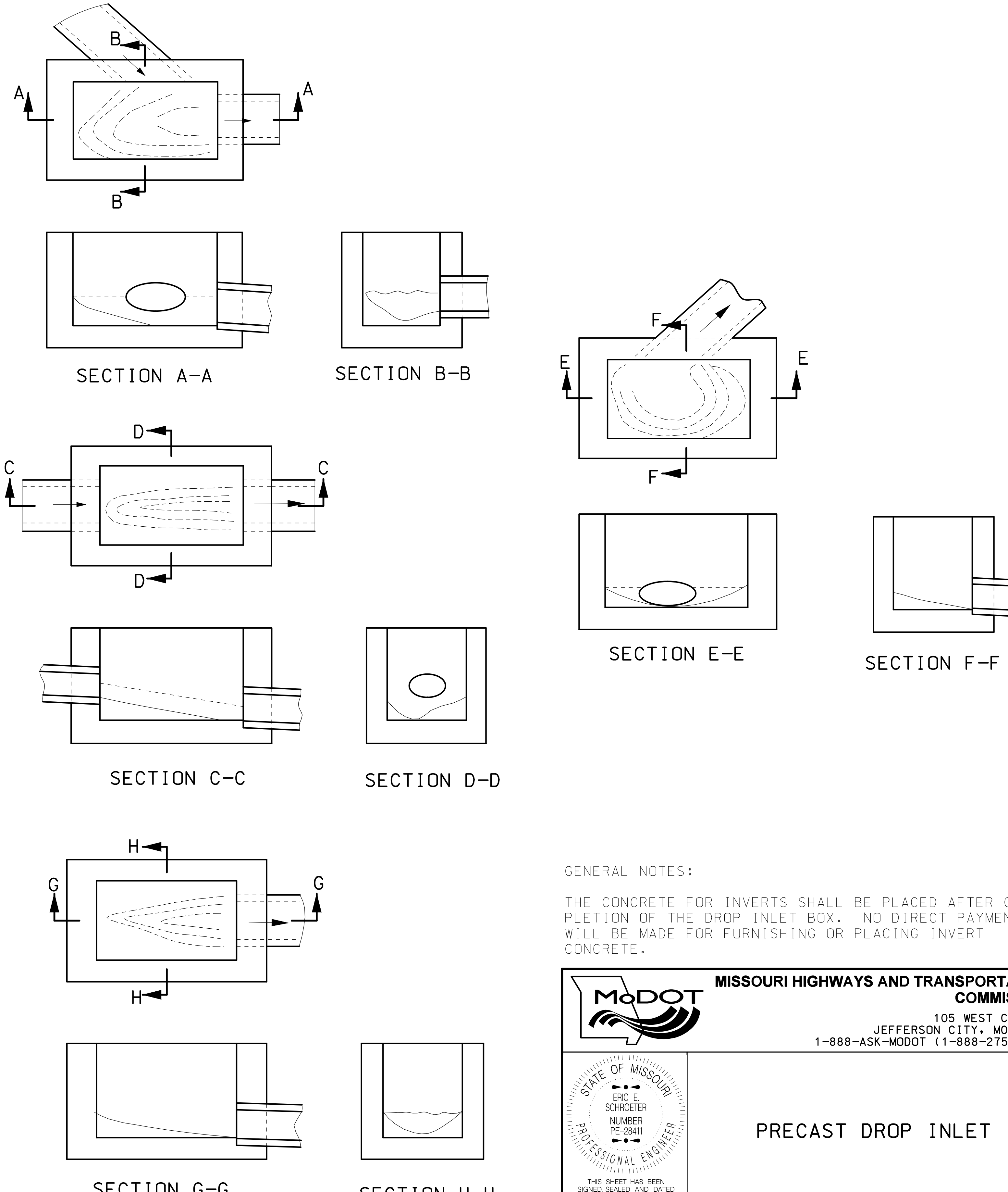
TYPE S-2



TYPE S-3

SEE STANDARD PLAN 614.10 FOR GRATES AND BEARING PLATES. TYPICAL LOCATION DETAILS ARE INDICATED ON SHEETS 7 AND 8 OF 8. TOP SECTIONS MAY BE CAST MONOLITHIC WITH BASE SECTION.

DROP INLET		
WIDTH FT.	LENGTH FT.	TYPE
2	2	A,B,C
4	2	
2	2	D
3	2	E,S-1 S-2,S-3
3	3	
5	2	
5	3	



TYPICAL INVERTS

GENERAL NOTES:

THE CONCRETE FOR INVERTS SHALL BE PLACED AFTER COMPLETION OF THE DROP INLET BOX. NO DIRECT PAYMENT WILL BE MADE FOR FURNISHING OR PLACING INVERT CONCRETE.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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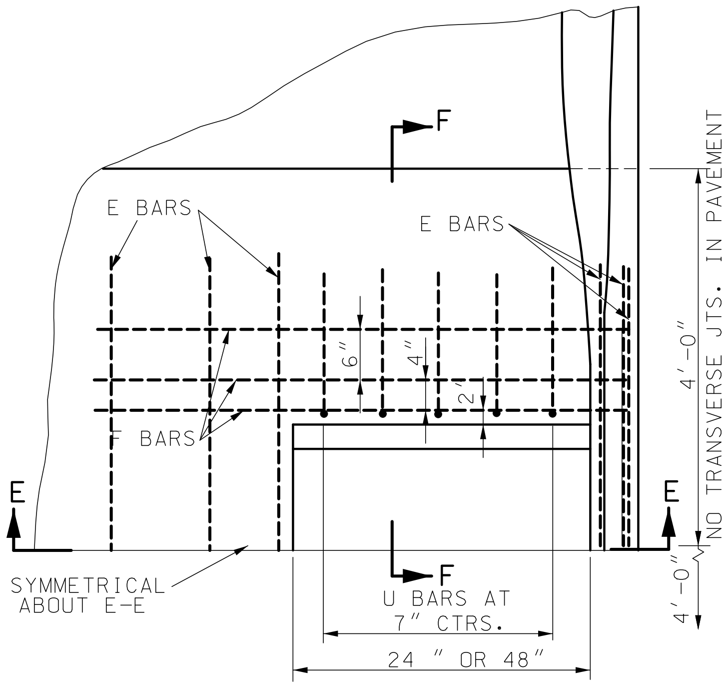
PRECAST DROP INLET

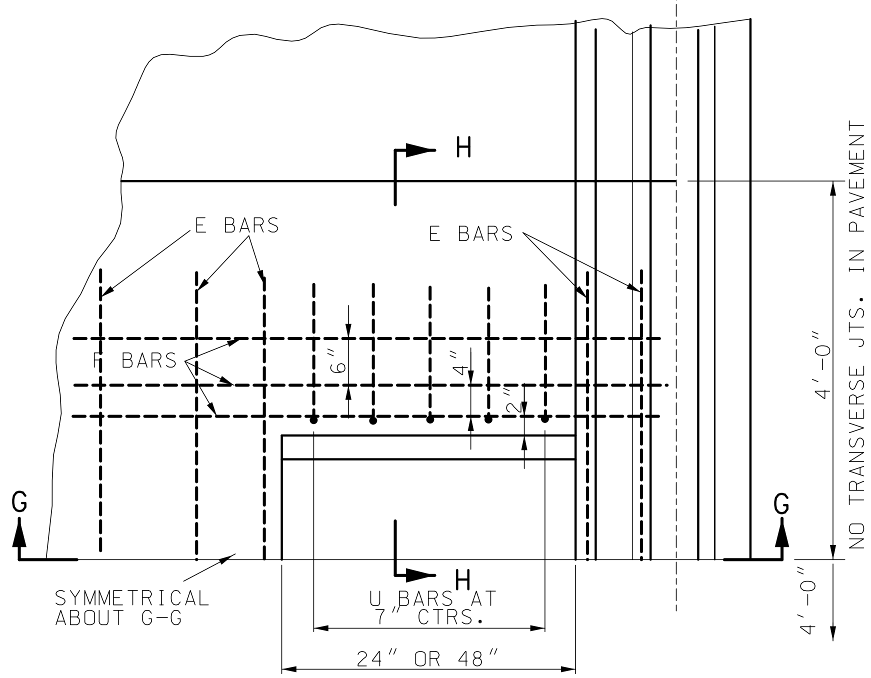
DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

731.10S

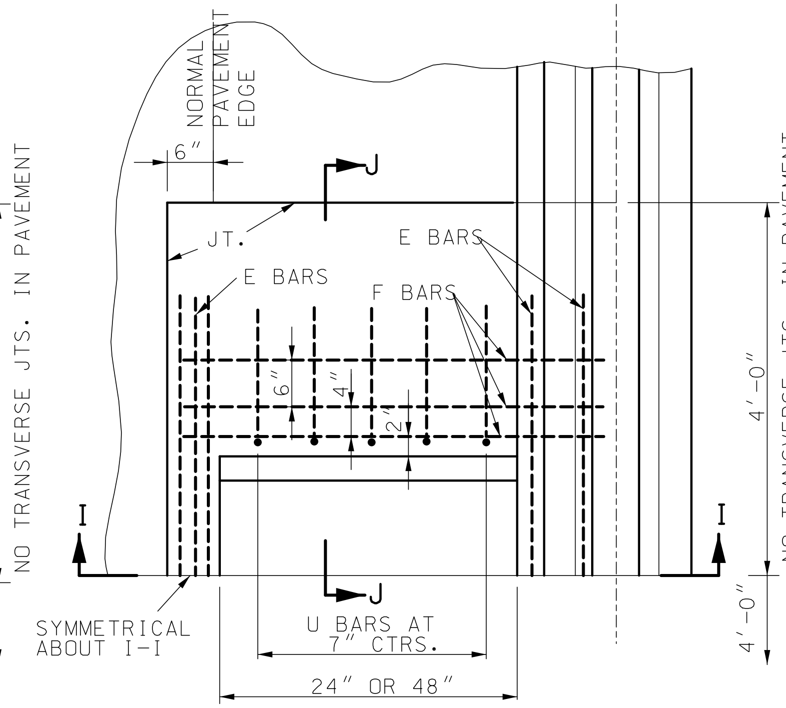
SHEET NO. 2 OF 8



HALF-PLAN

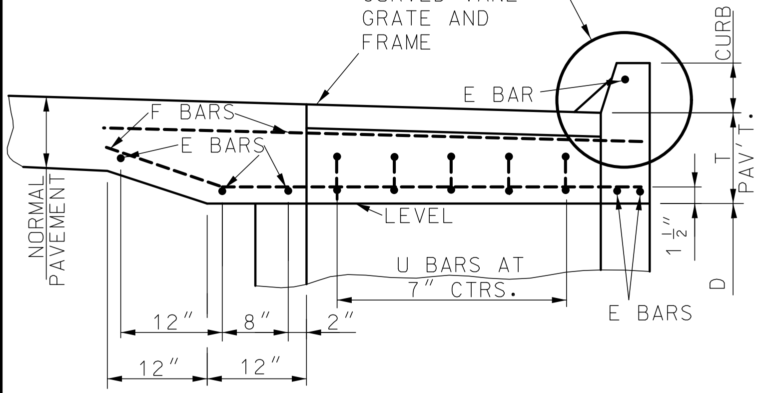


HALF-PLAN

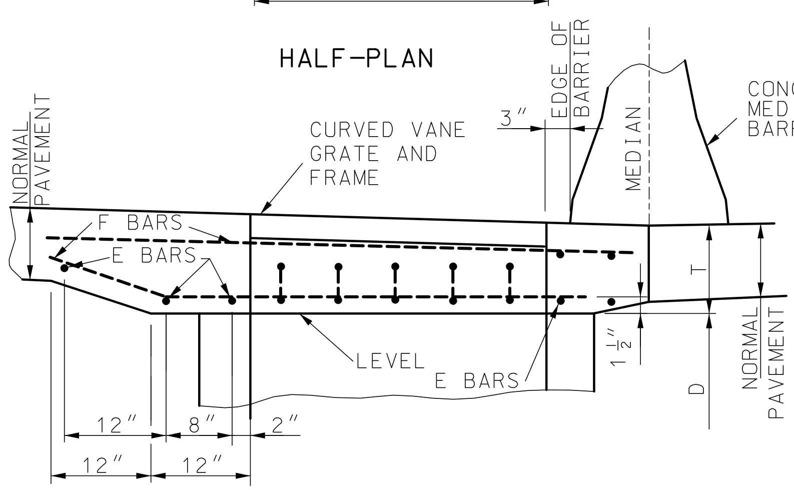


HALF-PLAN

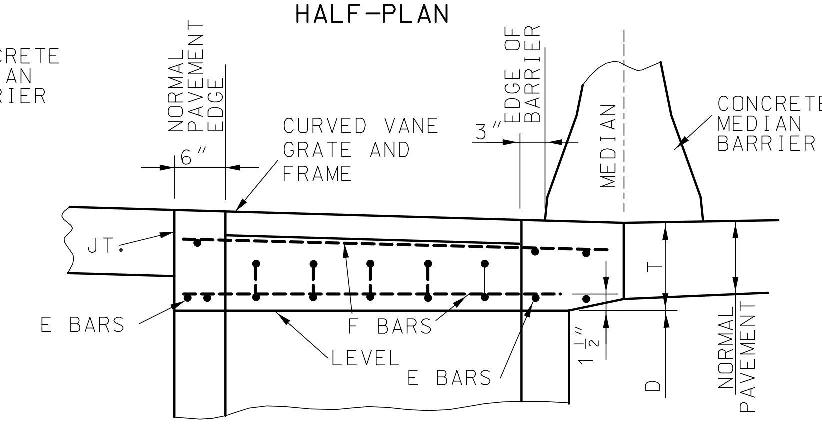
DETAIL A



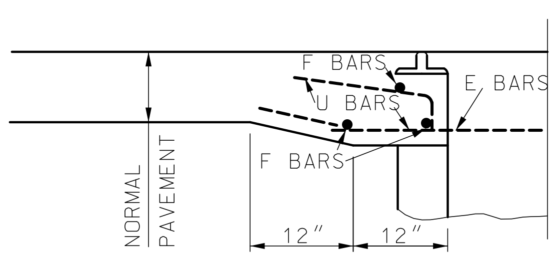
SECTION E-E



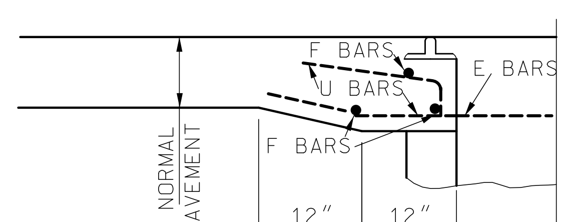
SECTION G-G



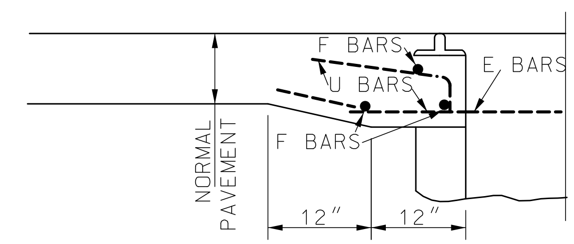
SECTION I-I



HALF SECTION F-F



HALF SECTION H-H



HALF SECTIONJ-J

TYPE A

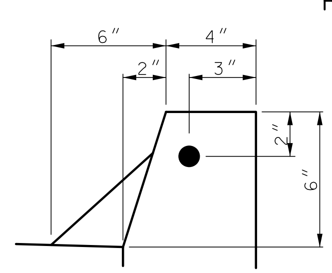
INLET ADJACENT TO CURB

TYPE B

DISTANCE BETWEEN BARRIER AND PAVEMENT EDGE GREATER THAN INLET WIDTH

TYPE C

DISTANCE BETWEEN BARRIER AND PAVEMENT EDGE EQUALTO INLET WIDTH

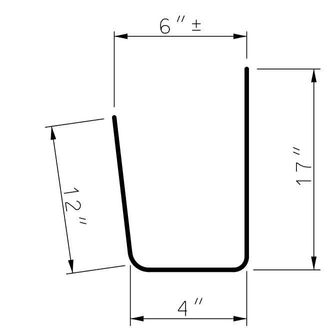


DETAIL A

PAVEMENT BAR BILL

TYPE	WIDTH	LENGTH	MARK	NO.	LENGTH
A	4'	2'	E	6	6'-0"
			F	6	6'-6"
			U	14	2'-9"
	2'	2'	E	6	6'-0"
			F	6	4'-6"
			U	8	2'-9"
B	4'	2'	E	7	6'-0"
			F	6	7'-0"
			U	14	2'-9"
	2'	2'	E	7	6'-0"
			F	6	5'-0"
			U	8	2'-9"
C	4'	2'	E	7	6'-0"
			F	6	5'-3"
			U	14	2'-9"
	2'	2'	E	7	6'-0"
			F	6	3'-3"
			U	8	2'-9"
D	2'	2'	E	6	7'-0"
			F	6	2'-9"
			U	8	2'-9"

BARS E, F, & U......#4



U-BARS
BENDING DIAGRAM

GENERAL NOTE:

SEE STANDARD PLAN 614.11 FOR CURVED VANE GRATE.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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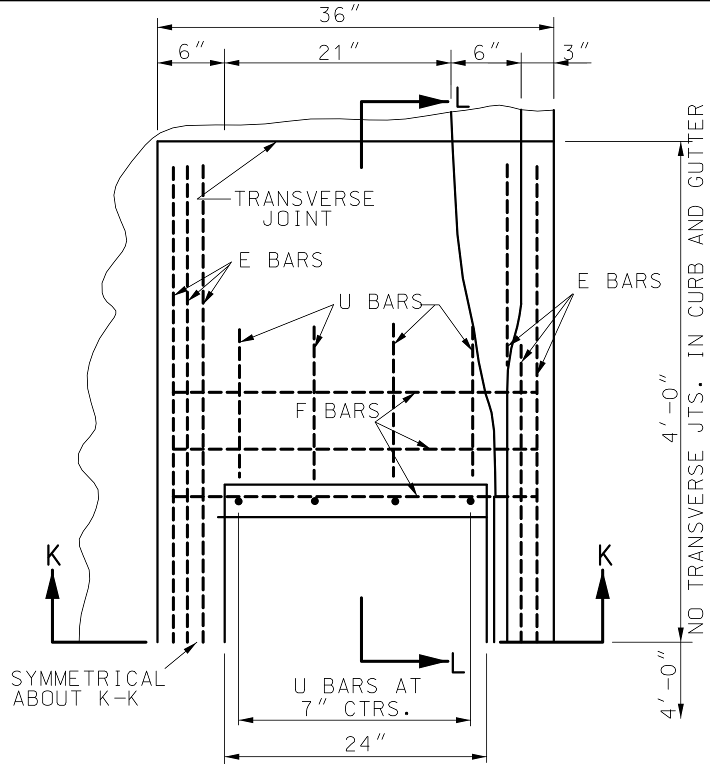
PRECAST DROP INLET

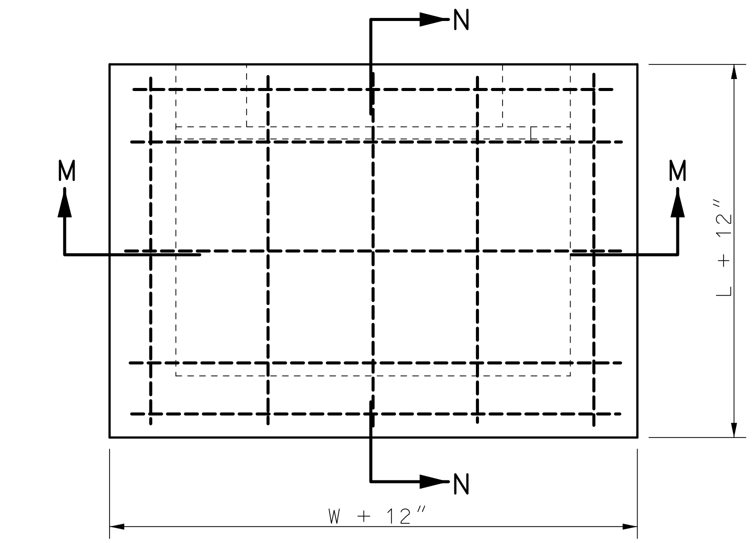
COVERS

DATE EFFECTIVE: 01/01/2022
DATE PREPARED: 10/21/2021

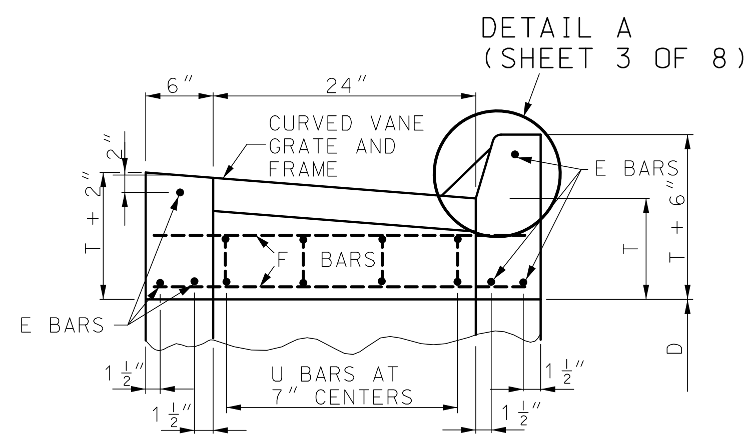
731.10S



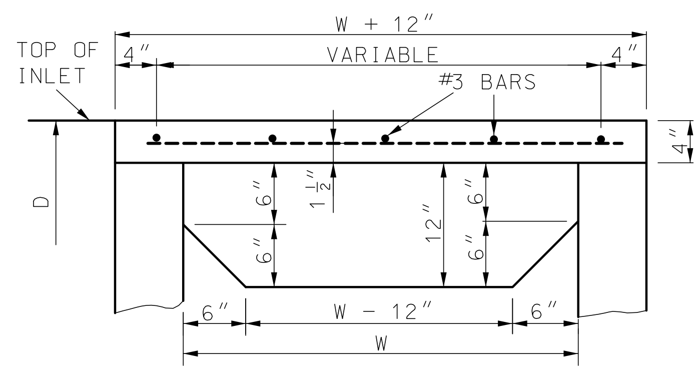
HALF-PLAN



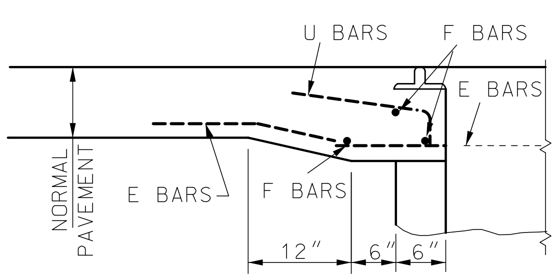
PLAN



SECTION K-K

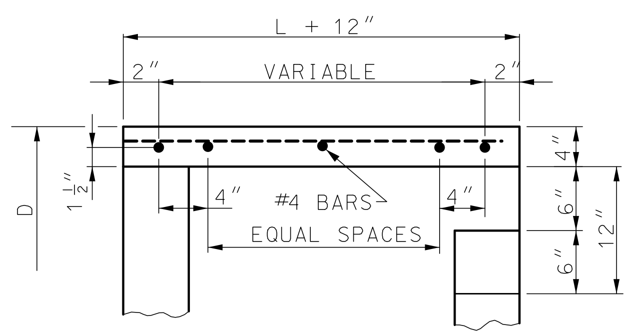


SECTION M-M



HALF SECTION L-L

TYPE D
CURB AND GUTTER



SECTION N-N

TYPE E
PRECAST SLAB

PAVEMENT THICKNESS	"T" DIMENSION
LESS THAN OR EQUAL TO 11"	11"
12"	12"
13"	13"
GREATER THAN OR EQUAL TO 14"	14"

TYPE E COVER BAR BILL

WIDTH	LENGTH	BAR SIZE	NO.	LENGTH
3'	2'	#3	5	2'-9"
		#4	5	3'-9"
3'	3'	#3	5	3'-9"
		#4	5	3'-9"
5'	2'	#3	6	2'-9"
		#4	6	5'-9"
5'	3'	#3	6	3'-9"
		#4	7	5'-9"

GENERAL NOTES:

THE SIZE OF THE DROP INLET AND TYPE OF COVER WILL BE SHOWN ON THE PLANS.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH ESTABLISHED MANUFACTURING PROCEDURES.

TOP OF DROP INLET WALL SHALL BE CONSTRUCTED TO THE ELEVATION OF BOTTOM OF SLAB AT THE EDGE OF PAVEMENT OR BOTTOM OF CURB AND GUTTER AT DROP INLET.

WHERE THE DROP INLET IS LOCATED IN AN UNPAVED AREA, THE TOP OF THE DROP INLET WALLS SHALL BE SET TO THE ELEVATION SHOWN ON THE PLANS.

ALL CONCRETE ABOVE THE TAR PAPER SEPARATION JOINT IS TO BE CONSTRUCTED DURING PAVING OPERATIONS OR CURB AND GUTTER CONSTRUCTION, AND WILL BE PAID FOR AS SQUARE YARDS OF CONCRETE PAVEMENT OR LINEAR FEET OF CURB AND GUTTER.

FORMED OR CUT-OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

REINFORCING BARS IN PAVEMENT SHALL BE EPOXY COATED AND SECURELY TIED TOGETHER AND FASTENED TO AVOID ANY POSSIBLE DISPLACEMENT DURING THE PLACING OF CONCRETE, REINFORCEMENT SHOWN IS IN ADDITION TO ANY REINFORCEMENT SHOWN FOR CONCRETE PAVEMENT OR CURB AND GUTTER.

JOINTS SHALL BE SEALED IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE DROP INLETS CALLED FOR IN THE PLANS, TO THE DIMENSIONS REQUIRED FOR PRECAST DROP INLETS.

WELDED WIRE REINFORCEMENT MAY BE IN LIEU OF REINFORCING BARS, THE REINFORCEMENT SHALL NOT BE LESS THAN .23 SQUARE INCHES PER LINEAR FOOT BOTH HORIZONTALLY AND VERTICALLY.

NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE NOR FOR CUTTING OR BENDING REINFORCING STEEL.

THE TOP OF INLET PIPES SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.

NO DIRECT PAYMENT WILL BE MADE FOR FORMING FOR CURVED VANE GRATES AND FRAMES.

THE REINFORCEMENT SHOWN IS THE MINIMUM REQUIRED. AT THE CONTRACTOR'S OPTION, ADDITIONAL REINFORCEMENT MAY BE USED.

REINFORCING STEEL EDGE DISTANCE WILL BE 1½" UNLESS OTHERWISE SPECIFIED.

NOT MORE THEN TWO LIFT HOLES OR LIFTING INSERTS MAY BE PROVIDED.

CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL PLANES 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION OF THE DROP INLETS, CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

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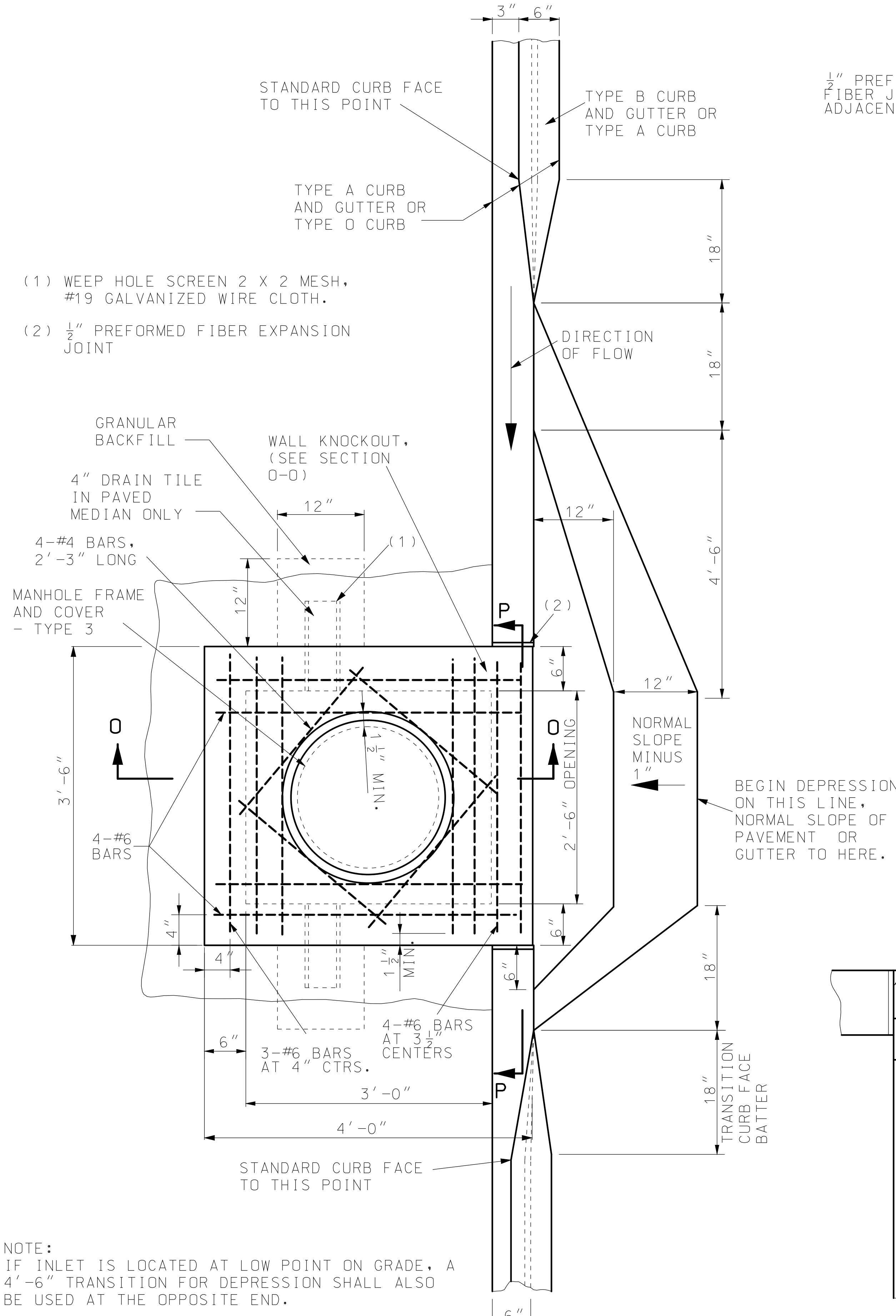
PRECAST DROP INLET
COVERS

DATE EFFECTIVE: 01/01/2022
DATE PREPARED: 10/21/2021
731.10S

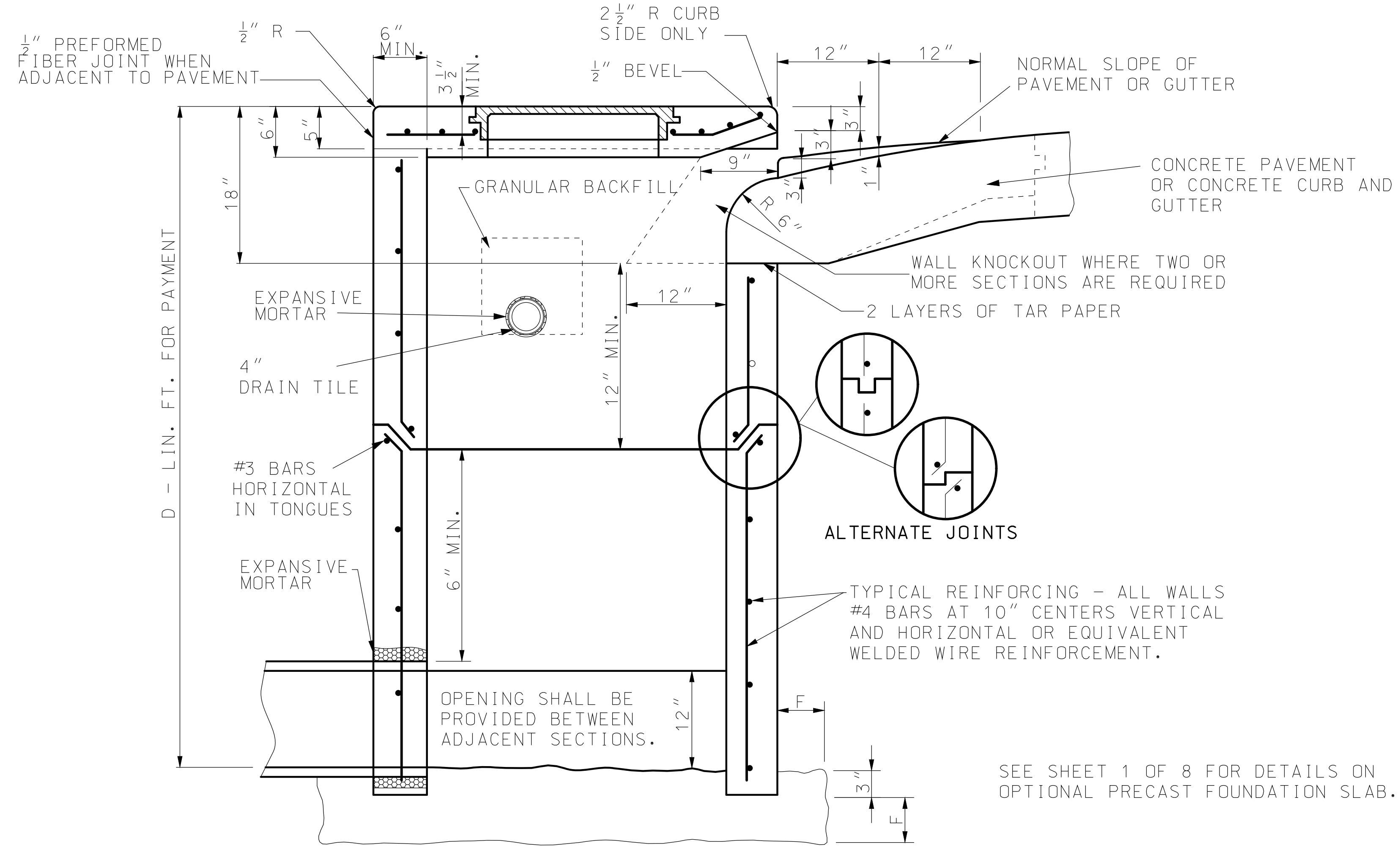
(1) WEEP HOLE SCREEN 2 X 2 MESH, #19 GALVANIZED WIRE CLOTH.

(2) ½" PREFORMED FIBER EXPANSION JOINT



NOTE:
IF INLET IS LOCATED AT LOW POINT ON GRADE, A 4'-6" TRANSITION FOR DEPRESSION SHALL ALSO BE USED AT THE OPPOSITE END.

PLAN

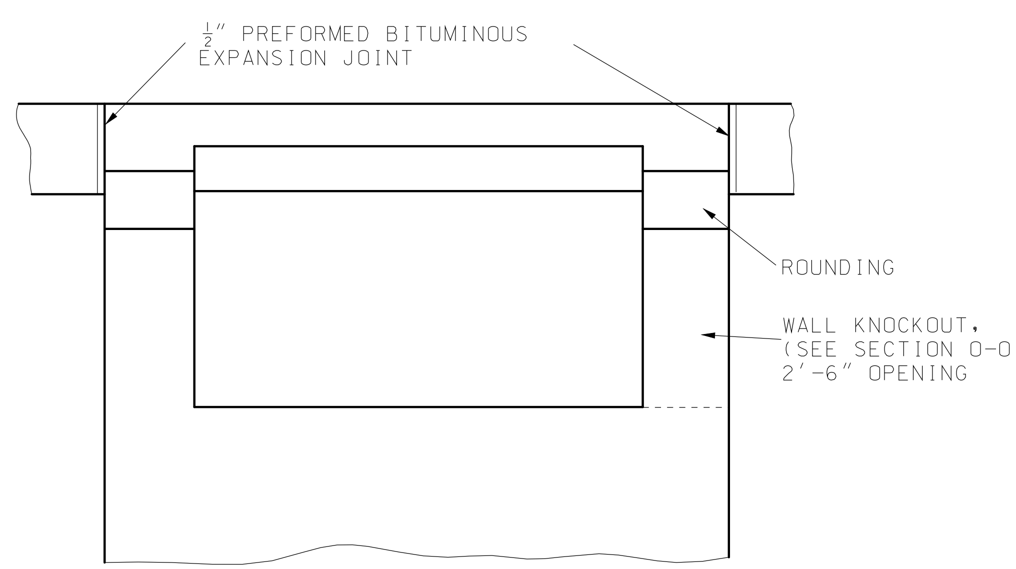


SEE SHEET 1 OF 8 FOR DETAILS ON OPTIONAL PRECAST FOUNDATION SLAB.

F = 6" FOR D's ≤ 6'.
F = 12" FOR D's > 6'.

SECTION O-O

PRECAST BASE SECTION SET ON CONCRETE BLOCKS FOUNDATION SLAB AND INVERT POURED MONOLITHIC.



SECTION P-P
DETAILS OF OPENING

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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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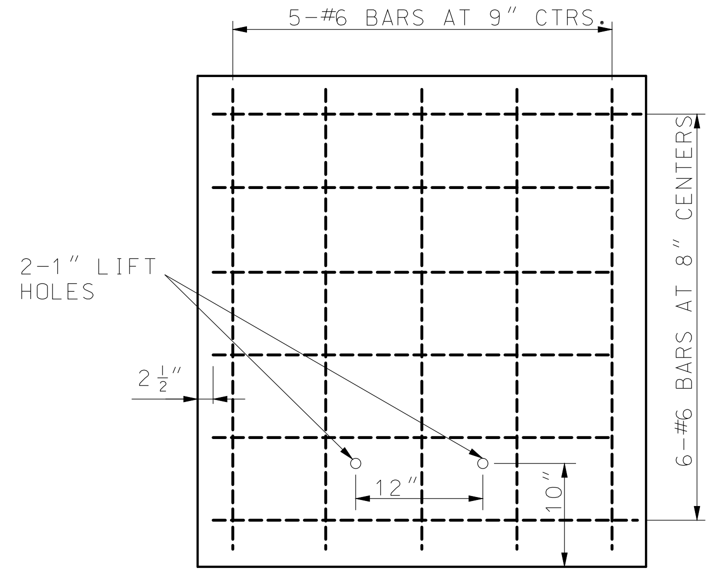
PRECAST DROP INLET
CURB INLET - TYPE T

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 8/11/2016

731.10S

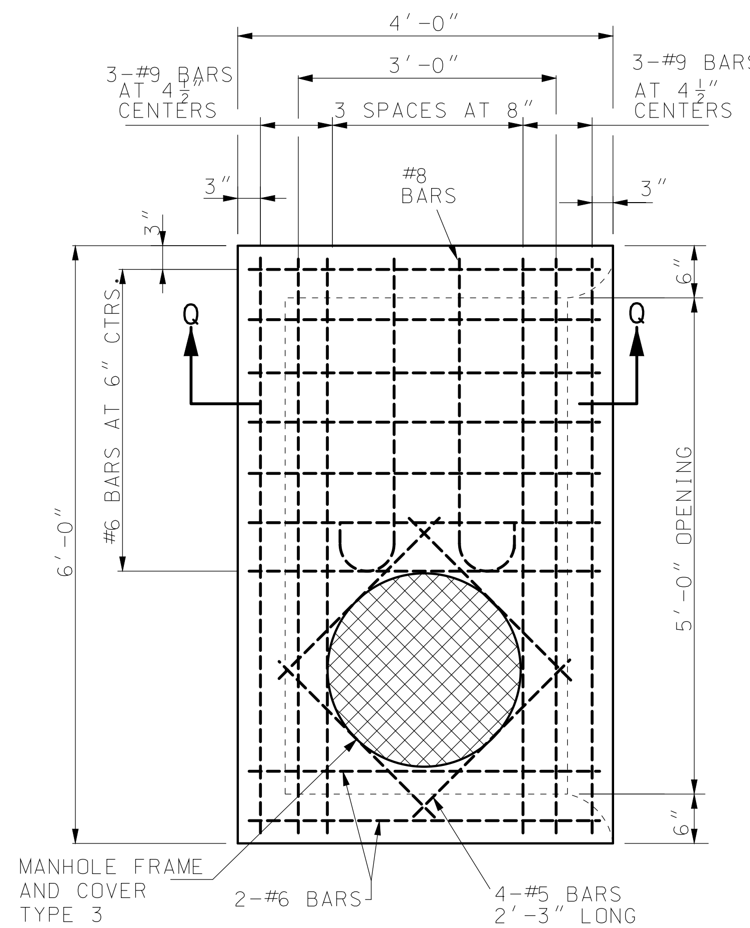
SHEET NO. 5 OF 8

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

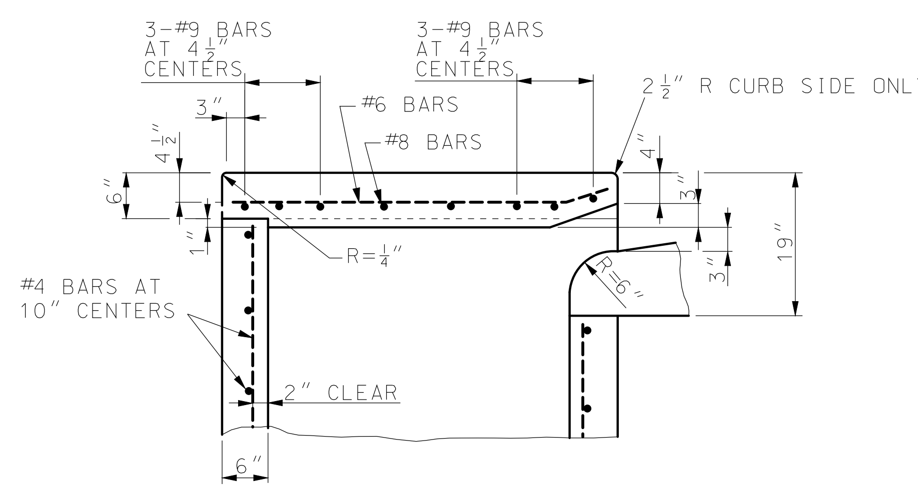


NOTE: REINFORCING FOR LIDS ON UPSTREAM SECTIONS.

LID FOR ADJACENT SECTIONS



PLAN



SECTION Q-Q

OPTIONAL PRECAST CURB INLET
5'-0" OPENING

OTHER DETAILS ARESAME AS FOR THE 2'-6" OPENING DROP INLET THIS SHEET.

GENERAL NOTES:

NOTES PERTAINING TO TYPE T:

THE LENGTH AND DEPTH OF THE INLET SHALL BE AS SHOWN ON THE PLANS.

WALLS BETWEEN THE ADJACENT SECTIONS SHALL BE SEALED IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD SPECIFICATIONS.

IF DEPTH OF INLET EXCEEDS 6 FEET THE PRECAST UNITS MAY BE FURNISHED IN TWO OR MORE SECTIONS.

IF TWO OR MORE SECTIONS ARE USED, THE TYPE 3 MANHOLE FRAME AND COVER SHALL BE IN THE DOWNSTREAM SECTION ONLY.

IF A 5 FOOT OPENING IS REQUIRED, TWO 2'-6" OPENING SECTIONS OR ONE 5 FOOT OPEING SECTION MAY BE PROVIDED AT THE CONTRACTOR'S OPTION.

SEE SHEET 1 FOR STEP DETAILS AND SHEET 4 FOR GENERAL NOTES.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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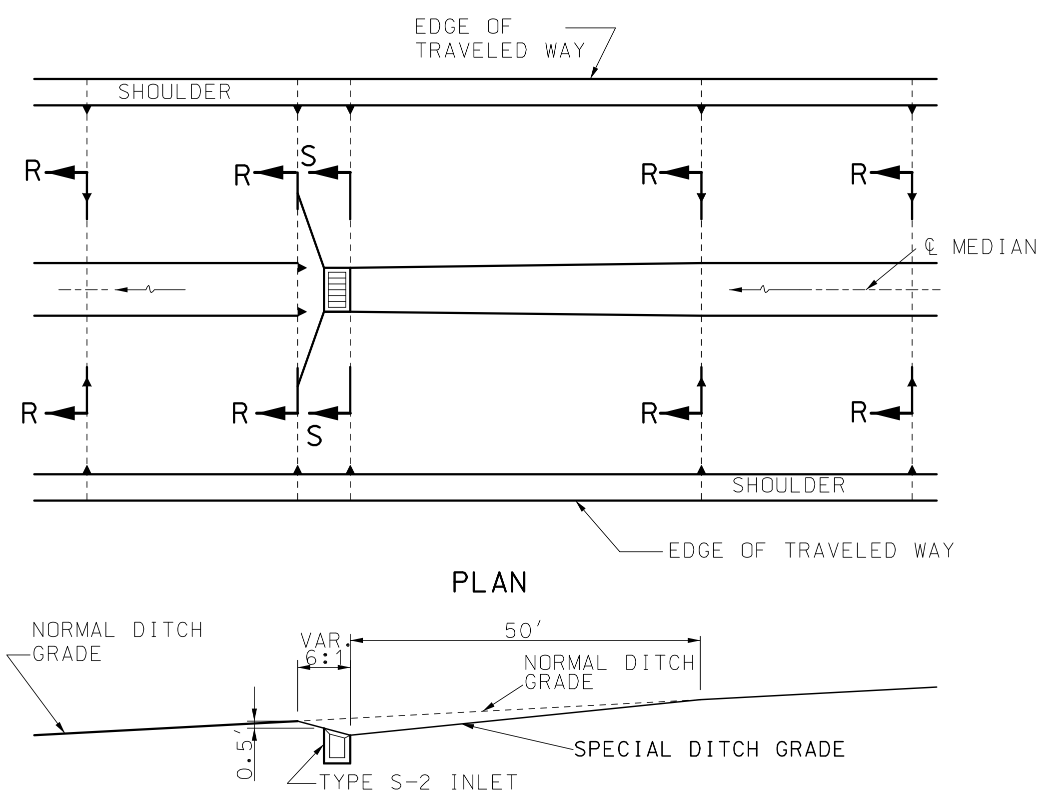
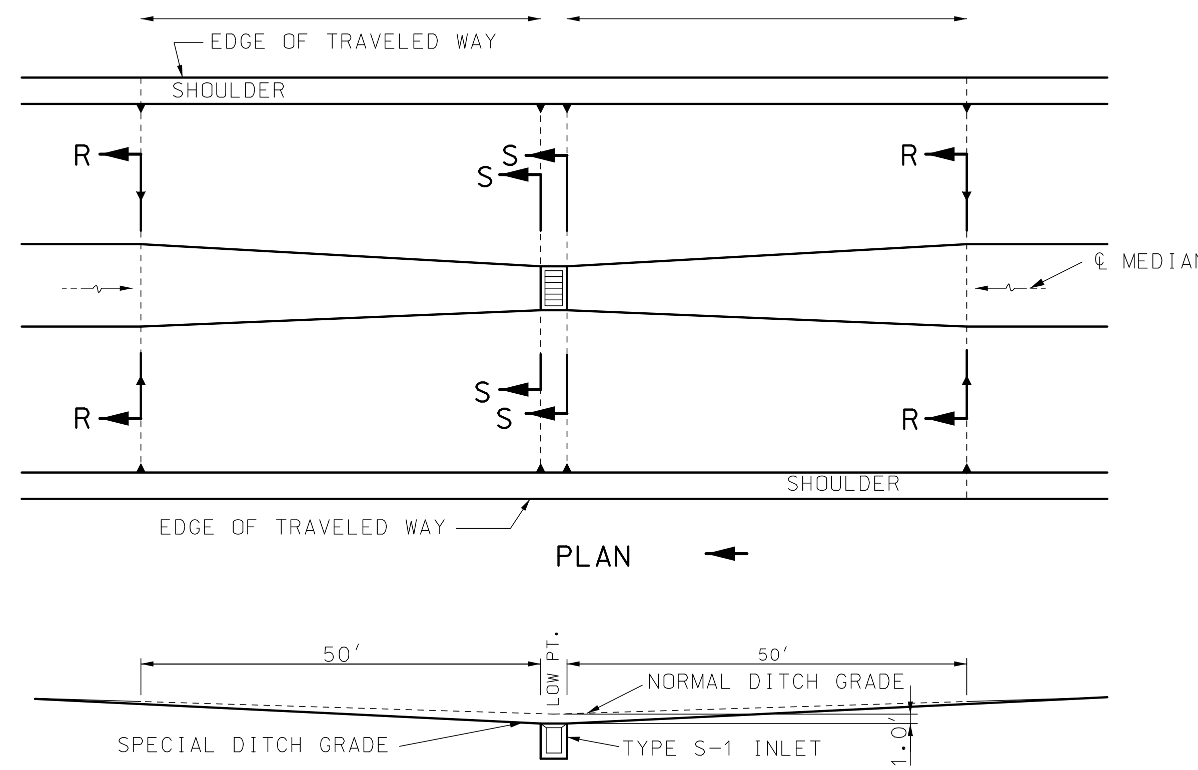
PRECAST DROP INLET
CURB INLET - TYPE T

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

731.10S

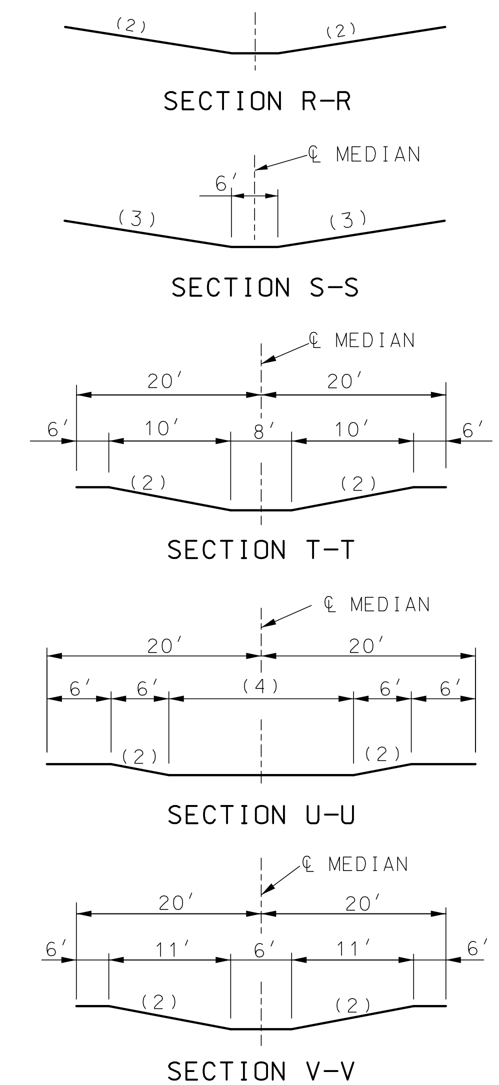


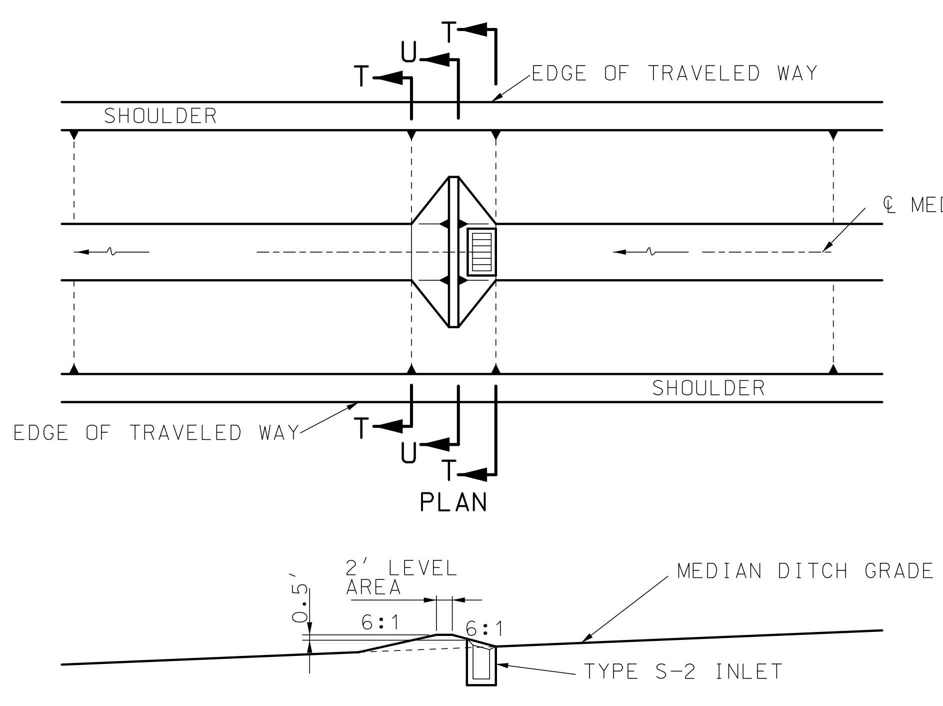
SECTION ALONG CENTERLINE OF MEDIAN RELIEF ON GRADE



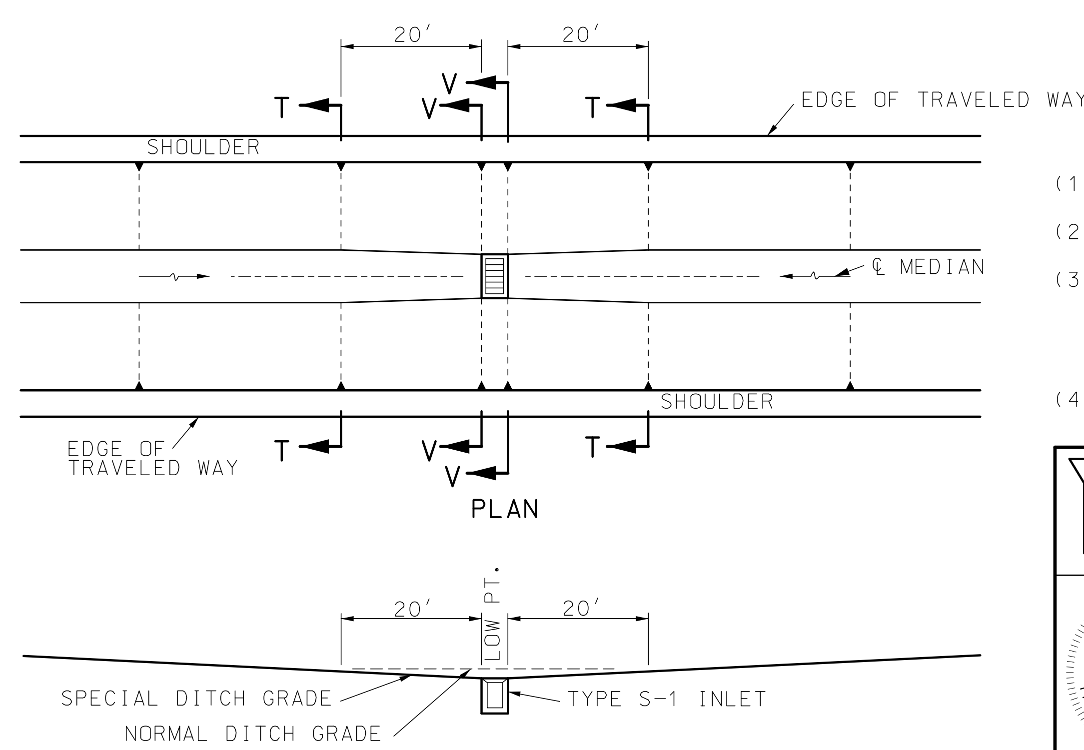
SECTION ALONG CENTERLINE OF MEDIAN RELIEF AT LOW POINT

DETAILS FOR MEDIAN RELIEF-60' MEDIAN





SECTION ALONG CENTERLINE OF MEDIAN RELIEF ON GRADE



SECTION ALONG CENTERLINE OF MEDIAN RELEIF AT LOW POINT

DETAILS FOR MEDIAN RELIEF-40' MEDIAN

(1) DITCH WIDTH AS GIVEN ON TYPICAL SECTION.

(2) DITCH SLOPE AS GIVEN ON TYPICAL SECTION.

(3) VARY SLOPE TO ACHIEVE MINIMUM 0.5 FT. FREEBOARD ABOVE TOP OF INLET GRATE ON GRADE, OR 1.0 FT. ADDITIONAL DITCH DEPTH BELOW NORMAL DITCH GRADE AT LOW POINT.

(4) VARY WIDTH TO ACHIEVE MINIMUM 0.5 FEET FREEBORAD ABOVE TOP OF INLET GRATE.

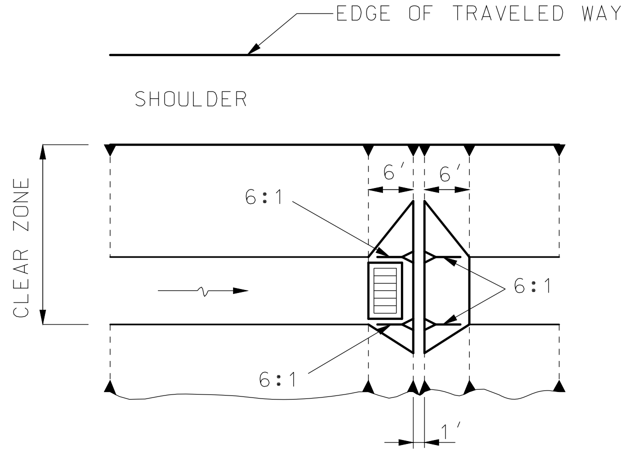
MoDOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

PRECAST DROP INLET
TYPICAL LOCATION DETAILS - TYPE S

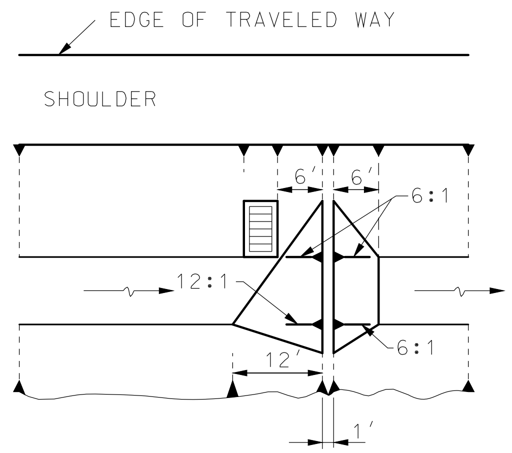
DATE EFFECTIVE: 01/01/2022 DATE PREPARED: 10/21/2021	731.10S	SHEET NO. 7 OF 8

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



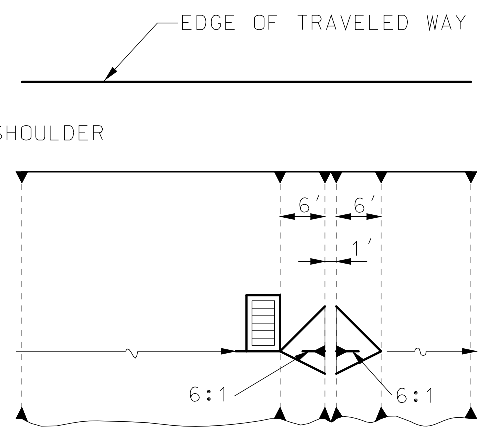
PLAN 1

TYPE S-2 INLET IN ROADWAY DITCH
(FLAT DITCH ON GRADE)



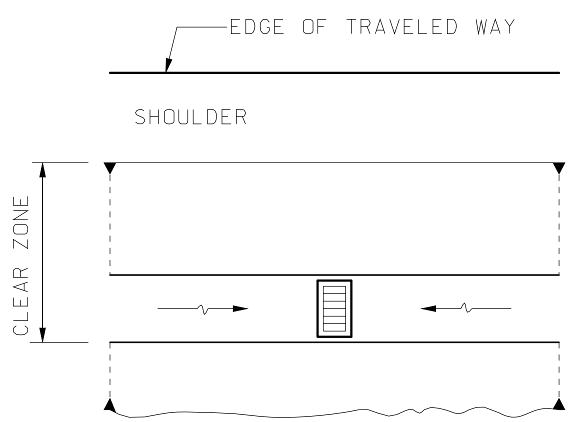
PLAN 2

TYPE S-3 INLET IN ROADWAY DITCH
(FLAT DITCH ON GRADE)



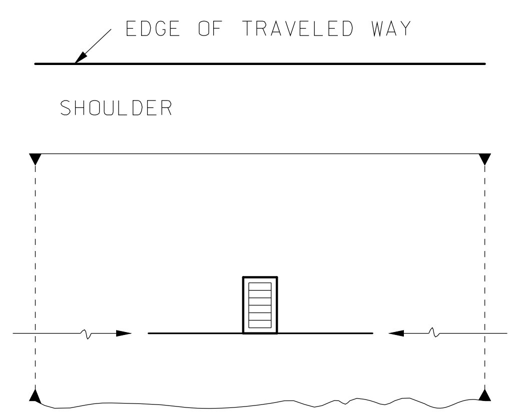
PLAN 3

TYPE S-3 INLET IN ROADWAY DITCH
(V DITCH ON GRADE)



PLAN 4

TYPE S-1 INLET AT LOW POINT
(FLAT DITCH)



PLAN 5

TYPE S-3 INLET AT LOW POINT
(LOW DITCH)

DETAILS FOR ROADWAY DITCH INLETS LOCATED WITHIN THE CLEAR ZONE

GENERAL NOTES:

THIS DRAWING IS FOR GENERAL INFORMATION ONLY. ACTUAL CONSTRUCTION DETAILS SHALL CONFORM TO THOSE SHOWN ON THE DETAIL PLANS.

DETAILS ON THIS SHEET ARE ONLY FOR USE WITH STRUCTURES LOCATED IN THE MEDIAN OR WITHIN THE CLEAR ZONE.

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

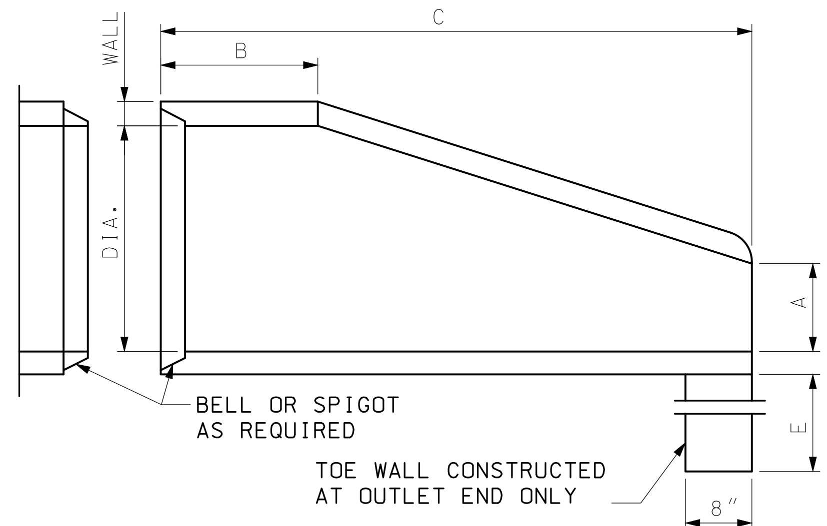
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

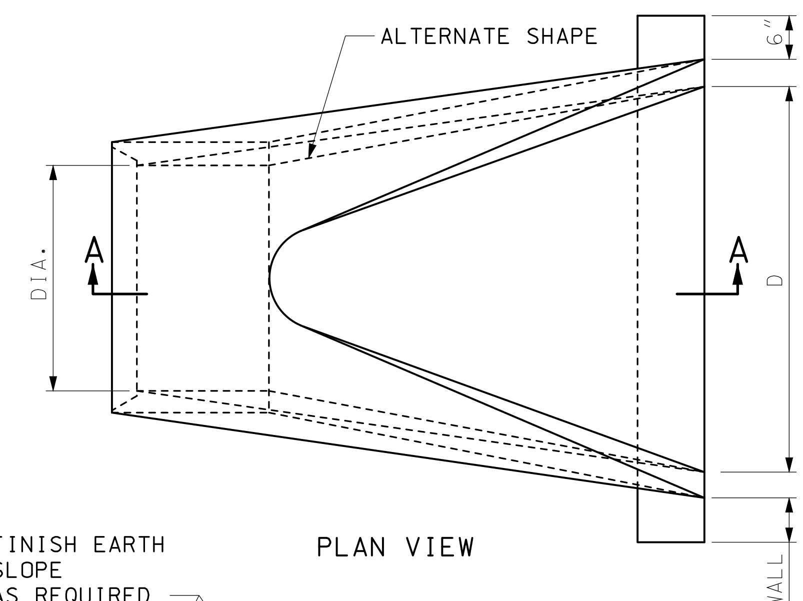
PRECAST DROP INLET
TYPICAL LOCATION DETAILS - TYPE S

DATE EFFECTIVE:	07/01/2016	731.10S	SHEET NO.
DATE PREPARED:	5/13/2016		8 OF 8

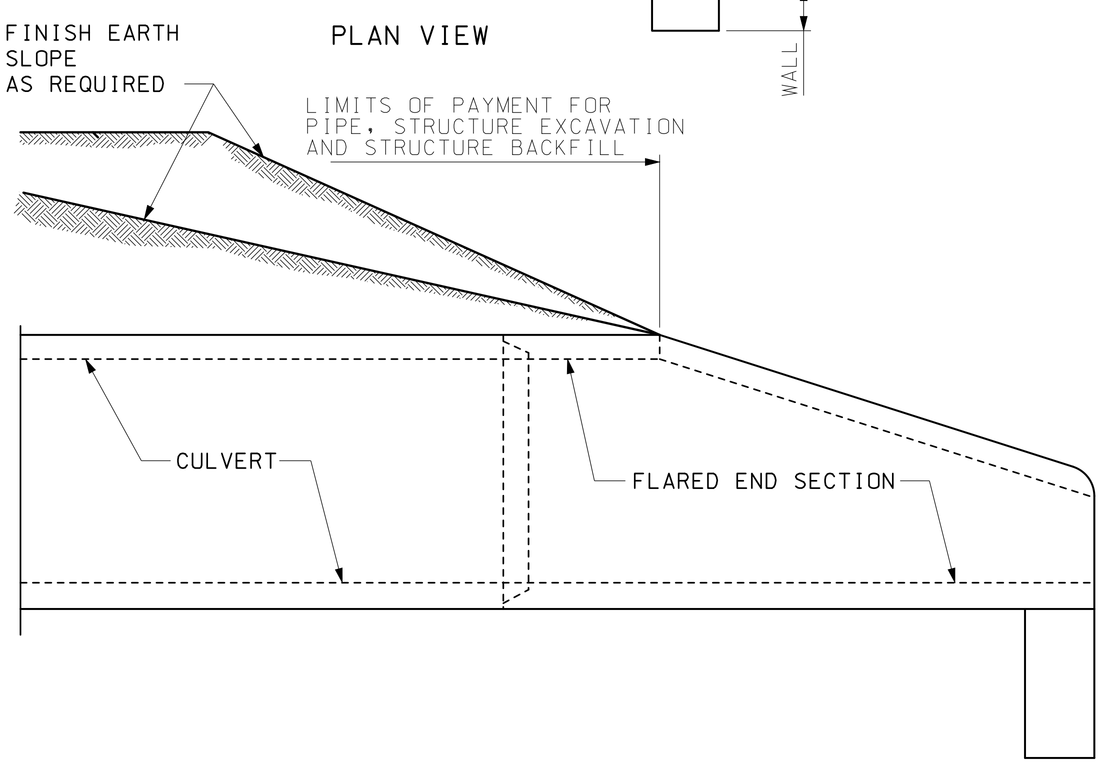
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SECTION A-A



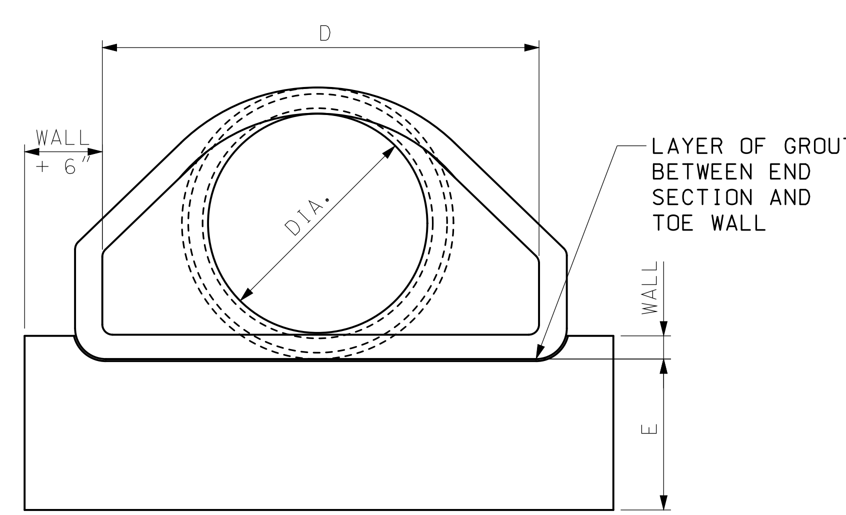
PLAN VIEW



INSTALLATION DETAILS

DIMENSIONS						
DIA.	WALL	A	B MIN.	C MIN.	D	E
12"	2"	4"	4'-0"	6'	2'-0"	18"
15"	2 1/4"	6"	3'-10"	6'	2'-6"	18"
18"	2 1/2"	9"	3'-10"	6'	3'-0"	18"
21"	2 3/4"	9"	3'-2"	6'	3'-6"	18"
24"	3"	9 1/2"	2'-6"	6'	4'-0"	24"
27"	3 1/4"	10 1/2"	2'-1"	6'	4'-6"	24"
30"	3 1/2"	1'-0"	1'-7"	6'	5'-0"	24"
33"	3 3/4"	1'-2"	1'-7"	6'	5'-6"	24"
36"	4"	1'-3"	2'-10"	8'	6'-0"	24"
42"	4 1/2"	1'-9"	2'-11"	8'	6'-6"	24"
48"	5"	2'-0"	2'-2"	8'	7'-0"	24"
54"	5 1/2"	2'-3"	2'-11"	8'	7'-6"	36"
60"	6"	2'-6"	3'-3"	8'	8'-0"	36"
66"	6 1/2"	2'-0"	1'-9"	8'	8'-6"	36"
72"	7"	2'-0"	2'-9"	10'	9'-0"	36"
78"	7 1/2"	2'-3"	2'-3"	10'	9'-6"	36"
84"	8"	2'-6"	2'-0"	10'	10'-0"	36"

REINFORCEMENT					
ADJOINING PIPE DIA.	BARREL SECTION REINFORCEMENT			FLARE SECTION REINFORCEMENT (ONE LAYER ONLY IN CENTER OF WALL)	
	CIRCULAR		ELLIPTICAL		
	INNER CAGE SQ. IN./ LIN. FT.	OUTER CAGE SQ. IN./ LIN. FT.	SQ. IN./ LIN. FT.	AREA OF LONGITUDINAL SQ. IN./ LIN. FT.	AREA OF TRANSVERSE SQ. IN./ LIN. FT.
12"	0.07			0.048	0.048
15"	0.07			0.054	0.054
18"	0.07		0.07	0.060	0.060
21"	0.07		0.07	0.066	0.066
24"	0.07		0.07	0.072	0.072
27"	0.13		0.11	0.078	0.078
30"	0.14		0.12	0.084	0.084
33"	0.15		0.13	0.090	0.090
36"	0.12	0.09	0.13	0.096	0.096
42"	0.15	0.12	0.17	0.108	0.108
48"	0.18	0.14	0.20	0.120	0.120
54"	0.22	0.16	0.24	0.132	0.132
60"	0.25	0.19	0.28	0.144	0.144
66"	0.31	0.23	0.34	0.156	0.156
72"	0.35	0.21	0.39	0.170	0.170
78"	0.40	0.24	0.44	0.185	0.185
84"	0.46	0.28	0.51	0.205	0.205



END VIEW

GENERAL NOTES:

SLIGHT VARIATIONS IN BOTH SHAPE AND DIMENSIONS FROM THOSE SHOWN MAY BE ACCEPTED IF APPROVED BY THE ENGINEER.

NOT MORE THAN THREE LIFT HOLES MAY BE DRILLED OR CAST IN THE END SECTION FOR HANDLING AND LAYING.

LIFT LUGS OR BARS WILL BE PERMITTED IN PRECAST TOE WALLS.

TOE WALLS MAY BE CAST-IN-PLACE OR PRECAST.

STEEL FIBERS MAY BE USED IN LIEU OF REBAR OR COLD DRAWN STEEL WIRE AS PER SECTION 1032.3.4.

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.

FLARED END SECTION

PRECAST CONCRETE

DATE EFFECTIVE: 04/01/2016
DATE PREPARED: 2/11/2016

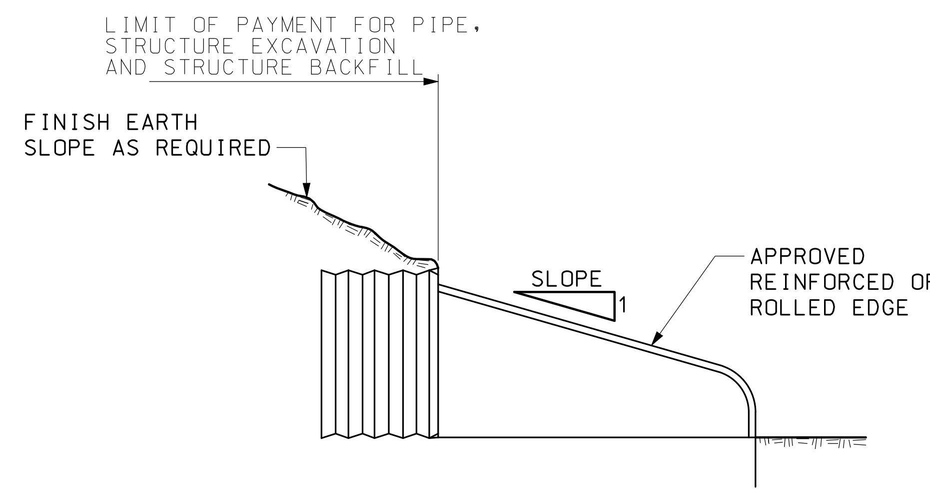
732.00S

END SECTIONS FOR ARCH PIPE

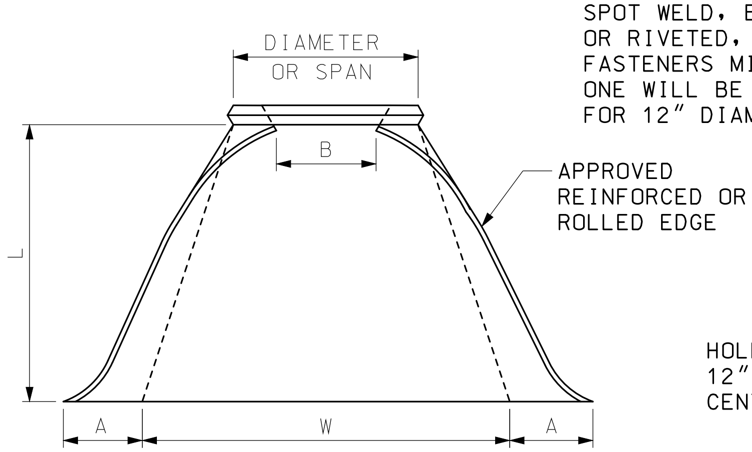
TYPE	ARCH DIMENSIONS SPAN x RISE	DIAMETER EQUIVALENT ROUND PIPE IN.	GALVANIZED SHEET THICK IN.	DIMENSIONS (IN.)					APPROXIMATE SLOPE (V:H) (1:SLOPE)	TOE PLATE IF SPECIFIED P, (IN.)
				A 1″ TOL.	B MAX.	H 1″ TOL.	L 1½″ TOL.	W 2″ TOL.		
B1	SEE STANDARD PLAN 725.00	15	.064	6	9	6	19	30	$2\frac{1}{8}$	40
B2		18	.064	7	11	6	23	36	2	46
B3		21	.064	8	12	6	28	42	$2\frac{1}{8}$	52
B4		24	.064	8	16	6	32	48	2	58
B5		30	.079	10	16	6	39	60	$1\frac{7}{8}$	70
B6 OR B6A		36	.079	12	18	8	46	75	$1\frac{3}{4}$	85
B7 OR B7A		42	.109	13	21	9	53	85	$1\frac{7}{8}$	107
B8 OR B8A		48	.109	18	26	12	63	90	$1\frac{7}{8}$	112
B9 OR B9A		54	.109	18	30	12	70	102	$1\frac{7}{8}$	124
B10 OR B10A		60	.109	18	33	12	77	114	$1\frac{7}{8}$	136
B11 OR B11A		66	.109	18	36	12	77	126	$1\frac{5}{8}$	148
B12 OR B12A		72	.109	18	39	12	77	138	$1\frac{1}{2}$	160

END SECTIONS FOR ROUND PIPE

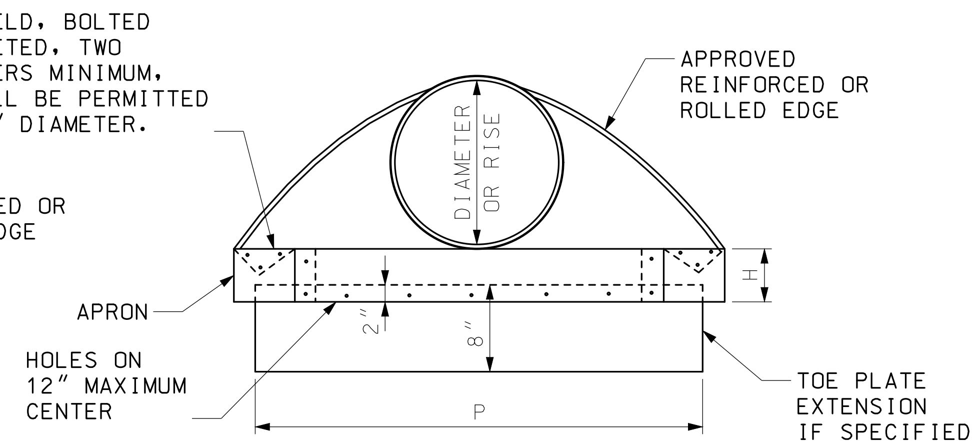
PIPE DIAMETER (IN.)	GALVANIZED SHEET THICK (IN.)	DIMENSIONS (IN.)					APPROXIMATE SLOPE (V:H) (1:SLOPE)	TOE PLATE IF SPECIFIED P, (IN.)
		A 1″ TOL.	B MAX.	H 1″ TOL.	L 1½″ TOL.	W 2″ TOL.		
12	.064	6	6	6	21	24	$2\frac{1}{2}$	34
15	.064	7	8	6	26	30	$2\frac{1}{2}$	40
18	.064	8	10	6	31	36	$2\frac{1}{2}$	46
21	.064	9	12	6	36	42	$2\frac{1}{2}$	52
24	.064	10	13	6	41	48	$2\frac{1}{2}$	58
30	.079	12	16	8	51	60	$2\frac{1}{2}$	70
36	.079	14	19	9	60	72	$2\frac{1}{2}$	94
42	.109	16	22	11	69	84	$2\frac{1}{2}$	106
48	.109	18	27	12	78	90	$2\frac{1}{2}$	112
54	.109	18	30	12	84	102	2 OR $2\frac{1}{4}$	124
60	.109	18	33	12	87	114	$1\frac{3}{4}$ OR 2	136
66	.109	18	36	12	87	120	$1\frac{1}{2}$ OR 2	144
72	.109	18	39	12	87	126	$1\frac{1}{3}$ OR 2	148
78	.109	18	42	12	87	132	$1\frac{1}{4}$ OR $1\frac{1}{2}$	154
84	.109	18	45	12	87	138	$1\frac{1}{6}$ OR $1\frac{1}{2}$	160



TYPICAL CROSS-SECTION



PLAN



ELEVATION

END SECTION FOR PIPE AND PIPE ARCH

GENERAL NOTES:

MINOR VARIATIONS OF DETAIL AND DIMENSIONS 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 ⅜″ DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN.

TOE PLATE EXTENSIONS, IF SPECIFIED, SHALL HAVE HOLES TO MATCH HOLES IN TOE PLATE.

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

SKIRT SECTION FOR 12″ THROUGH 24″ PIPES SHALL BE MADE IN ONE PIECE.

SKIRT SECTIONS FOR 30″ AND LARGER PIPES AND B5 AND LARGER PIPE ARCHES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTIONS FROM 48″ AND LARGER PIPES AND B8 OR LARGER PIPE ARCHES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

SKIRT SECTIONS FOR 72″ AND LARGER PIPES MAY BE MADE FROM UP TO 4 SHEETS JOINED BY RIVETING AND BOLTING. THE BOTTOM PANEL SHALL BE 2 EQUAL WIDTH SHEETS JOINED ON CENTERLINE.

ALL 3 PIECE AND 4 PIECE SKIRTS FOR 60″ OR LARGER PIPES AND B10 AND LARGER PIPE ARCHES 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 SECTIONS. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.

SEE SHEET 3 OF 3 FOR CONNECTION DETAILS

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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.

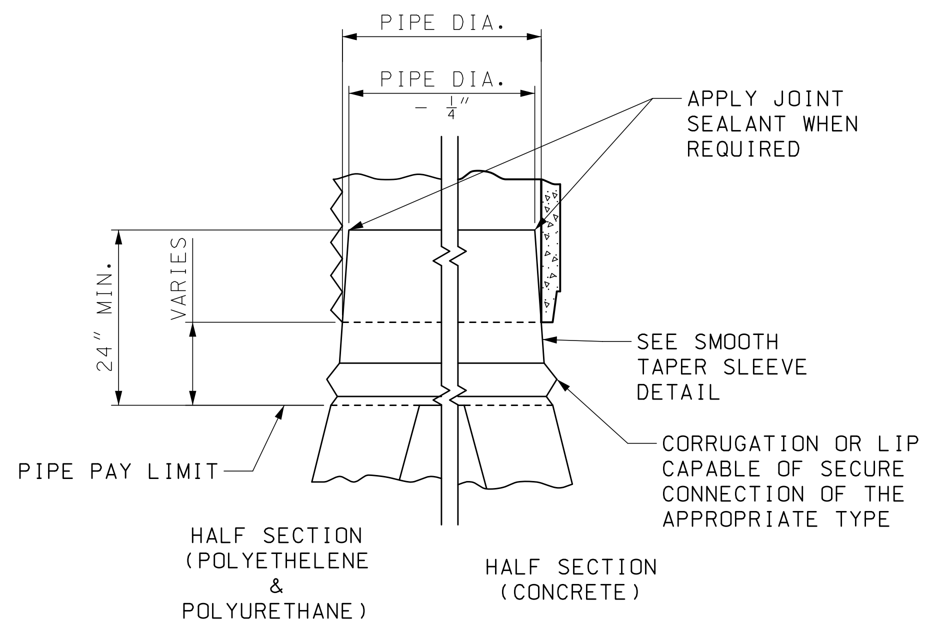
FLARED END SECTION

METAL

DATE EFFECTIVE: 04/01/2016
DATE PREPARED: 2/11/2016

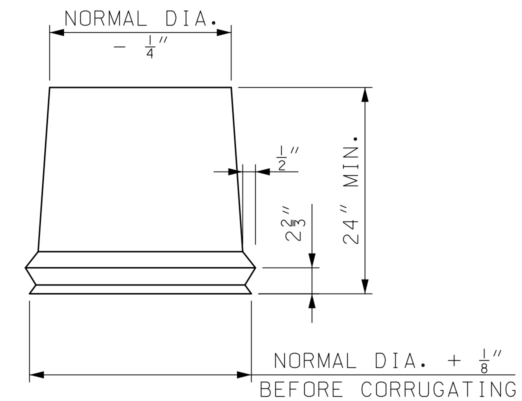
732.00S

CONNECTION REQUIREMENTS					
TYPE	CONNECTION TYPE	ALLOWABLE SIZE RANGE (IN.)	TAPERED SLEEVE REQUIREMENT		
			CMP	RCP PVC	PP PE
SAFETY END SECTION	2	ALL	N	Y	Y
METAL FLARED END SECTION	1	12-24	N	Y	N
	2	ALL	N	Y	N
	3	ALL	N	Y	N
	4	12-24	N	Y	N
	5	12-24	N	Y	N



TAPERED SLEEVE CONNECTION FOR CONCRETE AND THERMOPLASTIC PIPE

TAPERED SLEEVE SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.



FORM $\frac{1}{2}''$ X $2\frac{2}{3}''$ CORRUGATIONS.
MAINTAIN INSIDE DIAMETER OF SLEEVE.
FINISHED END TO BE THE SAME DIAMETER AS CORRUGATED STEEL PIPE DIAMETER.

SMOOTH TAPERED SLEEVE DETAIL

GENERAL NOTES:

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

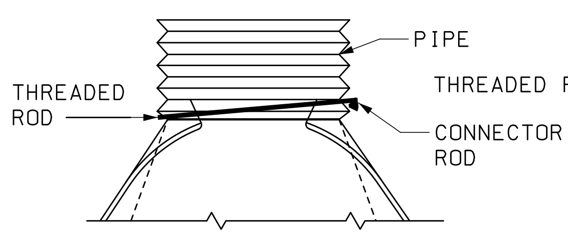
TAPERED SLEEVES SHALL BE FABRICATED FROM SMOOTH 12 GUAGE STEEL COATED IN ACCORDANCE WITH AASHTO M-218.

TAPERED SLEEVES SHALL BE FIRMLY WEDGED INTO THE PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.

THE LENGTH OF TAPERED SLEEVE SHALL BE SIZED TO PROTECT UV SENSITIVE PIPE MATERIALS FROM SUNLIGHT. THE ENTIRE COST OF THE TAPERED SLEEVE, HARDWARE, AND INSTALLATION SHALL BE INCLUDED IN THE COST OF THE PIPE.

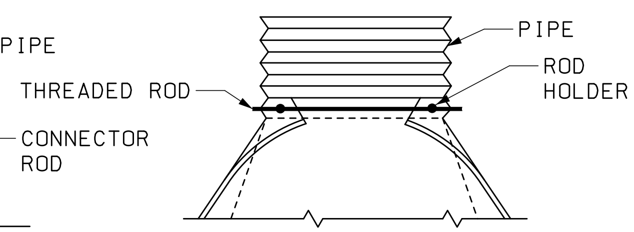
TAPERED SLEEVES SHALL HAVE AT A MINIMUM A HALF CORRUGATION OR LIP DESIGNED TO PROVIDE A SECURE CONNECTION WITH THE END SECTION.

ANY ROD OR STRAP USED FOR MAKING A CONNECTION SHALL BE SECURLY SEATED INTO A VALLEY OF THE PIPE CORRUGATION. THE VALLEY CHOOSEN TO HOLD THE ROD OR STRAP SHALL LEAVE AT LEAST ONE FULL INTACT CORRUGATION BEFORE THE END OF THE PIPE. THE FEMALE PORTION OF A BELL END SHALL NOT COUNT AS A FULL INTACT CORRUGATION.



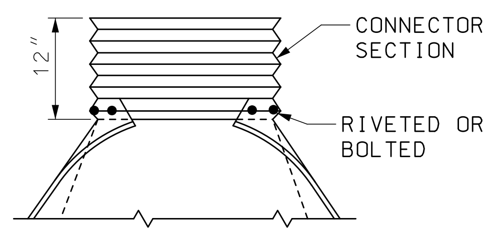
FOR 12" THRU 24" ROUND PIPE ONLY

TYPE 1 CONNECTION



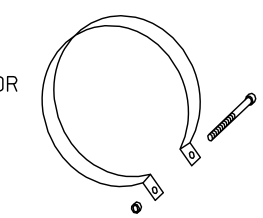
FOR 30" THRU 48" PIPE AND EQUIVALENT PIPE ARCH

TYPE 2 CONNECTION



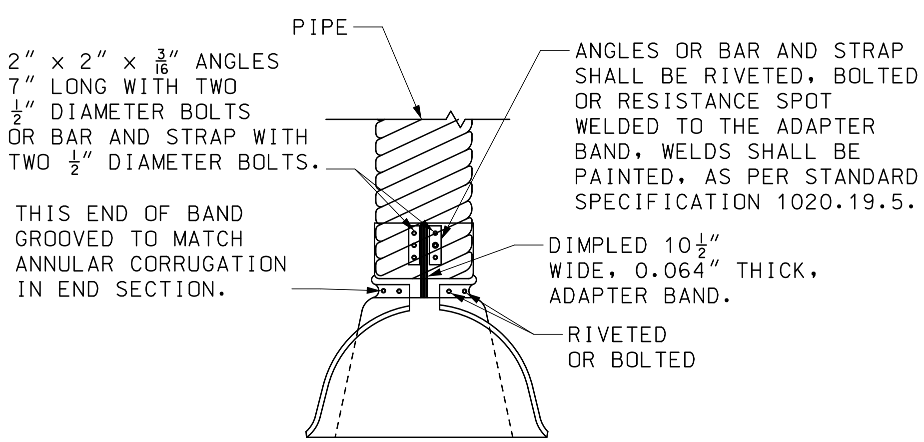
PERMISSIBLE FOR ALL SIZES

TYPE 3 CONNECTION



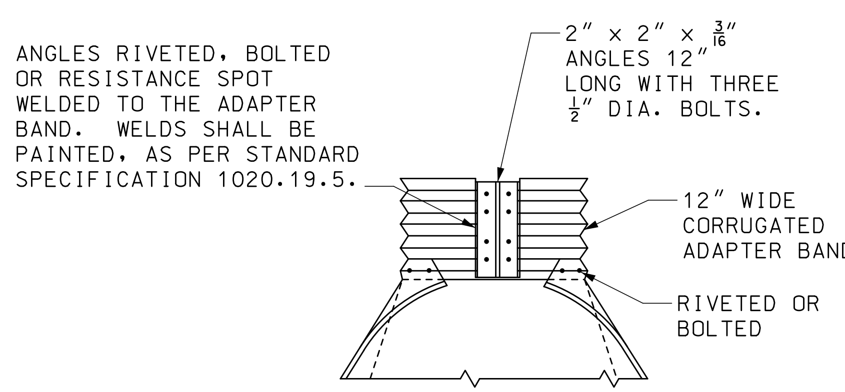
CONNECTOR STRAP

1 INCH WIDE, 0.109" THICK CONNECTOR STRAP OF COMMERCIAL QUALITY STEEL, GALVANIZED WITH SAME WEIGHT COATING AS PIPE, AND 6" x $\frac{1}{2}''$ GALVANIZED BAND BOLT AND NUT. USE AS ALTERNATE ON TYPE 1 CONNECTION ONLY.



FOR 12" THRU 42" PIPE AND EQUIVALENT PIPE ARCH

TYPE 4 CONNECTION



PERMISSIBLE FOR ALL SIZES THROUGH 84" PIPE AND B-12 OR B-12A PIPE ARCH

TYPE 5 CONNECTION

END SECTION FOR PIPE AND PIPE ARCH

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

FLARED END SECTION

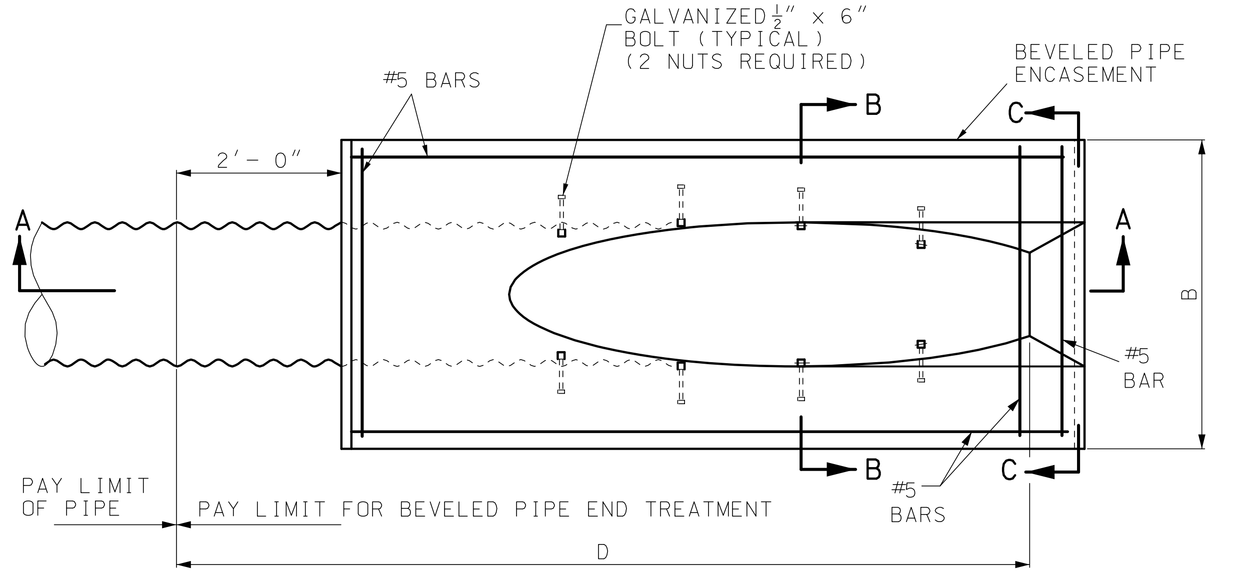
METAL

DATE EFFECTIVE: 07/01/2021
DATE PREPARED: 4/29/2021

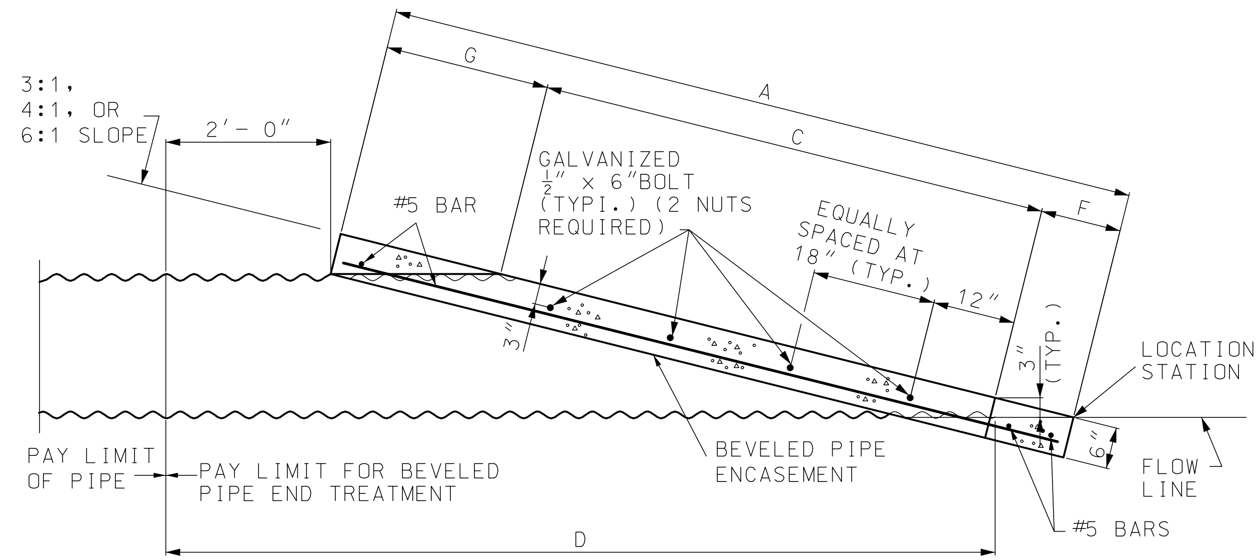
732.00S

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'-1/2"	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 1/4"	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'-3/4"	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'-1/4"	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

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.

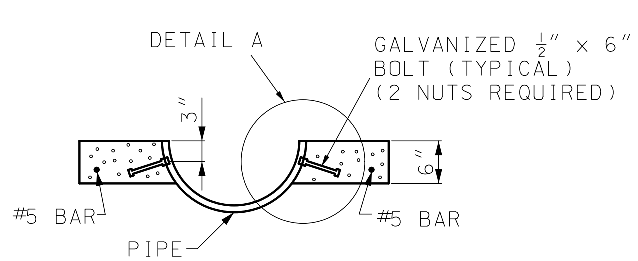
REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

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

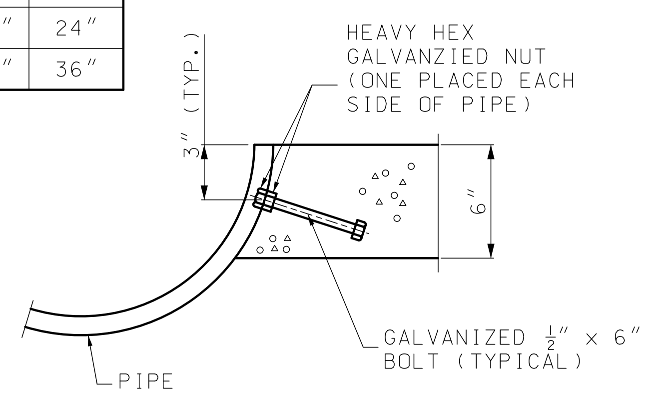
THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

THE 1/2" x 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.

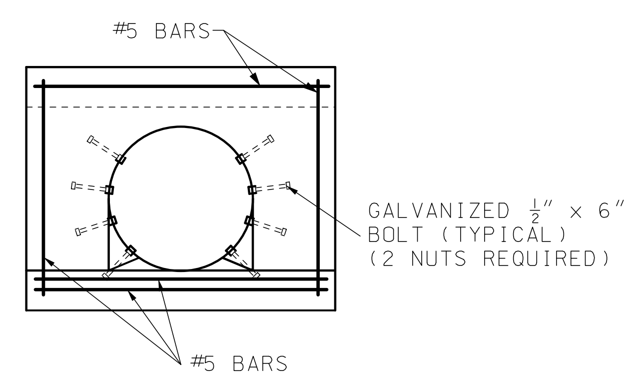
BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF 1/2" x 6" GALVANIZED BOLTS. THE 1/2" x 6" GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.



SECTION B-B



DETAIL A



SECTION C-C

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

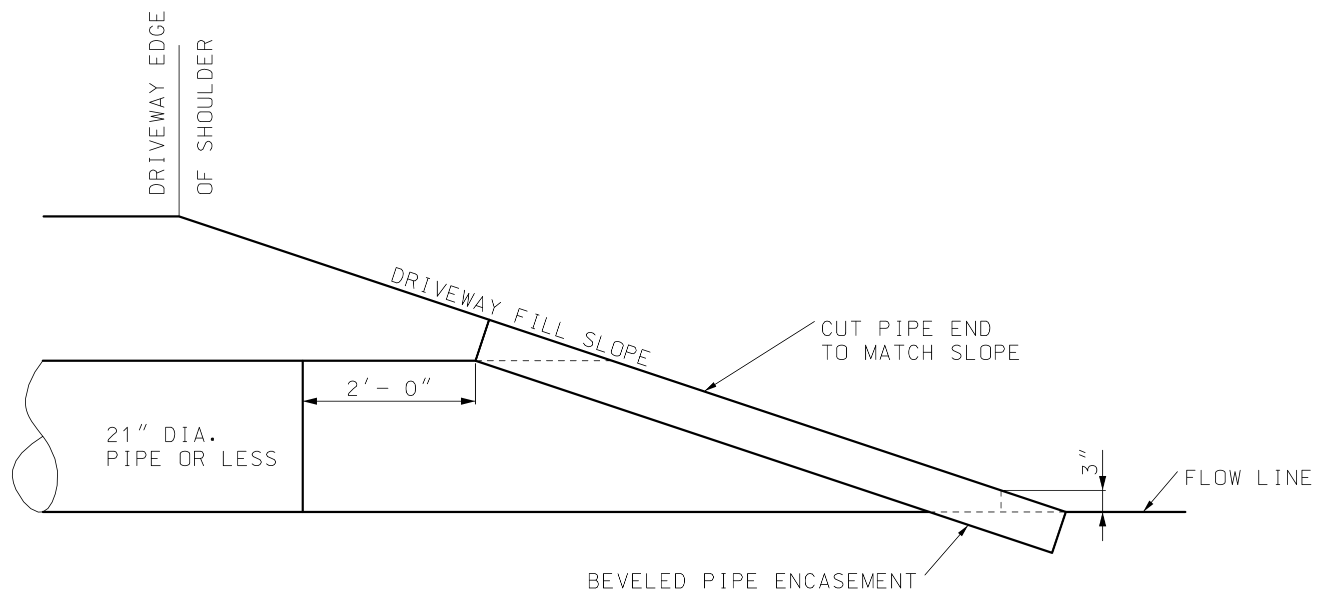
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

BEVELED PIPE END TREATMENT FOR HIGHWAYS

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

732.05D

SHEET NO. 1 OF 2



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 ½″ x 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 ½″ x 6″ GALVANIZED BOLTS. THE ½″ x 6″ GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.

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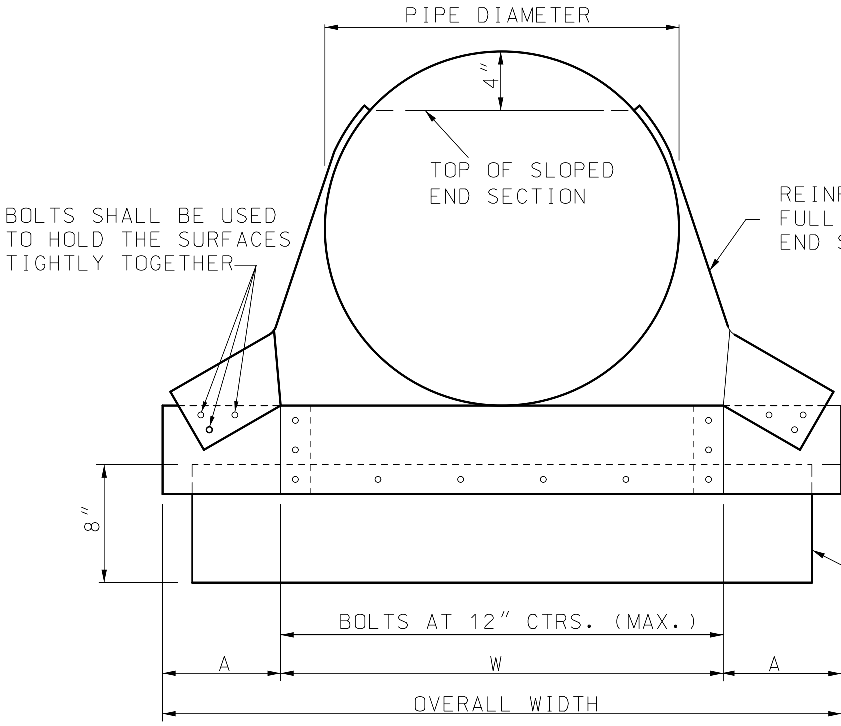
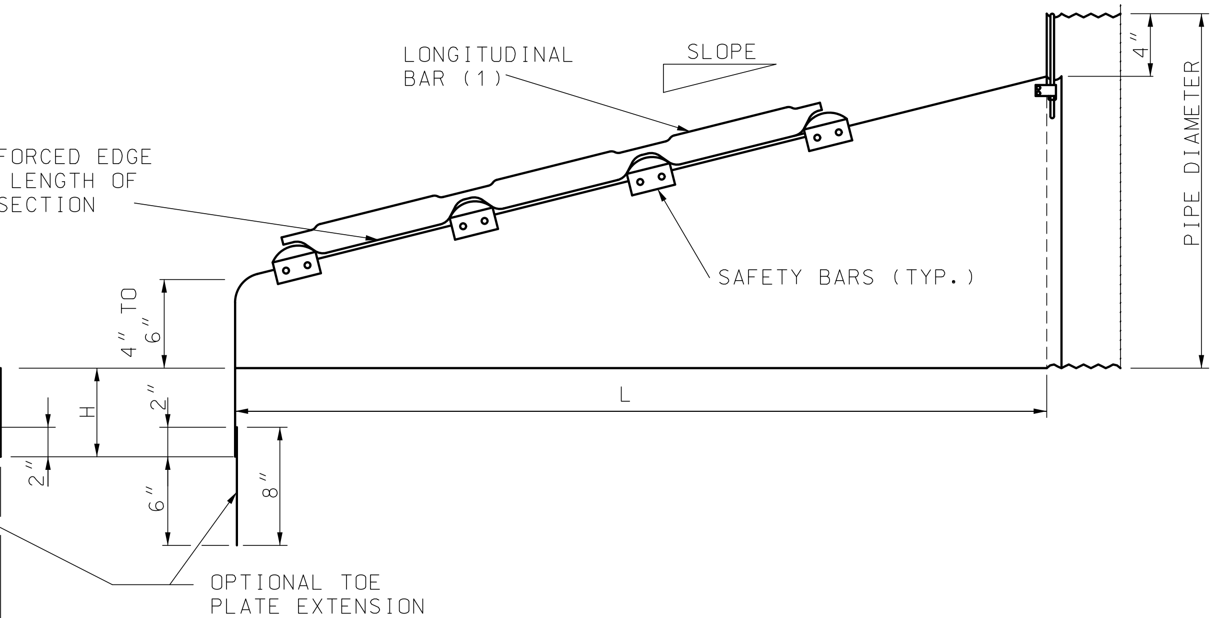
BEVELED PIPE END TREATMENT FOR DRIVEWAYS

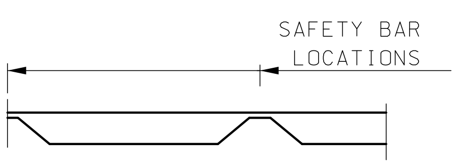
DATE EFFECTIVE:	01/01/2021	732.05D	SHEET NO.
DATE PREPARED:	10/14/2020		2 OF 2



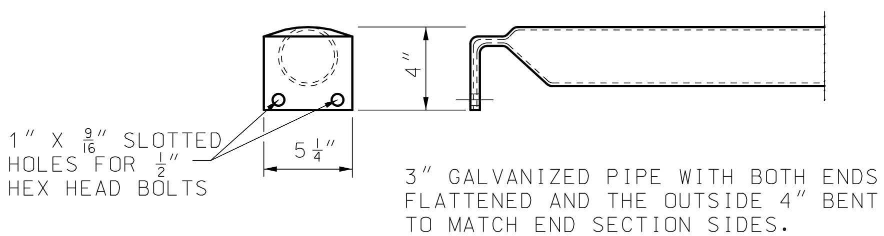
FRONT VIEW CIRCULAR PIPE



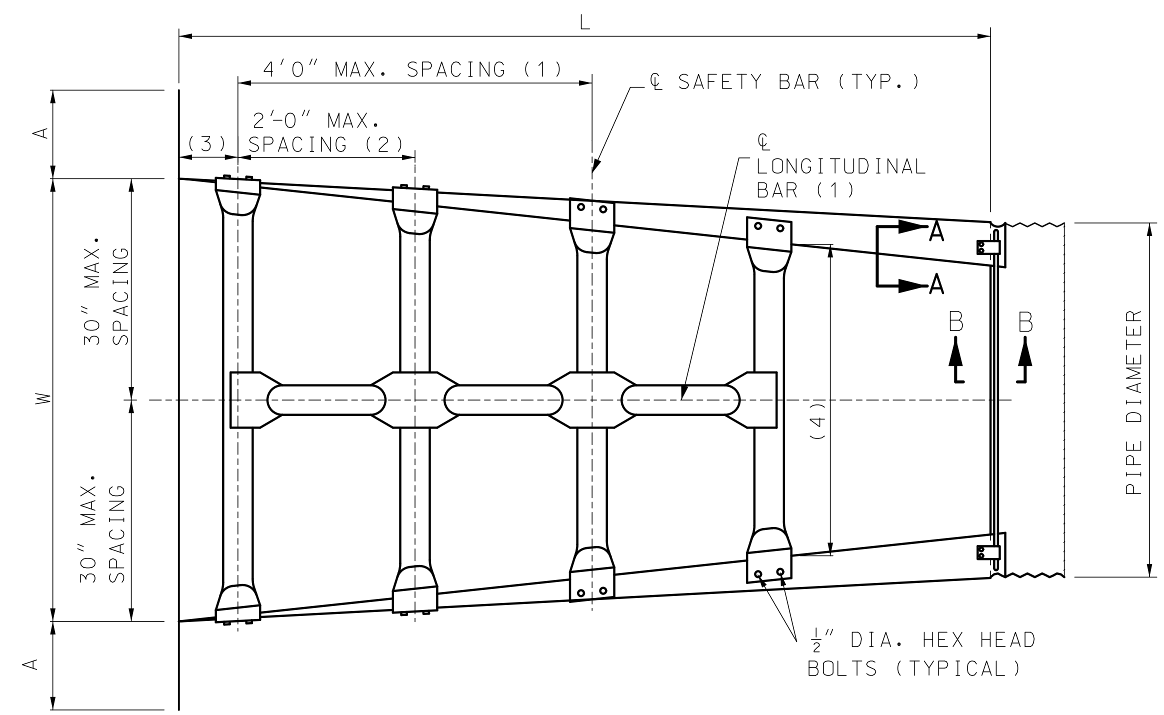
SIDE ELEVATION CIRCULAR SECTION



LONGITUDINAL BAR DETAIL

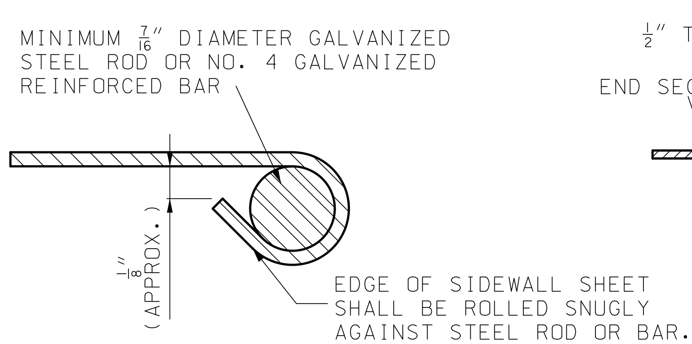


DETAIL OF SAFETY BAR

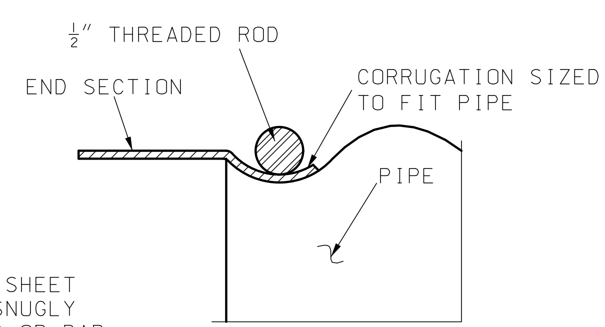


TOP VIEW CIRCULAR SECTION

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.



SECTION A-A



SECTION B-B

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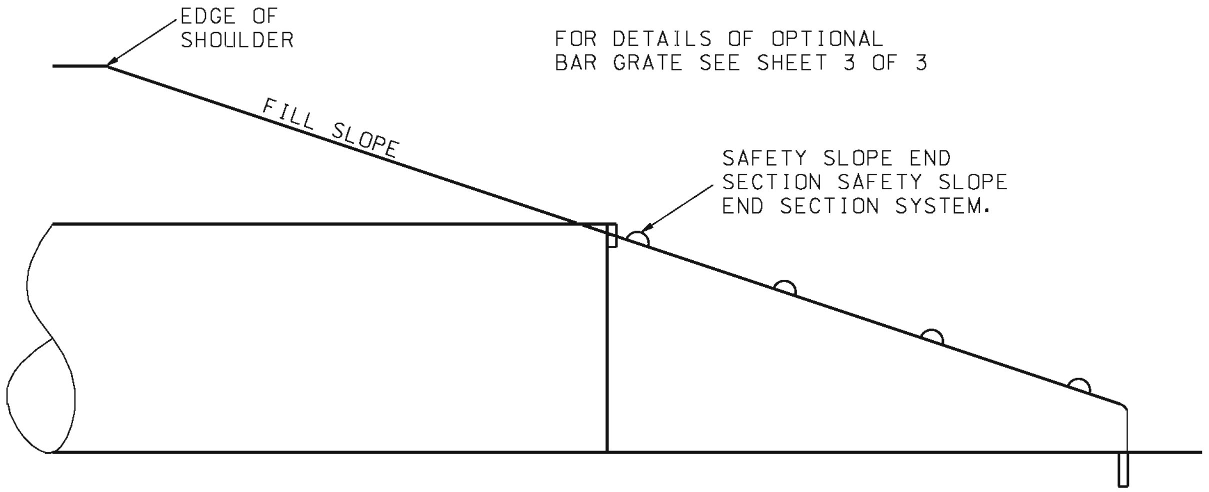
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SAFETY SLOPE END SECTION

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

732.10H

SHEET NO. 1 OF 3



FOR DETAILS OF OPTIONAL
BAR GRATE SEE SHEET 3 OF 3

PIPE END DETAILS FOR DRAINAGE STRUCTURES

(SINGLE PIPE INSTALLATION)

NOTE:
SEE DRIVEWAY STANDARD PLANS FOR
BEVELED END SECTION REQUIREMENT.

FOR CONNECTION DETAILS, SEE 732.00
SHEET 3 OF 3.

METAL END SECTIONS FOR CIRCULAR PIPES

PIPE DIA. (IN.)	MIN. GAUGE ENDS (IN.) 4:1 & 6:1	MIN. GAUGE ENDS (IN.) 10:1	DIMENSIONS IN INCHES				L DIMENSIONS					
			A 1" TOL.	H 1" TOL.	W 2" TOL.	OVERALL WIDTH	SLOPE	LENGTH (IN.)	SLOPE	LENGTH (IN.)	SLOPE	LENGTH (IN.)
15	16	12	8	6	21	37	4:1	20	6:1	30	10:1	70
18	16	12	8	6	24	40	4:1	32	6:1	48	10:1	100
21	16	12	8	6	27	43	4:1	44	6:1	66	10:1	130
24	16	12	8	6	30	46	4:1	56	6:1	84	10:1	160
30	12		12	9	36	60	4:1	80	6:1	120	10:1	220
36	12		12	9	42	66	4:1	104	6:1	156	10:1	280
42	12		16	12	48	80	4:1	128	6:1	192		
48	12		16	12	54	86	4:1	152	6:1	228		
54	12		16	12	60	92	4:1	176	6:1	264		
60	12		16	12	66	98	4:1	200	6:1	300		

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SAFETY SLOPE END SECTION

DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

732.10H

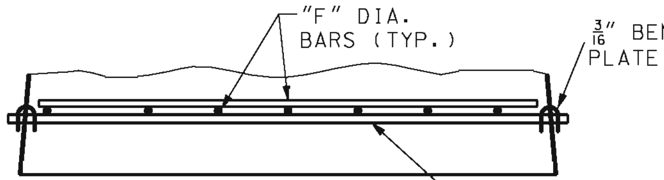
SHEET NO. 2 OF 3

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

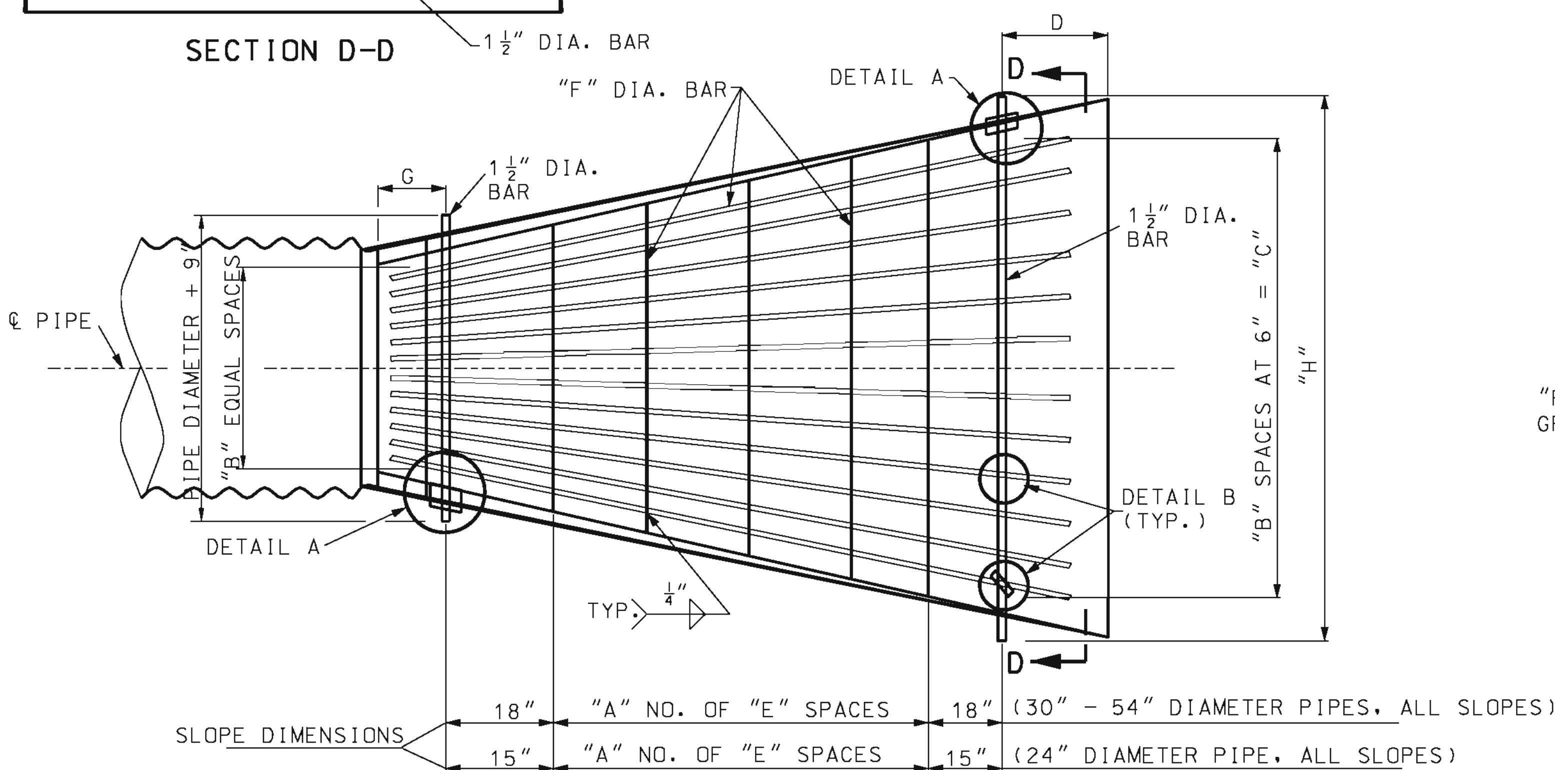
BAR GRATE SYSTEM DATA

DRAIN PIPE SIZE	3:1 SLOPE A	B	C	D	E	"F" BARS	G	H	J	4:1 SLOPE A	B	C	D	E	"F" BARS	G	H	J	6:1 SLOPE A	B	C	D	E	"F" BARS	G	H	J
15"**																											
18"**																											
21"**																											
24"	0	4	2'-0"	6"	15"	5/8"	8 1/4"	3'-3"	18.4°	0	4	2'-0"	15 3/4"	15"	5/8"	12"	3'-3"	14°	2	4	2'-0"	13 1/8"	15"	5/8"	12"	3'-3"	9.5°
30"	0	5	2'-6"	15 1/4"	18"	5/8"	12"	3'-9"	18.4°	1	5	2'-6"	16 1/2"	18"	5/8"	12"	3'-9"	14°	3	5	2'-6"	19 5/8"	18"	5/8"	12"	3'-9"	9.5°
36"	1	6	3'-0"	16 1/4"	18"	3/4"	12"	4'-3"	18.4°	2	6	3'-0"	18"	18"	3/4"	17 1/4"	4'-3"	14°	5	6	3'-0"	20 1/8"	18"	3/4"	12"	4'-3"	9.5°
42"	2	7	3'-6"	17 1/4"	18"	1"	12"	4'-9"	18.4°	4	7	3'-6"	12"	18"	1"	12"	4'-9"	14°	7	7	3'-6"	11 7/8"	18"	1"	9"	4'-9"	10.1°
48"	3	8	4'-0"	18"	18"	1"	12 1/8"	5'-3"	18.4°	5	8	4'-0"	18"	18"	1"	12 5/8"	5'-3"	14°	7	8	4'-0"	13"	18"	1"	9"	5'-3"	11.9°
54"	4	9	4'-6"	18"	18"	1 1/8"	13 1/8"	5'-9"	18.4°	6	9	4'-6"	18"	18"	1 1/8"	19 3/8"	5'-9"	14°	7	9	4'-6"	14 1/4"	18"	1 1/8"	9"	5'-9"	13.7°

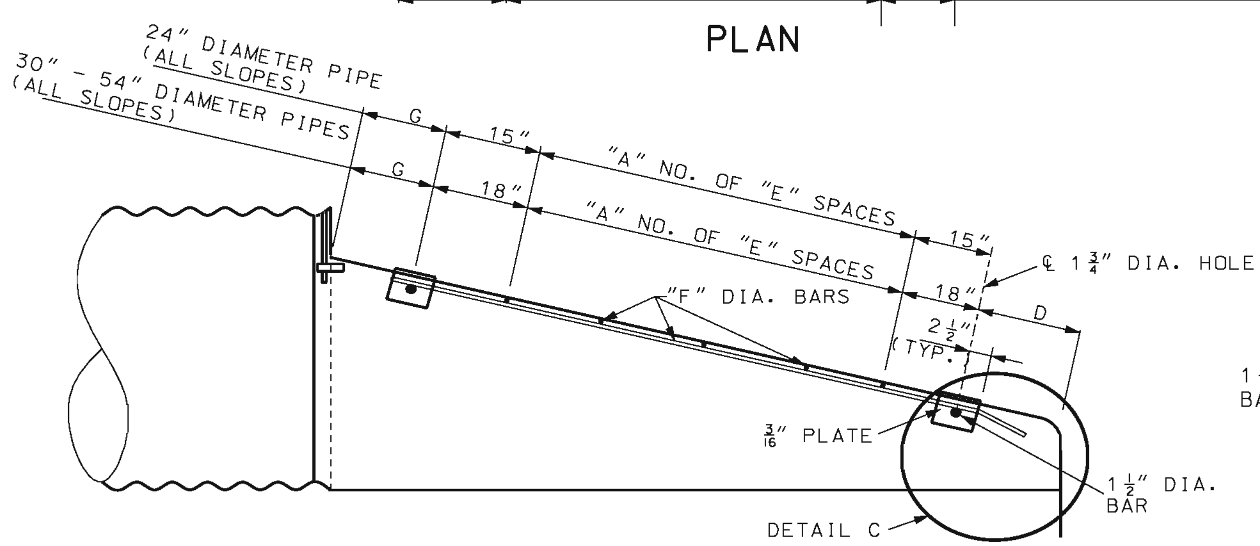
** BAR GRATE SYSTEM IS NOT REQUIRED FOR DRAIN PIPE DIAMETER OF 21" OR LESS, FOR SINGLE PIPE INSTALLATIONS.



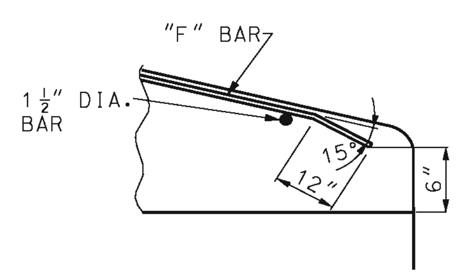
SECTION D-D



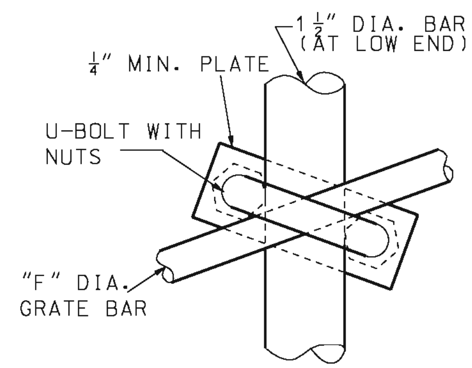
PLAN

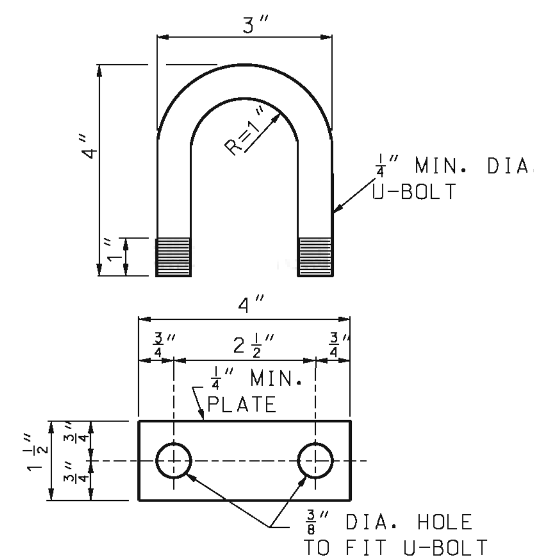


ELEVATION

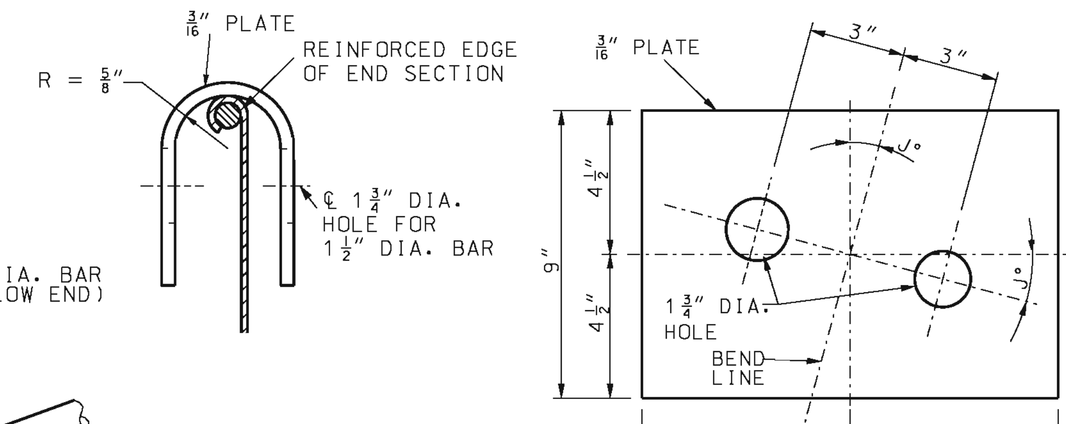


DETAIL C





DETAIL B
U-BOLT ANCHOR



DETAIL A
BENT PLATE ANCHOR

GENERAL NOTES:

ALL STEEL MATERIAL FOR BAR GRATE SYSTEM SHALL BE IN ACCORDANCE WITH ASTM A575 GRADE 1020 STEEL.

ALL MATERIAL IN GRATE SYSTEM SHALL BE GALVANIZED.

GALVANIZING SHALL BE DONE IN ACCORDANCE WITH ASTM A123.

ALL MATERIALS, FABRICATION AND INSTALLATION OF OPTIONAL BAR GRATE SYSTEM USED IN LIEU OF SAFETY BAR SYSTEM SHALL BE INCLUDED IN CONTRACT UNIT PRICE BID FOR END SECTION (SAFETY SLOPE).

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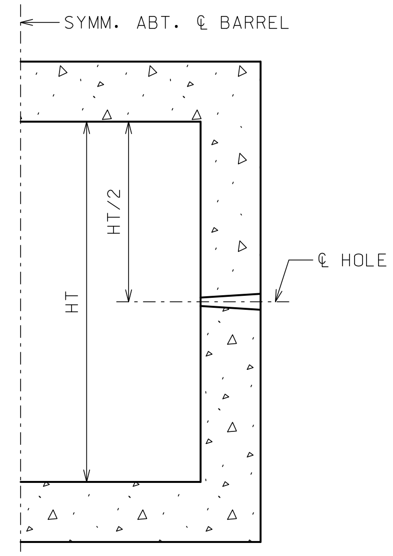
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OPTIONAL BAR GRATE SYSTEM FOR SAFETY SLOPE END SECTION

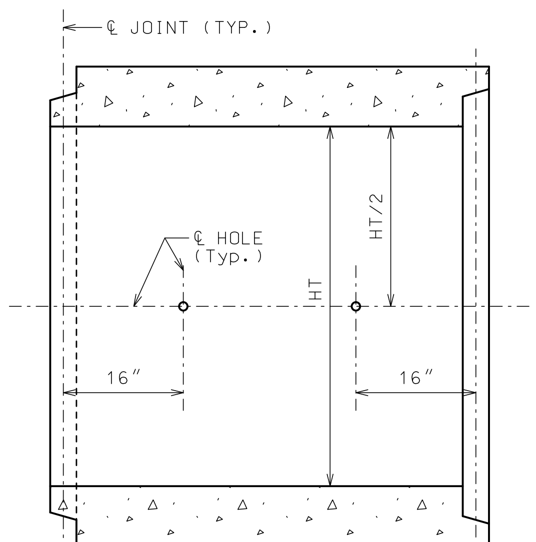
DATE EFFECTIVE: 06/01/2013 DATE PREPARED: 4/1/2013	732.10H	SHEET NO. 3 OF 3

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

PLACEMENT OF HOLES

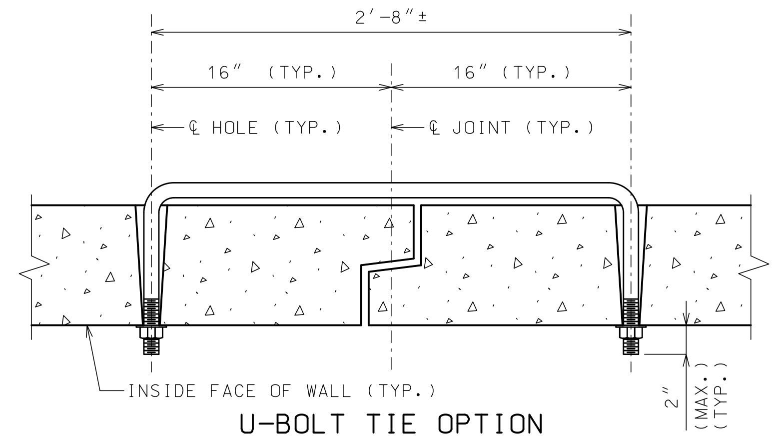


HALF SECTION THRU BARREL

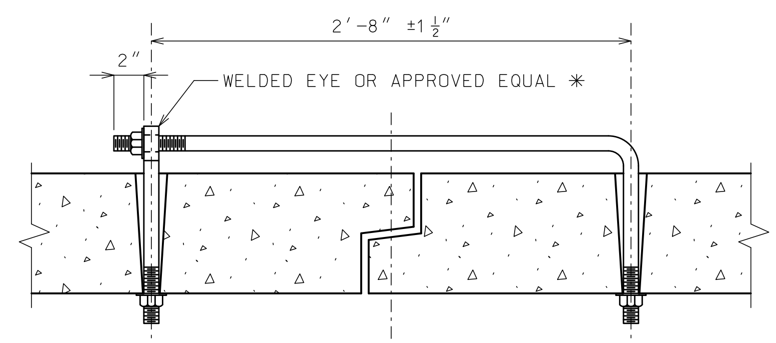


LONGITUDINAL SECTION

REGULAR STRENGTH CONNECTION DETAILS

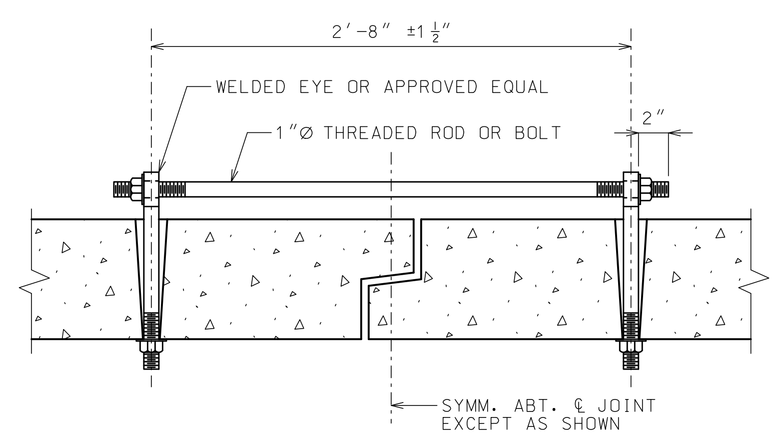


U-BOLT TIE OPTION



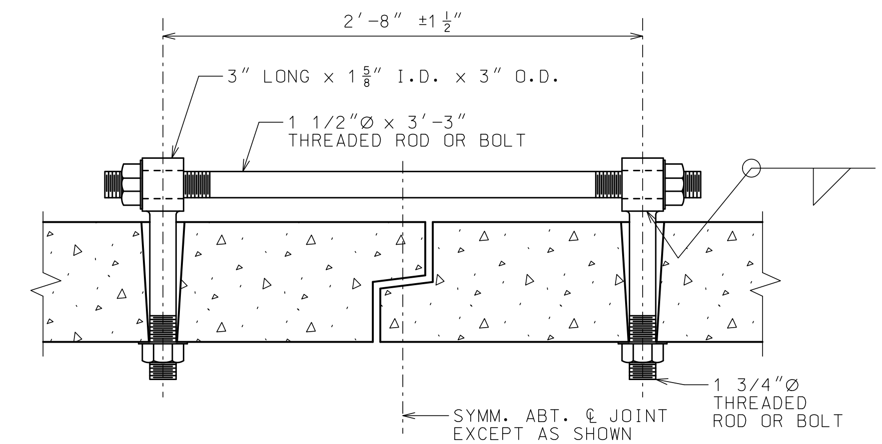
✱ THE CONNECTIONS SHALL BE PLACED AT DOWNSTREAM END WHEN PLACED INSIDE OF STRUCTURE.

EYE BOLT TIE OPTION



DOUBLE CONNECTION TIE OPTION

EXTRA STRENGTH CONNECTION DETAILS



DOUBLE CONNECTION TIE

GENERAL NOTES:

TIES SHALL BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

ALL PARTS OF THE TIE ASSEMBLY EXCEPT FOR ANCHORAGE SHALL BE LOCATED ON THE FILL FACE. ANCHORAGE THAT IS DIFFERENT THAN SHOWN SHALL BE APPROVED BY THE ENGINEER.

TIES SHALL ONLY BE USED FOR CONNECTING ADJACENT PRECAST SECTIONS. TIES ARE NOT TO BE USED TO CONNECT PRECAST TO CAST-IN-PLACE SECTIONS.

HOLES:
HOLES SHALL BE CAST OR DRILLED 16 INCHES FROM CENTERLINE OF JOINT AS SHOWN, UNLESS FORMS ARE SET UP FOR 16-INCH SPACING FROM OUTSIDE OF JOINT.

TAPERED HOLES ARE PERMITTED WHEN PRECAST.

REGULAR STRENGTH CONNECTIONS:
REGULAR STRENGTH CULVERT TIES SHALL BE 1″Ø THREADED RODS.

TIE RODS FOR REGULAR STRENGTH CONNECTIONS SHALL BE GALVANIZED IN ACCORDANCE WITH SEC 1081.

EXTRA STRENGTH CONNECTIONS:
THREADED RODS FOR EXTRA STRENGTH CONNECTIONS SHALL BE STAINLESS STEEL IN ACCORDANCE WITH ASTM A193 OR A320.

NUTS FOR EXTRA STRENGTH CONNECTIONS SHALL BE STAINLESS STEEL IN ACCORDANCE WITH ASTM A194 AND OF GRADE EQUIVALENT TO GRADE USED FOR THREADED RODS.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

PRECAST CONCRETE BOX CULVERT TIES

DATE EFFECTIVE: 07/01/2021 DATE PREPARED: 5/3/2021	733.00	SHEET NO. 1 OF 1

REGION 1

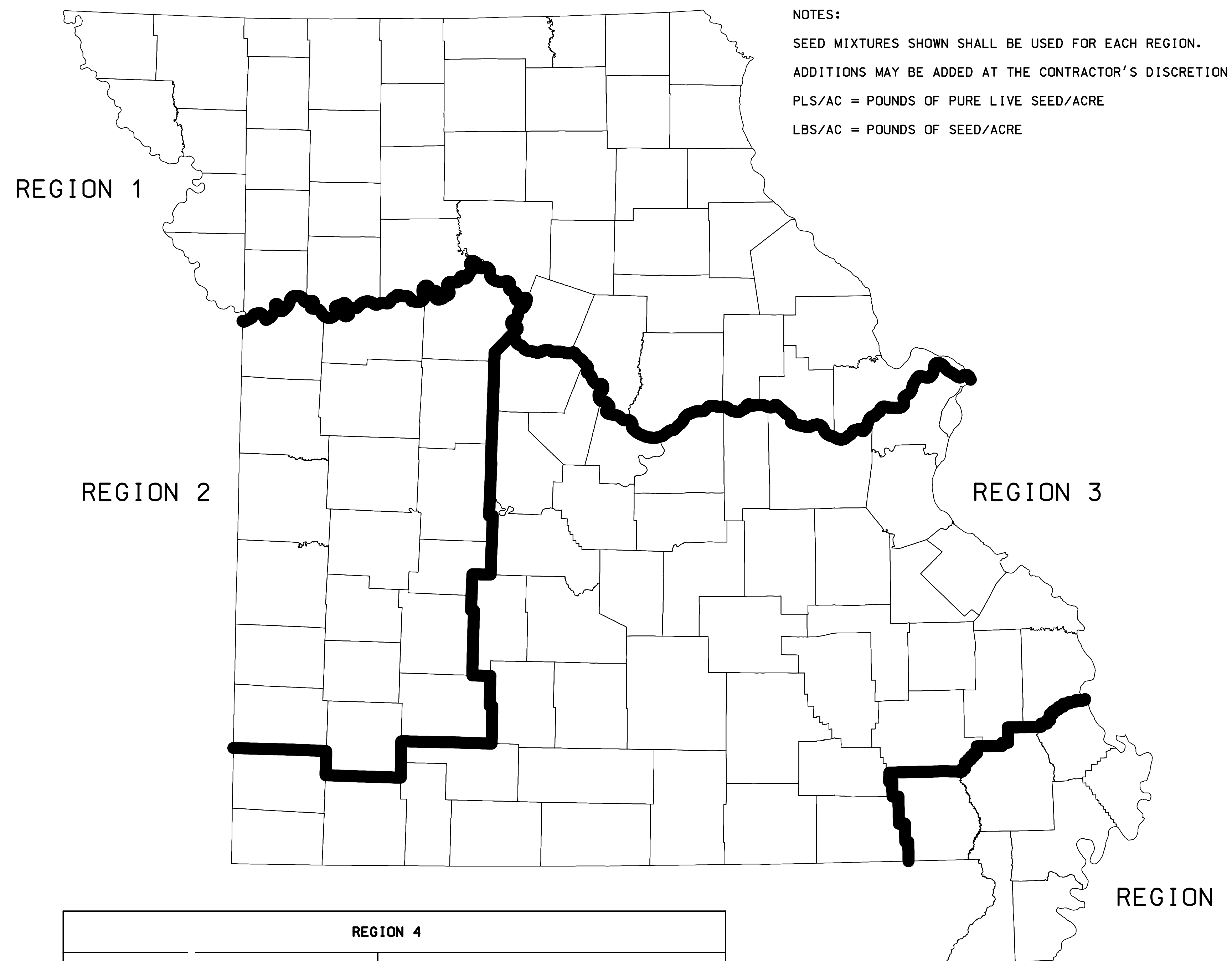
COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME 0 LBS ENM/AC	FERTILIZER 80-160-80	LIME 0 LBS ENM/AC	FERTILIZER 40-80-40
SEED MIXTURE	**ADDITIONS**	**SEED MIXTURE**	**ADDITIONS**
COVER CROP	**COVER CROP**	**COVER CROP**	**COVER CROP**
ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC	ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC
TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC	TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC
GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC	GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC
OATS 10 LBS/AC		OATS 10 LBS/AC	
COOL SEASON	**COOL SEASON**	**WARM SEASON**	**WARM SEASON**
TALL FESCUE 70 LBS/AC	ORCHARDGRASS 20 LBS/AC	BUFFALO GRASS 15 PLS/AC	RED FESCUE 5 LBS/AC
KENTUCKY BLUEGRASS 20 LBS/AC	TIMOTHY 10 LBS/AC	BIG BLUESTEM 10 PLS/AC	PRAIRIE CORDGRASS 10 PLS/AC
PERENNIAL RYEGRASS 10 LBS/AC	RED FESCUE 20 LBS/AC	LITTLE BLUESTEM 5 PLS/AC	PRAIRIE DROPSEED 2 PLS/AC
BUFFALO GRASS 15 PLS/AC	SMOOTH BROME 10 LBS/AC	INDIAN GRASS 10 PLS/AC	RIVER OATS 10 PLS/AC
RED TOP 4 LBS/AC		SIDE OATS GRAMA 5 PLS/AC	
		SWITCH GRASS 3 PLS/AC	
LEGUME	**LEGUME**	RED TOP 2 PLS/AC	
WHITE CLOVER 8 LBS/AC	RED CLOVER 5 LBS/AC	PERENIAL RYEGRASS 10 PLS/AC	
	ALSIKE CLOVER 4 LBS/AC		
TOTAL SEED/ACRE 148		**LEGUME**	**LEGUME**
		WHITE CLOVER 5 LBS/AC	RED CLOVER 5 LBS/AC
		WILDFLOWER / POLLINATOR	**WILDFLOWER**
		LANCELEAF COREOPSIS 0.5 LBS/AC	GOLDEN ALEXANDERS 0.25 LBS/AC
		BLACK EYED SUSAN 0.5 LBS/AC	SKY BLUE ASTER 0.25 LBS/AC
		GRAY HEADED CONEFLOWER 1 LBS/AC	PRAIRIE BLAZING STAR 0.25 LBS/AC
		PURPLE CONEFLOWER 2 LBS/AC	
		NEW ENGLAND ASTER 0.25 LBS/AC	
		COMMON MILKWEED 0.5 LBS/AC	
		SWAMP MILKWEED 0.25 LBS/AC	
		WHITE PRAIRIE CLOVER 0.25 LBS/AC	
		PURPLE PRAIRIE CLOVER 0.25 LBS/AC	
		PARTRIDGE PEA 0.5 LBS/AC	
		TOTAL SEED/ACRE 92	

REGION 2

COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME 1000 LBS ENM/AC	FERTILIZER 80-80-80	LIME 600 LBS ENM/AC	FERTILIZER 40-40-40
SEED MIXTURE	**ADDITIONS**	**SEED MIXTURE**	**ADDITIONS**
COVER CROP	**COVER CROP**	**COVER CROP**	**COVER CROP**
ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC	ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC
TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC	TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC
GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC	GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC
OATS 10 LBS/AC		OATS 10 LBS/AC	
COOL SEASON	**COOL SEASON**	**WARM SEASON**	**WARM SEASON**
TALL FESCUE 70 LBS/AC	ORCHARDGRASS 20 LBS/AC	BUFFALO GRASS 15 PLS/AC	RED FESCUE 5 LBS/AC
KENTUCKY BLUEGRASS 10 LBS/AC	TIMOTHY 10 LBS/AC	BIG BLUESTEM 10 PLS/AC	PRAIRIE CORDGRASS 10 PLS/AC
PERENNIAL RYEGRASS 10 LBS/AC	RED FESCUE 20 LBS/AC	LITTLE BLUESTEM 5 PLS/AC	PRAIRIE DROPSEED 2 PLS/AC
BUFFALO GRASS 15 PLS/AC	SMOOTH BROME 10 LBS/AC	INDIAN GRASS 10 PLS/AC	RIVER OATS 10 PLS/AC
RED TOP 4 LBS/AC		SIDE OATS GRAMA 5 PLS/AC	
BERMUDA GRASS 10 LBS/AC		SWITCH GRASS 3 PLS/AC	
		RED TOP 2 PLS/AC	
LEGUME	**LEGUME**	PERENIAL RYEGRASS 10 PLS/AC	
WHITE CLOVER 8 LBS/AC	RED CLOVER 5 LBS/AC		
	ALSIKE CLOVER 4 LBS/AC	**LEGUME**	**LEGUME**
TOTAL SEED/ACRE 148		WHITE CLOVER 5 LBS/AC	RED CLOVER 5 LBS/AC
		WILDFLOWER / POLLINATOR	**WILDFLOWER**
		LANCELEAF COREOPSIS 0.5 LBS/AC	GOLDEN ALEXANDERS 0.25 LBS/AC
		BLACK EYED SUSAN 0.5 LBS/AC	SKY BLUE ASTER 0.25 LBS/AC
		GRAY HEADED CONEFLOWER 1 LBS/AC	PRAIRIE BLAZING STAR 0.25 LBS/AC
		PURPLE CONEFLOWER 2 LBS/AC	
		NEW ENGLAND ASTER 0.25 LBS/AC	
		COMMON MILKWEED 0.5 LBS/AC	
		SWAMP MILKWEED 0.25 LBS/AC	
		WHITE PRAIRIE CLOVER 0.25 LBS/AC	
		PURPLE PRAIRIE CLOVER 0.25 LBS/AC	
		PARTRIDGE PEA 0.5 LBS/AC	
		TOTAL SEED/ACRE 92	

REGION 3

COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME 1500 LBS ENM/AC	FERTILIZER 80-240-80	LIME 1000 LBS ENM/AC	FERTILIZER 40-120-40
SEED MIXTURE	**ADDITIONS**	**SEED MIXTURE**	**ADDITIONS**
COVER CROP	**COVER CROP**	**COVER CROP**	**COVER CROP**
ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC	ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC
TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC	TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC
GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC	GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC
OATS 10 LBS/AC		OATS 10 LBS/AC	
COOL SEASON	**COOL SEASON**	**WARM SEASON**	**WARM SEASON**
TALL FESCUE 70 LBS/AC	ORCHARDGRASS 20 LBS/AC	BUFFALO GRASS 15 PLS/AC	RED FESCUE 5 LBS/AC
KENTUCKY BLUEGRASS 10 LBS/AC	TIMOTHY 10 LBS/AC	BIG BLUESTEM 10 PLS/AC	PRAIRIE CORDGRASS 10 PLS/AC
PERENNIAL RYEGRASS 10 LBS/AC	RED FESCUE 20 LBS/AC	LITTLE BLUESTEM 5 PLS/AC	PRAIRIE DROPSEED 2 PLS/AC
BUFFALO GRASS 15 PLS/AC	SMOOTH BROME 10 LBS/AC	INDIAN GRASS 10 PLS/AC	RIVER OATS 10 PLS/AC
RED TOP 4 LBS/AC		SIDE OATS GRAMA 5 PLS/AC	
BERMUDA GRASS 10 LBS/AC		SWITCH GRASS 3 PLS/AC	
		RED TOP 2 PLS/AC	
LEGUME	**LEGUME**	PERENIAL RYEGRASS 10 PLS/AC	
WHITE CLOVER 8 LBS/AC	RED CLOVER 5 LBS/AC		
	ALSIKE CLOVER 4 LBS/AC	**LEGUME**	**LEGUME**
TOTAL SEED/ACRE 148		WHITE CLOVER 5 LBS/AC	RED CLOVER 5 LBS/AC
		WILDFLOWER / POLLINATOR	**WILDFLOWER**
		LANCELEAF COREOPSIS 0.5 LBS/AC	GOLDEN ALEXANDERS 0.25 LBS/AC
		BLACK EYED SUSAN 0.5 LBS/AC	SKY BLUE ASTER 0.25 LBS/AC
		GRAY HEADED CONEFLOWER 1 LBS/AC	PRAIRIE BLAZING STAR 0.25 LBS/AC
		PURPLE CONEFLOWER 2 LBS/AC	
		NEW ENGLAND ASTER 0.25 LBS/AC	
		COMMON MILKWEED 0.5 LBS/AC	
		SWAMP MILKWEED 0.25 LBS/AC	
		WHITE PRAIRIE CLOVER 0.25 LBS/AC	
		PURPLE PRAIRIE CLOVER 0.25 LBS/AC	
		PARTRIDGE PEA 0.5 LBS/AC	
		TOTAL SEED/ACRE 92	



NOTES:

SEED MIXTURES SHOWN SHALL BE USED FOR EACH REGION.

ADDITIONS MAY BE ADDED AT THE CONTRACTOR'S DISCRETION FOR NO DIRECT PAY.

PLS/AC = POUNDS OF PURE LIVE SEED/ACRE

LBS/AC = POUNDS OF SEED/ACRE

REGION 4

COOL SEASON GRASSES		WARM SEASON GRASSES	
LIME 0 LBS ENM/AC	FERTILIZER 80-160-80	LIME 0 LBS ENM/AC	FERTILIZER 40-80-40
SEED MIXTURE	**ADDITIONS**	**SEED MIXTURE**	**ADDITIONS**
COVER CROP	**COVER CROP**	**COVER CROP**	**COVER CROP**
ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC	ANNUAL RYEGRASS 5 LBS/AC	VIRGINIA RYE 5 LBS/AC
TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC	TEFF GRASS 4 LBS/AC	CANADA RYE 5 LBS/AC
GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC	GERMAN MILLET 2 LBS/AC	WHEAT GRAIN 10 LBS/AC
OATS 10 LBS/AC		OATS 10 LBS/AC	
COOL SEASON	**COOL SEASON**	**WARM SEASON**	**WARM SEASON**
TALL FESCUE 70 LBS/AC	ORCHARDGRASS 20 LBS/AC	BUFFALO GRASS 15 PLS/AC	RED FESCUE 5 LBS/AC
KENTUCKY BLUEGRASS 10 LBS/AC	TIMOTHY 10 LBS/AC	BIG BLUESTEM 10 PLS/AC	PRAIRIE CORDGRASS 10 PLS/AC
PERENNIAL RYEGRASS 10 LBS/AC	RED FESCUE 20 LBS/AC	LITTLE BLUESTEM 5 PLS/AC	PRAIRIE DROPSEED 2 PLS/AC
BUFFALO GRASS 15 PLS/AC	SMOOTH BROME 10 LBS/AC	INDIAN GRASS 10 PLS/AC	RIVER OATS 10 PLS/AC
RED TOP 4 LBS/AC		SIDE OATS GRAMA 5 PLS/AC	
BERMUDA GRASS 10 LBS/AC		SWITCH GRASS 3 PLS/AC	
		RED TOP 2 PLS/AC	
LEGUME	**LEGUME**	PERENIAL RYEGRASS 10 PLS/AC	
WHITE CLOVER 8 LBS/AC	RED CLOVER 5 LBS/AC		
	ALSIKE CLOVER 4 LBS/AC	**LEGUME**	**LEGUME**
TOTAL SEED/ACRE 148		WHITE CLOVER 5 LBS/AC	RED CLOVER 5 LBS/AC
		WILDFLOWER / POLLINATOR	**WILDFLOWER**
		LANCELEAF COREOPSIS 0.5 LBS/AC	GOLDEN ALEXANDERS 0.25 LBS/AC
		BLACK EYED SUSAN 0.5 LBS/AC	SKY BLUE ASTER 0.25 LBS/AC
		GRAY HEADED CONEFLOWER 1 LBS/AC	PRAIRIE BLAZING STAR 0.25 LBS/AC
		PURPLE CONEFLOWER 2 LBS/AC	
		NEW ENGLAND ASTER 0.25 LBS/AC	
		COMMON MILKWEED 0.5 LBS/AC	
		SWAMP MILKWEED 0.25 LBS/AC	
		WHITE PRAIRIE CLOVER 0.25 LBS/AC	
		PURPLE PRAIRIE CLOVER 0.25 LBS/AC	
		PARTRIDGE PEA 0.5 LBS/AC	
		TOTAL SEED/ACRE 92	

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

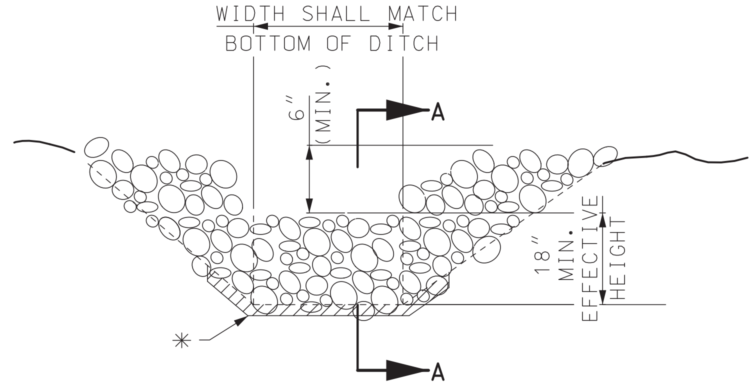
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

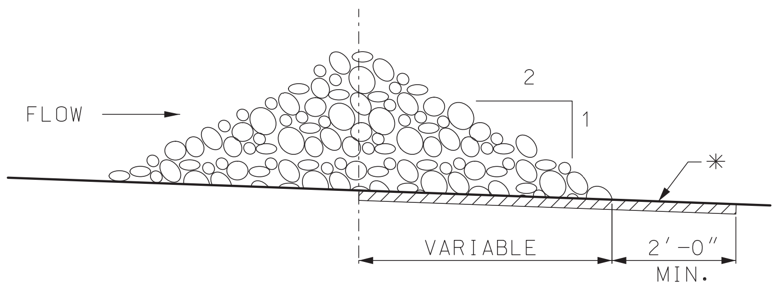
SEEDING

DATE EFFECTIVE:	07/01/2022	805.00	SHEET NO.
DATE PREPARED:	4/11/2022		1 OF 1

ROCK DITCH CHECK



END VIEW



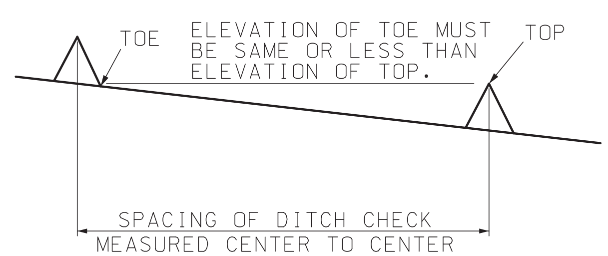
SECTION A-A

* GEOTEXTILE LINING MAY BE INSTALLED AS REQUIRED BY THE ENGINEER.

NOTE:

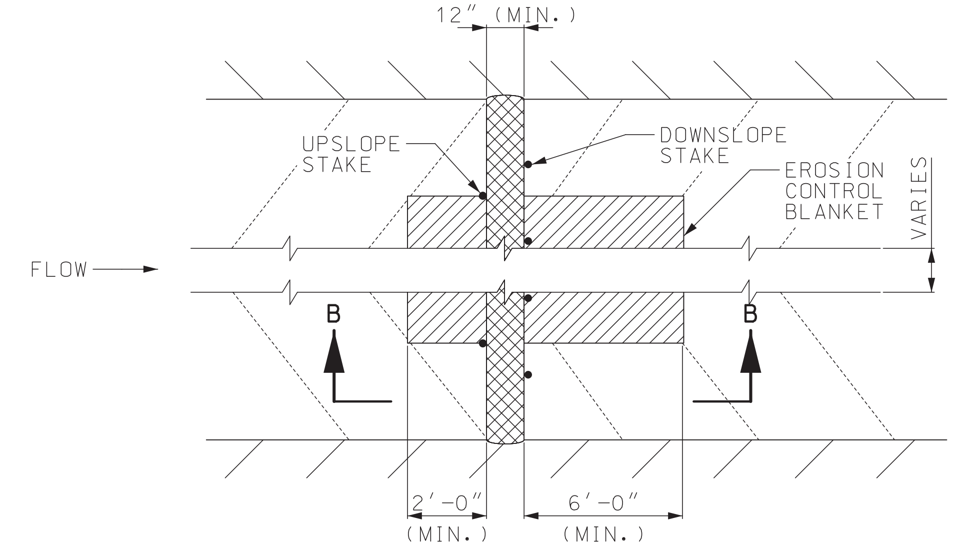
ROCK DITCH CHECK IN THE CLEAR ZONE SHALL BE REMOVED OR LEVELED (IF ALLOWABLE) AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE.

EXAMPLE DITCH CHECK SPACING FOR STANDARD HEIGHTS (FT.)		
DITCH ℄ SLOPE %	SPACING FOR 9" EFF. HEIGHT	SPACING FOR 18" EFF. HEIGHT
0.5	150	300
1.0	75	150
1.5	50	100
2.0	37	75
2.5	30	60
3.0	25	50
3.5	21	43
4.0	19	38
4.5	16	33
5.0	15	30
5.5	13	27
6.0	12	25
6.5	11	23
7.0	10	21
7.5	10	20
8.0	9	19
8.5	9	18
9.0	8	17
9.5	8	16
10.0	7	15

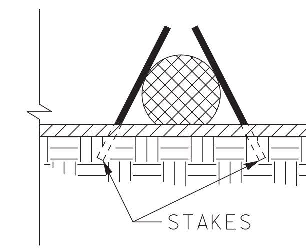


MINIMUM DITCH CHECK SPACING

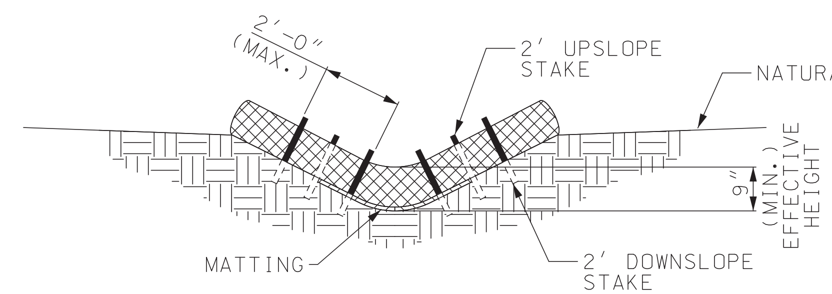
ALTERNATE DITCH CHECK



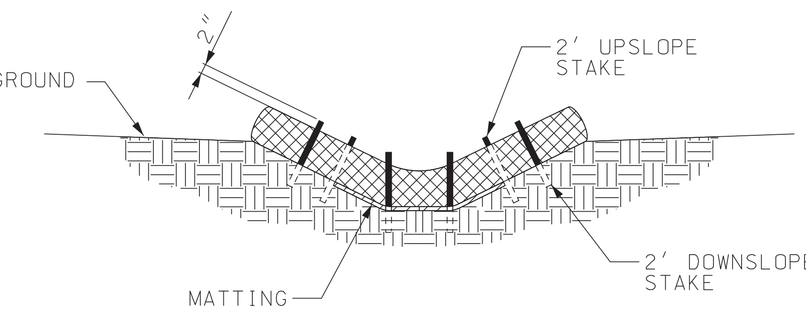
PLAN VIEW



SECTION B-B



TYPICAL SECTION
VEE DITCH



TYPICAL SECTION
TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER LOG/SOCK.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

INSTALL LOG/SOCK TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND LOG/SOCK AND SCOUR DITCH SLOPES OR AS DIRECTED BY ENGINEER.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE LOG/SOCK TO BOTTOM OF DITCH.

EROSION CONTROL BLANKET SHALL BE ANCHORED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

GENERAL NOTES:

OTHER PROPRIETARY DITCH CHECKS MAY BE SUBSTITUTED IN ACCORDANCE WITH SEC 806 OR AS DIRECTED BY THE ENGINEER.

INSTALLATION OF PROPRIETARY DITCH CHECKS SHALL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

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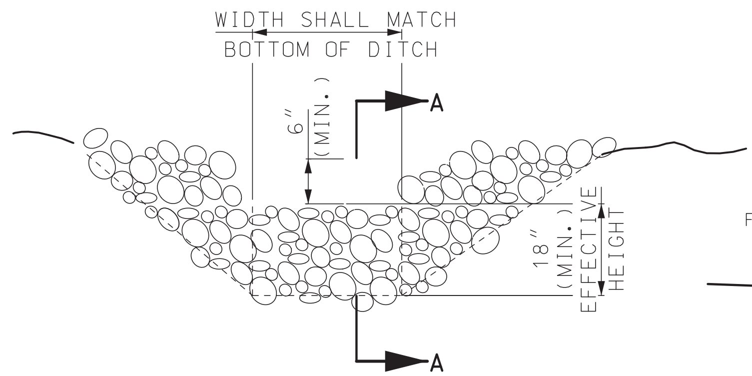
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

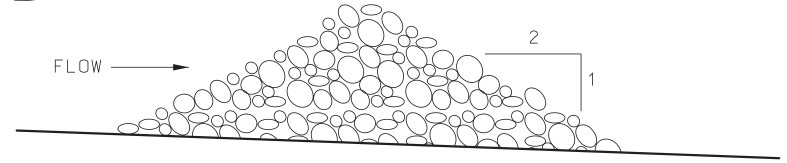
TEMPORARY EROSION CONTROL MEASURES
TEMPORARY DITCH CHECKS

DATE EFFECTIVE: 01/01/2023
DATE PREPARED: 10/11/2022
806.10K
SHEET NO. 1 OF 6

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



END VIEW

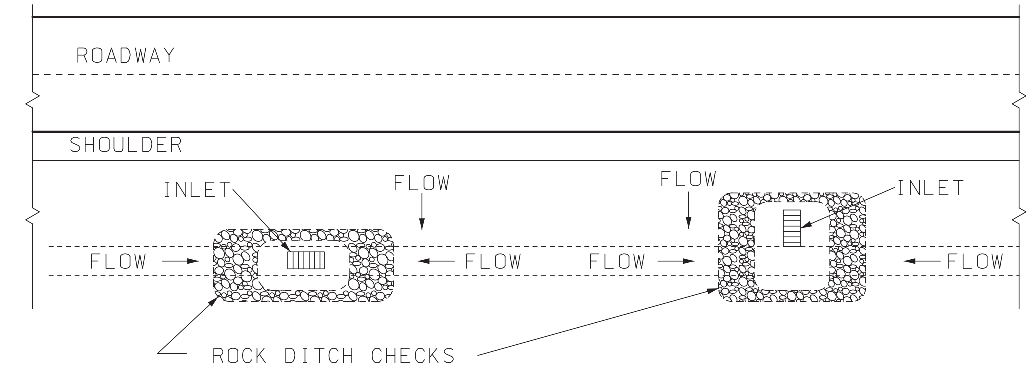


SECTION A-A

NOTE:

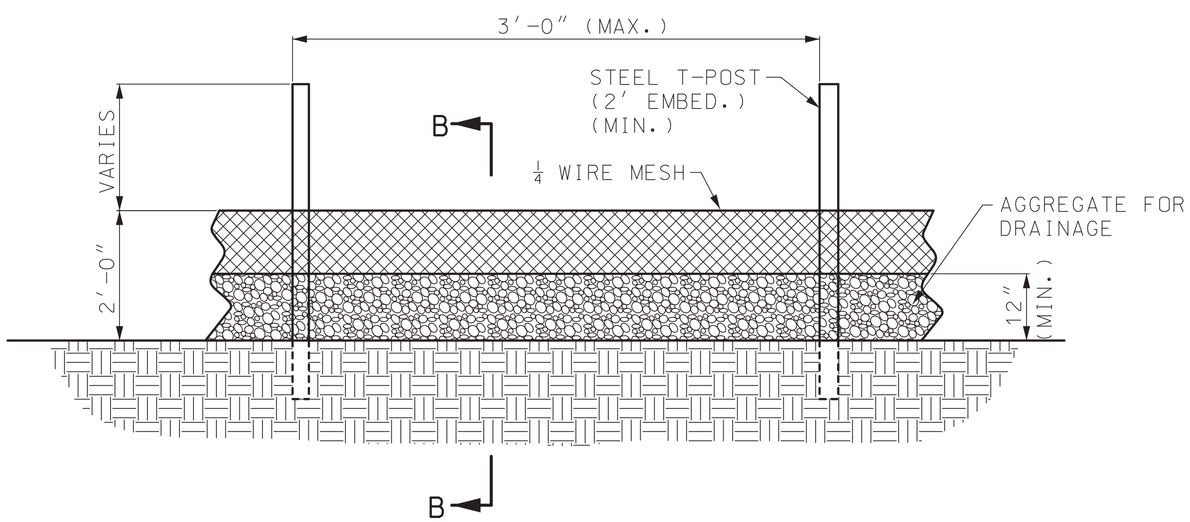
SEDIMENT TRAP

SEDIMENT TRAP IN THE CLEAR ZONE SHALL BE REMOVED OR LEVELED (IF ALLOWABLE) AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE.

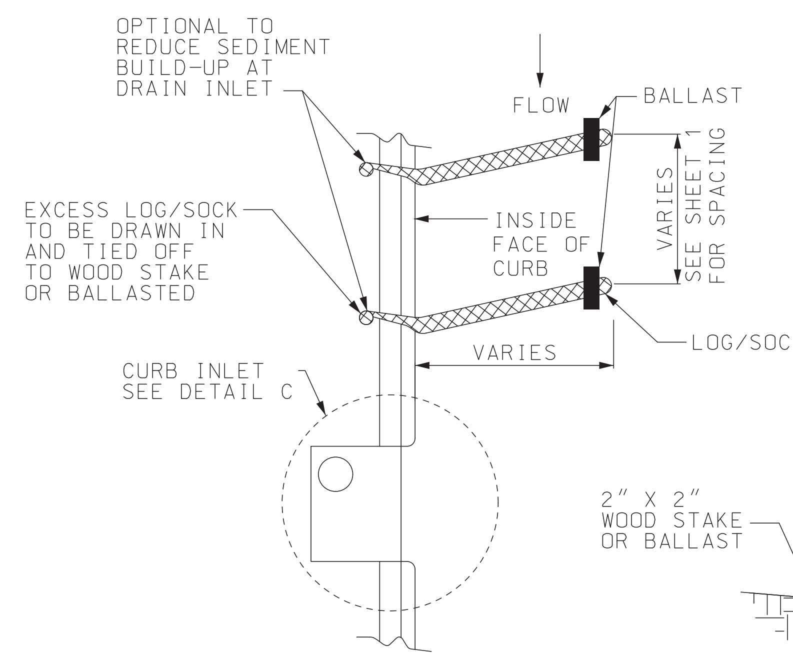


DROP INLET CHECK

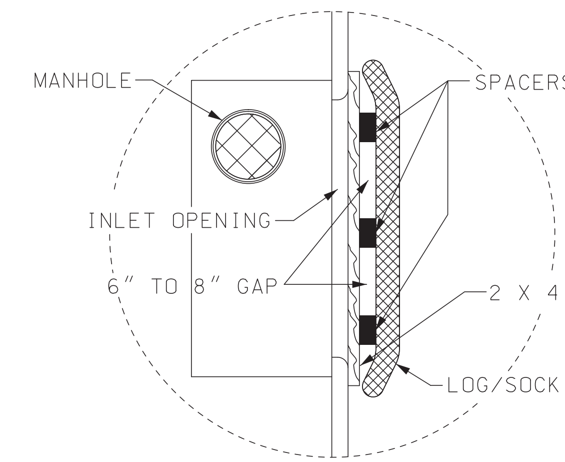
SEE SHEET 1 OF 6 FOR DETAILS OF ROCK DITCH CHECK.



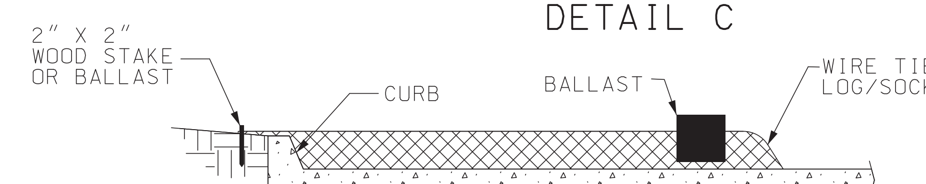
ELEVATION DETAIL



PLAN



DETAIL C



SECTION

CURB INLET PROTECTION

NOTES:

ROCK/MESH SEDIMENT CONTROL FENCE MAY BE NECESSARY, AS DETERMINED BY THE ENGINEER, IN ISOLATED AREAS WHERE PERIMETER SILT FENCE IS DEEMED INSUFFICIENT TO WITHSTAND SHEET FLOW. WHEN REQUIRED, IT WILL BE PAID PER LINEAR FOOT AS ROCK DITCH CHECK.

AGGREGATE FOR DRAINAGE SHALL BE IN ACCORDANCE WITH SEC 1009, GRADE 4 OR GRADE 5.

USE HARDWARE CLOTH 24 GAUGE WIRE MESH WITH ¼ INCH MESH OPENINGS.

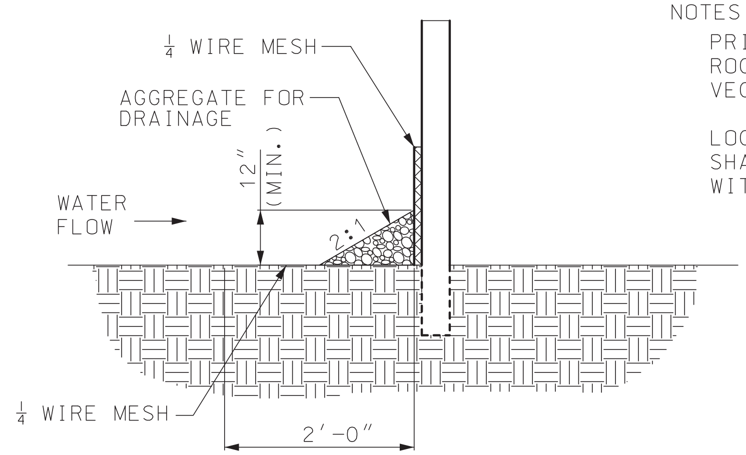
INSTALL 5 FT. T-POST WITH A 2 FOOT EMBEDMENT DEPTH (MIN.).

ATTACH HARDWARE CLOTH TO POST WITH WIRE STAPLE OR OTHER ACCEPTABLE METHODS.

SPACE POST A MAXIMUM OF 3 FT.

FOR INSTALLATION BETWEEN SECTIONS OF SILT FENCE, EXTEND AGGREGATE FOR DRAINAGE A MINIMUM OF 12 INCHES ON EACH SIDE OF SPECIAL SEDIMENT CONTROL FENCE SECTION.

ROCK/MESH SEDIMENT CONTROL FENCE MAY BE USED IN LIEU OF ROCK DITCH CHECK TO SURROUND AN INLET, AT NO ADDITIONAL COST TO THE COMMISSION.



SECTION B-B

ROCK/MESH SEDIMENT CONTROL FENCE

NOTES:

PRIOR TO PLACEMENT ALL DEBRIS, ROCK, LARGE CLODS AND WOOD VEGETATION SHALL BE CLEARED.

LOG/SOCK PLACED ON PAVEMENT SHALL BE WEIGHTED DOWN WITH GRAVEL/SAND BALLAST.

GENERAL NOTES:

OTHER PROPRIETARY INLET PROTECTION MAY BE SUBSTITUTED IN ACCORDANCE WITH SEC 806 OR AS DIRECTED BY THE ENGINEER.

FOR SEDIMENT CONTROL SPACING SEE SHEET 1 OF 6.

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

STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER
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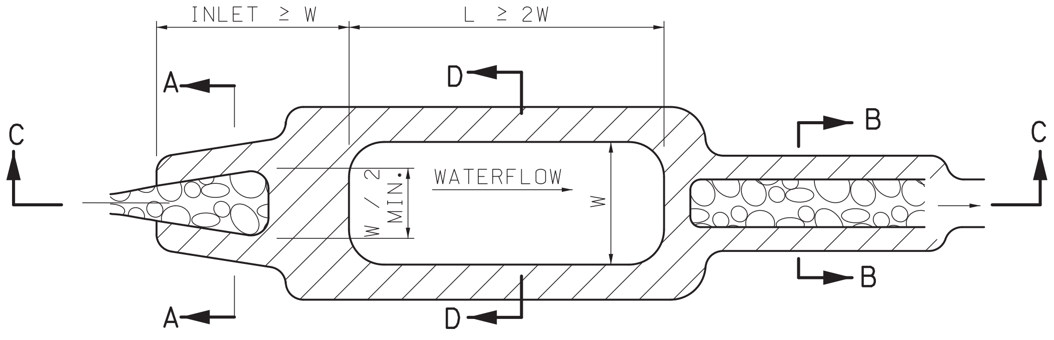
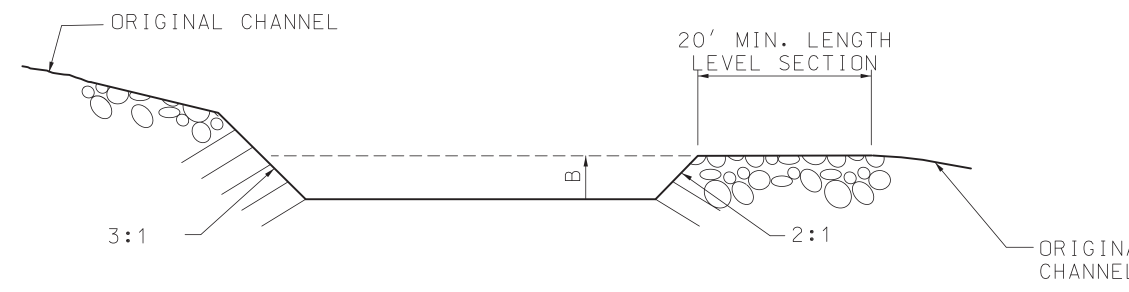
TEMPORARY EROSION CONTROL MEASURES

DATE EFFECTIVE:	01/01/2023	806.10K	SHEET NO.
DATE PREPARED:	10/11/2022		2 OF 6

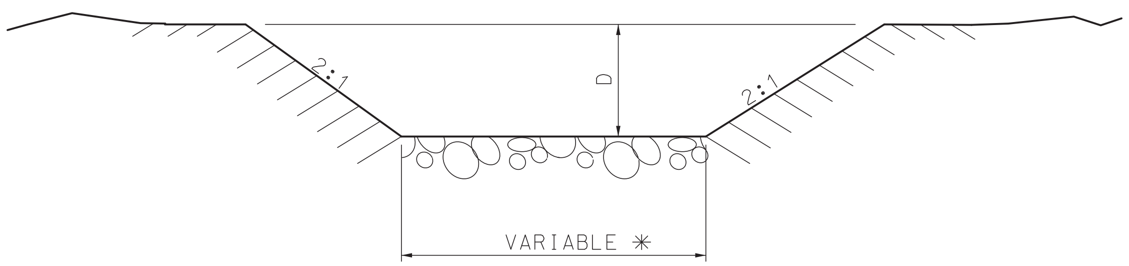


PLAN VIEW



SECTION C-C

EFFECTIVE DEPTH "B" = MIN. 2', MAX. 6' DEPENDENT UPON CONFIGURATION REQUIRED BY LOCATION AND ESTIMATED VOLUME.

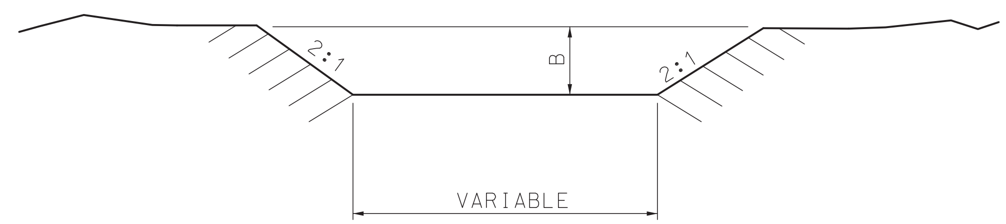


SECTION A-A

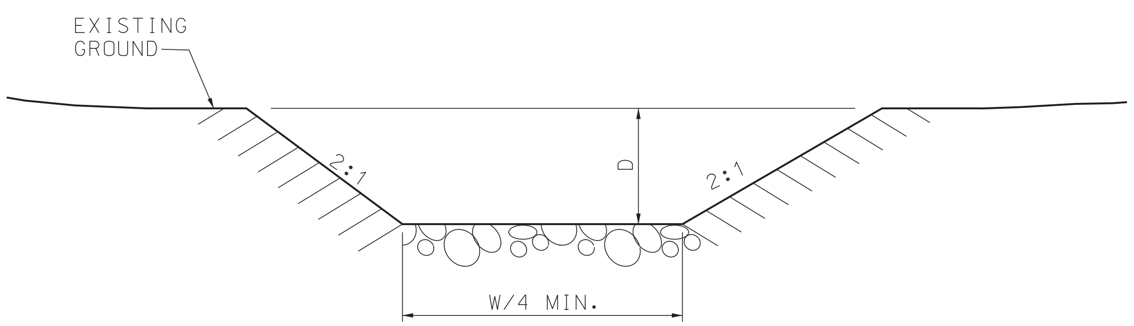
INLET

D = 1.0' + DESIGN FLOW DEPTH-MIN.

✳ VARIES FROM WIDTH OF STREAM AT INLET TO ONE-HALF WIDTH OF POND AT OUTLET.



SECTION D-D



SECTION B-B

OUTLET

LAYER OF APPROVED STABILIZING MATERIAL FOR SCOUR PREVENTION

GENERAL NOTES:

SEDIMENT BASINS ARE TO BE INCLUDED IN THE BMP SYSTEM WHEN THE GEOMETRY OF RIGHT-OF-WAY ALLOWS. WHERE INCLUDED, SEDIMENT BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE STORAGE VOLUME FOR THE LOCAL 2-YR, 24-HOUR STORM FOR DISTURBED ACREAGE DRAINING TO THEM. IF THE DESIGN STORM VOLUME HAS NOT BEEN CALCULATED, BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE A STORAGE VOLUME OF AT LEAST 3,600 CUBIC FEET PER DISTURBED ACRE DRAINING TO THE BASIN(S).

IF SEDIMENT BASIN IS TO BE PERMANENT ITS SLOPES SHALL BE STABILIZED WITH ROCK RIPRAP OR EQUIVALENT.

THE MATERIALS FOR ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF SEC 611.30 FOR TYPE 2 ROCK BLANKET.

SEE PLANS FOR LENGTH, DEPTH AND WIDTH OF BASIN.

SEE PLANS FOR ESTIMATED QUANTITIES OF ROCK RIPRAP - CUBIC YARDS.

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TEMPORARY EROSION CONTROL MEASURES

SEDIMENT BASIN

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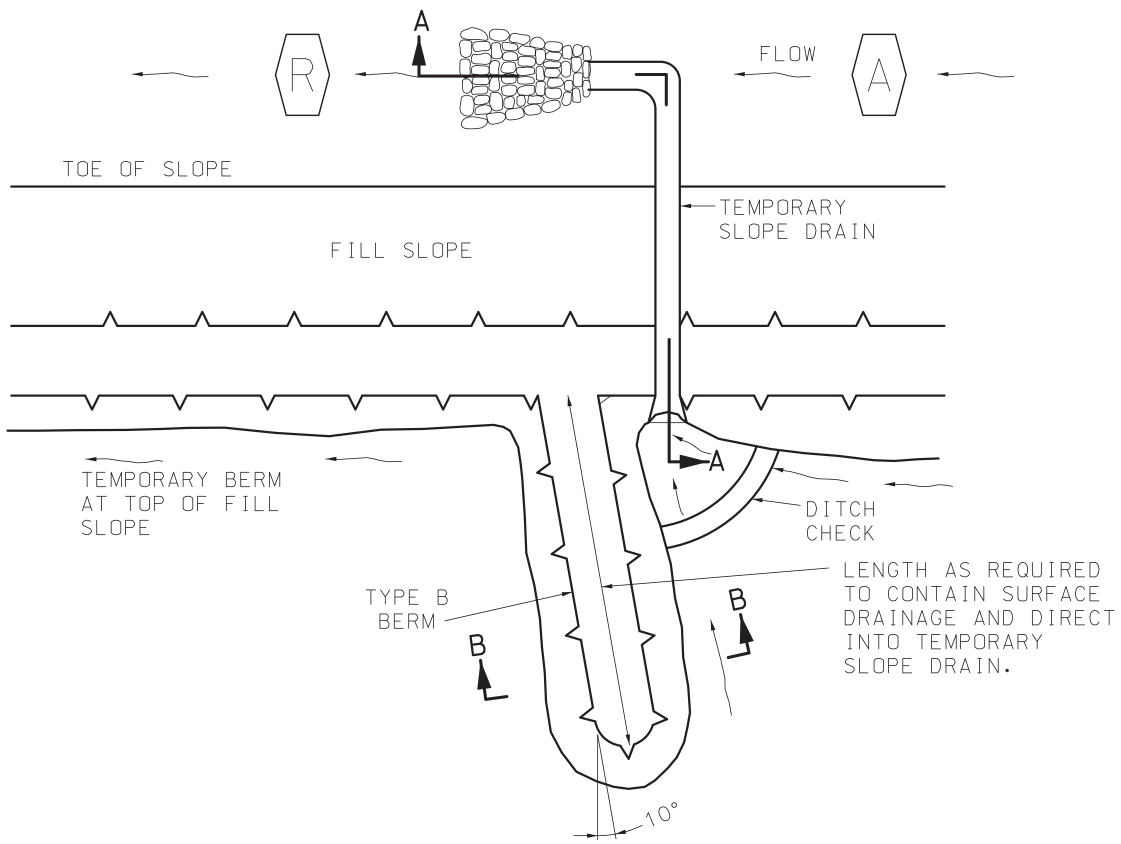
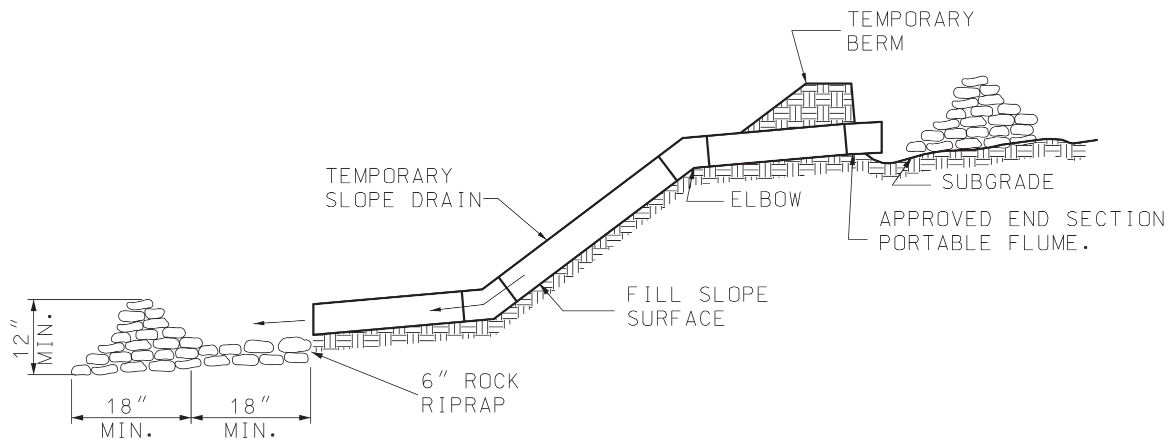


PLAN VIEW



NOTE:

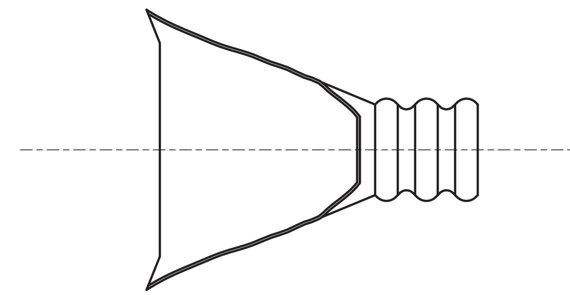
IN SOME CASES IT MAY BE NECESSARY TO EMBED METAL OR PLASTIC PIPE INTO THE FILL SLOPE TO SECURE PROPER ANCHORAGE.

SECTION A-A

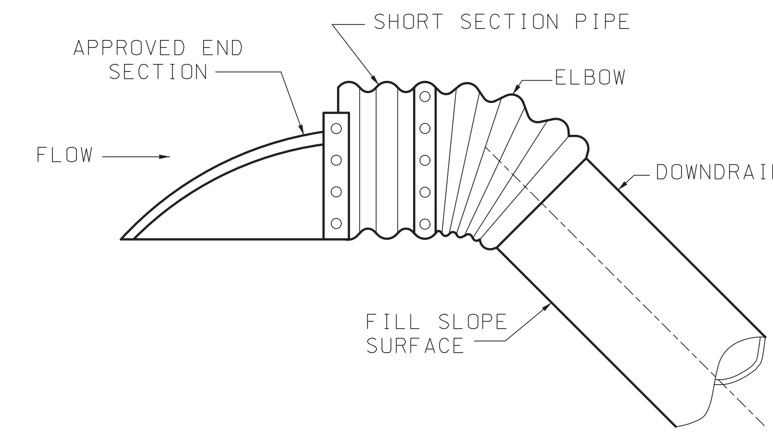
TEMPORARY BERM

(METAL, FLEXIBLE RUBBER OR PLASTIC PIPE)

NOTE:
MAXIMUM LENGTH BETWEEN SLOPE DRAINS SHALL BE APPROXIMATELY 500 FEET.

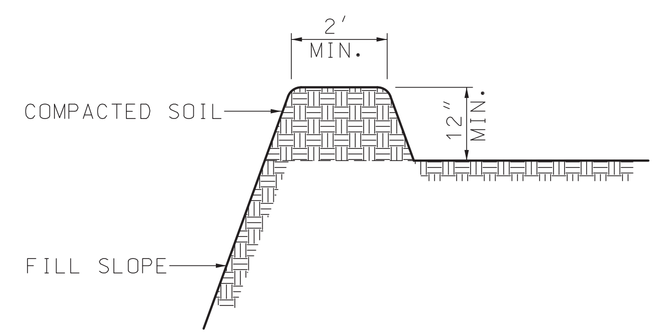


PLAN VIEW



SECTION VIEW

TEMPORARY SLOPE DRAIN INLET TREATMENT



SECTION B-B
TYPE B BERM

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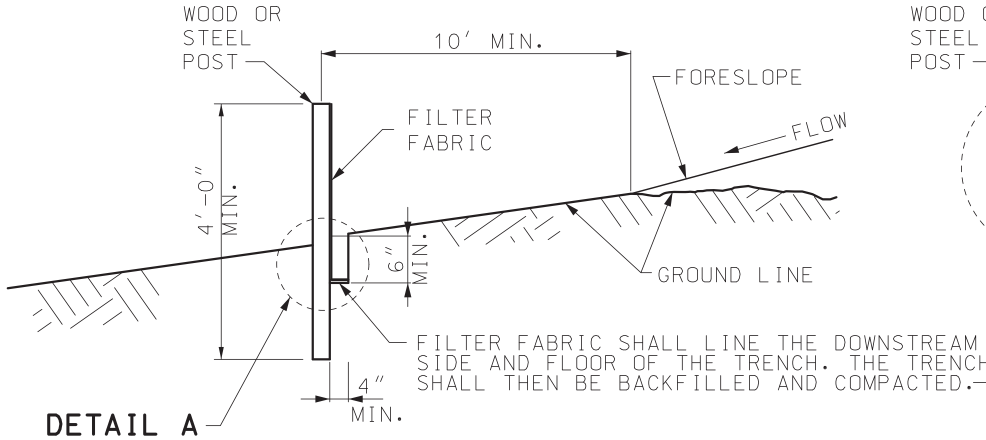
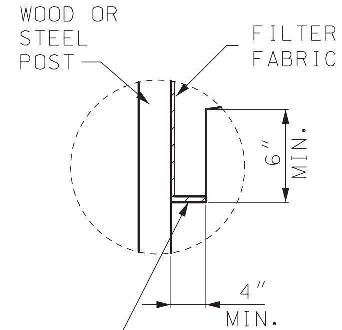
TEMPORARY EROSION CONTROL MEASURES

SLOPE DRAINS

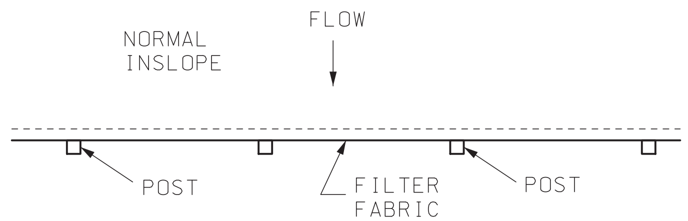
DATE EFFECTIVE:	01/01/2023	806.10K	SHEET NO.
DATE PREPARED:	10/11/2022		4 OF 6



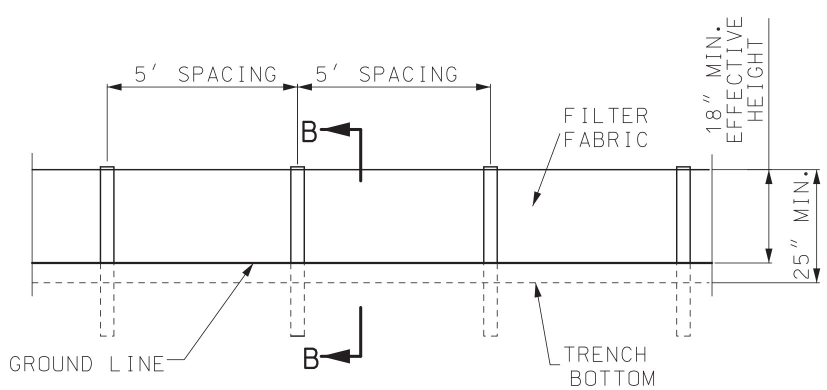
TYPICAL B-B



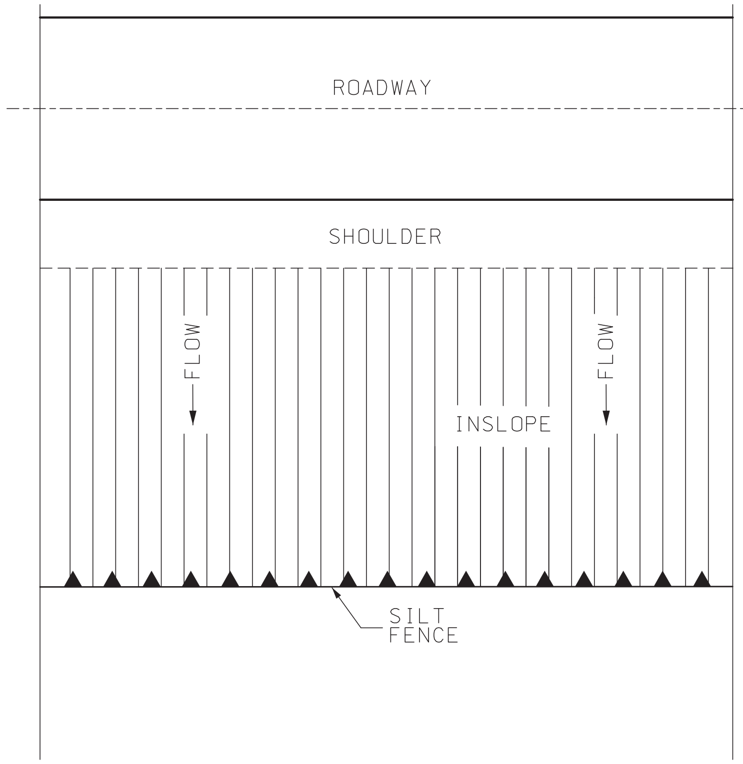
DETAIL A



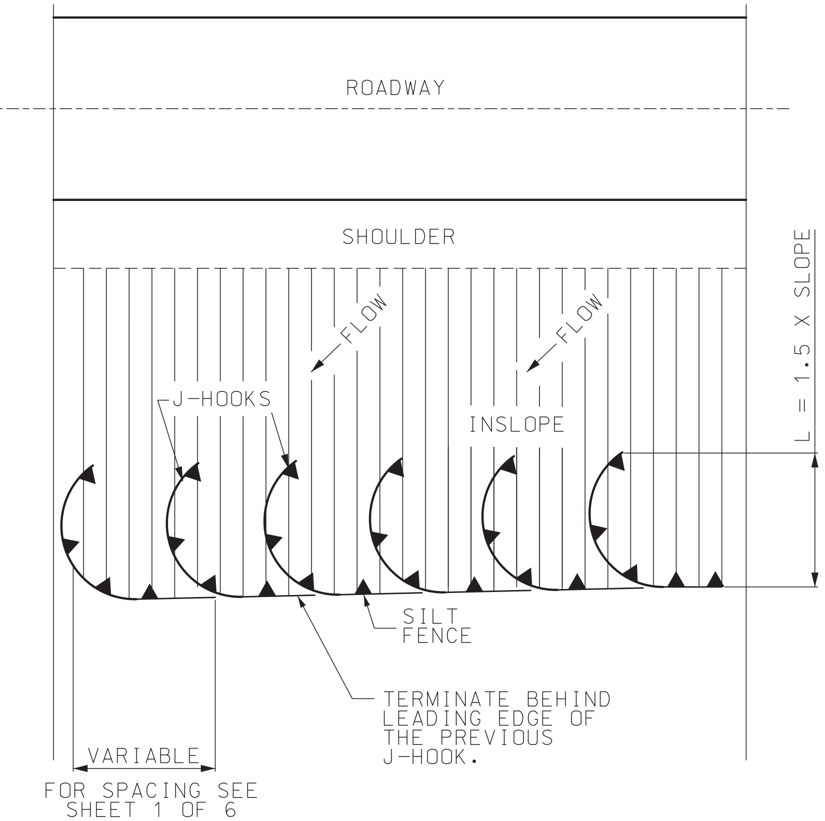
PLAN VIEW



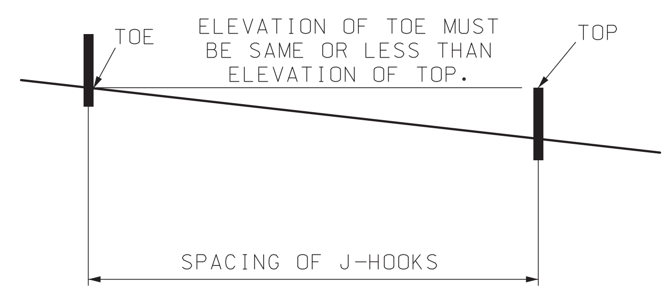
ELEVATION DETAIL
FABRIC SILT FENCE



PERIMETER SILT FENCE
FOR TRANSVERSE FLOW



PERIMETER SILT FENCE
FOR ANGULAR FLOW



MINIMUM J-HOOK SPACING

GENERAL NOTES:

USE SILT FENCE FOR FILL HEIGHTS GREATER OR EQUAL TO 10 FEET. ON ALL FILLS GREATER THAN 10 FEET HIGH, MID-SLOPE RUNS OF SILT FENCE SHOULD BE CONSIDERED.

FOR FABRIC SILT FENCE:

MINIMUM LONGITUDINAL SPLICE OVERLAP SHALL BE 2' WITH A POST AT EACH END.

SECURE FABRIC TO POSTS.

INSTEAD OF SILT FENCE ACROSS DRAINAGE DITCHES AND DRAINS, DITCH CHECKS SHALL BE USED AS SHOWN ON PLANS OR AS DIRECTED BY ENGINEER.

AT CULVERTS, PLACE SEDIMENT BARRIERS OVER THE TOP OF THE CULVERTS (NOT IN THE STREAM CHANNEL).

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TEMPORARY EROSION CONTROL MEASURES
SILT FENCE

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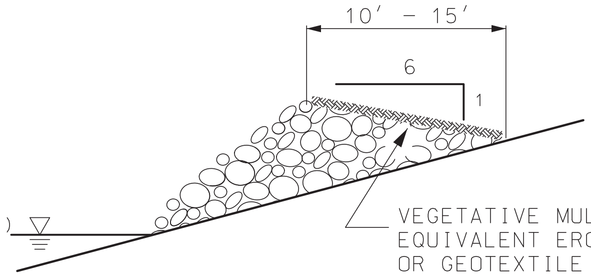
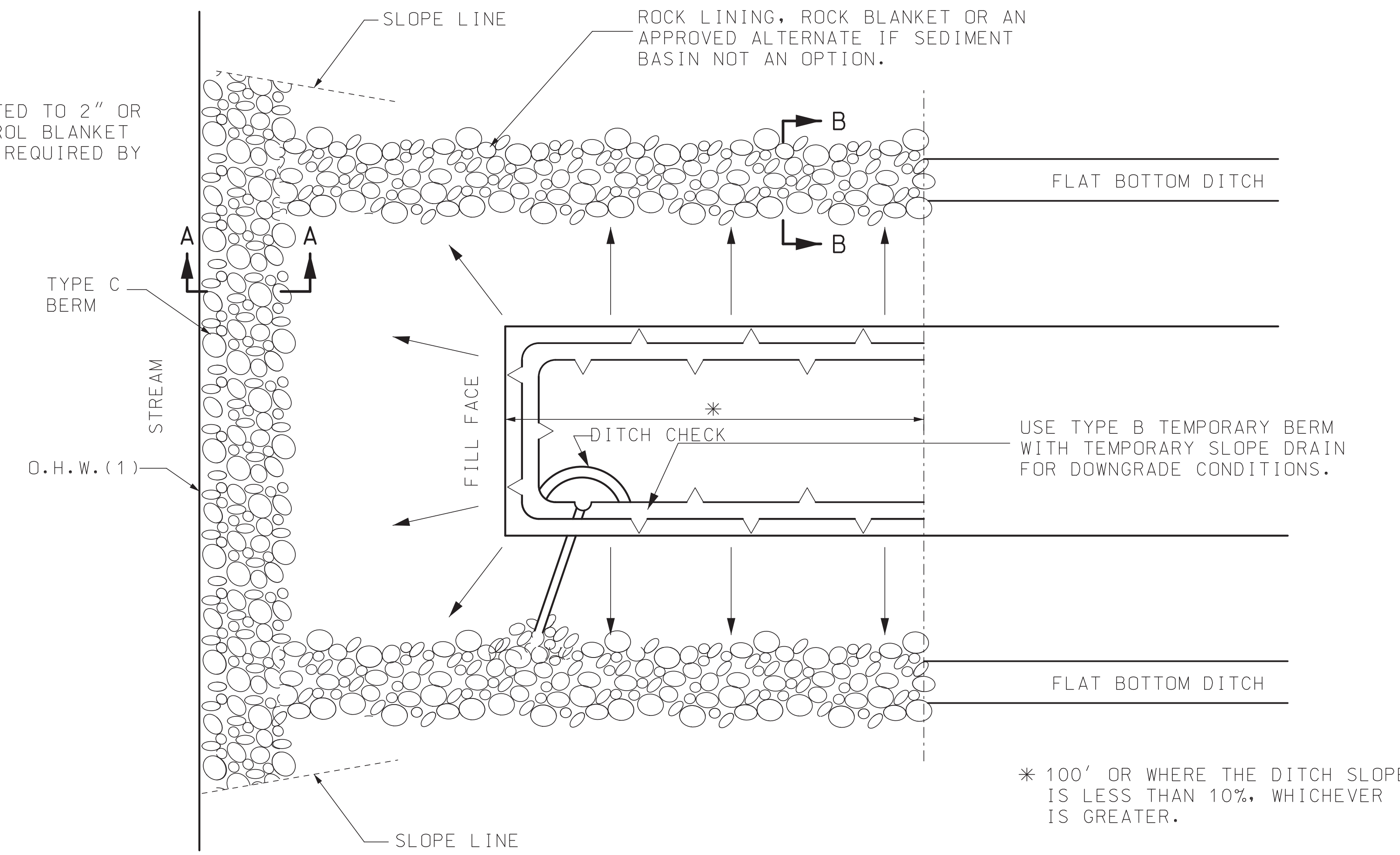
DATE PREPARED:	10/11/2022		5 OF 6



SECTION A-A
TYPE C BERM

(1) TYPE C BERM SHALL BE PLACED ABOVE THE ORDINARY HIGH WATER (O.H.W.) OR AT AN ELEVATION AS DIRECTED BY THE ENGINEER.

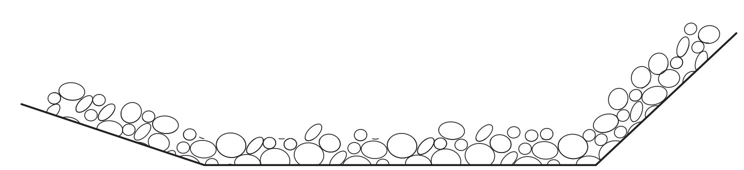


* 100' OR WHERE THE DITCH SLOPE IS LESS THAN 10%, WHICHEVER IS GREATER.

PLAN VIEW

GENERAL NOTES:

TYPE C BERM SHALL BE BUILT TO HANDLE SIGNIFICANT RUN-OFF EVENTS AND SHALL BE INSTALLED PRIOR TO SOIL DISTURBANCE OR PLACEMENT OF FILL IN THE DRAINAGE AREA OF THE BERM.



SECTION B-B

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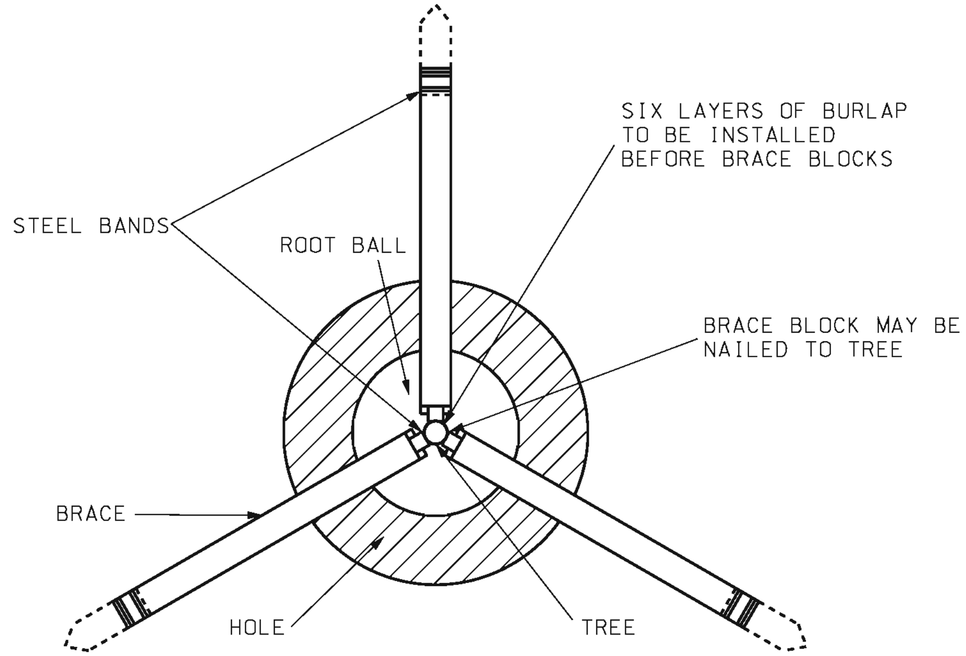
TEMPORARY EROSION CONTROL MEASURES

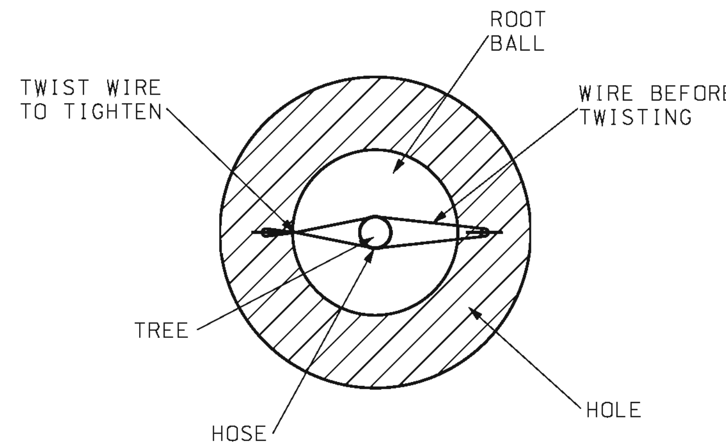
BRIDGES AND BOX CULVERTS AT STREAM CROSSINGS

DATE EFFECTIVE: 01/01/2023
DATE PREPARED: 10/11/2022

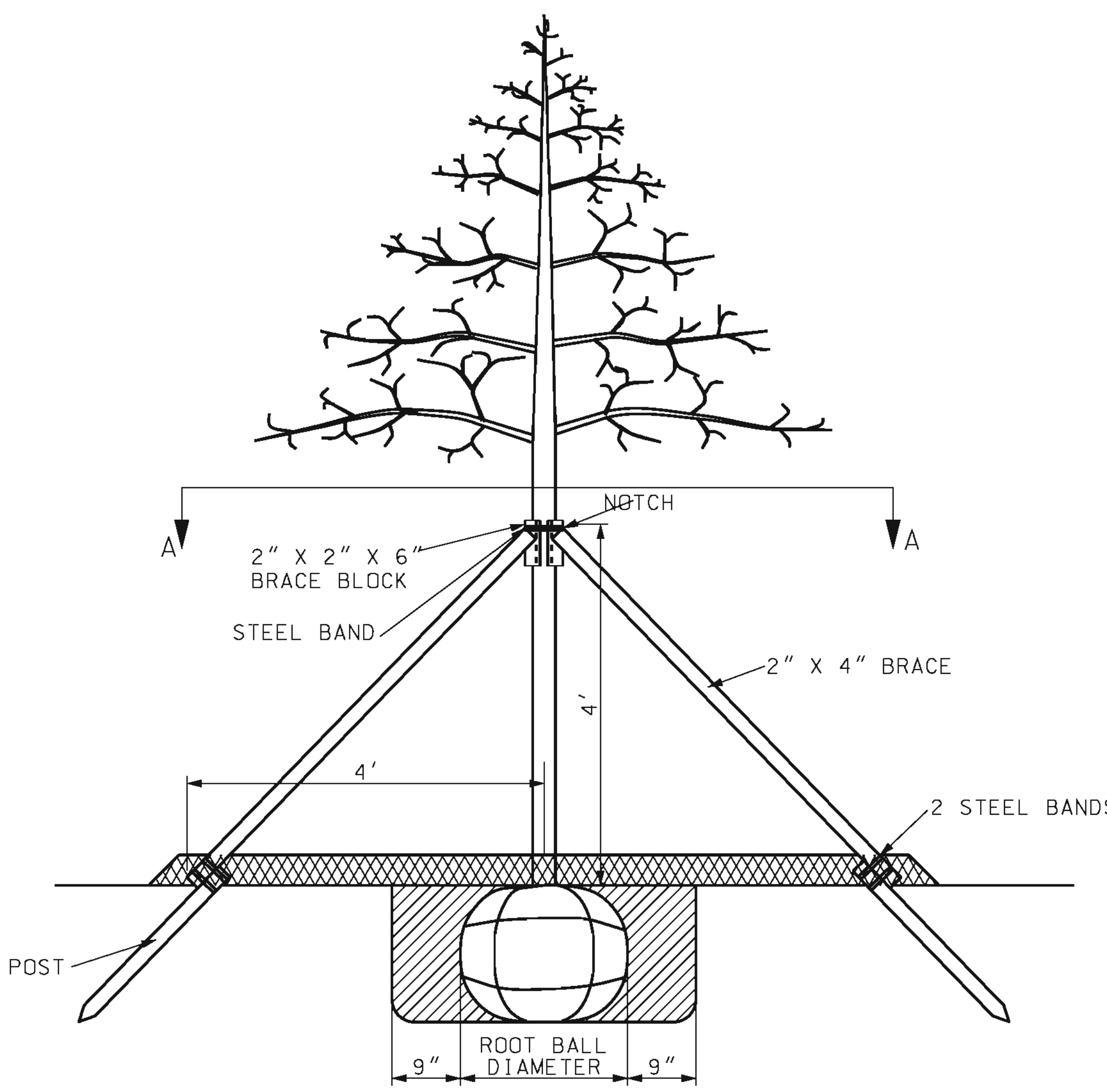
806.10K



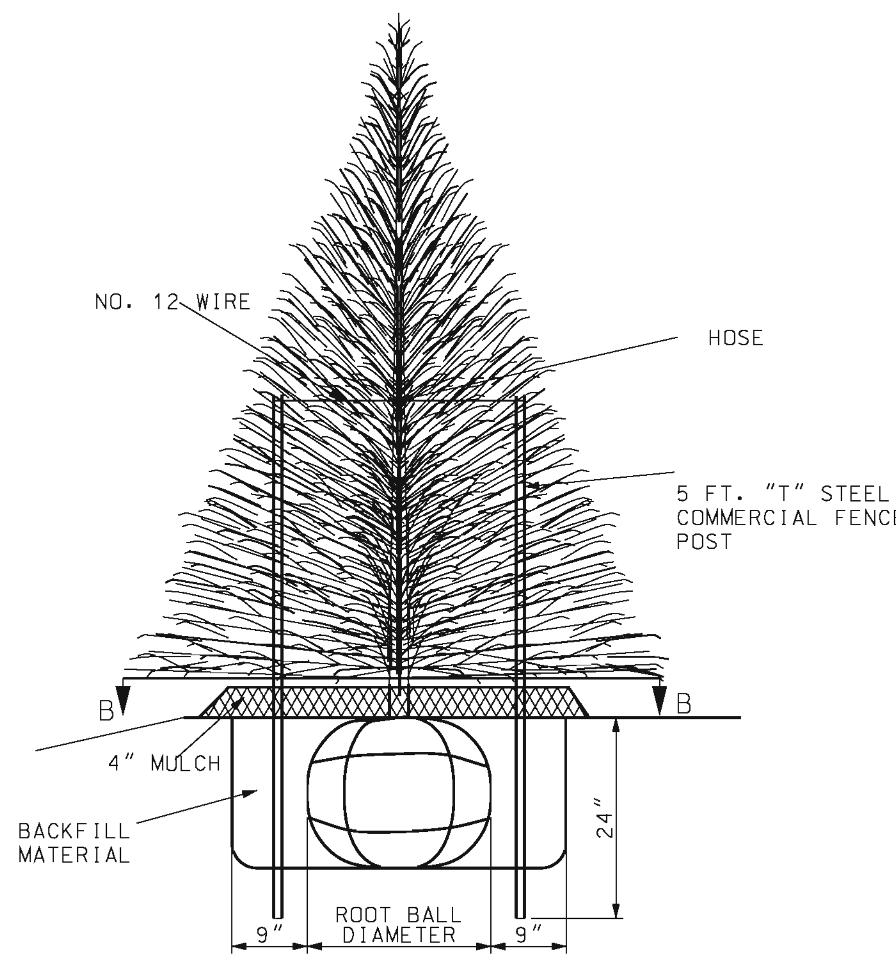
SECTION A-A



SECTION B-B



METHOD OF SUPPORTING DECIDUOUS TREES 3" CALIBER OR LARGER



METHOD OF SUPPORTING EVERGREEN TREES 3' OR MORE IN HEIGHT

NOTES:

TREE WRAP SHALL BE INSTALLED BEFORE BRACING.

BRACE SHALL BE NAILED SECURELY TO POST AND BRACE BLOCK.

BANDING SHALL BE DONE WITH A COMMERICAL BANDING MACHINE.

GENERAL NOTE:

ALL NUMBER MEASUREMENTS ARE NOMINAL.

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

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TYPICAL PLANTING ILLUSTRATIONS

METHOD OF SUPPORT

DATE EFFECTIVE:	07/01/2004	808.00	SHEET NO. 1 OF 3
DATE PREPARED:	8/26/2009		

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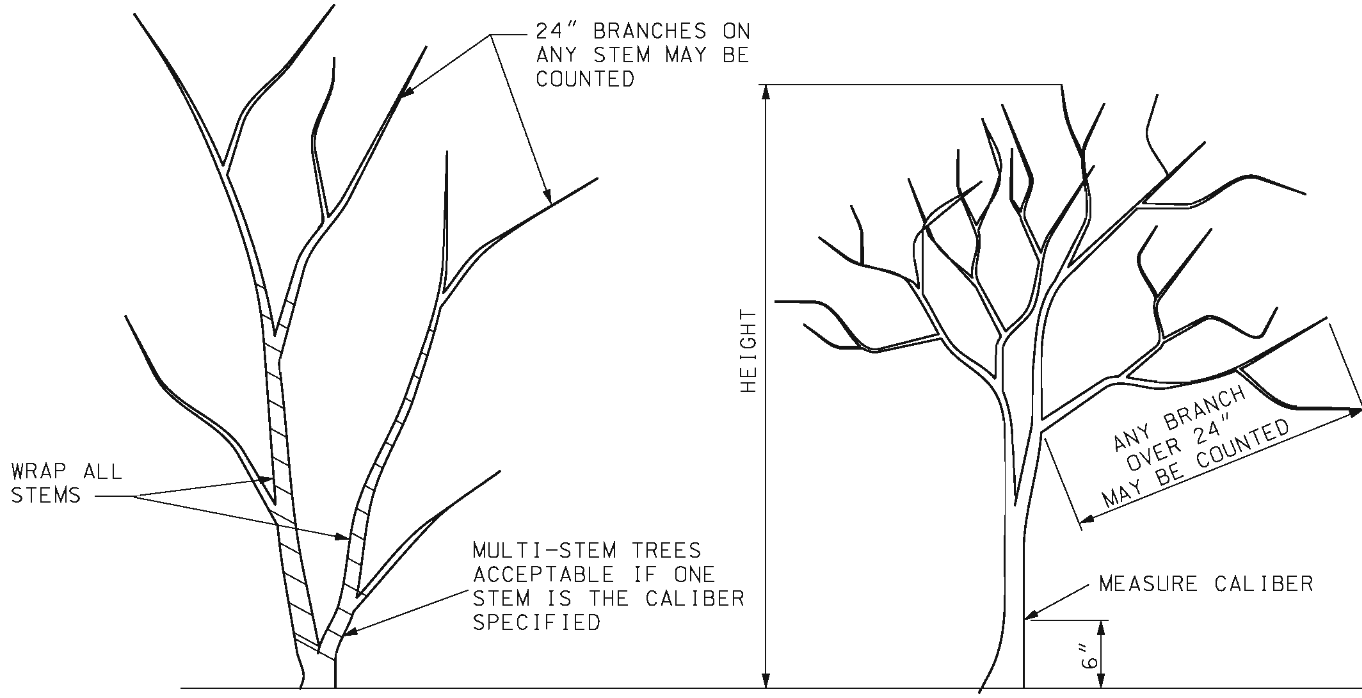
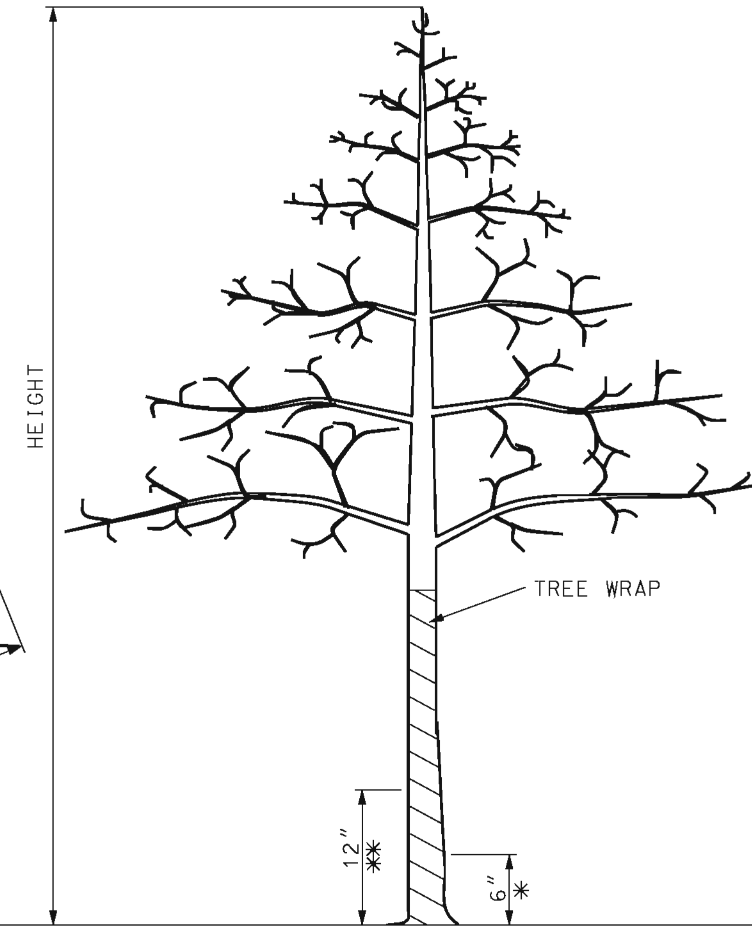


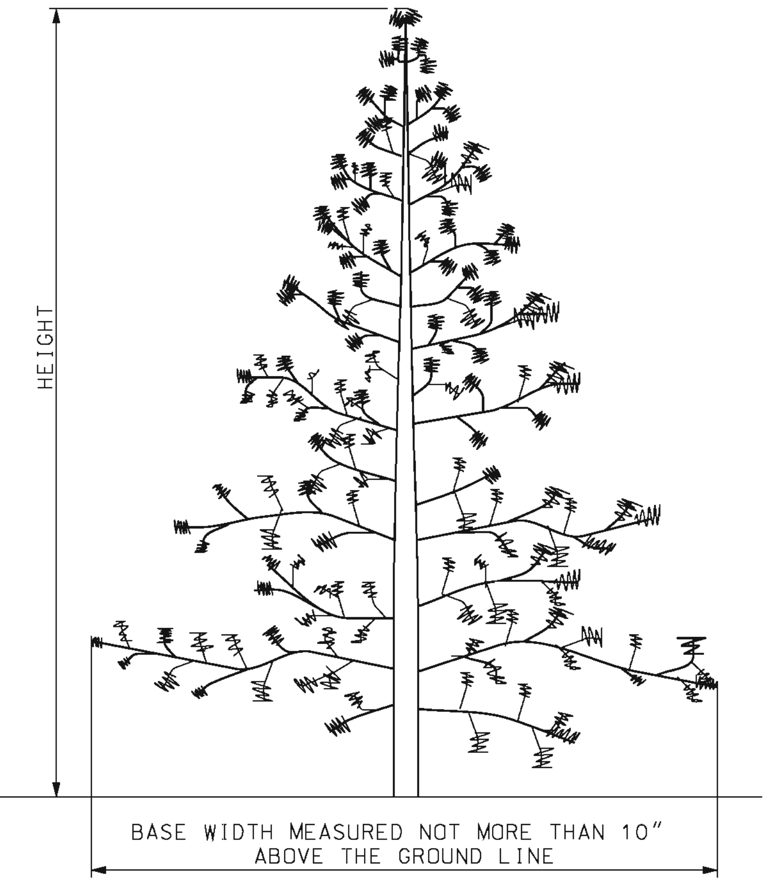
MEASUREMENT OF SMALL TREES



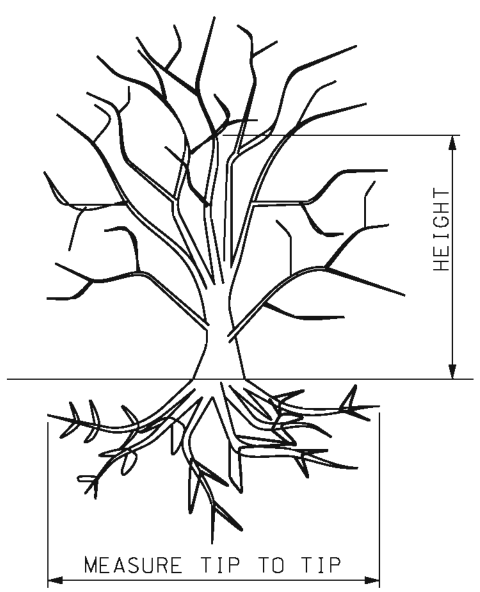
✱ MEASURE CALIBER FOR TREES 4" OR LESS.

✱✱ MEASURE CALIBER FOR TREES MORE THAN 4".

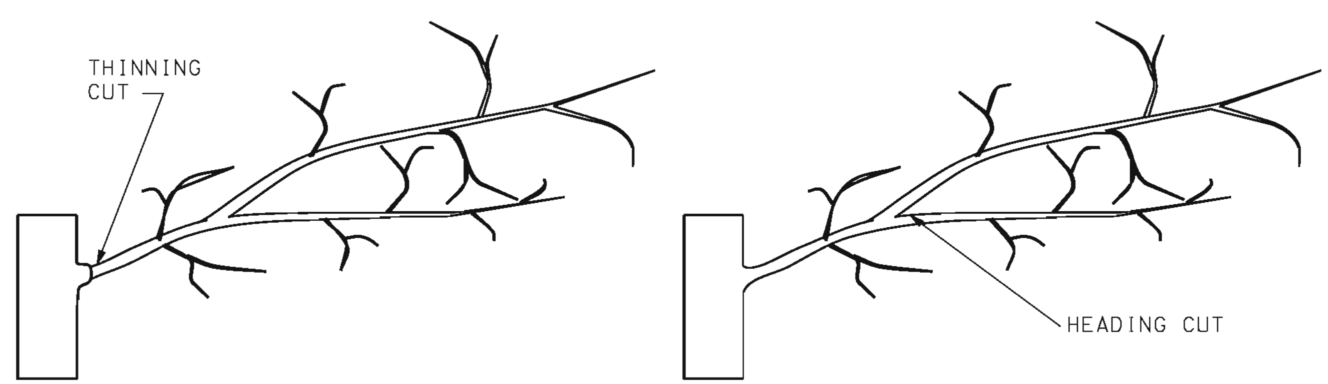
MEASUREMENT OF LARGE TREES



MEASUREMENT OF EVERGREEN TREES



MEASUREMENT OF DECIDUOUS SHRUBS



PRUNING CUTS

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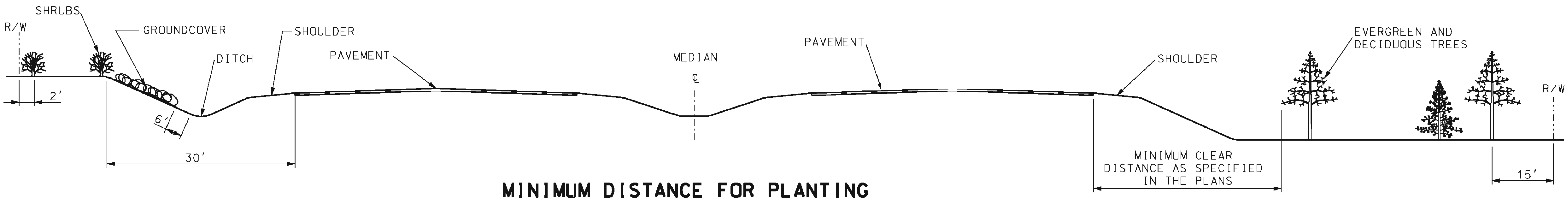
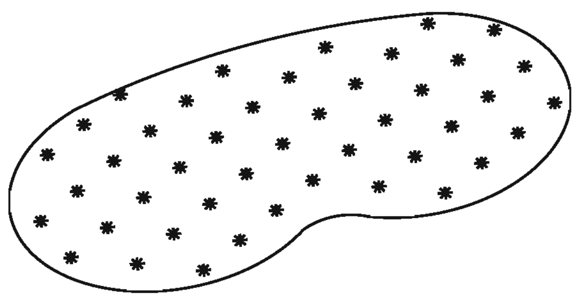
TYPICAL PLANTING ILLUSTRATIONS
MEASUREMENT AND PRUNING CUTS

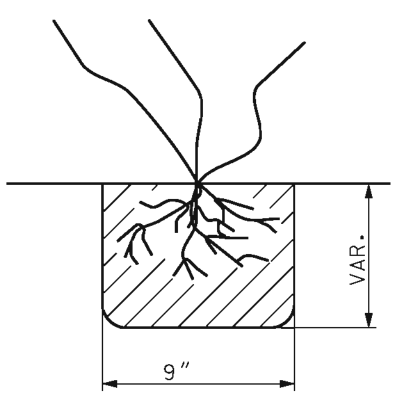
DATE EFFECTIVE:	07/01/2004	808.00	SHEET NO. 2 OF 3
DATE PREPARED:	8/26/2009		



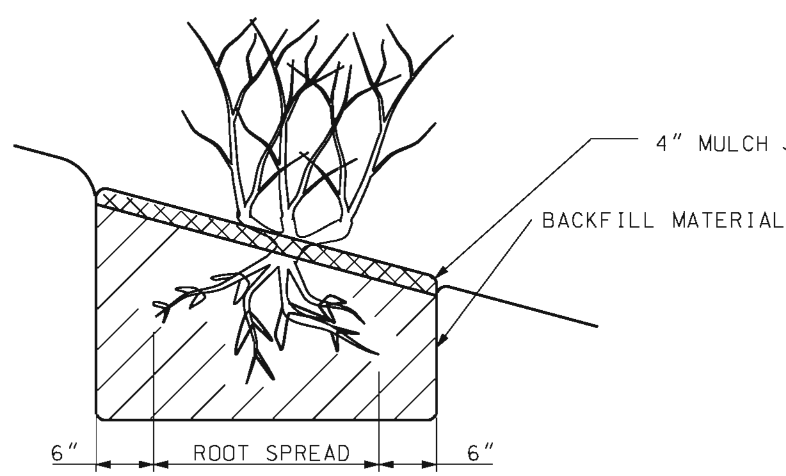
MINIMUM DISTANCE FOR PLANTING ON TYPICAL CROSS SECTION



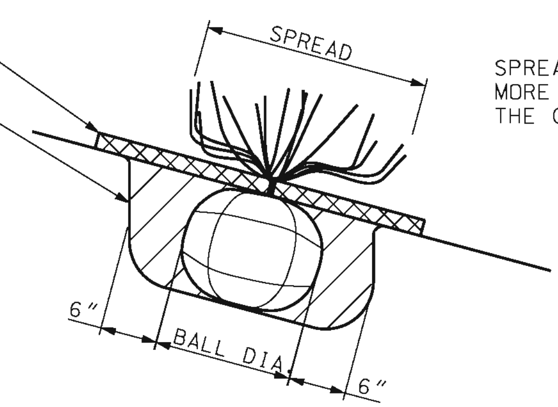
LOCATION OF SHRUBS
IN A TYPICAL PLANT BED



VINES AND SEEDLINGS



DECIDUOUS SHRUB
SLOPE PLANTING



SPREAD MEASURED NO
MORE THAN 10" ABOVE
THE GROUND LINE.

EVERGREEN SHRUB
SLOPE PLANTING

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TYPICAL PLANTING ILLUSTRATIONS
LOCATION AND
SLOPE PLANTING

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 8/26/2009

808.00

SHEET NO.
3 OF 3

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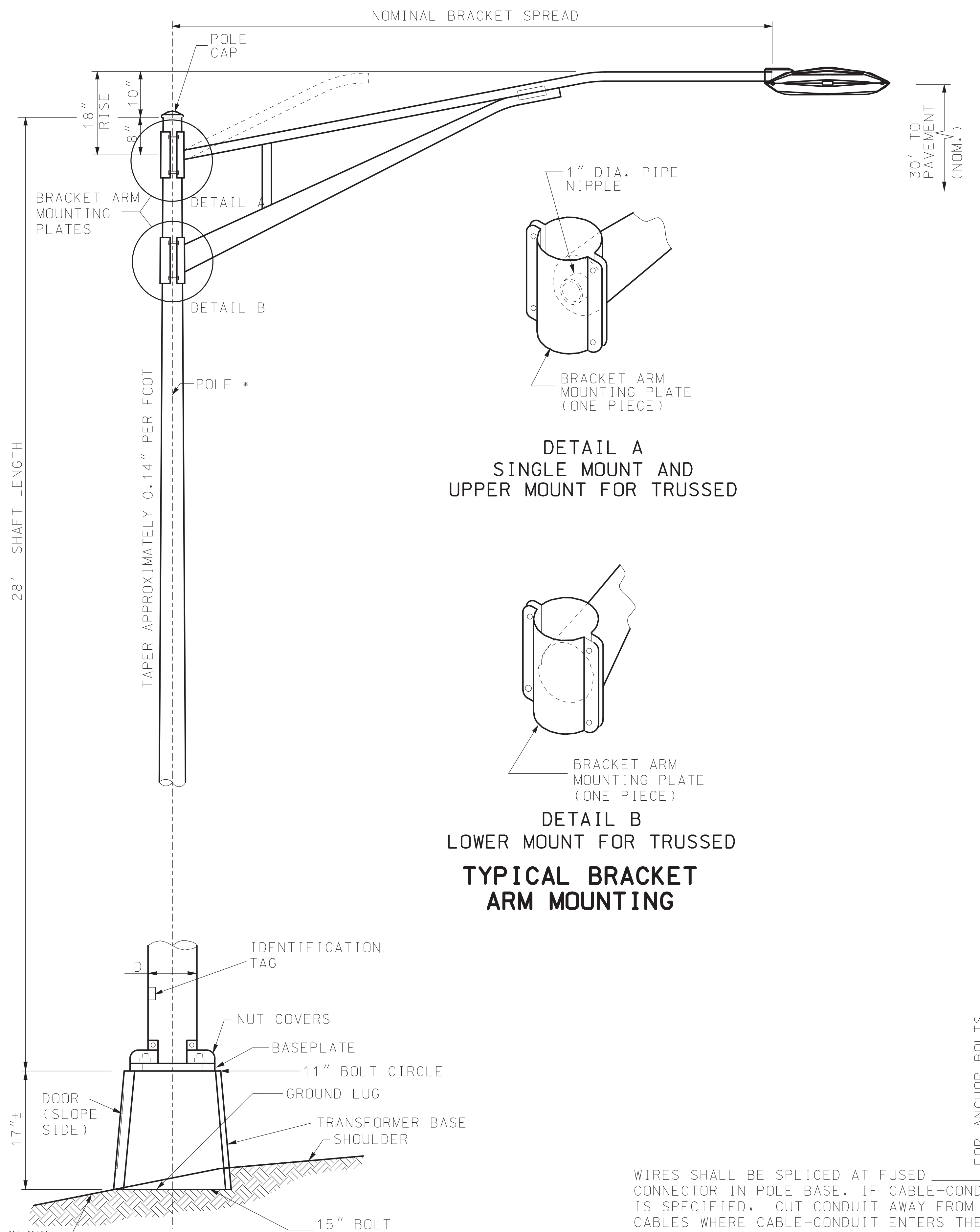
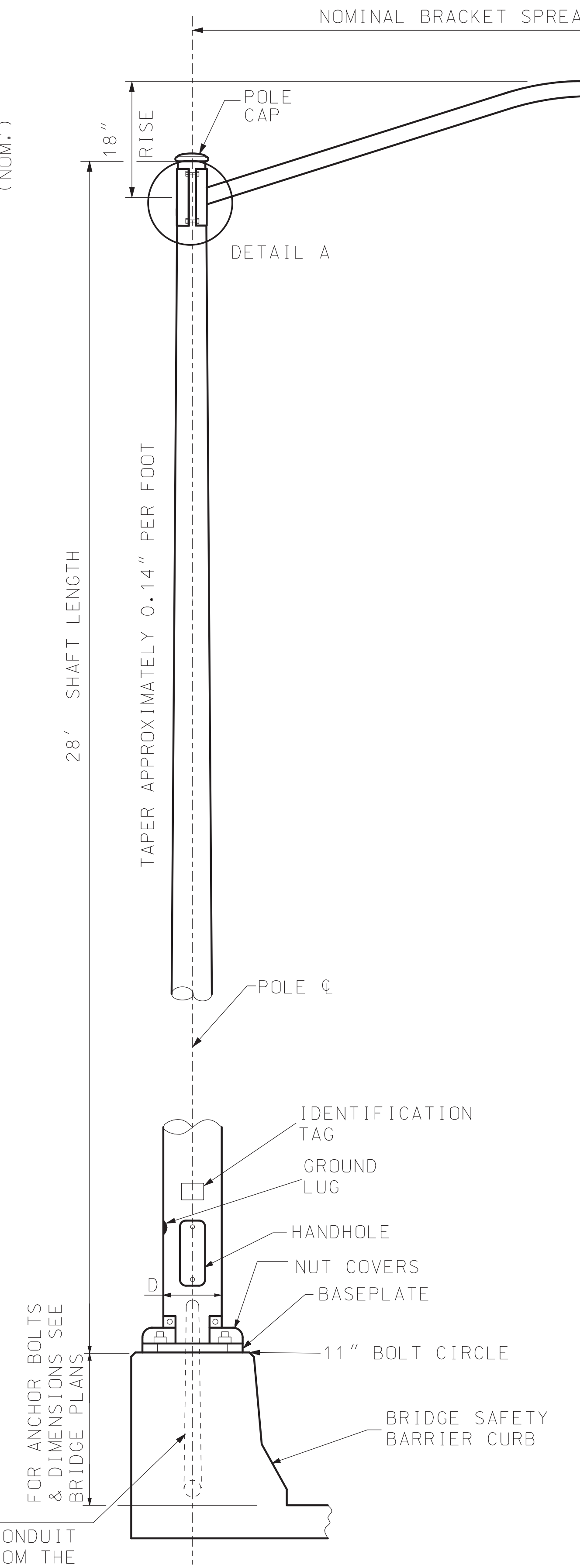
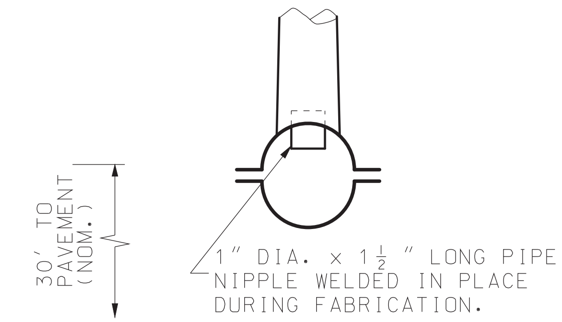


TYPE AT



TYPE B



PLAN VIEW OF DETAIL A

GENERAL NOTES:

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B POLES SHALL BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.

TRANSFORMER BASES FOR 30 FOOT MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE (1) DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAK-AWAY REQUIREMENTS OF NCHRP 350.

ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE ONCOMING TRAFFIC AND THE HANDHOLE. HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM CABLES. CABLES SHALL BE CONTINUOUS AND UNSPLICED TO THE FIRST LIGHT POLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIAMETER HOLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.

DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND INTERIMS THROUGH 2003.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

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ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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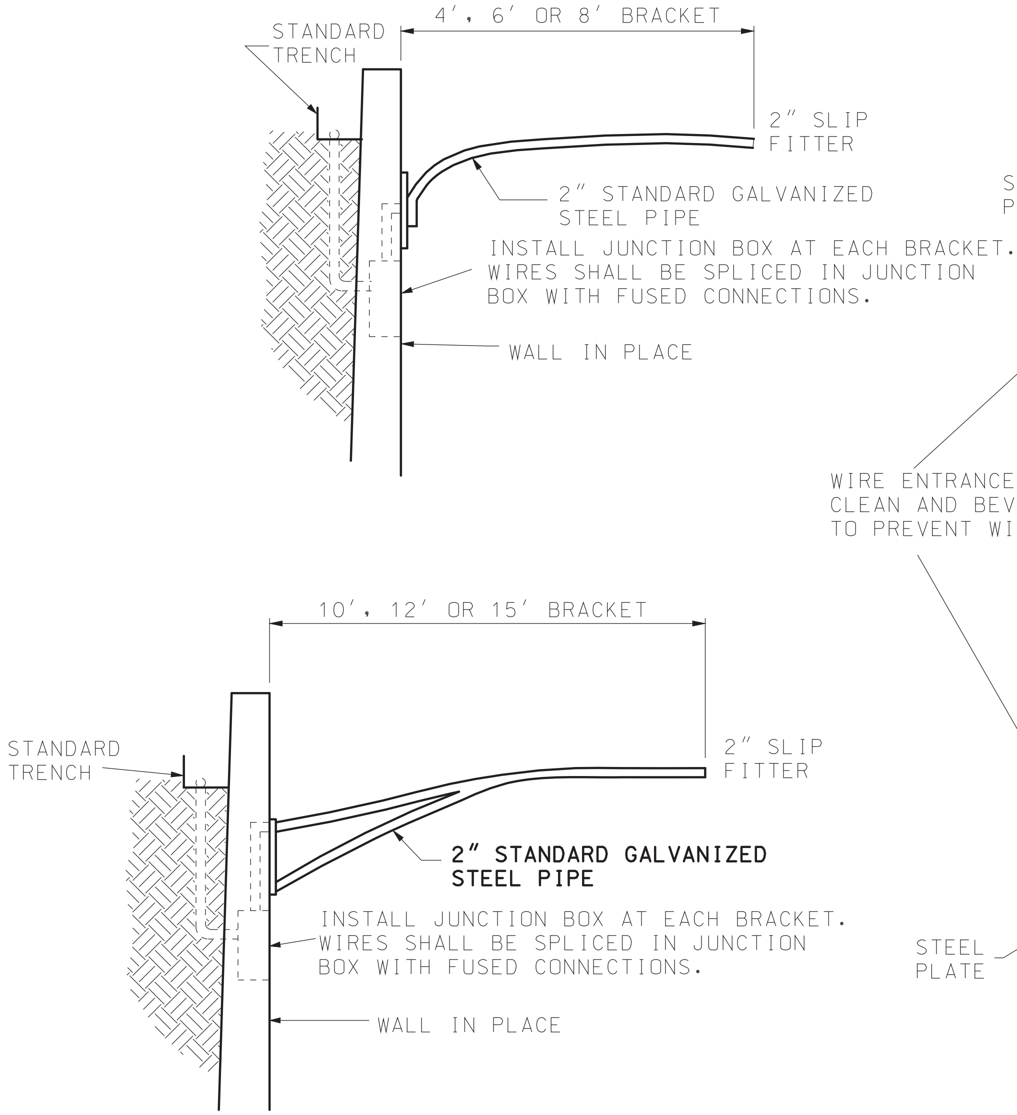
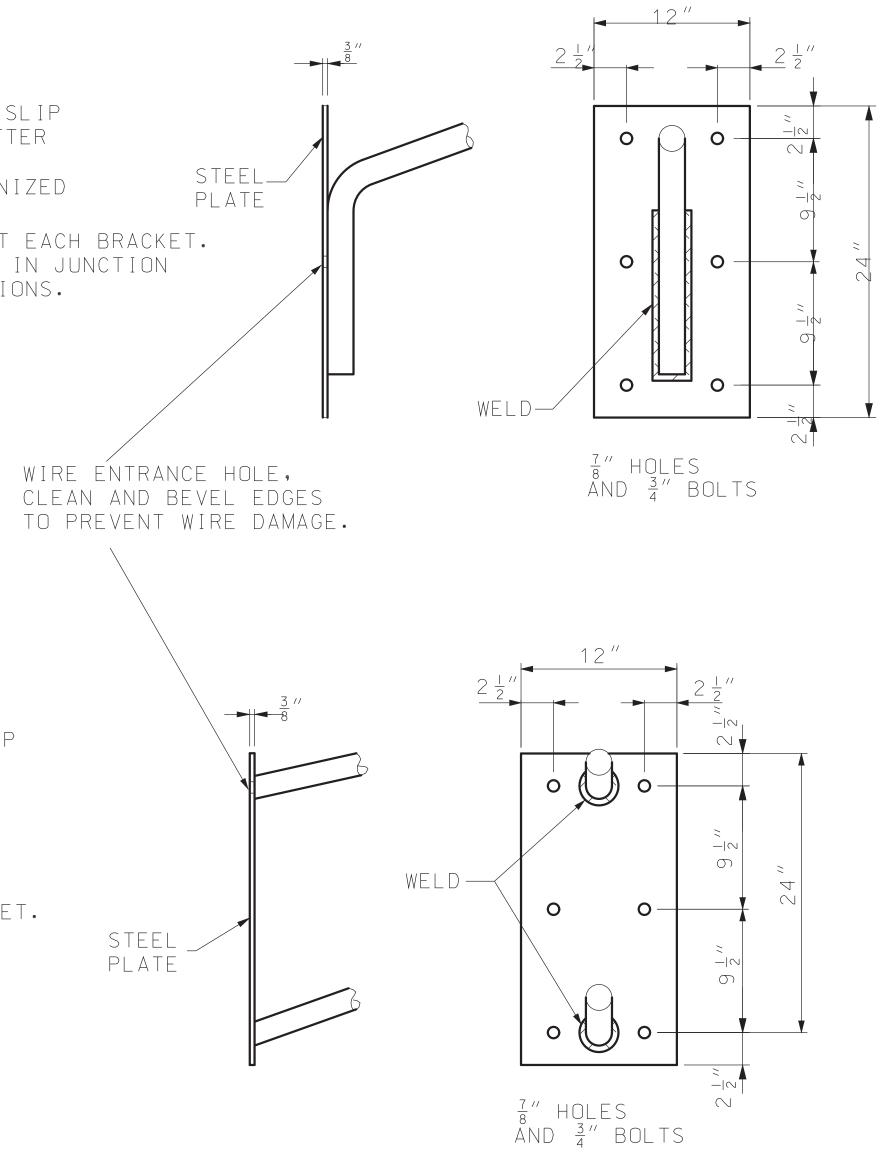
HIGHWAY LIGHTING
POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

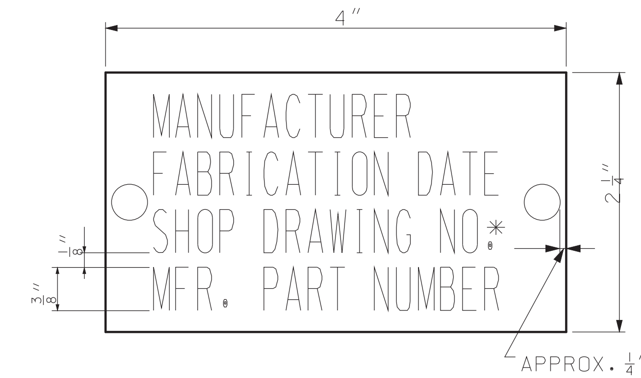
DATE EFFECTIVE:	04/01/2018	901.00AB	SHEET NO.
DATE PREPARED:	2/9/2018		1 OF 4



WALL BRACKETS



FACE PLATE DETAILS



IDENTIFICATION TAG

ID TAG NOTE:
TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS.

* INCLUDING REVISION

GENERAL NOTES:

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

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TRANSFORMER BASES FOR 30 FOOT MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE (1) DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE ONCOMING TRAFFIC AND THE HANDHOLE. HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM CABLES. CABLES SHALL BE CONTINUOUS AND UNSPLICED TO THE FIRST LIGHT POLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.

ID TAG HOLES SHALL BE DRILLED INTO POLE PRIOR TO GALVANIZING.

LED LUMINAIRES

FUSE RATING	DESIGNATION	MAX. WATT	DISTRIBUTION TYPE	BACKLIGHT-UPLIGHT-GLARE (BUG) RATING
3 A	LED-A	103	III	B2-U0-G2
LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED ON PLANS.				

TYPE AT POLE

BRACKET SPREAD	4'-10'	12'	15'
MAX. LUMINAIRE WEIGHT	75 LB	71 LB	66 LB
MAX. PROJECTED AREA	3.3 SQ. FT.		

SINGLE AND TRUSSED BRACKET ARMS

LOCATION	LENGTH POLE	BRACKET SPREAD	TRANS. BASE BOLT CIRC.	D
SHOULDER	28'	4',6',8',10',12',15'	15"	8"

TYPE B POLE

BRACKET SPREAD	4'	6'	8'
MAX. LUMINAIRE WEIGHT	75 LB	75 LB	54 LB
MAX. PROJECTED AREA	3.3 SQ. FT.		

SINGLE BRACKET ARM

LOCATION	LENGTH POLE	BRACKET SPREAD	D	ANCHOR BOLT DIA.
BRIDGE SAFETY BARRIER CURB	28'	4',6',8'	8"	1"

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.

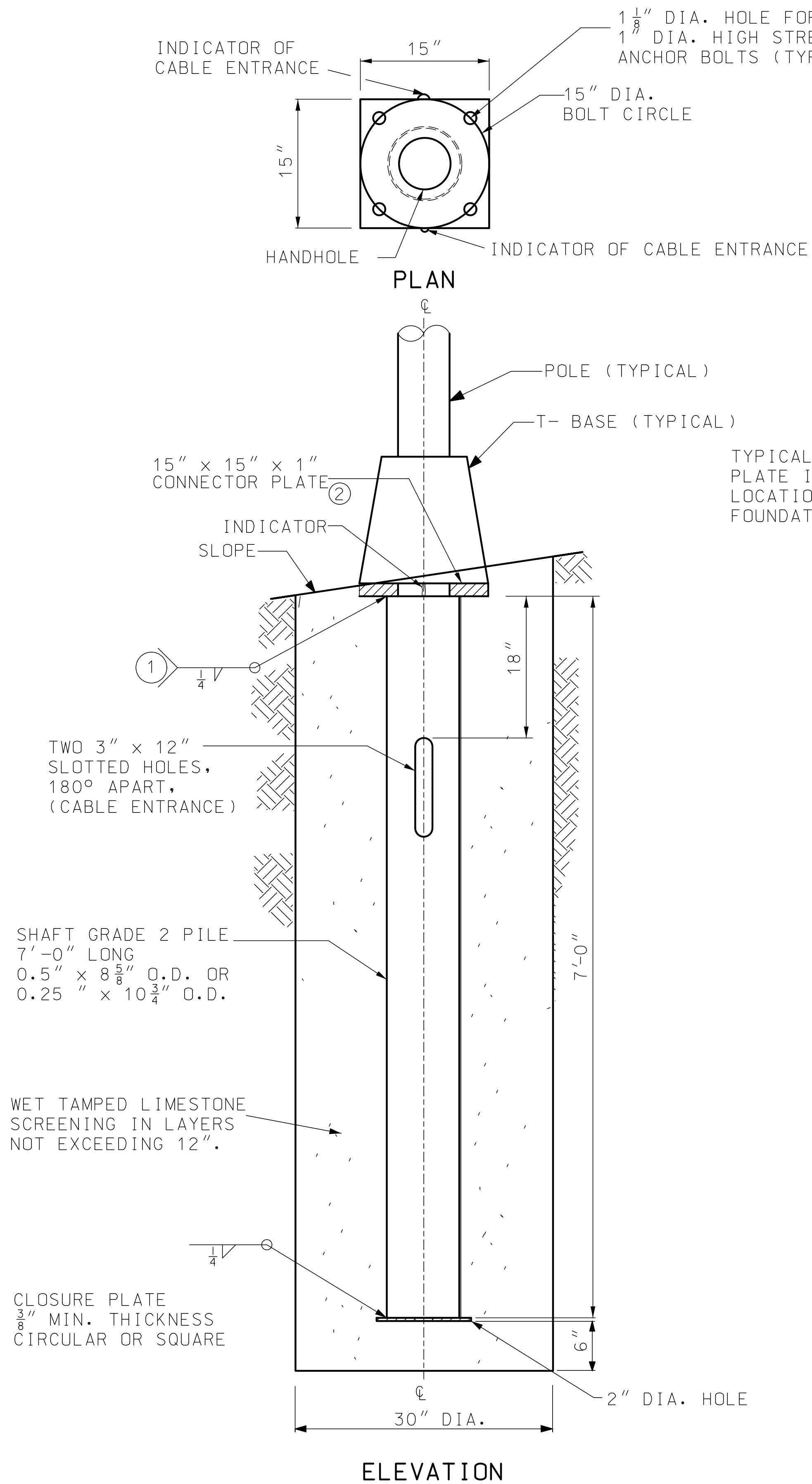
HIGHWAY LIGHTING
POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

DATE EFFECTIVE: 04/01/2018
DATE PREPARED: 2/9/2018

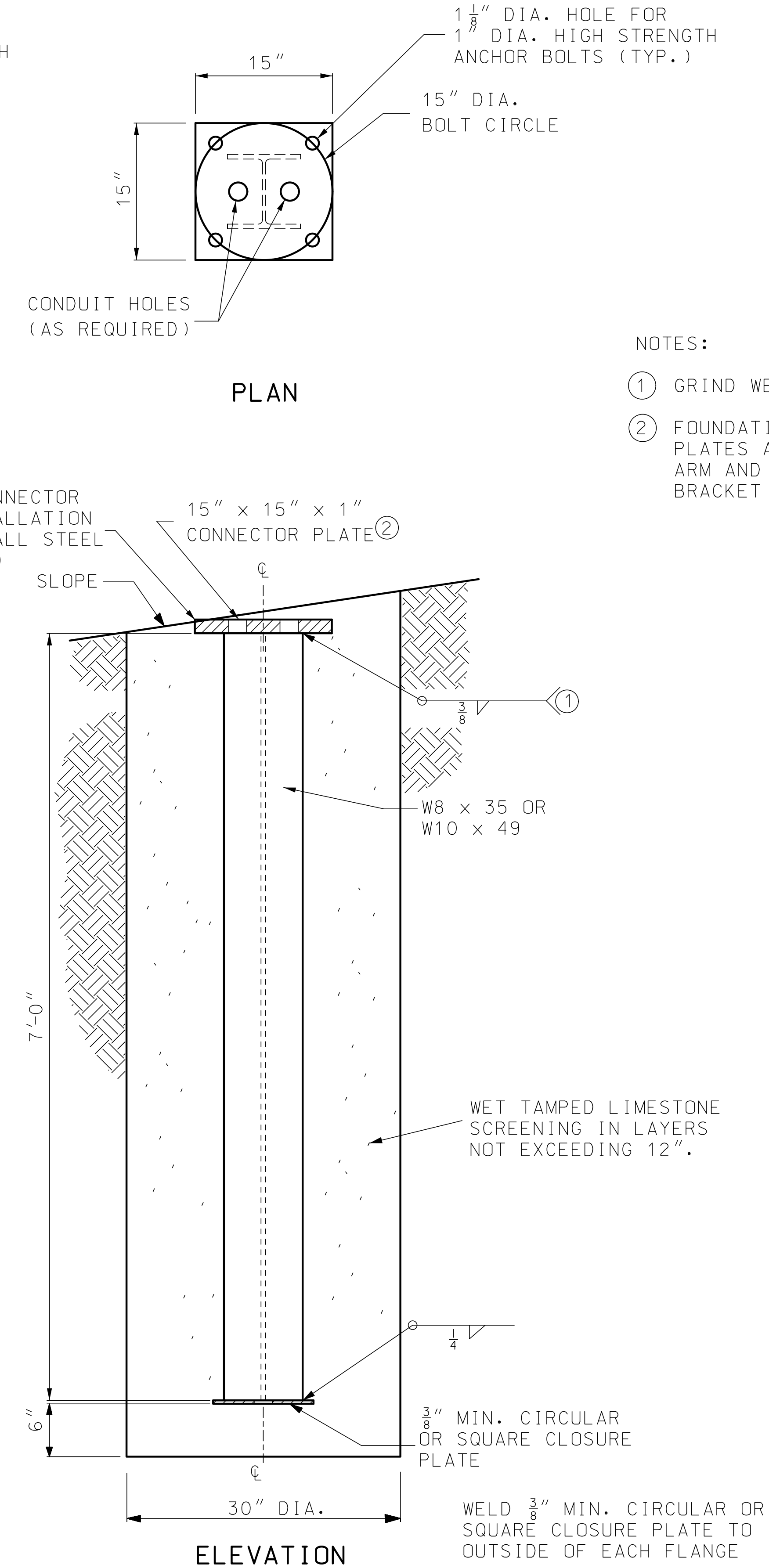
901.00AB

SHEET NO. 2 OF 4

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



DETAILS OF CIRCULAR STEEL PILE FOUNDATION



"H" PILE FOUNDATION DETAILS (DETAILS OF STEEL "H" PILE FOUNDATION)

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.

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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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
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

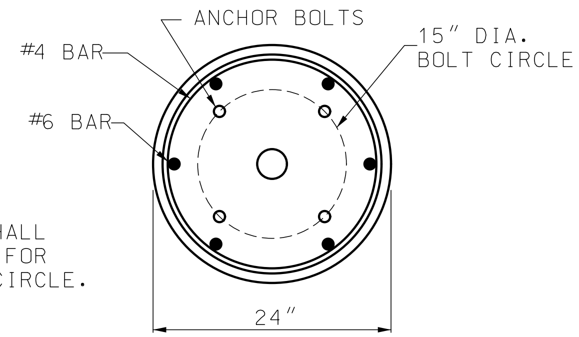
POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

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

901.00AB

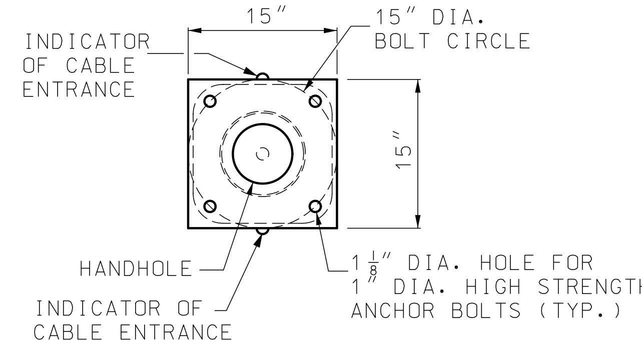
SHEET NO. 3 OF 4

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



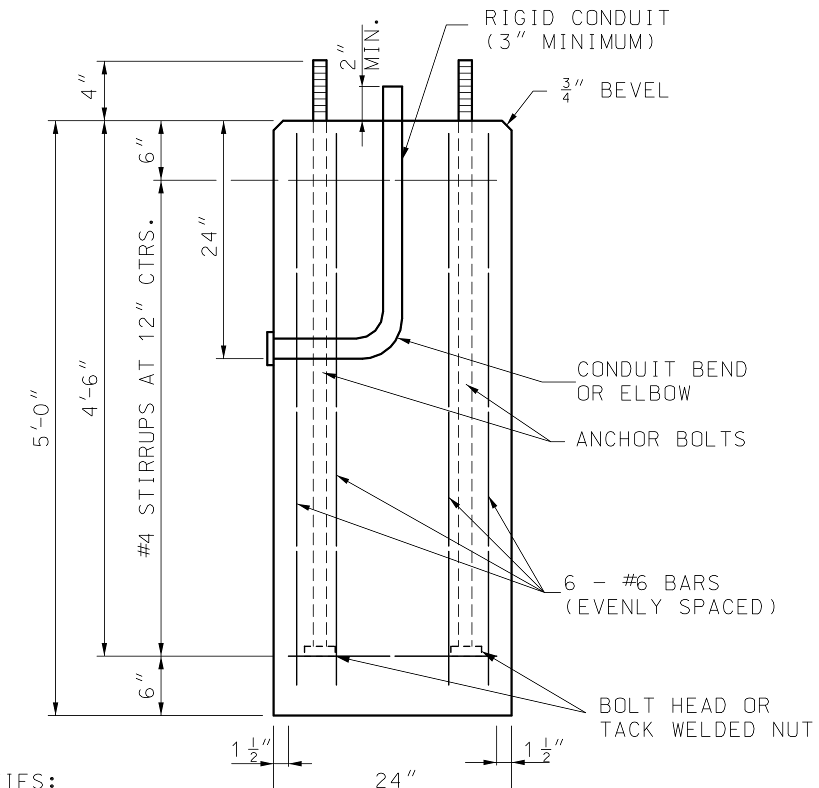
ANCHOR BOLTS SHALL
BE PLACED ONLY FOR
15" DIA. BOLT CIRCLE.

PLAN



PLAN

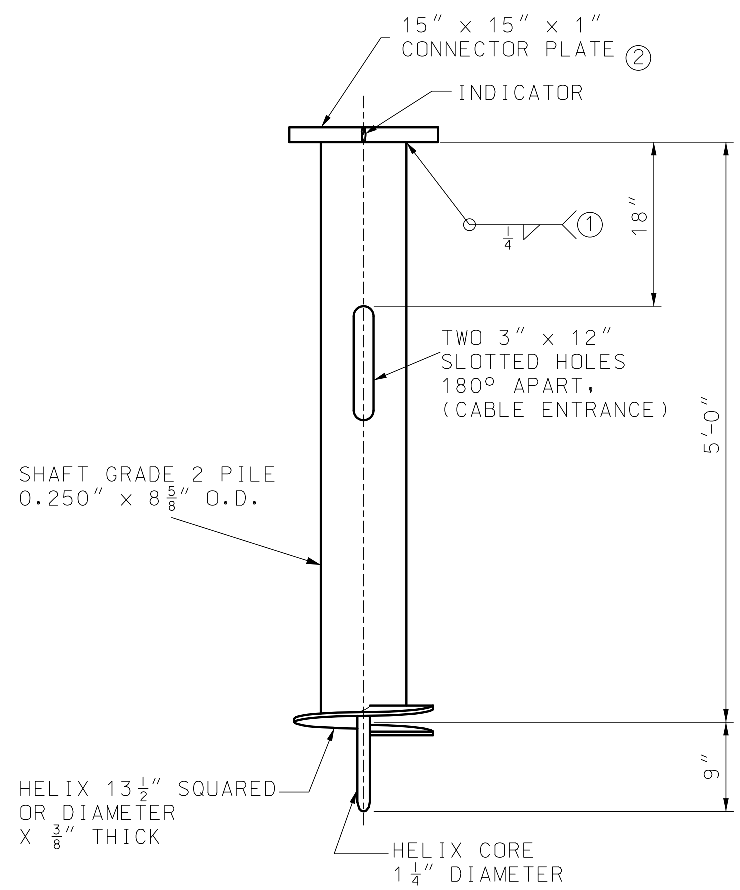
DRIVE HOLES WILL BE PERMITTED PROVIDED THAT THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE, THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.



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

ELEVATION

DETAILS OF CONCRETE FOUNDATION (3)



ELEVATION

DETAILS OF SCREW ANCHOR FOUNDATION

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.

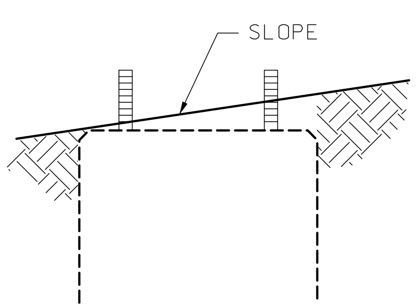
GENERAL NOTES:

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

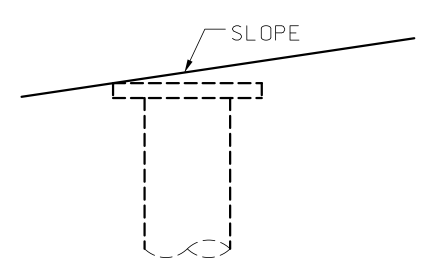
ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

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

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



CONCRETE FOUNDATION
EMBEDMENT



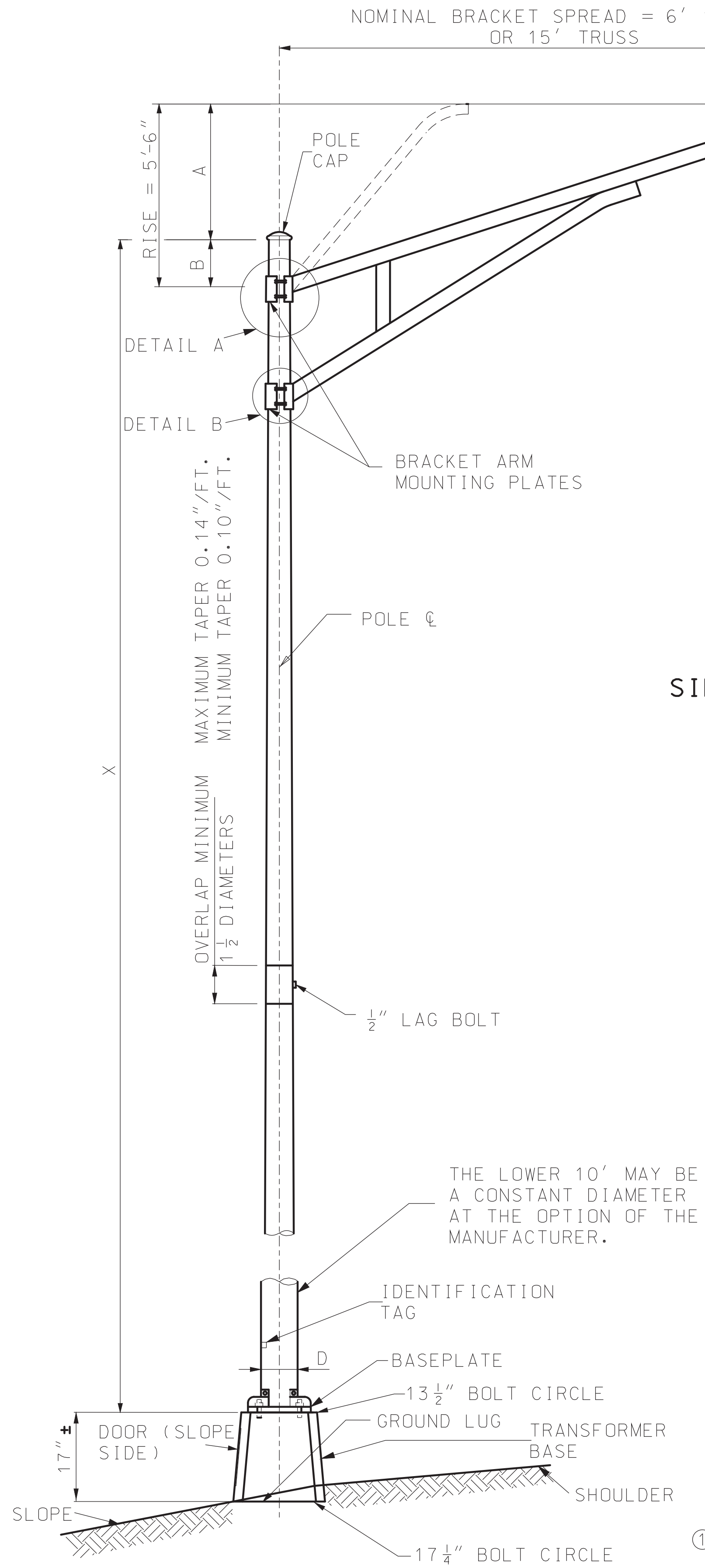
SCREW ANCHOR
EMBEDMENT

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

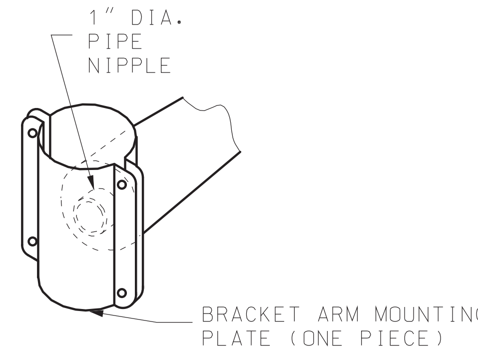
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

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

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

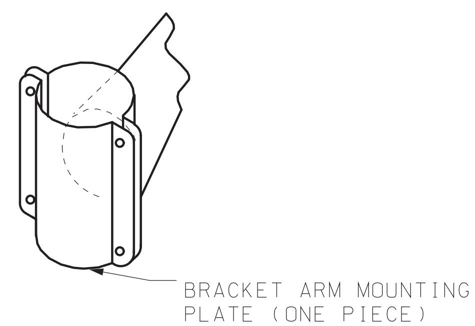


TYPE AT



DETAIL A

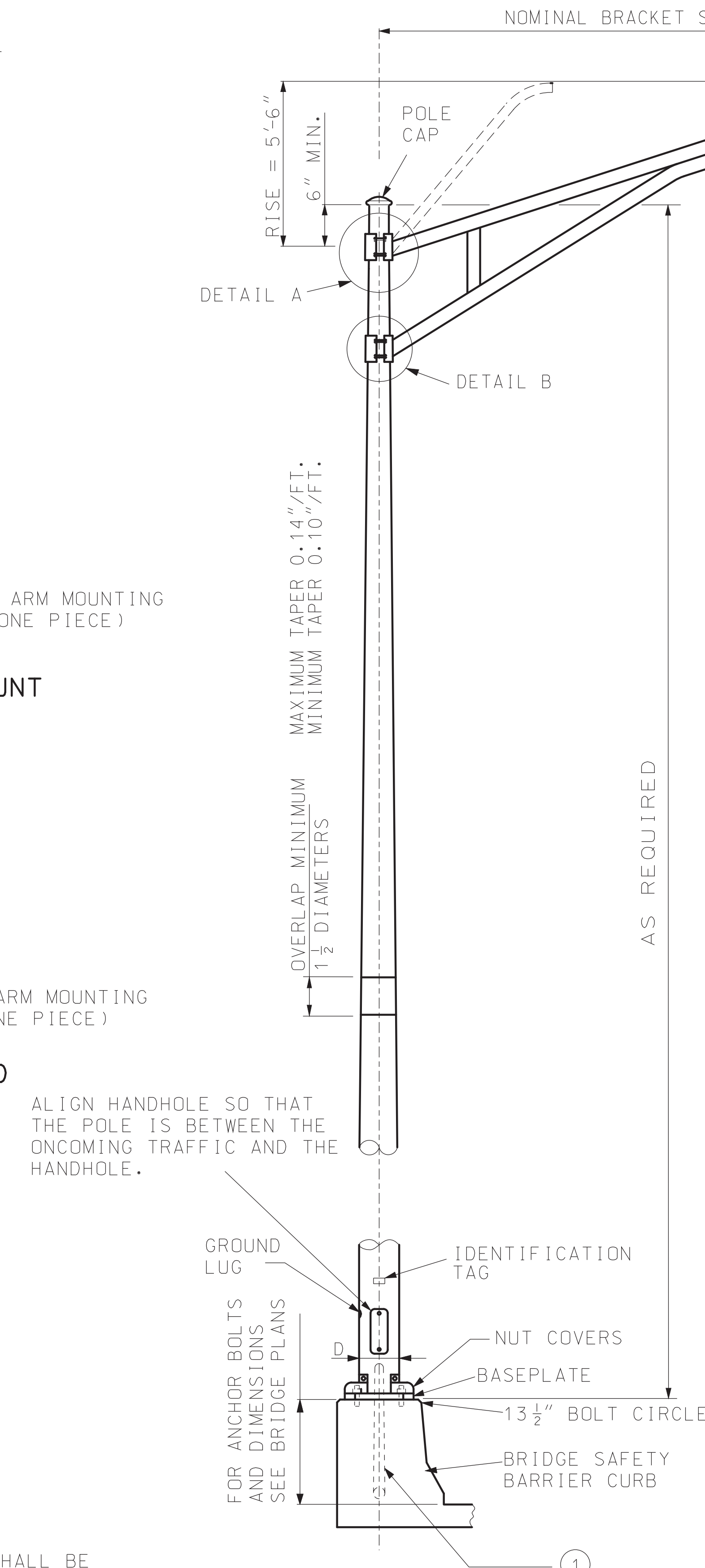
SINGLE MOUNT AND UPPER MOUNT
FOR TRUSSED



DETAIL B

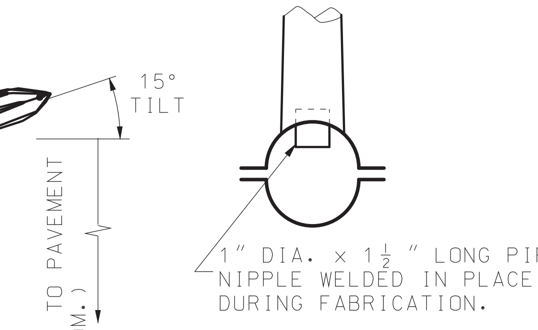
LOWER MOUNT FOR TRUSSED

TYPICAL BRACKET ARM MOUNTING



TYPE B

① RIGID CONDUIT SYSTEM. WIRES SHALL BE SPLICED AT FUSED CONNECTOR IN POLE BASE. IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM THE CABLES WHERE CABLE-CONDUIT ENTERS THE RIGID CONDUIT SYSTEM. (SEE DRAWING 901.02)



PLAN VIEW OF DETAIL A

GENERAL NOTES:

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6″ MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4″ X 6-1/2″. HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45′ MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4″ DIA. HOLE.

DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND INTERIMS THROUGH 2003.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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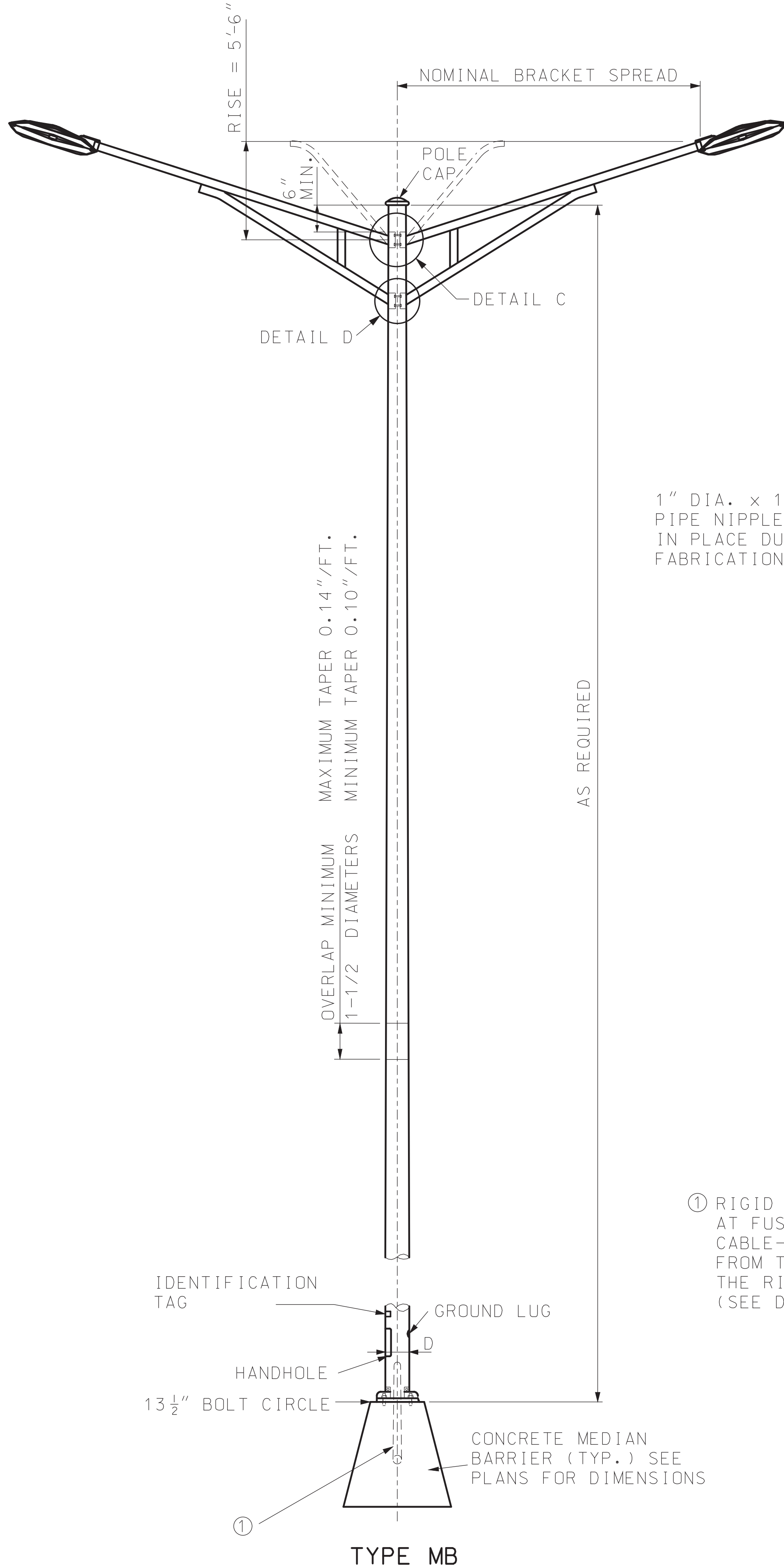
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

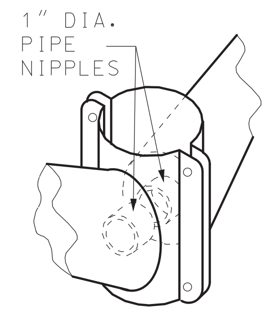
HIGHWAY LIGHTING
POLES, FOUNDATIONS AND APPURTENANCES FOR 45′ MOUNTING HEIGHT

DATE EFFECTIVE:	04/01/2018	901.01AJ	SHEET NO. 1 OF 6
DATE PREPARED:	2/9/2018		

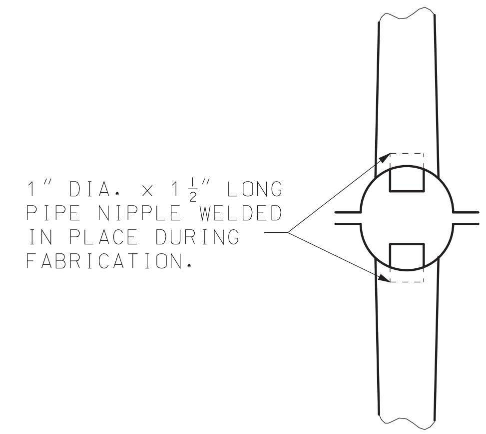
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



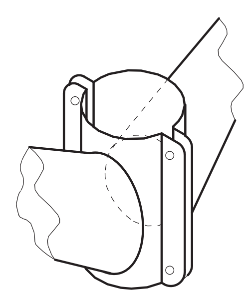
TYPE MB



DETAIL C

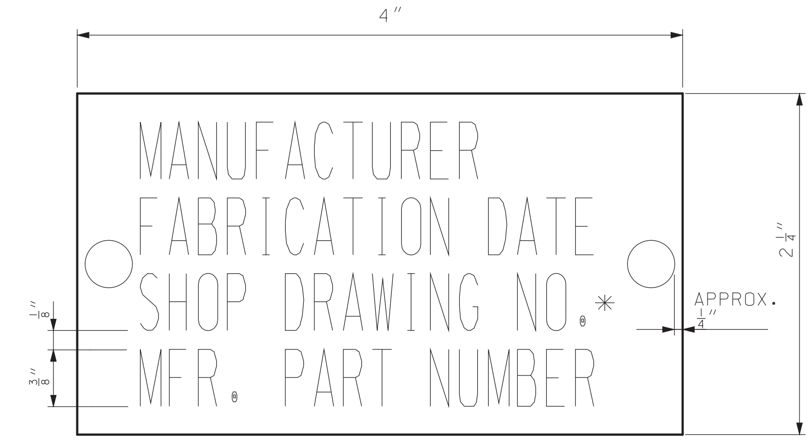


PLAN VIEW OF DETAIL C



DETAIL D
LOWER MOUNT FOR TRUSSED

① RIGID CONDUIT SYSTEM. WIRES SHALL BE SPLICED AT FUSED CONNECTOR IN POLE BASE. IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM THE CABLES WHERE CABLE-CONDUIT ENTERS THE RIGID CONDUIT SYSTEM. (SEE DRAWING 901.02)



IDENTIFICATION TAG

ID TAG NOTE:

TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS. ID TAG HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

* INCLUDING REVISION

GENERAL NOTES:

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

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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.

HIGHWAY LIGHTING
POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT

DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018	901.01AJ	SHEET NO. 2 OF 6

TYPE AT POLE

BRACKET SPREAD				6′ OR 15′
MAX. LUMINAIRE WEIGHT				60 LB
MAX. PROJECTED AREA				3.3 SQ. FT.
AT-45 DESIGN NO.	X	A	B	✳ D (NOMINAL)
1	50′	VAR.	6″ MIN.	10″
2	45′	VAR.	6″ MIN.	10″
3	40′	VAR.	6″ MIN.	10″
4	35′	VAR.	6″ MIN.	10″
5	30′	VAR.	6″ MIN.	10″

✳ THE MINIMUM ALTERNATE DIAMETER SHALL BE 10″ FOR A 50′ POLE, 9-1/2″ FOR A 45′ POLE, 9″ FOR A 40′ POLE, 8-1/2″ FOR A 35′ POLE AND 8″ FOR A 30′ POLE.

LED LUMINAIRES

FUSE RATING	DESIGNATION	MAX. WATT	DISTRIBUTION TYPE	BACKLIGHT-UPLIGHT-GLARE (BUG) RATING
3 A	LED-A	103	III	B2-U0-G2
5 A	LED-B	170	III	B3-U0-G3
7 A	LED-C	275	III	B3-U0-G3
LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED ON PLANS.				

TYPE B POLE

BRACKET SPREAD		6′ OR 15′	
MAX. LUMINAIRE WEIGHT		60 LB	
MAX. PROJECTED AREA		3.3 SQ. FT.	
SINGLE BRACKET ARM			
LOCATION	BRACKET SPREAD	D NOM.	ANCHOR BOLT DIA.
BRIDGE SAFETY BARRIER CURB	6′	10″	1-1/4″
TRUSSED BRACKET ARM			
LOCATION	BRACKET SPREAD	D NOM.	ANCHOR BOLT DIA.
BRIDGE SAFETY BARRIER CURB	15′	10″	1-1/4″

TYPE MB POLE

BRACKET SPREAD	6′ OR 15′	
MAX. LUMINAIRE WEIGHT	60 LB	
MAX. PROJECTED AREA	3.3 SQ. FT.	
DOUBLE BRACKET ARM		
LOCATION	BRACKET SPREAD	D NOM.
MEDIAN BARRIER CURB	6′	10″
DOUBLE TRUSSED BRACKET ARM		
LOCATION	BRACKET SPREAD	D NOM.
MEDIAN BARRIER CURB	15′	10″

GENERAL NOTES:

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6″ MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4″ X 6½″. HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45′ MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1¼″ DIA. HOLE.

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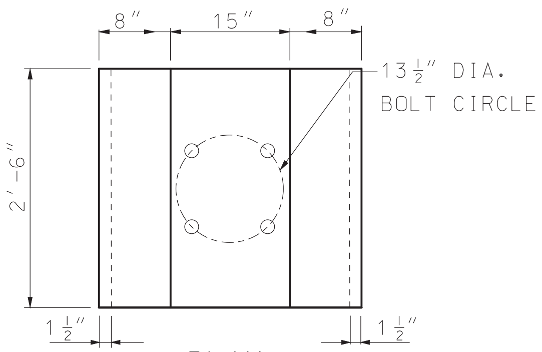
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER
PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

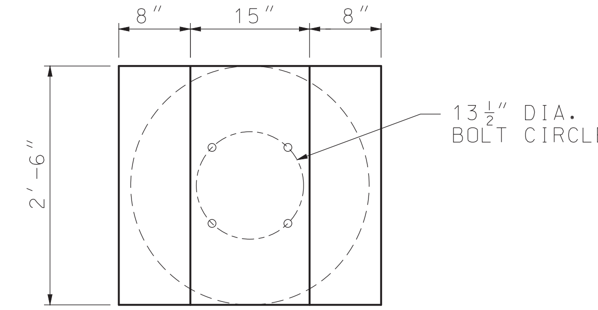
HIGHWAY LIGHTING
POLES, FOUNDATIONS AND APPURTENANCES FOR 45′ MOUNTING HEIGHT

DATE EFFECTIVE: 04/01/2018
DATE PREPARED: 2/9/2018

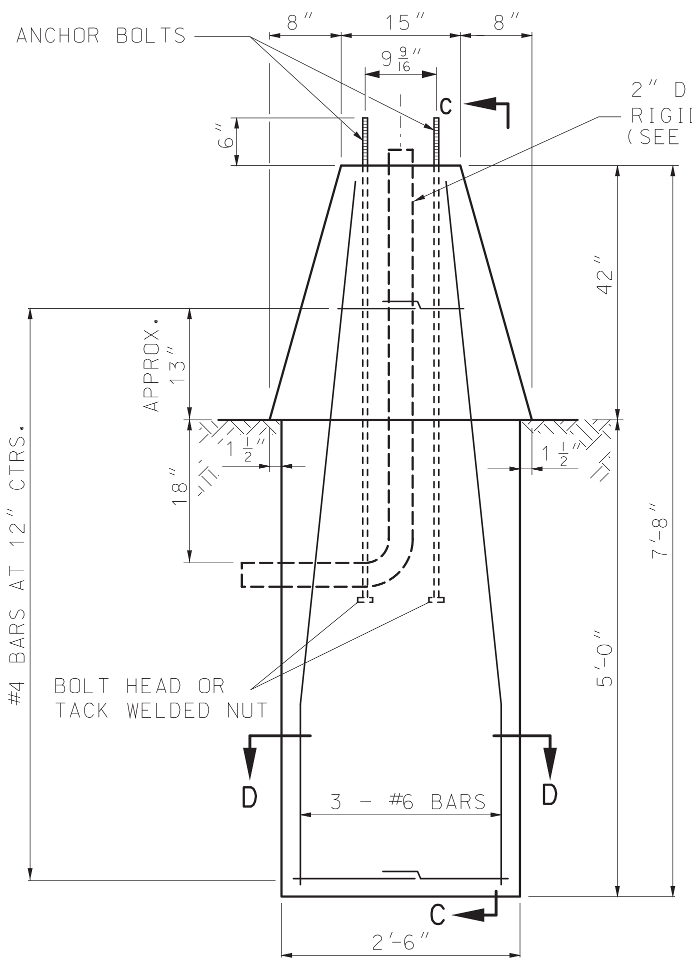
901.01AJ



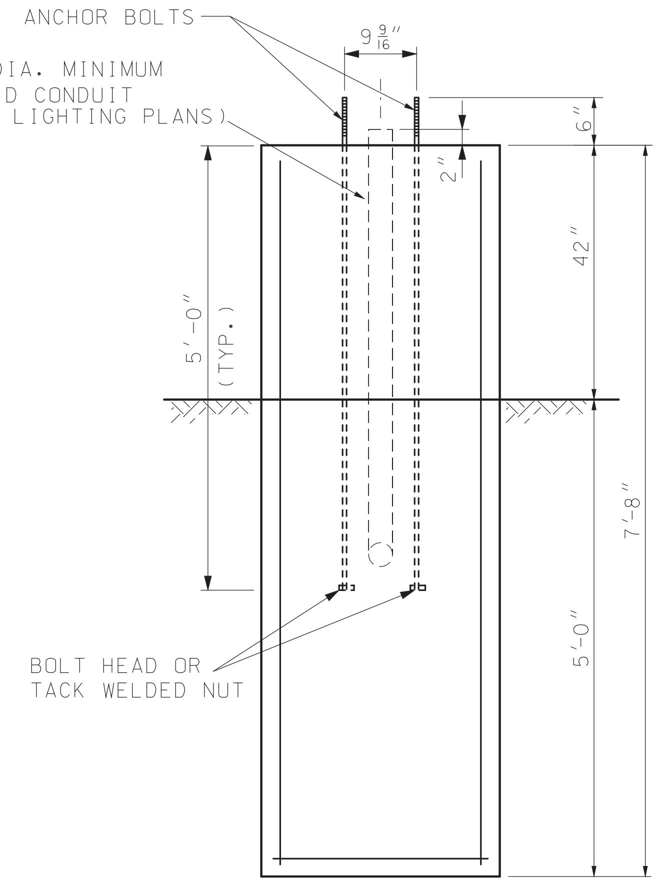
PLAN



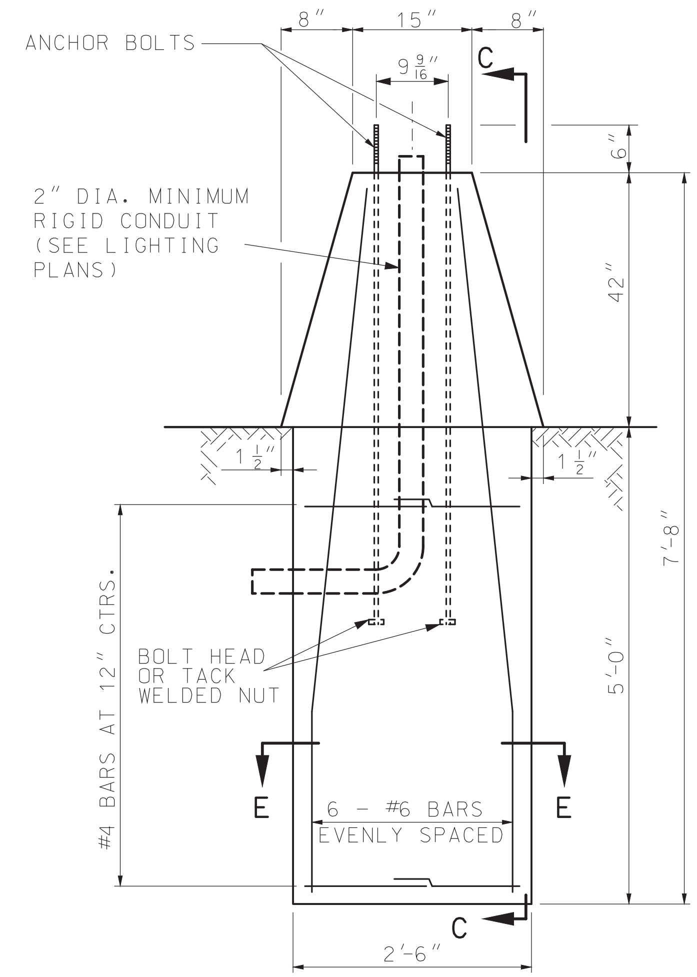
PLAN



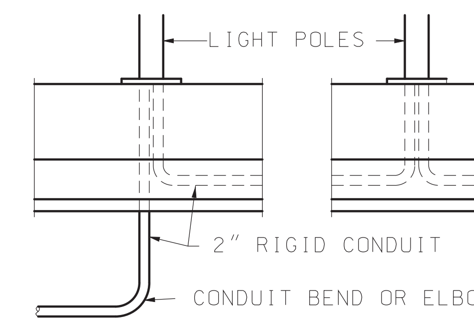
ELEVATION
ALTERNATE 1



SECTION C–C



ELEVATION
ALTERNATE 2



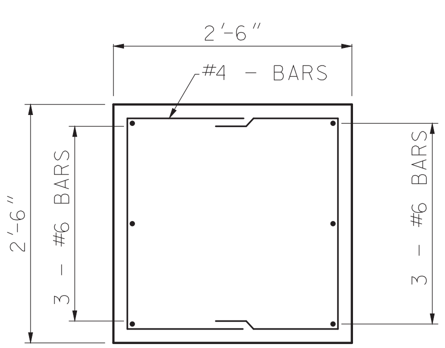
CONDUIT DETAIL FOR
ALTERNATE 1 & 2

GENERAL NOTES:

ALL FOUNDATIONS SHALL INCLUDE 4 ANCHOR BOLTS AND NUTS PLACED AS SHOWN.

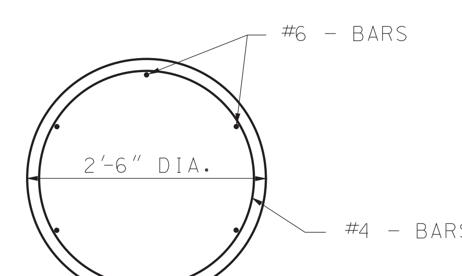
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1¼″ DIAMETER HIGH STRENGTH ANCHOR BOLTS.

TOUNGE AND GROOVE REQUIRED ON MEDIAN BARRIER SECTION FOR TYPEMB POLES WHEN ADJACENT MEDIAN BARRIER IS PRECAST, FOR DETAILS, SEE STANDARD PLANS.



SECTION D–D

**CONCRETE MEDIAN BARRIER
AND FOUNDATION DESIGN FOR
TYPE MB LIGHT POLE**



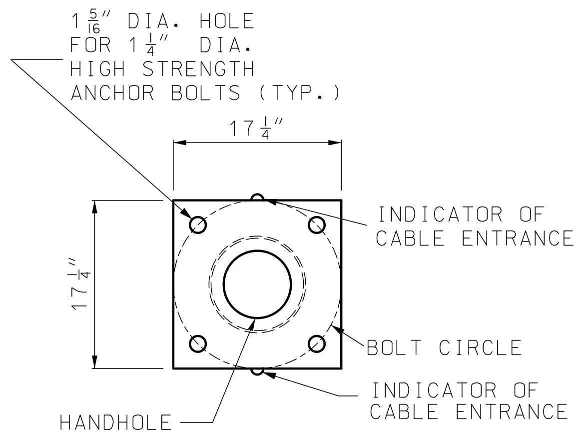
SECTION E–E

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

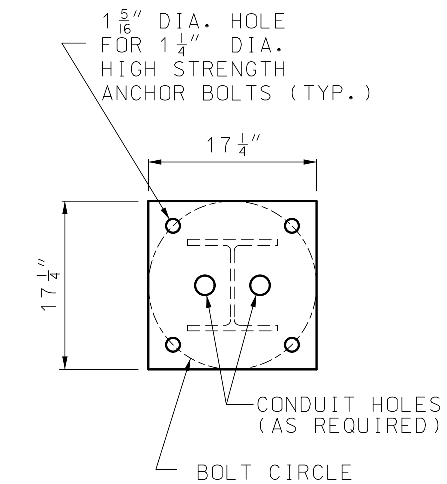
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY LIGHTING
POLES, FOUNDATIONS
AND APPURTENANCES
FOR 45′ MOUNTING HEIGHT

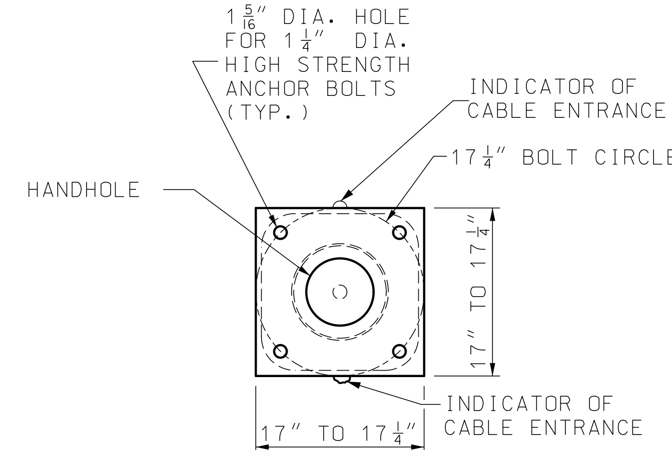
DATE EFFECTIVE:	12/01/2013	901.01AJ	SHEET NO. 4 OF 6
DATE PREPARED:	2/9/2018		



PLAN

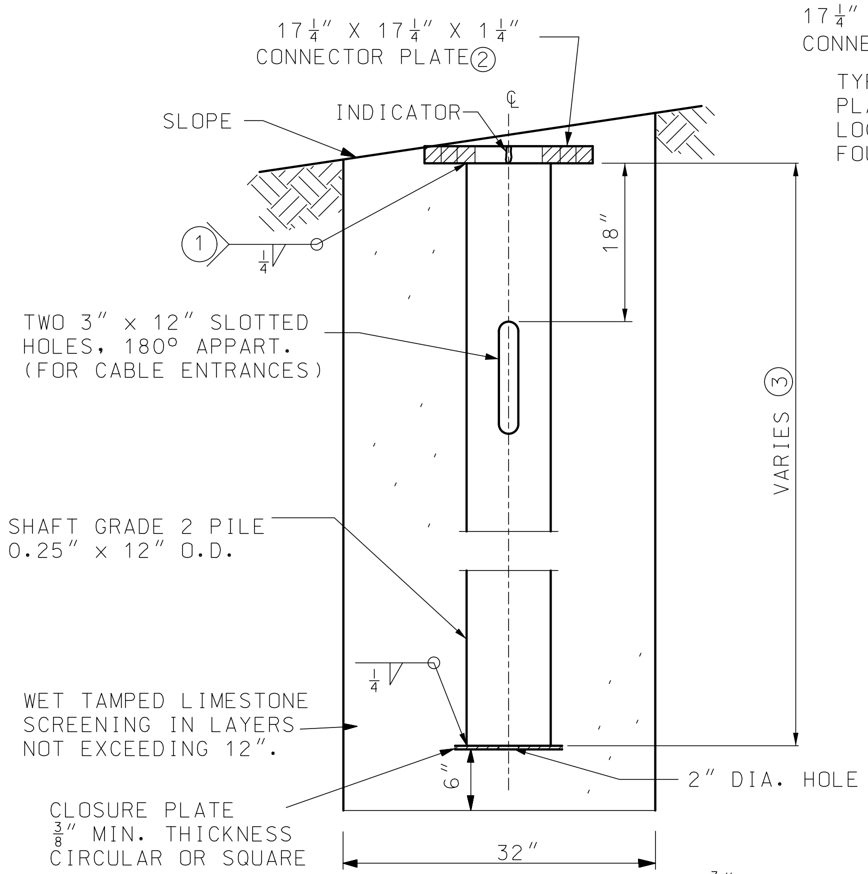


PLAN

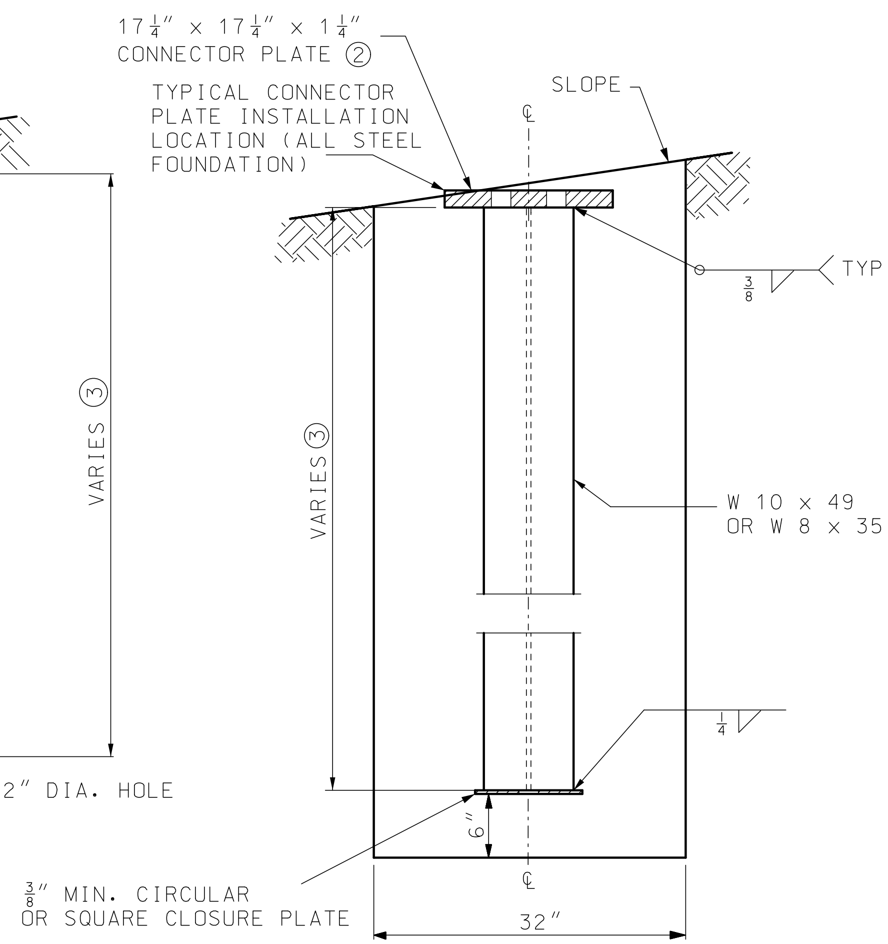


PLAN

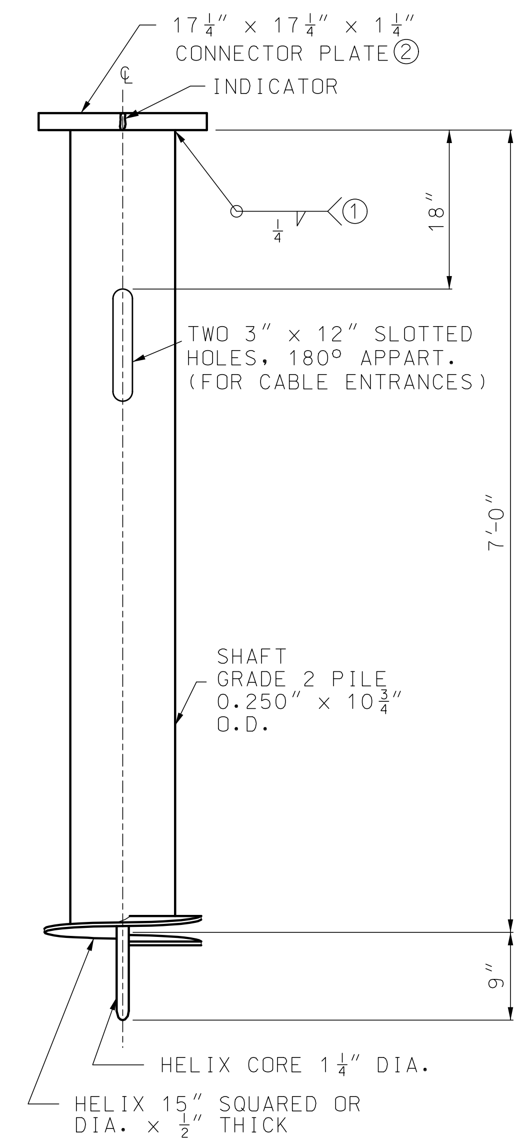
NOTE:
DRIVE HOLES WILL BE PERMITTED PROVIDED THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE, THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.



ELEVATION
DETAILS OF CIRCULAR STEEL PILE FOUNDATION



ELEVATION
DETAILS OF STEEL "H" PILE FOUNDATION



ELEVATION
DETAILS OF SCREW ANCHOR FOUNDATION

(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) PILE LENGTHS FOR STEEL PILE FOUNDATIONS:

AT-45 DESIGN NO.	PILE LENGTH
4 & 5	8'-0"
2 & 3	9'-0"
1	10'-0"

GENERAL NOTES:

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

ALL BOLT CIRCLES FOR 45' MOUNTING HEIGHT SHALL BE 17 1/4".

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

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 1/4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.

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.

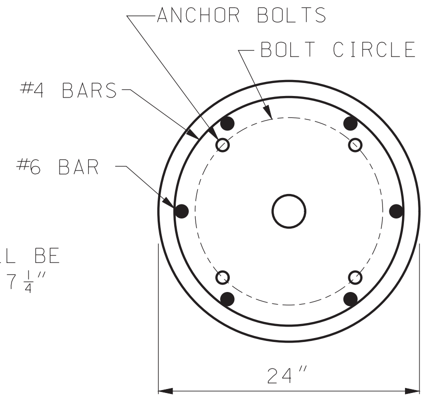
HIGHWAY LIGHTING
POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT

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

901.01AJ

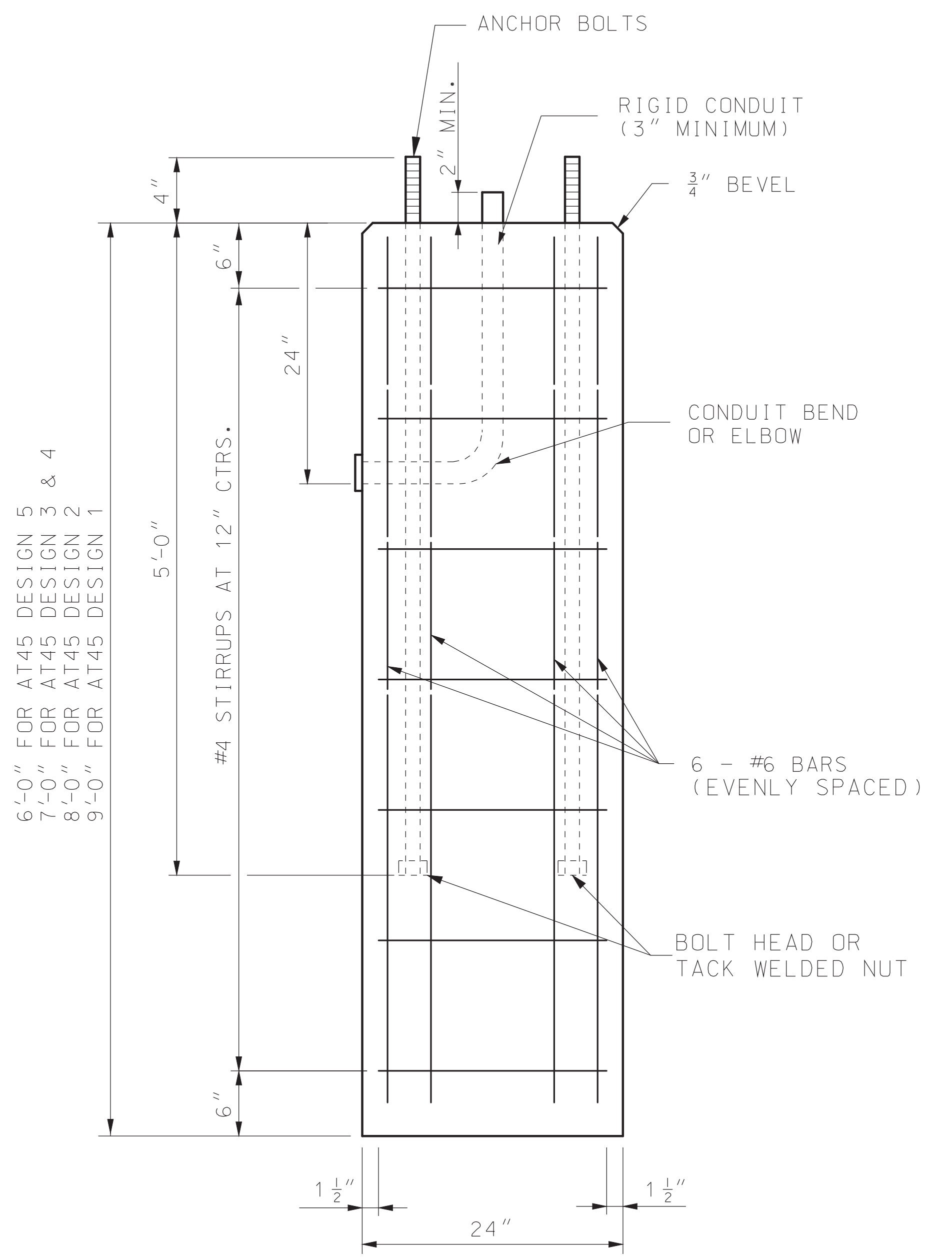
SHEET NO.
5 OF 6

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



NOTE:
ANCHOR BOLTS SHALL BE PLACED ONLY FOR 17¼″ BOLT CIRCLE

PLAN

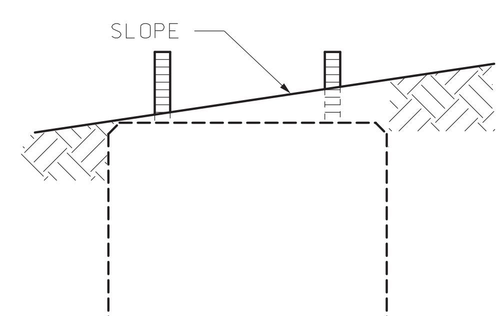


ELEVATION

DETAILS OF CONCRETE FOUNDATION (4)

(4) AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATIONS 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.	REINF.
HEIGHT	CU. YD.	LBS.
6′-0″	.70	80
7′-0″	.81	90
8′-0″	.93	104
9′-0″	1.05	120



CONCRETE FOUNDATION EMBEDMENT

GENERAL NOTES:

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

ALL BOLT CIRCLES FOR 45′ MOUNTING HEIGHT SHALL BE 17¼″.

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

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1¼″ DIAMETER HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.

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.

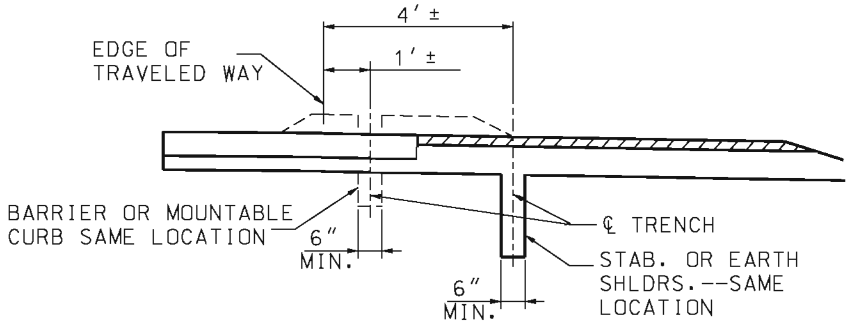
HIGHWAY LIGHTING
POLES, FOUNDATIONS AND APPURTENANCES FOR 45′ MOUNTING HEIGHT

DATE EFFECTIVE: 12/01/2013
DATE PREPARED: 2/9/2018

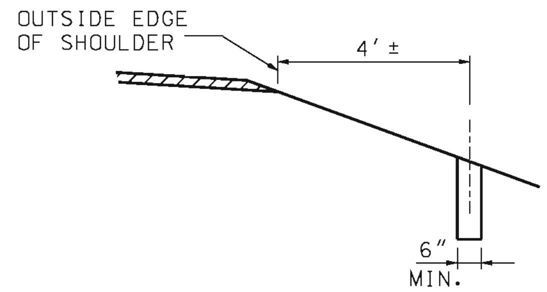
901.01AJ

SHEET NO. 6 OF 6

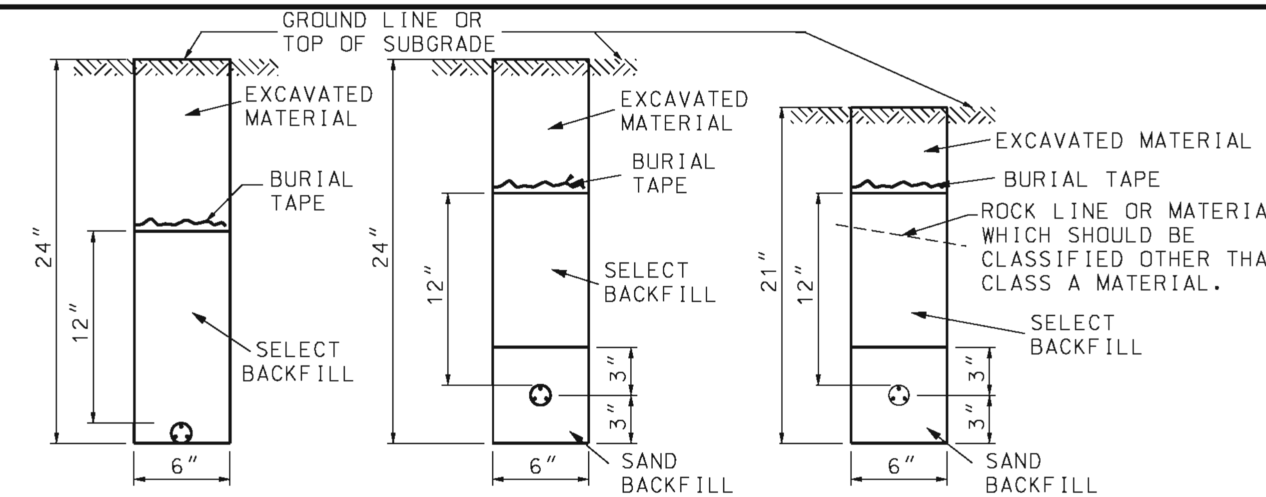
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TRENCH LOCATION - INSIDE SHOULDER

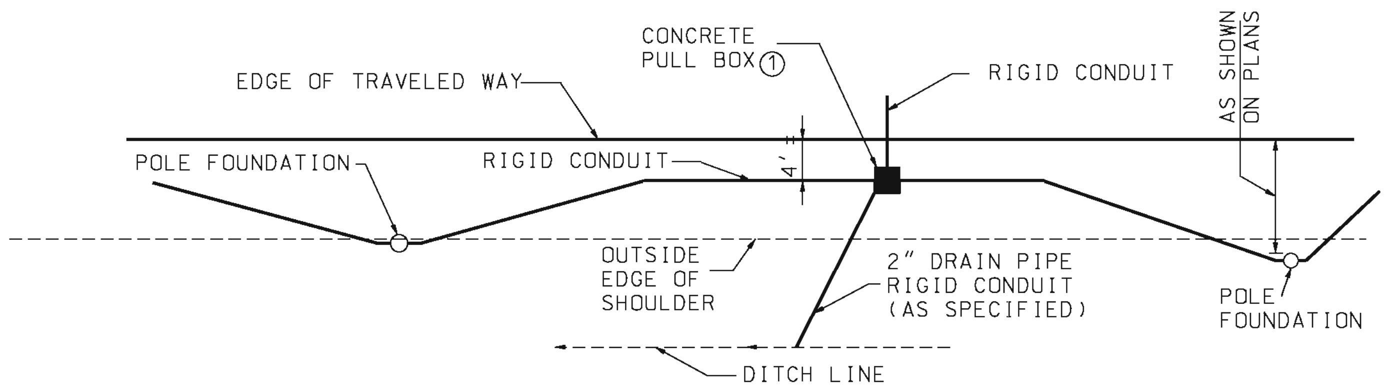


TRENCH LOCATION - OUTSIDE SHOULDER



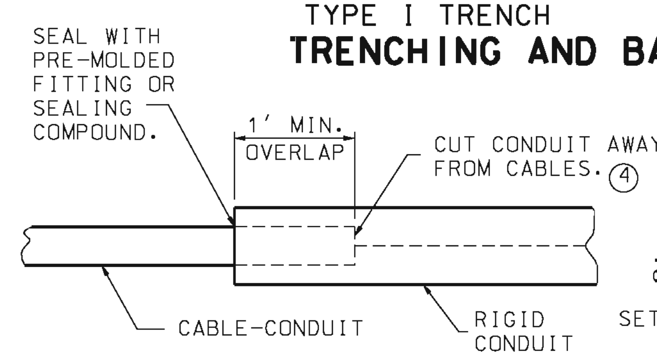
TYPE I TRENCH TYPE II TRENCH TYPE III TRENCH

TRENCHING AND BACKFILLING FOR CABLE-CONDUIT

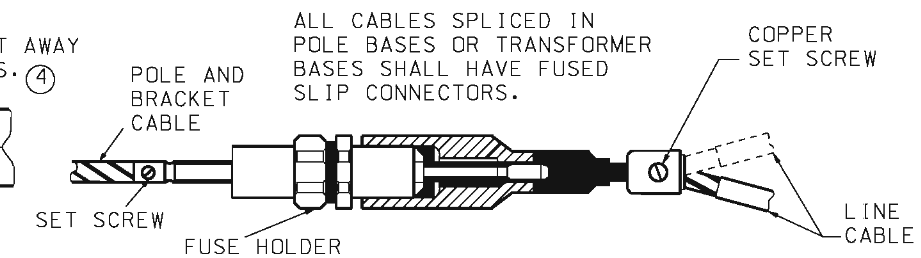


PLAN

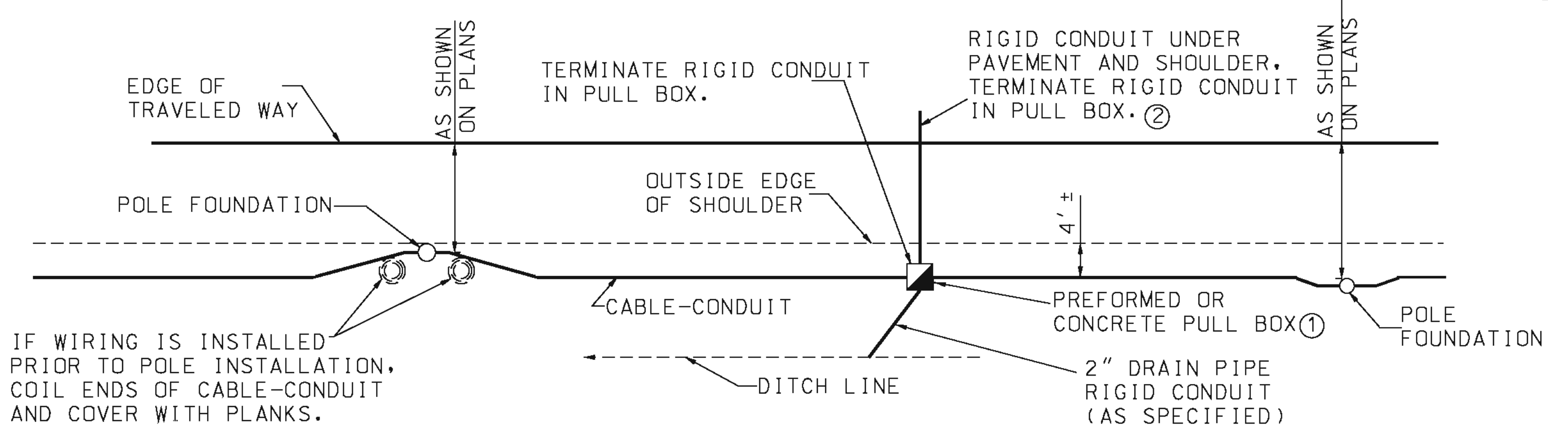
INSIDE SHOULDER (ALL SHOULDER TYPES)



TERMINATION OF CABLE-CONDUIT INTO RIGID CONDUIT SYSTEM

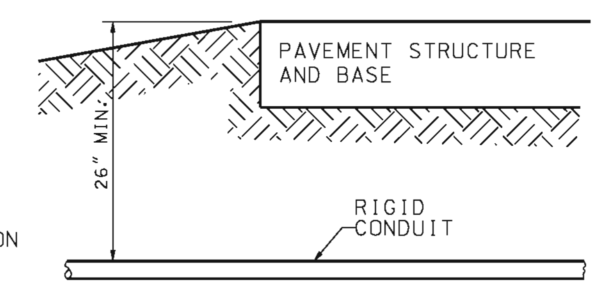


SINGLE OR DUAL CABLE FUSED SLIP CONNECTOR ASSEMBLY ③

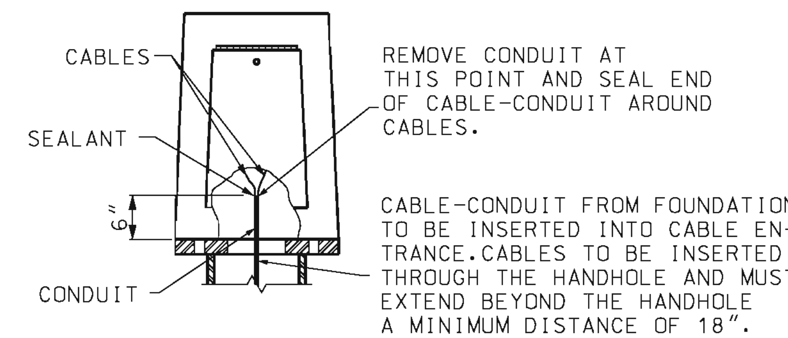


PLAN

OUTSIDE SHOULDER (ALL SHOULDER TYPES)



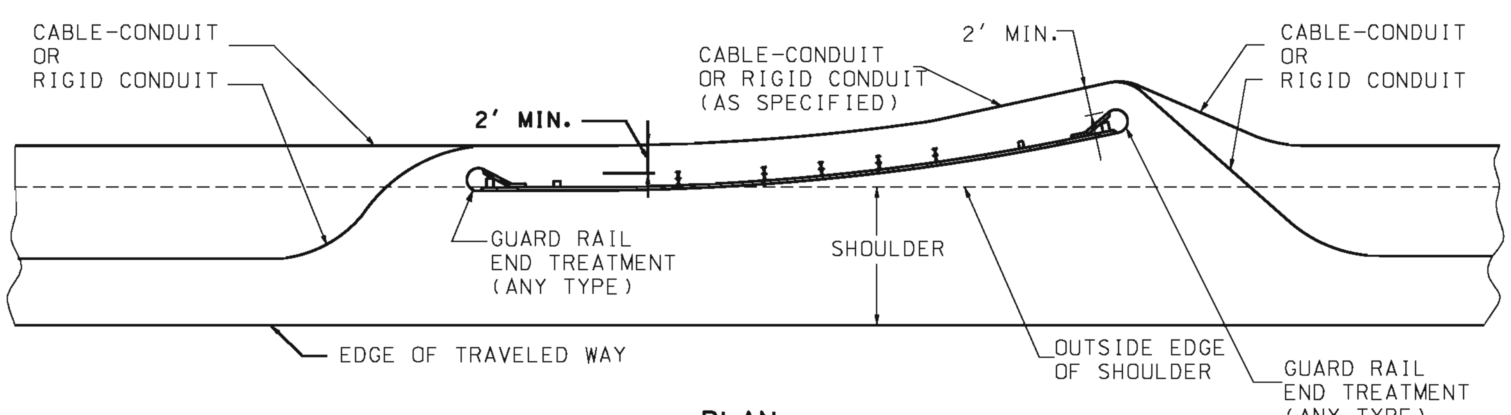
RIGID CONDUIT UNDER PAVEMENT



TYPICAL TRANSFORMER BASE ATTACHMENT

GENERAL NOTES:

THE CONDUIT OF THE CABLE-CONDUIT SHALL BE CUT AWAY FROM THE CABLES WHERE THEY ENTER THE RIGID CONDUIT INSIDE A CONCRETE BARRIER OR STRUCTURE.



PLAN

BEHIND GUARD RAIL

NOTES:

1. SEE DRAWING 902.20 FOR PULL BOXES.
2. CONDUIT MAY BE REMOVED FROM CABLES IN RIGID CONDUIT. SPLICES SHALL NOT BE MADE UNLESS SHOWN ON PLANS.
3. BRAND AND MODEL OF FUSE HOLDER SHALL BE APPROVED BY THE ENGINEER.
4. CABLES SHALL BE CONTINUOUS TO THE FIRST LIGHT POLE. SPLICES SHALL NOT BEMADE FOR THE PURPOSE OF TERMINATING CABLE-CONDUIT.

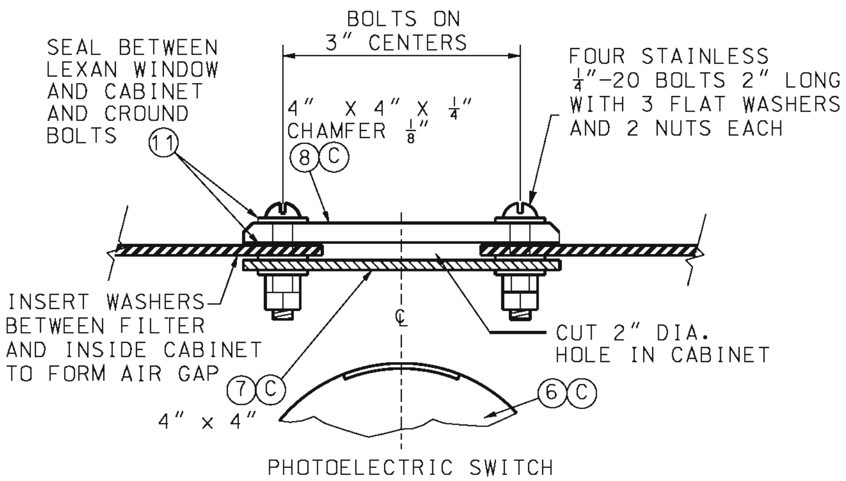
MoDOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

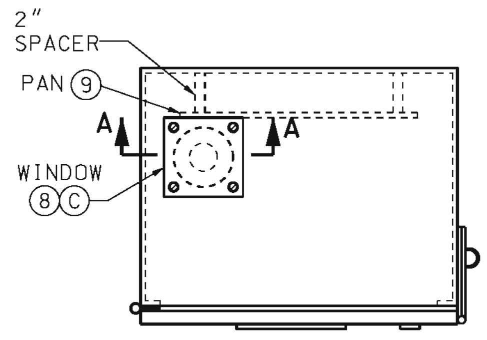
HIGHWAY LIGHTING
CABLE, CONDUIT AND TRENCHING

DATE EFFECTIVE:	04/01/2002	901.02B	SHEET NO. 1 OF 1
DATE PREPARED:	3/10/2011		

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



SECTION A-A
WINDOW DETAIL



DETAIL A

ITEM	DESCRIPTION
1	#2 CORBIN LOCK
2	RIGID CONDUIT ✱
3	CLASS B CONCRETE, 0.4 C.Y.±
4	NEMA 4, DUST-TIGHT, WATERTIGHT, CABINET
5	GROUND ROD, ¾" DIA. X 8' MIN.
6	PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000-WATT
7	TRANSLUCENT, PLEXIGLASS FILTER #W2067, ⅛" THICK
8	CLEAR, LEXAN #9034 WINDOW, ¼" THICK MIN.
9	MOUNTING PAN, 31½" x 12" x ¼" ALUMINUM OR STAINLESS STEEL
10	PLIABLE DUCT SEALANT
11	LIFETIME SILICONE CAULK
12	ANCHOR BOLTS, 5/8-11 x 14" LONG BOLTS, HOT DIP GALVANIZED, 4 REQUIRED, USE BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END
13	WEATHERPROOF ADHESIVE LABEL, VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL)
	✱ - SEE PLANS

LIST OF MATERIALS

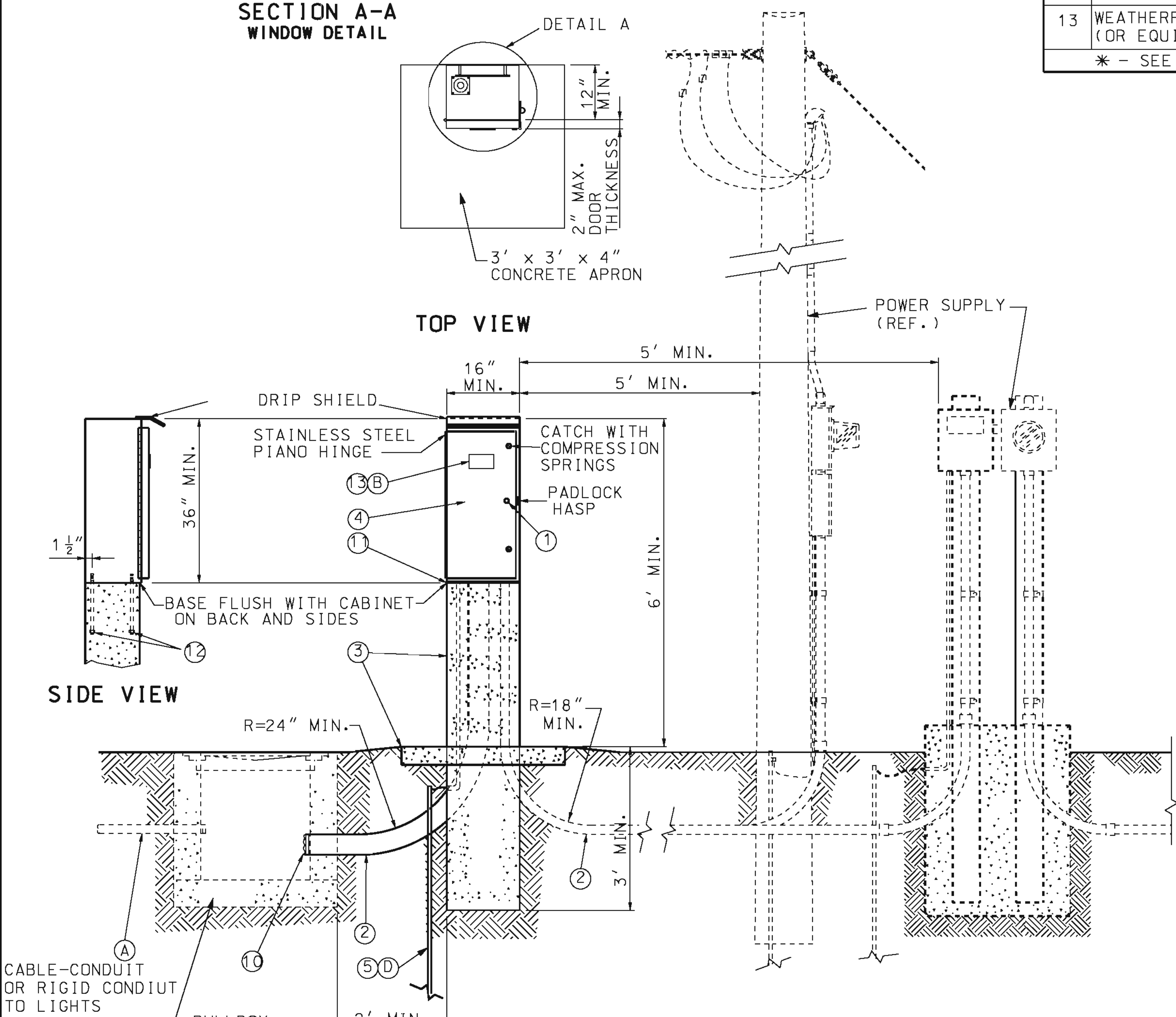
NOTES

(A) IF CABLE-CONDUIT IS SPECIFIED, THE CONDUIT SHALL BE CUT AWAY FROM CABINET BETWEEN PULL BOX AND CONTROL STATION.

(B) LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.

(C) PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WIDOW OVER CENTER OF PHOTOELECTRIC SWITCH.

(D) 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 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.



LABEL DETAIL

(240 VOLT) 13 B

LABEL DETAIL

(480 VOLT) 13 B

GENERAL NOTES:

ALTERNATE CABINET DIMENSIONS WILL BE ALLOWED AS APPROVED BY THE ENGINEER. INTERIOR CABINET VOLUME SHALL BE EQUAL TO OR GREATER THAN THAT SHOWN ON PLANS AND PROPER CLEARANCES SHALL BE PROVIDED FOR ALL EQUIPMENT. CONCRETE BASE DIMENSIONS SHALL BE MODIFIED TO FIT THE CABINET SUPPLIER.

PLACEMENT OF ALL ITEMS SHALL BE APPROVED BY THE ENGINEER.

CABINET SHALL BE LOCATED AWAY FROM TRAFFIC. TOP MOUNT PHOTO CONTROL SHALL FACE AN OPEN SKY. SIDE MOUNT PHOTO CONTROL SHALL FACE NORTH.

SEE PLANS FOR CIRCUIT WIRING; MAXIMUM LOADING PER CIRCUIT IS 7,400 WATTS FOR 240 VOLT AND 11,000 WATTS FOR 480 VOLT.

SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.

THE UTILITY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

ALL OPENINGS IN CABINET SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR CONTROL STATION.

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

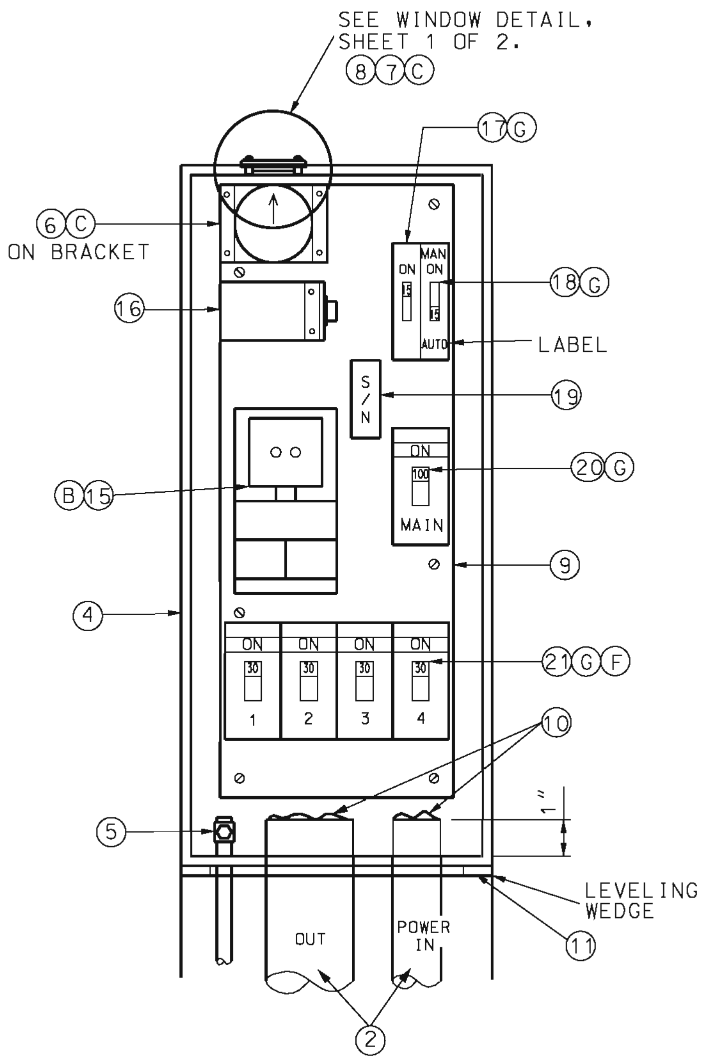
STATE OF MISSOURI
GLEEN H. RACKERS
NUMBER
PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY LIGHTING
BASE MOUNTED CONTROL STATION
240 V OR 480 V - 4 CIRCUIT

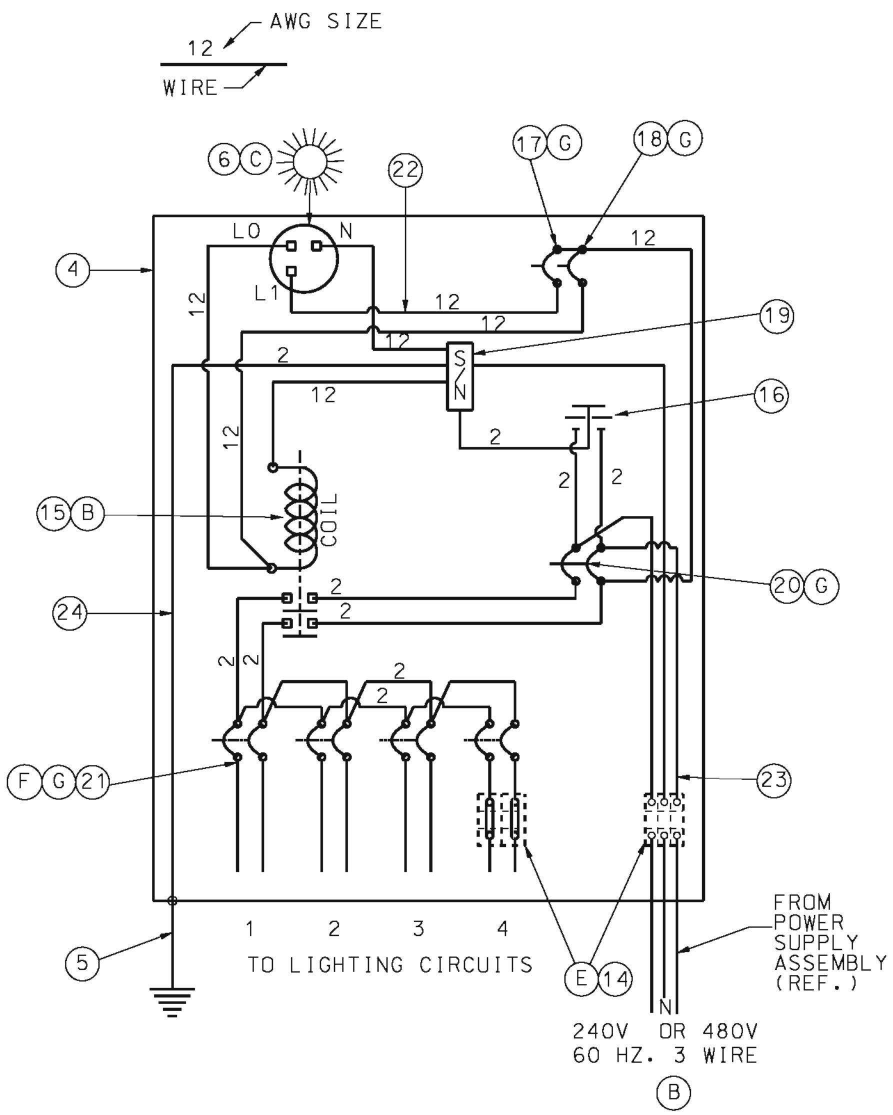
DATE EFFECTIVE: 04/01/2005
DATE PREPARED: 9/14/2010

901.30F

SHEET NO. 1 OF 2



EQUIPMENT LAYOUT



WIRING DIAGRAM

LIST OF MATERIALS	
ITEM	DESCRIPTION
2	RIGID CONDUIT ✱
4	NEMA 4, DUST-TIGHT, WATERTIGHT CABINET
5	GROUND ROD, $\frac{3}{4}$" DIA. X 8' MIN.
6	PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000 WATT
7	TRANSLUCENT, PLEXIGLASS FILTER #W2067, $\frac{1}{8}$" THICK
8	CLEAR, LEXAN #9034 WINDOW, $\frac{1}{4}$" THICK MIN.
9	MOUNTING PAN, 31$\frac{1}{2}$" x 12" x $\frac{1}{4}$" ALUMINUM OR STAINLESS STEEL
10	PLIABLE SEALANT
11	LIFETIME SILICONE CAULK
14	INSULATED TERMINAL BLOCK, FOR GREATER THAN 4/0 CABLE
15(240V)	2-POLE, 100 AMP, 120V COIL LIGHTING CONTACTOR
15(480V)	2-POLE, 100 AMP, 240V COIL LIGHTING CONTACTOR
16	2-POLE, 650 VOLT LIGHTING ARRESTER
17	1-POLE, 15 AMP, TYPE B CONTROL BREAKER
18	1-POLE, 15 AMP,TYPE B MANUAL-AUTO SWITCH
19	INSULATED GROUNDABLE NEUTRAL, 100 AMP
20	2-POLE, 100 AMP, TYPE A MAIN BREAKER
21	2-POLE, 15 AMP(MIN), TYPE A LIGHTING BREAKERS
22	#12 AWG MIN., 600 V. CONTROL CABLE
23	#2 AWG MIN., 600 V. ✱ POWER CABLE
24	#2 AWG MIN., 600 V. GROUND CABLE
✱	SEE PLANS

NOTES

(B) LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.

(C) PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.

(E) IF FOR REASONS OF VOLTAGE DROP A WIRE SIZE IS SPECIFIED LARGER THAN THE BREAKER LUGS CAN ACCOMMODATE, AN INSULATED HEAVY DUTY TERMINAL BLOCK SHALL BE INSTALLED TO TERMINATE THE LARGER WIRES AND A SMALLER JUMPER CONNECTED TO THE BREAKER ITSELF.

(F) LIGHTING BREAKER SIZING:

SIZE (AMPS)	240V TOTAL CIRCUIT LOAD (WATTS)	480V TOTAL CIRCUIT LOAD (WATTS)
15	0-2800	0 - 5500
20	2850-3700	5550 - 7400
25	3750-4600	7450 - 9200
30	4650-5500	9250 - 11,000
35	5550-6500	--
40	6550-7400	--

CIRCUIT LOAD INCLUDES LOAD DUE TO LINE LOSS, LAMP, AND BALLAST LOAD.

(G) ALL CIRCUIT BREAKERS SHALL CONFORM TO SECTION 901.4 OF THE STANDARD SPECIFICATIONS.

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
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY LIGHTING

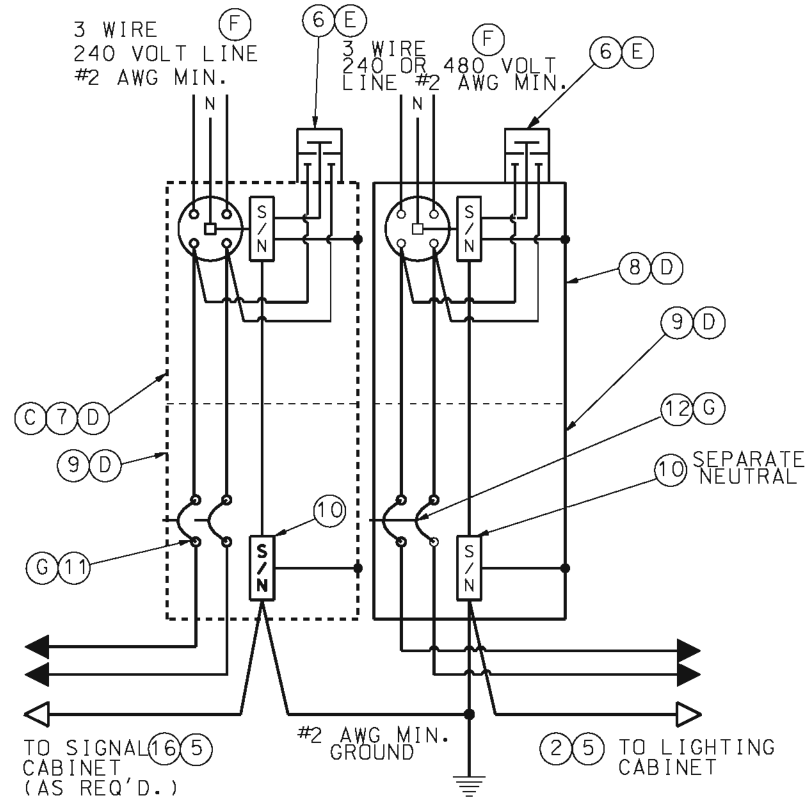
BASE MOUNTED CONTROL STATION 240 V OR 480 V - 4 CIRCUIT

DATE EFFECTIVE: 04/01/2005
DATE PREPARED: 8/26/2009

901.30F

SHEET NO. 2 OF 2

LIST OF MATERIALS	
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN.,CLASS 4 WOOD, CONTRACTOR PROVIDED, MoDOT OWNED✱
2	#2 AWG MIN. CABLE, 600 VOLT ✱
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	RIGID CONDUIT, 2" MIN., WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTER, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	METER SOCKET, 200 AMP, FOR LIGHTING
9	LOCKING, RAINTIGHT, NEMA 4 SERVICE DISCONNECT BOX
10	INSULATED, GROUNDABLE NEUTRAL WIRE, 200 AMP MINIMUM
11	SIGNAL BREAKERS, SINGLE POLE, 40A MIN, TYPE A OR B ✱
12	LIGHTING BREAKER, 2 POLE, 240 VOLT, 100A, TYPE A OR B
13	1/2" METAL CONDUIT
14	#2 AWG MIN. GROUND WIRE
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT ✱
17	CLASS B CONCRETE, 0.92 C.Y.±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	WEATHERPROOF ADHESIVE LABEL (LIGHTING), VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL)
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS), VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL)
21	W6 x 9 OR W6 x 15 GALVANIZED POST
22	#2 AWG MIN. CABLE, 600 VOLT
23	RIGID CONDUIT, 2" MINIMUM
✱	SEE PLANS



WIRING DIAGRAM
LIGHTING AND/OR SIGNALS

NOTES:

Ⓐ SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50 FEET.

Ⓑ INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 30 FEET.

Ⓒ SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL. ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAINLESS STEEL.METER SOCKET FOR SIGNALS OR LIGHTING AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.

Ⓓ SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.

Ⓔ UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET. IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE DISCONNECT CABINET.

Ⓕ LIGHTING SYSTEM VOLTAGE OF 240 VOLTS OR 480 VOLTS AS SHOWN ON THE PLANS.

Ⓖ BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.

Ⓗ 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 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

GENERAL NOTES:

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

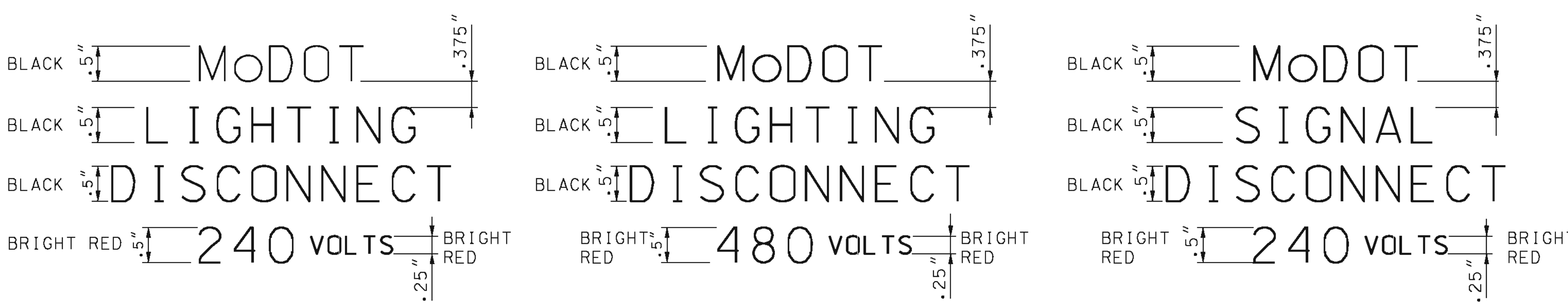
THE POWER SUPPLY ASSEMBLY TYPE IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED, OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED AS SHOWN ON DRAWING, INCLUDING CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES, SHALL BE INCLUDED IN UNIT BID PRICE FOR POWER SUPPLY ASSEMBLY.



LABEL DETAIL 19 (240 VOLT) F

LABEL DETAIL 19 (480 VOLT) F

LABEL DETAIL 20

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

STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

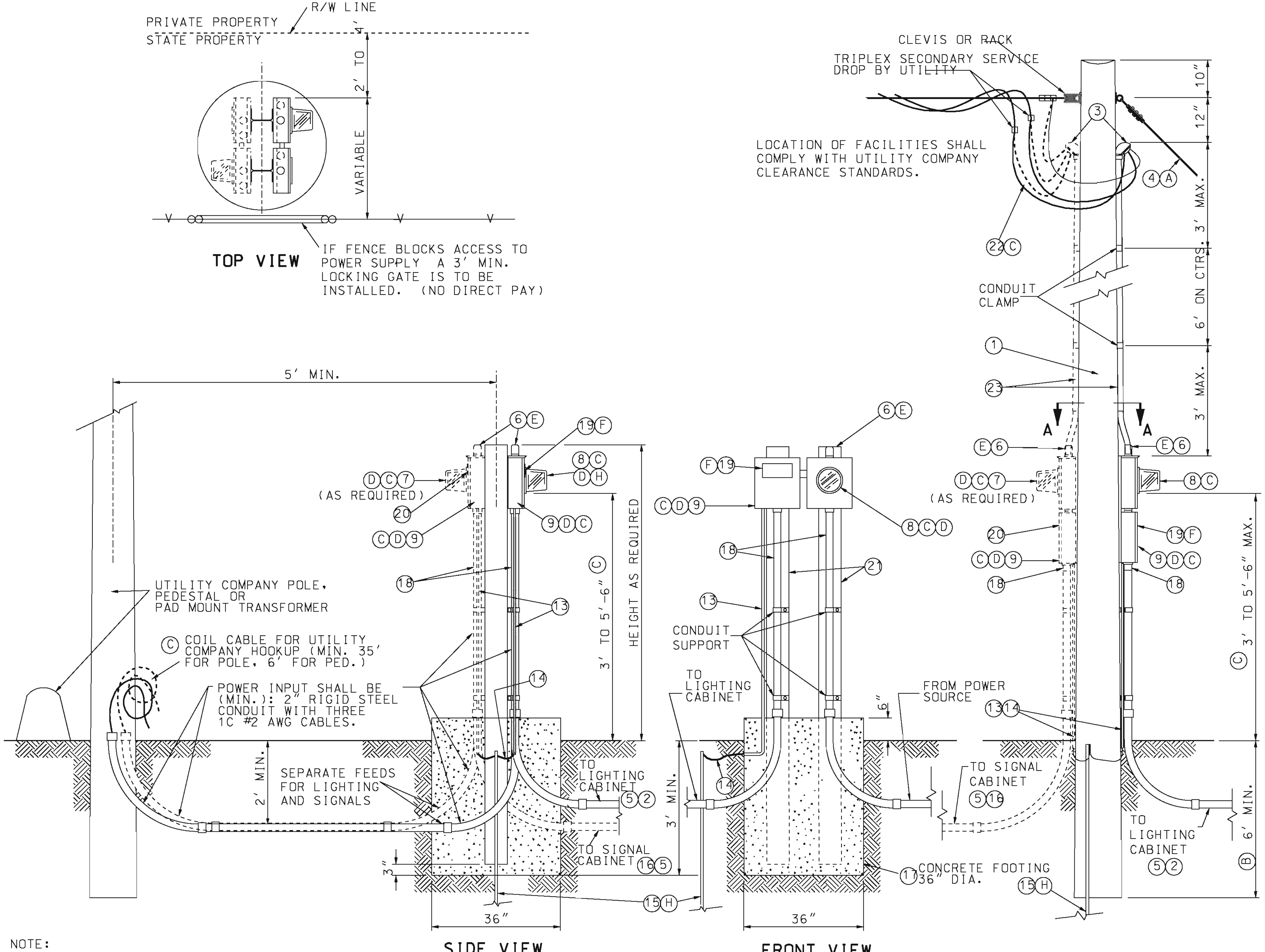
HIGHWAY LIGHTING
POWER SUPPLY ASSEMBLY
SECONDARY SERVICE

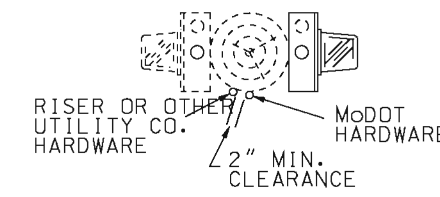
DATE EFFECTIVE: 04/01/2002
DATE PREPARED: 4/1/2010

901.80D

PEDESTAL OR NEW STATE-OWNED POLE TO BE SET WITHIN 2' TO 4' OF RIGHT-OF-WAY LINE.

ALL SERVICE POWER SUPPLY ASSEMBLIES ARE TO BE LOCATED ON STATE PROPERTY.





SECTION A-A

NOTE:
CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

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

STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY LIGHTING
POWER SUPPLY ASSEMBLY SECONDARY SERVICE

DATE EFFECTIVE: 04/01/2002
DATE PREPARED: 5/19/2010

901.80D

SHEET NO. 2 OF 2

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

- LED-C LUMINAIRE
- BRACKET ARM
- BOLT DOWN LIGHT STANDARD
- EXISTING LIGHT STANDARD AND LUMINAIRE
- LED-A LUMINAIRE
- LED-B LUMINAIRE
- 150 WATT UNDERPASS LUMINAIRE
- HIGH MAST TOWER WITH LUMINAIRE AIM
- PULL BOX, TYPE I DRAIN, CONCRETE
- PULL BOX, TYPE II DRAIN, CONCRETE
- PULL BOX, TYPE I DRAIN, PREFORMED
- PULL BOX, TYPE II DRAIN, PREFORMED
- EXISTING PULL BOX, TYPE I DRAIN, CONCRETE
- EXISTING PULL BOX, TYPE II DRAIN, CONCRETE
- EXISTING PULL BOX, TYPE I DRAIN, PREFORMED
- EXISTING PULL BOX, TYPE II DRAIN, PREFORMED

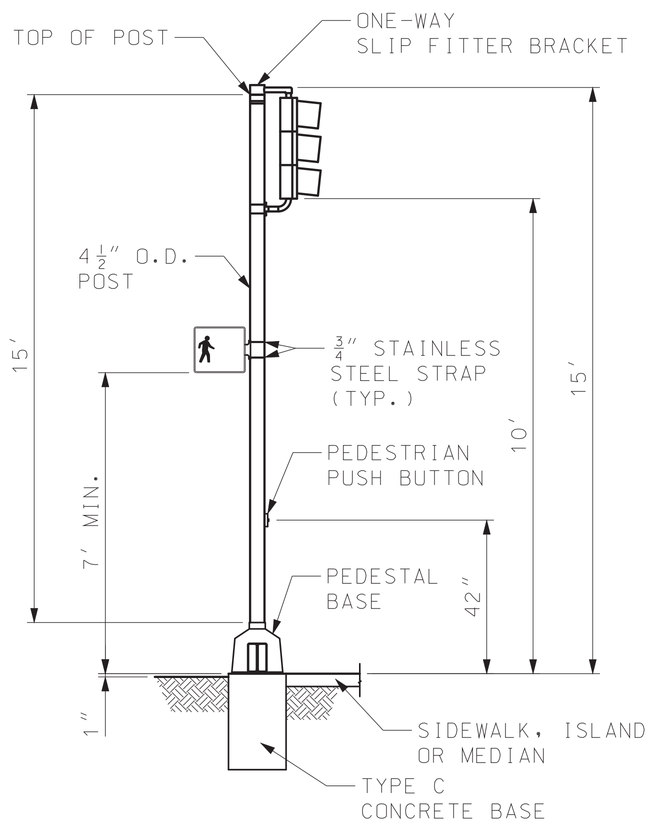
- SERVICE POLE OR PEDESTAL AND POWER SUPPLY
- TRANSFORMER OR SUBSTATION POLE
- BASE MOUNTED LIGHTING CONTROL STATION WITH PAD
- EXISTING BASE MOUNTED CONTROL STATION
- GROUND CONNECTION
- RIGID CONDUIT IN TRENCH
- CAPPED RIGID CONDUIT
- RIGID CONDUIT PUSHED
- EXISTING RIGID CONDUIT
- B B — RIGID CONDUIT ON BRIDGE
- M M — RIGID CONDUIT IN MEDIAN
- 1 — CABLE CONDUIT WITH CIRCUIT NUMBER
- EXISTING CABLE CONDUIT
- EXPOSED CONDUIT ON UNDER SIDE OF BRIDGES. NUMBER OF HATCHES DENOTES NUMBER OF WIRES IN CONDUIT

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

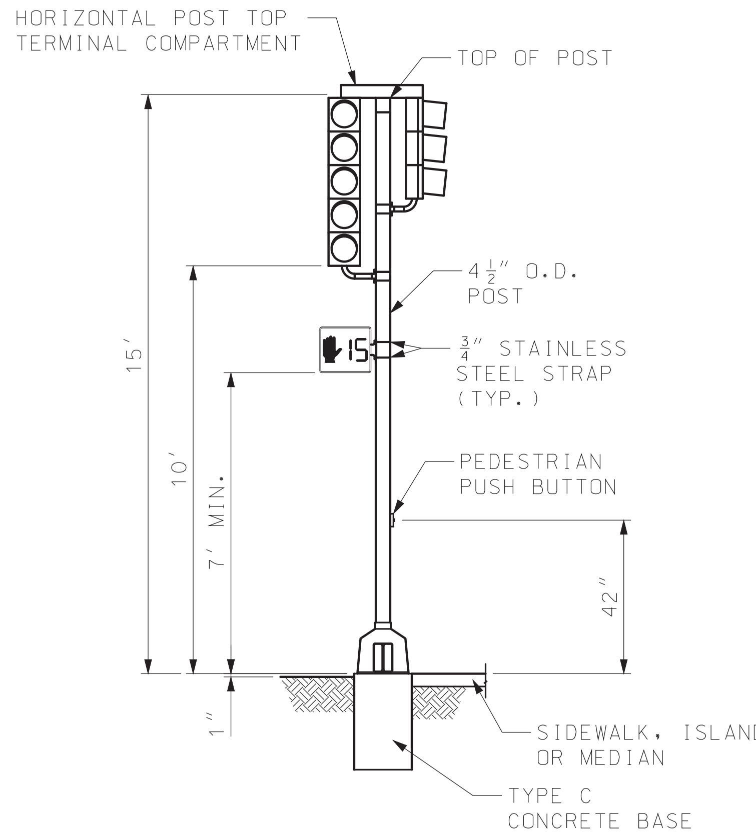
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY LIGHTING SYMBOLS

DATE EFFECTIVE: 04/01/2018		901.85B	SHEET NO.
DATE PREPARED: 2/9/2018			1 OF 1

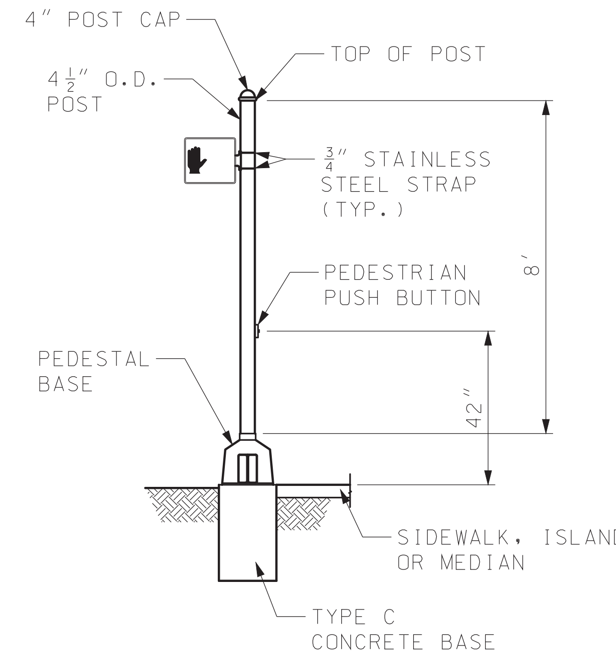


ONE FACE



TWO FACE

PEDESTAL POST MOUNTINGS



GENERAL NOTES:

ALL POST WIRE OUTLETS SHALL BE DEBURRED AND EQUIPPED WITH BUSHINGS.

BACKPLATES NOT SHOWN IN MOUNTING DIAGRAMS FOR CLARITY.

POSTS SHALL BE GROUNDED WITH #6 AWG BARE COPPER WIRE FROM GROUNDING BUSHING ON CONDUIT TO GROUNDING LUG IN POST BASE IF STEEL CONDUIT IS USED. IF PVC CONDUIT IS USED, PROVIDE #6 AWG BARE COPPER WIRE FROM GROUNDING LUG IN POST TO POWER SUPPLY GROUND BUSS IN CONTROLLER CABINET.

LEADS FROM PEDESTRIAN SIGNAL LAMPS ARE CONNECTED TO THE SIGNAL HEAD TERMINAL COMPARTMENT.

TYPE C MOUNTED SIGNALS SHALL HAVE A DISCONNECT HANGER.

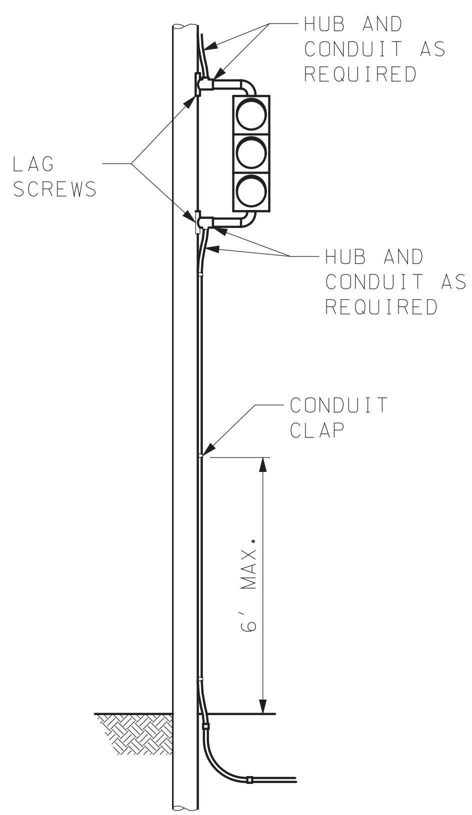
TYPE B MOUNTED SIGNALS SHALL HAVE A TERMINAL COMPARTMENT.

ONE FACE, TOP-MOUNTED (TYPE T) OR SIDE-MOUNTED (TYPE S) SIGNALS HAVE NO TERMINAL COMPARTMENT.
TWO FACE, TOP-MOUNTED (TYPE T) OR SIDE-MOUNTED (TYPE S) SIGNALS SHALL HAVE A HORIZONTAL TERMINAL COMPARTMENT.

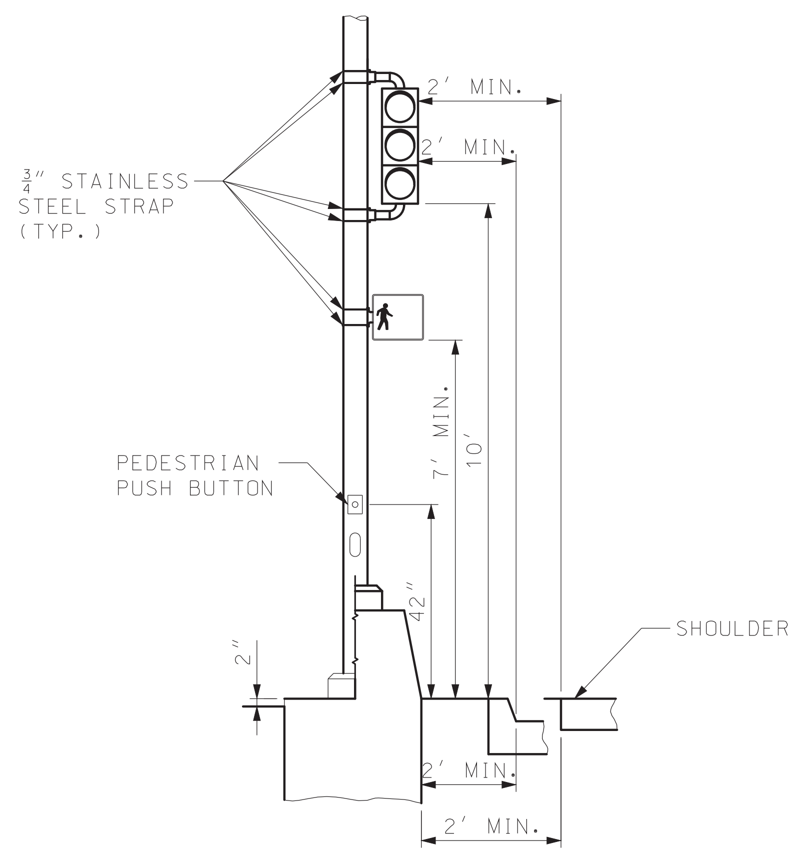
SIDE-MOUNTED OPTICALLY LIMITING HEADS SHALL HAVE A MINIMUM POST CLEARANCE OF 5½".

SIGNAL APPURTENANCES SHALL HAVE A HORIZONTAL CLEARANCE NO LESS THAN 2' FROM THE FACE OF A VERTICAL CURB OR FROM THE OUTSIDE EDGE OF A SHOULDER,EXCEPT SIGNALS LOCATED IN A MEDIAN ISLAND.

SEE STANDARD PLAN 902.30 FOR BASE DETAILS AND CONDUIT LOCATIONS.



WOOD POLE
MOUNTING



METAL POST
MOUNTING

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.

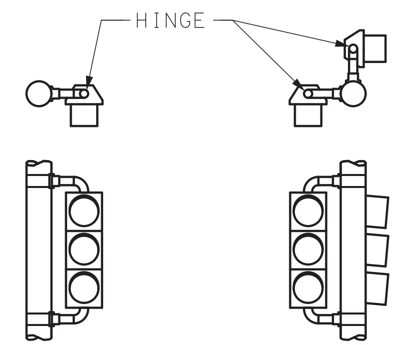
TRAFFIC SIGNALS
SIGNAL HEAD MOUNTING

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017
902.00P
SHEET NO.
1 OF 2

TYPE I BRACKET
ONE FACE

TYPE I BRACKET
TWO FACE

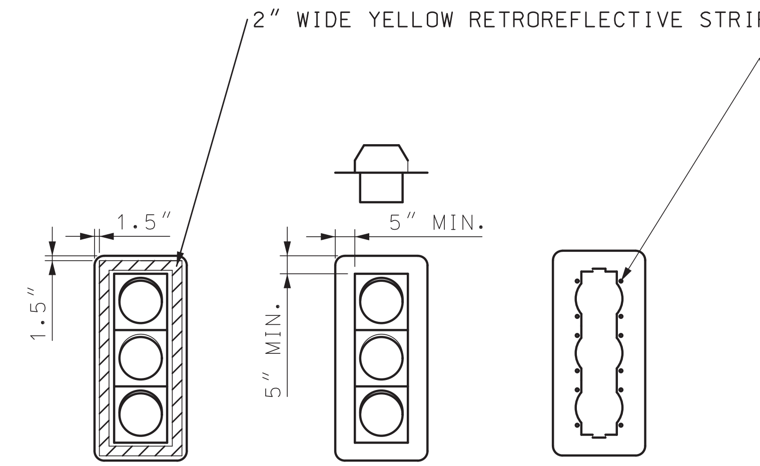
TOP-MOUNT (TYPE T)

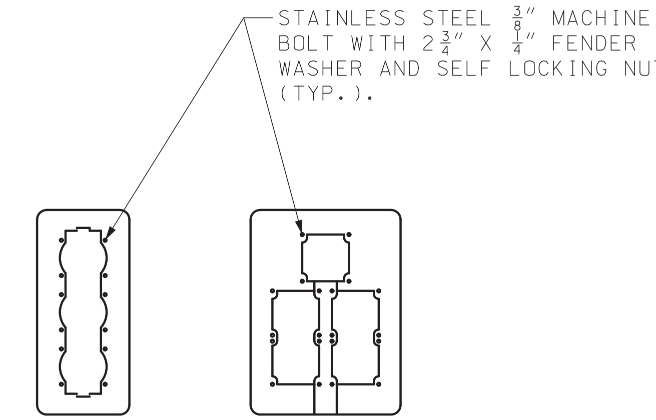


TYPE I BRACKET
ONE FACE

TYPE I BRACKET
TWO FACE

SIDE-MOUNT (TYPE S)



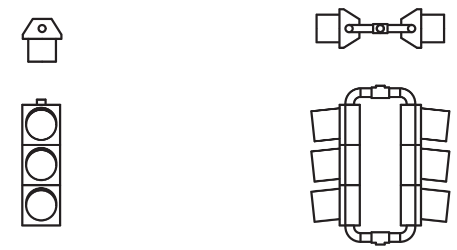


ALL SCREWS THROUGH BACKPLATE SHALL HAVE AT LEAST ¾" TO EDGE OF BACKPLATE.

1 THRU 5
SECTION

5
SECTION

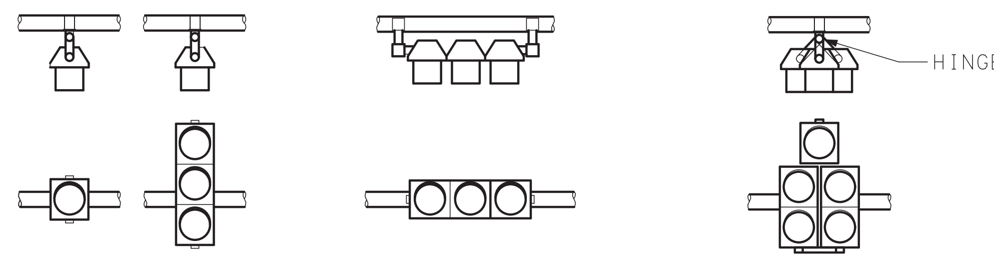
BACKPLATES



TYPE I BRACKET
ONE FACE

TYPE II BRACKET
TWO FACE

OVERHEAD SPANWIRE
(TYPE C)

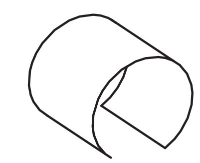


TYPE I BRACKET

TYPE II BRACKET

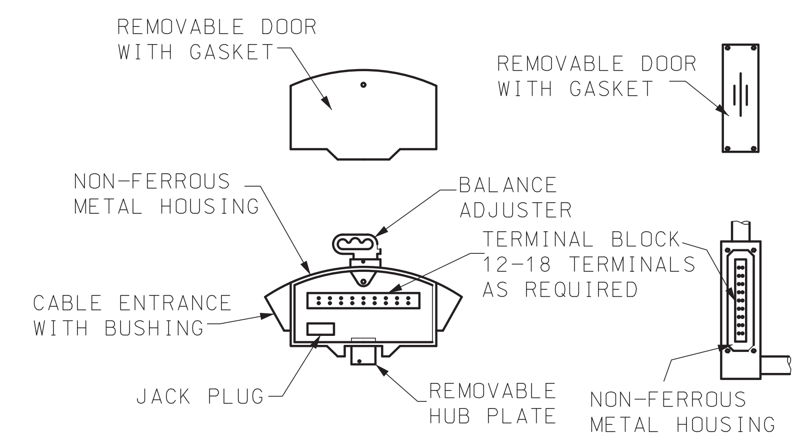
TYPE III BRACKET

MAST ARM (TYPE B)
(SEE DRAWING 902.40)

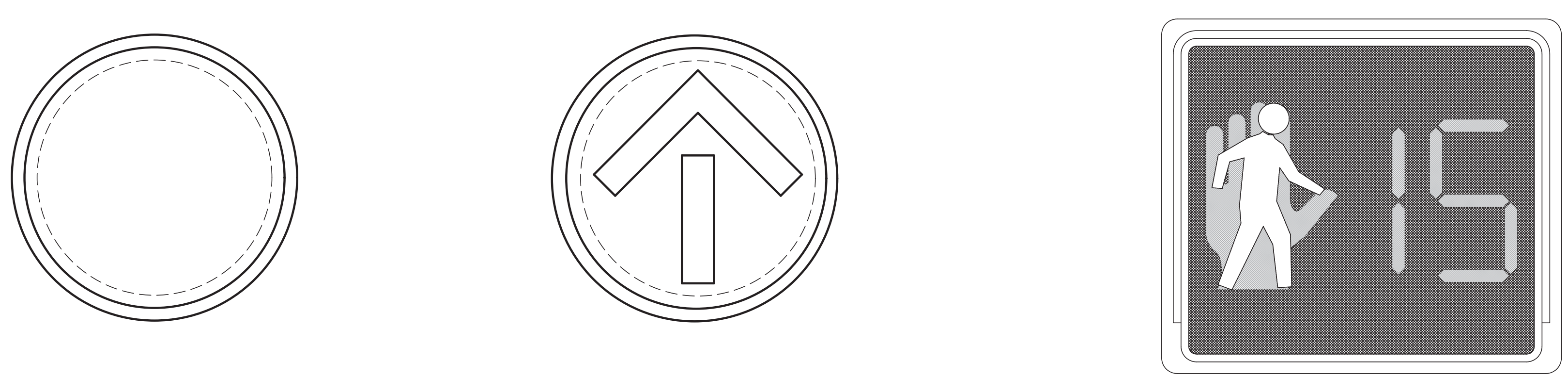


TUNNEL

VISORS



TERMINAL COMPARTMENT



CIRCULAR

ARROW

PEDESTRIAN

INDICATIONS

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

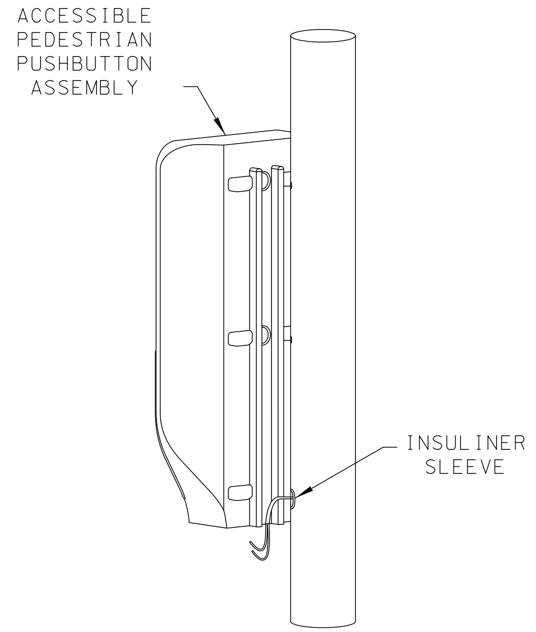
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
SIGNAL HEAD LOUVERS, VISORS, BACKPLATES AND TERMINAL COMPARTMENT

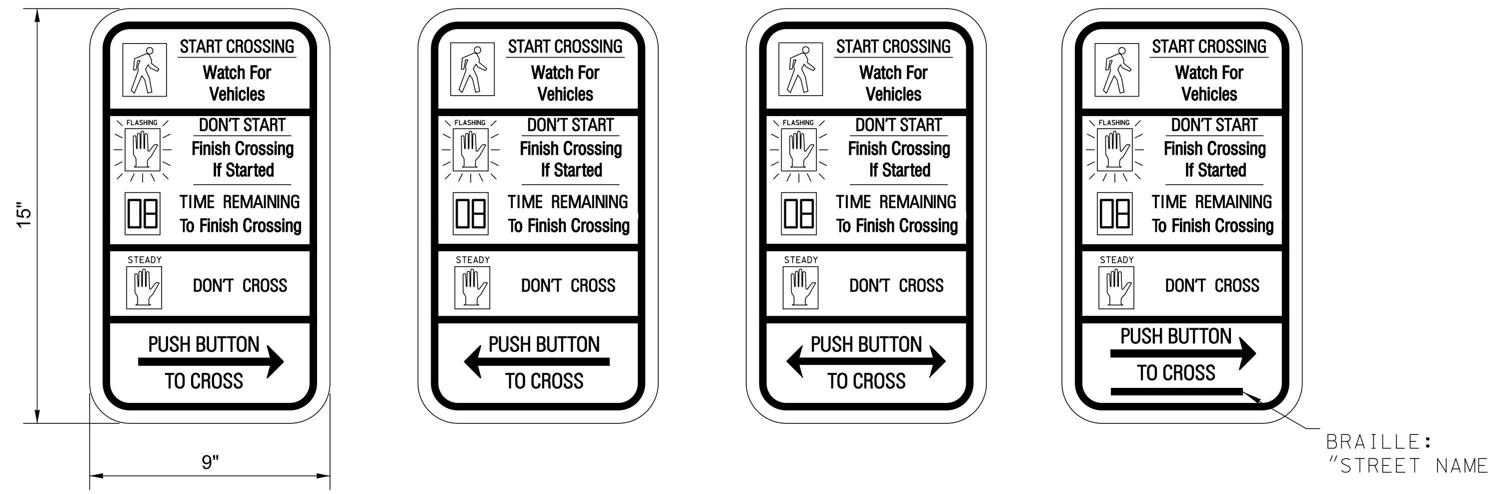
DATE EFFECTIVE: 07/01/2018
DATE PREPARED: 5/3/2018

902.00P

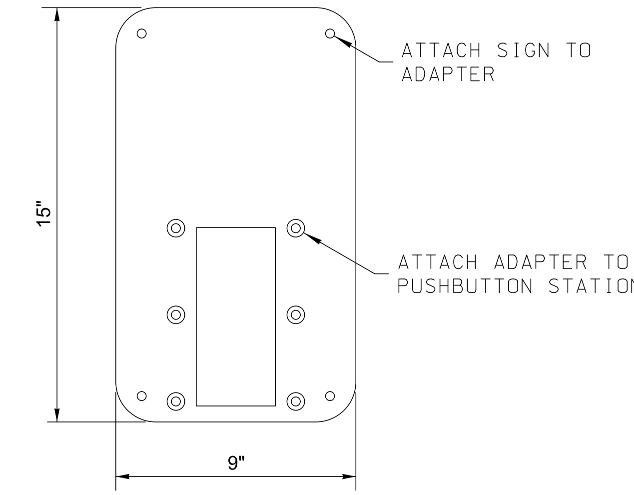
SHEET NO.
2 OF 2



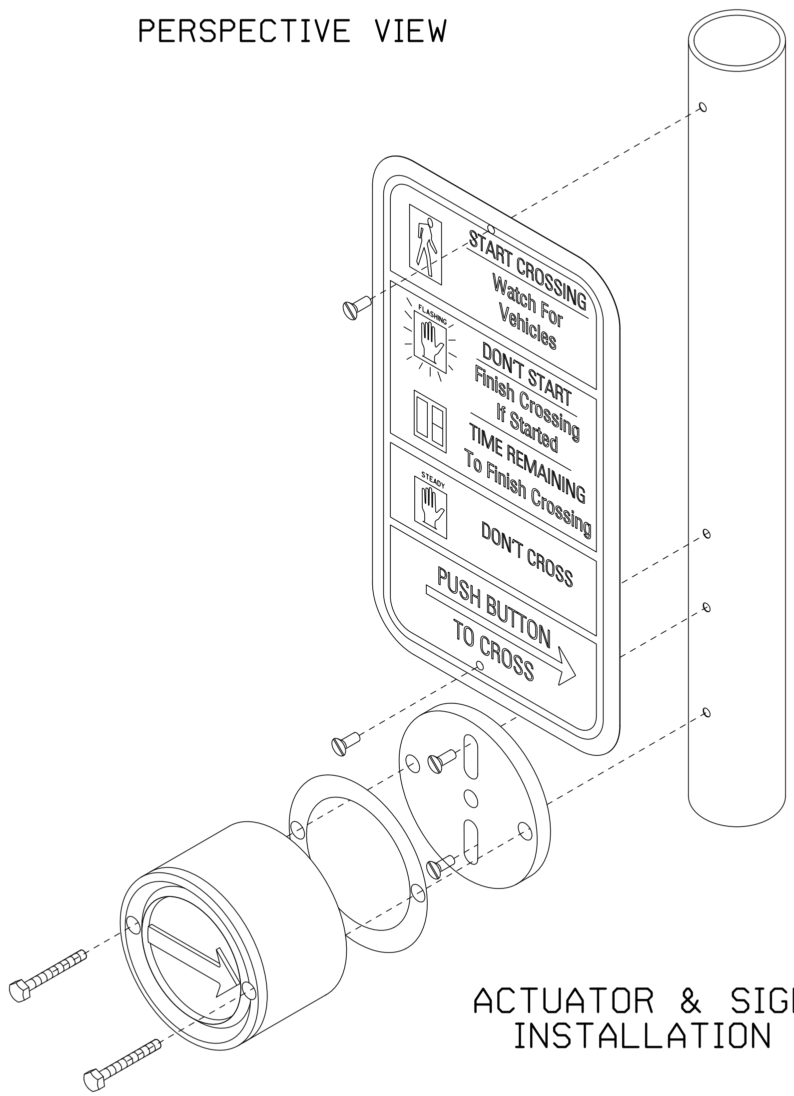
WIRE ROUTING
PERSPECTIVE VIEW



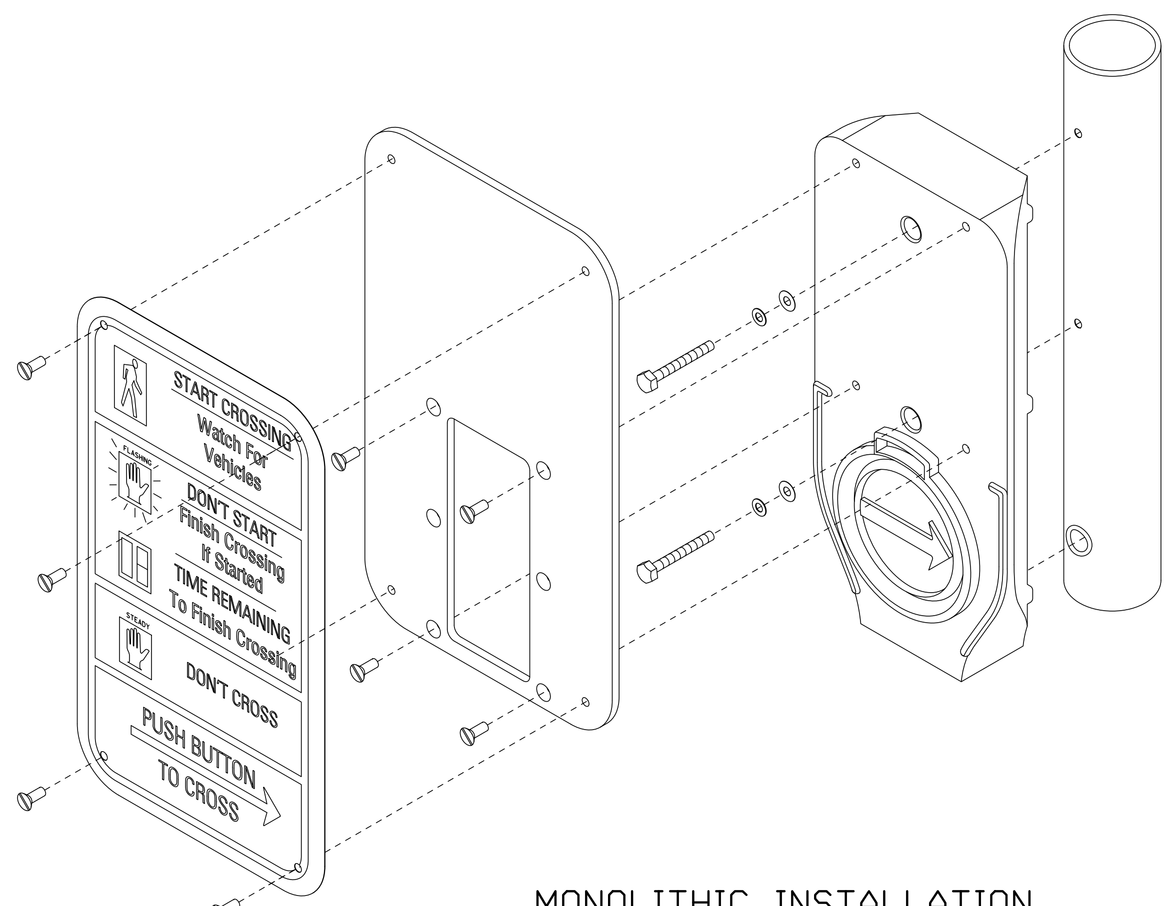
PEDESTRIAN PUSHBUTTON
INSTRUCTIONAL SIGN



PEDESTRIAN PUSHBUTTON
FRAME ADAPTER



ACTUATOR & SIGN
INSTALLATION



MONOLITHIC INSTALLATION

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY

GENERAL NOTES:

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY MAY BE MONOLITHIC OR A SEPARATE ACTUATOR AND SIGN.

SIGNS FOR SIGNAL INSTALLATIONS, INCLUDING ALL MATERIAL REQUIRED FOR SIGN MOUNTING, SHALL BE FURNISHED BY THE CONTRACTOR. SIGNS SHALL BE MANUFACTURED IN ACCORDANCE WITH SEC 903, AND MOUNTED AS SHOWN ON THE PLANS.

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY CAN BE MOUNTED TO SIGNAL POLE, PEDESTRIAN POLE, OR PEDESTRIAN PUSHBUTTON POLE.

INCLUDE A 9" X 15" R10-3E SIGN WITH EACH ASSEMBLY.

REQUIRES POLE ADAPTER WHEN MOUNTING TWO UNITS ON THE SAME PEDESTRIAN POLE. ADDITIONAL MOUNTING EXTENSION BRACKETS SHALL BE PROVIDED IF A 10" MAXIMUM REACH FROM AN ACCESSIBLE SIDEWALK CANNOT BE ACHIEVED.

IF THE CURB RAMP IS NOT ALIGNED WITH THE CROSSWALK, THE ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY SHALL POINT IN THE DIRECTION OF TRAVEL, NOT IN THE DIRECTION OF THE CURB RAMP ORIENTATION.

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TRAFFIC SIGNALS

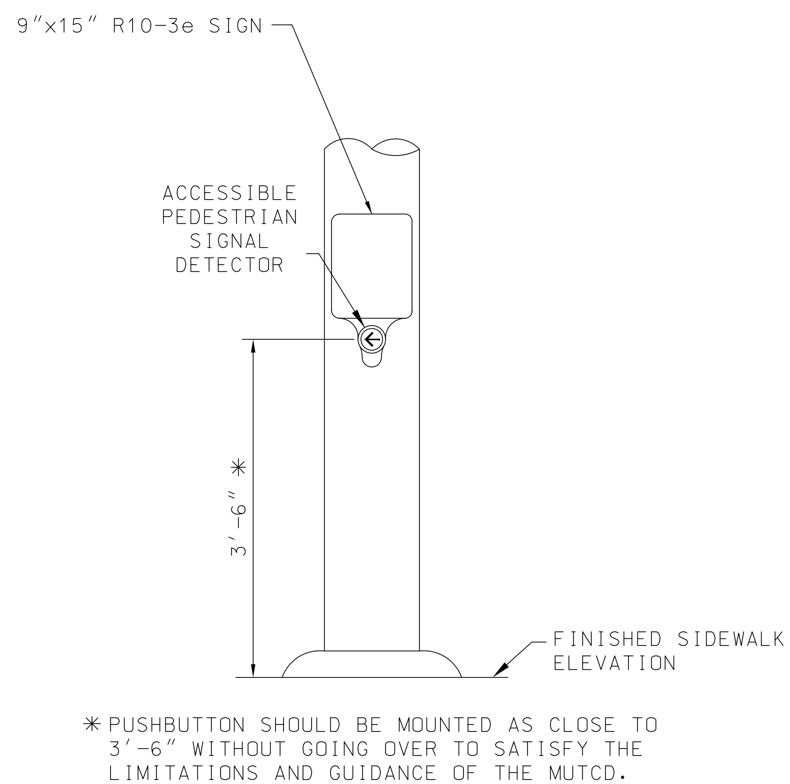
ACCESSIBLE PEDESTRIAN SIGNALS

DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 2/17/2021

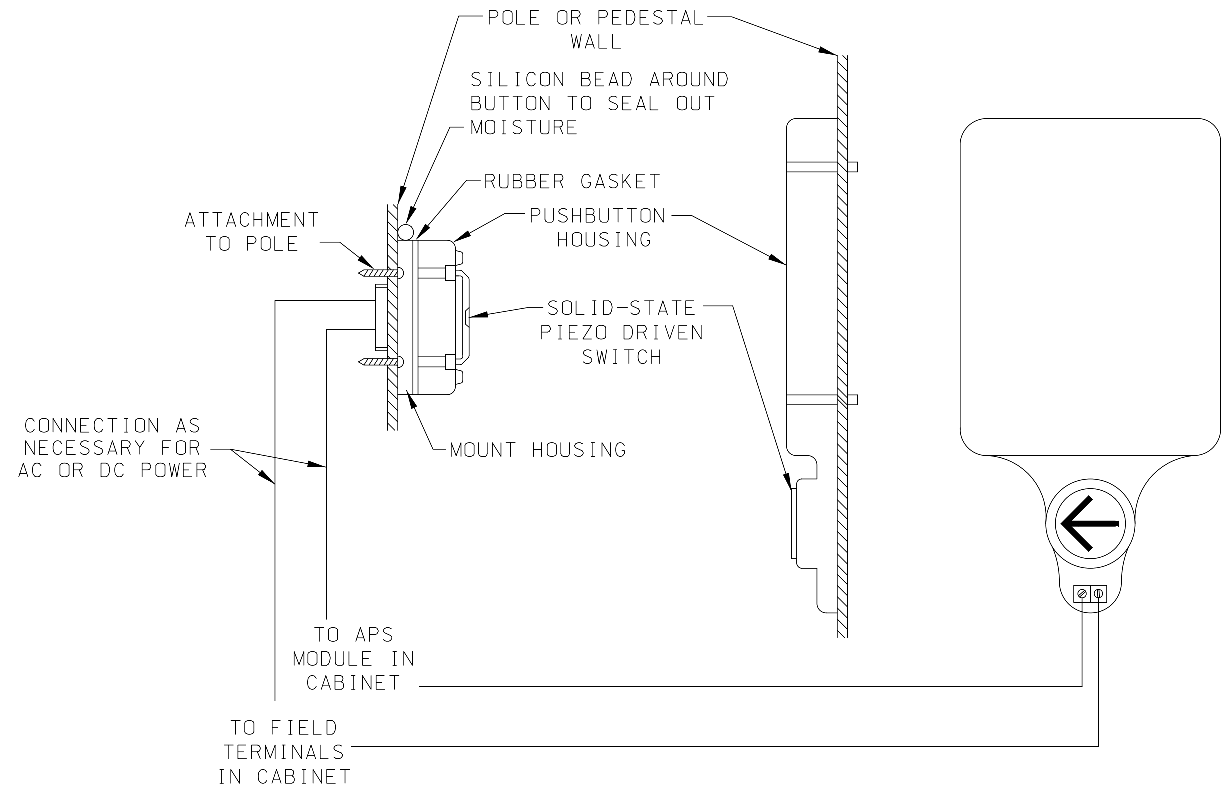
902.05

SHEET NO. 1 OF 2

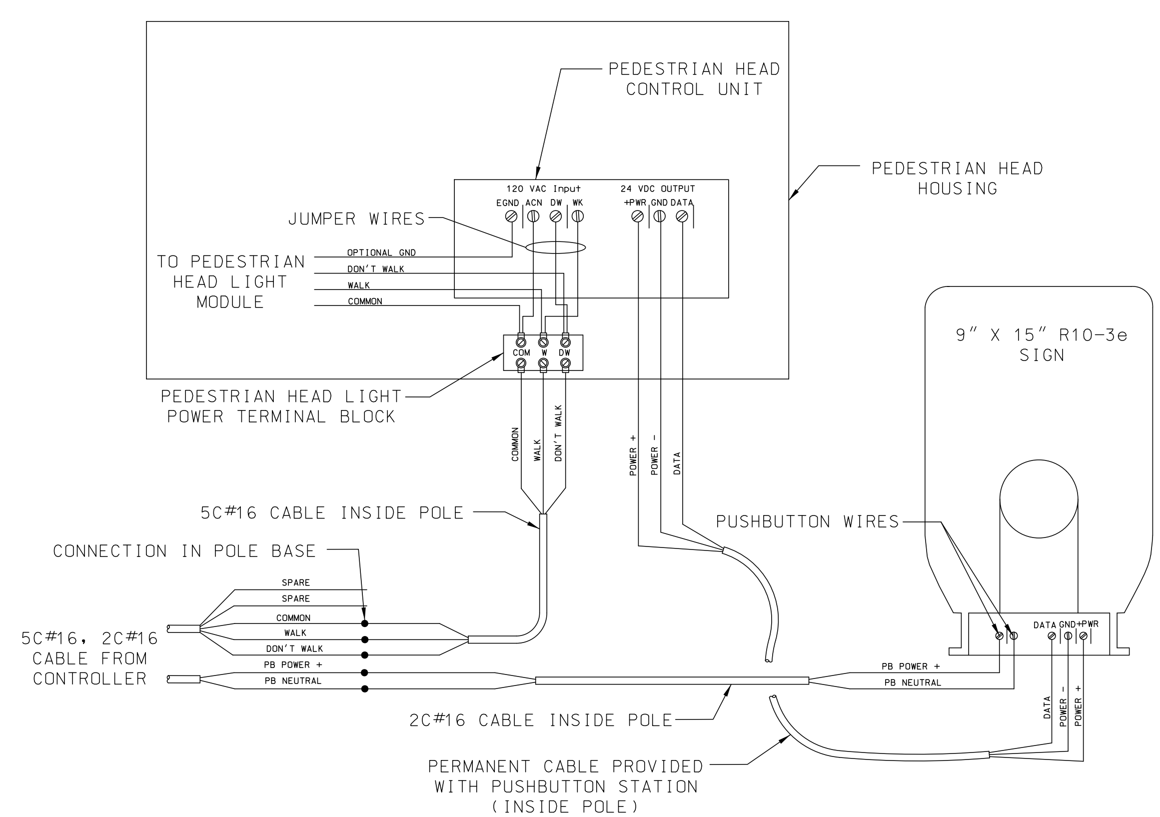
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



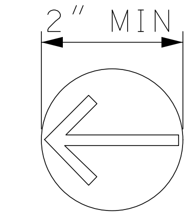
ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY



2-WIRE SYSTEM WIRING DETAILS



3-WIRE SYSTEM WIRING DETAILS



ACTUATOR DETAIL

GENERAL NOTES:

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY MAY BE MONOLITHIC OR A SEPARATE ACTUATOR AND SIGN.

THE ACCESSIBLE PEDESTRIAN SIGNAL PUSHBUTTON SHALL BE OF THE PRESSURE-ACTIVATED TYPE WITH ESSENTIALLY NO MOVING PARTS. IT SHALL BE "ADA" COMPLIANT AND WEATHERPROOF.

THE HOUSING SHALL BE BLACK, FIT THE CURVATURE OF THE POST TO WHICH IT IS ATTACHED AND SHALL PROVIDE A RIGID INSTALLATION. ACCESSIBLE PEDESTRIAN SIGNAL CAN BE MOUNTED TO THE SIGNAL POLE, PEDESTRIAN POLE, OR PEDESTRIAN PEDESTAL POLE.

THERE SHALL BE A TACTILE ARROW POINTING IN THE DIRECTION OF PEDESTRIAN TRAVEL CONTROLLED BY THE BUTTON.

THE ACTUATOR SHALL BE A MINIMUM OF 2 INCHES IN DIAMETER, RAISED, CONTRAST VISUALLY WITH THE HOUSING AND MADE OF BRASS OR CORROSION-RESISTANT METAL ALLOY OR NON-METALLIC MATERIAL. A MAXIMUM FORCE OF 3.5 LBS SHALL BE REQUIRED TO ACTIVATE THE SWITCH. SWITCH SHALL BE OF THE SOLID-STATE ELECTRONIC, PIEZO TYPE.

THE ACCESSIBLE PEDESTRIAN SIGNAL SHALL OPERATE AT A VOLTAGE NO GREATER THAN 24 VOLTS. SOME MANUFACTURERS PROVIDE A 2-WIRE ACCESSIBLE PEDESTRIAN SIGNAL SYSTEM THAT USES THE EXISTING WIRING FROM PREVIOUSLY INSTALLED STANDARD PUSHBUTTONS. SOME MANUFACTURERS PROVIDE 3-WIRE AND 4-WIRE SYSTEMS. A 4-WIRE SYSTEM SHOULD BE SET UP JUST LIKE THE 3-WIRE SYSTEM, BUT IN THE 4-WIRE SYSTEM, AN EXTRA GROUND WIRE RUNS FROM THE PEDESTRIAN HEAD TO THE PUSHBUTTON. BOTH ARE ACCEPTABLE OPTIONS. THERE ARE SOME SYSTEMS THAT PROVIDE WIRELESS CONNECTIVITY FOR BLUETOOTH PROGRAMMING.

THE ACCESSIBLE PEDESTRIAN SIGNAL SHALL BE FULLY OPERATIONAL BETWEEN -30°F TO +165°F (-34°C TO +74°C), SHALL NOT ALLOW ICE TO FORM SUCH TO IMPEDE THE OPERATION OF THE BUTTON, AND SHALL HAVE A WEATHERPROOF SPEAKER.

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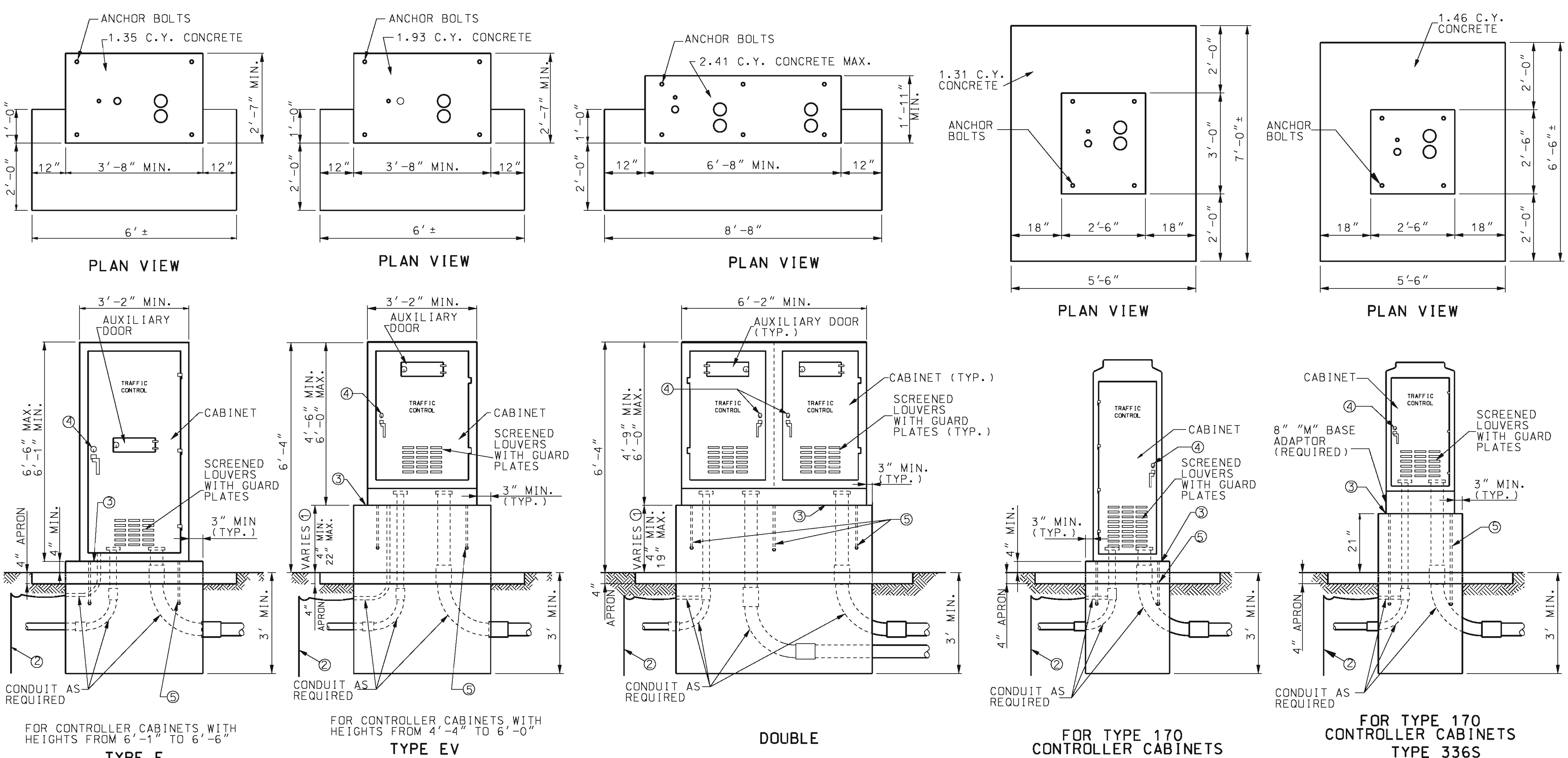
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

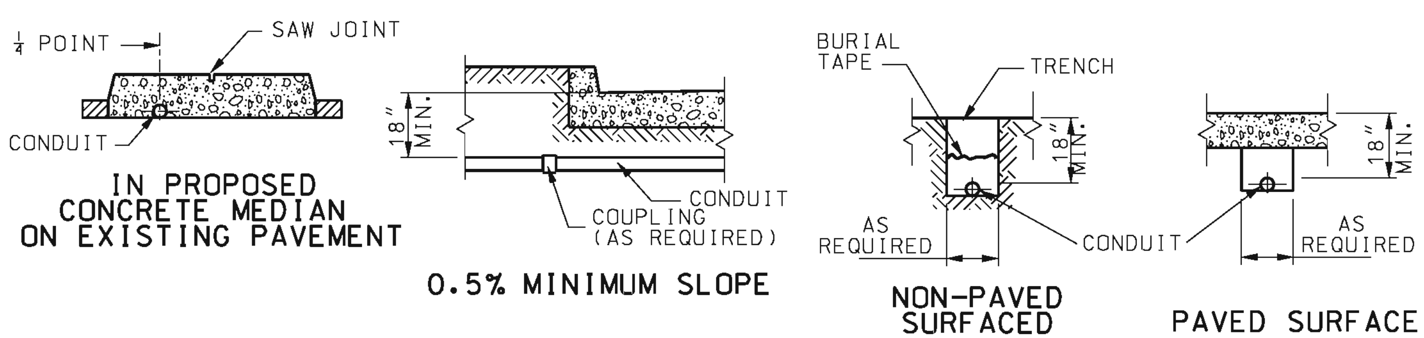
TRAFFIC SIGNALS
ACCESSIBLE PEDESTRIAN SIGNALS

DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 2/17/2021

902.05



CONTROLLER CABINETS AND BASE TYPES



CONDUIT LOCATIONS

NOTES:

① DIMENSION VARIES ACCORDING TO CABINET HEIGHT.

② GROUND ROD, 3/4″ DIA. x 8′ MIN. 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 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

③ LIFETIME SILICONE CAULK BETWEEN CABINET AND BASE.

④ #2 CORBIN LOCK

⑤ ANCHOR BOLTS (USE BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END AND SIZE AS SPECIFIED BY CABINET MANUFACTURER).

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STATE OF MISSOURI
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NUMBER PE-28336
PROFESSIONAL ENGINEER
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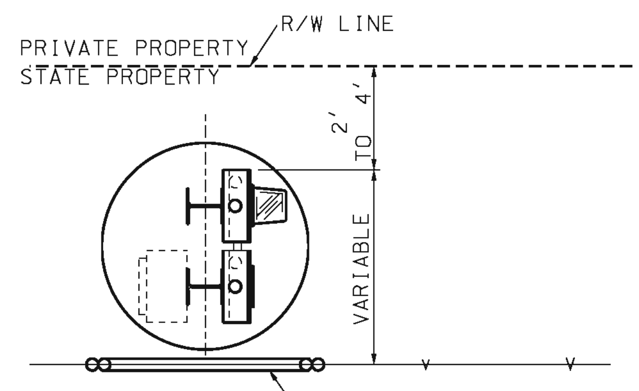
TRAFFIC SIGNALS
CONTROLLERS
CONDUIT LOCATION

DATE EFFECTIVE:	04/01/2005	902.100	SHEET NO. 1 OF 1
DATE PREPARED:	8/26/2009		

LIST OF MATERIALS	
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN.,CLASS IV WOOD, CONTRACTOR PROVIDED, MoDOT OWNED ✱
2	#8 AWG MIN. CABLE, 600 VOLT ✱
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	2" MIN. RIGID CONDUIT WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTOR, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	2" MIN. RIGID CONDUIT
9	SERVICE DISCONNECT BOX, LOCKING, RAINTIGHT, NEMA 4
10	INSULATED, GROUNDABLE NEUTRAL, 200 AMP MINIMUM
11	SIGNAL BREAKER, SINGLE POLE, 40A MIN, TYPE A OR B ✱
12	LIGHTING BREAKER, SINGLE POLE, 40A, TYPE A OR B
13	METAL CONDUIT, 1/2"
14	GROUND WIRE, #2 AWG MIN.
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT
17	CLASS B CONCRETE, 0.92 C.Y. ±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	LIGHTING CABLES ✱
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS) VINYL RAISED LETTERING
21	TYPE B CONTROLLER AND SIGNAL BREAKER, AS SPECIFIED.
22	TYPE B AUXILIARY BREAKER, 15 AMP
23	W6 x 9 OR W6 x 15 GALVANIZED POST
24	LIGHTING CONTROL CABINET (SEE SHEET 2)
25	#2 AWG MIN. CABLE, 600 VOLT
✱	SEE PLANS

PEDESTAL OR NEW STATE-OWNED POLE TO BE SET WITHIN 2' TO 4' OF RIGHT-OF-WAY LINE.

ALL SERVICE POWER SUPPLY ASSEMBLIES ARE TO BE LOCATED ON STATE PROPERTY.



TOP VIEW

IF FENCE BLOCKS ACCESS TO POWER SUPPLY, A 3' MIN. LOCKING GATE IS TO BE INSTALLED. (NO DIRECT PAY)

NOTES

(A) SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50'.

(B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 50 FEET.

(C) SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL, ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAIN-LESS STEEL. METER SOCKET AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.

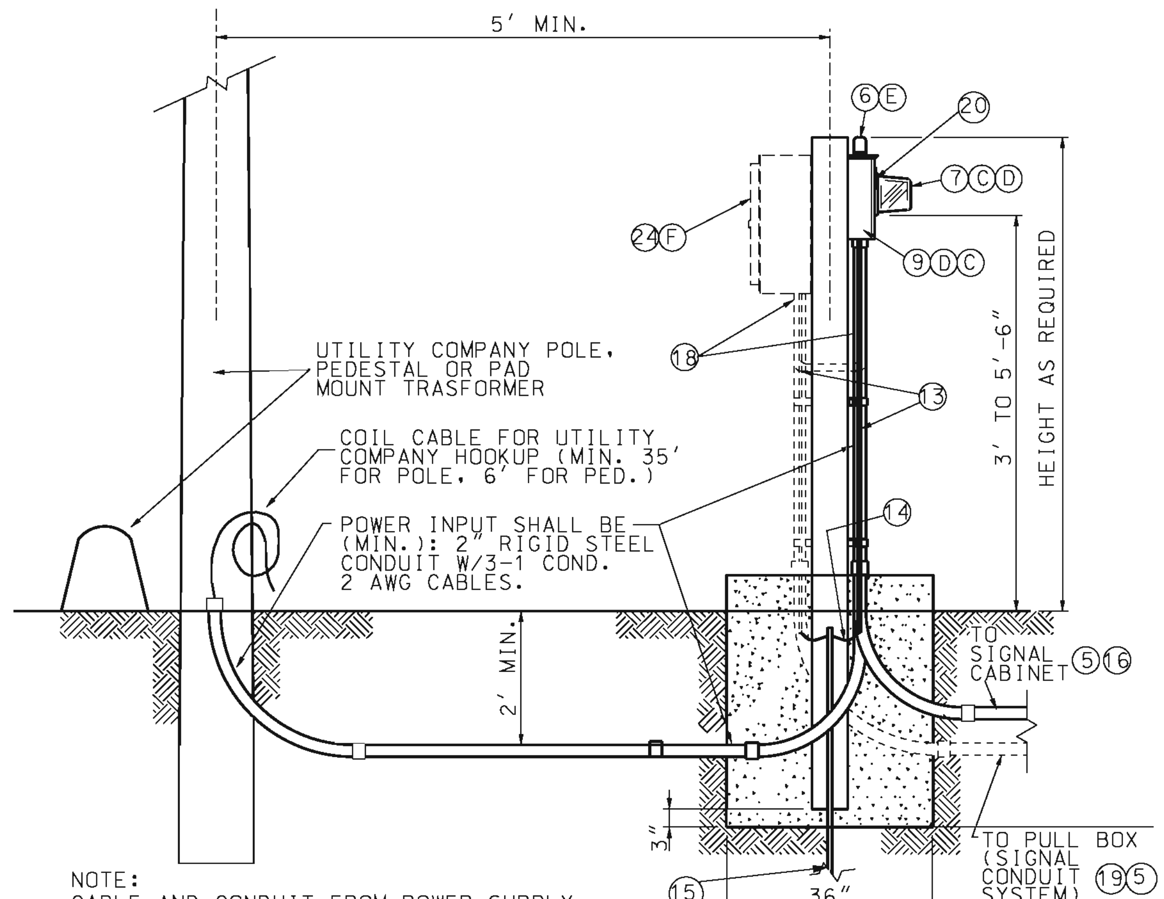
(D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF DOOR.

(E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET. IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE CONNECT CABINET

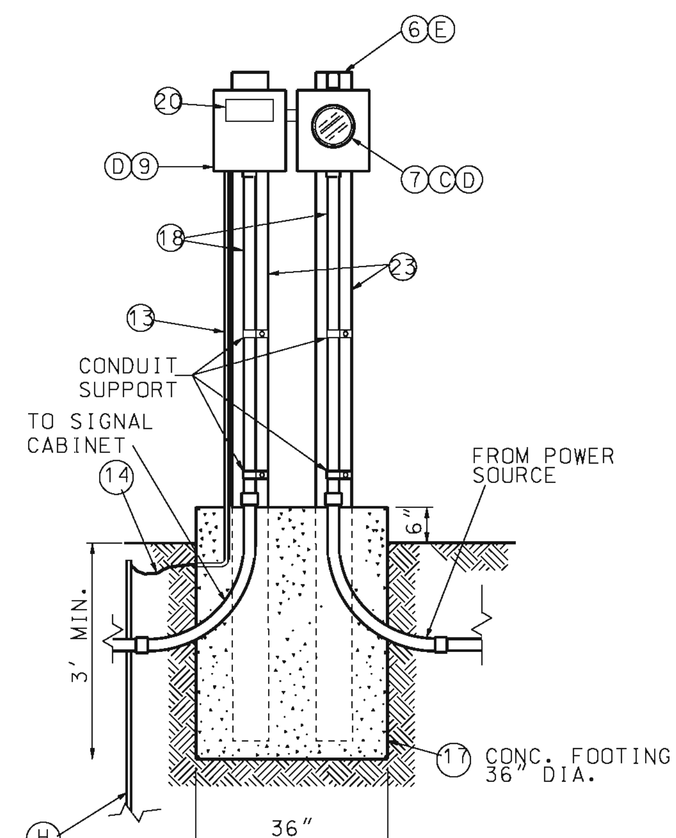
(F) IF LIGHTING IS SPECIFIED, INSTALL LIGHTING CONTROL ON POWER SUPPLY.

(G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.

(H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CAD WELDED.



SIDE VIEW



FRONT VIEW

NOTE:
CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

TYPE 2 (PEDESTAL) UNDERGROUND SERVICE

GENERAL NOTES:

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

THE TYPE POWER SUPPLY ASSEMBLY IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED, OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

FOR WIRING DIAGRAM AND LABEL DETAIL SEE SHEET 2 OF 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
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
POWER SUPPLY ASSEMBLY 240/120 VOLT SERVICE

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 8/26/2009
902.15K
SHEET NO. 1 OF 3

LIST OF MATERIALS	
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN.,CLASS IV WOOD, CONTRACTOR PROVIDED, MoDOT OWNED ✻
2	#8 AWG MIN. CABLE, 600 VOLT ✻
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	2" MIN. RIGID CONDUIT WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTOR, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	2" MIN. RIGID CONDUIT
9	SERVICE DISCONNECT BOX, LOCKING, RAINTIGHT, NEMA 4
10	INSULATED, GROUNDABLE NEUTRAL, 200 AMP MINIMUM
11	SIGNAL BREAKER, SINGLE POLE, 40A MIN, TYPE A OR B ✻
12	LIGHTING BREAKER, SINGLE POLE, 40A, TYPE A OR B
13	METAL CONDUIT, 1/2"
14	GROUND WIRE, #2 AWG MIN.
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT
17	CLASS B CONCRETE, 0.92 C.Y. ±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	LIGHTING CABLES ✻
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS) VINYL RAISED LETTERING
21	TYPE B CONTROLLER AND SIGNAL BREAKER, AS SPECIFIED.
22	TYPE B AUXILIARY BREAKER, 15 AMP
23	W6 x 9 OR W6 x 15 GALVANIZED POST
24	LIGHTING CONTROL CABINET (SEE SHEET 2)
25	#2 AWG MIN. CABLE, 600 VOLT
✻	SEE PLANS

NOTES

(A) SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50'.

(B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 50 FEET.

(C) SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL, ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAIN-LESS STEEL.
METER SOCKET AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.

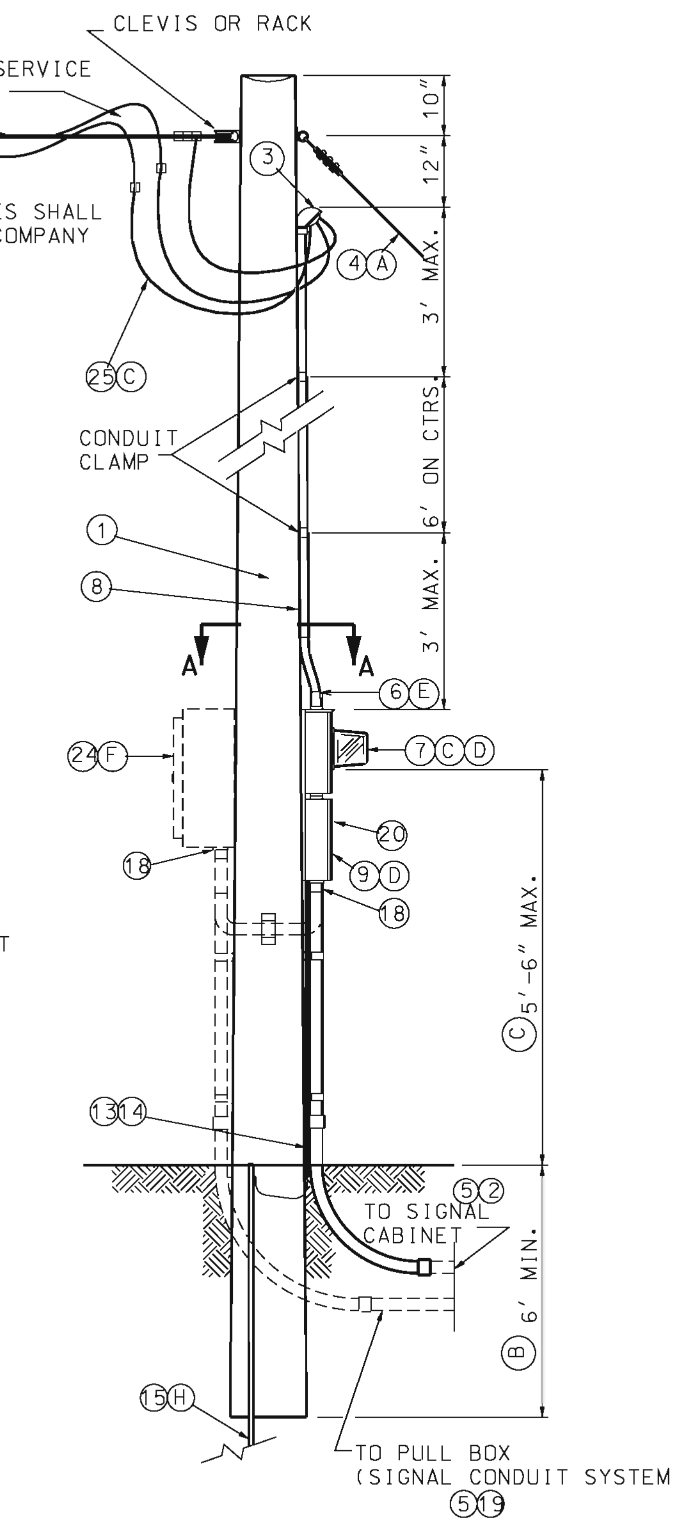
(D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF DOOR.

(E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET. IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE CONNECT CABINET

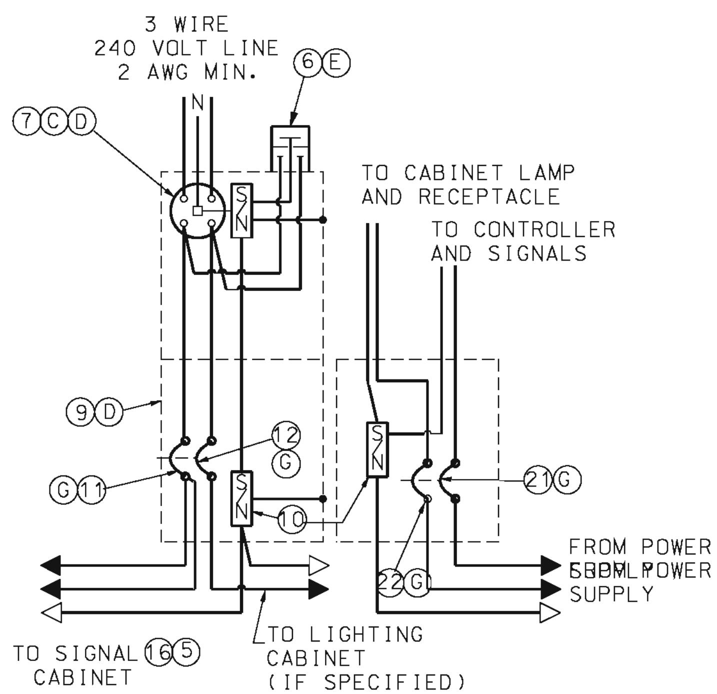
(F) IF LIGHTING IS SPECIFIED, INSTALL LIGHTING CONTROL ON POWER SUPPLY.

(G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.

(H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CAD WELDED.



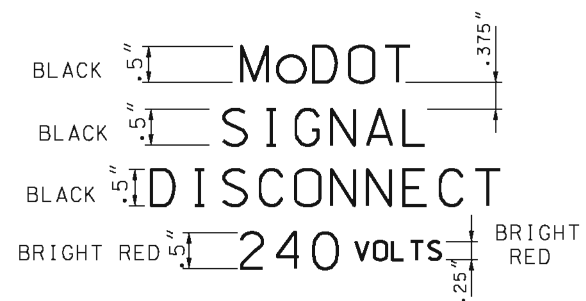
TYPE 1 (POLE) OVERHEAD SERVICE



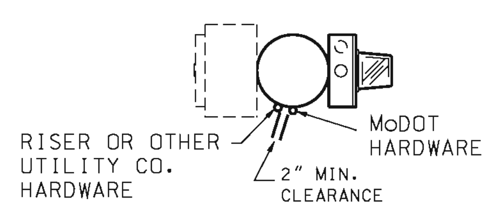
POWER SUPPLY

SIGNAL CABINET POWER PANEL

WIRING DIAGRAM SIGNALS AND/OR LIGHTING



LABEL DETAIL (20)



SECTION A-A

GENERAL NOTES:

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

THE TYPE POWER SUPPLY ASSEMBLY IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

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WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED, OMIT ITEMS NOT REQUIRED.

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ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

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

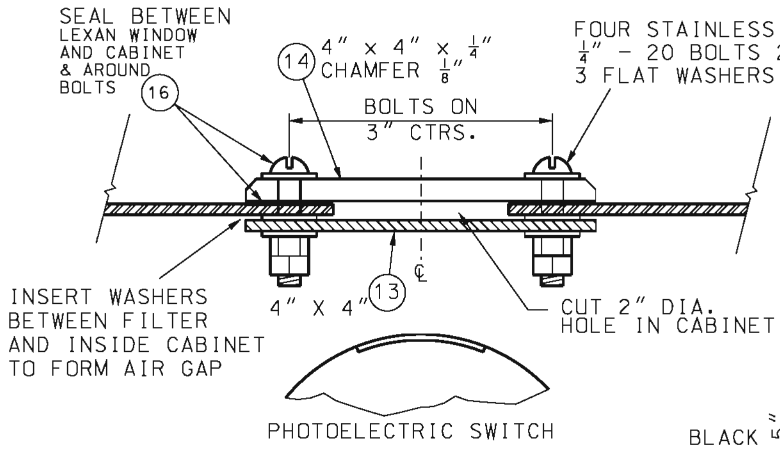
STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
POWER SUPPLY ASSEMBLY
240/120 VOLT SERVICE

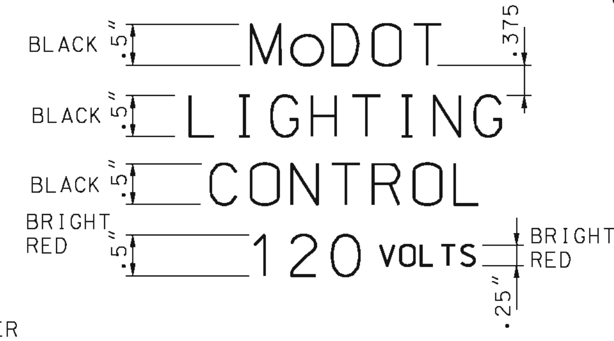
DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 8/26/2009

902.15K

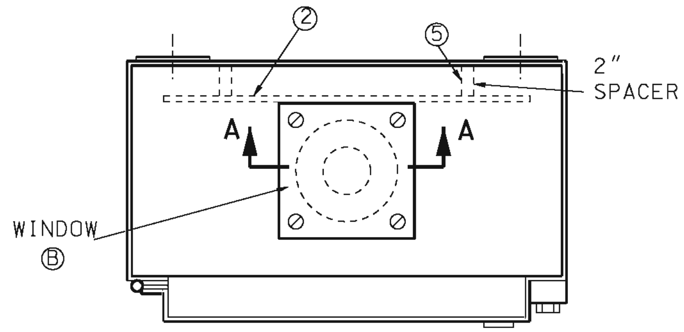
SHEET NO. 2 OF 3



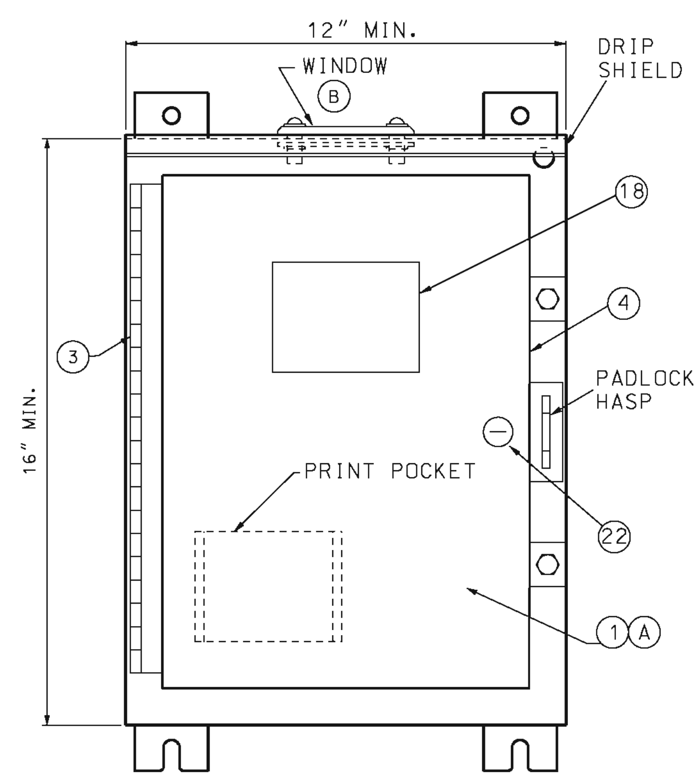
SECTION A-A
WINDOW DETAIL



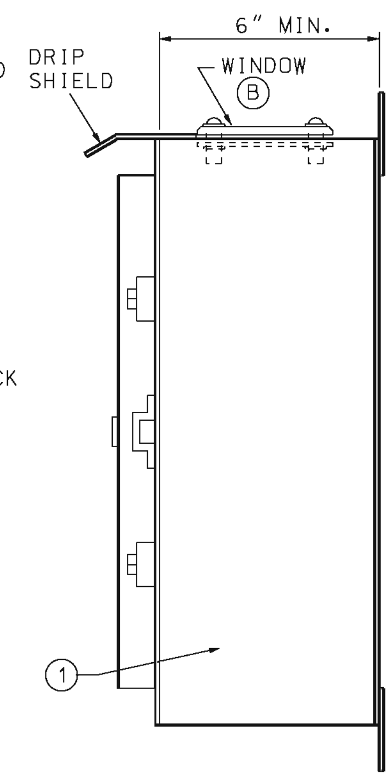
LABEL DETAIL 18



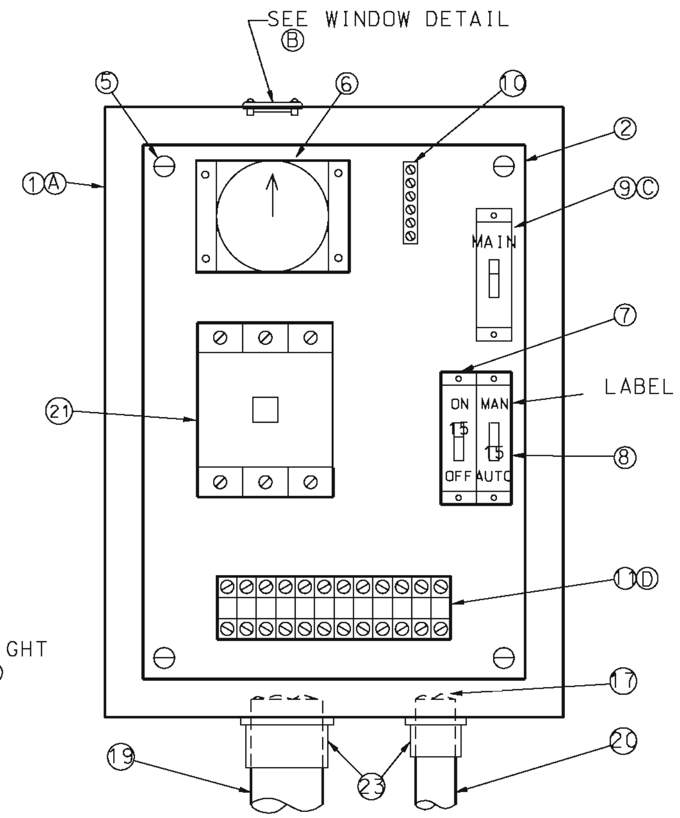
TOP VIEW



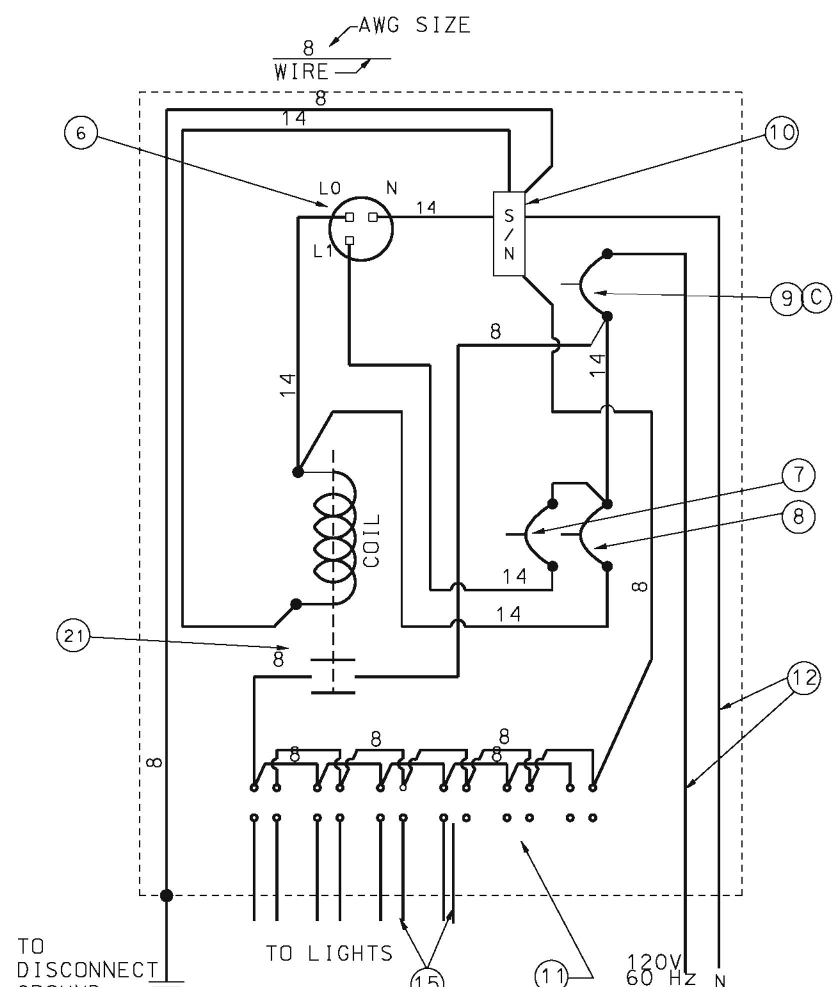
FRONT VIEW



SIDE VIEW



EQUIPMENT LAYOUT



WIRING DIAGRAM

ITEM	LIST OF MATERIALS DESCRIPTION
1	CABINET, WATERTIGHT, NEMA 4, 14 GA MINIMUM THICKNESS
2	PANEL, 12 GA MINIMUM THICKNESS, ALUMINUM OR STAINLESS STEEL
3	CONTINUOUS STAINLESS STEEL HINGE
4	NEOPRENE GASKET DOOR
5	3/8" - 16 COLLAR STUD
6	PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000 WATT
7	15 AMP CONTROL BREAKER, SINGLE POLE, TYPE B
8	15 AMP AUTO-MANUAL SWITCH, SINGLE POLE BREAKER, TYPE B,WITH LABEL
9	MAIN BREAKER, SINGLE POLE, TYPE B ✱
10	NEUTRAL TERMINAL STRIP
11	LIGHTING TERMINAL BLOCK, INSULATED FROM BACK PANEL,12 POSITION E
12	POWER, CABLE, #8 AWG MIN., 600 V.
13	FILTER, TRANSLUCENT, PLEXIGLASS #W2067, 1 8" THICK
14	CLEAR, LEXAN #9034 WINDOW, 1/4" THICK MIN. EXCEPT FOR 15A BREAKER; MIN. WIRE SIZE 10 AWG.
15	CABLE, LIGHTING ✱
16	LIFETIME SILICONE CAULK
17	PLIABLE DUCT SEALANT
18	LABEL-WEATHERPROOF ADHESIVE-VINYL RAISED LETTERING (OR EQUIV.) (SEE DETAIL)
19	CONDUIT, RIGID, 2" MIN. ✱
20	CONDUIT, RIGID, 1" MIN.
21	LIGHTING CONTACTOR, 2 POLE, 30 AMP, 600 VOLT, 120 VOLT COIL
22	#2 CORBIN LOCK
23	THREADED CONDUIT HUB WITH SEALING WASHERS
✱	SEE PLANS

NOTES:

A SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.

B PHOTOELECTRIC WITCH BARCKETS MAY VARY, LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.

C MAIN BREAKER SIZE:

TOTAL LUMINAIRE✱✱ LOAD (WATTS)	BREAKER SIZE (AMPS)	MIN. AWG
0-920	15	10
930-1260	20	8
1270-1600	25	8
1610-1930	30	8

✱✱ EXCLUDING BALLAST LOAD

D TERMINAL BLOCK SHALL BE RATED AT 600V, SHALL ACCEPT WIRES UP TO 8 AWG AND SHALL HAVE A BARRIER BETWEEN EACH TERMINAL AND ON EACH END.

GENERAL NOTES:

ALL OPENINGS IN CABINET SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL CIRCUIT BREAKERS SHALL CONFORM TO SECTION 901.4 OF THE STANDARD SPECIFICATIONS.

PLACEMENT OF ALL ITEMS SHALL BE APPROVED BY THE ENGINEER.

CABINET SHALL BE LOCATED AWAY FROM TRAFFIC. TOP MOUNT PHOTO CONTROL SHALL FACE AN OPEN SKY. SIDE MOUNT PHOTO CONTROL SHALL FACE NORTH.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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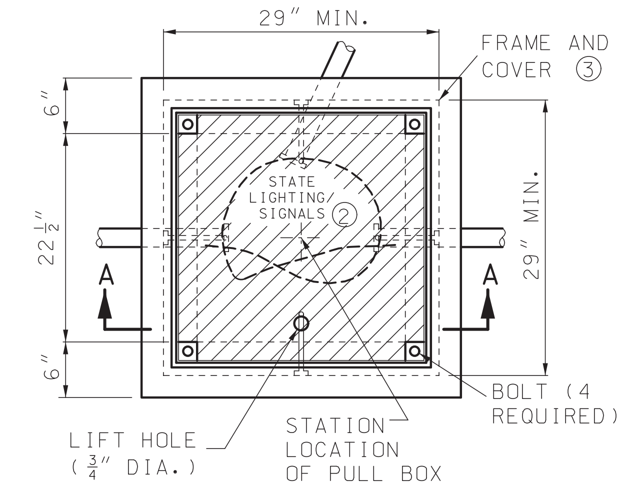
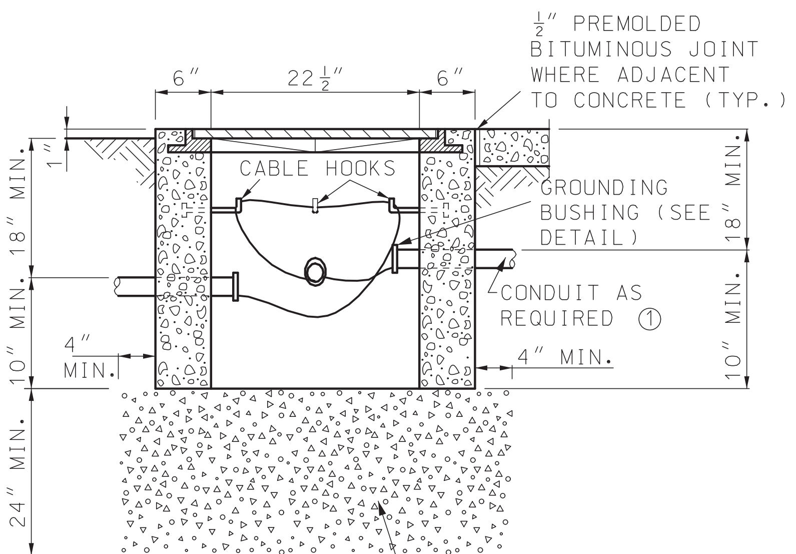
STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
POWER SUPPLY ASSEMBLY
240/120 VOLT SERVICE

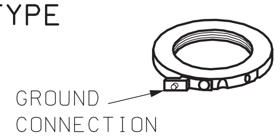
DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 8/26/2009

902.15K

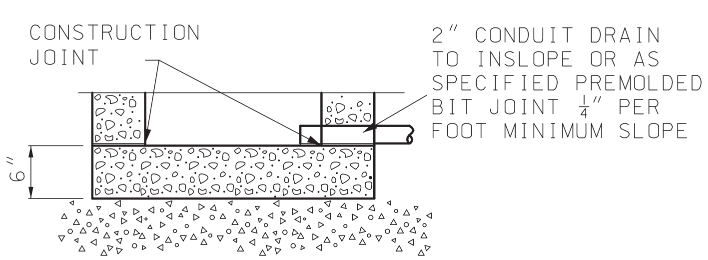




SECTION A–A
TYPE I DRAIN TYPE

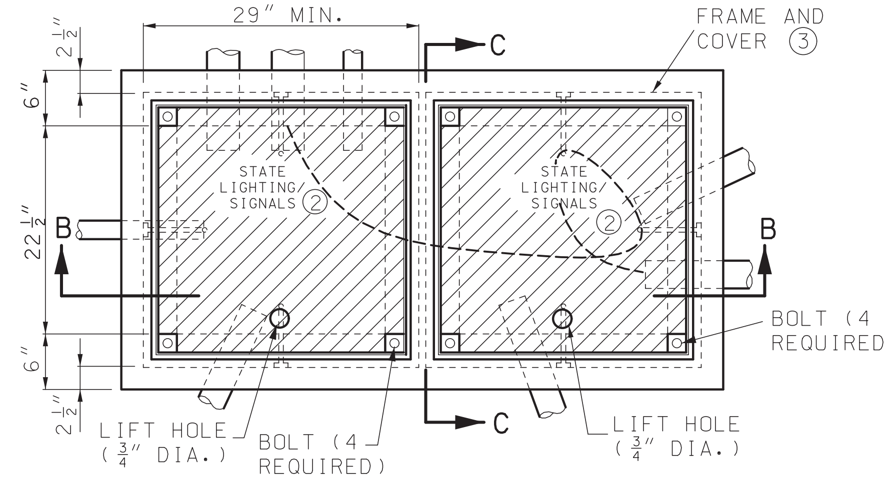


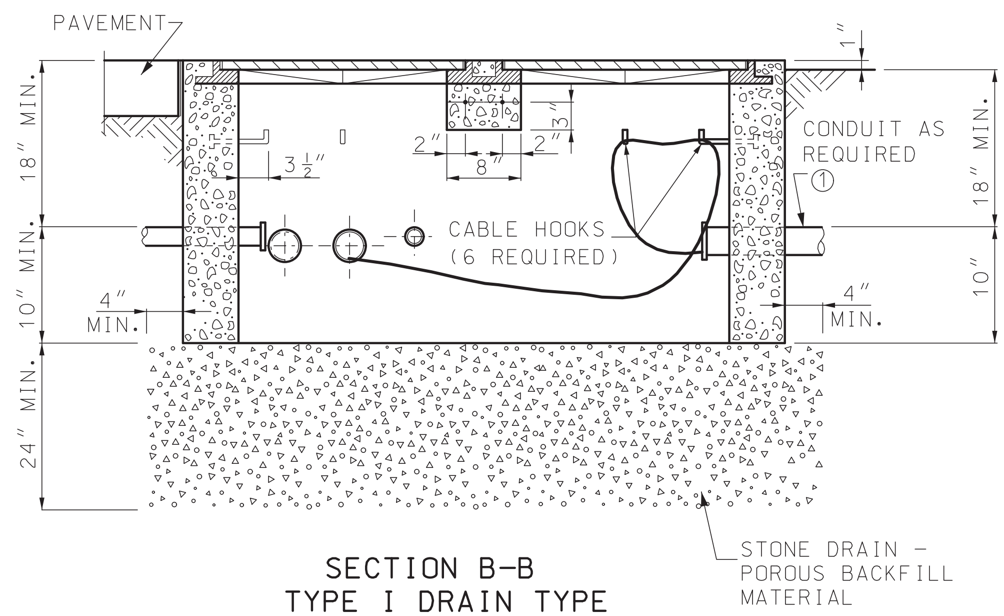
GROUNDING BUSHING (TYP) ①



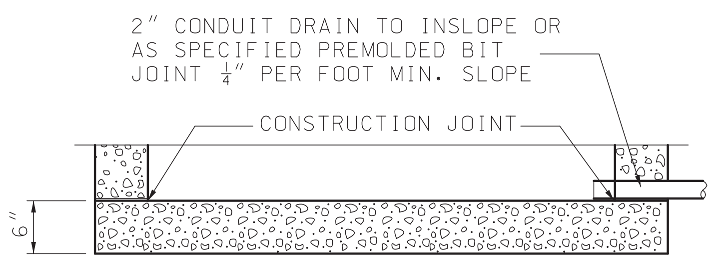
SECTION A–A
TYPE II DRAIN TYPE
(SEE DRAIN OUTLET DETAILS)
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN)

STANDARD CONCRETE PULL BOX

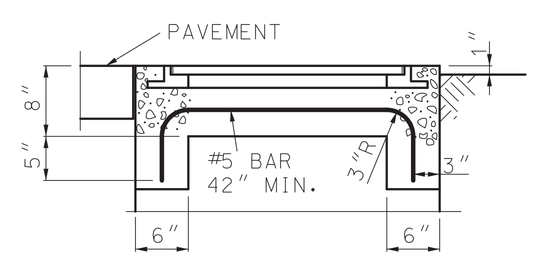




SECTION B–B
TYPE I DRAIN TYPE

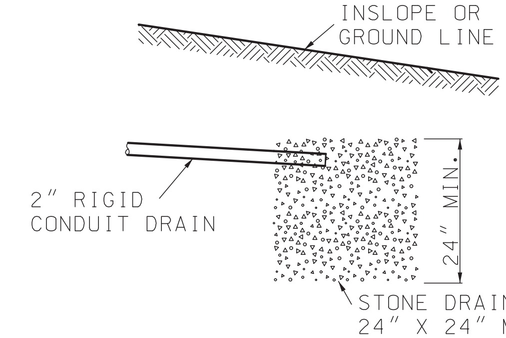


SECTION B–B
TYPE II DRAIN TYPE
(SEE DRAIN OUTLET DETAILS)
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN)

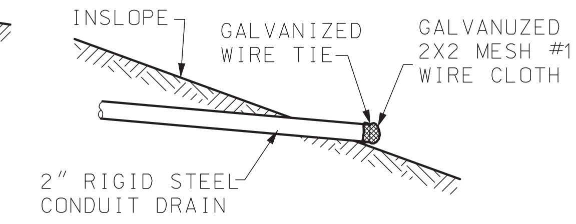


SECTION C–C

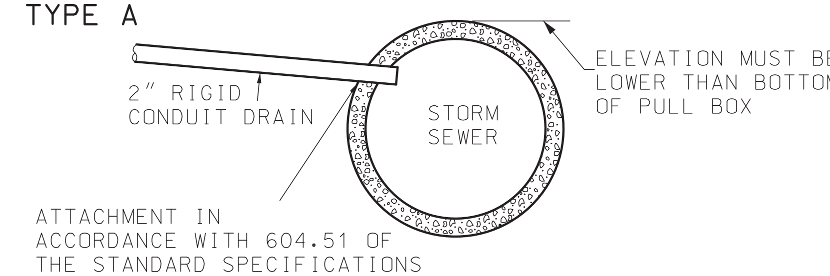
DOUBLE CONCRETE PULL BOX, TYPE A



POROUS BACKFILL MATERIAL
TYPE A



TYPE B



TYPE C

TYPE II DRAIN OUTLET DETAILS

① ALL METAL CONDUITS SHALL BE ELECTRICALLY BONDED BY A GROUND BUSHING AND #6 AWG BARE COPPER WIRE. FOR PVC CONDUIT, ALL GROUND WIRES SHALL BE CONNECTED.

② SIGNAL PULL BOXES SHALL BE EMBOSSED "STATE SIGNALS" AND LIGHTING PULL BOXES "STATE LIGHTING."

③ PULL BOX FRAMES AND COVERS SHALL BE CAST IRON AND THE FOLLOWING MINIMUM DIMENSIONS:

FRAME SIZE:	29" x 29"
FRAME HEIGHT:	4 1/4"
OPENING SIZE:	22 1/2" x 22 1/2"
FRAME WEIGHT:	120 LBS.
COVER SIZE:	22 5/8" x 22 5/8"
COVER THICKNESS:	3/4"
COVER WEIGHT:	140 LBS.

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE NOMINAL.

BOLT CLEANOUT DETAIL SHALL BE APPROVED BY ENGINEER.

PAVEMENT AND SUBGRADE SHALL BE AS SHOWN ON PLANS.

STONE DRAIN MATERIAL SHALL CONFORM TO SECTION 1009 OF THE STANDARD SPECIFICATIONS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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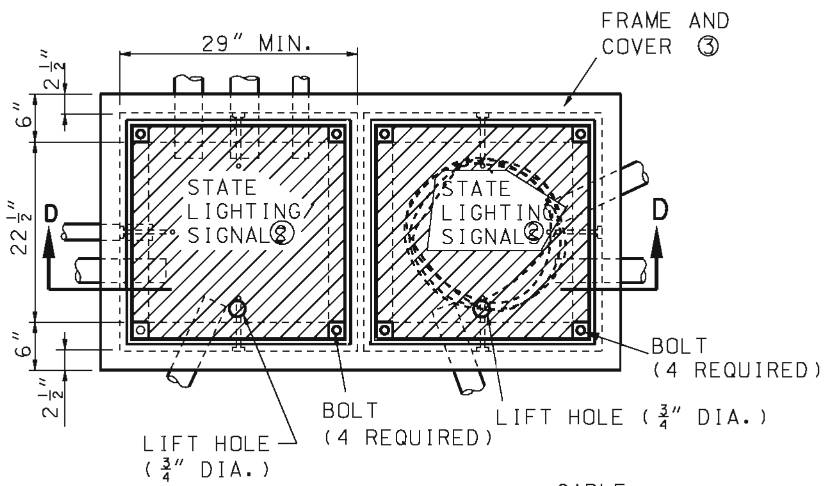
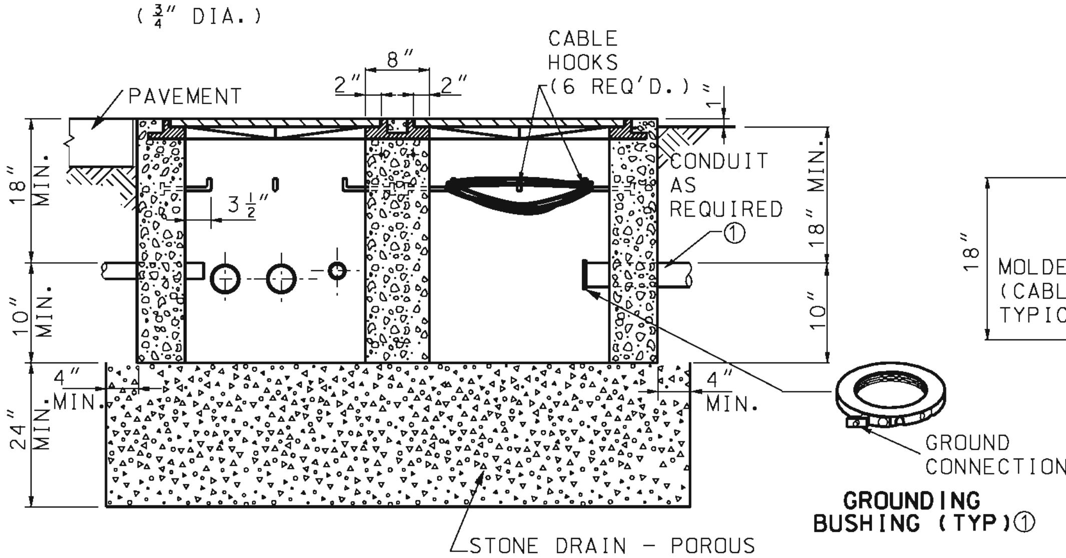
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

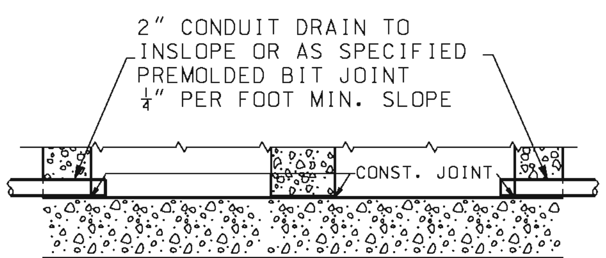
TRAFFIC SIGNALS
CONCRETE PULL BOXES

DATE EFFECTIVE:	04/01/2019	902.20G	SHEET NO. 1 OF 3
DATE PREPARED:	1/16/2019		



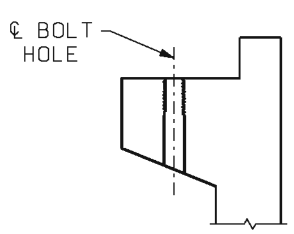


SECTION D-D
TYPE I DRAIN TYPE

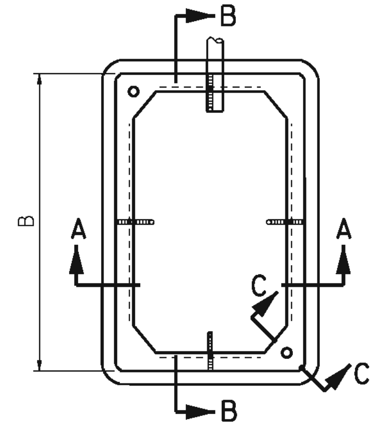


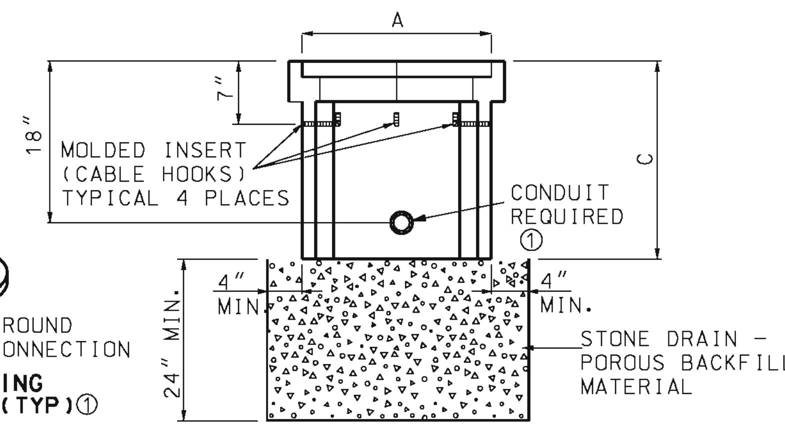
TYPE II DRAIN TYPE
(SEE DRAIN OUTLET DETAILS)
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN.)

DOUBLE CONCRETE PULL BOX, TYPE B

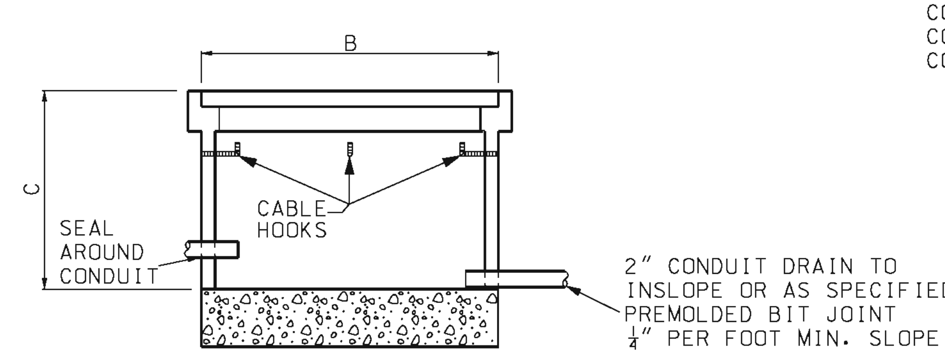


SECTION C-C
TYPICAL BOLT CLEANOUT



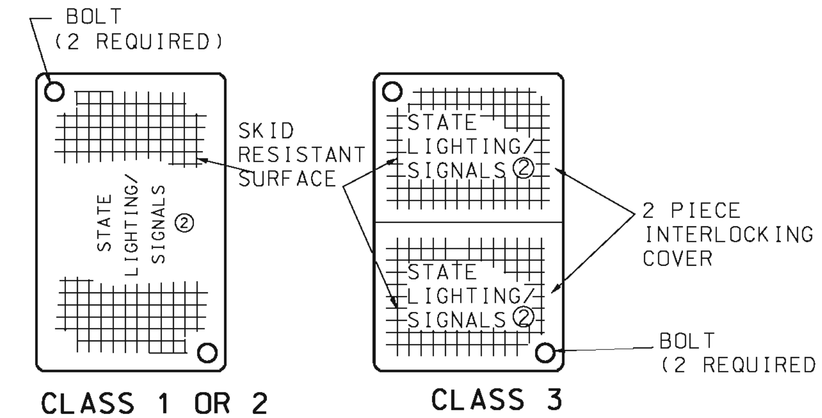


SECTION A-A
TYPE I DRAIN TYPE



SECTION B-B
TYPE II DRAIN TYPE

PREFORMED PULL BOX



PREFORMED PULL BOX COVER

NUMBER OF ENTERING CONDUCTORS	CLASS	PREFORMED PULL BOX MINIMUM DIMENSIONS		
		A	B	C
< 23	1	17"	30"	22"
23 - 68	2	24"	36"	24"
> 68	3	30"	48"	36"

① ALL METAL CONDUITS SHALL BE ELECTRICALLY BONDED BY A GROUND BUSHING AND #6 AWG BARE COPPER WIRE. FOR PVC CONDUIT, ALL GROUND WIRES SHALL BE CONNECTED.

② SIGNAL PULL BOXES SHALL BE EMBOSSED "STATE SIGNALS" AND LIGHTING PULL BOXES "STATE LIGHTING."

③ PULL BOX FRAMES AND COVERS SHALL BE CAST IRON AND THE FOLLOWING MINIMUM DIMENSIONS:

FRAME SIZE:	29" X 29"
FRAME HEIGHT:	4¼"
OPENING SIZE:	22½" x 22½"
FRAME WEIGHT:	120 LBS.
COVER SIZE:	22⅝" x 22⅝"
COVER THICKNESS:	¾"
COVER WEIGHT:	140 LBS.

GENERAL NOTES:

IF AN EXTENSION IS USED WITH A PREFORMED BOX, THE LIP OF THE EXTENSION MAY BE INTERIOR OR EXTERIOR. THE EXTENSION SHALL BE COMPATIBLE AND FROM THE SAME MANUFACTURER.

IF PREFORMED PULL BOXES ARE SPECIFIED, THE CONTRACTOR MAY USE THE STANDARD CONCRETE PULL BOX IN LIEU OF THE CLASS 1 OR 2 PREFORMED PULL BOX OR THE DOUBLE CONCRETE PULL BOX, TYPE A, IN LIEU OF THE CLASS 3 PREFORMED PULL BOXES.

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STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

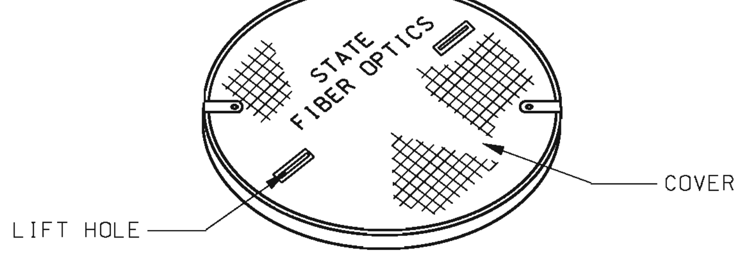
TRAFFIC SIGNALS
CONCRETE AND PREFORMED PULL BOXES

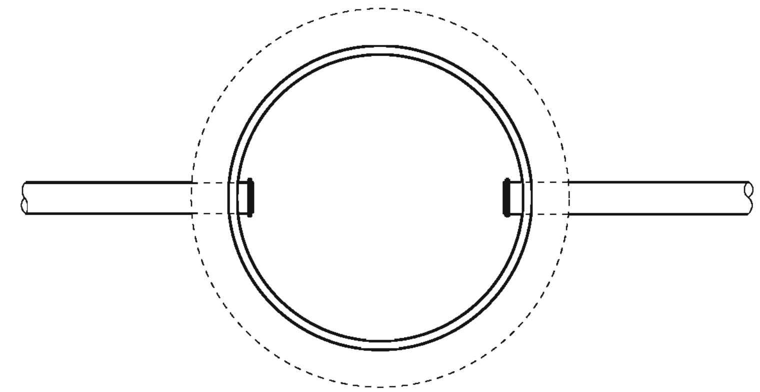
DATE EFFECTIVE: 11/01/2010
DATE PREPARED: 9/3/2010

902.20G

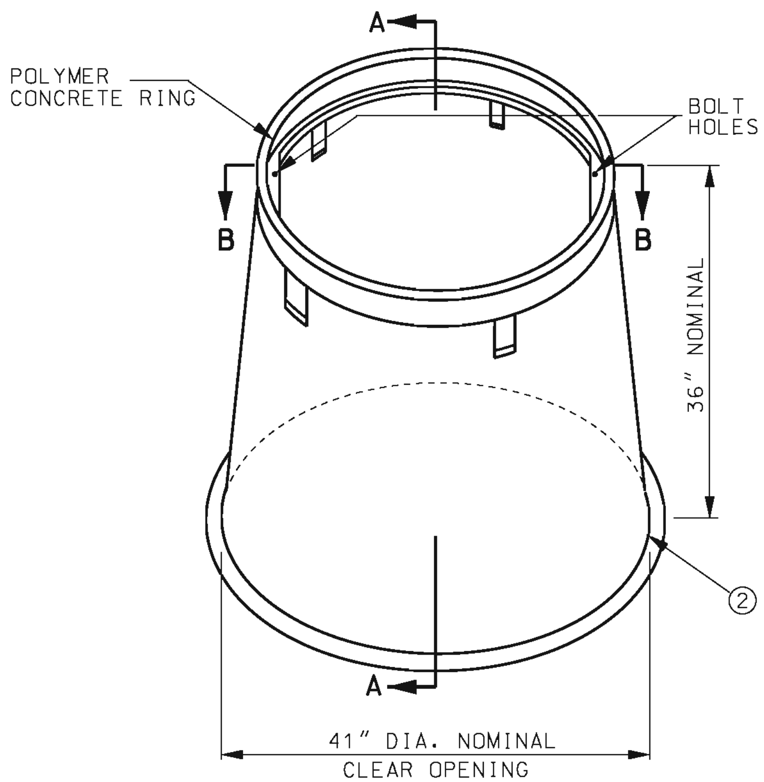
SHEET NO. 2 OF 3

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

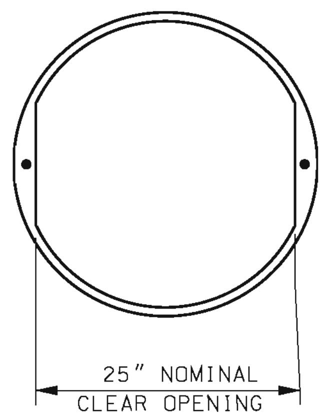




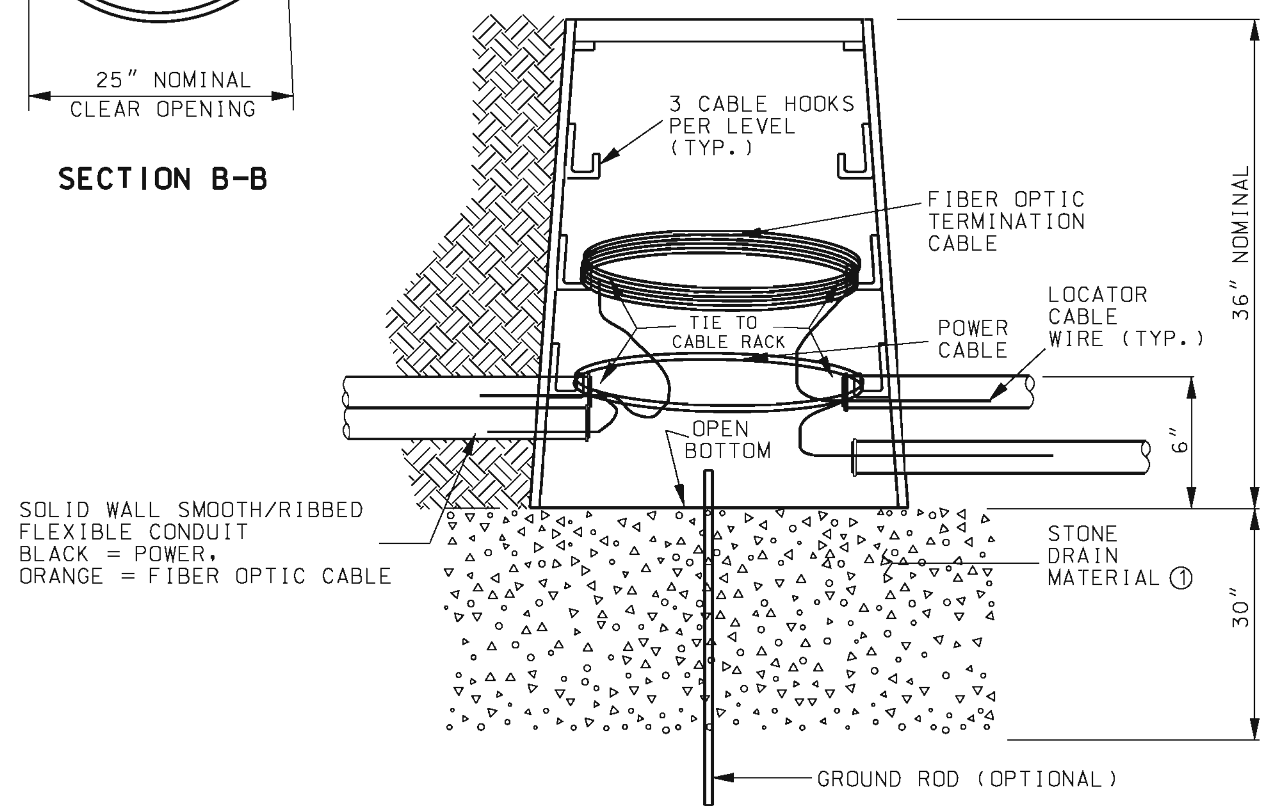
PLAN



CIRCULAR PULL BOX
CLASS 5

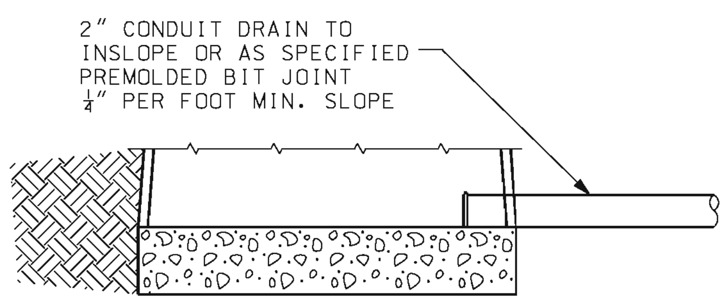


SECTION B-B



SECTION A-A

TYPE I DRAIN TYPE



TYPE II DRAIN TYPE

(SEE DRAIN OUTLET DETAILS)
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN.)

① AGGREGATE SHALL BE TYPE 1 CONFORMING TO SEC 1007.

② BOX SHALL BE OF A FLARE DESIGN AND HAVE A LIP FOR STABILIZATION.

GENERAL NOTES:

A MINIMUM OF NINE HOOKS, INSTALLED IN THREE LEVELS, SHALL BE INCLUDED WITH EACH PULL BOX.

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 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

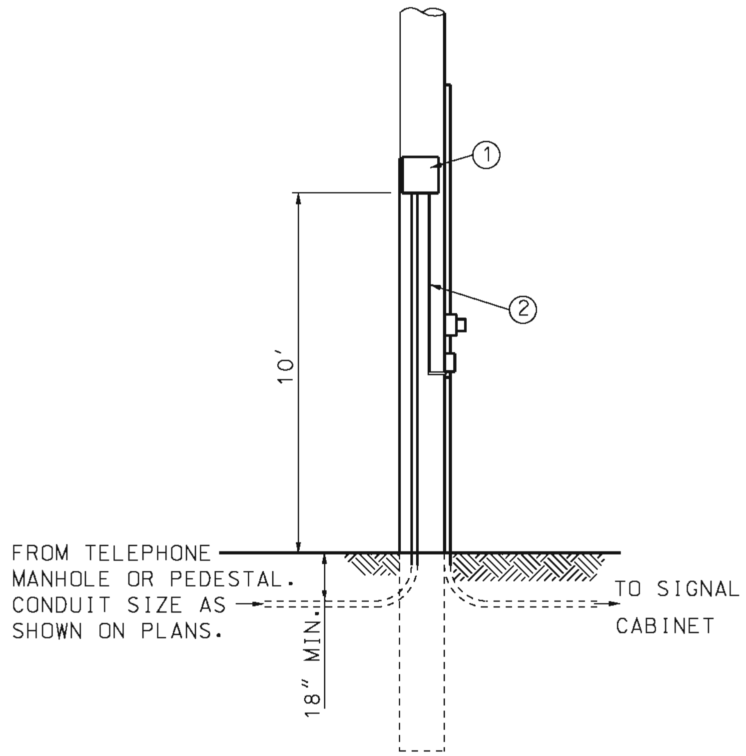
THE CIRCULAR PULL BOX COVER SHOULD BE SIZED TO FIT A BOX WITH A CLEAR OPENING OF 25".

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

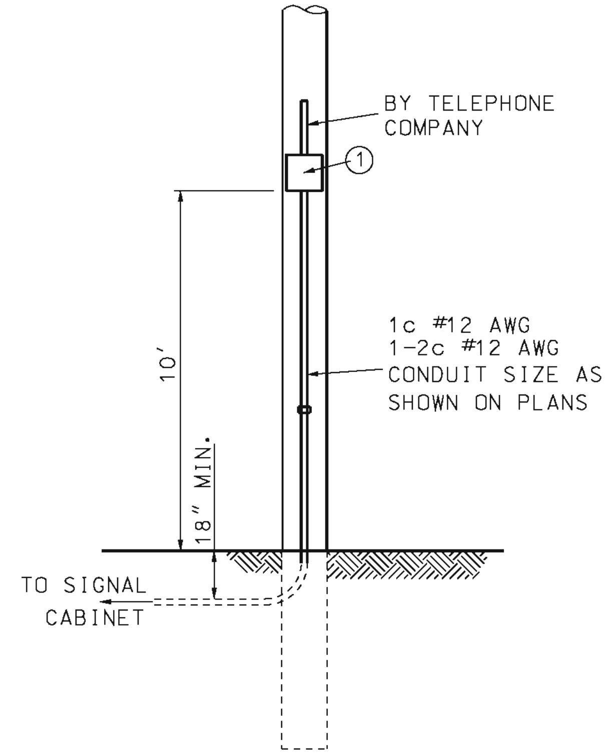
STATE OF MISSOURI
KATHRYN
PHILLIPS HARVEY
NUMBER
PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
CONCRETE AND PREFORMED
PULL BOXES

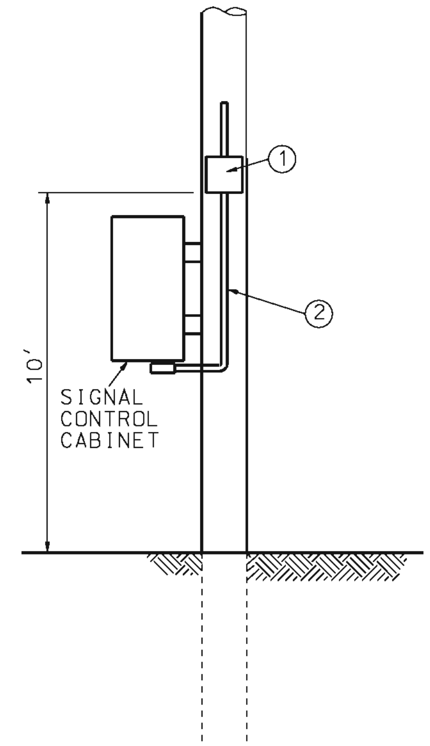
DATE EFFECTIVE:	11/01/2010	902.20G	SHEET NO.
DATE PREPARED:	9/3/2010		3 OF 3



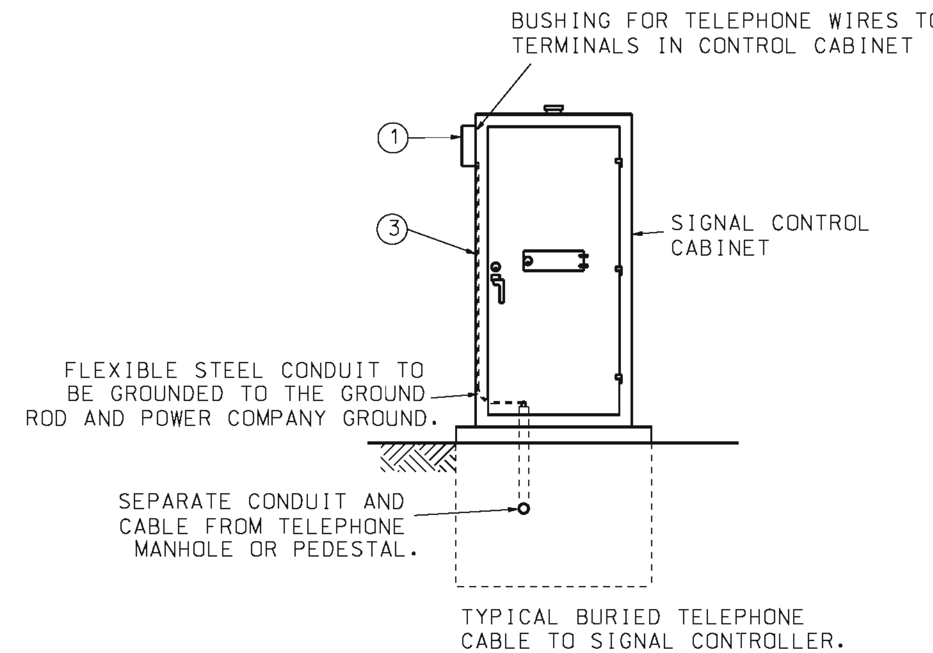
TYPE 902.10-U
USE ON EXISTING ONLY



TELEPHONE OR UTILITY COMPANY POLE
TYPE TPA
USE ON NEW OR EXISTING

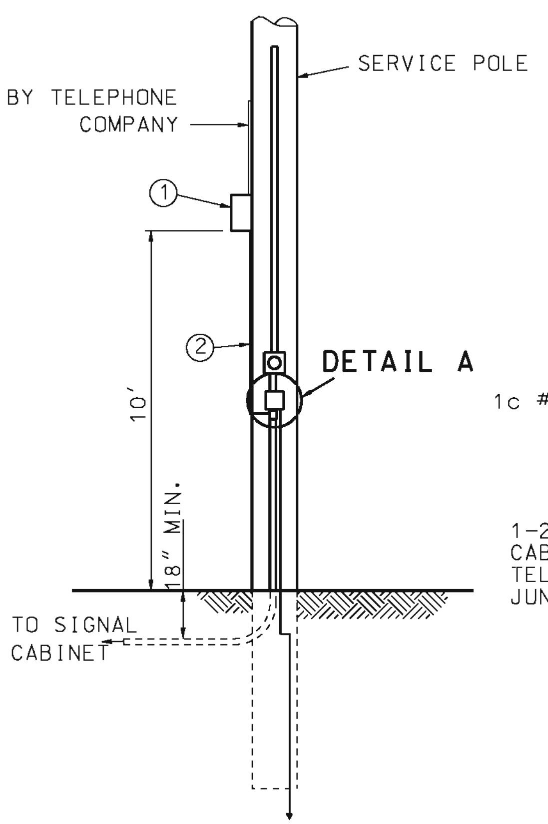


TYPE SWA
USE ON NEW OR EXISTING

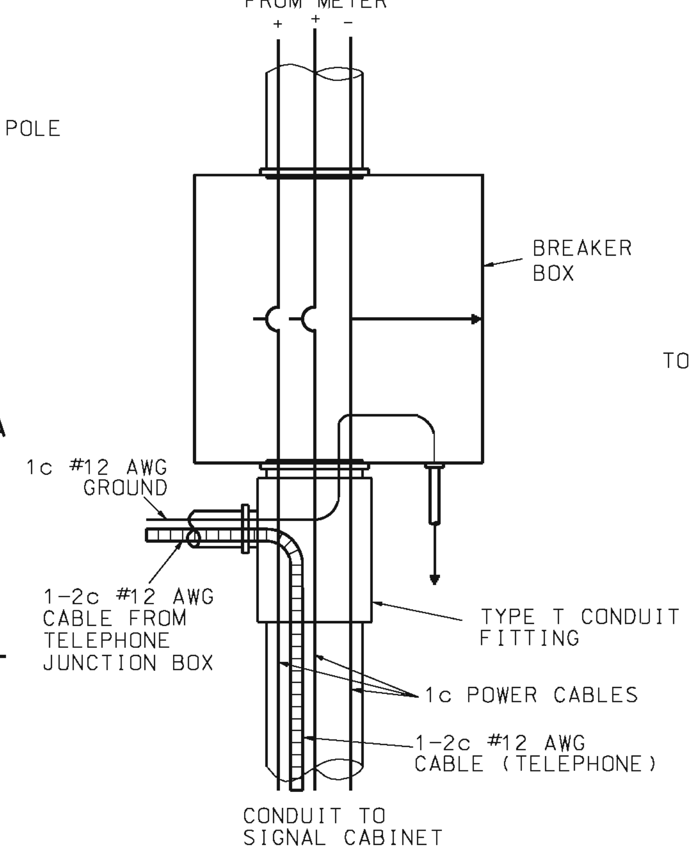


TYPE CU
USE ON NEW ONLY

NOTE:
WIRING FROM TELEPHONE COMPANY PEDESTAL OR MANHOLE WILL BE FURNISHED AND INSTALLED BY TELEPHONE COMPANY.

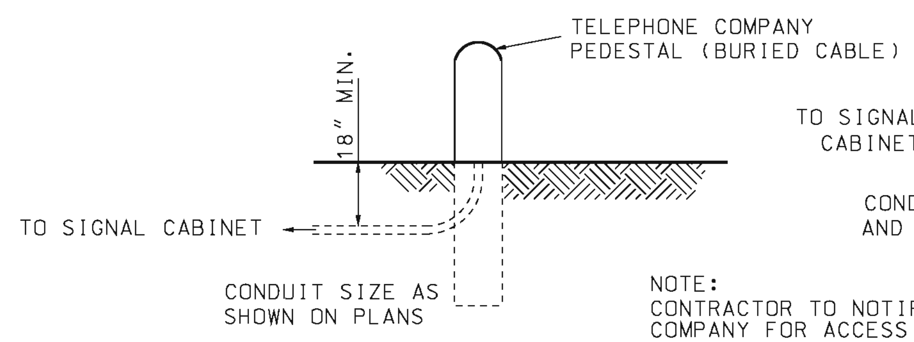


TYPE 902.10-A
USE ON EXISTING ONLY



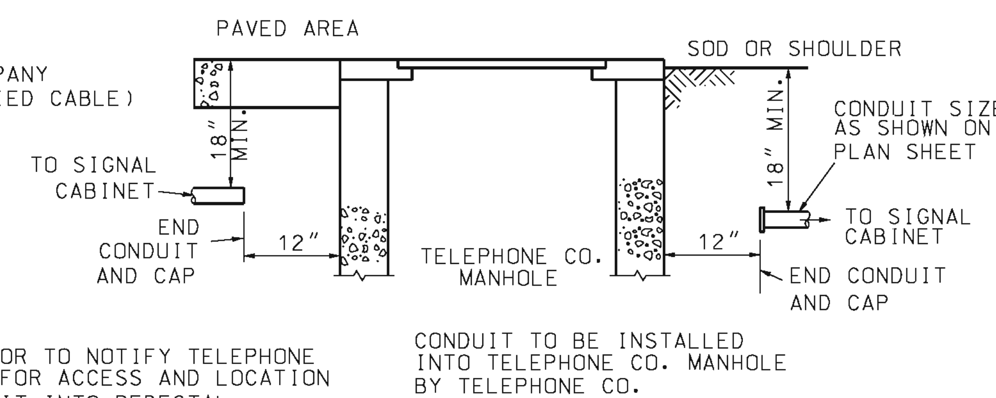
DETAIL A

AERIAL TELEPHONE CONNECTION



NOTE:
CONTRACTOR TO NOTIFY TELEPHONE COMPANY FOR ACCESS AND LOCATION OF CONDUIT INTO PEDESTAL.

TYPE CP
USE ON NEW OR EXISTING



CONDUIT TO BE INSTALLED INTO TELEPHONE CO. MANHOLE BY TELEPHONE CO.

TYPE CM
USE ON NEW OR EXISTING

UNDERGROUND TELEPHONE CONNECTION

NOTE:
SCHEMATIC DIAGRAM APPLIES TO STANDARD PLANS 901.80 AND 902.15.

1. 12" x 12" x 6" JUNCTION BOX WITH $\frac{3}{4}$" TO $1\frac{1}{2}$" KNOCK-OUT IN BOTTOM.
2. $\frac{3}{4}$" MINIMUM METAL CONDUIT CONTAINING 1-2c #12 AWG AND 1c #12 AWG.
3. $\frac{3}{4}$" MINIMUM FLEXIBLE CONDUIT CONTAINING 1-2c #12 AWG AND 1c #12 AWG.

ALL ITEMS CONTRACTOR FURNISHED AND INSTALLED.

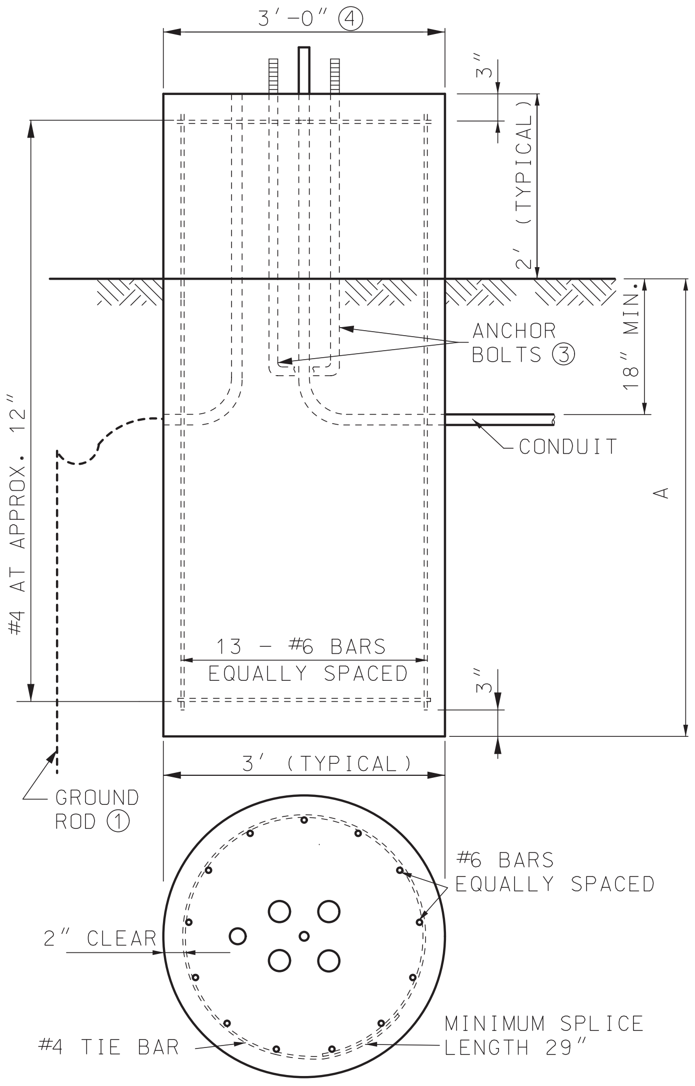
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

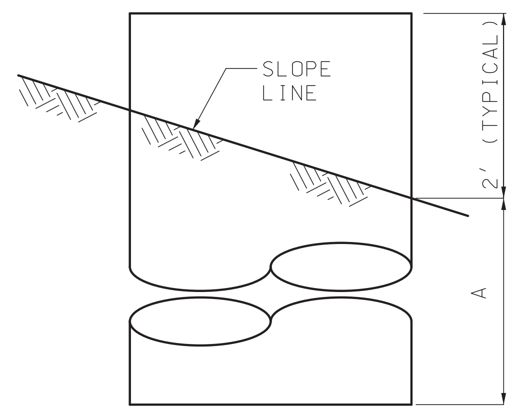
TRAFFIC SIGNALS
TELEPHONE INTERCONNECT

DATE EFFECTIVE:	03/01/1996	902.21C	SHEET NO. 1 OF 1
DATE PREPARED:	8/26/2009		

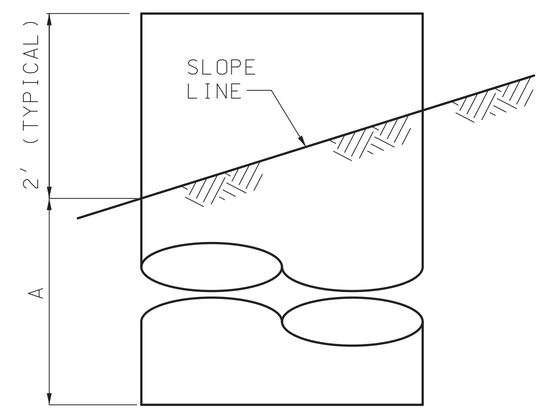
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPE A (FLAT GROUND)

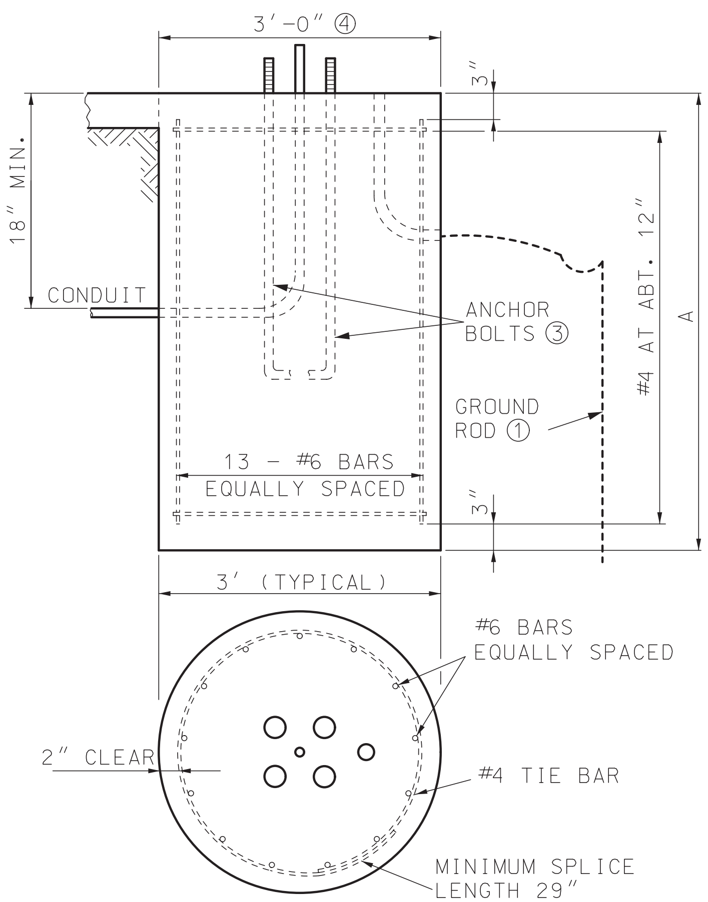


TYPE A (FILL)
(FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)

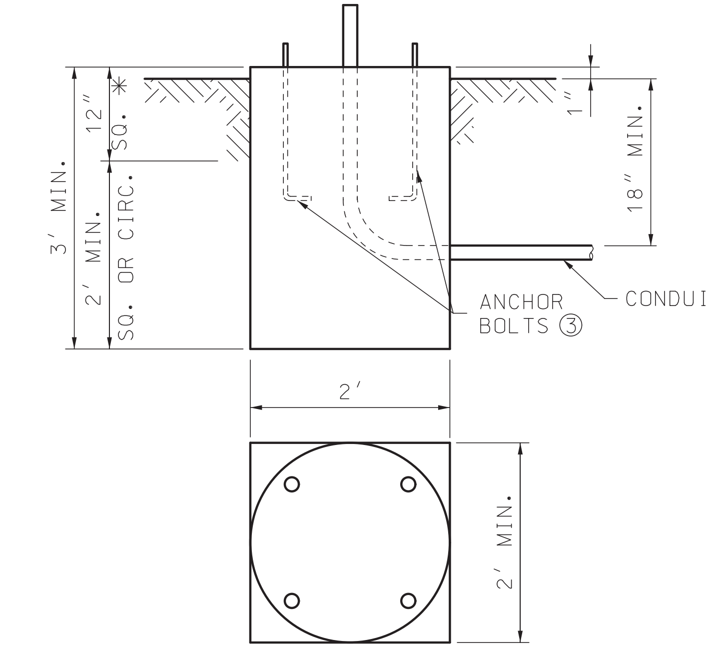


TYPE A (CUT)
(FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)

POST BASES



TYPE F



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

TYPE C

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 ½ 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

STEEL AND CONCRETE REQUIREMENTS FOR POST BASES⑨

BASES		#6 STEEL BAR		CONC.
TYPE	A ⑦	LENGTH	WEIGHT LBS. ⑧	C.Y.
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".

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.

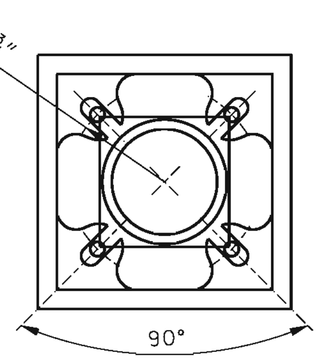
MoDOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

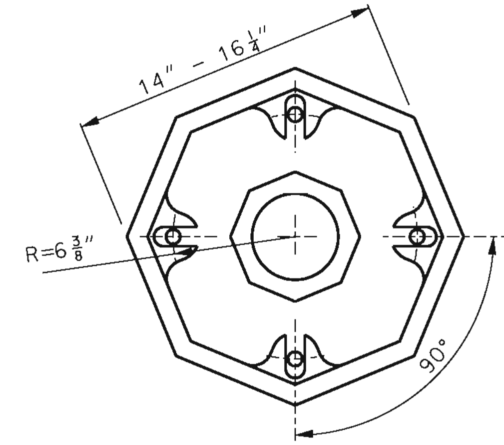
TRAFFIC SIGNALS
POST BASES

DATE EFFECTIVE: 07/01/2019
DATE PREPARED: 5/20/2019

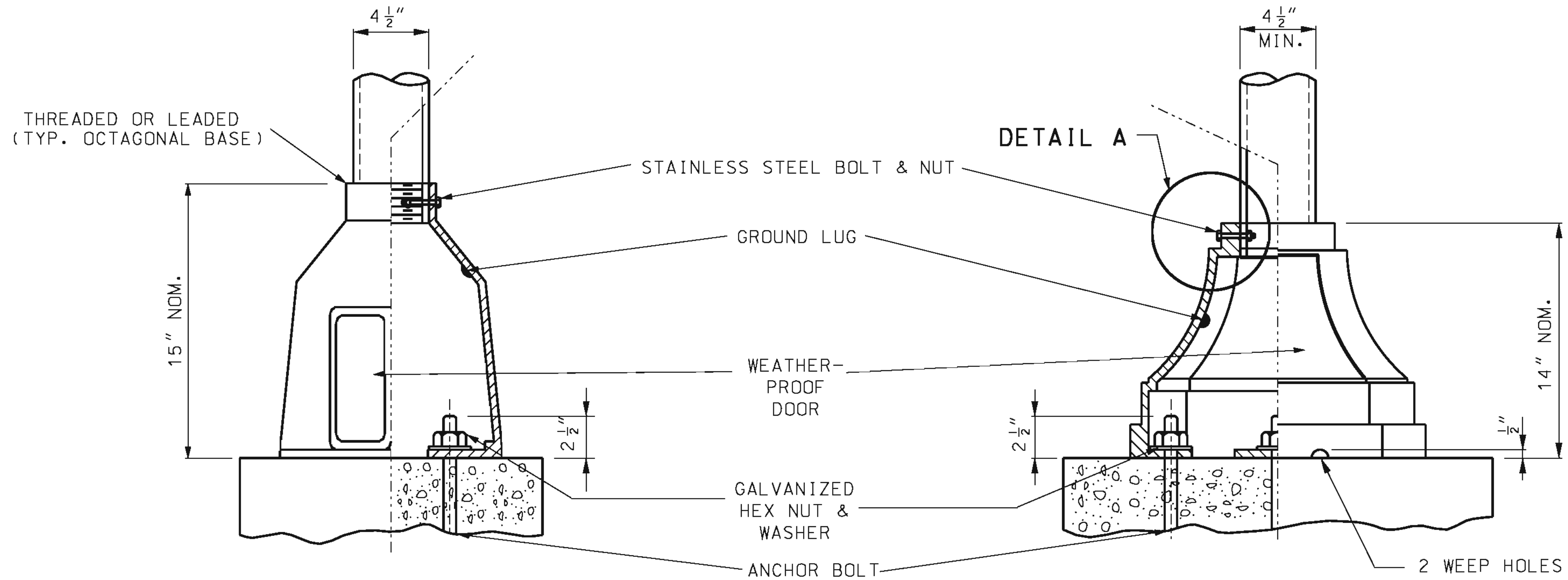
902.30P



BOLT CIRCLE



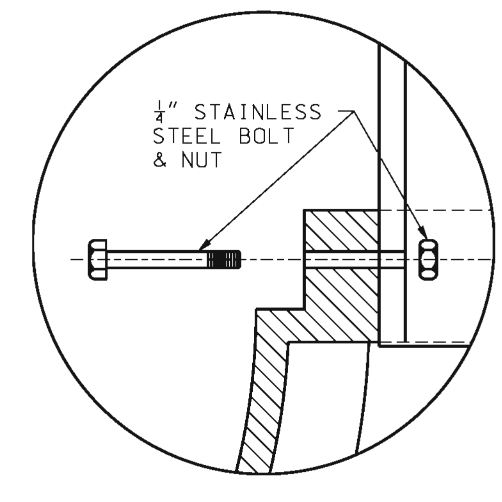
BOLT CIRCLE



SQUARE

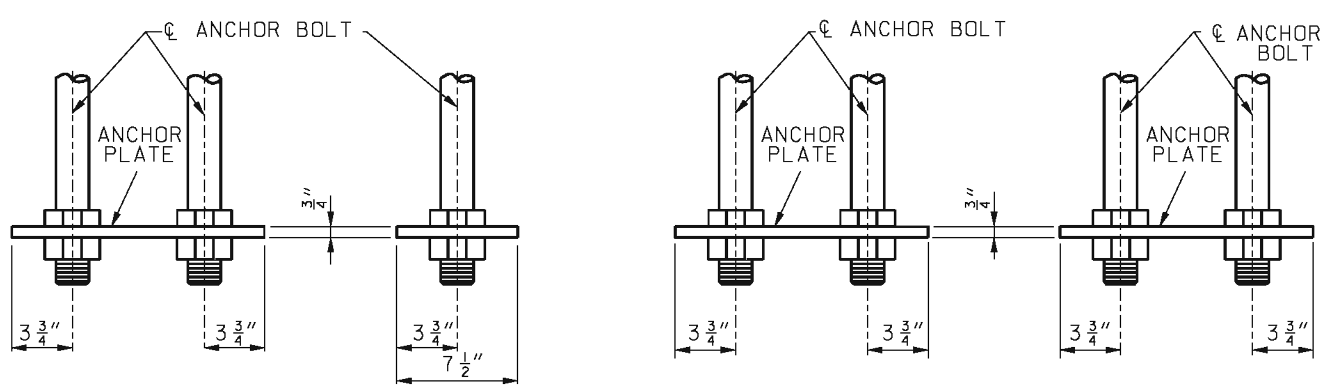
OCTAGONAL

CAST BASE



DETAIL A

BOLT LENGTH	VERT. HT. A	THREAD LEN. B	DIA. C
INCHES	INCHES	INCHES	INCHES
19	17	1.50	0.625
57	51	7.00	1.250
79	73	7.50	1.500
94	88	8.00	1.750
121	115	8.50	2.000
120	114	9.00	2.250
146	140	9.50	2.500



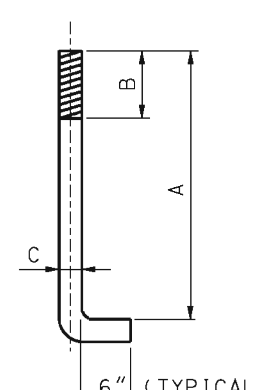
SIDE VIEW END VIEW

TWO BOLTS PER PLATE
HEX NUT OR 5/16" FILLET WELD ALL AROUND BOTH SIDES

SIDE VIEW END VIEW

FOUR BOLTS PER PLATE
HEX NUT OR 5/16" FILLET WELD ALL AROUND BOTH SIDES

OPTIONAL STEEL PLATE FOR ANCHOR BOLTS



ANCHOR BOLT

NOTE:
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED.

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

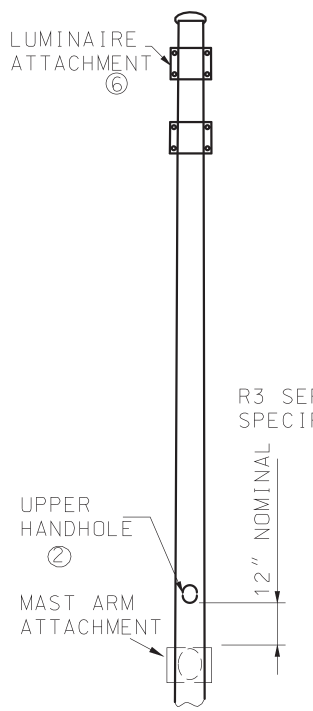
STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
POST BASES

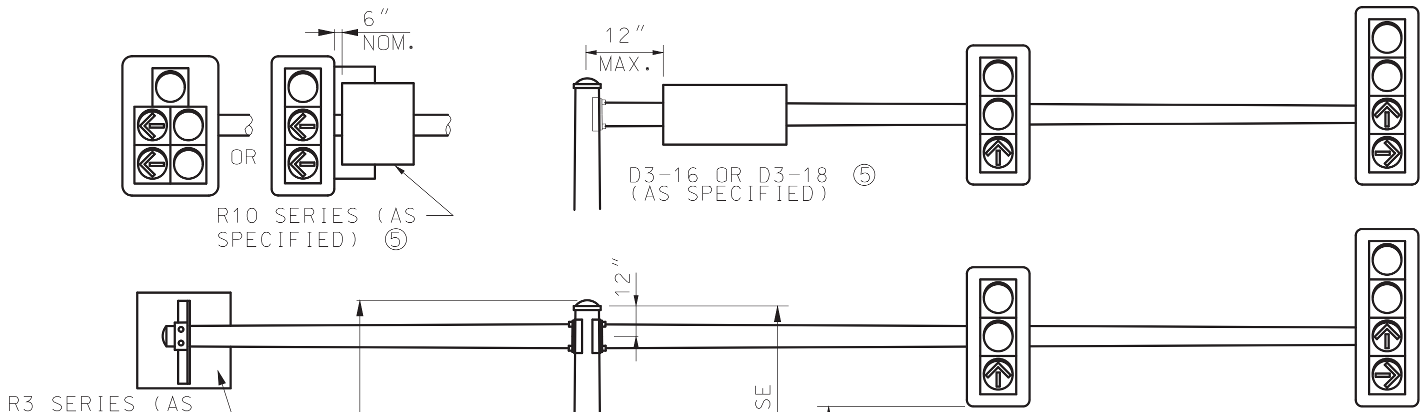
DATE EFFECTIVE: 02/01/2008
DATE PREPARED: 8/26/2009

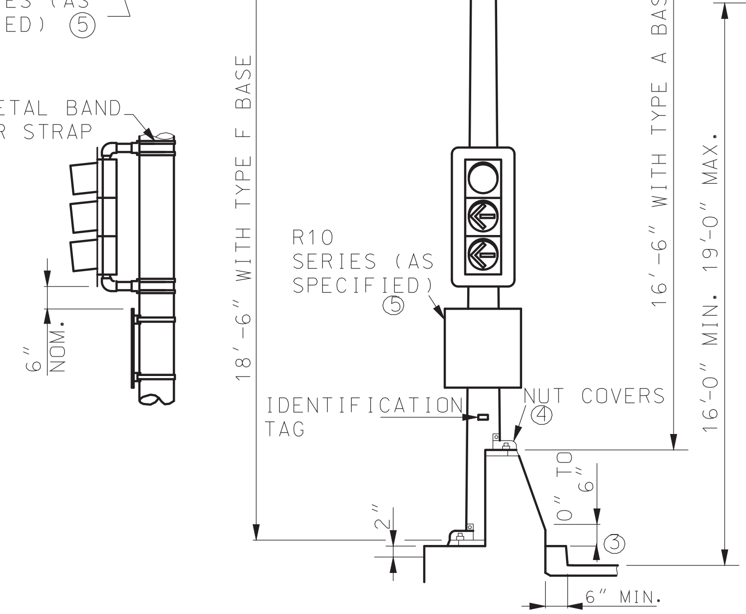
902.30P

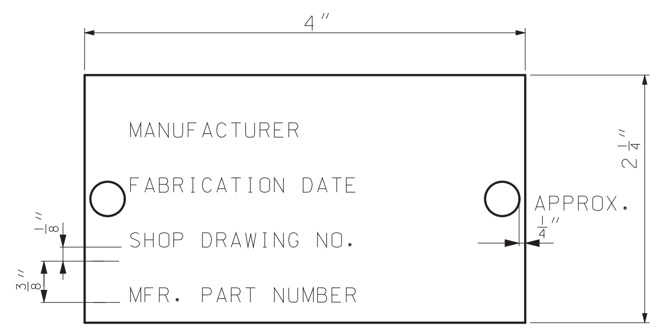
SHEET NO. 2 OF 2



TYPE BL AND CL POSTS







IDENTIFICATION TAG

ID TAG NOTE:

TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE OR MAST ARM USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS. ID TAG HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

① ARM LENGTHS SHALL NOT EXCEED 55 FEET.

② HANDHOLES SHALL BE APPROXIMATELY 4" x $6\frac{1}{2}$". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

③ 0" TO 6" VARIATION IN BASE HEIGHT IS FOR OBTAINING 16'-0" CLEARANCE. 0.13 C.Y. CONCRETE AND 3 LBS. REINFORCING STEEL PER 6".

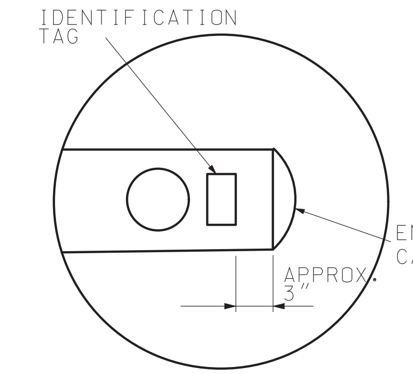
④ POSTS SHALL BE FURNISHED WITH INDIVIDUAL NUT COVERS.

⑤ NO SIGN IN EXCESS OF 15.0 SQUARE FEET SHALL BE INSTALLED ON POSTS OR MAST ARMS. SIGNS EXCEEDING 8.0 SQUARE FEET SHALL BE LOCATED SO THAT THE EDGE OF THE SIGN IS NO MORE THAN 12" FROM THE CENTERLINE OF THE POST. D3 SERIES SIGNS, AS WELL AS SIGNS INSTALLED ON THE POST, SHALL BE MOUNTED WITH A STRAP TYPE SIGN SUPPORT. R10 SERIES SIGNS INSTALLED ON THE MAST ARM SHALL BE MOUNTED WITH A SIGN BRACKET ASSEMBLY.

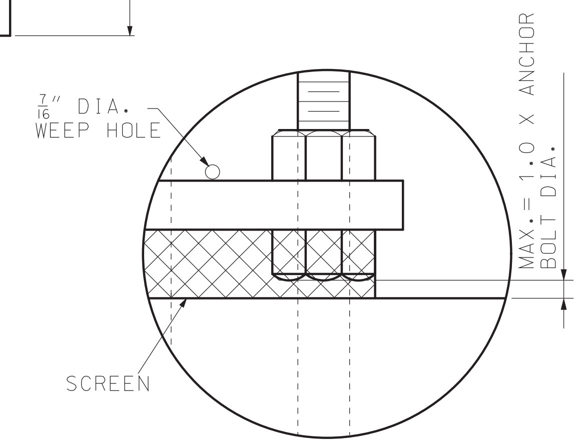
⑥ SEE DRAWING 901.00 FOR TYPICAL BRACKET ARM MOUNTING FOR TYPE BL AND TYPE CL POSTS.

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.

⑧ POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH # 6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.



DETAIL B



DETAIL A

GENERAL NOTES:

ARMS SHALL BE RAKED UP 0.25" PER FOOT MINIMUM. ARMS SHALL BE PROVIDED WITH A PERMANENT MARKING INDICATING PROPER ORIENTATION FOR INSTALLATION.

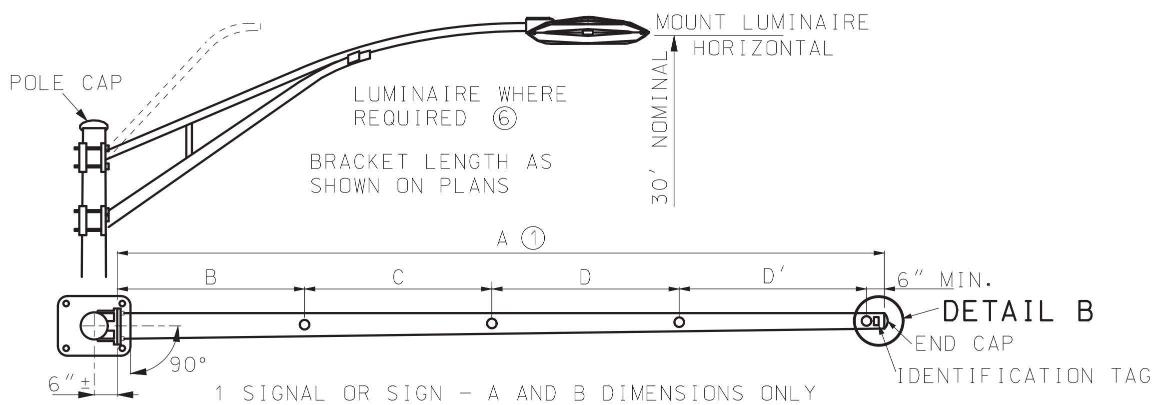
SIGNS AND SIGNALS SHALL BE VERTICAL. SIGNAL HEADS ON MAST ARMS SHALL BE TILTED FORWARD FROM THE TOP 3 TO 7 DEGREES FROM VERTICAL.

IF A SIGN EXCEEDS 42" IN LENGTH, TWO STRAP SUPPORTS ARE REQUIRED: AND IF A SIGN EXCEEDS 96" IN LENGTH, THREE STRAP SUPPORTS ARE REQUIRED.

TO DETERMINE LEFT OR RIGHT ON TYPE B OR C SIGNAL POST, VIEWING POSITION SHALL BE FROM THE CENTER OF THE INTERSECTION BEING CONTROLLED AND FACING THE SIGNAL INVOLVED.

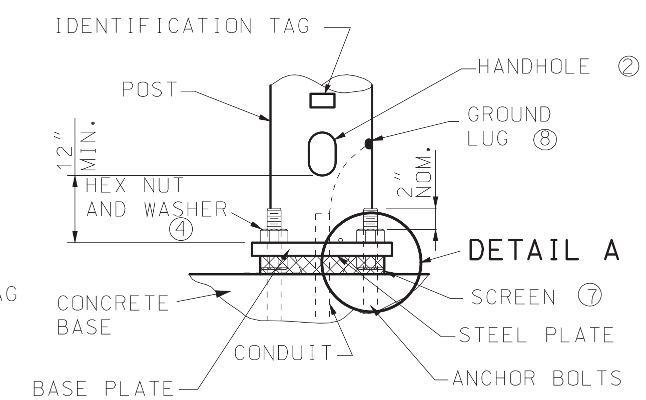
TRAFFIC SIGNALS MOUNTED ON MAST ARMS SHALL BE FURNISHED WITH MOUNTING BRACKETS UTILIZING CABLES.

SEE STANDARD 902.30 FOR FOUNDATION AND ANCHOR BOLT DETAILS.

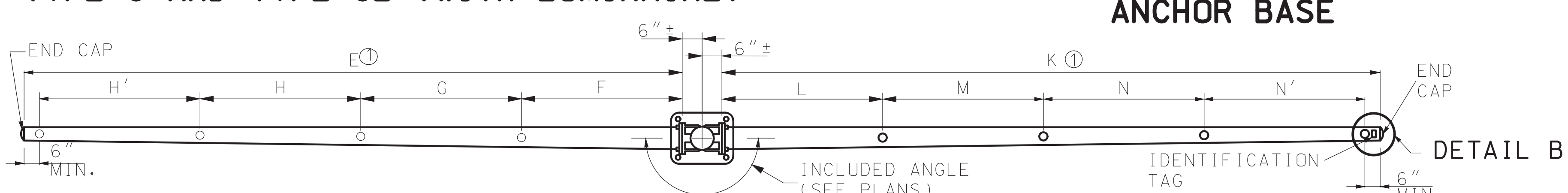


1 SIGNAL OR SIGN - A AND B DIMENSIONS ONLY
2 SIGNALS OR SIGNS - A, B, AND C DIMENSIONS ONLY
3 SIGNALS OR SIGNS - A, B, C AND D DIMENSIONS ONLY
4 SIGNALS OR SIGNS - A, B, C, D AND D' DIMENSIONS
SEE TRAFFIC SIGNAL PLANS FOR DIMENSIONS.

TYPE C AND TYPE CL (WITH LUMINAIRE)



STEEL PLATE AND ANCHOR BASE



1 SIGNAL OR SIGN - E AND F DIMENSIONS ONLY
2 SIGNALS OR SIGNS - E, F, AND G DIMENSIONS ONLY
3 SIGNALS OR SIGNS - E, F, G, AND H DIMENSIONS ONLY
4 SIGNALS OR SIGNS - E, F, G, H AND H' DIMENSIONS

1 SIGNAL OR SIGN - K AND L DIMENSIONS ONLY
2 SIGNALS OR SIGNS - K, L, AND M DIMENSIONS ONLY
3 SIGNALS OR SIGNS - K, L, M, AND N DIMENSIONS ONLY
4 SIGNALS OR SIGNS - K, L, M, N AND N' DIMENSIONS
SEE TRAFFIC SIGNAL PLANS FOR DIMENSIONS

TYPE B AND TYPE BL (WITH LUMINAIRE)

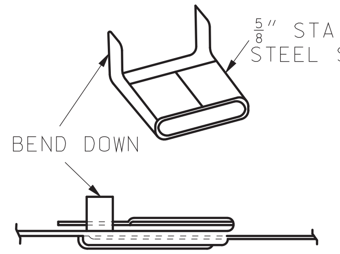
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
TUBULAR STEEL POSTS

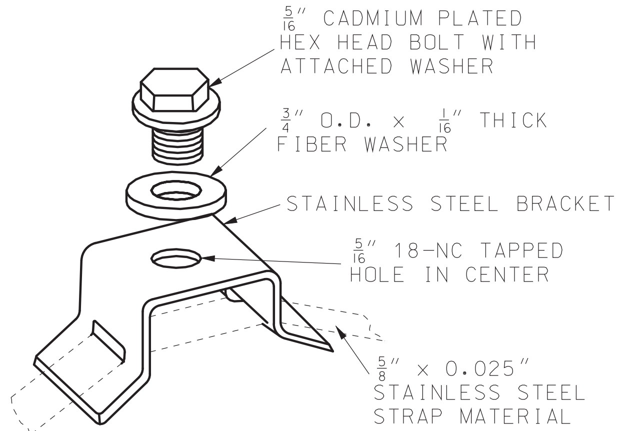
DATE EFFECTIVE:	04/01/2018	902.40R	SHEET NO. 1 OF 3
DATE PREPARED:	2/9/2018		

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

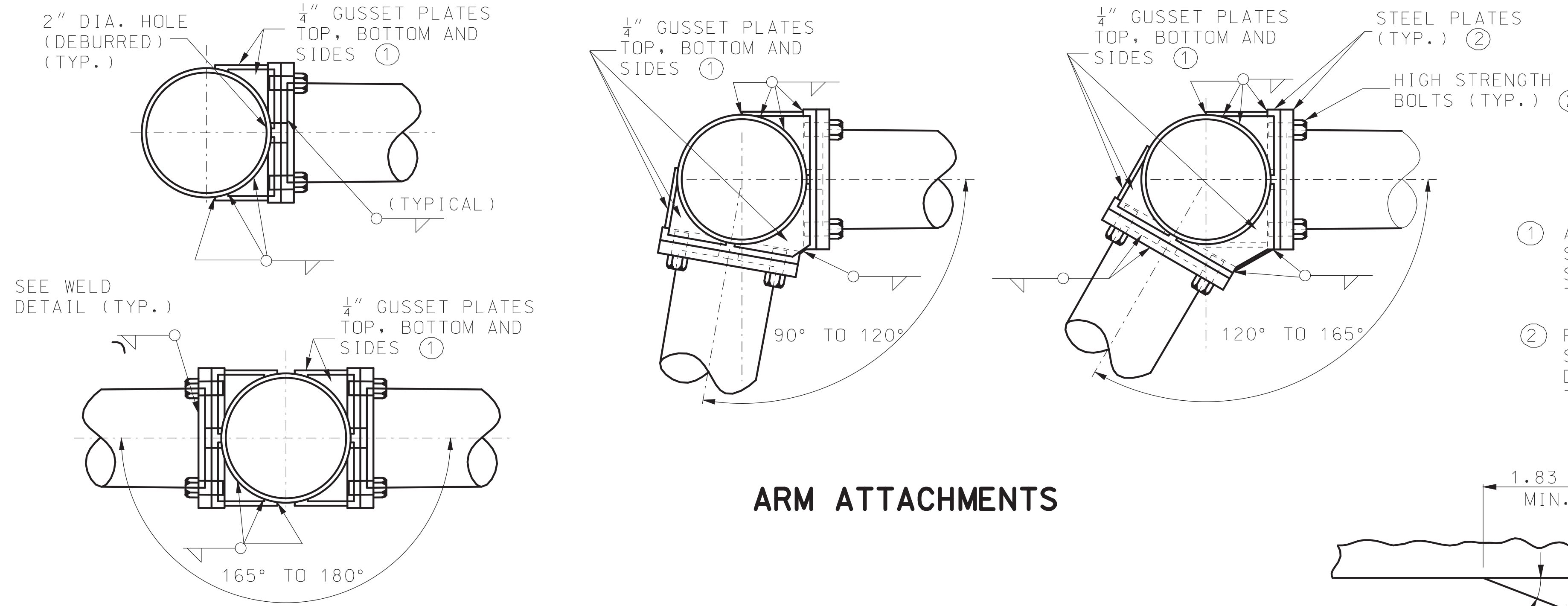


VIEW SHOWING

ENDS OF STRAP CLAMPED IN SEAL



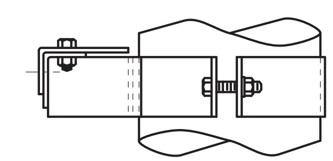
STRAP TYPE SIGN SUPPORT



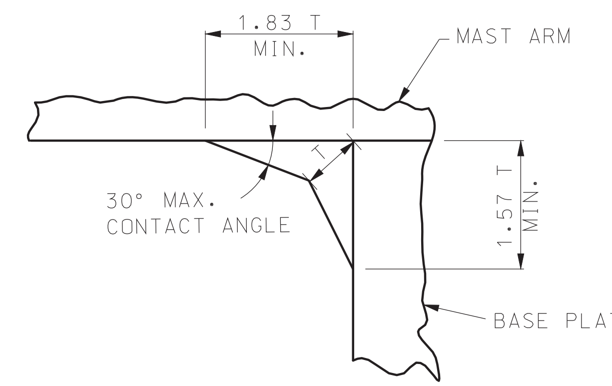
ARM ATTACHMENTS

(1) ANY OPENINGS BETWEEN TOP AND SIDE GUSSET PLATES SHALL BE SEALED WITH LIFETIME CAULK AT TIME OF INSTALLATION.

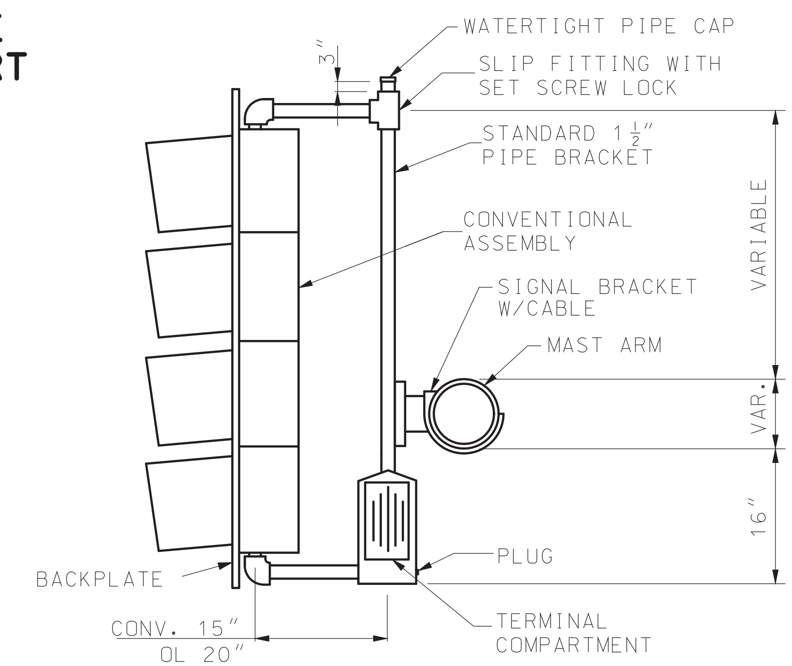
(2) PLATE AND BOLT SIZES SHALL BE SHOWN ON FABRICATORS SHOP DRAWINGS AND SHALL BE SUBJECT TO APPROVAL.



TOP VIEW

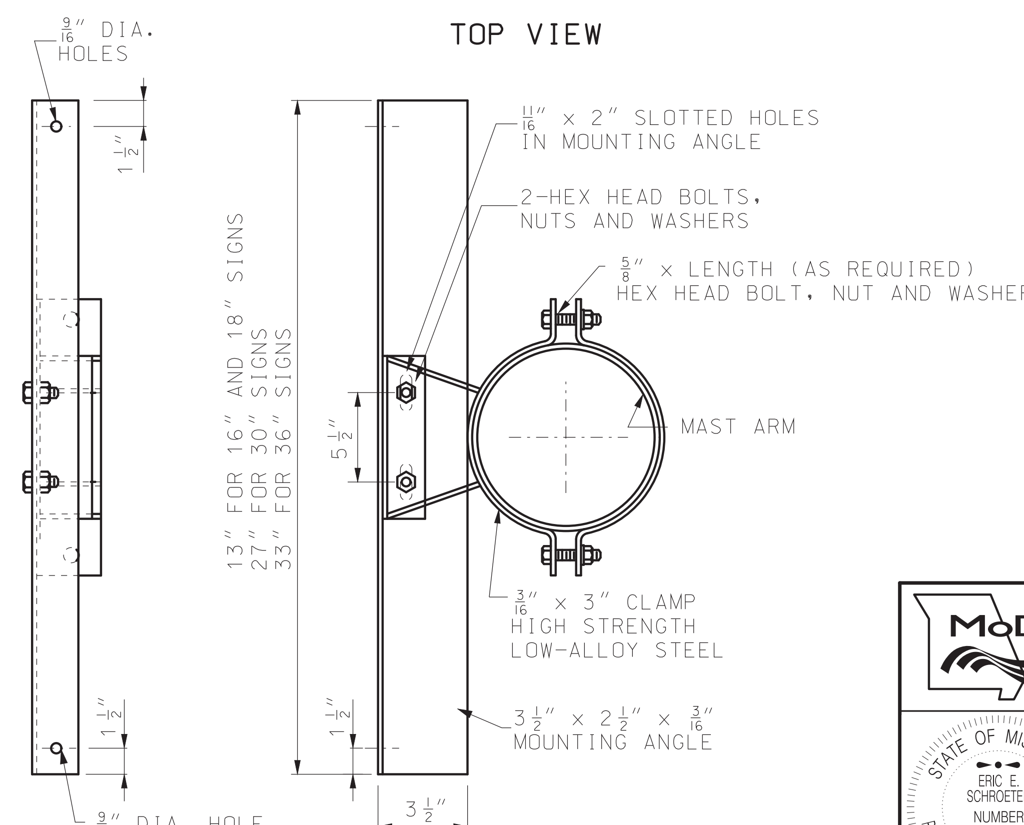


WELD DETAIL



MAST ARM MOUNTED SIGNAL HEAD

(SEE STANDARD 902.00)



FRONT VIEW

SIDE VIEW

SIGN BRACKET ASSEMBLY

ALTERNATE DESIGN MAY BE PROVIDED AS APPROVED BY ENGINEER

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

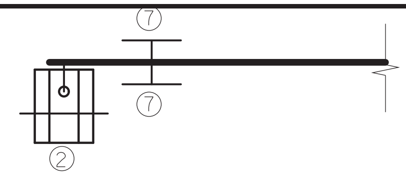
STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS

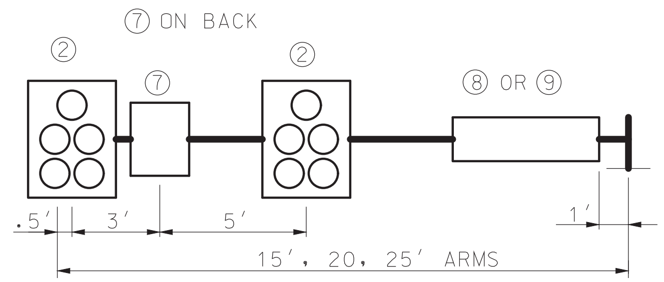
TUBULAR STEEL POSTS

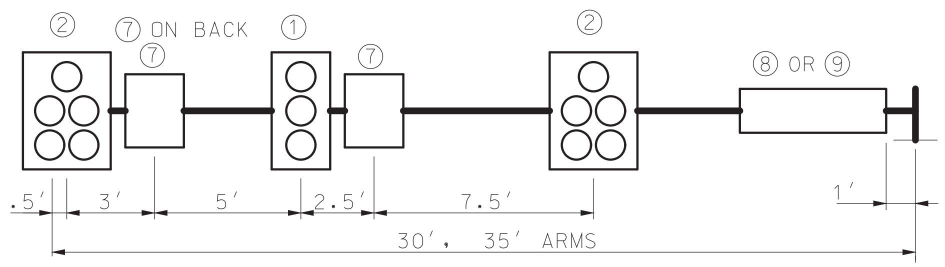
DATE EFFECTIVE:	04/01/2018	902.40R	SHEET NO. 2 OF 3
DATE PREPARED:	2/9/2018		

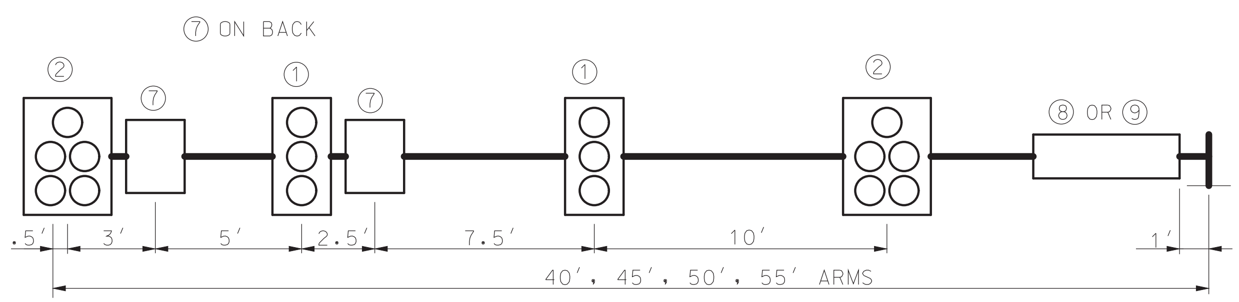
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPICAL TOP VIEW

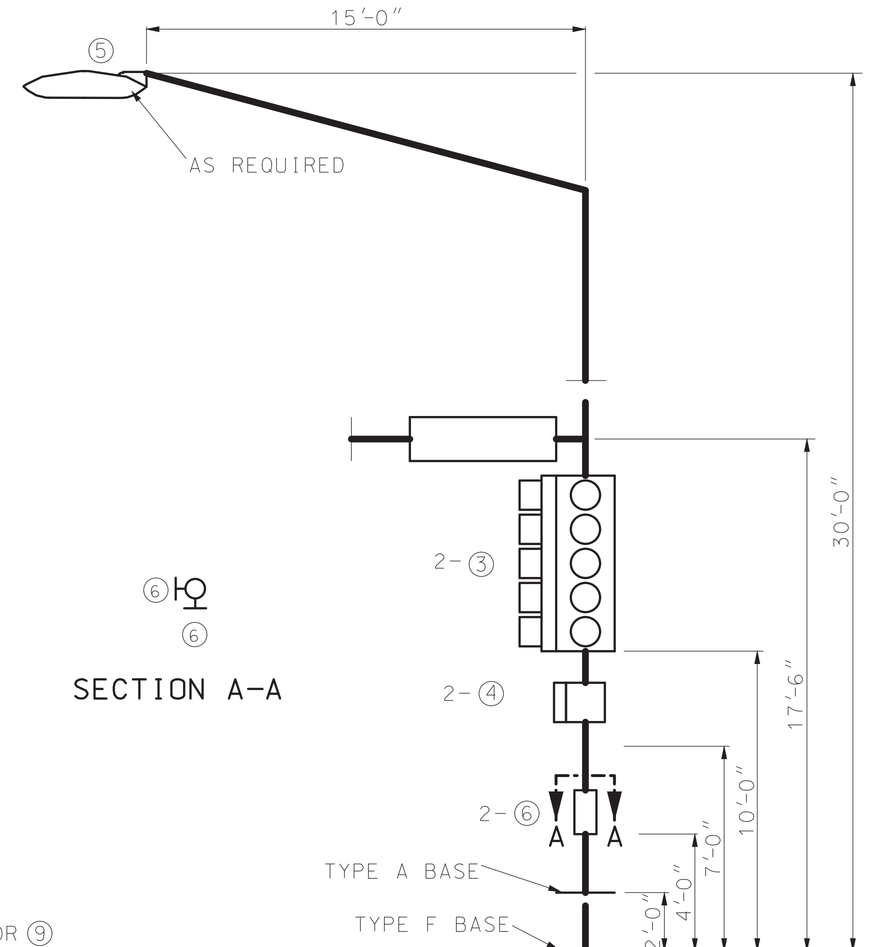




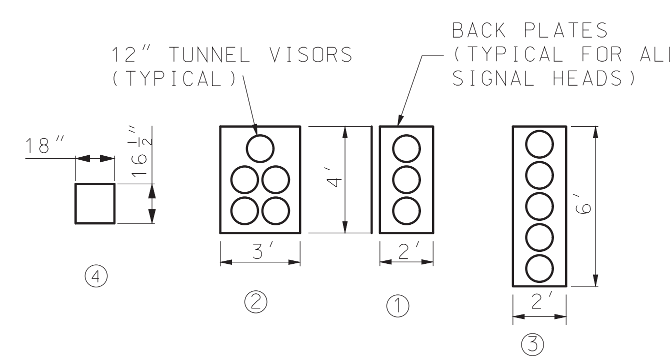


MAST ARM LOADING

SECTION A-A



TYPICAL POST LOADING



MINIMUM DESIGN LOADING FOR POST AND MAST ARM ATTACHMENTS

ITEM NO.	DESCRIPTION	WEIGHT (LBS.)✳	PROJ. AREA (SQ.FT.)	SURFACE AREA (SQ.FT.)
①	3-SECTION OL HEAD	95.0	8.0	32.5
②	5-SECTION OL HEAD	173.0	12.0	47.5
③	VERT. 5-SECT. OL HEAD	100.0	12.0	50.5
④	1-SECTION PED HEAD	15.0	2.0	XX.X
⑤	LED-A LUMINAIRE	30.0	1.0	3.5
⑥	9″ X 12″ SIGN	2.0	0.8	N/A
⑦	30″ X 36″ SIGN	13.0	7.5	N/A
⑧	120″ X 18″ SIGN	25.0	15.0	N/A
⑨	96″ X 16″ SIGN	18.0	10.7	N/A
	96″ X 18″ SIGN	20.0	12.0	N/A

OL- OPTICALLY LIMITED
✳ MOUNTING HARDWARE INCLUDED

STRUCTURAL DESIGN REQUIREMENTS:

STRUCTURAL SUPPORTS SHALL BE DESIGNED AND FABRICATED TO WITHSTAND THEIR OWN LOADING AND THE ATTACHMENT LOADING SHOWN ON THIS DRAWING OR ON THE PLANS, WHICHEVER IS GREATER. STRUCTURAL MEMBERS INCLUDE POSTS, MAST ARMS AND LUMINAIRE BRACKET ARMS, AS REQUIRED.

DESIGN OF STRUCTURAL SUPPORTS SHALL BE BASED ON AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS, 1994 OR LATEST REVISION, WITH THESE EXCEPTIONS:

MINIMUM DESIGN WIND SPEED OF 90 MPH AT 30 FEET ABOVE GROUND.

GROUP LOADING:

LOADS	PERCENT OF ALLOWABLE STRESS (ALL MATERIALS)
GROUP I - DL	100
GROUP II - DL + W	133
GROUP III - DL + ICE + 0.5(W✳✳)	133

✳ NO LOAD REDUCTION FACTORS SHALL BE APPLIED IN CONJUNCTION WITH THESE INCREASED ALLOWABLE STRESSES.
✳✳ W TO BE COMPUTED ON THE BASIS OF THE WIND PRESSURE FORMULA, 25 PSF (1197 Pa) MINIMUM FOR W FOR GROUP III.

FOR TYPE B AND BL POSTS, ICE AND DEAD LOADING SHALL BE BASED ON THE COMBINED EFFECT OF DESIGN LOADING ON EACH ARM. WIND LOADING IS APPLIED AS DESCRIBED IN SECTION 1.2.5(5)(b) OF THE STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS, 1994 REVISION.

GENERAL NOTES:

ATTACHMENT LOCATIONS ARE FOR STRUCTURAL DESIGN PURPOSES ONLY. ACTUAL LOCATIONS ARE SHOWN ON THE PLANS.

LUMINAIRE PER MODOT'S STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS.

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ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER
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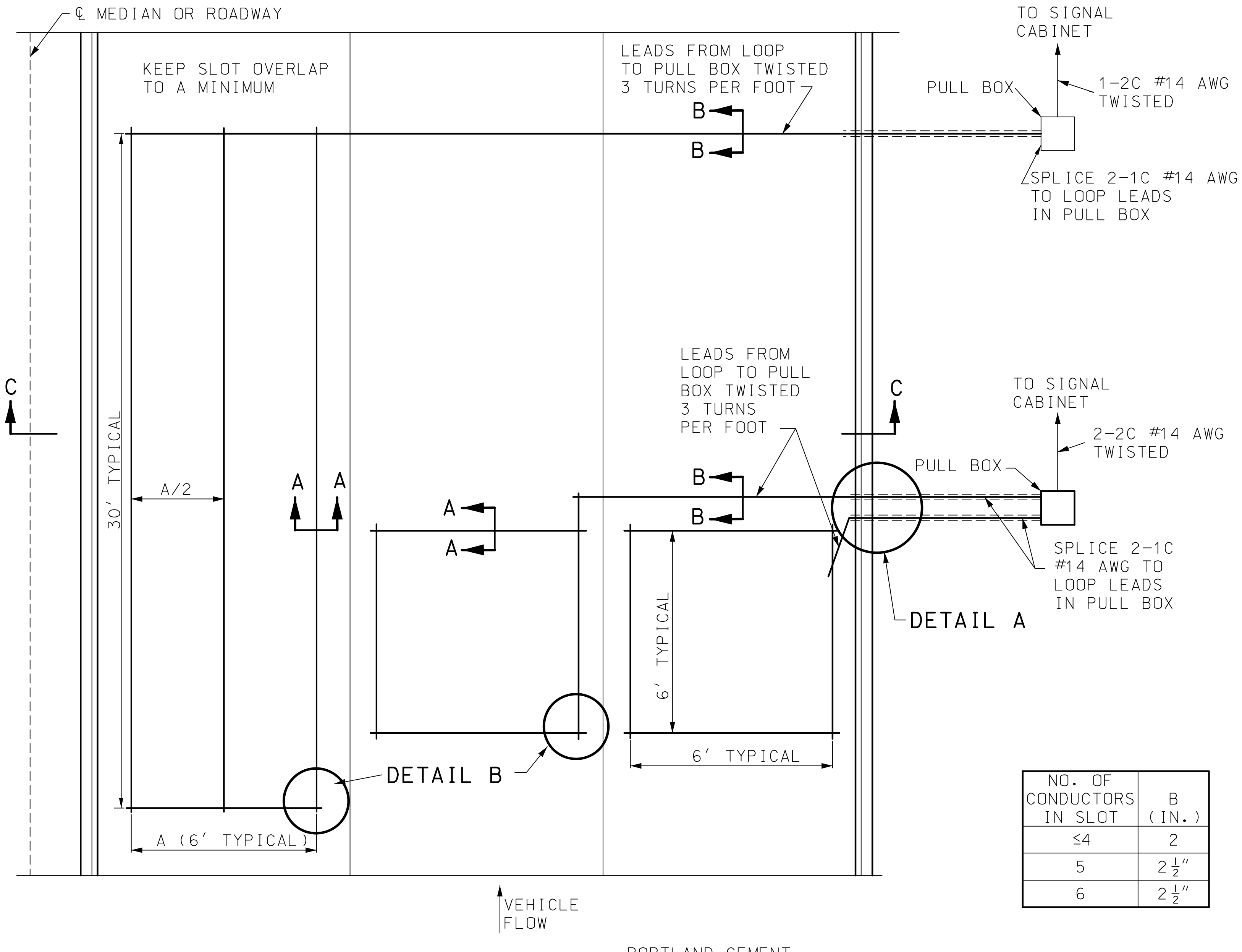
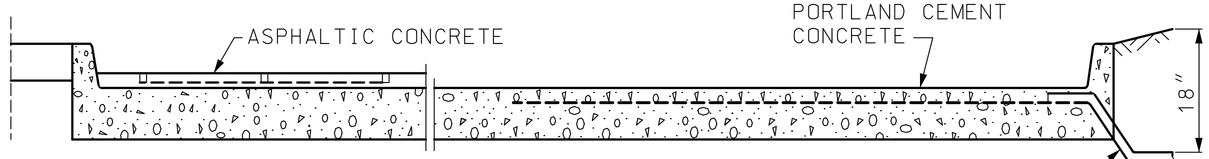
TRAFFIC SIGNALS
TUBULAR STEEL POSTS DESIGN LOADING REQUIREMENTS

DATE EFFECTIVE: 04/01/2018
DATE PREPARED: 2/9/2018

902.40R

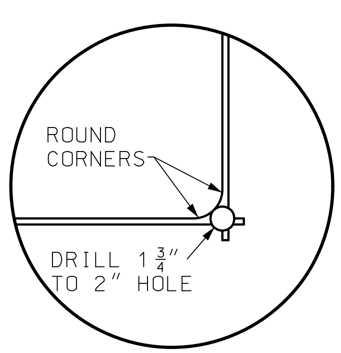
SHEET NO. 3 OF 3



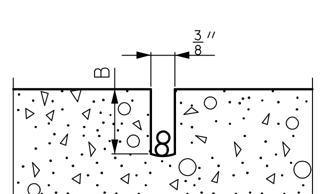


SECTION C-C

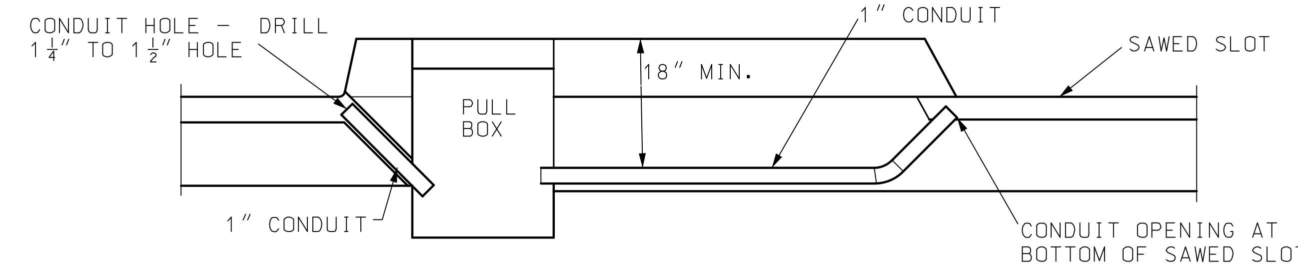
LOOP SLOT DETAIL



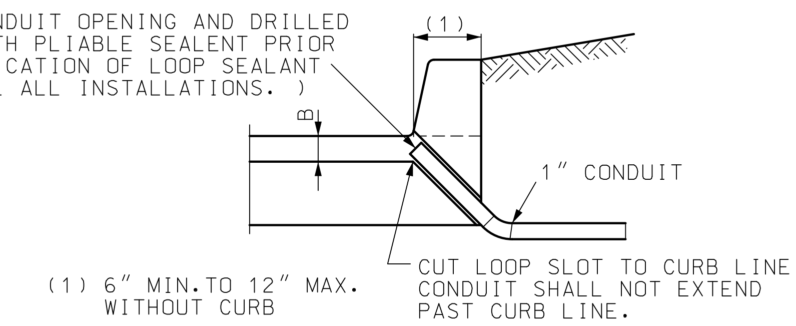
DETAIL B
TYPICAL LOOP CORNER DETAIL



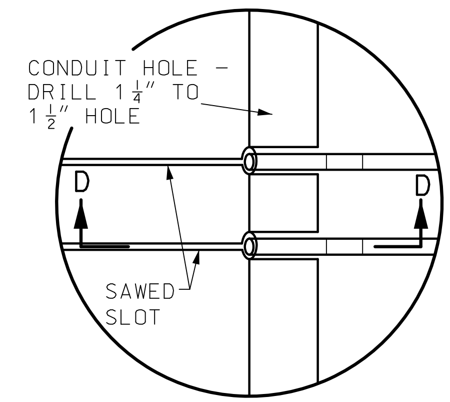
SECTION A-A
LOOP SLOT



ALTERNATE SECTION D-D
MEDIAN OR ISLAND DETAIL

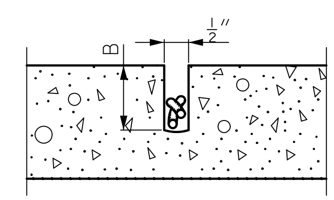


SECTION D-D

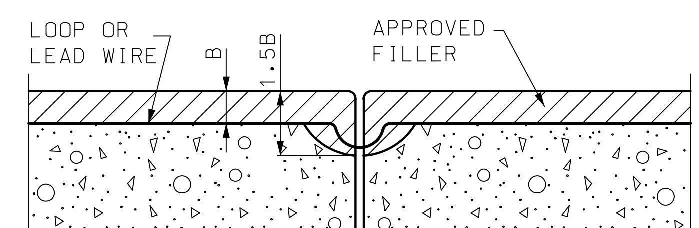


DETAIL A
CONDUIT SLOT DETAIL

NO. OF CONDUCTORS IN SLOT	B (IN.)
≤4	2
5	2½"
6	2½"



SECTION B-B
LEAD SLOT



DETAIL OF AN "E" JOINT OR OTHER FULL DEPTH JOINT CROSSING

CAUTION:
WIRE SHALL BE PLACED IN SAWED SLOT WITH DEVICE WHICH WILL NOT DAMAGE THE WIRE INSULATION.

GENERAL NOTES:

SENSOR UNIT SHALL BE HOUSED IN CONTROLLER CABINET UNLESS SPECIFIED OTHERWISE.

LOOPS TO BE INSTALLED, WHEN EXISTING PORTLAND CEMENT CONCRETE OR ASPHALTIC CONCRETE PAVEMENT IS BEING RESURFACED, LOOPS SHALL NOT BE PLACED IN SURFACE COURSE OF THE ASPHALTIC CONCRETE.

THE CONDUIT SLOT MAY BE POWER OR MANUALLY CONSTRUCTED, ANY FORMING NEEDED TO SECURE CONDUIT IN SLOT SHALL BE REMOVED.

A SEPARATE CONDUIT SHALL BE INSTALLED BETWEEN THE SAWED LOOP SLOT AND THE FIRST PULL BOX FOR EACH LOOP. THE CONDUIT OPENING AT THE END OF THE LEAD-IN SLOT SHALL BE AT THE BOTTOM OF THE SAWED SLOT.

AFTER CABLE INSTALLATION, THE CONDUIT OPENING AT THE LOOP LEAD ENTRANCE SHALL BE SEALED.

AVOID "E" JOINTS OR OTHER FULL DEPTH JOINTS. MINOR ADJUSTMENTS TO LOOP LOCATION MAY BE MADE.

USE TYPICAL DIMENSIONS UNLESS OTHERWISE SHOWN ON PLANS.

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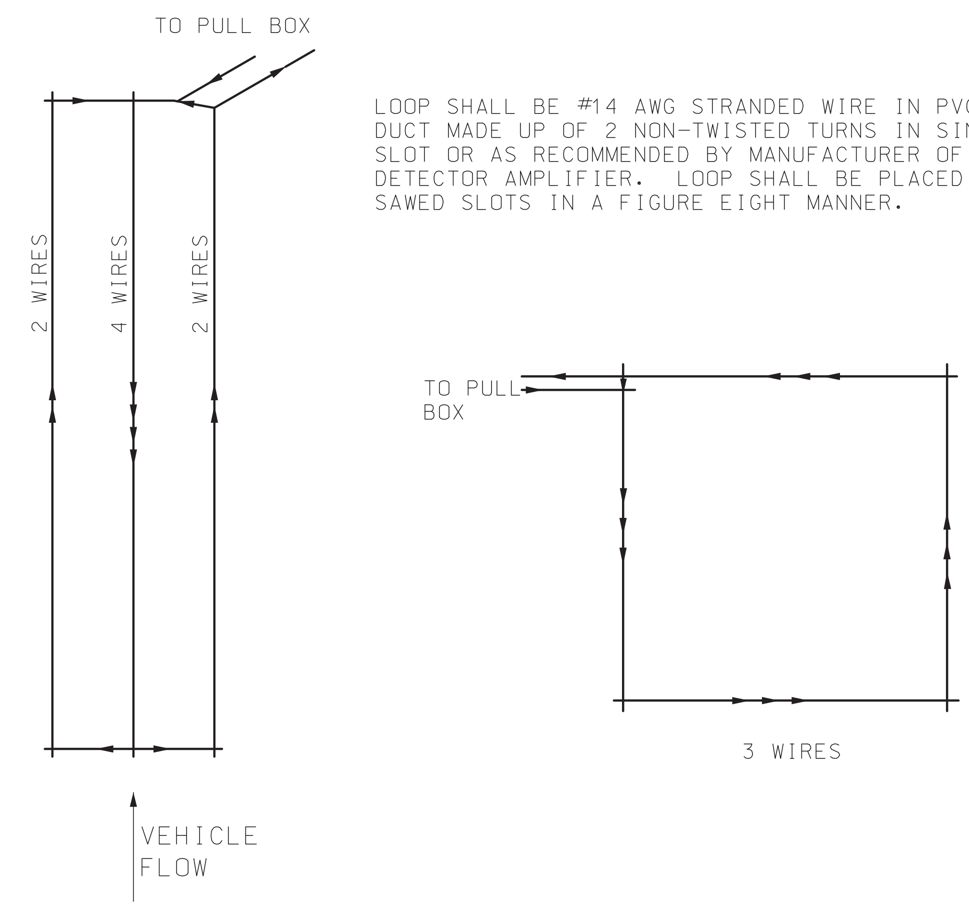
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS
INDUCTION LOOP DETECTORS

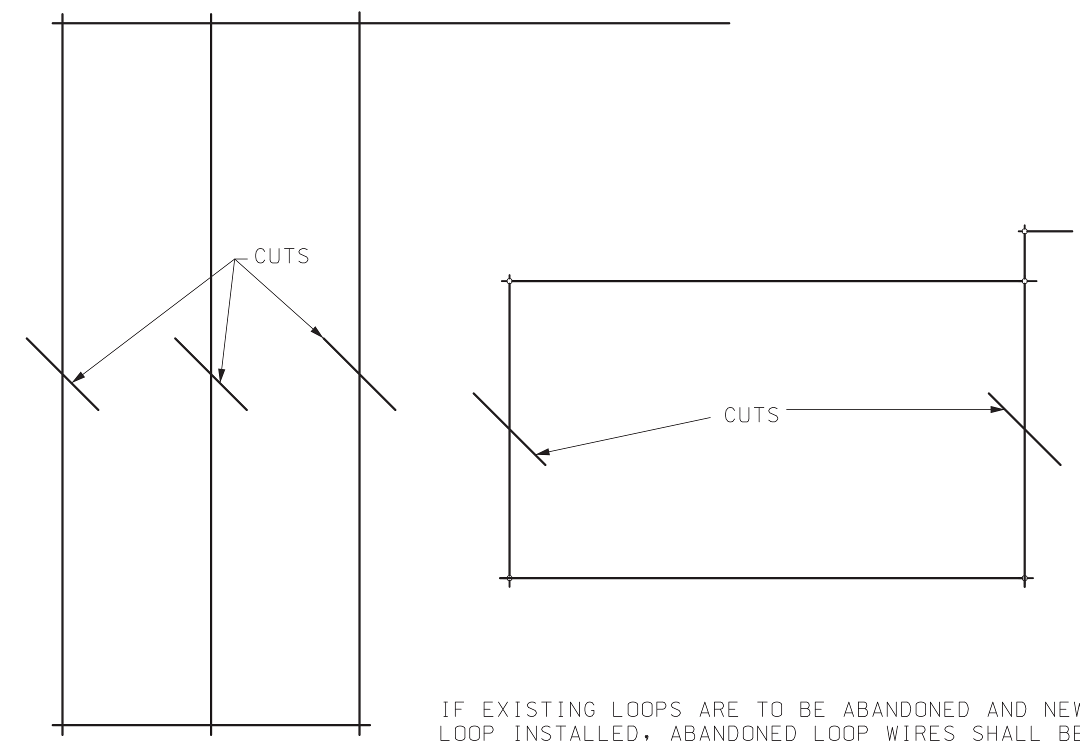
DATE EFFECTIVE: 04/01/2020
DATE PREPARED: 1/21/2020

902.50M



LOOP SHALL BE #14 AWG STRANDED WIRE IN PVC DUCT MADE UP OF 2 NON-TWISTED TURNS IN SINGLE SLOT OR AS RECOMMENDED BY MANUFACTURER OF THE DETECTOR AMPLIFIER. LOOP SHALL BE PLACED IN SAWED SLOTS IN A FIGURE EIGHT MANNER.

LOOP CONFIGURATION



IF EXISTING LOOPS ARE TO BE ABANDONED AND NEW LOOP INSTALLED, ABANDONED LOOP WIRES SHALL BE REMOVED OR CUT COMPLETELY THROUGH.

ABANDONED LOOPS

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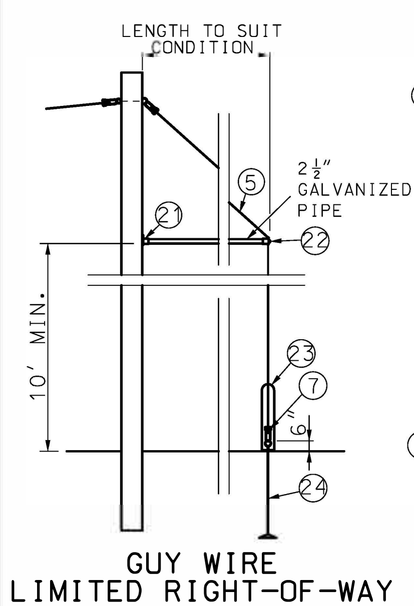
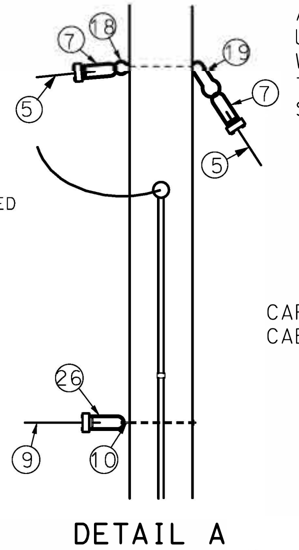
TRAFFIC SIGNALS
INDUCTION LOOP DETECTORS

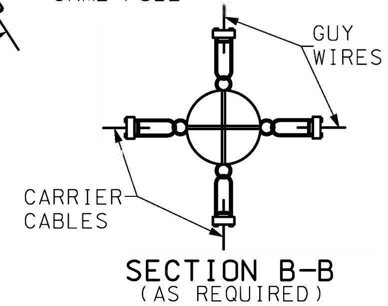
DATE EFFECTIVE: 01/01/2020
DATE PREPARED: 10/17/2019

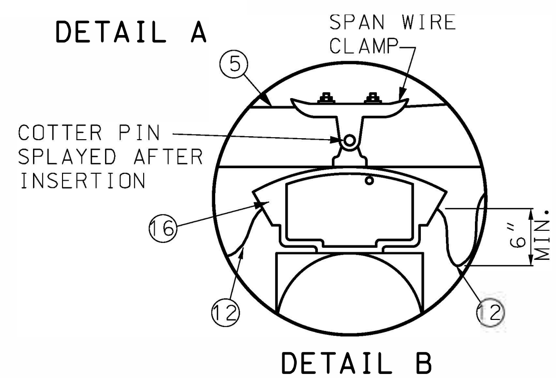
902.50M



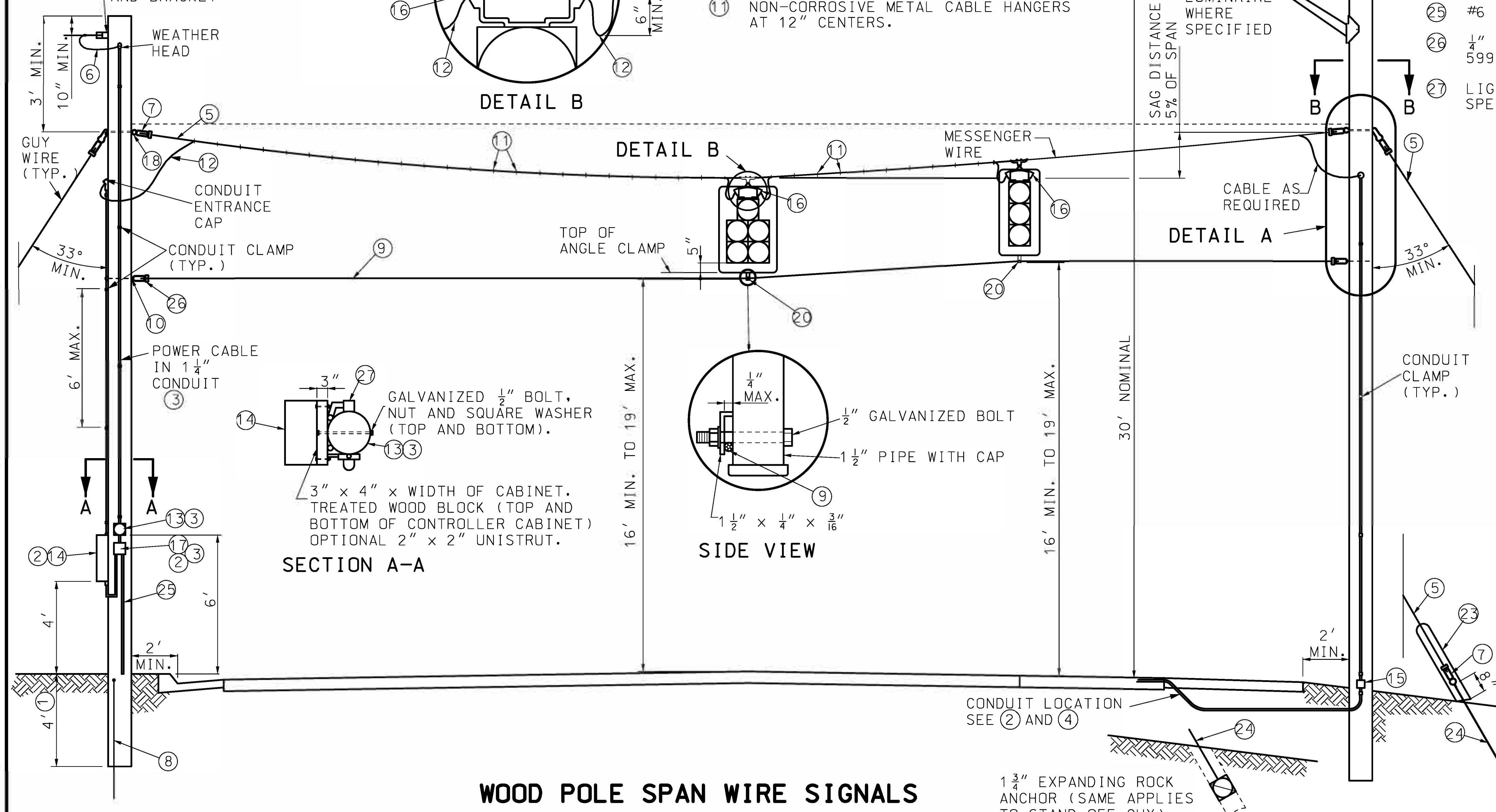


SEPARATE GUY WIRE, BOLT AND THIMBLEYE SHALL BE USED FOR MESSENGER WIRE WHEN SPAN WIRE EXTENDS TWO DIRECTIONS FROM THE SAME POLE.





1. INCREASE EMBEDMENT 1' FOR EACH 5' INCREMENT IN POLE LENGTH OVER 20'.
2. ITEMS ARE INSTALLED AS REQUIRED (SEE PLANS).
3. ITEMS ARE INSTALLED IF THE POLE IS USED AS A POWER SUPPLY (SEE GENERAL NOTES).
4. THREE OR MORE ENTERING CONDUITS WILL REQUIRE A PULL BOX OR OTHER APPROVED FITTING.
5. DOUBLE GALVANIZED ⅜" (MIN.) STEEL MESSENGER WIRE - 7 STRAND HIGH STRENGTH GRADE. DOUBLE GALVANIZED ½" STEEL GUY WIRE - 7 STRAND HIGH STRENGTH GRADE.
6. SERVICE WIRE AND SPLIT-BOLT OR SLEEVE CONNECTION BY UTILITY COMPANY. WIRE SPACING AS REQUIRED BY THE UTILITY COMPANY.
7. ⅜" AUTOMATIC JAW-TYPE CABLE FITTING WITH SHORT BAIL, 13,860 LBS. MINIMUM HOLDING STRENGTH.
8. ¾" X 8' MIN. COPPER GROUND ROD. 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 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30" DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.
9. DOUBLE GALVANIZED ¼" STEEL TETHER WIRE - 7 STRAND HIGH STRENGTH GRADE. INSTALL HORIZONTAL OR BELOW HORIZONTAL.
10. ½" GALVANIZED OVAL EYE BOLT.
11. NON-CORROSIVE METAL CABLE HANGERS AT 12" CENTERS.
12. MULTI-CONDUCTOR CABLE (SEE PLANS).
13. METER SOCKET AND CABINET.
14. CONTROLLER CABINET. ALL CONDUITS SHALL ENTER THE BOTTOM OF THE CABINET. NO HOLES SHALL BE MADE IN THE TOP, BACK OR SIDES OF THE CABINET.
15. JUNCTION BOX (NEMA 4).
16. DISCONNECT HANGER (NOT REQUIRED IF TEMPORARY)
17. CIRCUIT BREAKER. SEE STANDARD 902.15 FOR DETAILS.
18. ⅝" GALVANIZED STRAIGHT THIMBLEYE BOLT WITH GALVANIZED NUT AND 2½" GALVANIZED CURVE WASHER.
19. ⅝" GALVANIZED ANGLE THIMBLEYE.
20. TETHER WIRE AND CLAMP WITH QUICK RELEASE PROVISIONS. SEE DETAIL FOR MOUNTING TO POLE AND SIGNAL. OPTIONAL ATTACHMENT PERMITTED WITH APPROVAL OF ENGINEER.
21. 2½" GALVANIZED POST PLATE FASTENED TO POLE WITH ONE ⅝" GALVANIZED MACHINE BOLT & TWO ⅜" x 4" GALVANIZED LAG SCREWS.
22. 2½" GALVANIZED CONNECTOR END FITTING.
23. ALL LOCATIONS REQUIRE GUY WIRE PROTECTOR. (7' MIN.)
24. ¾" x 8' GALVANIZED THIMBLEYE ANCHOR ROD. (30" MIN. LENGTH IN ROCK).
25. #6 AWG BARE COPPER WIRE IN ½" CONDUIT.
26. ¼" AUTOMATIC JAW TYPE CABLE FITTING WITH SHORT BAIL. 5990 LBS. MINIMUM HOLDING STRENGTH.
27. LIGHTING CIRCUIT BREAKER CABINET (IF LUMINARIES ARE SPECIFIED SEE STANDARD 902.15 FOR DETAILS.



WOOD POLE SPAN WIRE SIGNALS

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:
100' FOR ONE OR TWO SPANS OFF POST, WITH ONE 5-SECTION HEAD SIGNAL, TWO 3-SECTION HEAD SIGNALS AND TWO SIGNS PER SPAN.

ALL APPURTENANCES TO BE MOUNTED ON POLE SHALL BE FASTENED TO POLE AS RECOMMENDED BY THE MANUFACTURER.

SCHEDULE 40 POLYETHYLENE OR POLYVINYL CHLORIDE CONDUIT AND WEATHER HEAD SHALL BE USED ON UTILITY COMPANY POLES IN LIEU OF RIGID STEEL CONDUIT.

NO DIRECT PAYMENT WILL BE MADE FOR GUYS, CONDUIT AND JUNCTION BOXES ON POLES, HARDWARE, LIGHTING BRACKET ARMS OR ANY OTHER ITEMS FOR WHICH SEPARATE PAYMENT IS NOT PROVIDED.

ALL GUY WIRES SHALL BE GROUNDED.

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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

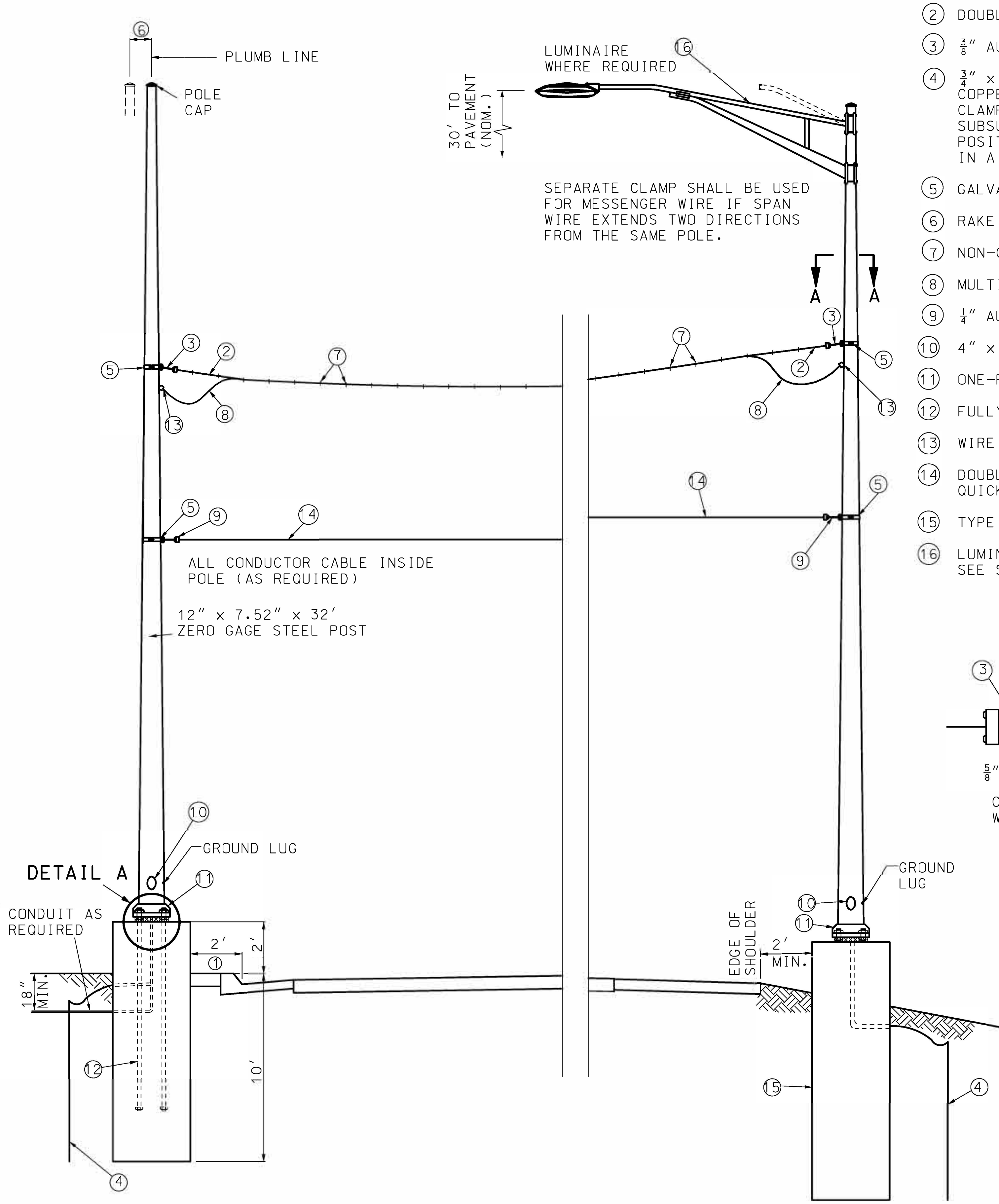
TRAFFIC SIGNALS
RIGID SPAN WIRE DETAILS

DATE EFFECTIVE: 04/01/2021
DATE PREPARED: 1/27/2021

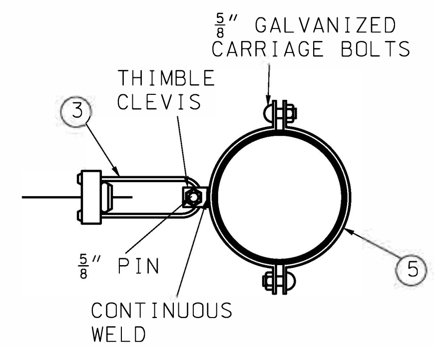
902.70Q

SHEET NO. 1 OF 3

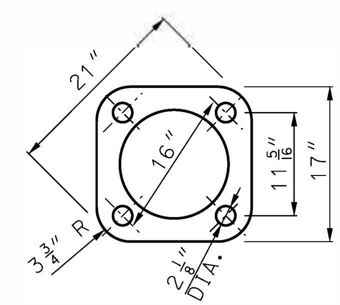
1. 6" IF LOCATED WITHIN 4' OF CONCRETE MEDIAN.
2. DOUBLE GALVANIZED $\frac{3}{8}$" (MIN.) STEEL MESSENGER WIRE - 7 STRAND HIGH STRENGTH GRADE.
3. $\frac{3}{8}$" AUTOMATIC JAW TYPE CABLE FITTING WITH SHORT BAIL. 13,860 LBS. MINIMUM HOLDING STRENGTH.
4. $\frac{3}{4}$" x 8' MIN. COPPER GROUND ROD, ONE POLE 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.



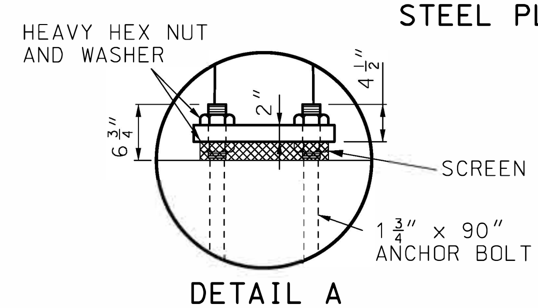
STEEL POST DETAILS



SECTION A-A



STEEL PLATE



DETAIL A
STEEL PLATE ANCHOR BASE

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.

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NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
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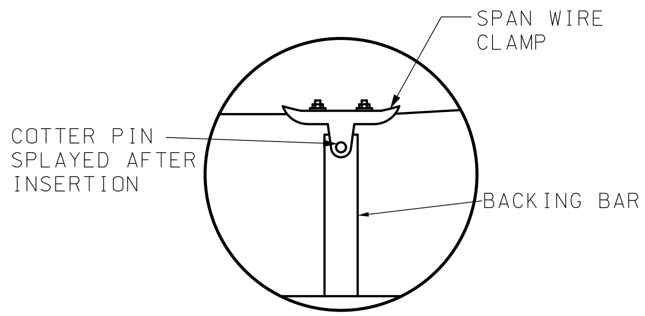
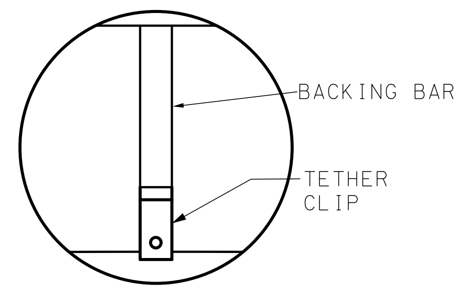
TRAFFIC SIGNALS
RIGID SPAN WIRE DETAILS

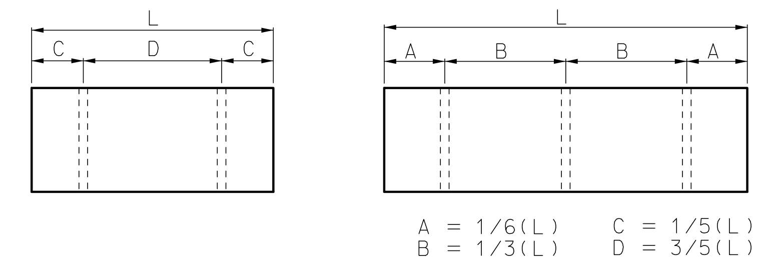
DATE EFFECTIVE:	04/01/2021	902.70Q	SHEET NO. 2 OF 3
DATE PREPARED:	1/27/2021		



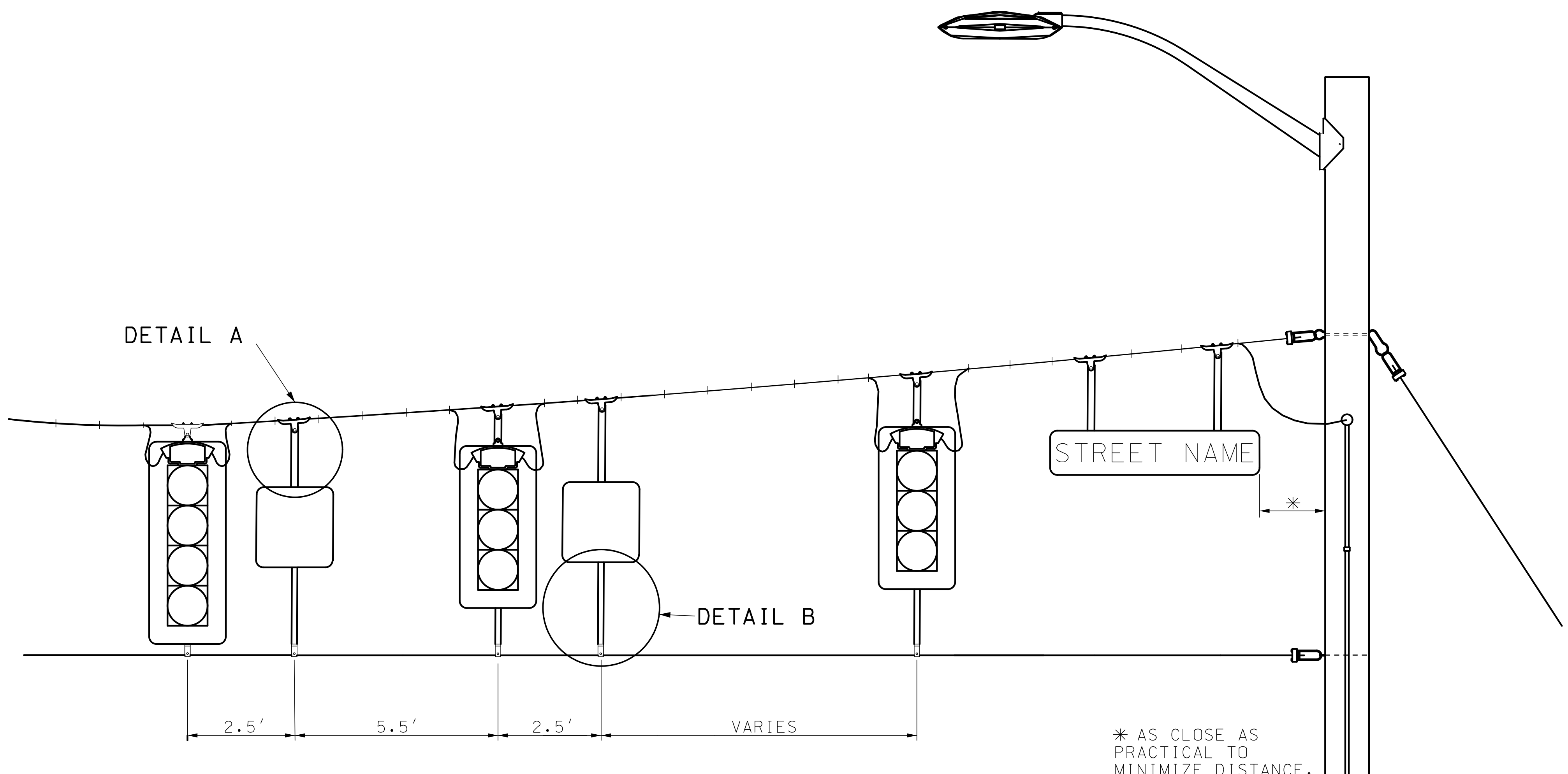
DETAIL A



DETAIL B



BACKING BAR PLACEMENT



SPAN WIRE SIGNING

GENERAL NOTES:

SIGNS UP TO 30" IN WIDTH SHALL BE INSTALLED ON ONE VERTICAL BACKING BAR. SIGNS 30" TO 60" IN WIDTH SHALL BE INSTALLED ON TWO VERTICAL BACKING BARS. SIGNS WIDER THAN 60" SHALL BE INSTALLED ON THREE VERTICAL BACKING BARS.

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.

TRAFFIC SIGNALS

RIGID SPAN WIRE
SIGN DETAILS

DATE EFFECTIVE: 01/01/2022
DATE PREPARED: 10/21/2021

902.70Q

SHEET NO.
3 OF 3

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

	OPTICALLY LIMITING SIGNAL HEAD WITH BACKPLATE
	OPTICALLY LIMITING & CONVENTIONAL SIGNAL HEAD WITH BACKPLATE
	CONVENTIONAL SIGNAL HEAD WITH BACKPLATE
	SIGNAL HEAD - PEDESTRIAN
	POST MOUNTED SIGNAL HEAD WITH SIGN AND BACKPLATE
	STOP LINE
	LANE USE
	TYPE A BASE
	TYPE F BASE
	TYPE C BASE
	EXISTING POST BASE
	WOOD POLE WITH DOWN GUY
	STEEL POLE
	STEEL POLE WITH DOWN GUY
	CONTROLLER WITH PAD
	EXISTING CONTROLLER
	PULL BOX, TYPE I DRAIN, CONCRETE
	PULL BOX, TYPE II DRAIN, CONCRETE
	PULL BOX, TYPE I DRAIN, PREFORMED
	PULL BOX, TYPE II DRAIN, PREFORMED
	DOUBLE PULL BOX, TYPE A, TYPE I DRAIN, CONCRETE
	DOUBLE PULL BOX, TYPE A, TYPE II DRAIN, CONCRETE
	DOUBLE PULL BOX, TYPE B, TYPE I DRAIN
	DOUBLE PULL BOX, TYPE B, TYPE II DRAIN
	PULL BOX, CLASS 5, TYPE I DRAIN, PREFORMED
	PULL BOX, CLASS 5, TYPE II DRAIN, PREFORMED

	EXISTING PULL BOX
	SERVICE POLE OR PEDESTAL AND POWER SUPPLY
	EXISTING SERVICE POLE
	LED - A LUMINAIRE
	SPAN WIRE WITH SIGNAL HEAD
	MAST ARM WITH SIGNAL HEADS AND LED - A LUMINAIRE
	MAST ARM WITH OVERHEAD SIGN
	INDUCTION LOOP DETECTOR
V	VIDEO DETECTION ZONE
	PUSH BUTTON DETECTOR
	CAPPED RIGID CONDUIT
	RIGID CONDUIT IN TRENCH
	RIGID CONDUIT PUSHED
	EXISTING RIGID CONDUIT
B B	RIGID CONDUIT ON BRIDGE
M M	RIGID CONDUIT IN MEDIAN
3"	SIZE OF CONDUIT
3-7c #16	NUMBER & AWG SIZE OF CABLE
7	SIGNAL FACE NUMBER
7	POST NUMBER
7	DETECTOR NUMBER
7	PULL BOX NUMBER
	WALK INTERVAL
	DON'T WALK INTERVAL
	FLASHING DON'T WALK INTERVAL

R	RED (CIRCULAR)
FR	FLASHING RED (CIRCULAR)
RL	RED LEFT ARROW
Y	YELLOW (CIRCULAR)
FY	FLASHING YELLOW (CIRCULAR)
FYA	FLASHING YELLOW ARROW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
YL	YELLOW LEFT ARROW
YR†	YELLOW RIGHT ARROW
G	GREEN (CIRCULAR)
S	GREEN STRAIGHT ARROW
L	GREEN LEFT ARROW
R†	GREEN RIGHT ARROW
R	TUNNEL VISOR WITH LOUVER

ALL 12 INCH WITH TUNNEL VISOR

SIGN	LEGEND
R10 - 10L	LEFT TURN SIGNAL
R10 - 10R	RIGHT TURN SIGNAL
R3 - 5L	LEFT ARROW (SYMBOL) ONLY
R3 - 5R	RIGHT ARROW (SYMBOL) ONLY
R3 - 5A	STRAIGHT ARROW (SYMBOL) ONLY
R3 - 6L	LEFT ARROW - STRAIGHT ARROW (SYMBOL)
R3 - 6R	RIGHT ARROW - STRAIGHT ARROW (SYMBOL)
R3 - 2	NO LEFT TURN (SYMBOL)
R3 - 1	NO RIGHT TURN (SYMBOL)
R3 - 3	NO TURNS
D3 - 1	STREET NAME (ONE LINE)
D3 - 1B	STREET NAME (TWO LINE)
R10 - 3E	CROSSWALK (PEDESTRIAN SYMBOL)
R10 - 11A	NO TURN ON RED
R10 - 13	EMERGENCY SIGNAL
R10 - 27A	LEFT TURN YIELD ON FLASHING ARROW

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STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
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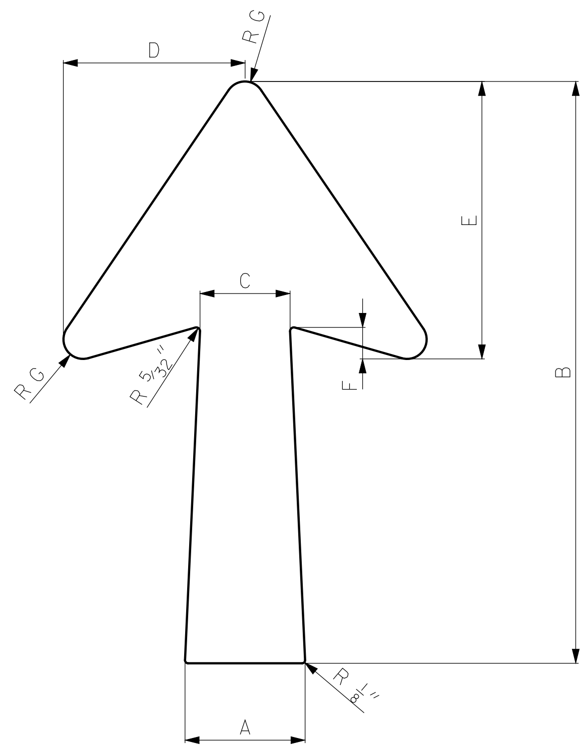
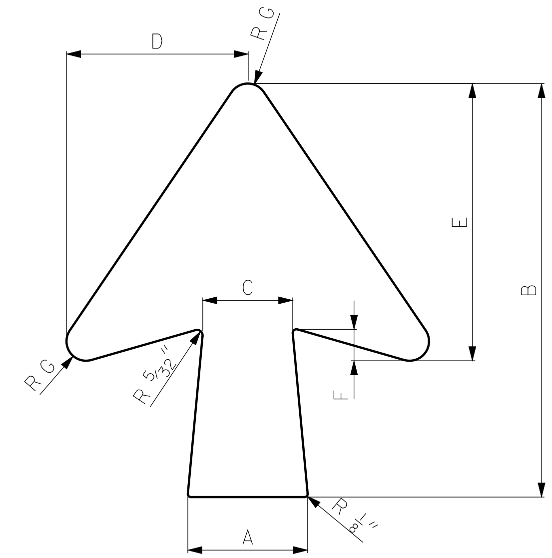
TRAFFIC SIGNALS
TRAFFIC SIGNAL SYMBOLS

DATE EFFECTIVE: 04/01/2020
DATE PREPARED: 1/21/2020
902.80L
SHEET NO. 1 OF 1



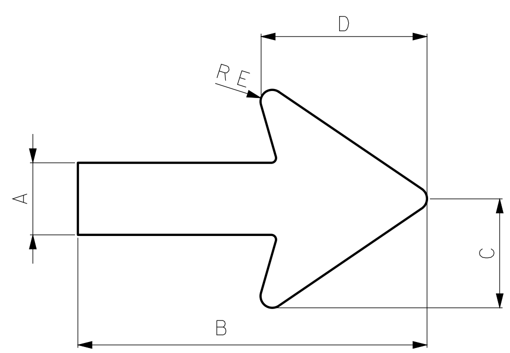
TYPE A

TYPE A ARROW TABLE							
LETTER SIZE	A	B	C	D	E	F	RG
8" U.C.	5"	25"	3 3/4"	7 9/16"	11 9/16"	1 5/16"	13/16"
10.67" & 13.33" U.C.	6"	30"	4 1/2"	9 1/8"	14"	1 1/2"	3/4"
16" U.C.	7 1/8"	35"	5 3/8"	11 1/8"	17"	1 3/4"	1"



TYPE B

TYPE B ARROW TABLE							
LETTER SIZE	A	B	C	D	E	F	RG
8" - 10.67" U.C.	5"	17"	3 3/4"	7 9/16"	11 9/16"	1 5/16"	13/16"
13.33" U.C.	6"	20"	4 1/2"	9 1/8"	14"	1 1/2"	3/4"
16" U.C.	7 1/8"	25"	5 3/8"	11 1/8"	17"	1 3/4"	1"

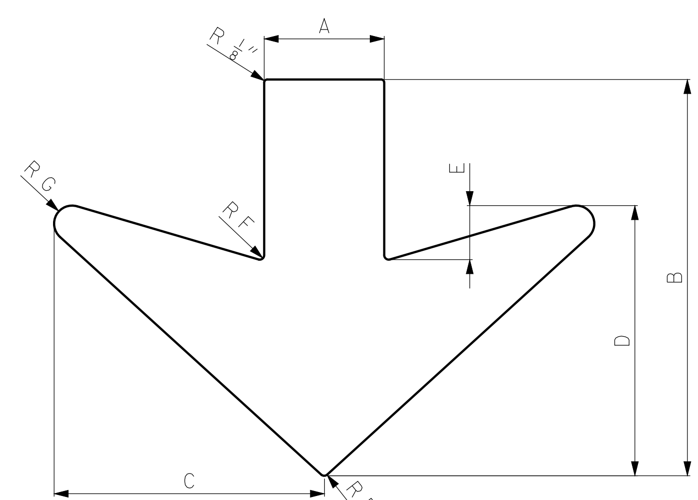


TYPE D

TYPE D ARROW TABLE					
LETTER SIZE	A	B	C	D	RE
6" U.C.**	2 1/4"	9" MIN.	3"	4 1/2"	7/16"
8" U.C.	2 3/4"	12 1/4"	3 9/16"	6 1/8"	9/16"
10.67" U.C.	3 1/4"	14 1/2"	4 3/8"	7 1/4"	5/8"
13.33" U.C.	3 3/4"	16 3/4"	5 1/16"	8 3/8"	3/4"
16" U.C.	4 1/2"	20"	6 1/16"	10"	7/8"
20" U.C.	5 1/2"	24 1/2"	7 1/2"	11 1/8"	1 1/8"

* FOR HORIZONTAL PLACEMENT UNDER LEGEND, DIMENSION "B" WILL BE EXTENDED, AT 1 FOOT INCREMENTS, TO APPROXIMATELY 50% OF THE MAXIMUM LEGEND WIDTH.

** FOR USE ON SIGNS WITH TYPE L-1 OR L-3 LEGENDS.



TYPE C

TYPE C OVERHEAD ARROW DIMENSIONS						
A	B	C	D	E	RF	RG
6 1/2"	22"	16"	16"	3"	3/16"	1"

GENERAL NOTES:

ARROWS FOR REFERENCE ONLY.

ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

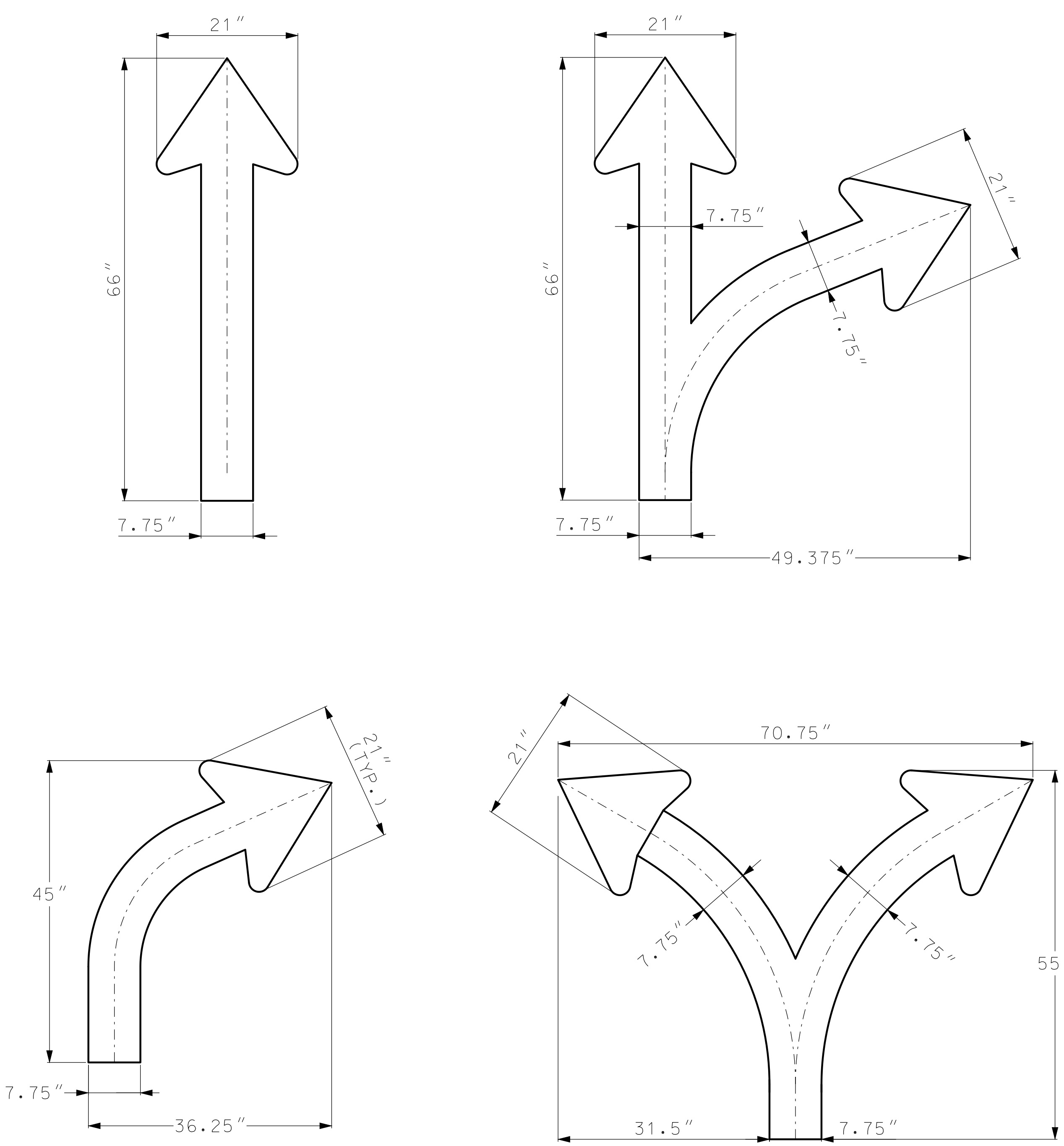
STANDARD ARROW DETAILS

DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

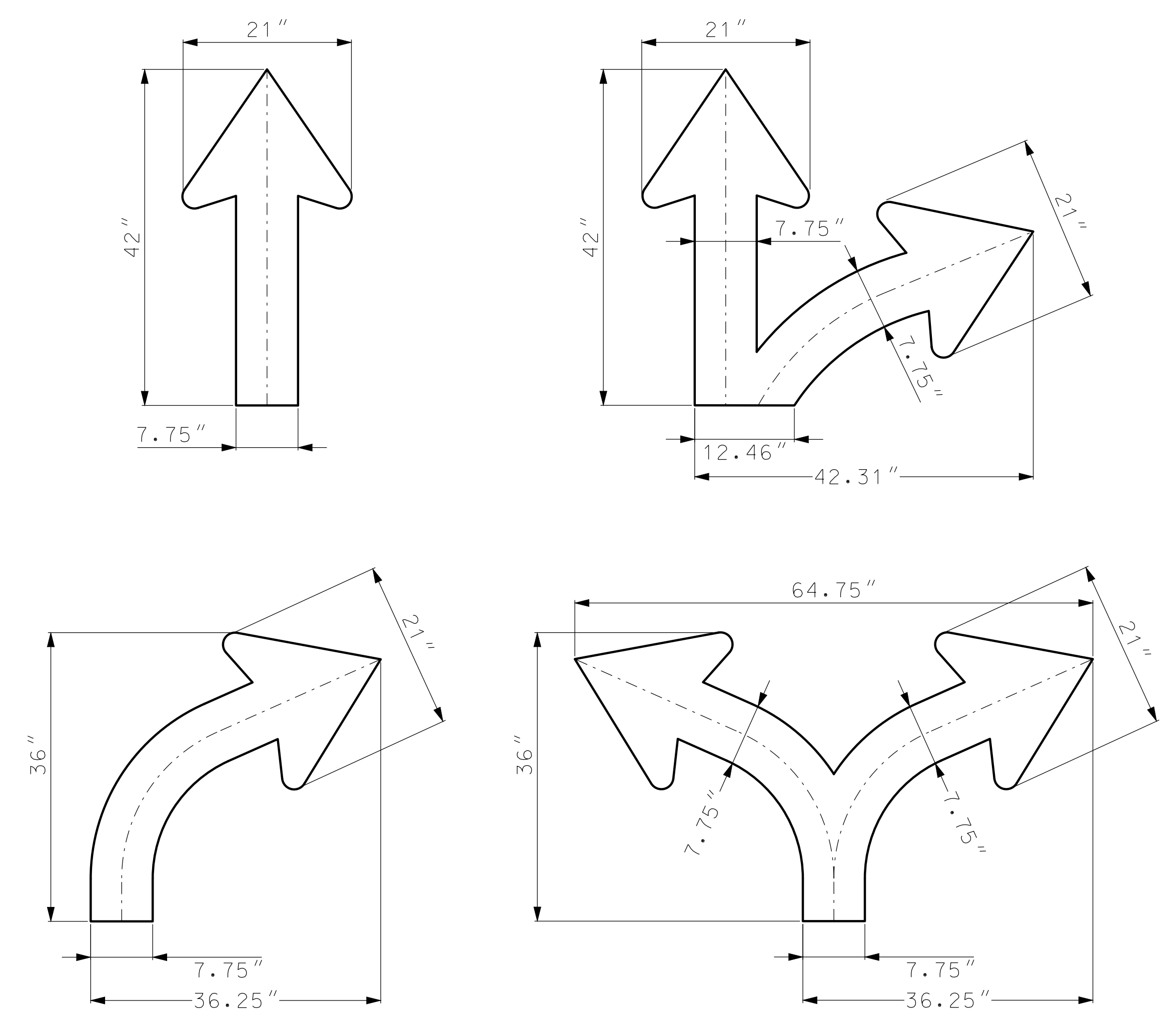
903.01J

SHEET NO.
1 OF 2

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



MUTCD ARROWS



MODOT ARROWS

GENERAL NOTES:

ARROWS FOR REFERENCE ONLY.

ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.

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STANDARD ARROW DETAILS

DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

903.01J

SHEET NO. 2 OF 2

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

STRUCTURAL SIGN DATA

DESIGNATION	COLOR SCHEME		SHEETING	
	LEGEND	BACKGROUND	LEGEND	BACKGROUND
STRUCTURAL (ST)	BLACK	WHITE	OPAQUE BLACK FILM	ASTM TYPE 4
	WHITE	RED	ASTM TYPE 9 OR 11	ASTM TYPE 4
	WHITE	GREEN	ASTM TYPE 9 OR 11	ASTM TYPE 4
	WHITE	BLUE	ASTM TYPE 9 OR 11	ASTM TYPE 4
	WHITE	BROWN	ASTM TYPE 9 OR 11	ASTM TYPE 4
STRUCTURAL FLUORESCENT (STF)	BLACK	FL YELLOW	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11
	BLACK	FL YELLOW GREEN	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11
	BLACK	FL ORANGE	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11

NOTE: WHITE LEGEND IS DIRECT APPLIED UNLESS SPECIFIED OTHERWISE.

FLAT SHEET SIGN DATA

DESIGNATION	COLOR SCHEME		SHEETING
	LEGEND	BACKGROUND	
FLAT SHEET (SH)	BLACK **	WHITE	ASTM TYPE 4 WHITE
	WHITE	BLACK **	ASTM TYPE 4 WHITE
	RED	WHITE	ASTM TYPE 4 WHITE
	WHITE	RED	ASTM TYPE 4 WHITE
	WHITE	GREEN	ASTM TYPE 4 WHITE
	GREEN	WHITE	ASTM TYPE 4 WHITE
	WHITE	BLUE	ASTM TYPE 4 WHITE
	WHITE	BROWN	ASTM TYPE 4 WHITE
FLAT SHEET FLUORESCENT (SHF)	BLACK **	FL YELLOW	ASTM TYPE 9 OR 11 FL YELLOW
	BLACK **	FL YELLOW GREEN	ASTM TYPE 9 OR 11 FL YELLOW GREEN
	BLACK **	FL ORANGE	ASTM TYPE 9 OR 11 FL ORANGE

** OPAQUE INK OR FILM

NOTE: LEGEND AND BACKGROUND COLORS ARE ACHIEVED THROUGH TRANSLUCENT INKS AND FILMS.

FLAT SHEET THICKNESS	
SIGN SIZE	THICKNESS
9 SF OR LESS	0.080 IN.
OVER 9 SF TO 16 SF	0.100 IN.
16 SF OR LARGER	0.125 IN.

GENERAL NOTES:

GROUND MOUNTED SIGNS GREATER THAN 5 FEET WIDE OR SIGNS GREATER THAN 30 SQUARE FEET SHALL BE STRUCTURAL.

ALL NON STANDARD SIGNS NOT FOUND IN THE MUTCD SHS MANUAL SHALL BE DETAILED BY THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING, SUBSTRATE AND FABRICATION DETAILS.

FOR MOUNTING DETAILS, SEE STANDARD PLANS 903.02.

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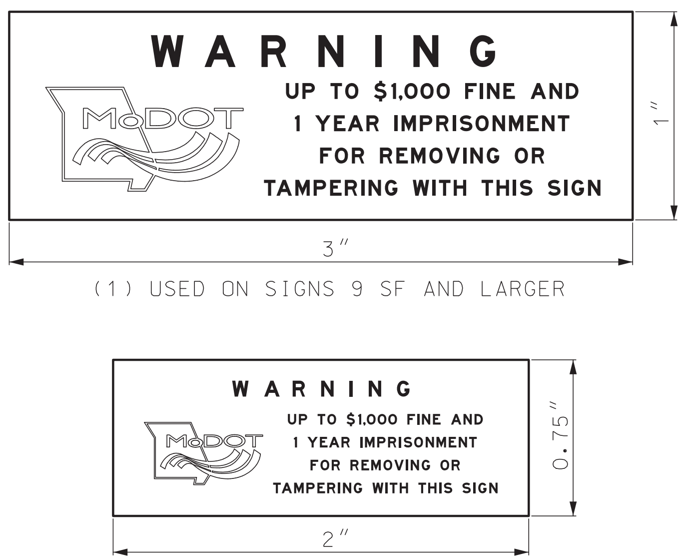
HIGHWAY SIGNING

GENERAL SIGN DATA

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019
903.02AP

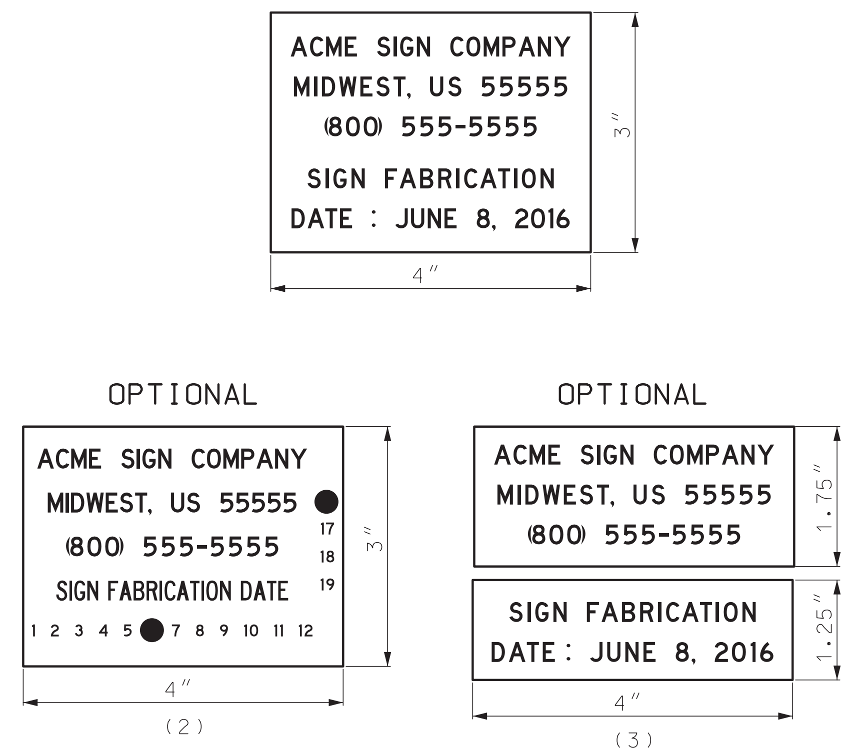
MODOT ID LABEL DETAILS

PLACED ON THE SIGN FACE



VENDOR ID LABEL DETAILS

PLACED ON THE BACK OF THE SIGN

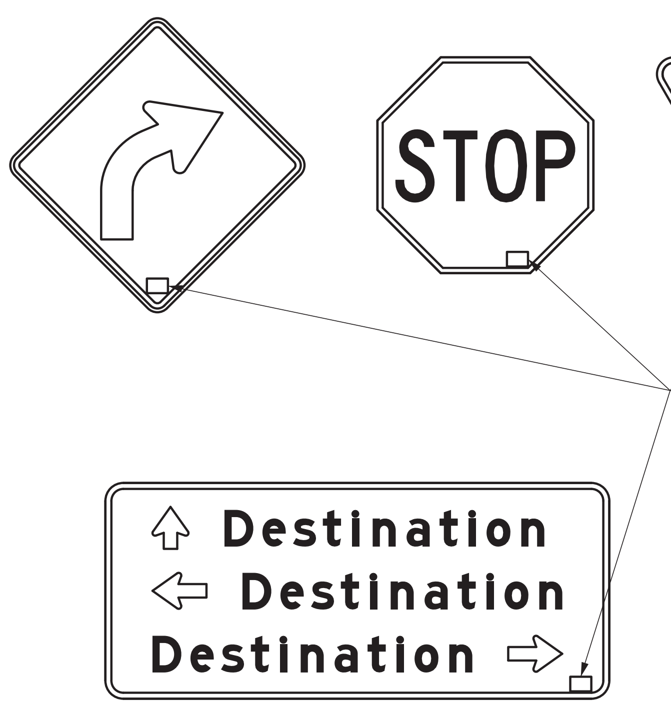


(1) MODOT ID LABEL DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.

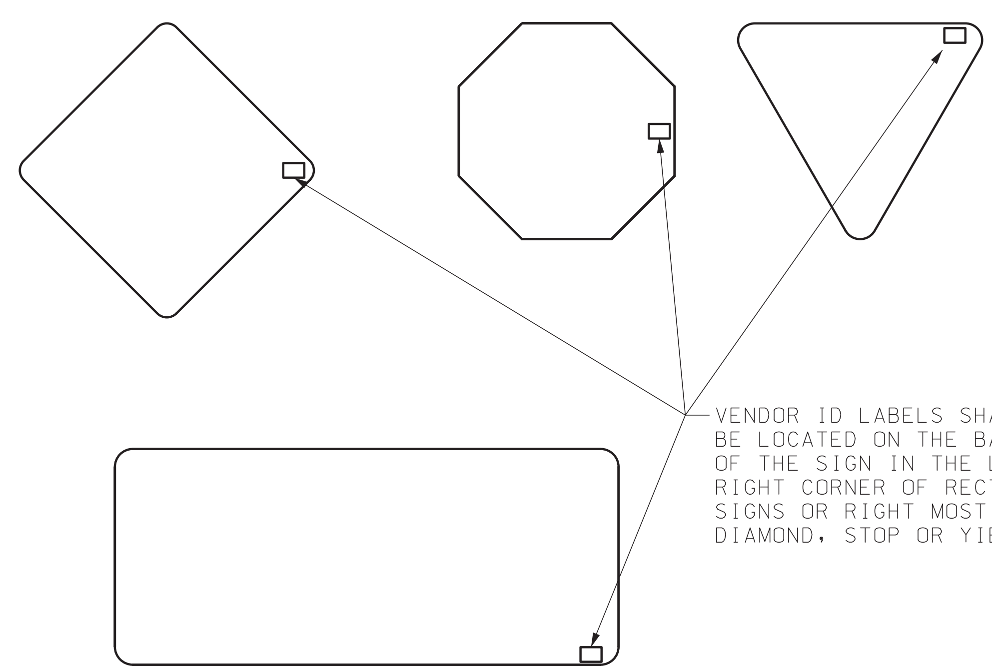
(2) TO FACILITATE MASS PRODUCTION OF LABELS, THE FABRICATION DATE MAY BE INDICATED BY DISPLAYING NUMBERS FOR MONTHS ALONG THE BOTTOM OF THE LABEL AND NUMBERS FOR YEARS ALONG THE RIGHT SIDE OF THE LABEL. THE FABRICATION DATE WOULD BE INDICATED BY HOLE PUNCHING THE APPROPRIATE NUMBERS (OR SOME EQUIVALENT PERMANENT METHOD TO BLOCK OUT OF THE NUMBERS) FOR THE MONTH AND YEAR BEFORE THE LABEL IS APPLIED TO THE SIGN.

(3) INDIVIDUAL DECALS MAY BE USED TO DISPLAY THE VENDOR INFORMATION AND THE FABRICATION DATE. DECALS SHALL BE INSTALLED IN CLOSE VERTICAL PROXIMITY.

(4) THE MODOT ID LABEL MAY BE PLACED ON THE BACK OF THE SIGN ABOVE THE VENDOR ID LABEL IF THERE IS INSUFFICIENT SPACE AVAILABLE TO DISPLAY THE ID LABEL ON THE SIGN FACE WITHOUT INTERFERING WITH THE SIGN LEGEND OR BOARDER.



MODOT ID LABELS SHALL BE LOCATED AT THE BOTTOM RIGHT CORNER OF ANY RECTANGULAR SIGN, IN THE BOTTOM POINT OF A DIAMOND OR YIELD SIGN AND AT THE LOWER RIGHT CORNER OF A STOP SIGN IN CLOSE PROXIMITY TO THE SIGN BORDER. AVOID BOLT HOLE LOCATIONS. (4)



VENDOR ID LABELS SHALL BE LOCATED ON THE BACK OF THE SIGN IN THE LOWER RIGHT CORNER OF RECTANGULAR SIGNS OR RIGHT MOST EDGE OF DIAMOND, STOP OR YIELD SIGNS.

GENERAL NOTES:

ALL DECALS SHALL BE SILK SCREEN PRINTED WITH MATCHED COMPONENT INK AND SHEETING MATERIALS TO PROVIDE A LABEL THAT HAS AN EQUAL LIFE EXPECTANCY AS THE SIGN FACE.

MODOT ID LABELS SHALL BE PRINTED ON CLEAR ELECTROCUT FILM BACKGROUND WITH BLACK INK OR IT MAY BE INCORPORATED INTO THE SILK SCREEN DETAIL AND PRINTED ALONG WITH THE SIGN FACE.
IF THE LABEL IS APPLIED IN THIS MANNER THE LEGEND OF THE LABEL SHALL MATCH THE COLOR OF THE SIGN LEGEND IT IS BEING APPLIED TO. THE LABEL SHALL NOT HAVE ANY BACKGROUND COLOR OR BORDER.

VENDOR ID LABEL SHALL CONTAIN THE COMPANY CONTACT INFORMATION (INCLUDING FULL NAME, CITY, STATE, PHONE NUMBER) AND THE SIGN FABRICATION DATE.

VENDOR ID LABEL SHALL BE PRINTED ON A WHITE BACKGROUND WITH BLACK INK AND THE LEGEND SHALL BE A MINIMUM OF 1/4".

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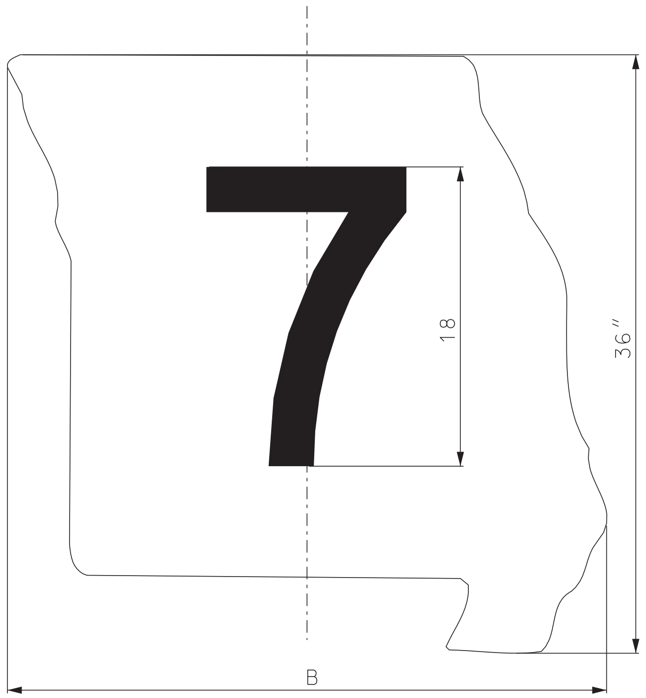
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY SIGNING

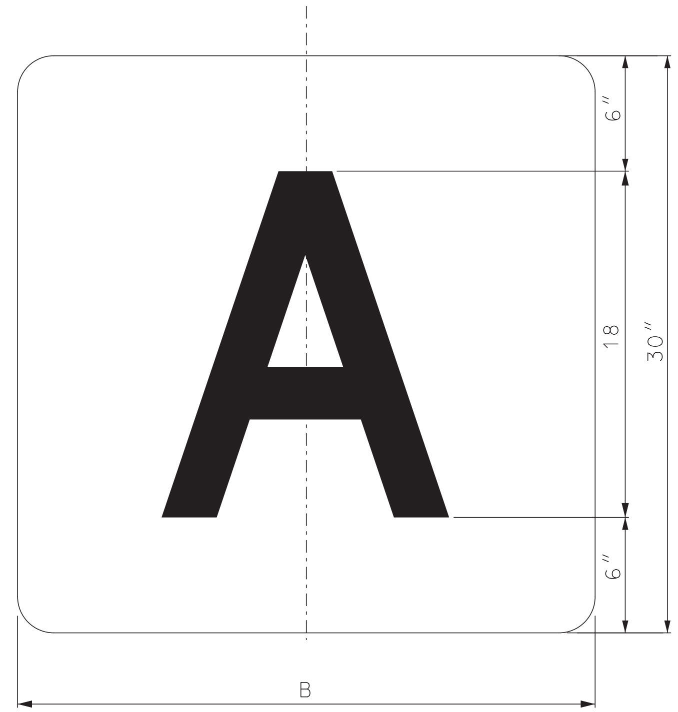
GENERAL SIGN DATA

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019
903.02AP

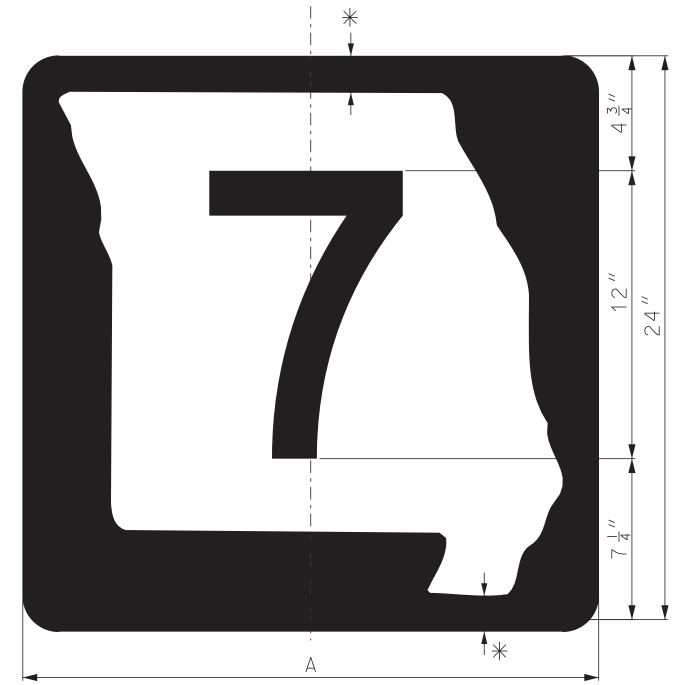
STATE NUMBER ROUTE SHIELD
GUIDE SIGN USE



STATE LETTER ROUTE SHIELD
GUIDE SIGN USE

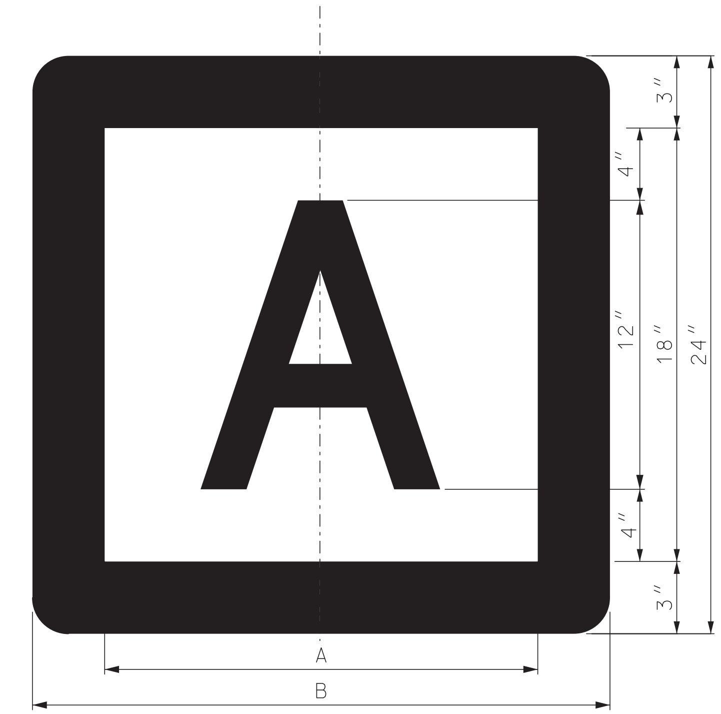


STATE NUMBER ROUTE SHIELD
INDEPENDENT USE



* DIMENSIONS SHALL BE EQUAL

STATE LETTER ROUTE SHIELD
INDEPENDENT USE



LOCATION	NO. OF LETTERS	DIMENSIONS (INCHES)		LEGEND FONTS
		A	B	
INDEPENDENT USE	1	18	24	D
INDEPENDENT USE	2	24	30	D
GUIDE SIGN USE	1	–	30	D
GUIDE SIGN USE	2	–	36	D

STATE LETTER ROUTE SHIELD

LOCATION	ROUTE NUMBER	DIMENSIONS (INCHES)		LEGEND FONTS
		A	B	
INDEPENDENT USE	1 & 2 DIGITS	24	24	D,C
INDEPENDENT USE	3 DIGITS	30	30	D,C,B
GUIDE SIGN USE	1 & 2 DIGITS	–	36	D,C
GUIDE SIGN USE	3 DIGITS	–	45	D,C,B

STATE NUMBER ROUTE SHIELD

GENERAL NOTES:

REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING AND SUBSTRATE DETAILS.

FOR HOLE PUNCHING AND MOUNTING DETAILS SEE OTHER DRAWINGS.

FOR GENERAL SIGN DATA DETAILS SEE OTHER DRAWINGS.

THE MISSOURI SHAPE DETAIL MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

GUIDE SIGN USE SHALL BE DIRECT APPLIED. POST MOUNTED USE SHALL BE APPLIED TO ALUMINUM SUBSTRATE.

FOR NUMBERED ROUTES WITH MORE THAN 1 DIGIT THE LEGEND FONT MAY NEED TO BE REDUCED TO C OR B FONT.

SEE MUTCD SHS FOR DETAILS FOR US AND INTERSTATE ROUTE SHIELDS.

NON-STANDARD SHIELD SIZES MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

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STATE OF MISSOURI
NICOLE A. KOLB HOOD
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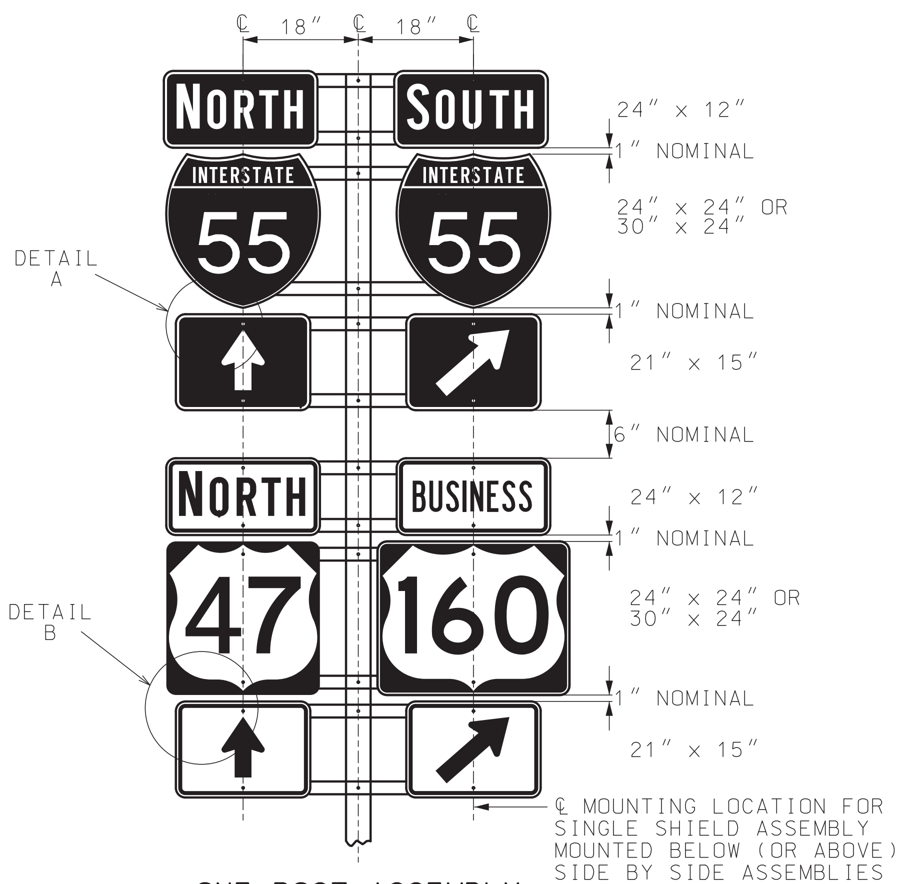
HIGHWAY SIGNING
STANDARD SHIELDS FOR INDEPENDENT AND GUIDE SIGN USE

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

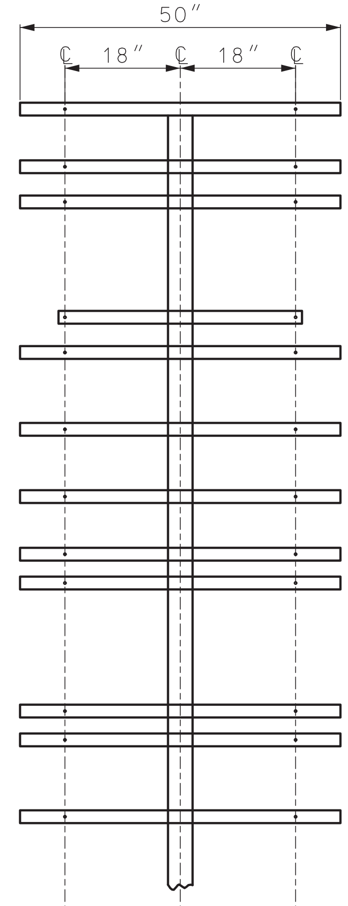
903.02AP

SHEET NO. 3 OF 8

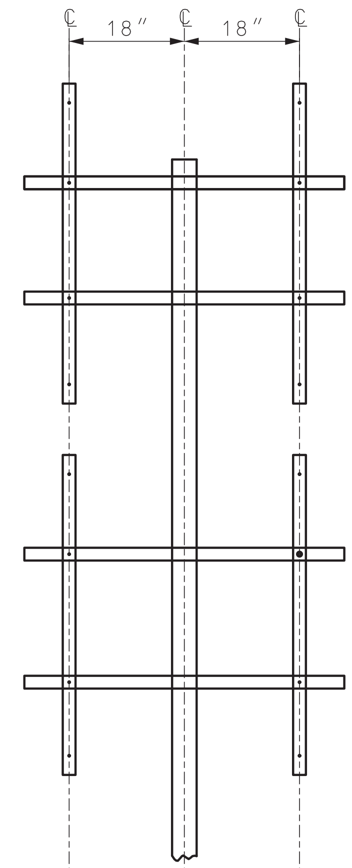
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



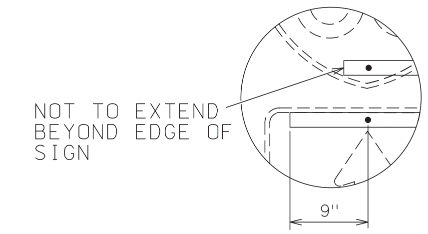
ONE POST ASSEMBLY
USE TO SUPPORT UP TO 4 ROUTE MARKERS



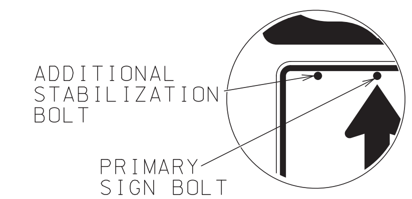
STANDARD BACKING BAR LAYOUT



OPTIONAL BACKING BAR LAYOUT



DETAIL A
SEE GENERAL NOTES



DETAIL B
SEE GENERAL NOTES

GENERAL NOTES:

ALL BACKING BARS SHALL BE 2″x $\frac{3}{8}$″ STEEL, GALVANIZED AFTER PUNCHING. WEIGHT = 2.55 LBS. PER FOOT. HOLES IN BARS SHALL BE $\frac{3}{8}$″ AND SHALL BE PUNCHED AS SHOWN ON THIS DRAWING.

DETAIL A - THE END OF THE HORIZONTAL BACKING BARS SHALL EXTEND MAXIMUM OF 9 INCHES PAST THE SIGN BOLT, BUT SHALL NOT EXTEND PAST THE EDGE OF THE SIGN.

DETAIL B - FOR SIGNS INSTALLED ON TWO PARALLEL HORIZONTAL BACKING BARS, ONE ADDITIONAL BOLT SHALL BE ADDED TO THE LEFT SIGN TO KEEP ASSEMBLY SQUARE.

WHEN USING OPTIONAL BACKING BAR LAYOUT, VERTICAL BARS SHALL BE MOUNTED BEHIND HORIZONTAL BARS.

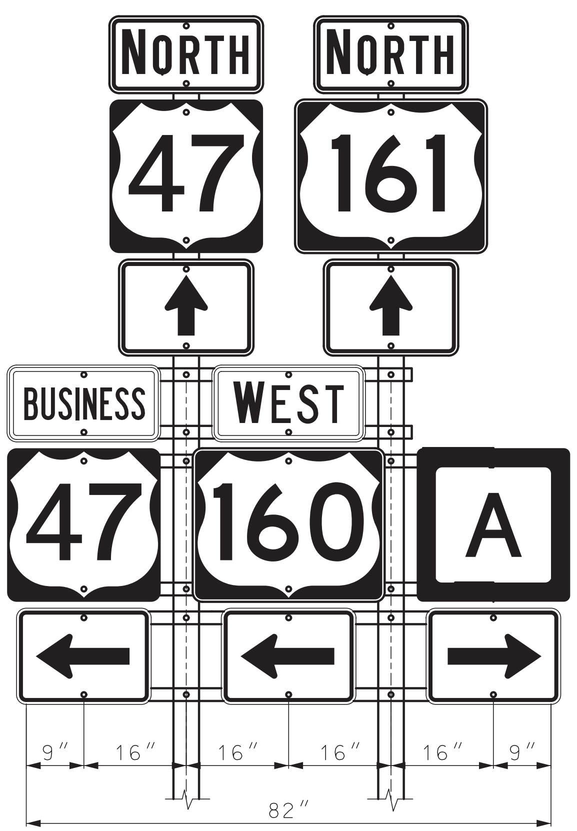
BACKING BARS SHALL MEET MISSOURI STANDARD PLANS OR APPROVED PRODUCTS LIST.

BACKING BARS PAID FOR AS STRUCTURAL STEEL, PER POUND.

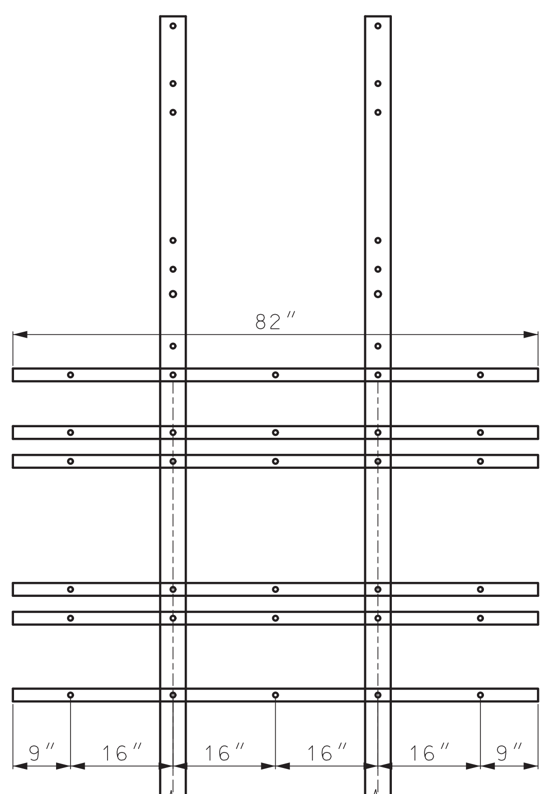
ALL SIGNS TO BE INSTALLED ALONG VERTICAL CENTERLINES.

FOR POST AND FOOTING DATA AND DETAILS OF SHIELDS AND PLAQUES, SEE OTHER DRAWINGS.

NOMINAL VERTICAL SPACING INDICATED BETWEEN SIGNS TO BE ACHIEVED BY USING THE CLOSEST AVAILABLE HOLES WHEN USING PSST.



TWO POST ASSEMBLY
USE TO SUPPORT 5 OR 6 ROUTE MARKERS



STANDARD BACKING BAR LAYOUT

TWO POST ASSEMBLY NOTE:

OPTIONAL BACKING BAR LAYOUT MAY BE USED WITH TWO POST ASSEMBLY.

FOR 6 ROUTE SHIELD ASSEMBLY ADDITIONAL BACKING BARS ARE REQUIRED.

POST SELECTION

SINGLE POST ASSEMBLIES SHALL USE A 4″ PIPE POST OR A $2\frac{1}{2}$″ PSST POST.

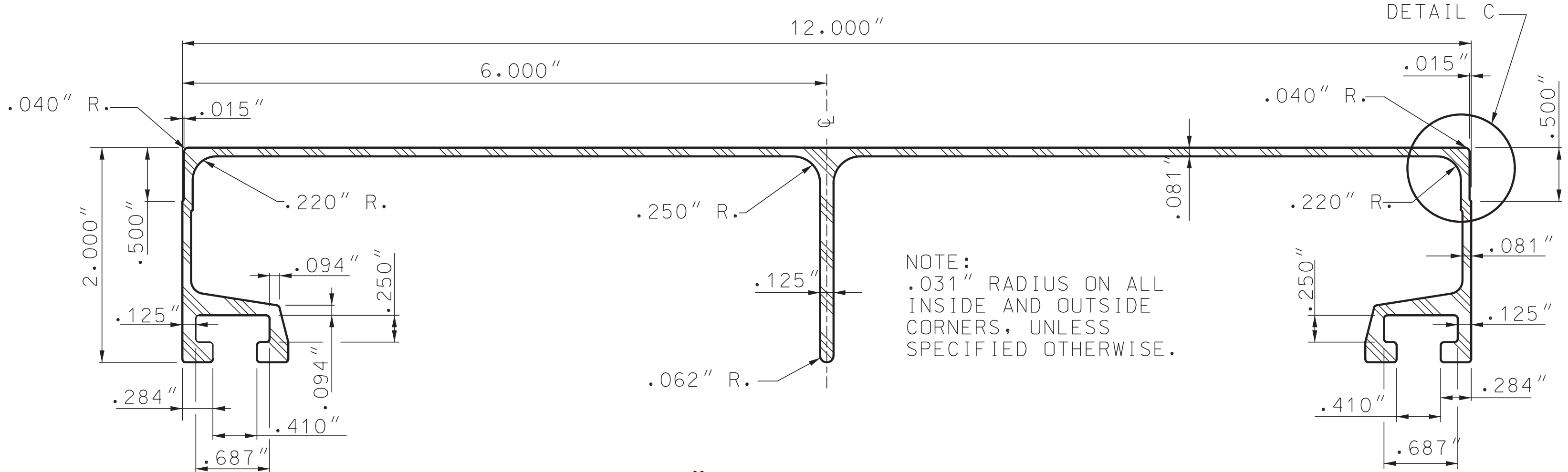
TWO POST ASSEMBLIES SHALL USE TWO 4″ PIPE POSTS OR TWO $2\frac{1}{2}$″ PSST POST WITH $2\frac{1}{4}$″ PSST INSERTS AND BREAKAWAYS. (SEE STANDARD PLAN 903.03)

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
BACKING BARS
SHEET SIGN MOUNTING
ROUTE SHIELD AND
MARKER ASSEMBLIES

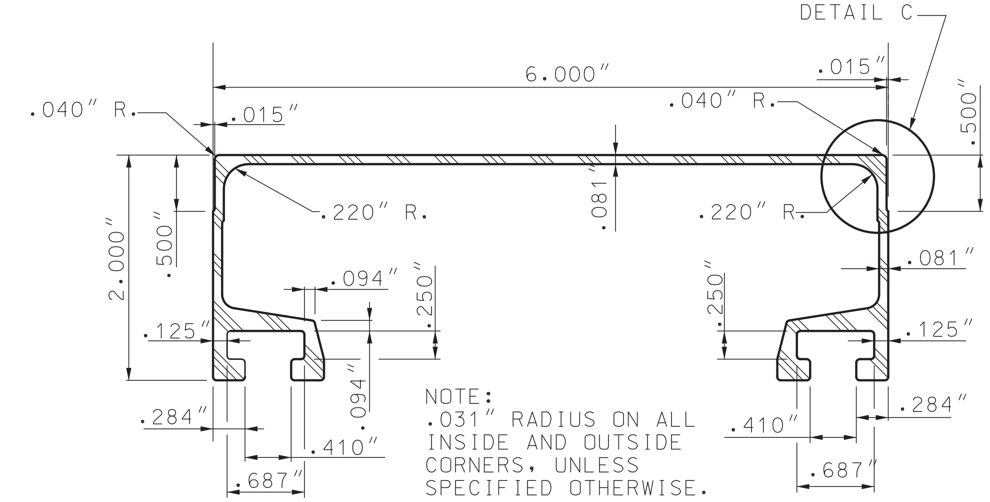
DATE EFFECTIVE:	10/01/2019	903.02AP	SHEET NO. 4 OF 8
DATE PREPARED:	7/18/2019		



12″ EXTRUDED ALUMINUM PANEL

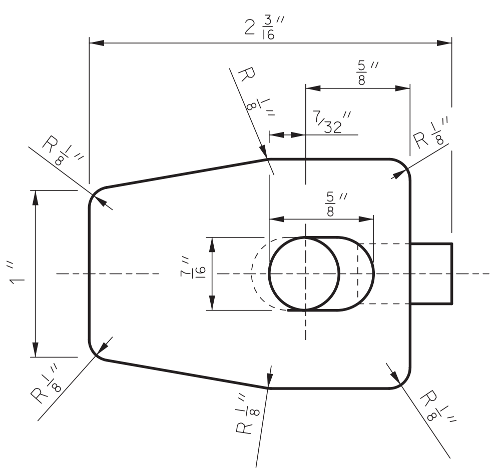
MINIMUM WT. = 2.40 LBS./FT.

NOTE:
MINIMUM WEIGHT AND THICKNESS DIMENSIONS SHOWN.
HEAVIER PANELS MAY BE USED.

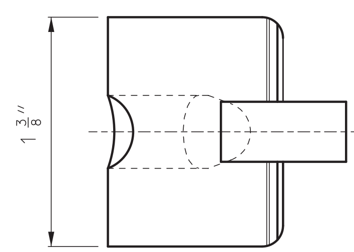


6″ EXTRUDED ALUMINUM PANEL

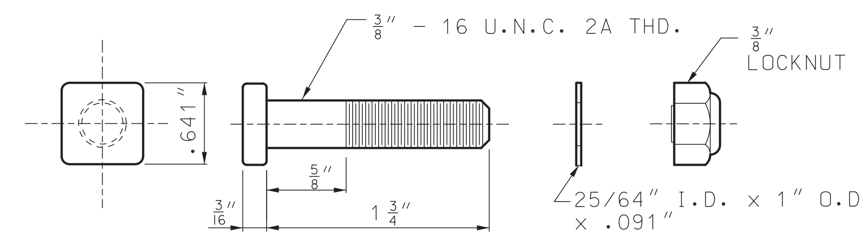
MINIMUM WT. = 2.40 LBS./FT.



PLAN VIEW



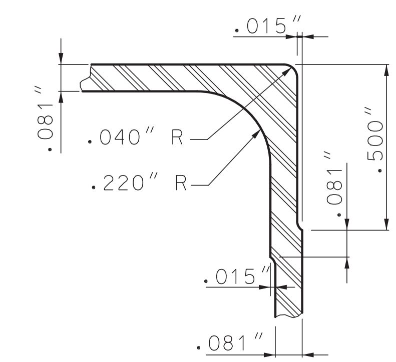
END VIEW



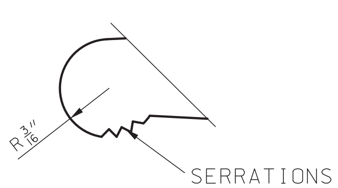
POST CLIP BOLT
WITH FLAT WASHER AND LOCKNUT

NOTE:
SQUARE BOLT HEAD SHOWN.
RECTANGULAR BOLT HEAD WITH
LEAST DIMENSION OF .641″ MAY
BE USED.

BOLT - 1 3/4 × 3/8 ALUMINUM
HEX LOCKNUT - 3/8″ ALUMINUM
WASHER - ALUMINUM

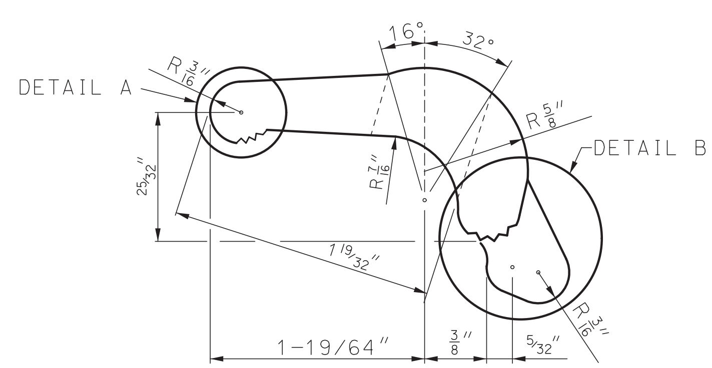


DETAIL C



DETAIL A

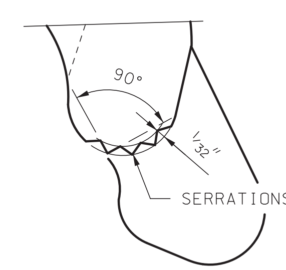
ENLARGED VIEW OF
SERRATIONS



ELEVATION VIEW

POST CLIP

POST CLIPS SHALL BE ASTM B 108, 356-T6 ALUMINUM ALLOY.



DETAIL B

ENLARGED DETAIL OF SERRATIONS

SAW GATING AS SHOWN
(APPROXIMATELY FLAT PERMISSABLE)

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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STATE OF MISSOURI
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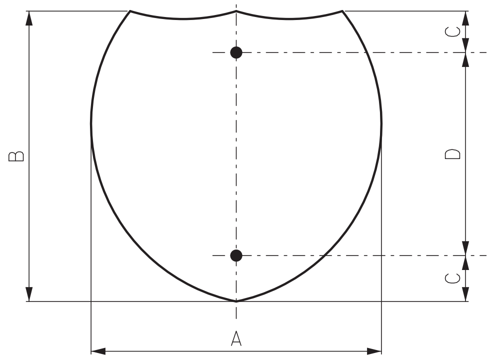
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

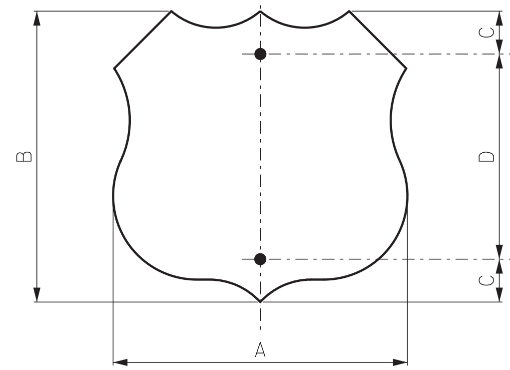
HIGHWAY SIGNING

EXTRUDED ALUMINUM PANEL DETAILS

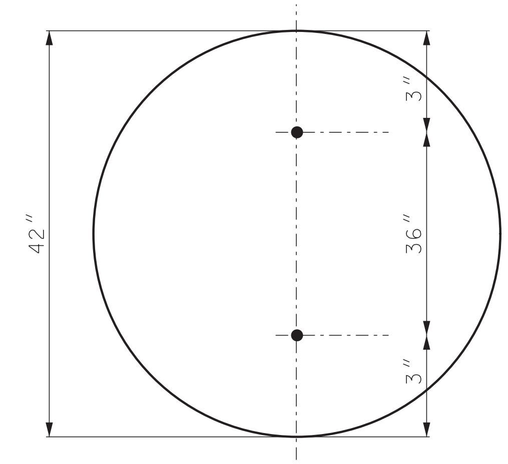
DATE EFFECTIVE: 10/01/2019	903.02AP	SHEET NO.	5 OF 8
DATE PREPARED: 7/18/2019			

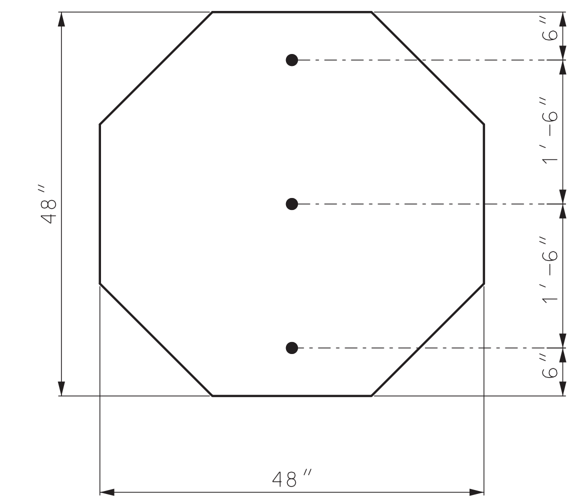


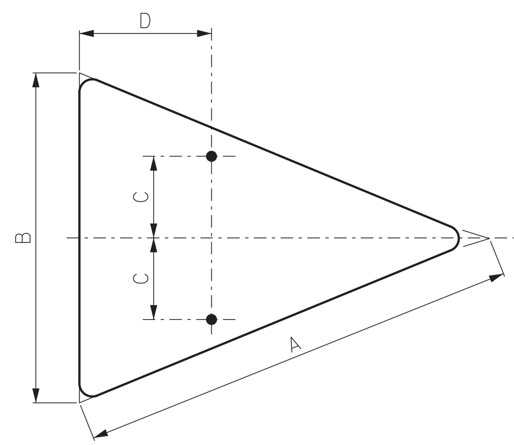
DIMENSIONS (IN.)			
A	B	C	D
24	24	3	18
30	24	3	18
36	36	6	24
45	36	6	24



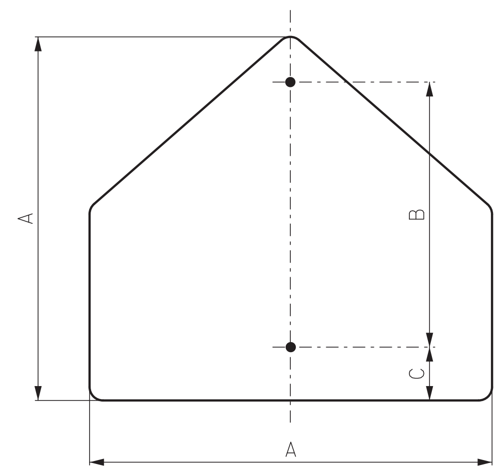
DIMENSIONS (IN.)			
A	B	C	D
24	24	3	18
30	24	3	18
36	36	6	24
45	36	6	24



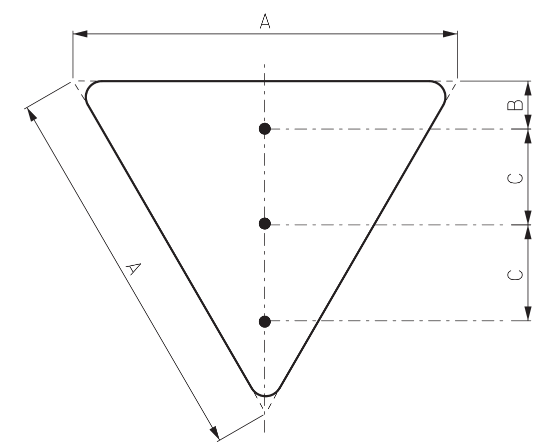




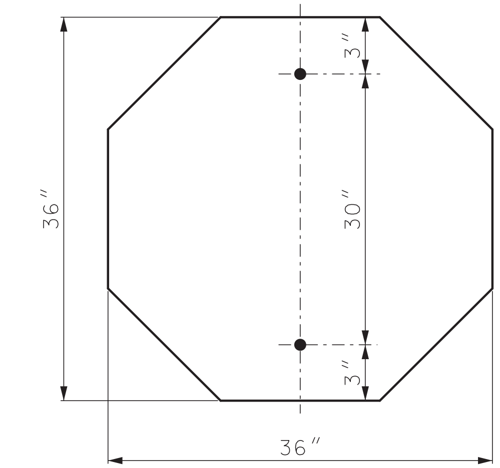
DIMENSIONS (IN.)				
A	B	C	D	RADIUS
40	30	7.5	12	1.875
48	36	9	15	2.25



DIMENSIONS (IN.)			
A	B	C	RADIUS
36	24	3	2.25



DIMENSIONS (IN.)			
A	B	C	RADIUS
48	6	12	3
60	8	15	4



GENERAL NOTES:

SIGNS WITH FOUR OR MORE HOLES REQUIRE BACKING BARS OR MULTIPLE POSTS.

HOLES IN SIGNS SHALL BE ⅜″ AND PUNCHED AS SHOWN ON THIS DRAWING.

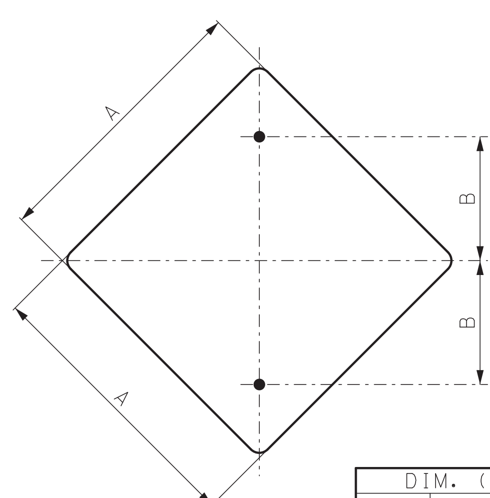
FLAT SHEET FOR SIGNS SHALL BE THE FOLLOWING THICKNESS:

9 SQUARE FEET OR LESS - .080 IN.,

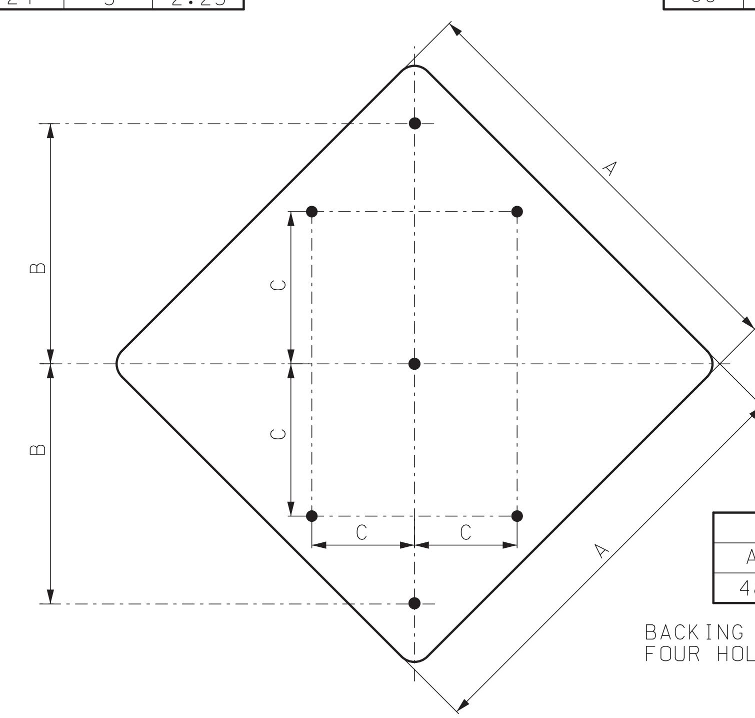
OVER 9 SQUARE FEET BUT LESS THAN 16 SQUARE FEET - .100 IN.,

16 SQUARE FEET OR LARGER - .125 IN.

FOR MOUNTING DETAILS, SEE OTHER DRAWINGS.



DIM. (IN.)		
A	B	RADIUS
18	9	1.5
24	12	1.5
30	15	1.875
36	18	2.25



DIMENSIONS (IN.)			
A	B	C	RADIUS
48	24	15	3

BACKING BARS ONLY REQUIRED FOR FOUR HOLE PUNCH INSTALLATION.

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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

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HIGHWAY SIGNING

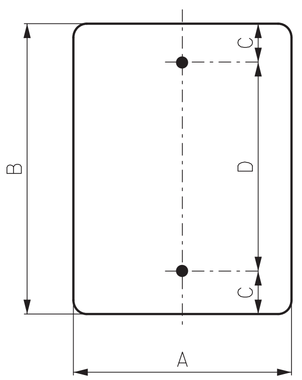
HOLE PUNCHING

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

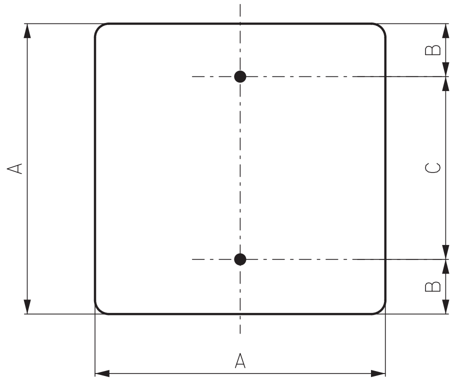
903.02AP

SHEET NO. 6 OF 8

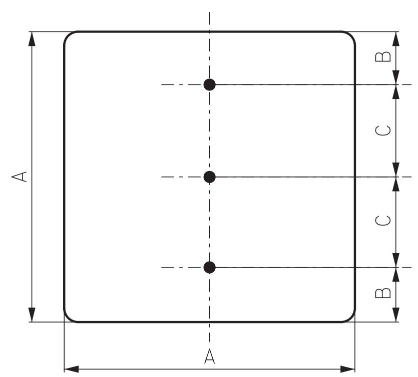
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



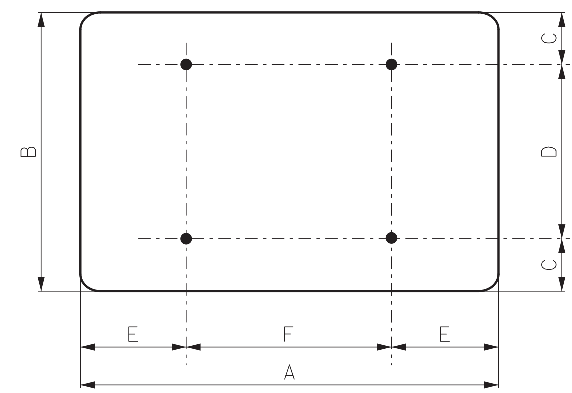
DIMENSIONS (IN.)				
A	B	C	D	RADIUS
4	16	0.75	14.5	SQ
6	12	1.5	9	1
9	12	3.5	5	1.5
9	15	3.75	7.5	1.5
12	18	3	12	1.5
12	24	3	18	1.5
12	36	3	30	1.5
12	48	3	42	1.5
15	21	3	15	1.5
18	24	3	18	1.5
24	30	3	24	1.5
24	36	3	30	1.5
30	36	3	30	1.875
30	42	3	36	1.875
30	48	6	36	1.875



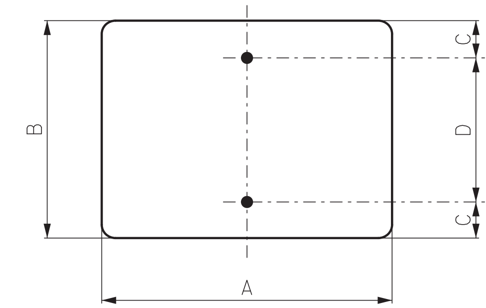
DIMENSIONS (IN.)			
A	B	C	RADIUS
12	1.5	9	1.5
18	3	12	1.5
24	3	18	1.5
30	3	24	1.875
36	6	24	2.25



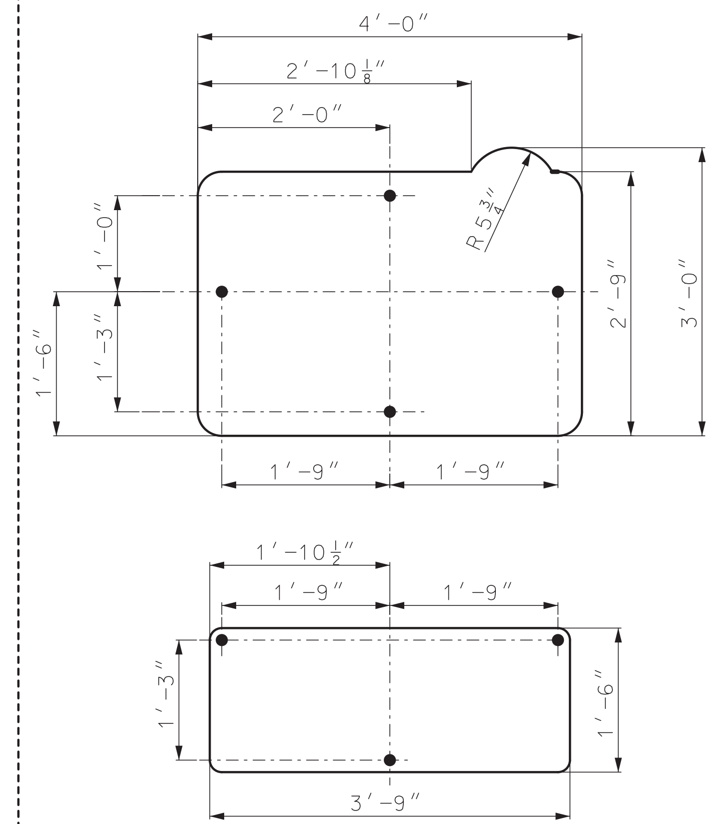
DIMENSIONS (IN.)			
A	B	C	RADIUS
48	6	18	3



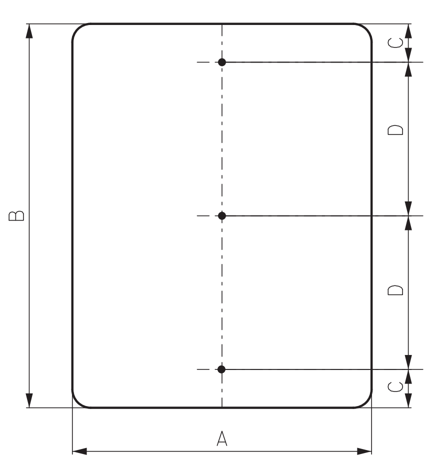
DIMENSIONS (IN.)						
A	B	C	D	E	F	RADIUS
48	12	1.5	9	9	30	1.5
48	18	1.5	15	9	30	1.5
48	24	3	18	9	30	1.5
48	30	3	24	9	30	1.875
48	36	6	24	9	30	2.25
54	18	1.5	15	9	36	1.5
60	12	1.5	9	12	36	1.5
60	18	1.5	15	12	36	1.5
60	24	3	18	12	36	1.5
60	30	3	24	12	36	1.875
60	36	6	24	12	36	2.25
60	48	6	36	12	36	3
72	36	6	24	12	48	2.25
72	48	6	36	12	48	3



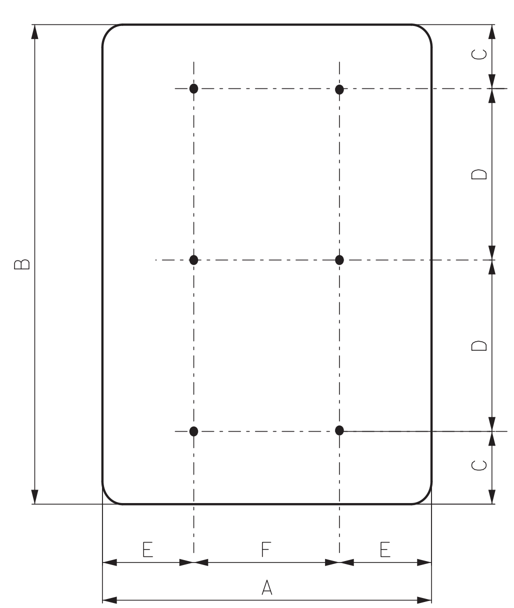
DIMENSIONS (IN.)				
A	B	C	D	RADIUS
4	5	1.5	2	1.5
12	9	1.5	6	1.5
18	9	1.5	6	1.5
18	12	1.5	9	1.5
21	15	1.5	12	1.5
24	8	1.5	5	1.5
24	12	1.5	9	1.5
24	18	3	12	1.5
30	8	1.5	5	1.5
30	12	1.5	9	1.5
30	18	3	12	1.5
30	24	3	18	1.5
36	8	1.5	5	1.5
36	12	1.5	9	1.5
36	18	3	12	1.5
36	24	3	18	1.5
36	30	3	24	1.875
42	8	1.5	5	1.5
42	18	3	12	1.5
42	24	3	18	1.5
42	30	3	24	1.875
42	36	3	30	2.25
48	8	1.5	5	1.5



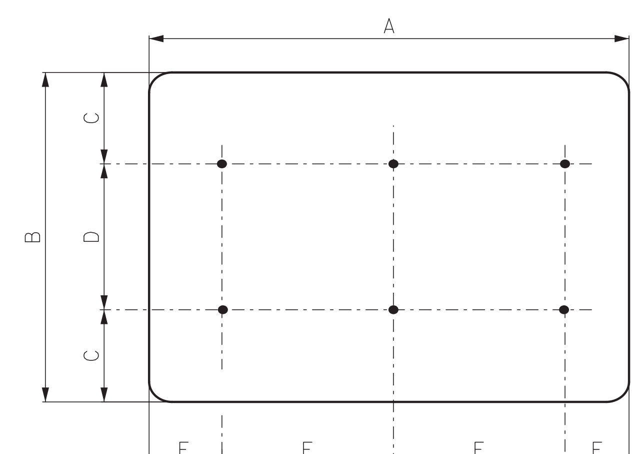
ADOPT A HIGHWAY
PRIMARY SIGN AND
NAME PANEL



DIMENSIONS (IN.)				
A	B	C	D	RADIUS
4	72	6	30	SQ
12	72	6	30	1.5
18	60	6	24	1.5
24	48	6	18	1.5
36	48	6	18	2.25
36	60	6	24	2.25
36	72	6	30	2.25

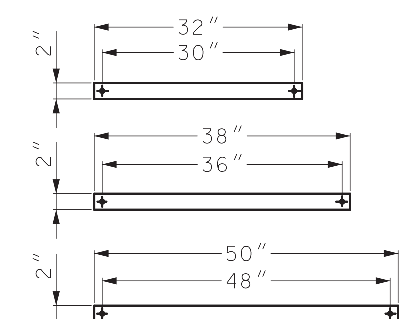


DIMENSIONS (IN.)						
A	B	C	D	E	F	RADIUS
48	60	6	24	9	30	3
48	72	6	30	9	30	3
48	84	6	36	9	30	3
48	96	6	42	9	30	3



DIMENSIONS (IN.)						
A	B	C	D	E	F	RADIUS
84	24	3	18	12	30	3
96	48	6	36	16	32	3

DIMENSIONS (IN.) FOR SIGNS REQUIRING NO HOLE PUNCHING		
A	B	RADIUS
66	18	1.5
72	18	1.5
78	18	1.5
84	18	1.5
90	18	1.5
96	18	1.5
36	78	2.25



BACKING BARS FOR SINGLE POST SIGNS

GENERAL NOTES:

REFER TO GENERAL NOTES ON SHEET 6 OF 8.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
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NUMBER PE-2001018754
PROFESSIONAL ENGINEER

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HIGHWAY SIGNING

HOLE PUNCHING

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.02AP

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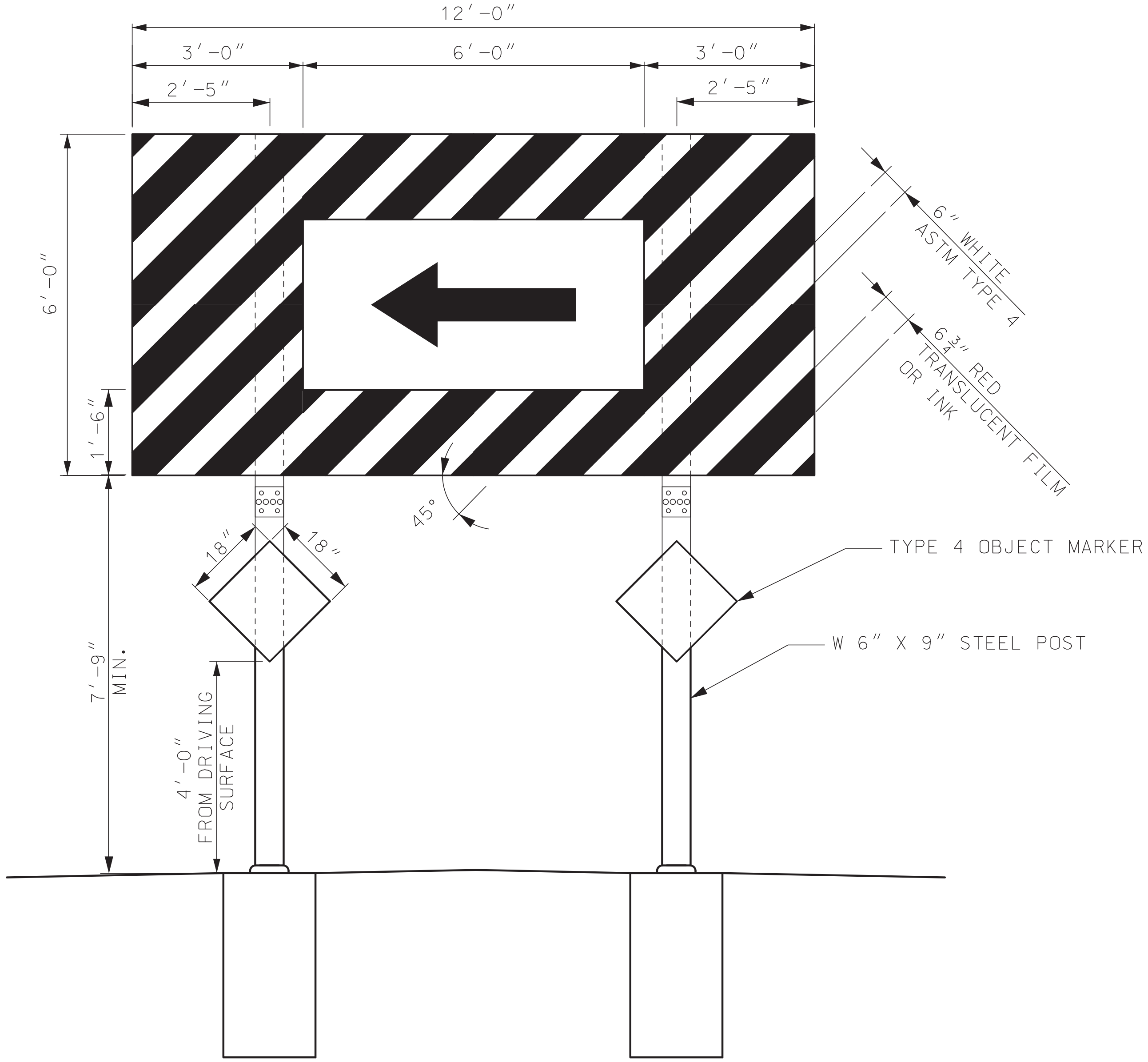
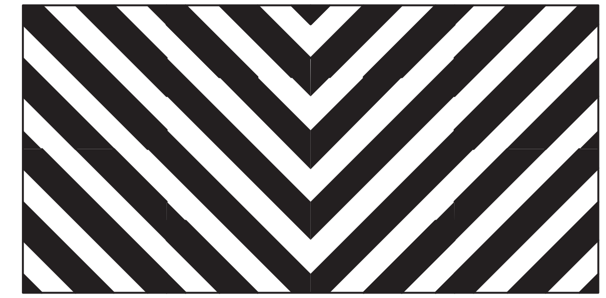
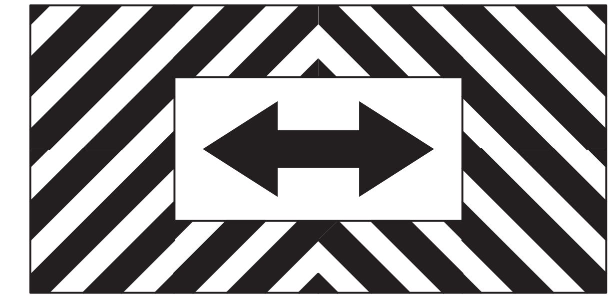


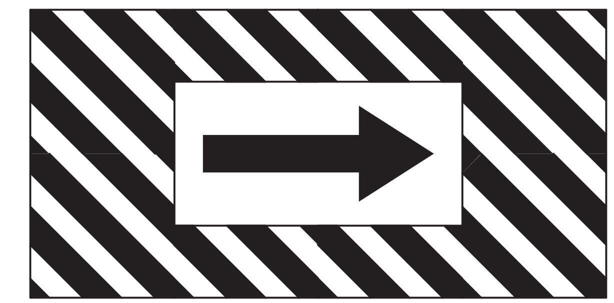
SEE STANDARD PLAN 903.03
FOR MOUNTING HEIGHT ON UNLEVEL GROUND

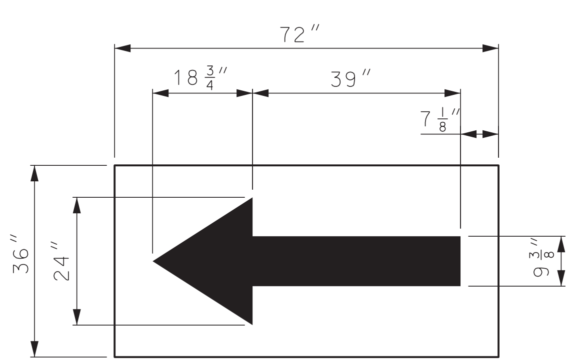


DEAD END

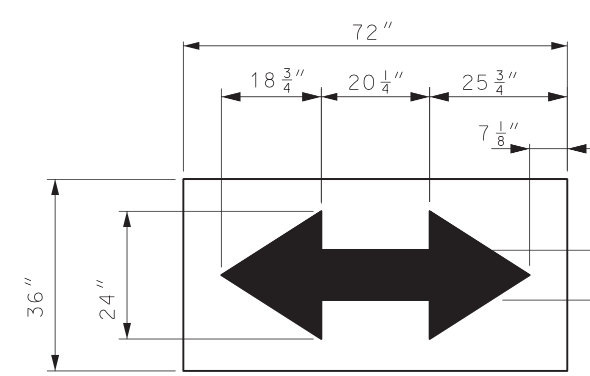


T-INTERSECTION





W1-6



W1-7

GENERAL NOTES:

SEE STANDARD PLAN 903.03 FOR WIDE FLANGE INSTALLATION.

SIGN BARRICADE SHALL BE CONSTRUCTED AS A STRUCTURAL (ST) SIGN.

DIRECTIONAL ARROWS SHALL BE SHF AND CONSIDERED INCIDENTAL TO THE SIGN.

ALL REFLECTORIZED SURFACES SHALL BE RETROREFLECTIVE SHEETING IN ACCORDANCE WITH SEC 1042.

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

SIGN BARRICADE

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.02AP

SHEET NO. 8 OF 8

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

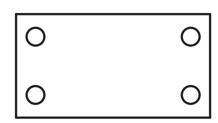
STRUCTURAL STEEL POST FOR GROUND MOUNTED SIGNS

POST		BOLT			WASHER			BASE CONNECTION DATA TABLE (IN.)								
DES. NO.	NOM SIZE (IN.X LBS/FT)	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	5/8	2 3/4	345	1 5/16	11/16	1/8	5	2	1 1/4	2 3/4	1 1/8	3/4	1/2	1/4	11/32
3	W8x18															
4	W10x22															
5	W10x26	3/4	3 1/2	555	1 15/32	13/16	1/8	6	2 1/4	1 3/8	3 1/2	1 1/4	1	3/4	5/16	13/32
6	W12x35															

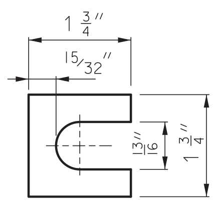
POST AND FOOTING DATA TABLE

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

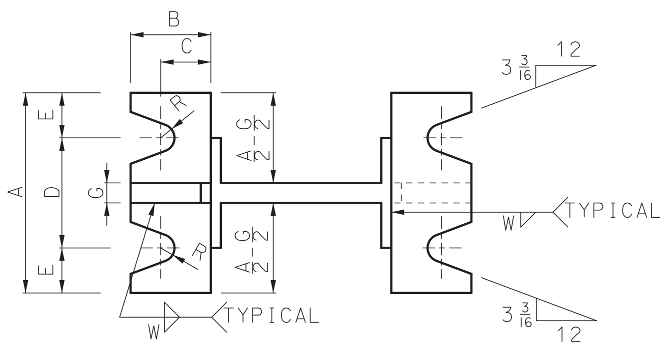
SHEET METAL BOLT RETAINER CUT FROM 30 GAGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES TO BE 1/16" LARGER THAN REQUIRED BOLT SIZE.



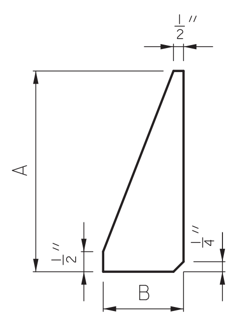
BOLT RETAINER



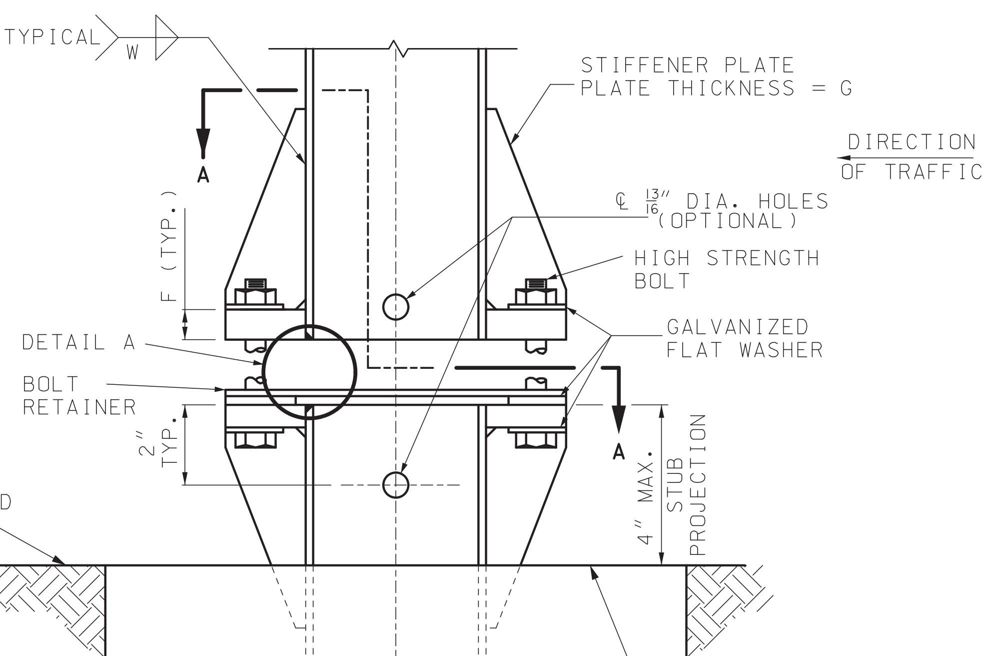
SHIM



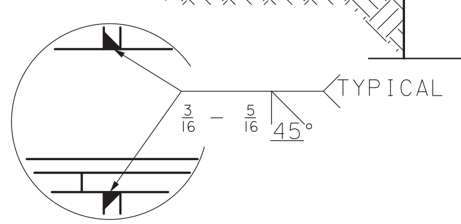
SECTION A-A



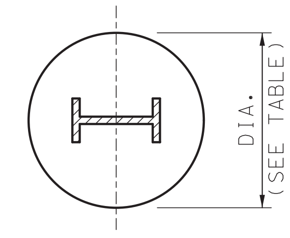
STIFFENER PLATE



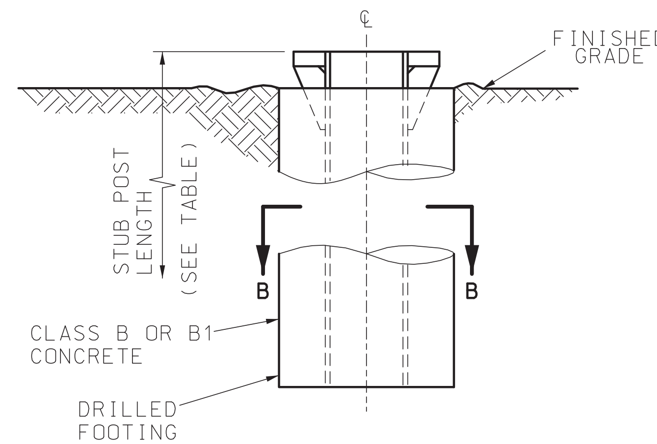
ELEVATION



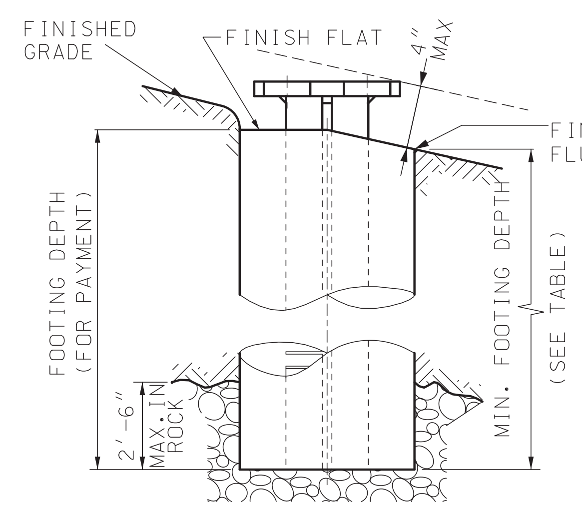
DETAIL A



SECTION B-B



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 "I" SHAPE POSTS AND 9/16" ROUND FOR PIPE POST BASE PLATES) AS SHOWN IN "ELEVATIONS" ARE TO BE USED AS AID FOR GALVANIZING ONLY.

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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.

POST INSTALLATION DETAILS

POST AND FOOTING DETAILS WIDE FLANGE (WF) POSTS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

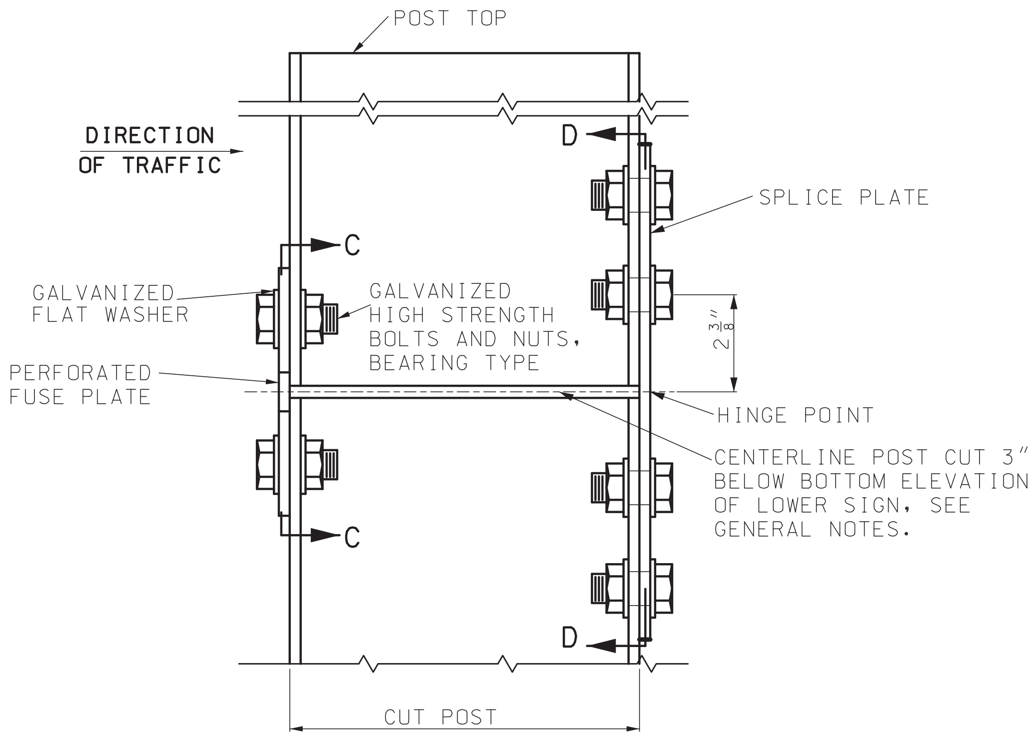
903.03BR

WIDE FLANGE STRUCTURAL STEEL POSTS DESIGN DATA							
POST DES. NO.	NOM. SIZE (IN.)	WEIGHT		DEPTH (IN.)	FLANGE		WEB THICK (IN.)
		LB/FT	LB/IN		WIDTH (IN.)	THICK (IN.)	
1	W6	9	0.75	5 7/8	4	3/16	3/16
2	W6	15	1.25	6	6	1/4	1/4
3	W8	18	1.50	8 1/8	5 1/4	5/16	1/4
4	W10	22	1.83	10 1/8	5 3/4	3/8	1/4
5	W10	26	2.17	10 3/8	5 3/4	7/16	1/4
6	W12	35	2.92	12 1/2	6 1/2	1/2	5/16

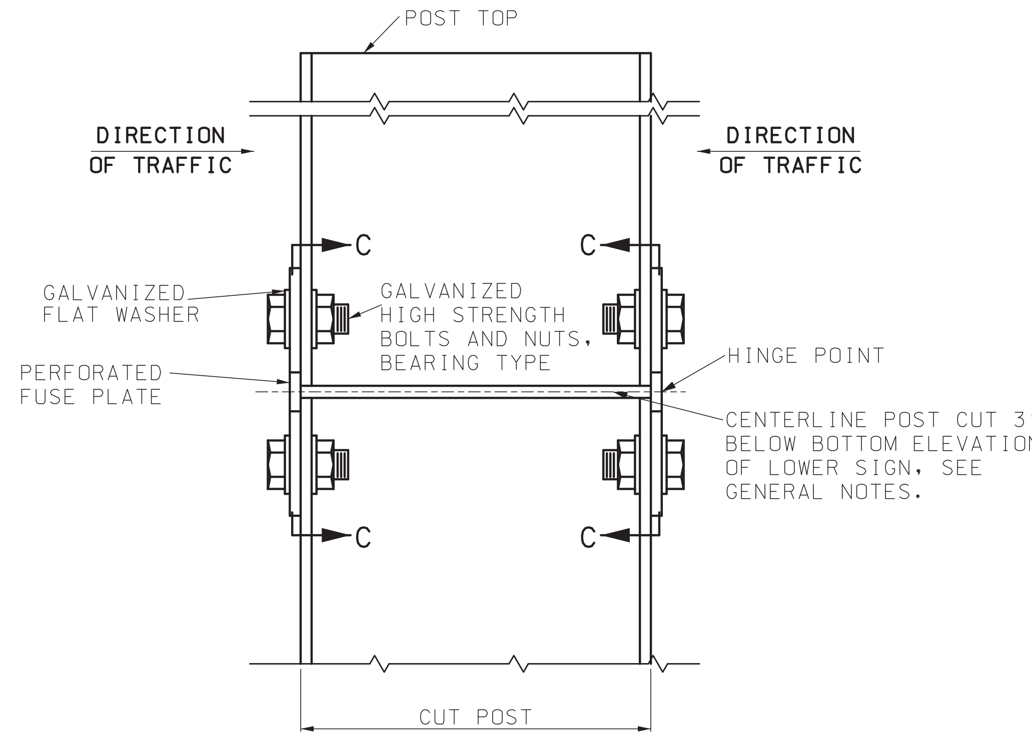
THE WEIGHT OF STRUCTURAL STEEL POSTS SHOWN IN THE CONTRACT HAS BEEN COMPUTED USING THE WEIGHTS SHOWN.

PERFORATED FUSE PLATE DATA TABLE													
POST DESIGN NO.	F (IN.)	G (IN.)	H (IN.)	J (IN.)	K (IN.)	L (IN.)	M (IN.)	N (IN.)	d1 (IN.)	d2 (IN.)	P (IN.)	BOLT DIA. (IN.)	WT. (EA.) (LBS.)
1	4 1/4	1	1 1/8	4	2 1/4	7/8	1	1/2	9/16	3/4	3/16	1/2	0.76
2	5	1 1/4	1 1/4	6	3 1/2	1 1/4	1 1/2	3/4	11/16	1 1/4	1/4	5/8	1.67
3	5	1 1/4	1 1/4	5 1/4	2 3/4	1 1/4	1 1/4	3/4	11/16	1 1/16	1/4	5/8	1.51
4	6	1 1/2	1 1/2	5 3/4	2 3/4	1 1/2	1 3/8	13/16	13/16	1 1/8	5/16	3/4	2.52
5	6	1 1/2	1 1/2	5 3/4	2 3/4	1 1/2	1 3/8	13/16	13/16	1 1/8	5/16	3/4	2.52
6	6	1 1/2	1 1/2	6 1/2	3 1/2	1 1/2	1 5/8	13/16	13/16	1 5/16	3/8	3/4	3.35

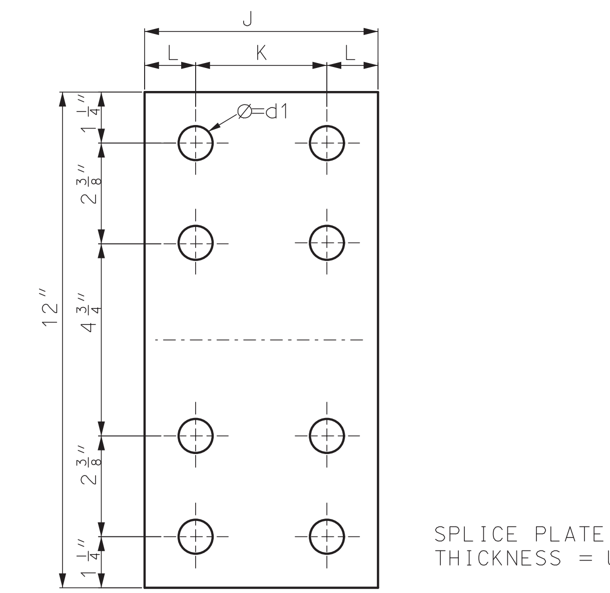
SPLICE PLATE DATA TABLE										
POST DESIGN NO.	J (IN.)	K (IN.)	L (IN.)	U (IN.)	d1 (IN.)	BOLT DIA. (IN.)	WT. (EA.) (LBS.)	WASHER		
								OD IN.	ID IN.	THICK IN.
1	4	2 1/4	7/8	3/16	9/16	1/2	2.45	1 3/16	5/8	1/8
2	6	3 1/2	1 1/4	1/4	11/16	5/8	4.89	1 5/16	11/16	1/8
3	5 1/4	2 3/4	1 1/4	5/16	11/16	5/8	5.32			
4	5 3/4	2 3/4	1 1/2	5/16	13/16	3/4	5.75	1 15/32	13/16	1/8
5	5 3/4	2 3/4	1 1/2	7/16	13/16	3/4	8.04			
6	6 1/2	3 1/2	1 1/2	1/2	13/16	3/4	10.47			



ONE DIRECTION BREAKAWAY

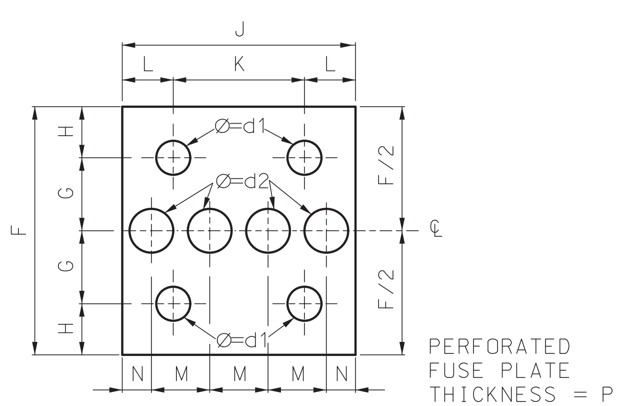


TWO DIRECTION BREAKAWAY



ELEVATION D-D

PERFORATED FUSE PLATE AND SPLICE PLATE DETAIL



ELEVATION C-C

ALL HOLES SHALL BE DRILLED. ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS. HOWEVER: FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND.

PERFORATED FUSE PLATE AND SPICE PLATE SHALL BE FABRICATED FROM ASTM A 36 STRUCTURAL STEEL.

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR ROADWAYS WHERE TRAFFIC MAY STRIKE THE BACKSIDE OF THE POST, PERFORATED FUSE PLATES SHALL BE INSTALLED ON BOTH SIDES OF THE POST.

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

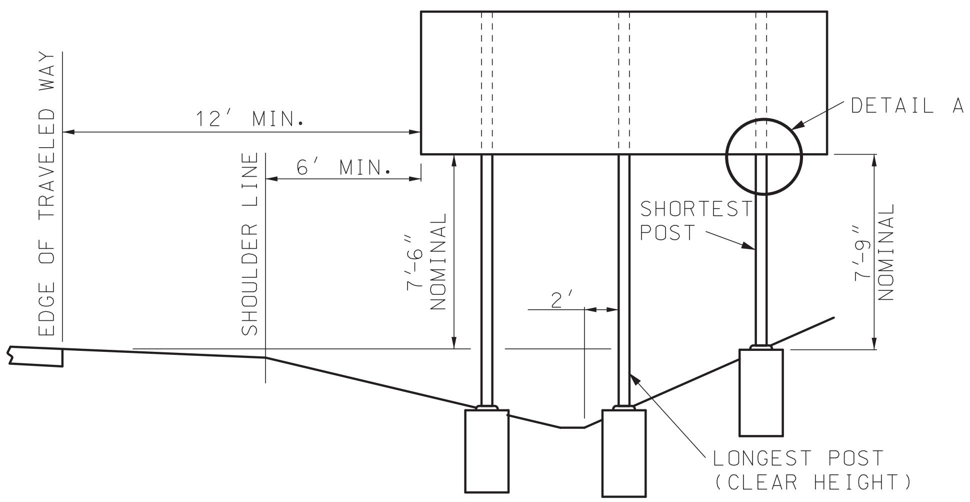
POST INSTALLATION DETAILS

HINGE DETAILS WIDE FLANGE (WF) POSTS

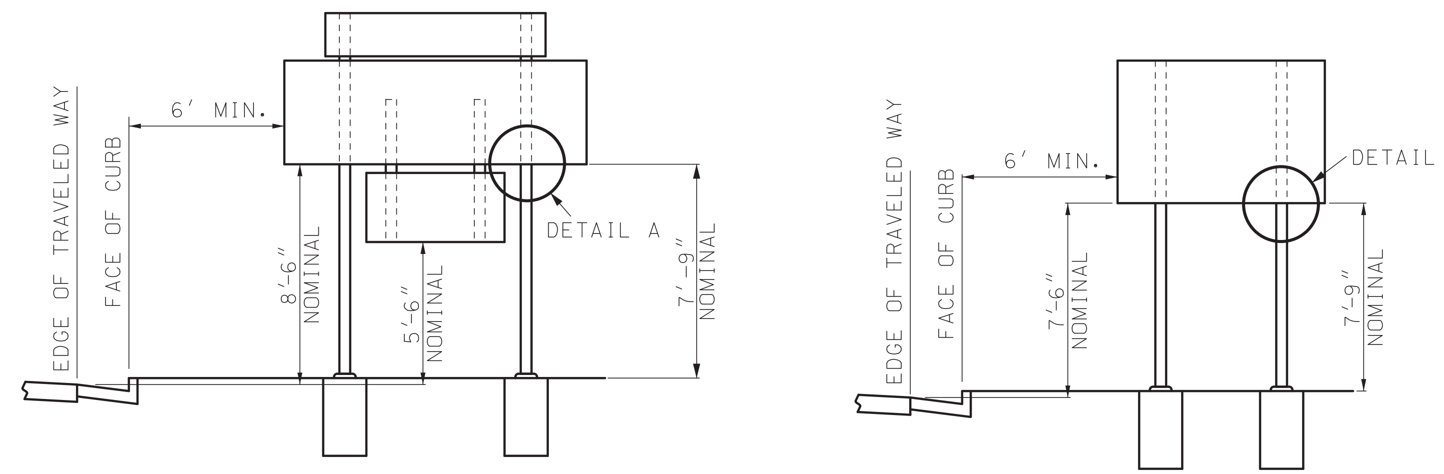
DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

903.03BR

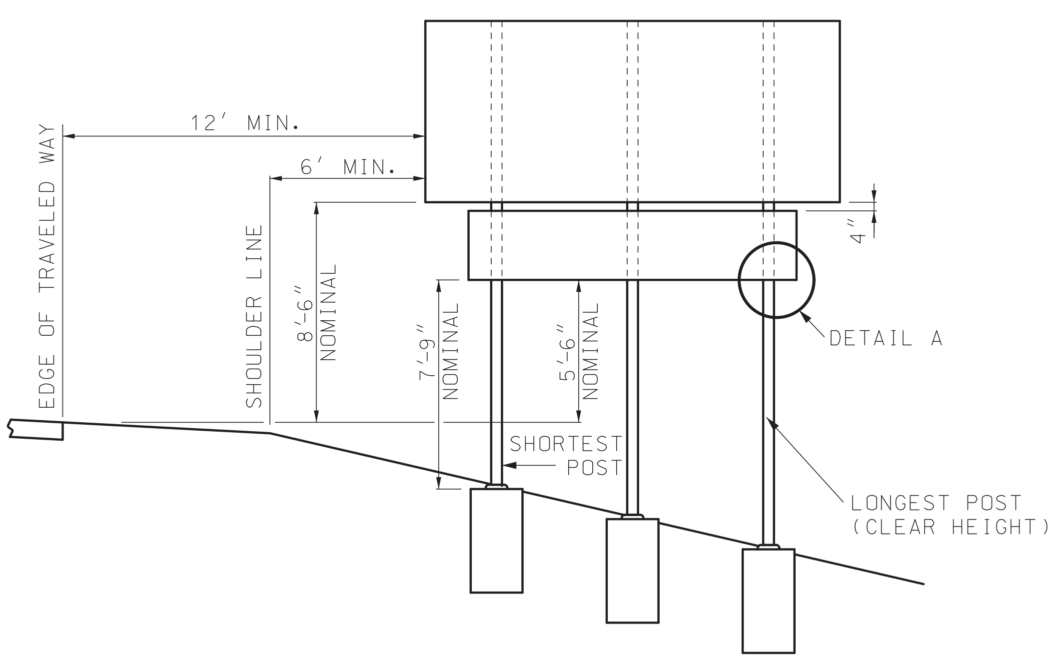
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



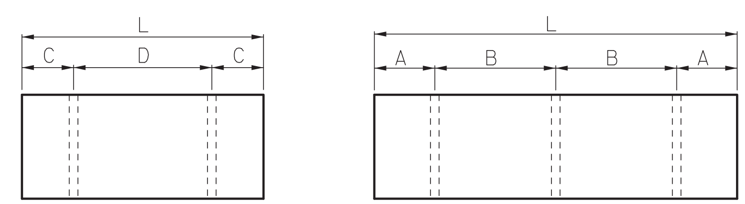
DITCH SECTION



BARRIER CURB SECTIONS



FILL SECTION



A = 1/6(L)   C = 1/5(L)
B = 1/3(L)   D = 3/5(L)

POST SPACING

FOR POST DESIGNS NUMBERS 3, 4, 5 AND 6 HAVING WEIGHTS GREATER THAN 18LBS./FT., POSTS SHALL BE SPACED AT LEAST 7′ APART.

FOR POST DESIGNS NUMBERS 1 AND 2, POSTS MAY BE SPACED LESS THAN 7′ APART.

DO NOT USE THREE NUMBER 1 OR 2 POSTS FOR L LESS THAN 11′.

FOR L GREATER THAN 11′ AND LESS THAN 17′, 3 POSTS MAY BE USED DEPENDING ON SOIL CONDITIONS.

FOR L OF 6′ TO 17′ TYPICALLY USE 2 POSTS.

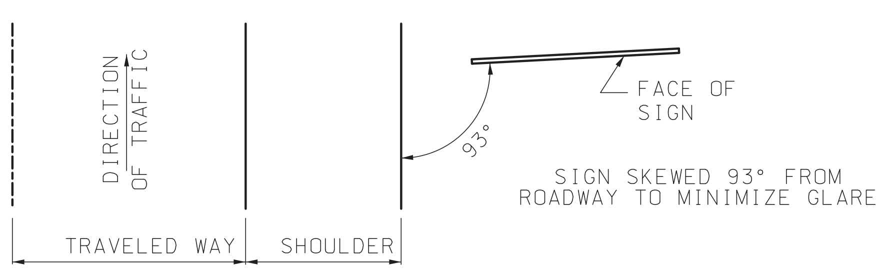
FOR L GREATER THAN 17′ TYPICALLY USE 3 POSTS.

GENERAL NOTES:

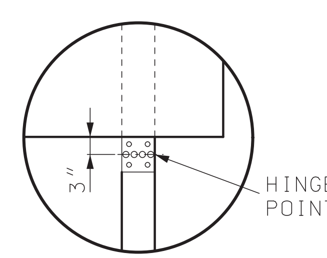
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 7′9″ MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

POST SIZE IS DETERMINED USING SIGN HEIGHT, SIGN WIDTH AND CLEAR HEIGHT. THE CLEAR HEIGHT IS EQUAL TO THE LENGTH OF THE LONGEST POST MEASURED FROM THE GROUND TO THE BOTTOM OF THE SIGN.



SIGN ORIENTATION



DETAIL A

NOTE: SEE SHEET 2 FOR FUSE PLATE DETAILS.

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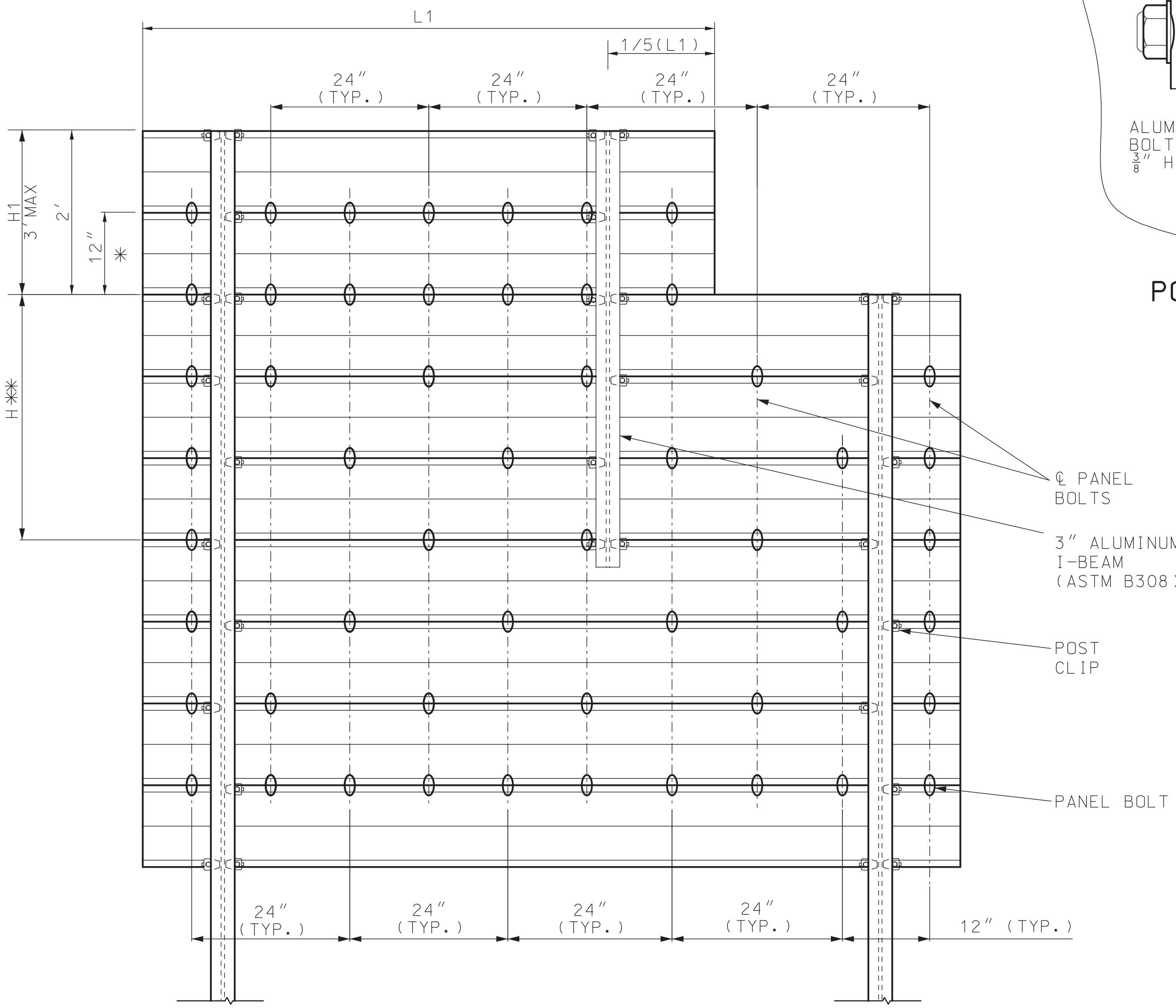
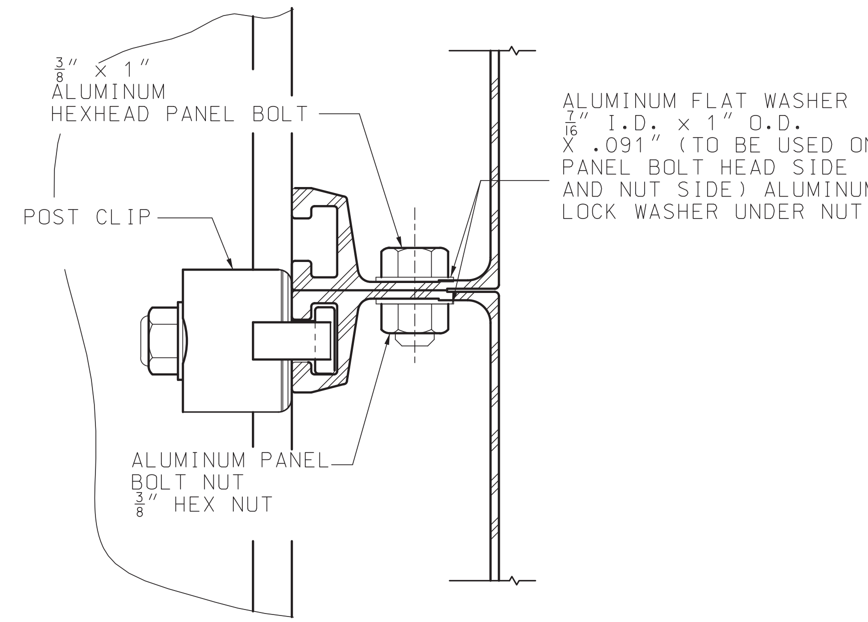
POST INSTALLATION DETAILS

TYPICAL SECTION, MOUNTING HEIGHT AND POST SPACING WIDE FLANGE (WF) POSTS

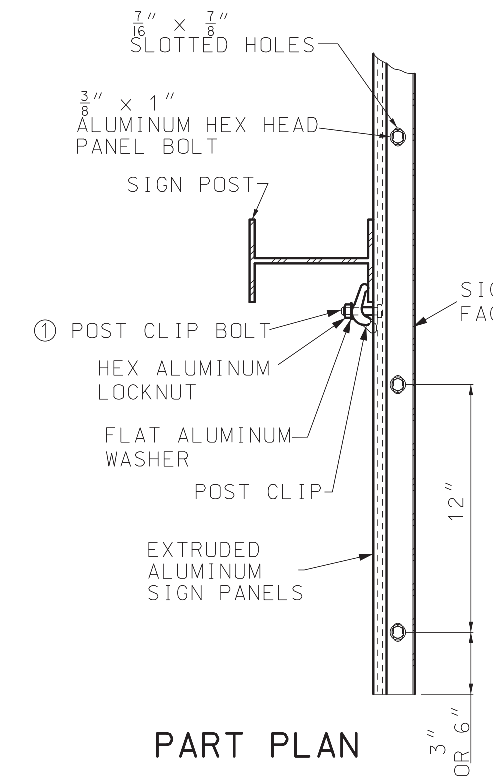
DATE EFFECTIVE: 4/1/2023		903.03BR	SHEET NO.
DATE PREPARED: 1/6/2023			3 OF 16



PANEL BOLT LOCATION



POST CLIP DETAIL



PART PLAN

① SIGNS SHALL BE FIELD ATTACHED TO POSTS WITH POST CLIPS AND BOLTS, SEE POST CLIP DETAIL. THE SHANK OF THE POST CLIP BOLT SHALL FIT TIGHTLY AGAINST THE POST FLANGE AFTER THE LOCKNUTS ARE TORQUED. LOCKNUTS ON THE POST CLIP BOLTS SHALL BE TORQUED TO 225 INCH-POUNDS WHEN USING DRY, CLEAN, UNLUBRICATED THREADS.

∗ EXTRUDED ALUMINUM PANEL.

∗∗ H = H1 + 12″. H APPLIES TO SIGNS SUSPENDED ABOVE OR BELOW THE PRIMARY SIGN IF SECONDARY SIGN IS NOT ATTACHED TO THE MAIN SIGN POSTS.

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR EXTRUDED ALUMINUM PANEL AND POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

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SIGN MOUNTING DETAILS

WIDE FLANGE (WF) POSTS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

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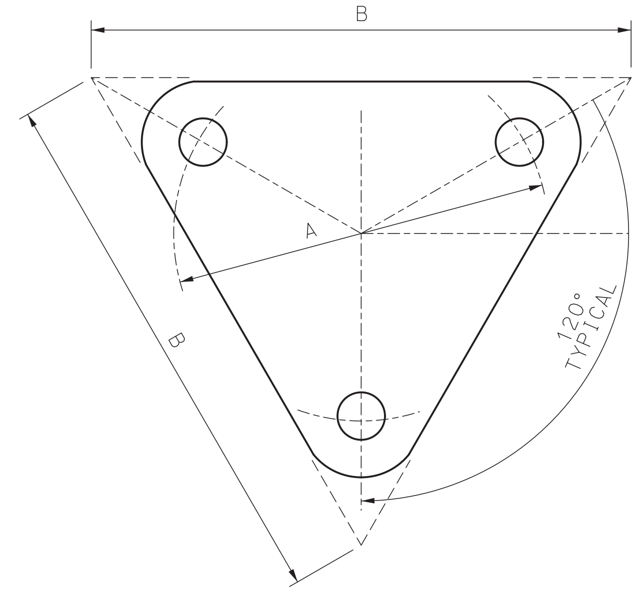
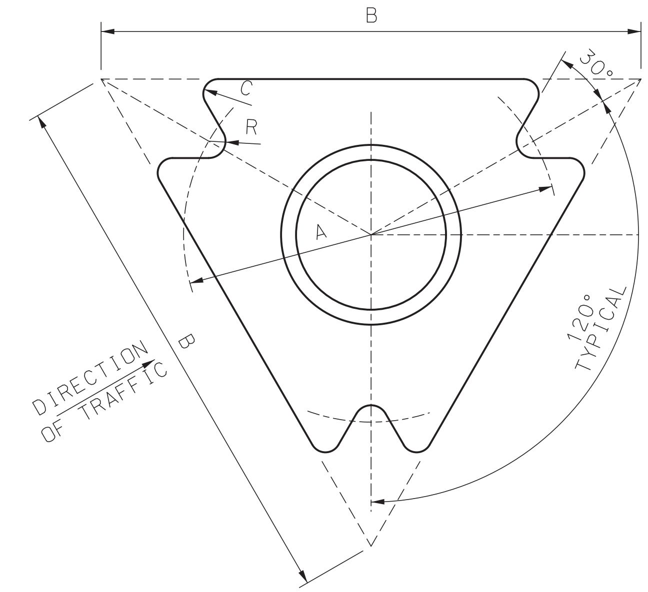
ROUND PIPE POST FOR GROUND MOUNTED SIGNS													
POST	BOLT			WASHER			BASE CONNECTION DATA TABLE (IN.)						
NOM SIZE (IN.-ID)	DIA	LENGTH	TORQUE	OD	ID	THICK	A	B	C	R	T	W
	IN.	IN.	IN./LB.	IN.	IN.	IN.						
$2\frac{1}{2}$	$\frac{1}{2}$	$3\frac{1}{2}$	140	$1\frac{1}{16}$	$17/32$	$\frac{1}{8}$	$6\frac{1}{4}$	9	$\frac{1}{4}$	$9/32$	1	$\frac{1}{4}$
4	$\frac{5}{8}$	$3\frac{3}{4}$	345	$1\frac{5}{16}$	$\frac{11}{16}$	$\frac{1}{8}$	$7\frac{3}{16}$	10	$\frac{1}{4}$	$\frac{3}{8}$	1	$\frac{5}{16}$

ROUND PIPE POST AND FOOTING DATA TABLE						
NOM. SIZE (IN.)	WEIGHT		STUB LENGTH	FOOTING		CONCRETE
	LBS/FT	LBS/IN		DIA.	DEPTH	C.Y.
$2\frac{1}{2}$	5.79	0.48	$4' - 3\frac{1}{2}''$	12″	4′-6″	0.13
4	10.79	0.90	$5' - 3\frac{1}{2}''$	18″	5′-6″	0.36



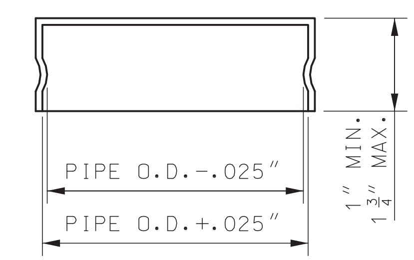
BOLT RETAINER

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

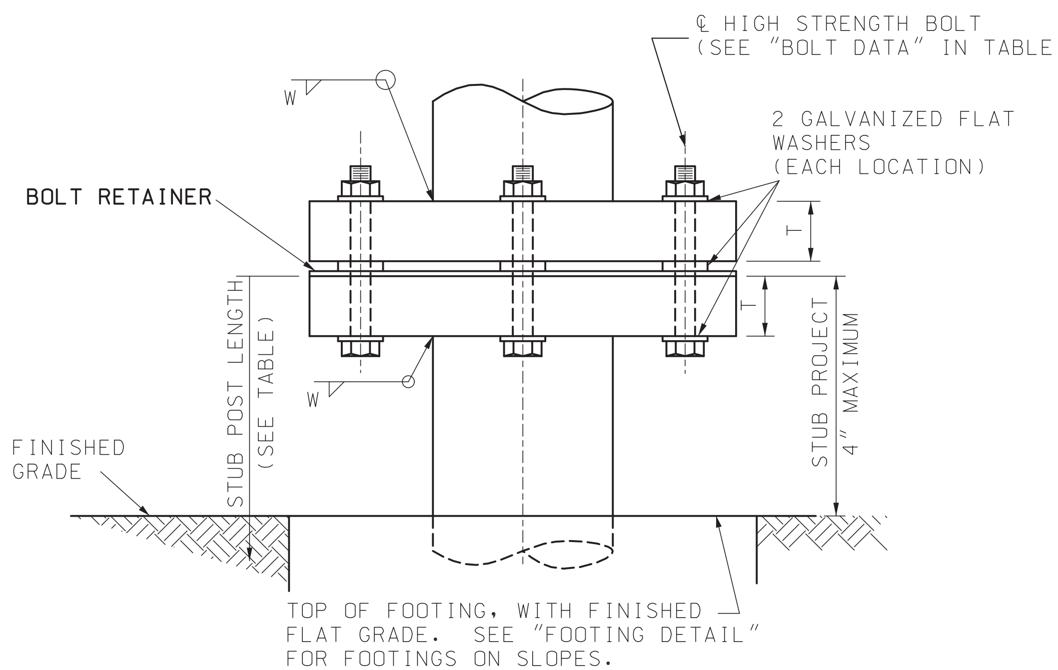


PLAN VIEW

ROLLED CRIMP TO ENGAGE PIPE O.D.



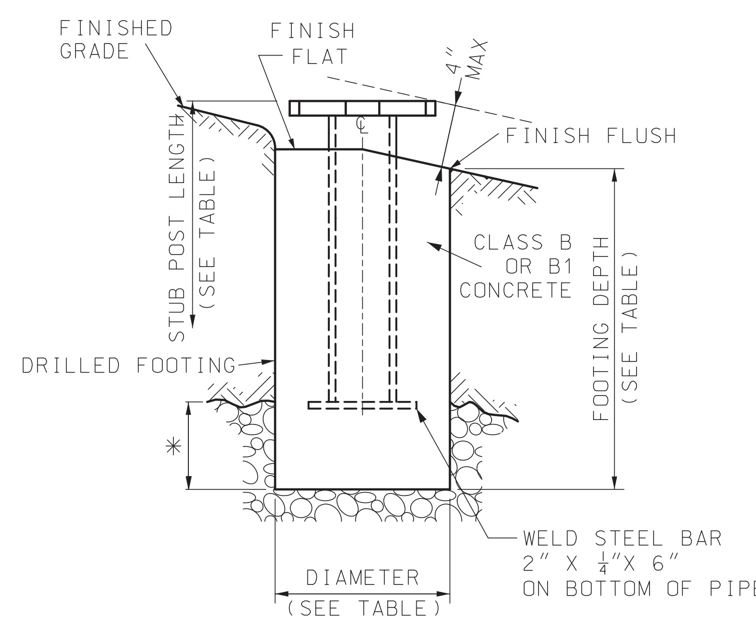
FRICTION CAP



ELEVATION

(STEEL PIPE POST BASE CONNECTION)

MULTI-DIRECTION SLIP BASE



* 2′ MAXIMUM IN ROCK FOR 2″ DIA. PIPE;
3′ MAXIMUM IN ROCK FOR 4″ DIA. PIPE.

FOOTING DETAIL

NOTE:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE STANDARD PLANS SHEET 10 OF 16.

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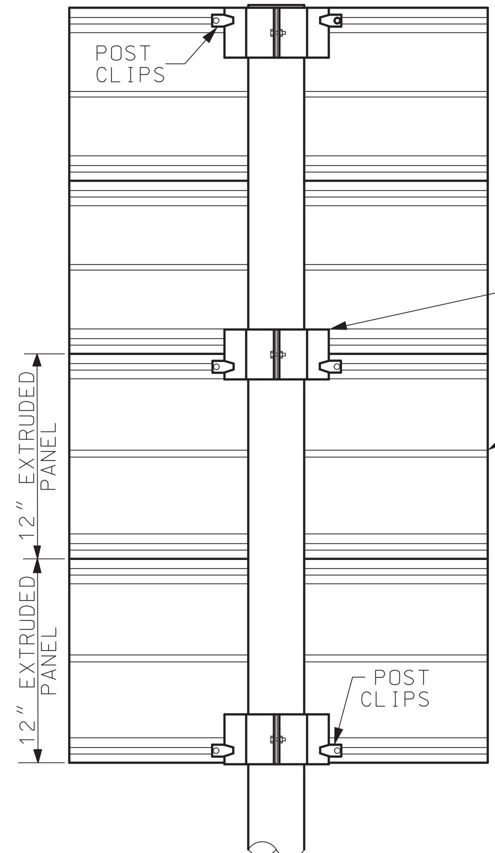
POST INSTALLATION DETAILS

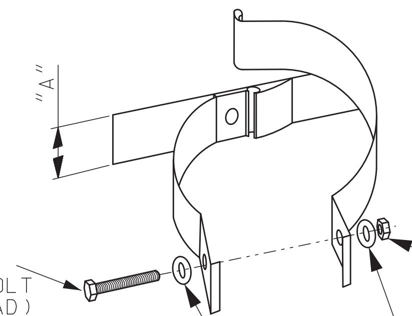
PIPE POST

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

903.03BR

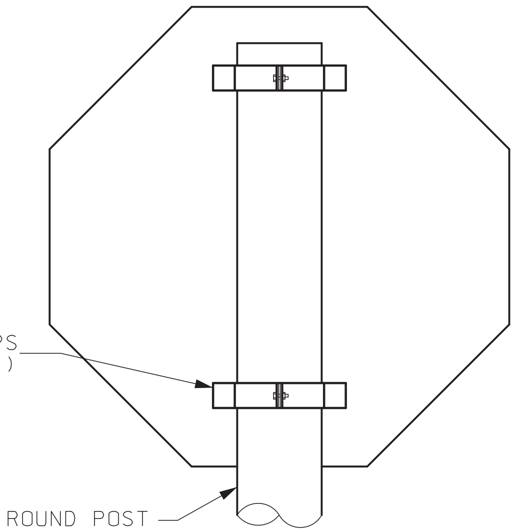


PROFILE VIEW

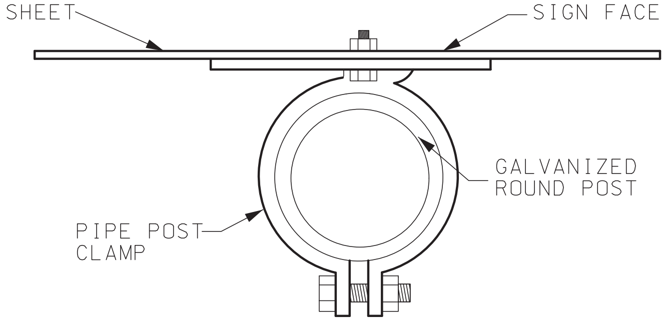


CLAMP TYPE SIGN SUPPORT
FOR PIPE POST

WIDTH OF PIPE POST CLAMP	
SIGN TYPE	MINIMUM "A"
FLAT	$1\frac{1}{4}$"
STRUCTURAL	3"

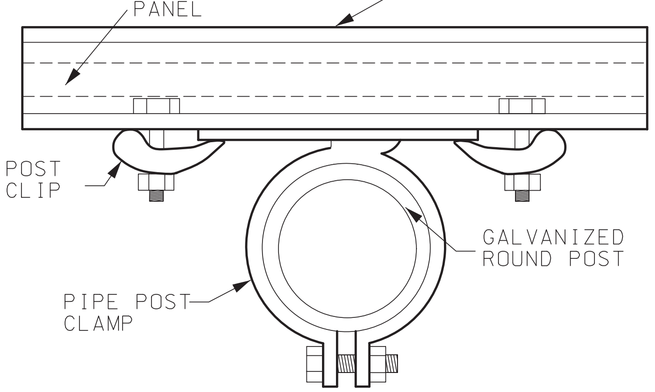


PROFILE VIEW



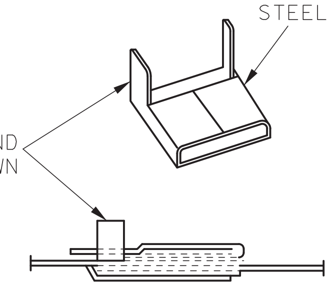
PLAN VIEW

MOUNTING DETAILS
FOR FLAT SHEET ON PIPE POST

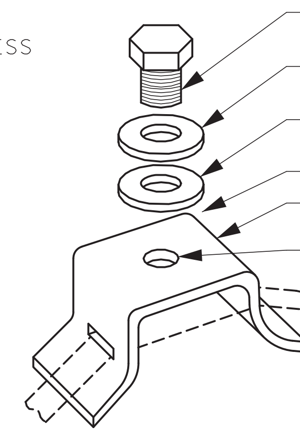


PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS
ON PIPE POST



STRAP SEAL



FLARED LEG SIGN BRACKET

MOUNTING DETAILS FOR FLAT SHEET SIGNS
ON ROUND STRUCTURES >4" PIPE POST

NOTES:

FOR GENERAL NOTES, SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

FOR DETAILS OF EXTRUDED ALUMINUM PANEL AND POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

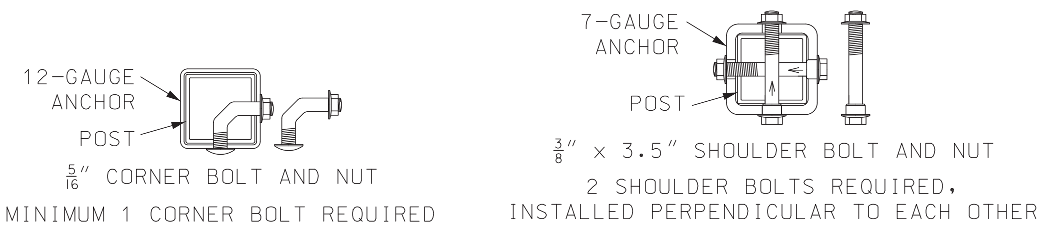
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

SIGN MOUNTING DETAILS
PIPE POST

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

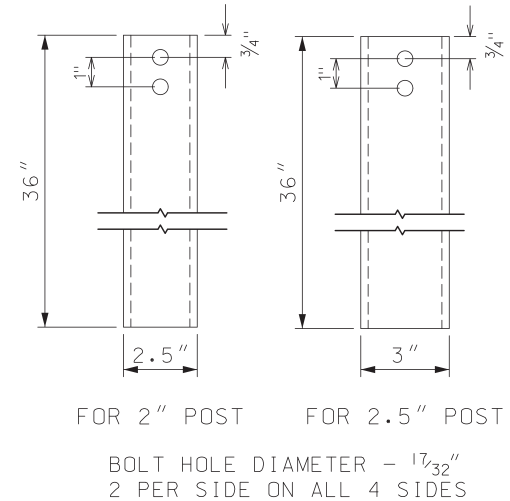
903.03BR



12-GAUGE ANCHOR

7-GAUGE ANCHOR

ANCHOR BOLT DETAIL



7-GAUGE ANCHOR FABRICATION DETAIL

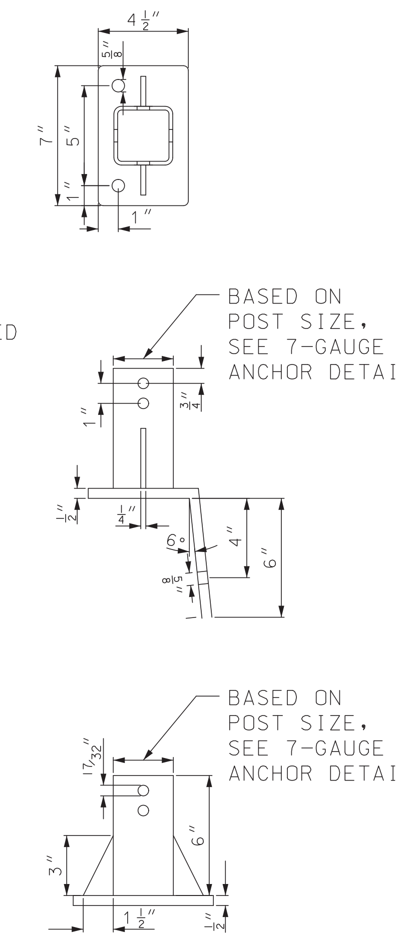
ANCHOR TUBE SHALL BE 7-GAUGE

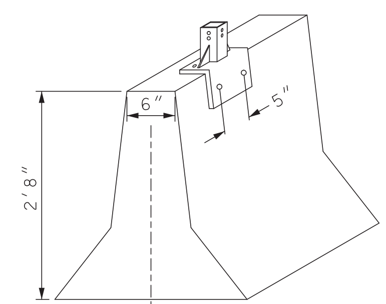
1/2" X 4 1/2"GALVANIZED MECHANICAL FASTENERS SHALL BE USED TO ATTACH ANCHOR TO BARRIER WALL

SHOULDER BOLTS SHALL BE USED TO ATTACH PSST POST TO ANCHOR (SEE ANCHOR BOLT DETAIL)

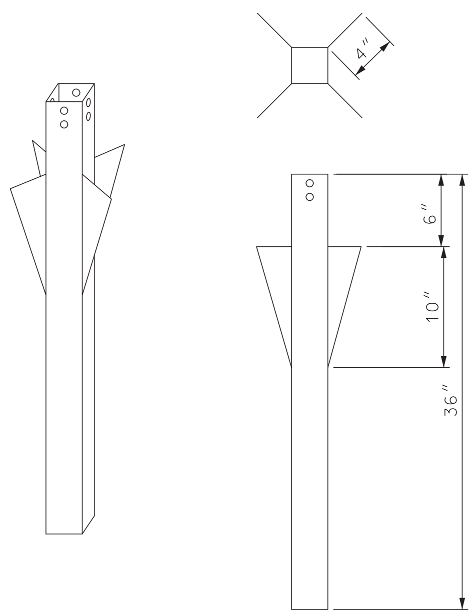
ANCHOR SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION PER SECTION 1080

FURNISHING AND INSTALLATION OF BARRIER WALL POST ANCHOR FOR PSST SHALL BE PAID PER EACH AS CONCRETE POST ANCHOR



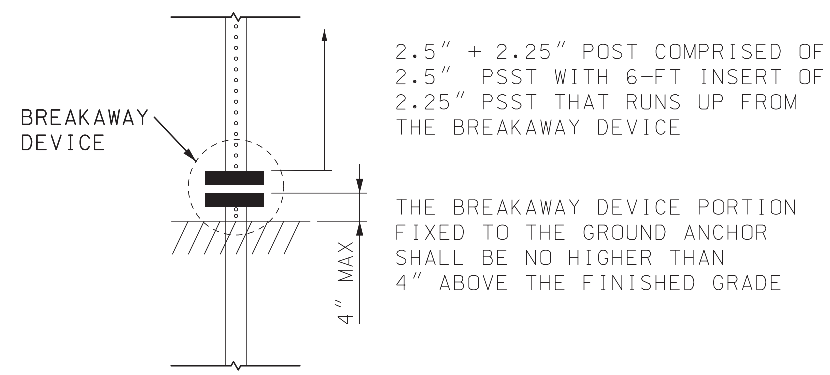


BARRIER WALL MOUNTING DETAIL

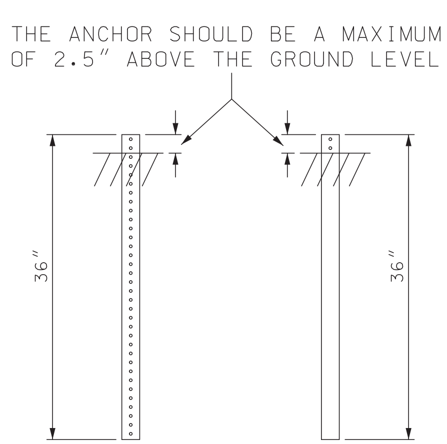


12-GAUGE (NOT SHOWN) OR 7-GAUGE

OMNIDIRECTIONAL/STABILIZED DRIVEN ANCHOR DETAIL

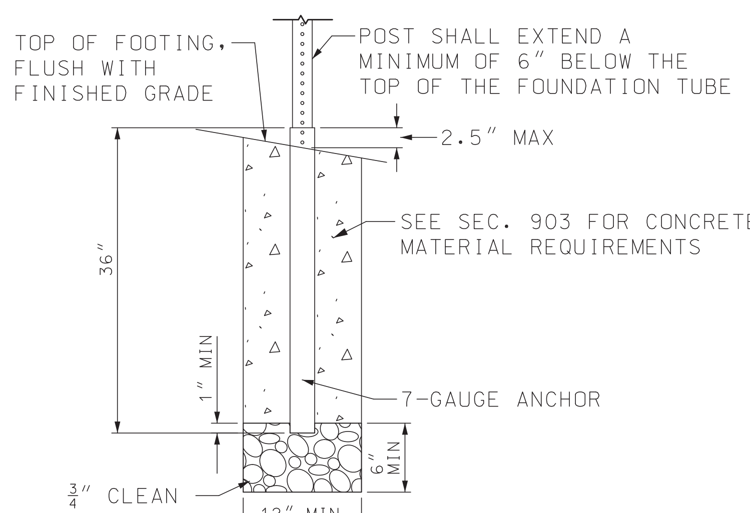


BREAKAWAY AND 2.5" + 2.25" POST DETAIL

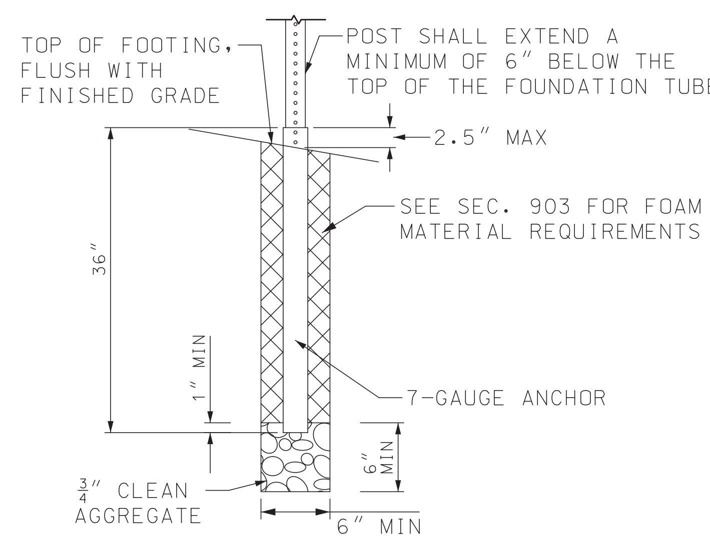


12-GAUGE 7-GAUGE

DRIVEN ANCHOR INSTALLATION DETAIL



CONCRETE FOOTING DETAIL



POLYURETHANE FOAM FOOTING DETAIL

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

ALL BREAKAWAY DEVICES USED ON AN INSTALLATION SHALL BE CERTIFIED NCHRP 350 COMPLIANT.

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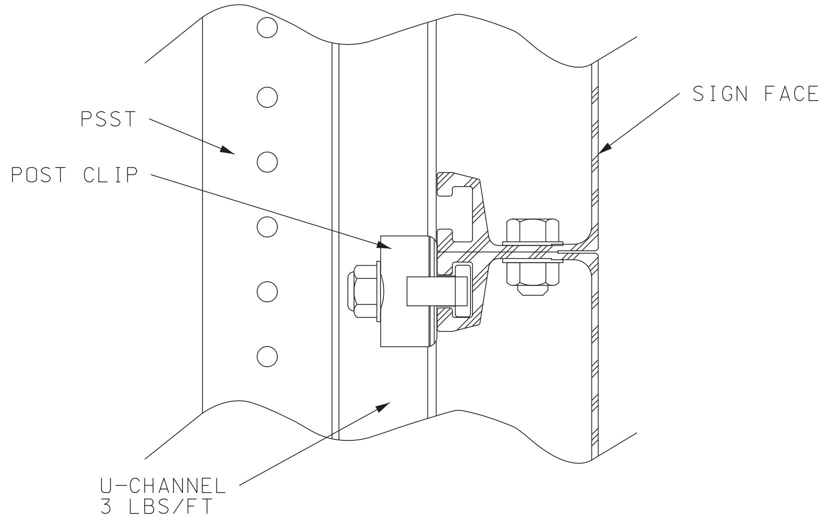
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

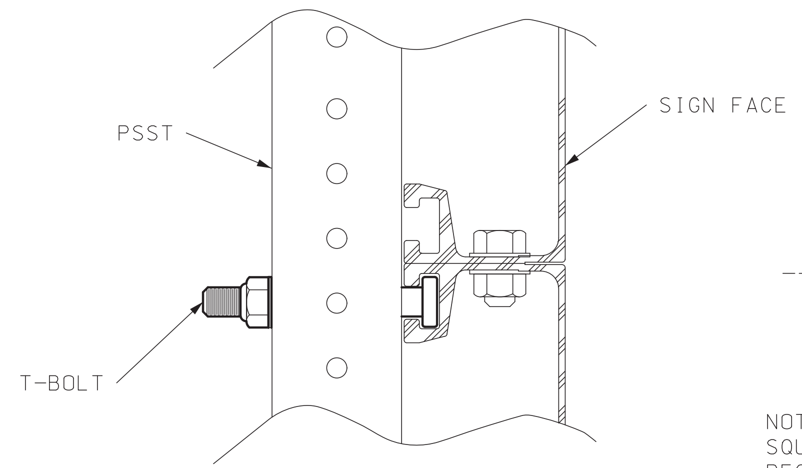
POST INSTALLATION DETAILS

PERFORATED SQUARE STEEL TUBE (PSST)

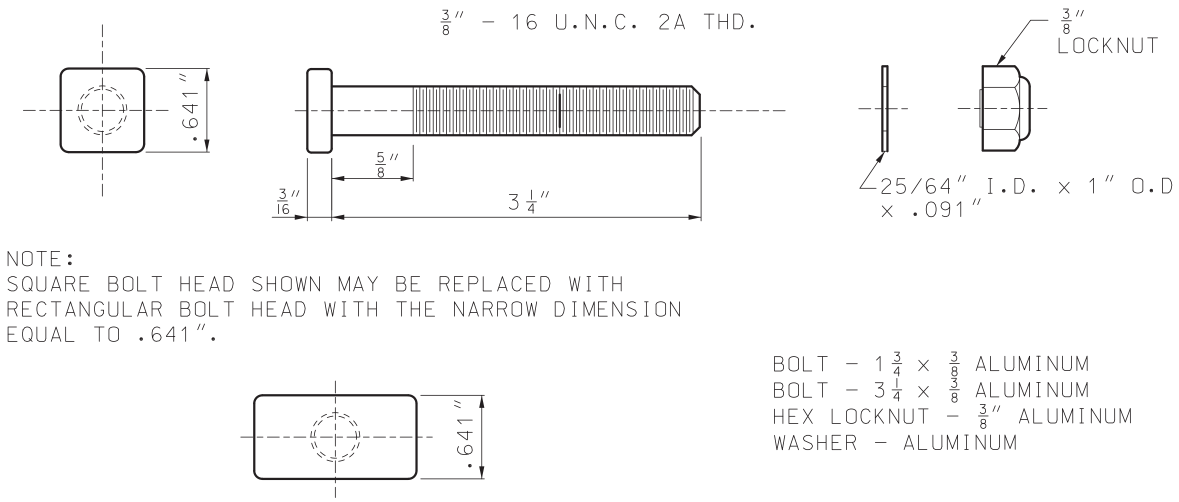
DATE EFFECTIVE:	4/1/2023	903.03BR	SHEET NO. 7 OF 16
DATE PREPARED:	1/6/2023		



PROFILE



PROFILE

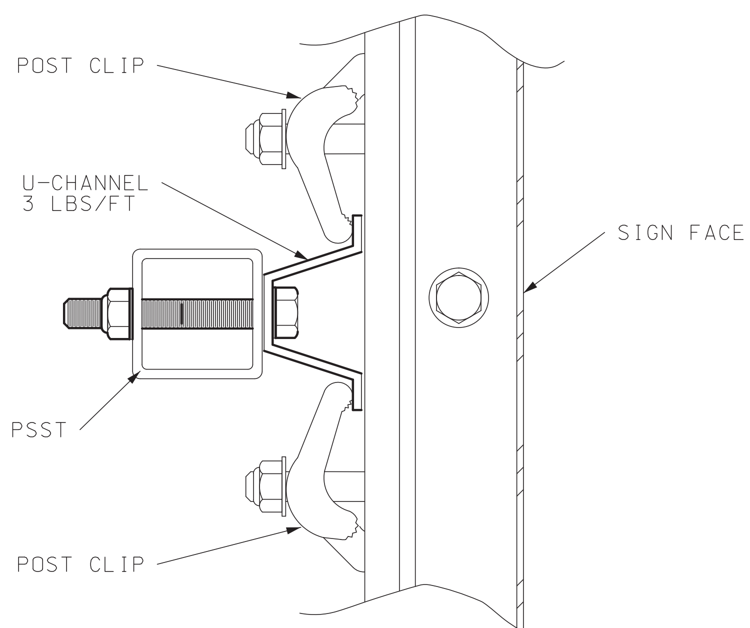


NOTE:
SQUARE BOLT HEAD SHOWN MAY BE REPLACED WITH RECTANGULAR BOLT HEAD WITH THE NARROW DIMENSION EQUAL TO .641".

BOLT - $1\frac{3}{4}$ x $\frac{3}{8}$ ALUMINUM
BOLT - $3\frac{1}{4}$ x $\frac{3}{8}$ ALUMINUM
HEX LOCKNUT - $\frac{3}{8}$" ALUMINUM
WASHER - ALUMINUM

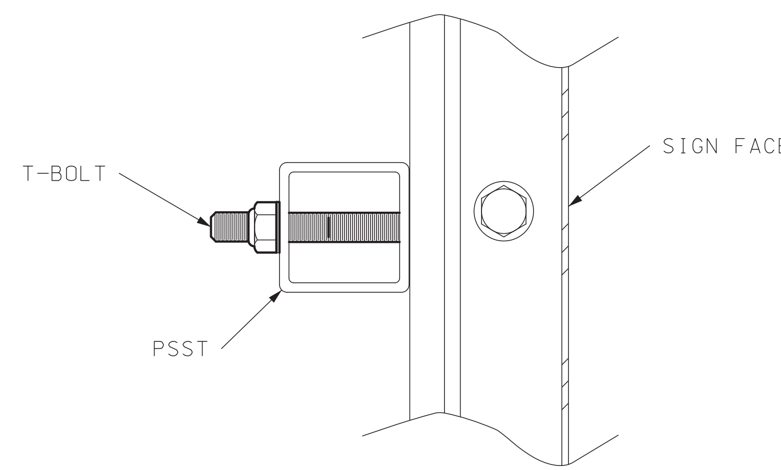
T-BOLT DETAIL

NOTES:
- ALUMINUM BOLTS SHALL BE ASTM B 211, 2024-T4 OR 6061-T6
- ALUMINUM FLAT WASHERS SHALL BE ASTM B 209, ALCLAD 2024-T4 OR 2024-T4
- ALUMINUM LOCK NUTS (NYLON INSERT) SHALL BE ASTM B 211 OR 2017-T4



PLAN

POST CLIP METHOD



PLAN

T-BOLT METHOD

NOTES:

FOR THE GENERAL NOTES, SEE SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

FOR POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

ALTERNATE PSST MOUNTING HARDWARE USE SHALL BE ON APPROVED LIST.

EXTRUDED PANEL MOUNTING DETAIL

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO PSST POST	
SIGN HEIGHT	NO. OF BOLTS PER PSST POST USED
1'	2
2'	3
3'	4
4'	5
5'	6
6'	7
7'	8

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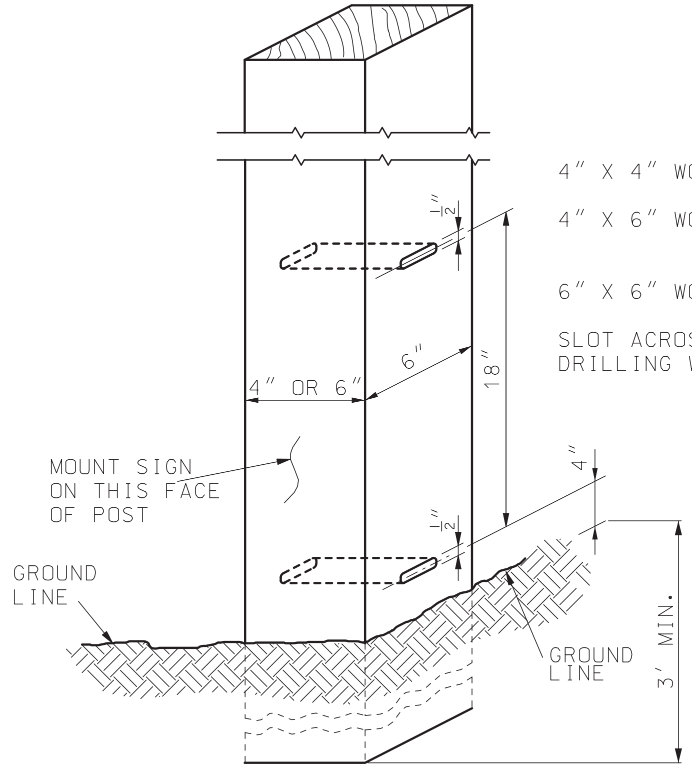
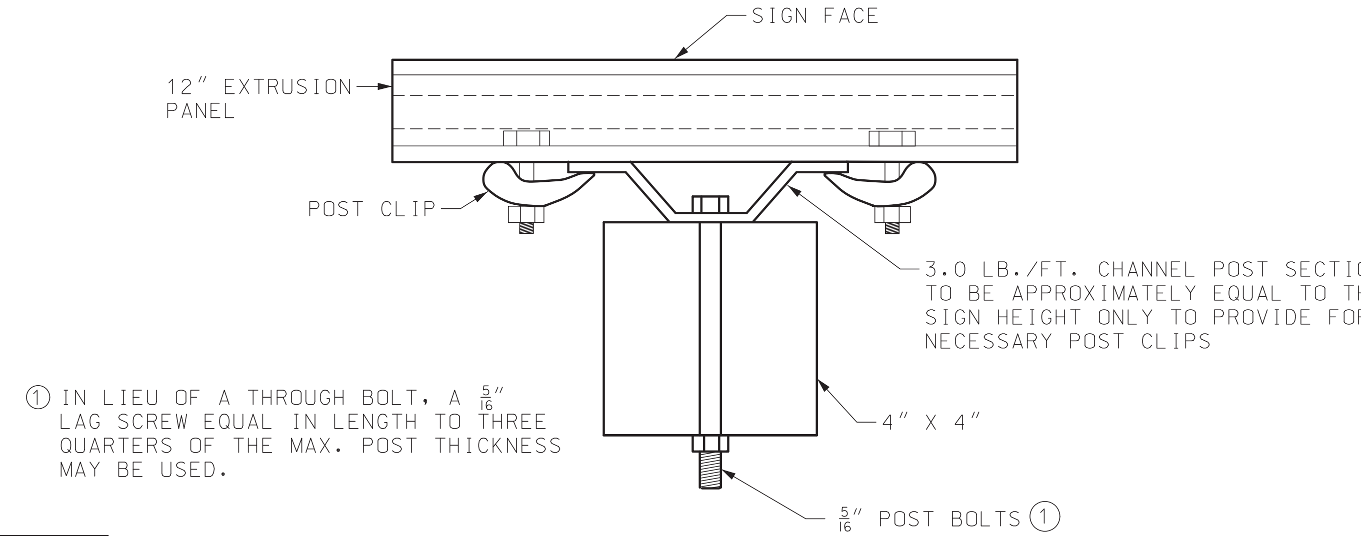
SIGN MOUNTING DETAILS

PERFORATED SQUARE STEEL TUBE (PSST)

DATE EFFECTIVE: 4/1/2023		903.03BR	SHEET NO. 8 OF 16
DATE PREPARED: 1/6/2023			



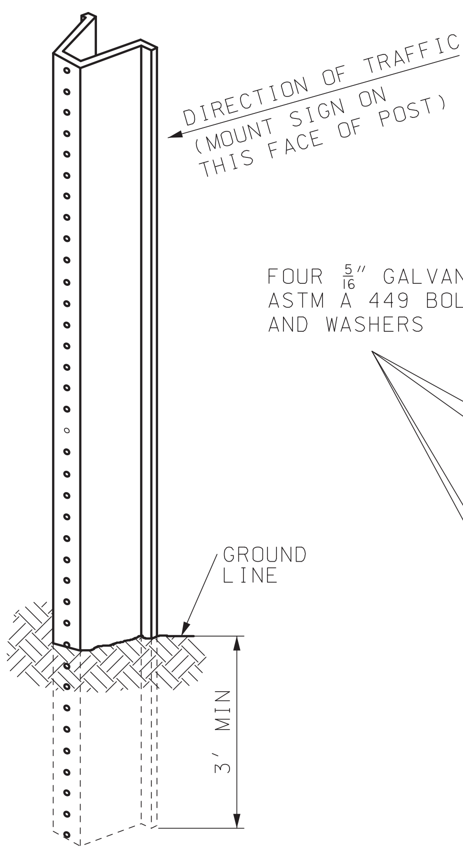
WOOD POST DETAIL



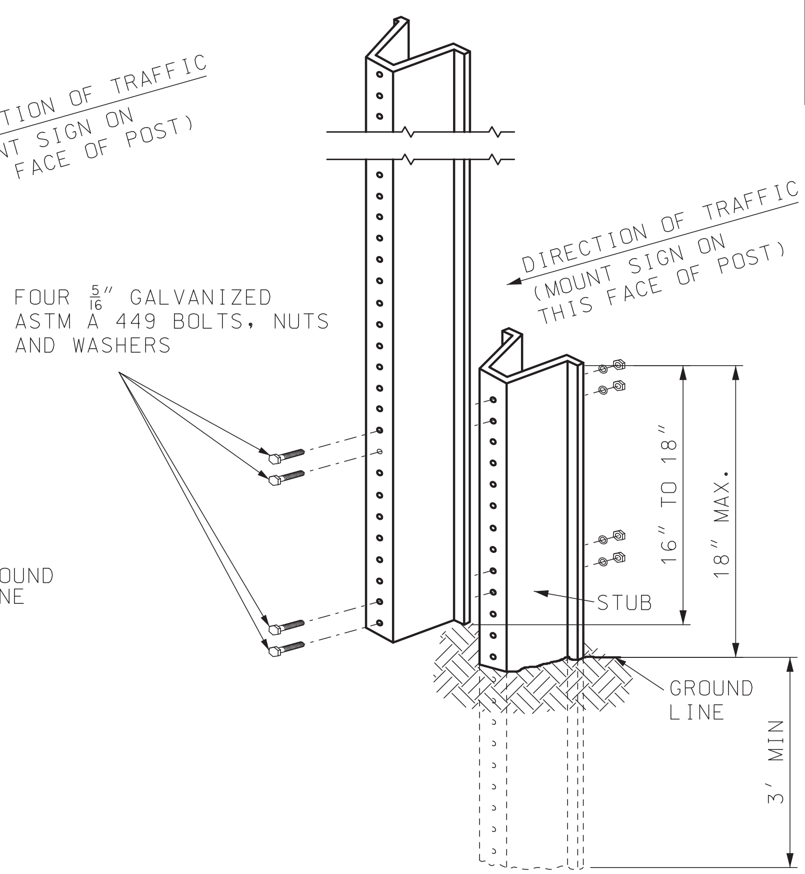
PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS ON WOOD POST

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO WOOD POST	
SIGN HEIGHT	NO. OF BOLTS PER WOOD POST USED
1'	2
2'	3
3'	4
4'	5
5'	6
6'	7
7'	8



U-CHANNEL POST-STUB DETAIL



U-CHANNEL POST DETAIL OPTIONAL INSTALLATION

	POST TYPE	
SIGN AREA (SQ.FT.)	U-CHANNEL	WOOD
≤ 10	1 - 3.0 LB./FT.✳	1 - 4" X 4"✳
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4" 1 - 4" X 6"✳
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"
> 24 ≤ 30	3 - 3.0 LB./FT.	2 - 4" X 6"
> 30 ≤ 50	N/A	2 - 6" X 6"

✳ SIGNS GREATER THAN 4 FEET IN WIDTH REQUIRE TWO POSTS, EXCEPT DIAMOND SHAPED WARNING SIGNS, YIELD SIGNS, AND ONE WAY SIGNS.

POST SIZE REQUIREMENTS

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET INTO THE GROUND.

U-CHANNEL POST-STUB OVERLAP SHALL BE POSITIONED ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.

FOR POST SIZING SEE ENGINEERING POLICY GUIDE.

FOR POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

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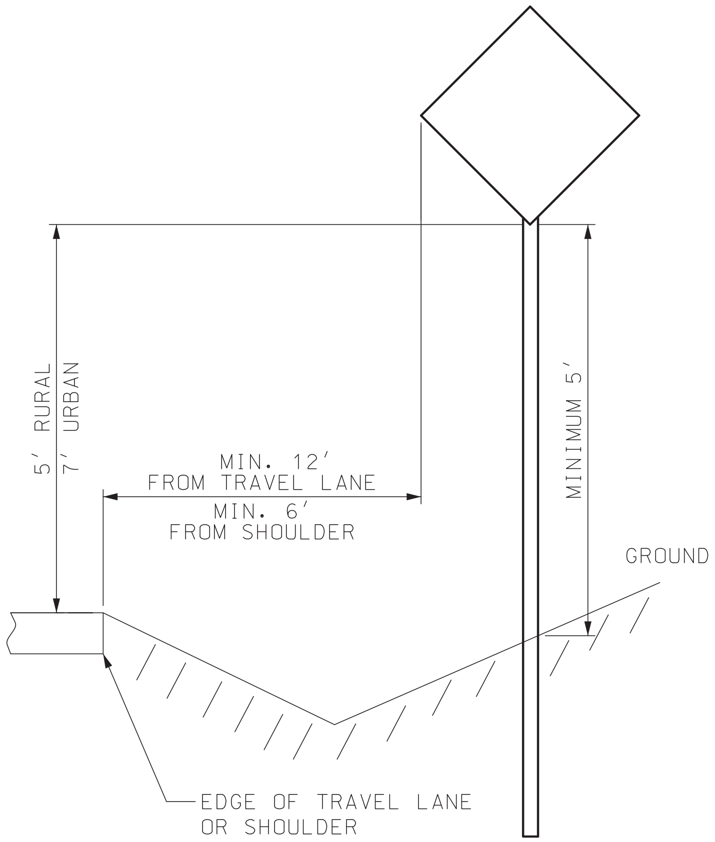
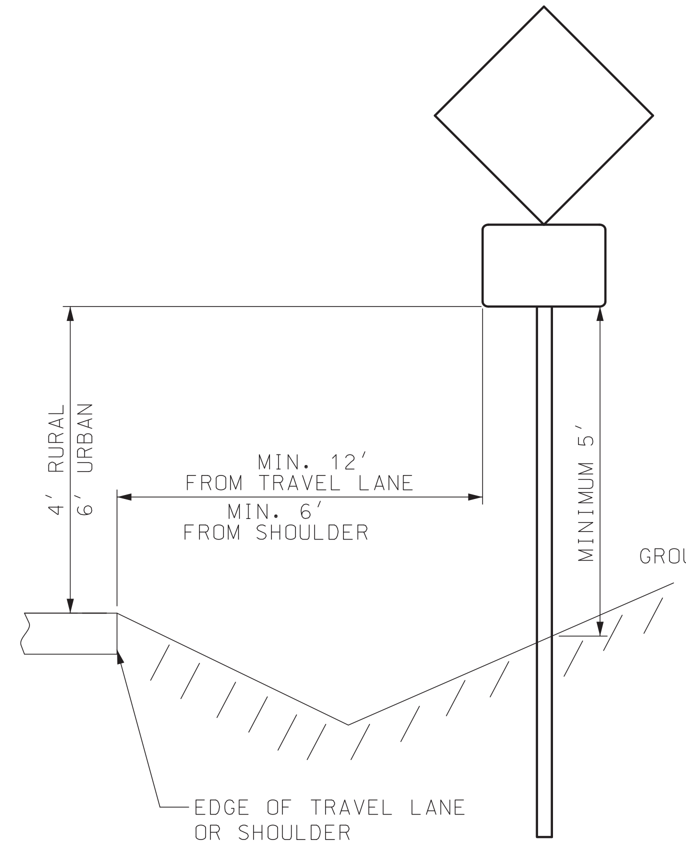
SIGN MOUNTING DETAILS
WOOD AND U-CHANNEL POST

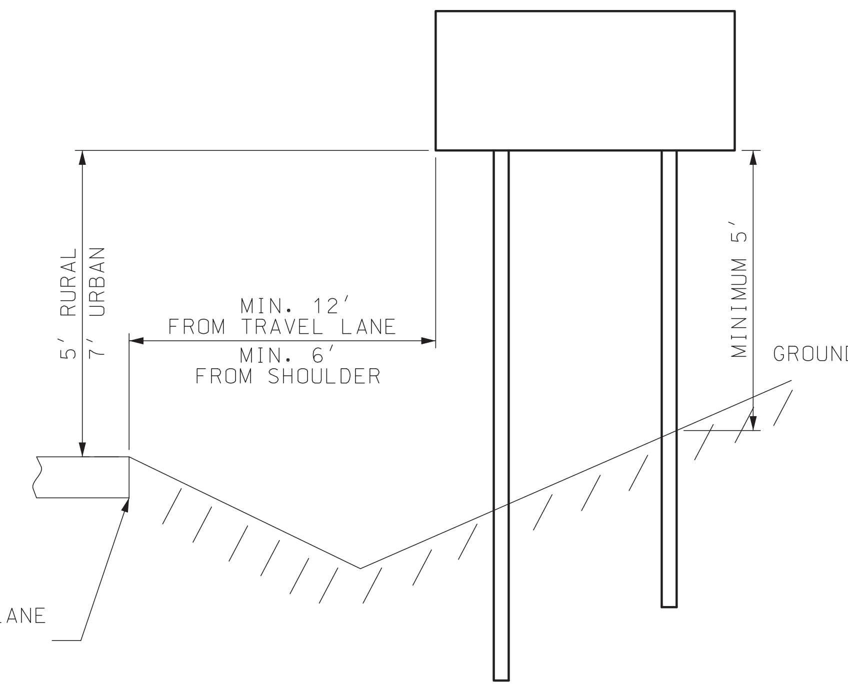
DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023
903.03BR



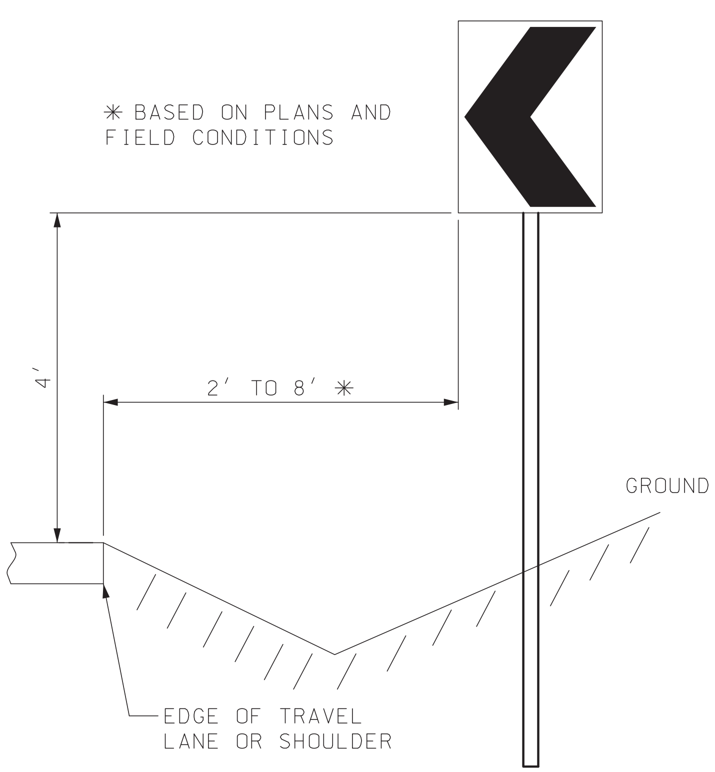
ONE POST - SINGLE SIGN



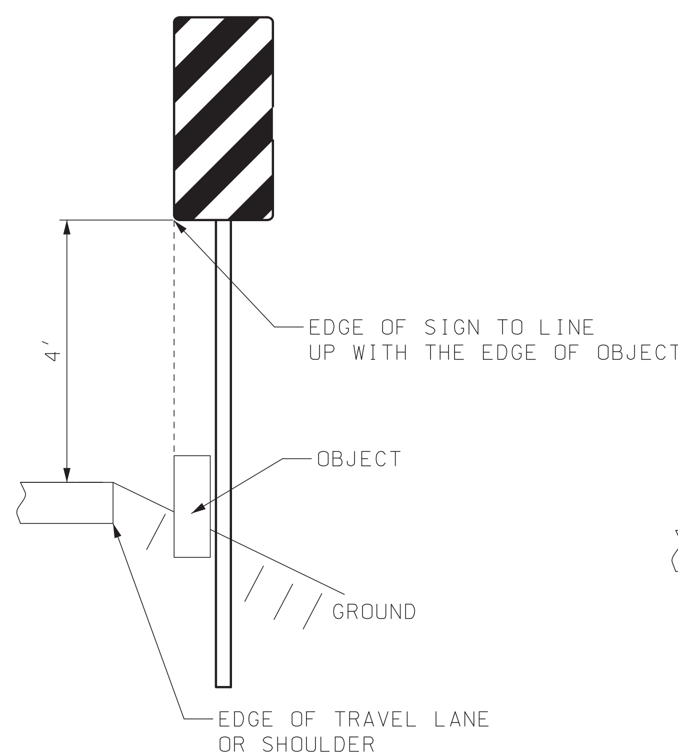
ONE POST - SINGLE SIGN WITH SUPPLEMENTAL PLAGUE



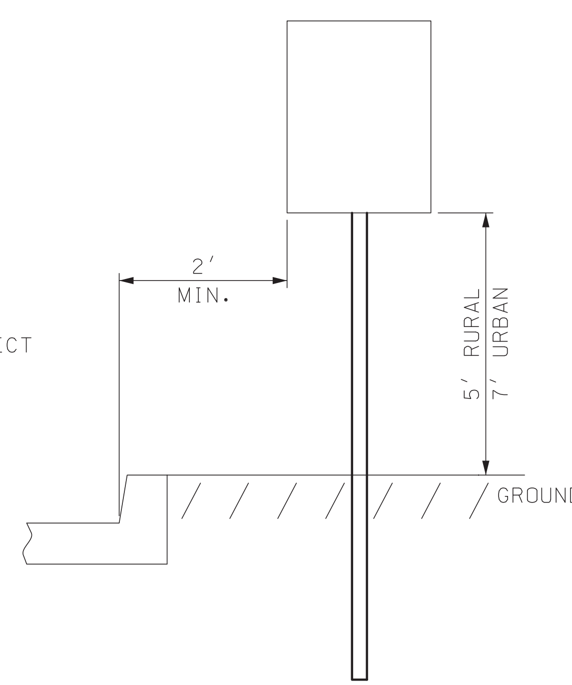
TWO POST



CHEVRON SIGN



TYPE III OBJECT MARKER



ADJACENT TO CURB

MOUNTING HEIGHT DETAILS

GENERAL NOTES:

SIGN MOUNTING BOLTS SHALL BE INSTALLED WITH A NYLON WASHER AGAINST THE SIGN FACE WITH A STEEL WASHER BETWEEN THE NYLON WASHER AND BOLT HEAD.

A LOCKNUT SHALL BE USED TO FASTEN THE SIGN TO THE POST.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 5' MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

HORIZONTAL OFFSET MAY BE ADJUSTED BASED ON FIELD CONDITIONS.

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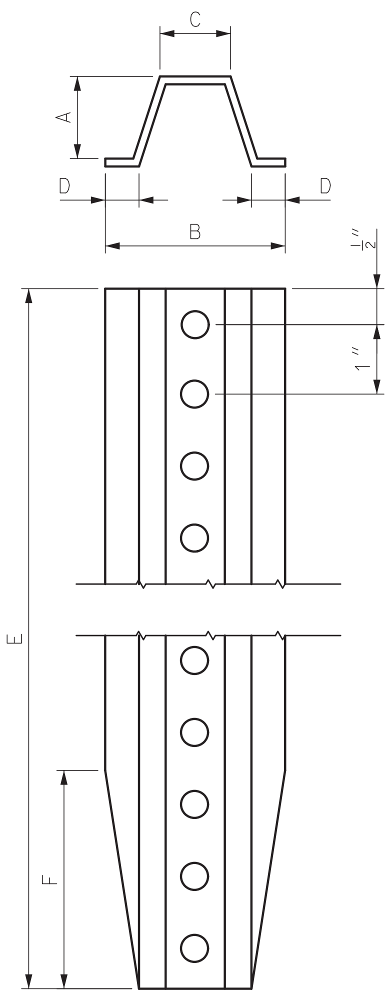
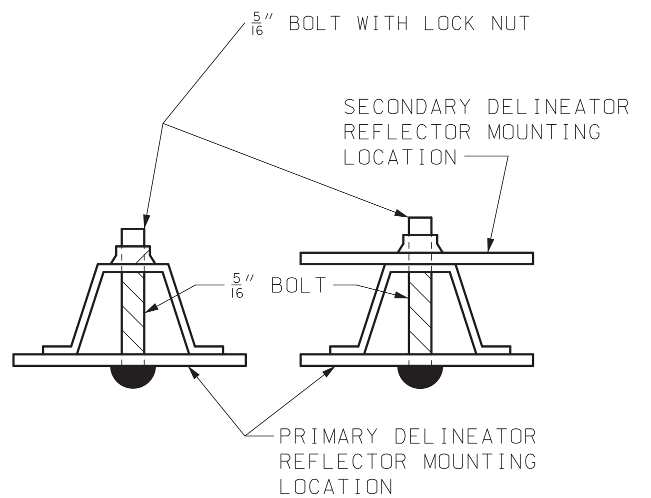
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

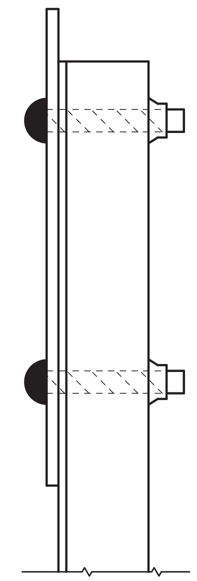
SIGN MOUNTING DETAILS
MOUNTING HEIGHT & OFFSET
PIPE POSTS, PSST, WOOD
& U-CHANNEL POSTS

DATE EFFECTIVE:	4/1/2023	903.03BR	SHEET NO.
DATE PREPARED:	1/6/2023		10 OF 16



GROUND MOUNT
U-CHANNEL





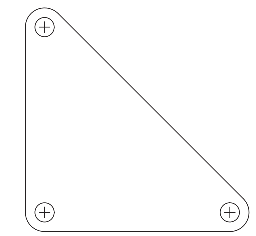
HOLE PUNCHING TO EQUAL 3/8" DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.

CHANNEL POST DELINEATOR							
LIMITS	LBS/FT (2)	DIMENSIONS - INCHES					
		A	B	C	D	E	F
NOMINAL	1.12	1	2¼	7/8	3/8	84	1
TOLERANCE	± 5%	±1/8	±1/8	±1/8	±1/8	±1	±¼

(2) WEIGHT BEFORE GALVANIZING OR PUNCHING.

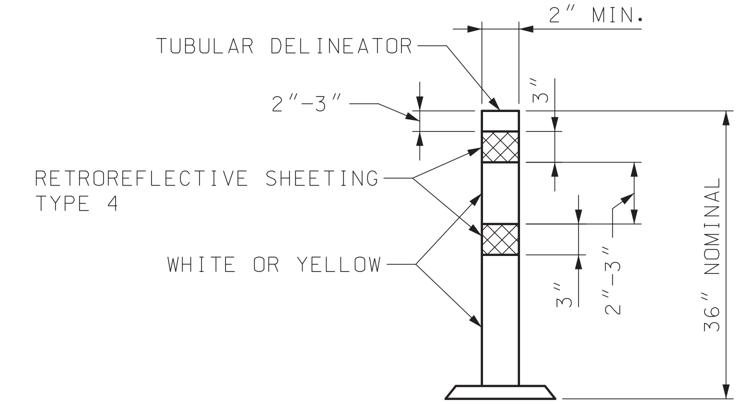
THE CHANNEL POST FOR DELINEATORS SHALL BE MANUFACTURED FROM DUCTILE ASTM A 36 OR ASTM A 1011 GR 60.

CHANNEL POST DELINEATOR AND FASTENER DETAILS



DELINEATOR PLACEMENT LOCATED AT THE RADIUS POINTS

TUBULAR DELINEATOR PLACEMENT FOR ISLANDS

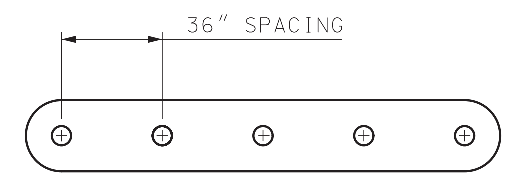


36 INCH SURFACE-MOUNT DELINEATOR POST

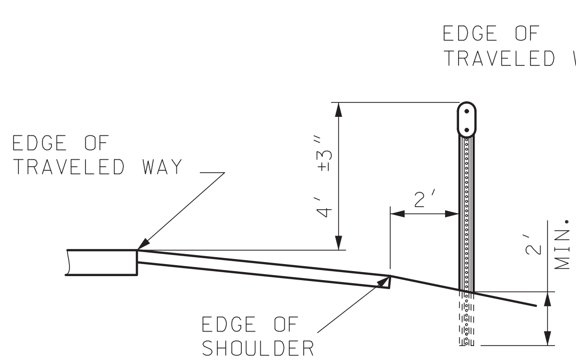
TUBULAR DELINEATOR DETAIL

COLOR OF TUBULAR DELINEATOR AND REFLECTIVE SHEETING SHALL MATCH THE COLOR OF THE CLOSEST PAVEMENT MARKING OR CURB MARKING.

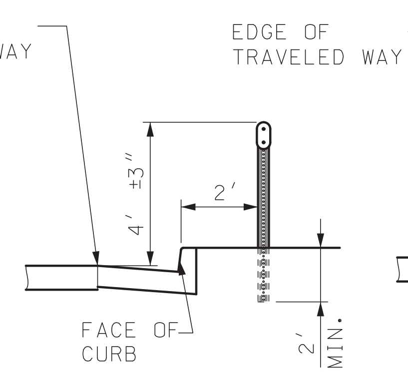
TUBULAR DELINEATOR SHAPE MAY BE ROUND OR T-SHAPED. TUBULAR DELINEATOR SHALL BE PERMANENTLY MOUNTED TO THE PAVEMENT SURFACE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.



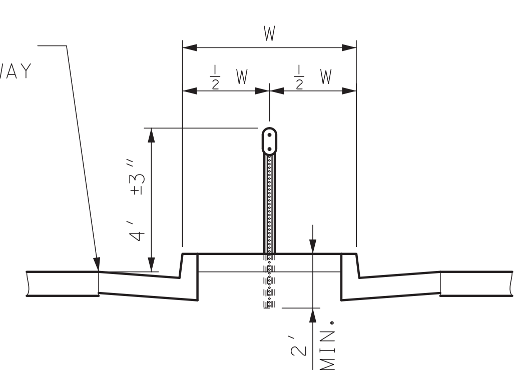
DELINEATOR PLACEMENT FOR MEDIAN STRIPS



SHOULDER MOUNTED

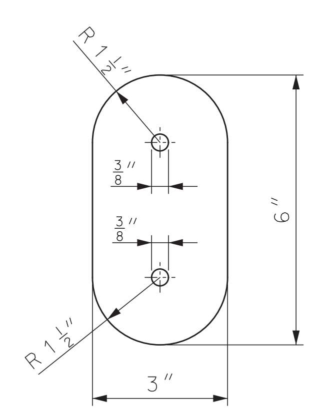


OUTSIDE
BARRIER CURB

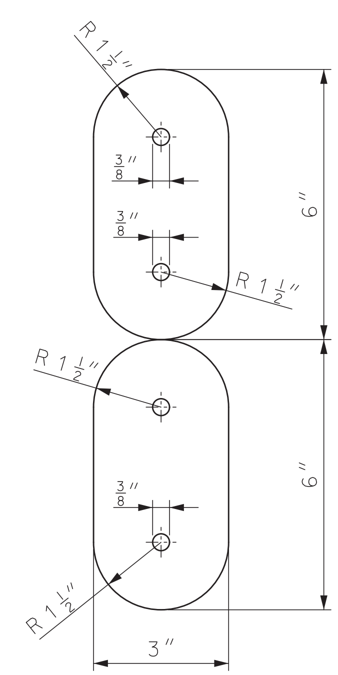


NARROW
PAVED MEDIAN

CHANNEL POST DELINEATOR MOUNTING DETAILS



SINGLE



DOUBLE STACKED

CHANNEL POST DELINEATOR REFLECTOR

NOTES:

RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D4956 TYPE 9 OR 11 SHALL BE APPLIED TO ONLY ONE SIDE OF THE DELINEATOR REFLECTOR BODY.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7.5 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING.

3" X 6" DELINEATOR BODY SHALL BE MADE FROM 0.080 INCH ALUMINUM.

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STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
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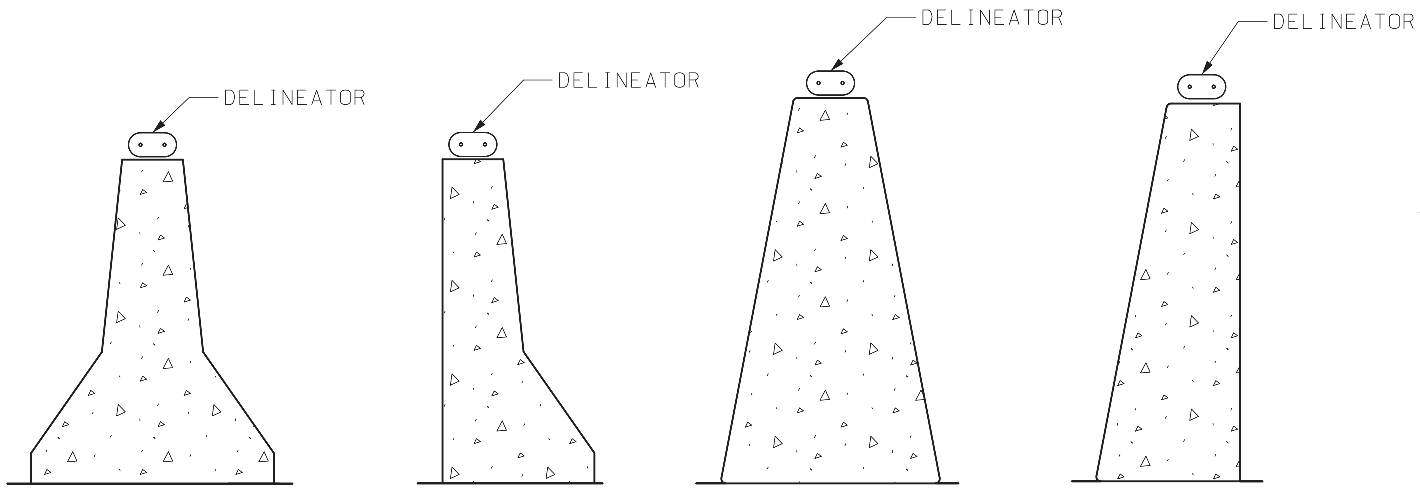
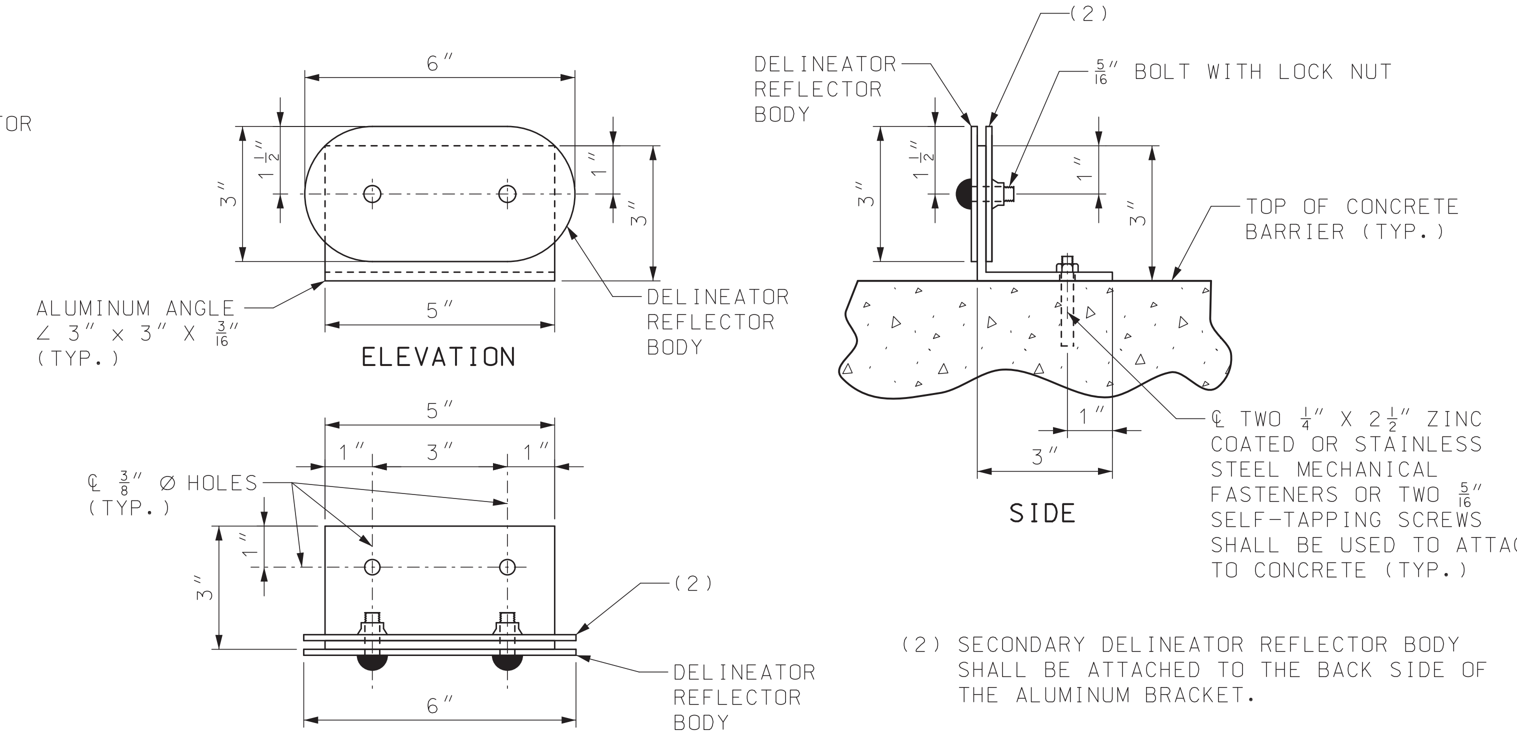
SIGN MOUNTING DETAILS
DELINEATORS



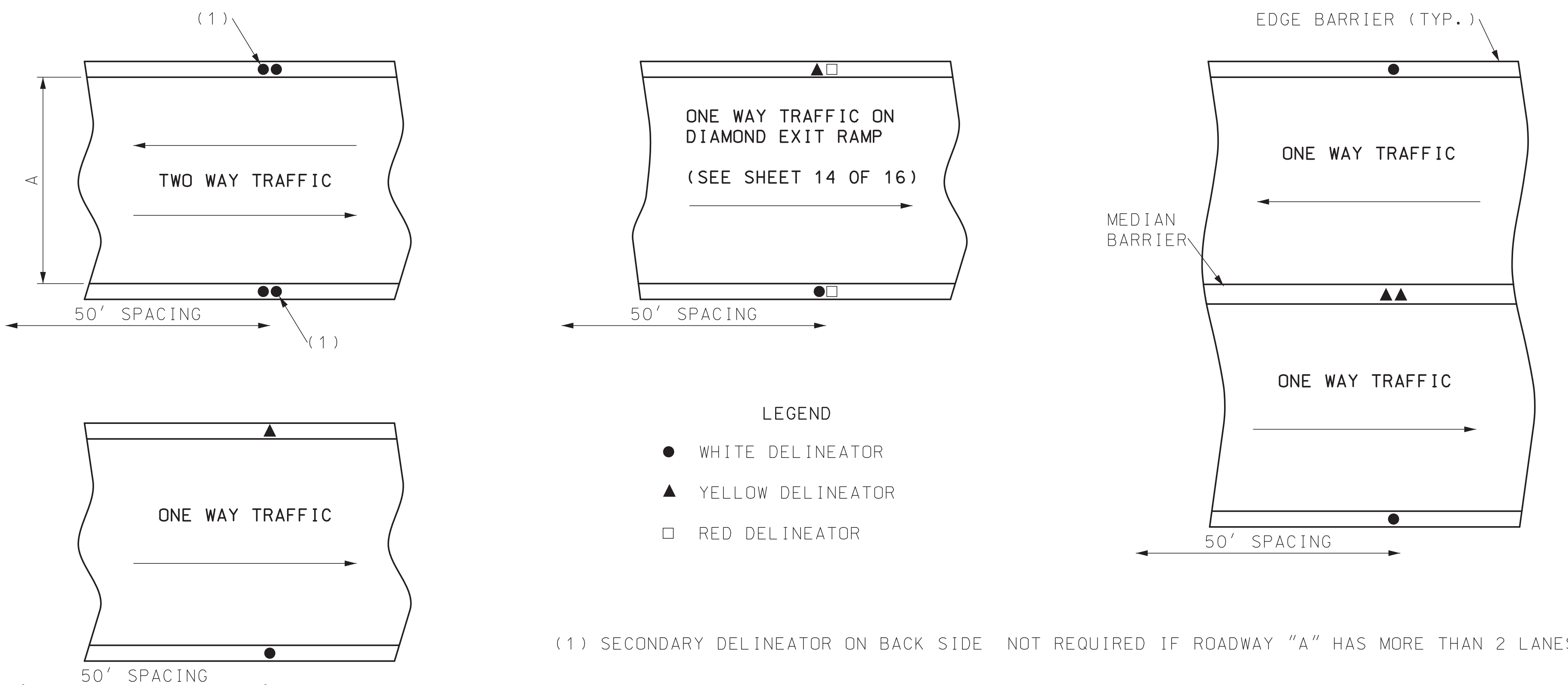
DELINEATORS ON CONCRETE TRAFFIC BARRIER

FOR CONCRETE BARRIER DETAILS, SEE STD PLANS 617.10 OR BRIDGE PLANS.



(2) SECONDARY DELINEATOR REFLECTOR BODY SHALL BE ATTACHED TO THE BACK SIDE OF THE ALUMINUM BRACKET.

DELINEATOR CONNECTION
ON CONCRETE TRAFFIC BARRIER
DETAIL



(1) SECONDARY DELINEATOR ON BACK SIDE NOT REQUIRED IF ROADWAY "A" HAS MORE THAN 2 LANES

ROADWAY OR BRIDGE CONCRETE TRAFFIC BARRIER DELINEATION

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D 4956 TYPE 5 OR 8 SHALL BE APPLIED TO ONLY ONE SIDE OF THE DELINEATOR REFLECTOR BODY.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING.

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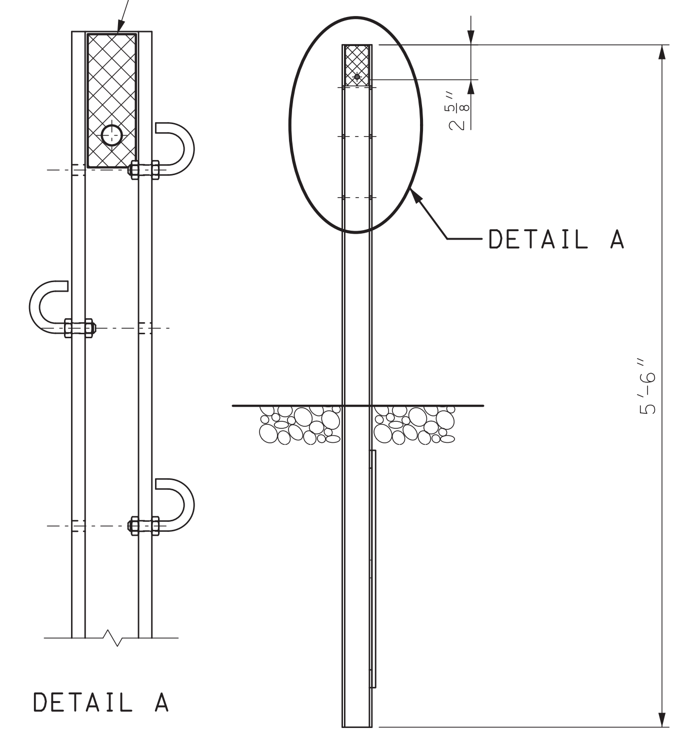
SIGN MOUNTING DETAILS
CONCRETE BARRIER DELINEATORS

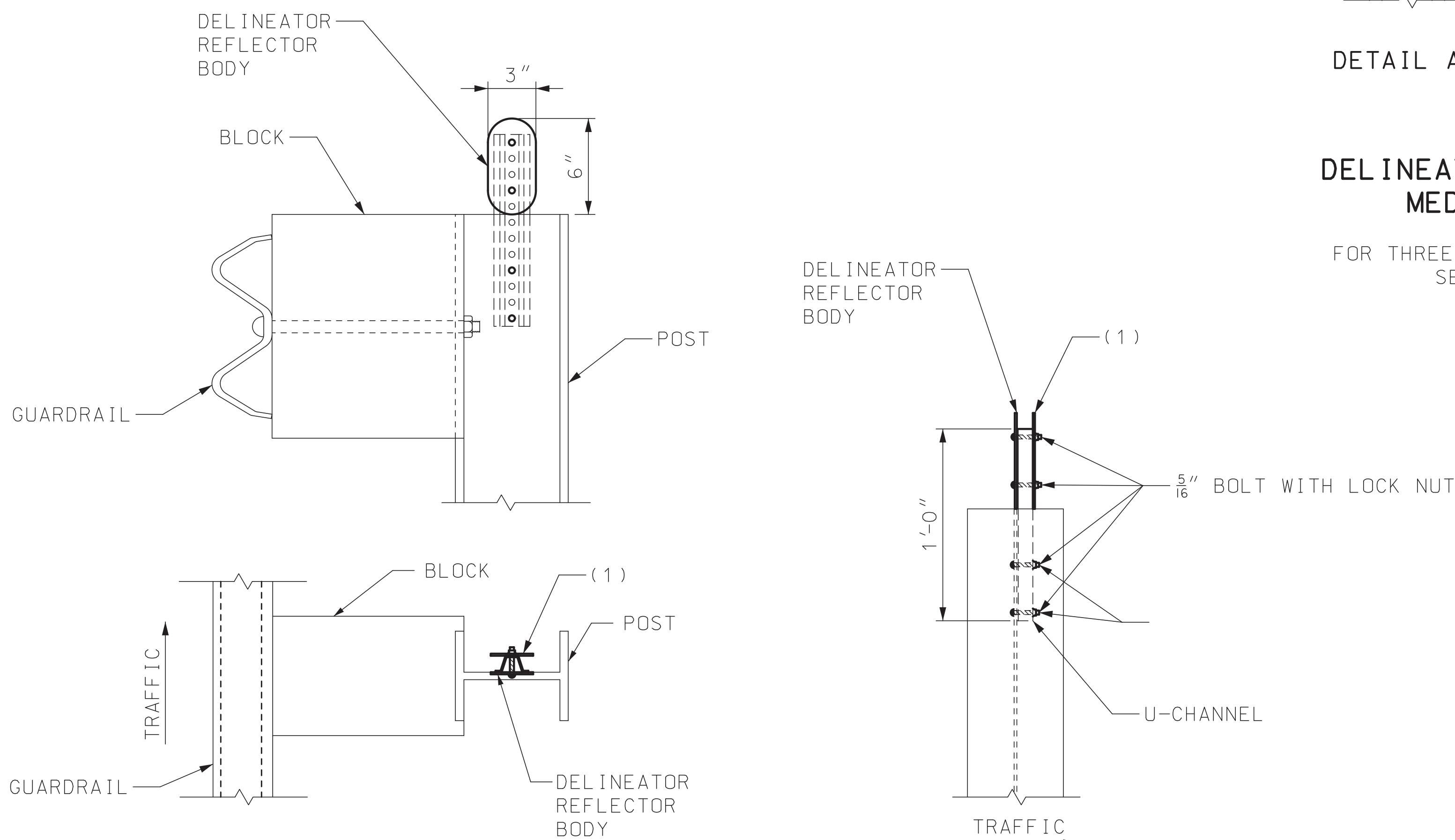
DATE EFFECTIVE:	4/1/2023	903.03BR	SHEET NO. 12 OF 16
DATE PREPARED:	1/11/2023		

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



DELINEATORS ON THREE-STRAND MEDIAN GUARD CABLE

FOR THREE-STRAND GUARD CABLE DETAILS SEE STD PLANS 606.41.



DELINEATORS ON GUARDRAIL

FOR GUARDRAIL DETAILS, SEE STD PLANS 606.00 AND 606.50.

(1) A SECONDARY DELINEATOR WITH RED SHEETING SHALL BE ATTACHED TO THE BACK SIDE OF THE CHANNEL WHEN THE DELINEATION IS PLACED ALONG AN INTERCHANGE RAMP AND COULD BE VIEWED BY WRONG WAY TRAFFIC.

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D 4956 TYPE 5 OR 8 SHALL BE APPLIED TO ONLY ONE SIDE OF THE CHANNEL POST DELINEATOR MOUNTED TOWARDS THE CHANNEL POST.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING.

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

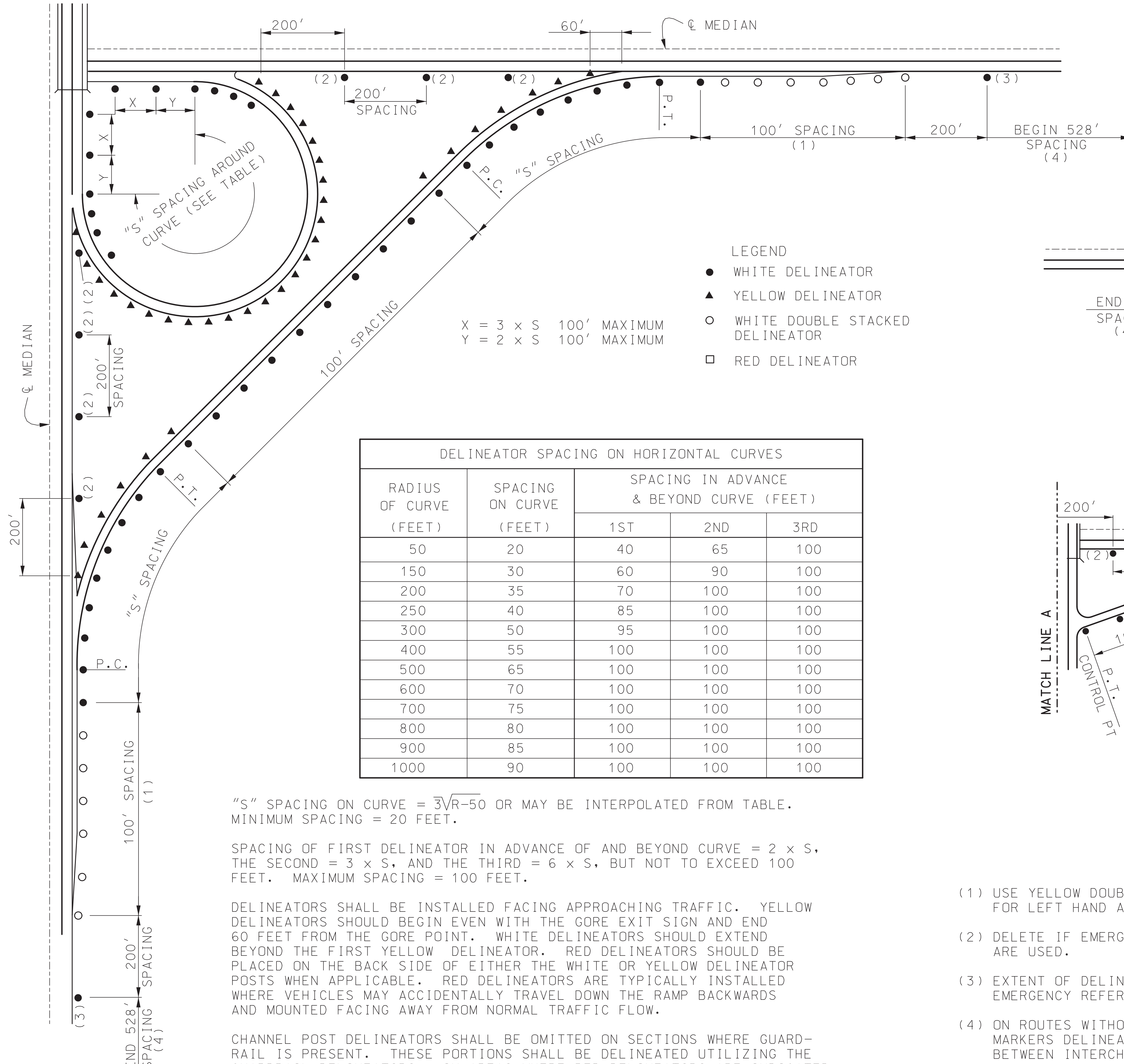
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SIGN MOUNTING DETAILS
GUARDRAIL AND GUARDCABLE DELINEATORS

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

903.03BR

SHEET NO. 13 OF 16



DELINEATOR SPACING ON HORIZONTAL CURVES				
RADIUS OF CURVE (FEET)	SPACING ON CURVE (FEET)	SPACING IN ADVANCE & BEYOND CURVE (FEET)		
		1ST	2ND	3RD
50	20	40	65	100
150	30	60	90	100
200	35	70	100	100
250	40	85	100	100
300	50	95	100	100
400	55	100	100	100
500	65	100	100	100
600	70	100	100	100
700	75	100	100	100
800	80	100	100	100
900	85	100	100	100
1000	90	100	100	100

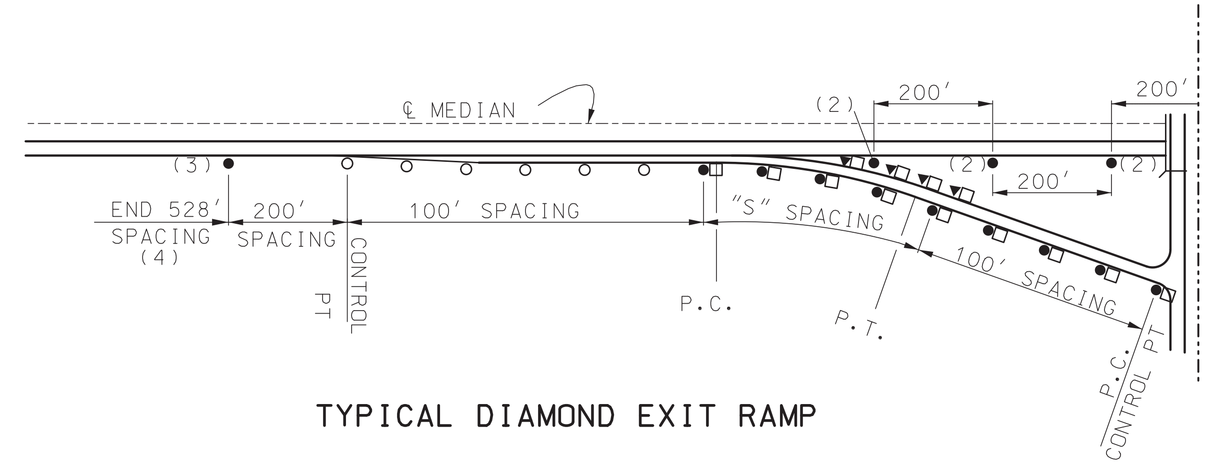
"S" SPACING ON CURVE = $3\sqrt{R-50}$ OR MAY BE INTERPOLATED FROM TABLE. MINIMUM SPACING = 20 FEET.

SPACING OF FIRST DELINEATOR IN ADVANCE OF AND BEYOND CURVE = 2 x S, THE SECOND = 3 x S, AND THE THIRD = 6 x S, BUT NOT TO EXCEED 100 FEET. MAXIMUM SPACING = 100 FEET.

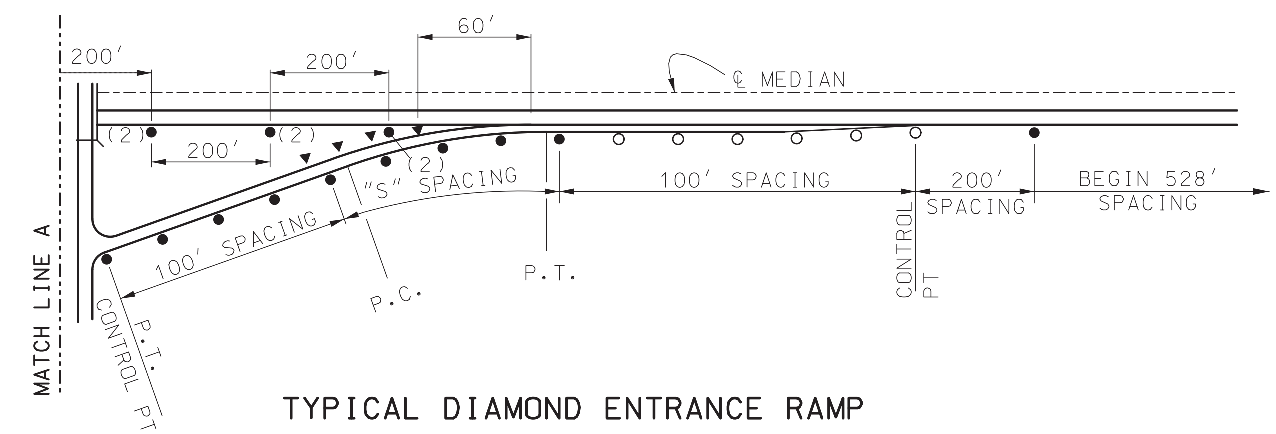
DELINEATORS SHALL BE INSTALLED FACING APPROACHING TRAFFIC. YELLOW DELINEATORS SHOULD BEGIN EVEN WITH THE GORE EXIT SIGN AND END 60 FEET FROM THE GORE POINT. WHITE DELINEATORS SHOULD EXTEND BEYOND THE FIRST YELLOW DELINEATOR. RED DELINEATORS SHOULD BE PLACED ON THE BACK SIDE OF EITHER THE WHITE OR YELLOW DELINEATOR POSTS WHEN APPLICABLE. RED DELINEATORS ARE TYPICALLY INSTALLED WHERE VEHICLES MAY ACCIDENTALLY TRAVEL DOWN THE RAMP BACKWARDS AND MOUNTED FACING AWAY FROM NORMAL TRAFFIC FLOW.

CHANNEL POST DELINEATORS SHALL BE OMITTED ON SECTIONS WHERE GUARDRAIL IS PRESENT. THESE PORTIONS SHALL BE DELINEATED UTILIZING THE GUARDRAIL DELINEATORS. IN AREAS WHERE RED DELINEATORS ARE INDICATED, RED RETROREFLECTIVE SHEETING WILL BE PLACED ON THE BACK SIDE OF THE GUARDRAIL DELINEATOR.

REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.3.



TYPICAL DIAMOND EXIT RAMP



TYPICAL DIAMOND ENTRANCE RAMP

TYPICAL INTERCHANGE

(1) USE YELLOW DOUBLE STACKED DELINEATORS FOR LEFT HAND ACCEL/DECEL LANES.

(2) DELETE IF EMERGENCY REFERENCE MARKERS ARE USED.

(3) EXTENT OF DELINEATION ON ROUTES WITH EMERGENCY REFERENCE MARKERS.

(4) ON ROUTES WITHOUT EMERGENCY REFERENCE MARKERS DELINEATORS SHALL BE INSTALLED BETWEEN INTERCHANGES EVERY 528'.

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

THE CONTRACT UNIT PRICE FOR EACH CHANNEL POST DELINEATOR SHALL INCLUDE THE REFLECTOR, FASTENERS AND POST.

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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.

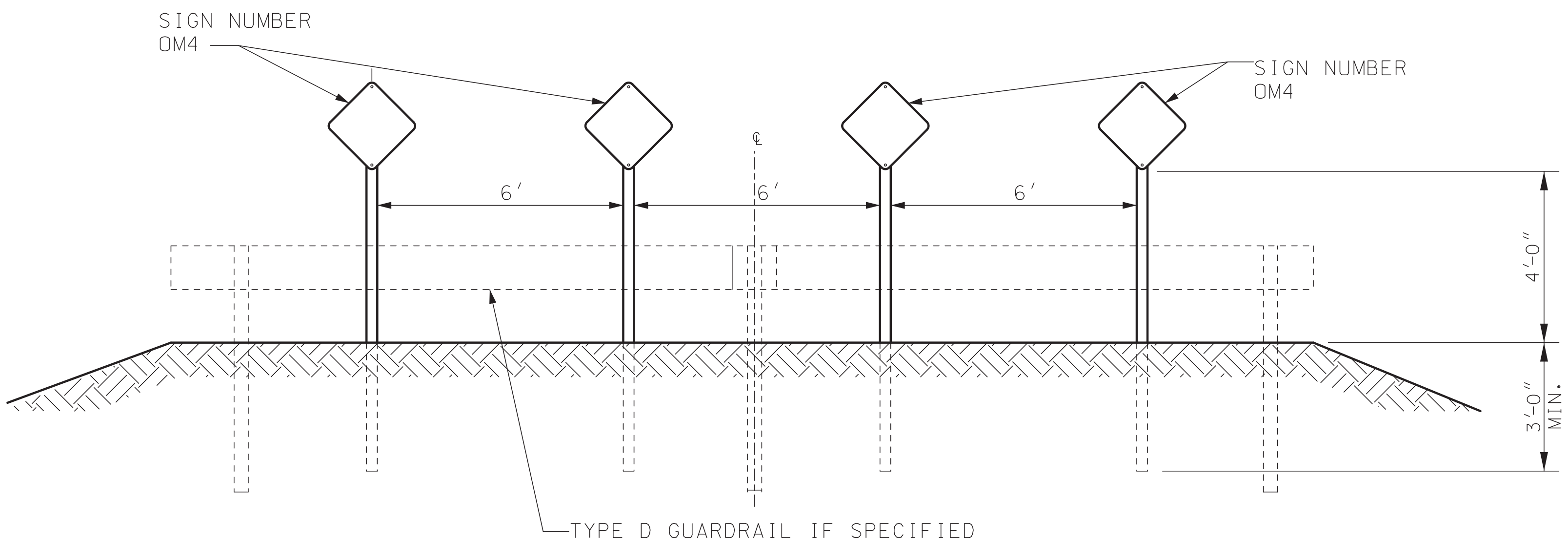
SIGN MOUNTING DETAILS
INTERCHANGE DELINEATION

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

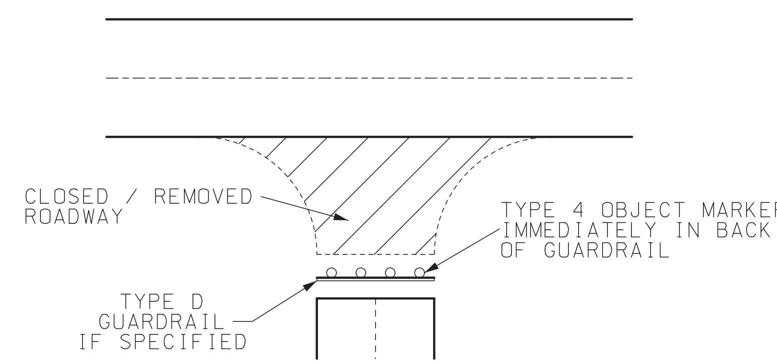
903.03BR

SHEET NO. 14 OF 16

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



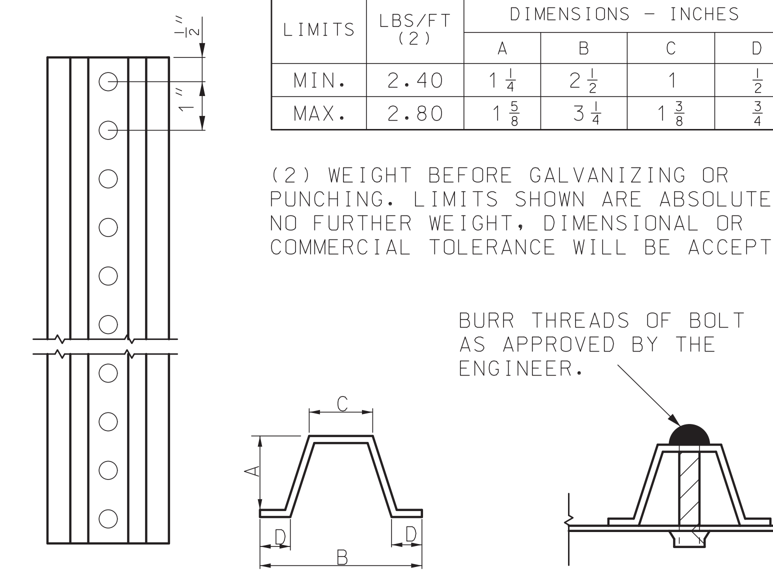
TYPE 4 OBJECT MARKER INSTALLATION



TYPICAL ROAD CLOSURE

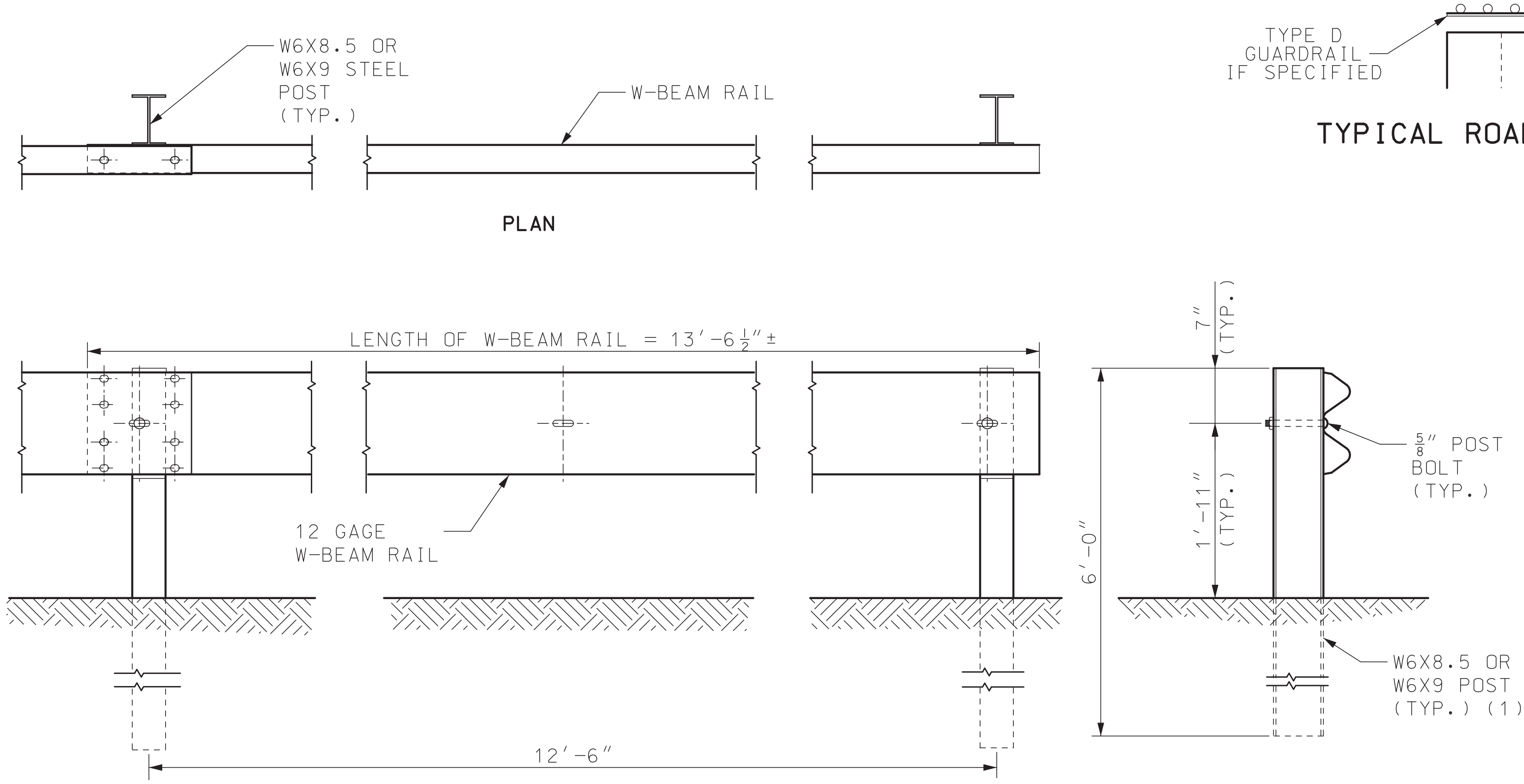
STEEL OBJECT MARKER POST					
LIMITS	LBS/FT (2)	DIMENSIONS - INCHES			
		A	B	C	D
MIN.	2.40	1 1/4	2 1/2	1	1/2
MAX.	2.80	1 5/8	3 1/4	1 3/8	3/4

(2) WEIGHT BEFORE GALVANIZING OR PUNCHING. LIMITS SHOWN ARE ABSOLUTE. NO FURTHER WEIGHT, DIMENSIONAL OR COMMERCIAL TOLERANCE WILL BE ACCEPTABLE.



HOLE PUNCHING TO EQUAL 3/8" DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.

OBJECT MARKER POST AND FASTENER DETAILS



(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SEC 1040.

TYPE D GUARDRAIL

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

TYPE D GUARDRAIL IS ACCESS RESTRAINT AND VISUAL TARGET VALUE ONLY. IT HAS NO REDIRECTIVE CAPABILITY.

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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.

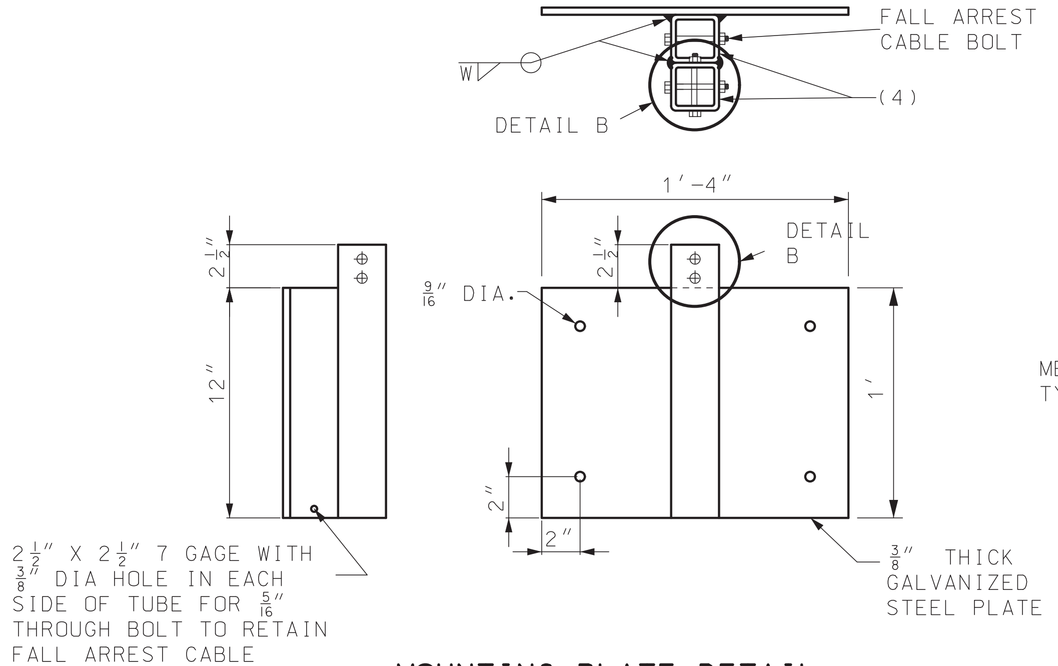
SIGN MOUNTING DETAILS
OBJECT MARKERS FOR
ROAD CLOSURE

DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

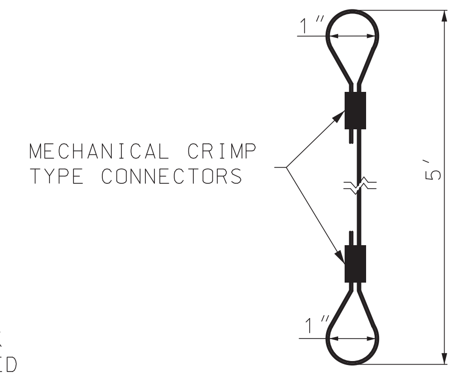
903.03BR

SHEET NO.
15 OF 16

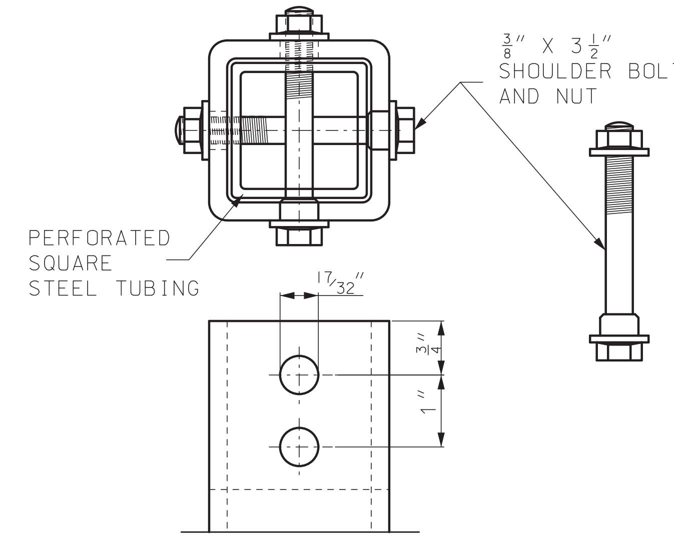
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



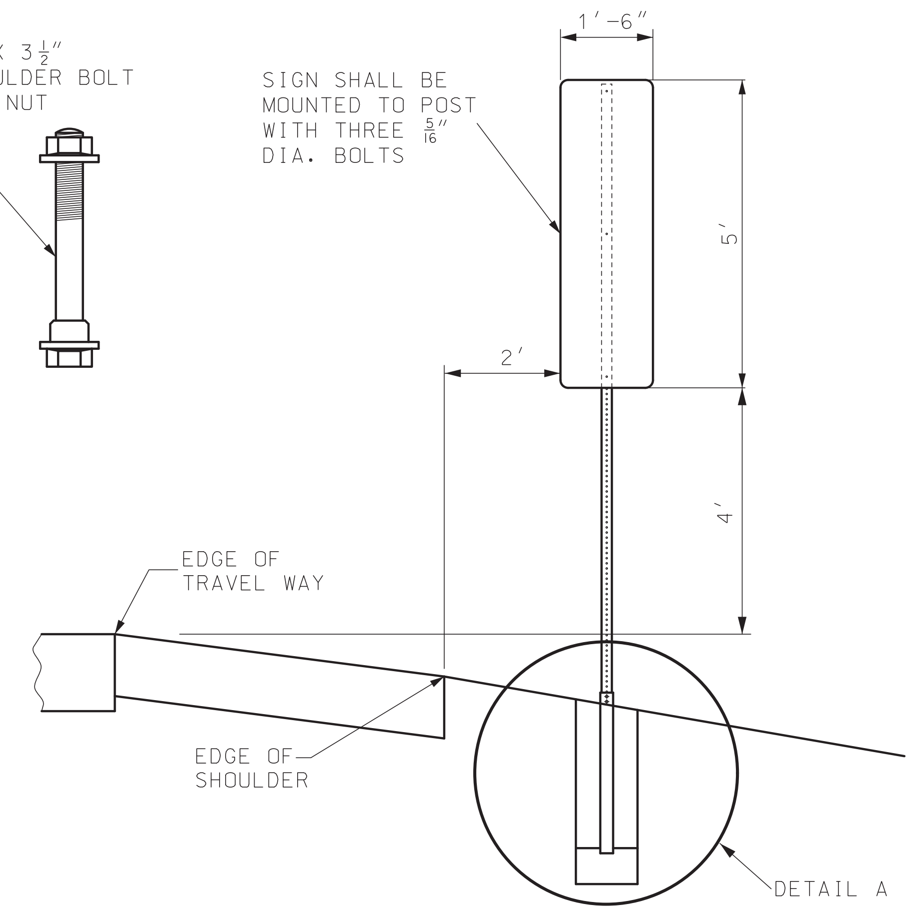
MOUNTING PLATE DETAIL



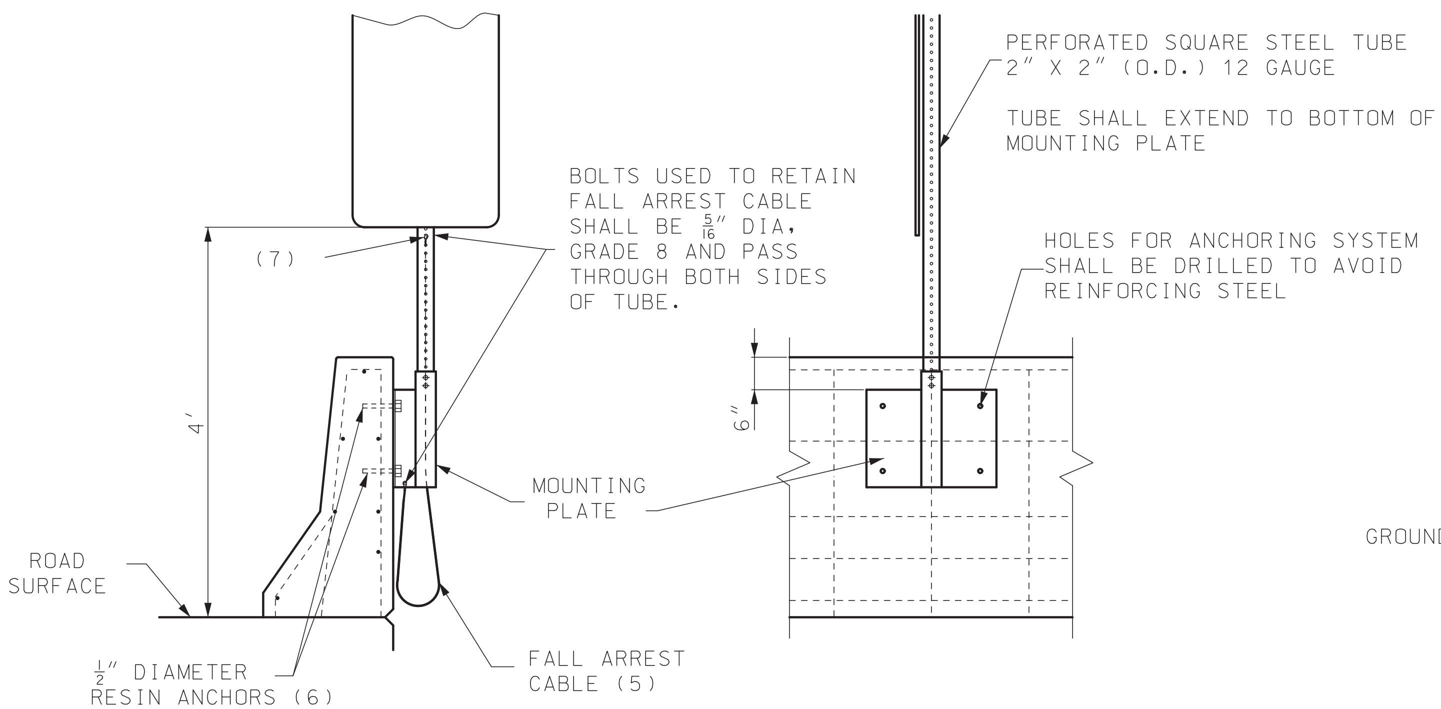
FALL ARREST
CABLE DETAIL



DETAIL B
SHOULDER BOLT



GROUND INSTALLATION



BARRIER WALL INSTALLATION

(1) PERFORATED SQUARE STEEL TUBE 2" X 2" (O.D.) 12 GAUGE. TUBE SHALL EXTEND A MINIMUM OF 6" BELOW THE TOP OF THE FOUNDATION TUBE.

(2) TUBE TO EXTEND ABOVE FOUNDATION ONLY ENOUGH TO ALLOW BOLT TO BE INSERTED $2\frac{1}{2}''$ MAXIMUM.

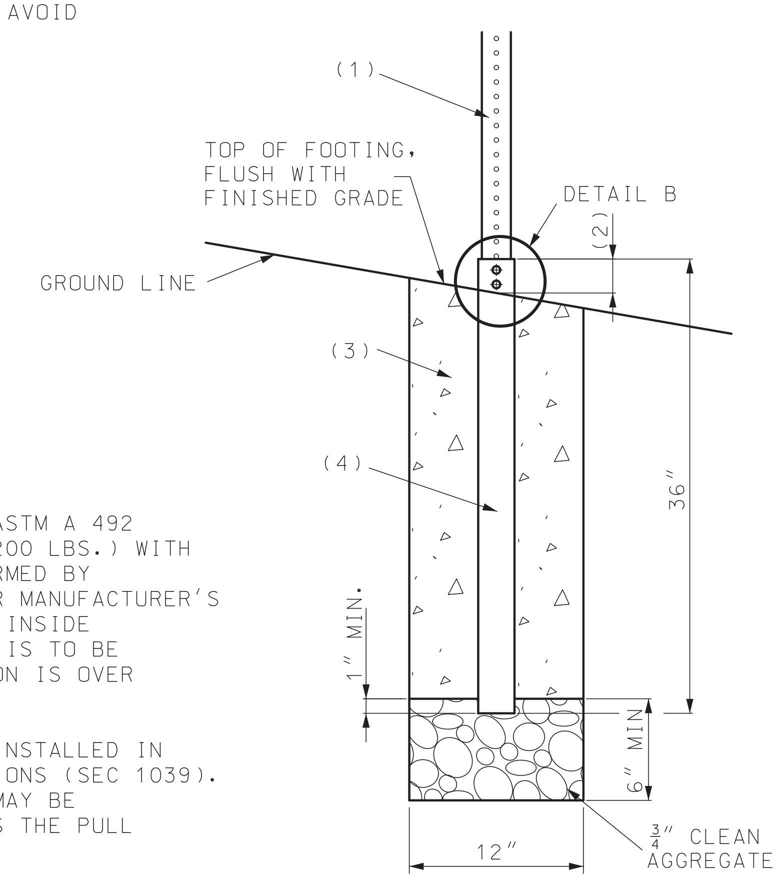
(3) SEE SEC 903 FOR CONCRETE MATERIAL REQUIREMENTS.

(4) $2\frac{1}{2}''$ x $2\frac{1}{2}''$ (O.D.) SQUARE TUBE GALVANIZED 7 GAUGE WITH TWO $\frac{17}{32}''$ DIAMETER HOLES IN EACH FACE $\frac{3}{4}''$ BELOW TOP OF TUBE.

(5) $\frac{1}{8}''$x 5' LONG STAINLESS STEEL CABLE (ASTM A 492 TYPE 304 MINIMUM BREAKING STRENGTH 200 LBS.) WITH A 1" DIA. LOOP AT EACH END LOOPS FORMED BY MECHANICAL CRIMP TYPE CONNECTION PER MANUFACTURER'S SPECIFICATIONS. CABLE IS TO BE RUN INSIDE PERFORATED SQUARE STEEL TUBE. CABLE IS TO BE USED ONLY WHEN SIGN MOUNTING LOCATION IS OVER ANOTHER TRAVELED WAY.

(6) $\frac{1}{2}''$ DIAMETER RESIN ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD SPECIFICATIONS (SEC 1039). AN APPROVED MECHANICAL TYPE ANCHOR MAY BE USED IF THE DEVICE EQUALS OR EXCEEDS THE PULL TEST REQUIREMENTS OF SEC. 1039.

(7) FALL ARREST CABLE TO BE SECURED TO NEXT FULL HOLE BELOW SIGN



DETAIL A

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

PERFORATED SQUARE STEEL TUBE SHALL BE SECURED TO FOUNDATION TUBE OR BARRIER WALL MOUNTING PLATE WITH A SHOULDER BOLT PER PERFORATED SQUARE STEEL TUBE MANUFACTURER'S SPECIFICATION.

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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.

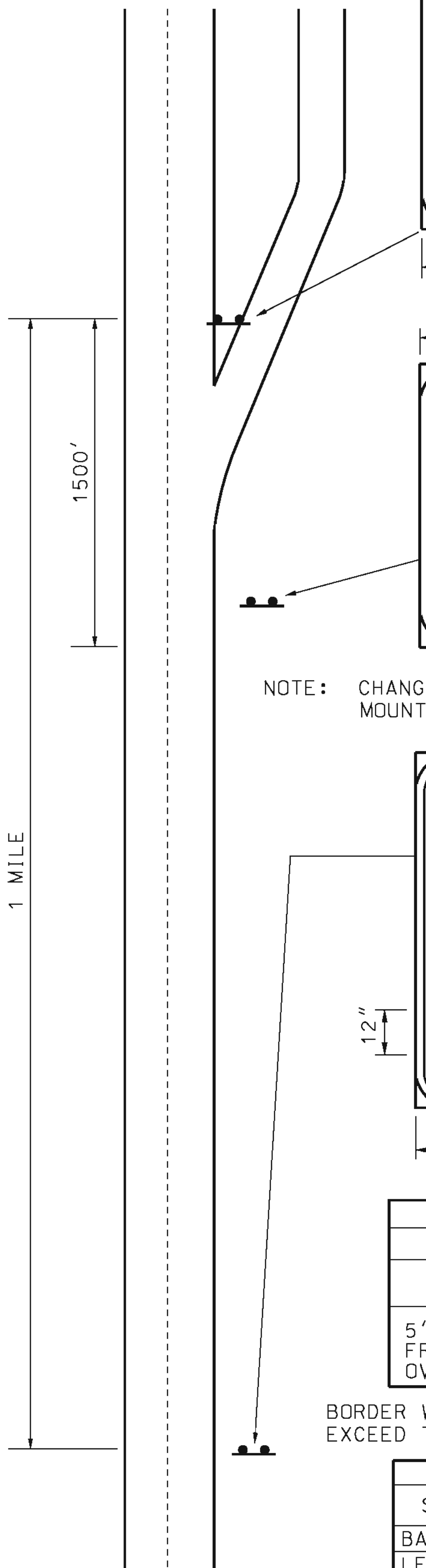
SIGN MOUNTING DETAILS
EMERGENCY REFERENCE MARKERS

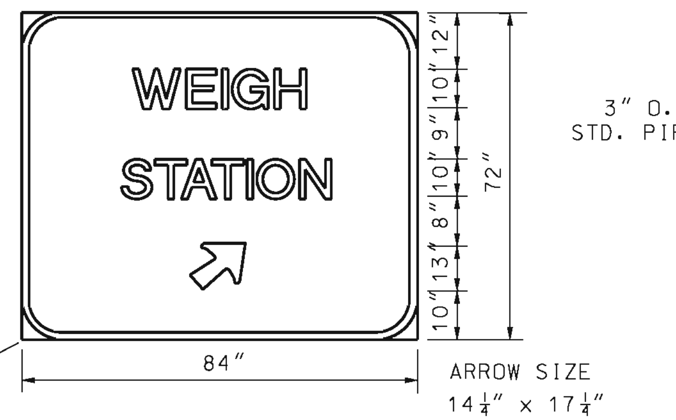
DATE EFFECTIVE: 4/1/2023
DATE PREPARED: 1/6/2023

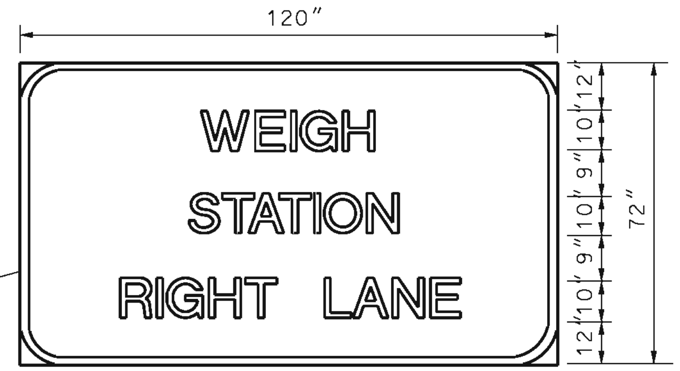
903.03BR

SHEET NO.
16 OF 16

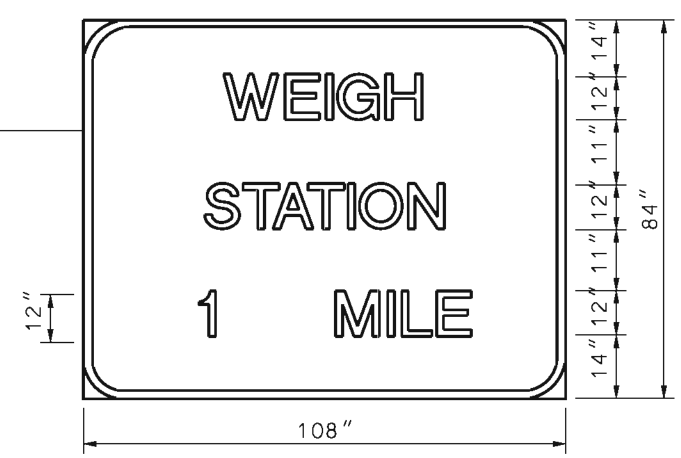
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.







NOTE: CHANGEABLE "OPEN/CLOSE" AND "BUSES WEIGH" SIGNS MOUNTED BELOW THIS SIGN. SEE DETAILS THIS SHEET.

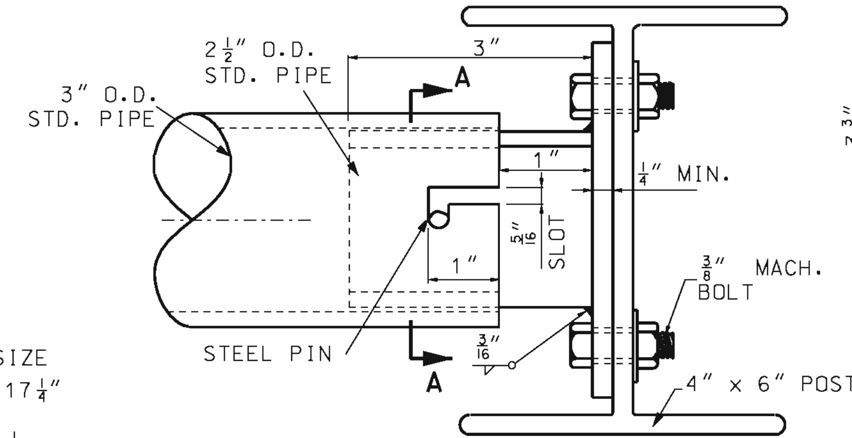


BORDER			
CORNER RADII		WIDTH	
MINIMUM SIGN DIM.	IN.	SIGN SIZE	IN.
5' OR LESS FROM 5' TO 7' OVER 7'	6 9 12	6' x 10' OR LARGER LESS THAN 6' x 10'	2 $1\frac{1}{8}$

BORDER WIDTH SHALL BE AS SHOWN ON CHART BUT NOT TO EXCEED THE STROKE WIDTH OF THE MAJOR LETTERING ON SIGN.

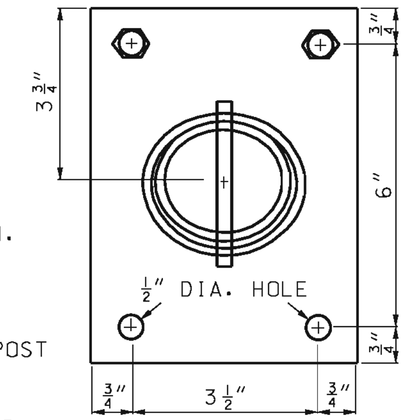
GENERAL SIGN DATA				
STR1L-3	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES
BACKGROUND		1	GREEN	
LEGEND	L-3	4	WHITE	E
SYMBOLS	L-3	4	WHITE	
BORDER	L-3	4	WHITE	
SUBSTRATE	STRUCTURAL			

GUIDE SIGN DETAIL

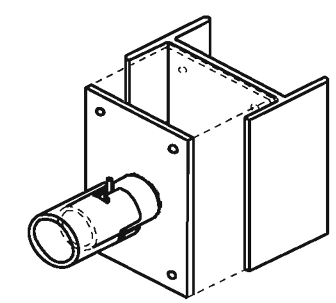


ASSEMBLY SHALL BE GALVANIZED AFTER FABRICATION

PLAN VIEW



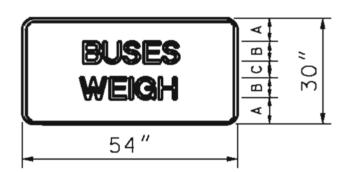
SECTION A-A



ISOMETRIC VIEW

BUSES WEIGH MOUNTING ASSEMBLY

FOR OPEN AND CLOSED SIGN SEE SPECIAL PROVISIONS



A = $6\frac{1}{2}$"
B = 6"
C = 5"

MAXIMUM HEIGHT FROM BOTTOM OF BUSES WEIGH SIGN TO GROUND SHALL BE 60".

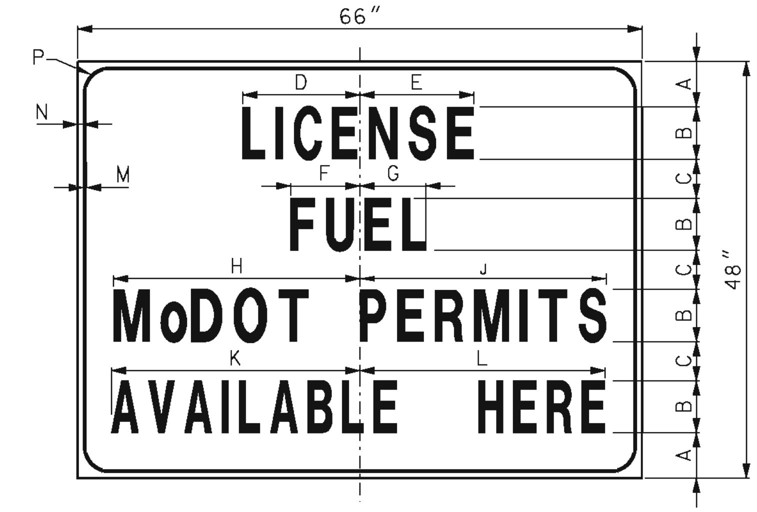
GENERAL SIGN DATA				
SHR1L-3	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES
BACKGROUND		1	GREEN	
LEGEND	L-3	4	WHITE	E
SYMBOLS				
BORDER	L-3	4	WHITE	
SUBSTRATE	SHEET			

CHANGEABLE SIGN DETAIL

SUBSTRATE
ST STRUCTURAL
SH SHEET

LEGEND, SYMBOLS, & BORDER
L-1 SCREEN PRINT
L-3 DIRECT APPLIED (CUT FROM MATERIAL SHOWN ON PLANS.)

REFLECTIVE SHEETING
R1 ENGINEERING GRADE IN ACCORDANCE WITH SEC 1042.2.7.1
R4 PRISMATIC IN ACCORDANCE WITH SEC 1042.2.7.3



SIGN	A	B	C	D	E	F	G	H	J	K	L	M	N	P
R21-1	$5\frac{1}{4}$"	6"	$4\frac{1}{2}$"	$13\frac{1}{2}$"	$13\frac{1}{8}$"	8"	$7\frac{5}{8}$"	$28\frac{3}{8}$"	$28\frac{3}{8}$"	$28\frac{5}{8}$"	$28\frac{1}{4}$"	$\frac{3}{8}$"	$\frac{5}{8}$"	3"

GENERAL SIGN DATA				
SHR1L-1	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES
BACKGROUND		1	WHITE	
LEGEND	L-1		BLACK	C
SYMBOLS				
BORDER	L-1		BLACK	
SUBSTRATE	SHEET			

PERMIT SIGN DETAIL

MATERIAL LIST		
NO.	DESCRIPTION	LB.
2	$\frac{1}{4}$" STEEL PLATE	2.26
1	3" STANDARD PIPE	32.44
2	2-1/2" STANDARD PIPE	3.89
8	$\frac{3}{8}$" GALV. MACH. BOLT	
8	GALV. WASHER	

GENERAL NOTES:

DESIGN SPECS: AASHTO STANDARD SPECIFCATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARES, AND TRAFFIC SIGNALS - 1975.

MATERIALS AND FABRICATION SHALL CONFORM TO THE REQUIREMENTS OF THE STATE HIGHWAY AND TRANSPORTATION COMMISSION STANDARD SPECIFICATIONS AND PROVISIONS.

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

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY SIGNING

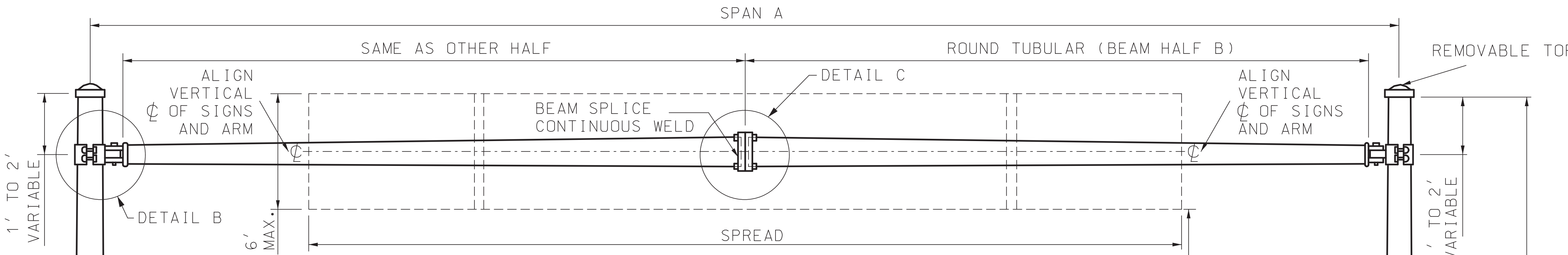
WEIGH STATION

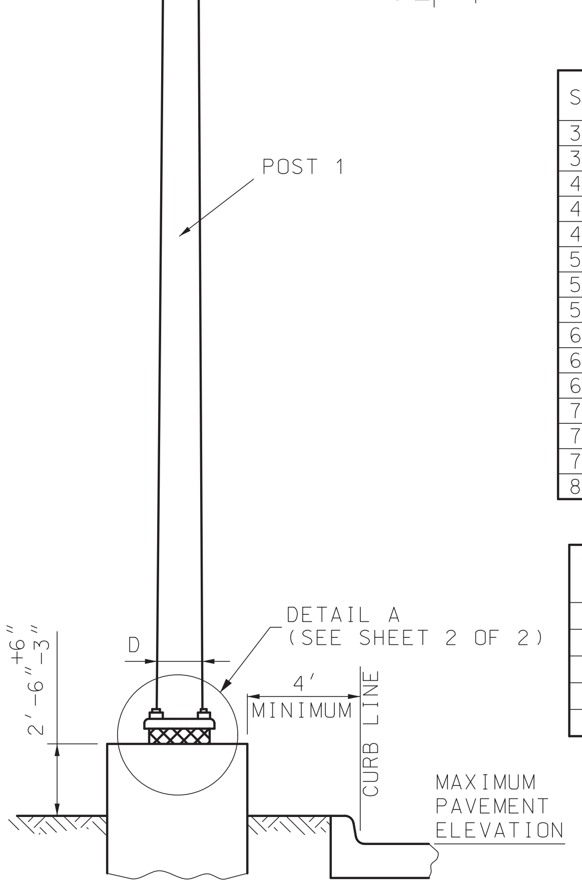
DATE EFFECTIVE: 02/01/2012
DATE PREPARED: 12/19/2011

903.04F

SHEET NO. 1 OF 1

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



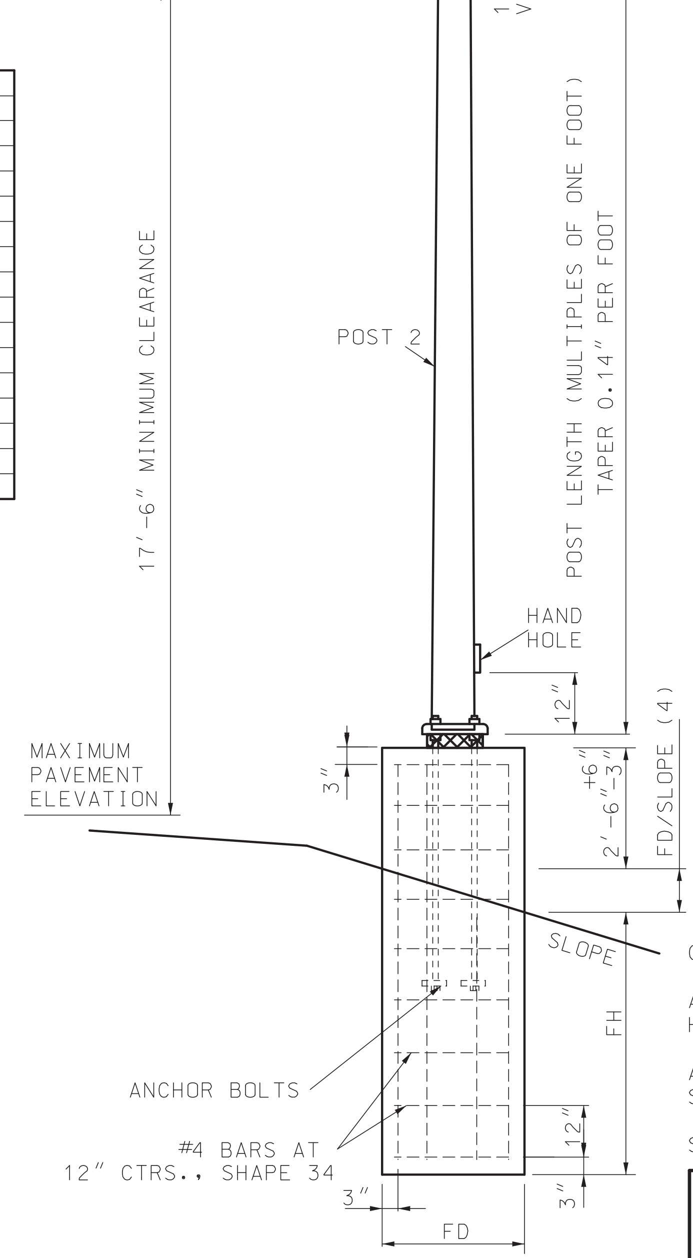


SPAN A	SPREAD FEET											
	15	20	25	30	35	40	45	50	55	60	65	70
31'-6"	143	152			MAXIMUM SIGN AREA SQUARE FEET							
35'-0"	126	138	153									
41'-3"	106	120	130	144								
41'-6"	124	134	144	155								
45'-0"	102	112	121	132	144							
51'-3"	78	88	98	108	118	129						
51'-6"	109	119	129	141	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.	END POST D
S-1310	31'-6" THRU 41'-3"	3	8.8" x 6" x 20'	3	10"
S-1310	41'-6" THRU 51'-3"	3	9.5" x 6" x 25'	3	10"
S-1310	51'-6" THRU 61'-3"	3	10.5" x 6.3" x 30'	3	10"
S-1312	61'-6" THRU 71'-3"	7	14" x 9.1" x 35'	3	12"
S-1312	71'-6" THRU 81'-3"	7	16" x 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.



ELEVATION

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

GENERAL NOTES:

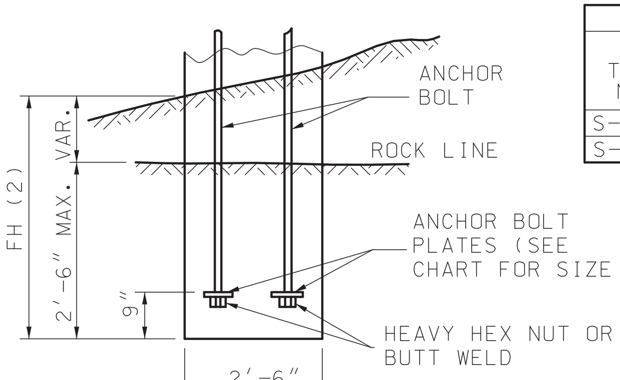
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ℄ OF THE ARM.

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

SEE SHEET 2 OF 2 FOR DETAILS A, B AND C.

ESTIMATED QUANTITIES FOOTING								
TYPE NO.	DIA. FD	CLASS B CONCRETE 1' DEPTH CU. YD.	CLASS B CONCRETE 1" DEPTH CU. YD.	REINFORCING STEEL #5 NO.	#5 LENGTH	#4 (3) NO.	#4 (3) LENGTH	TOTAL LBS.
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.



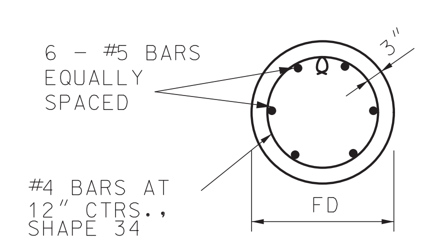
REINFORCEMENT PLACED SAME AS STANDARD FOOTING.
CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK.

MODIFIED FOOTING IN SOLID ROCK

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

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

(1) ANCHOR BOLT LENGTH AS REQUIRED



PLAN FOOTINGS

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.

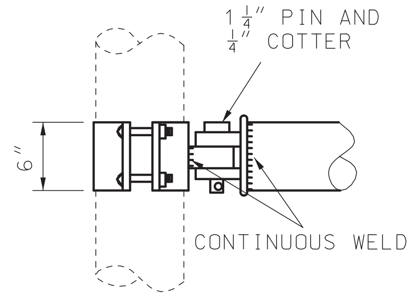
HIGHWAY SIGNING

TUBULAR SUPPORT STEEL TYPE S ONE TUBE

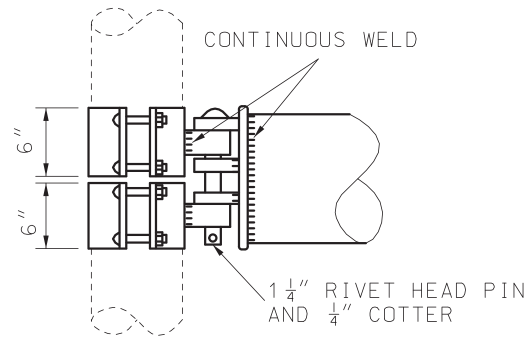
DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

903.05L

SHEET NO. 1 OF 2

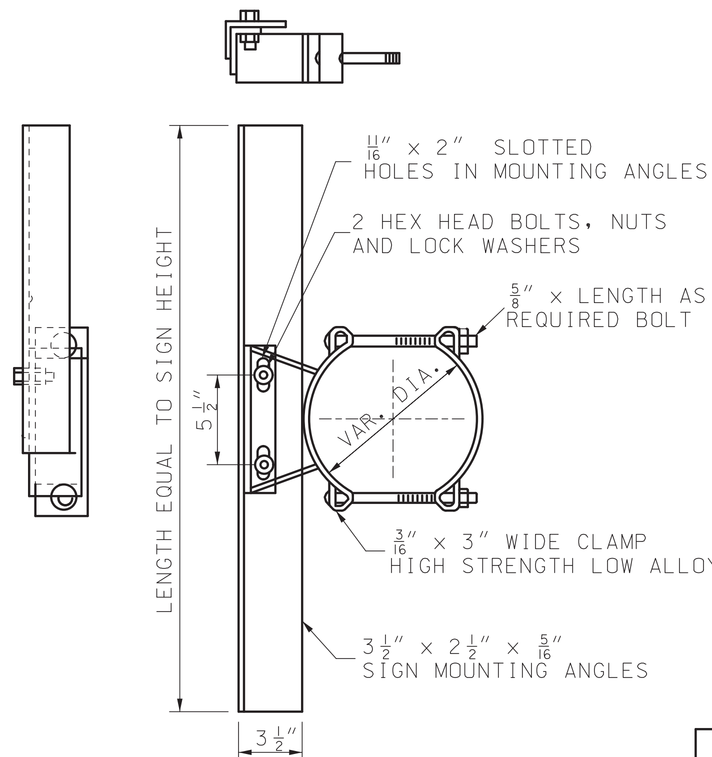


TUBE DIAMETER EQUAL TO
OR LESS THAN $10\frac{1}{2}''$
AT CENTER OF SPAN



TUBE DIAMETER GREATER THAN $10\frac{1}{2}''$
AT CENTER OF SPAN

DETAIL B
BEAM CLAMP

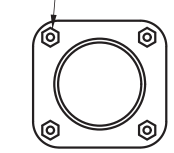


NOTE:
MINIMUM OF TWO BRACKETS ARE REQUIRED
FOR SIGNS OVER 42" IN LENGTH.

GALVANIZED SIGN BRACKET ASSEMBLY

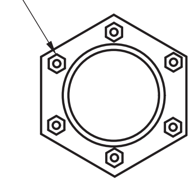
SIGN HEIGHT (INCHES)	MAXIMUM LIN. FT. OF SIGN WIDTH PER BRACKET
48 & UNDER	13
60	8
72	5

$1\frac{1}{4}''$ x 4" HIGH TENSILE
HEX HEAD BOLTS
$2\frac{3}{4}''$ THREAD LENGTH -
4 REQUIRED

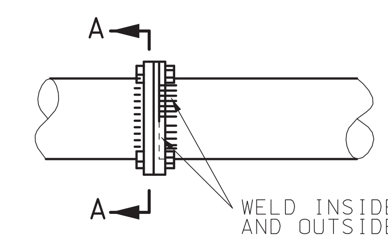


SECTION A-A

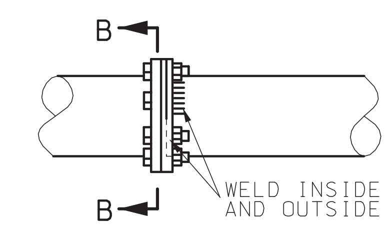
$1\frac{1}{4}''$ x 4" HIGH TENSILE
HEX HEAD BOLTS
$2\frac{3}{4}''$ THREAD LENGTH -
6 REQUIRED



SECTION B-B



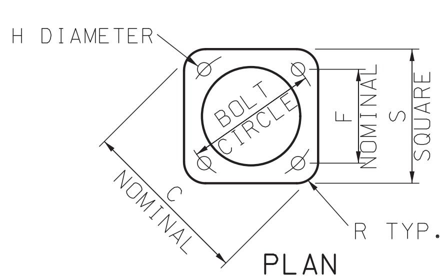
TUBE DIAMETER $9\frac{1}{2}''$
AND UNDER



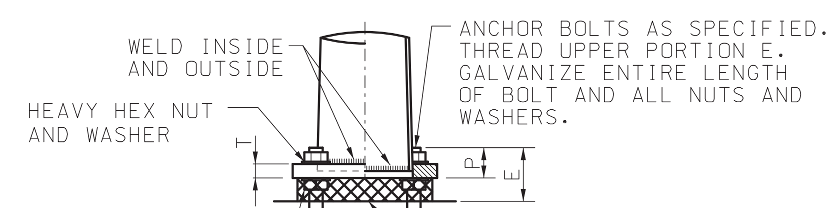
TUBE DIAMETER
OVER $9\frac{1}{2}''$

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	$13\frac{1}{2}''$	$17\frac{1}{2}''$	$9\frac{9}{16}''$	$1\frac{3}{4}''$	$14\frac{1}{8}''$	$3\frac{1}{8}''$	$3\frac{3}{4}''$	$1\frac{1}{2}''$	7"	$1\frac{1}{2}''$ x 60"	5'-0"	2'-6"
S-1312	16"	21"	$11\frac{5}{16}''$	$2\frac{1}{8}''$	17"	$3\frac{3}{4}''$	$4\frac{1}{2}''$	2"	$7\frac{1}{2}''$	$1\frac{3}{4}''$ x 90"	6'-6"	2'-6"



PLAN



ELEVATION

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.

DETAIL A
POST BASE DETAIL

MoDOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
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STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
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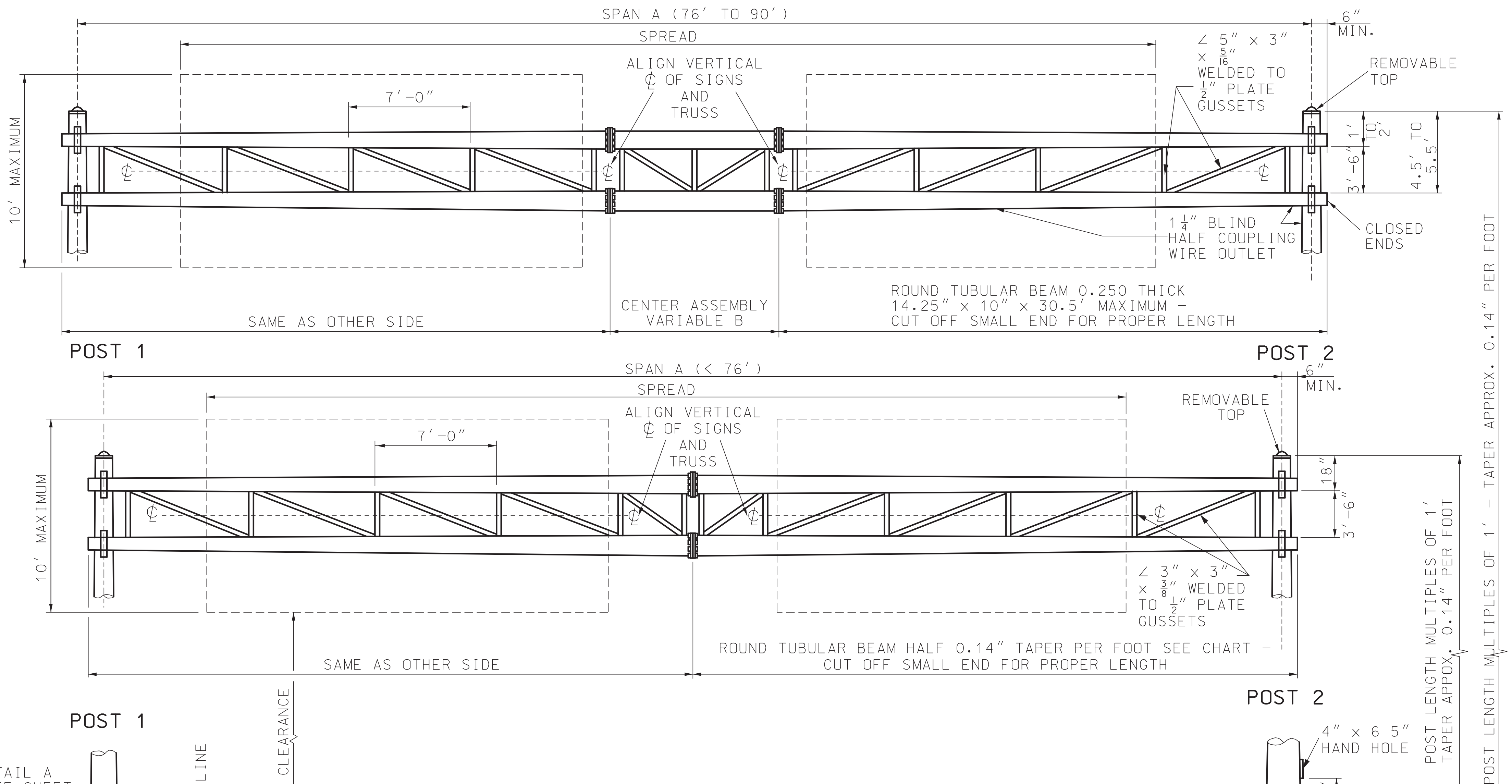
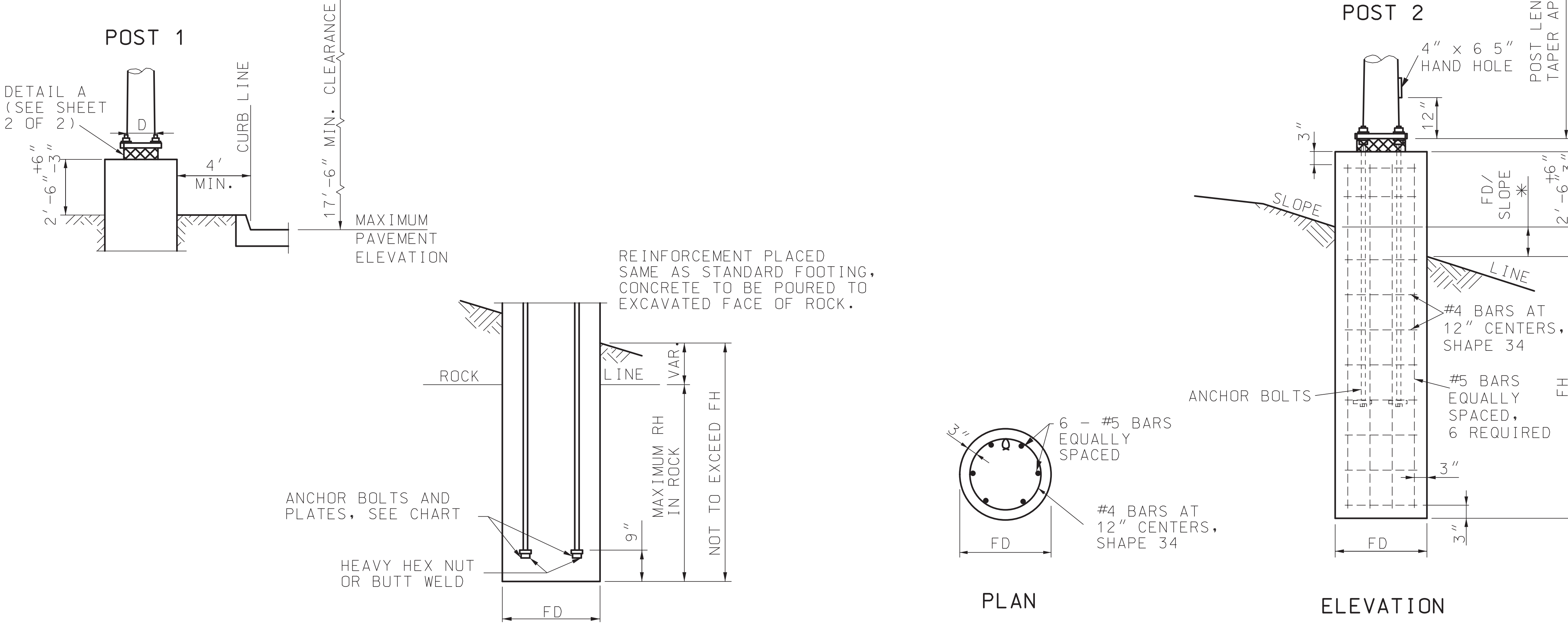
HIGHWAY SIGNING
TUBULAR SUPPORT STEEL
TYPE S
ONE TUBE

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

903.05L



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



MODIFIED FOOTING IN SOLID ROCK

PLAN

ELEVATION

FOOTINGS

✳ 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 ℄ OF THE TRUSS.

MoDOT
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NICOLE A. KOLB HOOD
NUMBER PE-2001018754
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HIGHWAY SIGNING

TUBULAR SUPPORT STEEL TYPE S TWO TUBES

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

903.06L

SHEET NO. 1 OF 2

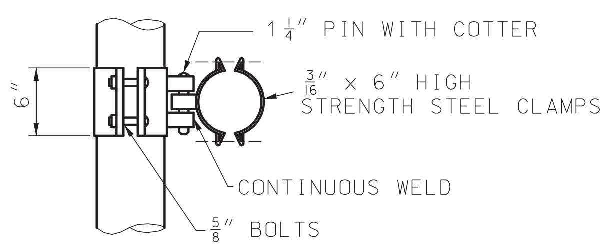
SPAN A	SPREAD IN FEET													STRUCTURE: TUBULAR BEAMS			STRUCTURE: CENTER SECTION B			POSTS FOR MAXIMUM AREA: LENGTH OF POSTS IN FEET									
FEET	30	35	40	45	50	55	60	65	70	75	80	85	90	GA	LARGE DIA.	MIN. L	THICK-NESS	O.D.	LENGTH	18	19	20	21	22	23	24	25	26	27
40	300													3	9.5"	20.5'				S-2315	S-2315	S-2315	S-2316.5	S-2316.5	S-2316.5	S-2318	S-2318	S-2318	S-2318
45	264	288												3	9.5"	23.0'				S-2315	S-2315	S-2315	S-2316.5	S-2316.5	S-2316.5	S-2318	S-2318	S-2318	S-2318
50	282	308	336											3	10.5"	25.5'				S-2315	S-2316.5	S-2316.5	S-2316.5	S-2318	S-2318	S-2318	S-27716	S-27716	S-27716
55	238	262	284	310										3	10.5"	28.0'				S-2315	S-2316.5	S-2316.5	S-2316.5	S-2318	S-2318	S-2318	S-2318	S-27716	S-27716
60	266	288	314	340	364									7	14.0"	30.5'				S-2318	S-27716	S-27716	S-27716	S-2018	S-27718	S-27718	S-27718	S-23316.5	S-23316.5
65	234	256	280	304	328	352								7	14.0"	33.0'				S-2318	S-27716	S-27716	S-27716	S-27716	S-27718	S-27718	S-27718	S-23316.5	S-23316.5
70	262	284	304	324	346	368	394							3	14.0"	35.5'				S-27716	S-27716	S-27716	S-27718	S-27718	S-27718	S-23316.5	S-23316.5	S-23316.5	S-23317
75	228	248	268	288	308	330	352	374						3	14.0"	38.0'				S-27716	S-27716	S-27716	S-2018	S-27718	S-27718	S-27718	S-23316.5	S-23316.5	S-23316.5
76	295	308	326	350	370	397	425	450	472	502				3	14.25"	30.5'	312"	14.238"	16'	S-27716	S-27718	S-27718	S-27718	S-23316.5	S-23316.5	S-23317	S-23317	S-23317	S-20018
79	310	326	347	366	384	410	432	460	490	520				3	14.25"	28.5'	312"	14.238"	23'	S-2018	S-27718	S-27718	S-23316.5	S-23316.5	S-23317	S-23317	S-23317	S-20018	S-20018
83	277	288	300	322	340	360	385	412	434	465	498			3	14.25"	30.5'	312"	14.238"	23'	S-27716	S-2018	S-27718	S-27718	S-23316.5	S-23316.5	S-23316.5	S-23317	S-23317	S-20018
86	297	309	322	337	356	378	402	425	447	473	500	522		3	14.25"	28.0'	312"	14.238"	30'	S-2018	S-27718	S-27718	S-23316.5	S-23316.5	S-23317	S-23317	S-23317	S-20018	S-20018
90	269	280	294	310	327	345	363	385	403	426	446	466	485	3	14.25"	30.5'	312"	14.238"	30'	S-27716	S-27718	S-27718	S-23316.5	S-23316.5	S-23316.5	S-23317	S-23317	S-20018	S-20018

MAXIMUM SIGN AREA IN SQ. FEET

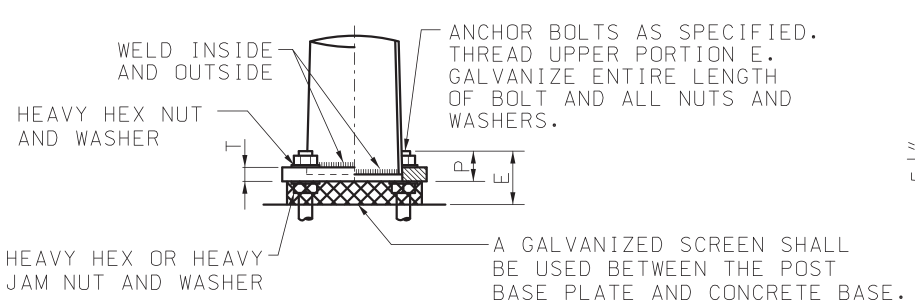
BASE DATA										FOOTINGS: IN EARTH					FOOTINGS: IN SOLID ROCK				ESTIMATED QUANTITIES OF STANDARD FOOTINGS						
TYPE NO.	BOLT CIRCLE	C	F	H	P	R	S	T	E	DIA. FD	FH	ANCHOR BOLTS DIA.	ANCHOR BOLTS LENGTH	RH MAX	ANCHOR BOLTS DIA.	ANCHOR BOLTS LENGTH	PLATES	CLASS B CONC CY/FT	CLASS B CONC CY/IN	#5 BARS NO.	#5 BARS LENGTH	#4 BARS ✻ NO.	#4 BARS ✻ LENGTH	TOTAL LBS.
S-2315	22"	$28\frac{5}{8}$"	$15\frac{1}{2}$"	$2\frac{3}{8}$"	$4\frac{3}{4}$"	$4\frac{5}{8}$"	23"	2"	$8\frac{1}{2}$"	2'-6"	8'	2"	96"	3'	2"	AS REQUIRED SEE ROCK FOOTING	3.5" x 3.5" x 0.75"	0.1818	0.01515	6	11'-9"	13	7'-2"	136
S-2316.5	$23\frac{1}{2}$"	$30\frac{1}{2}$"	$16\frac{5}{8}$"	$2\frac{3}{8}$"	$4\frac{3}{4}$"	5"	$24\frac{1}{2}$"	2"	$8\frac{1}{2}$"	3'-0"	10'	2"	96"	3'	2"		3.5" x 3.5" x 0.75"	0.2618	0.0218	6	14'-0"	15	8'-9"	176
S-2318	$25\frac{1}{2}$"	33"	18"	$2\frac{3}{8}$"	$4\frac{3}{4}$"	$5\frac{1}{2}$"	$26\frac{1}{2}$"	2"	$8\frac{1}{2}$"	3'-0"	10'	2"	96"	3'	2"		3.5" x 3.5" x 0.75"	0.2618	0.0218	6	14'-0"	15	8'-9"	176
S-27716	$23\frac{1}{2}$"	$30\frac{1}{2}$"	$16\frac{5}{8}$"	$2\frac{5}{8}$"	$5\frac{1}{2}$"	5"	$24\frac{1}{2}$"	$2\frac{1}{2}$"	$9\frac{1}{2}$"	3'-0"	10'	$2\frac{1}{4}$"	96"	3'	$2\frac{1}{4}$"		4.5" x 4.5" x 0.75"	0.2618	0.0218	6	14'-0"	15	8'-9"	176
S-2018	$25\frac{1}{2}$"	33"	18"	$2\frac{5}{8}$"	$5\frac{1}{2}$"	$5\frac{1}{2}$"	$26\frac{1}{2}$"	$2\frac{1}{2}$"	$9\frac{1}{2}$"	3'-6"	11'	$2\frac{1}{4}$"	96"	4'	$2\frac{1}{4}$"		4.5" x 4.5" x 0.75"	0.3563	0.0297	6	15'-3"	17	10'-4"	212
S-27718	$25\frac{1}{2}$"	33"	18"	$2\frac{7}{8}$"	6"	$5\frac{1}{2}$"	$26\frac{1}{2}$"	$2\frac{1}{2}$"	$10\frac{1}{2}$"	3'-6"	11'	$2\frac{1}{2}$"	120"	4'	$2\frac{1}{2}$"		5" x 5" x 1"	0.3563	0.0297	6	15'-3"	17	10'-4"	212
S-23316.5	$23\frac{1}{2}$"	$30\frac{1}{2}$"	$16\frac{5}{8}$"	$3\frac{3}{8}$"	7"	5"	$24\frac{1}{2}$"	3"	12"	3'-6"	12'	3"	144"	4'	3"		5" x 5" x 1"	0.3563	0.0297	6	16'-3"	18	10'-4"	226
S-23317	$25\frac{1}{2}$"	33"	18"	$3\frac{3}{8}$"	7"	$5\frac{1}{2}$"	$26\frac{1}{2}$"	3"	12"	3'-6"	12'	3"	144"	4'	3"		5" x 5" x 1"	0.3563	0.0297	6	16'-3"	18	10'-4"	226
S-20018	$25\frac{1}{2}$"	33"	18"	$3\frac{3}{8}$"	7"	$5\frac{1}{2}$"	$26\frac{1}{2}$"	3"	12"	4'-0"	12'	3"	144"	5'	3"		5" x 5" x 1"	0.4654	0.0388	6	16'-6"	18	11'-10"	245

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

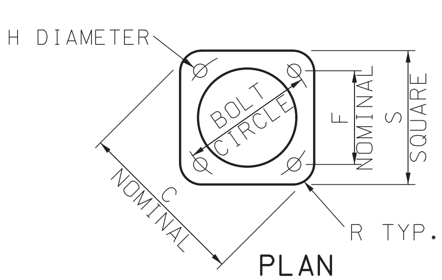
TUBE DIA.	A	B	NO. OF BOLTS
$9\frac{1}{2}$"	$11\frac{1}{2}$"	$12\frac{1}{2}$"	4
$10\frac{1}{2}$"	$14\frac{5}{8}$"	14"	4
14.0"	$17\frac{1}{4}$"	17"	6



BEAM CLAMP DETAIL



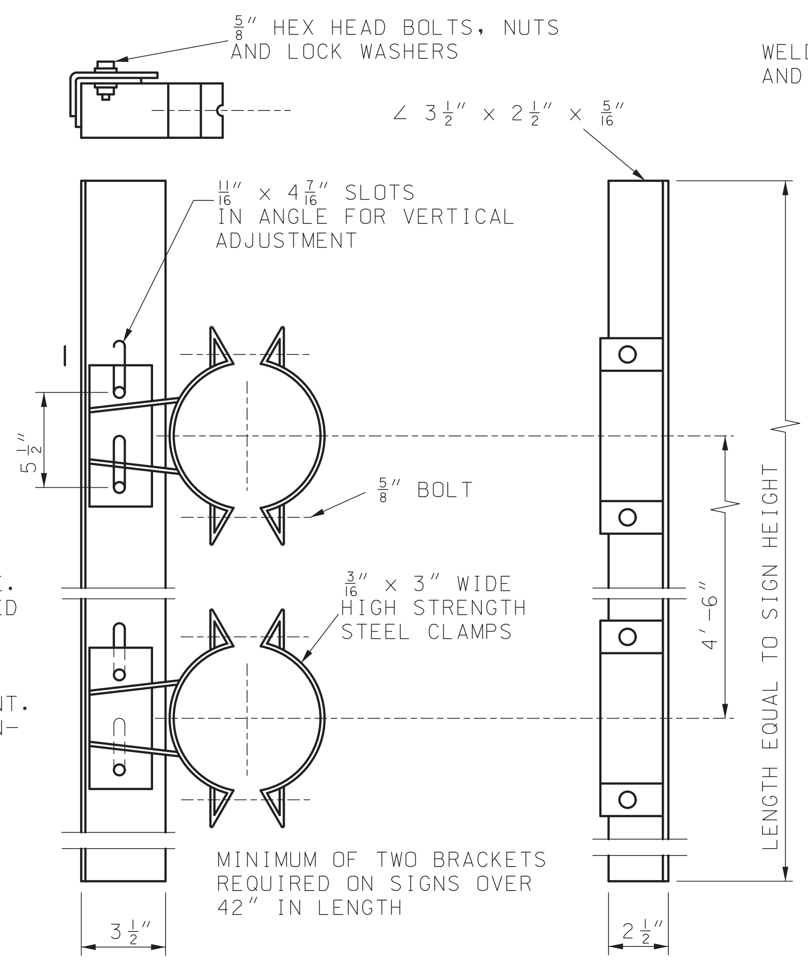
ELEVATION



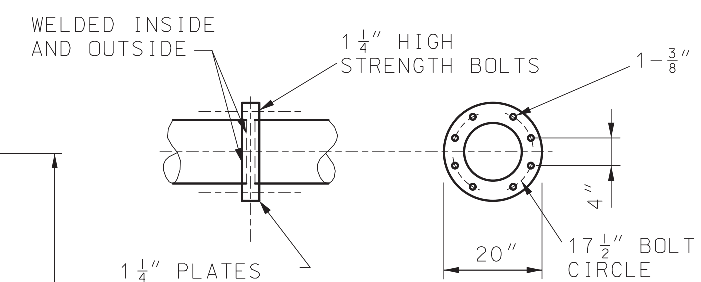
PLAN

DETAIL A

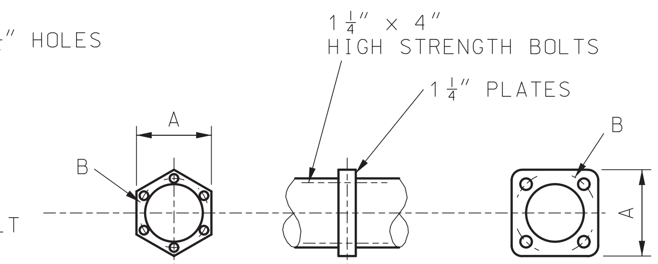
POST BASE DETAIL



GALVANIZED SIGN BRACKET ASSEMBLY



SPANS 76' TO 90'



SPANS UP TO 76'

BEAM SPLICE 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

MoDOT

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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STATE OF MISSOURI
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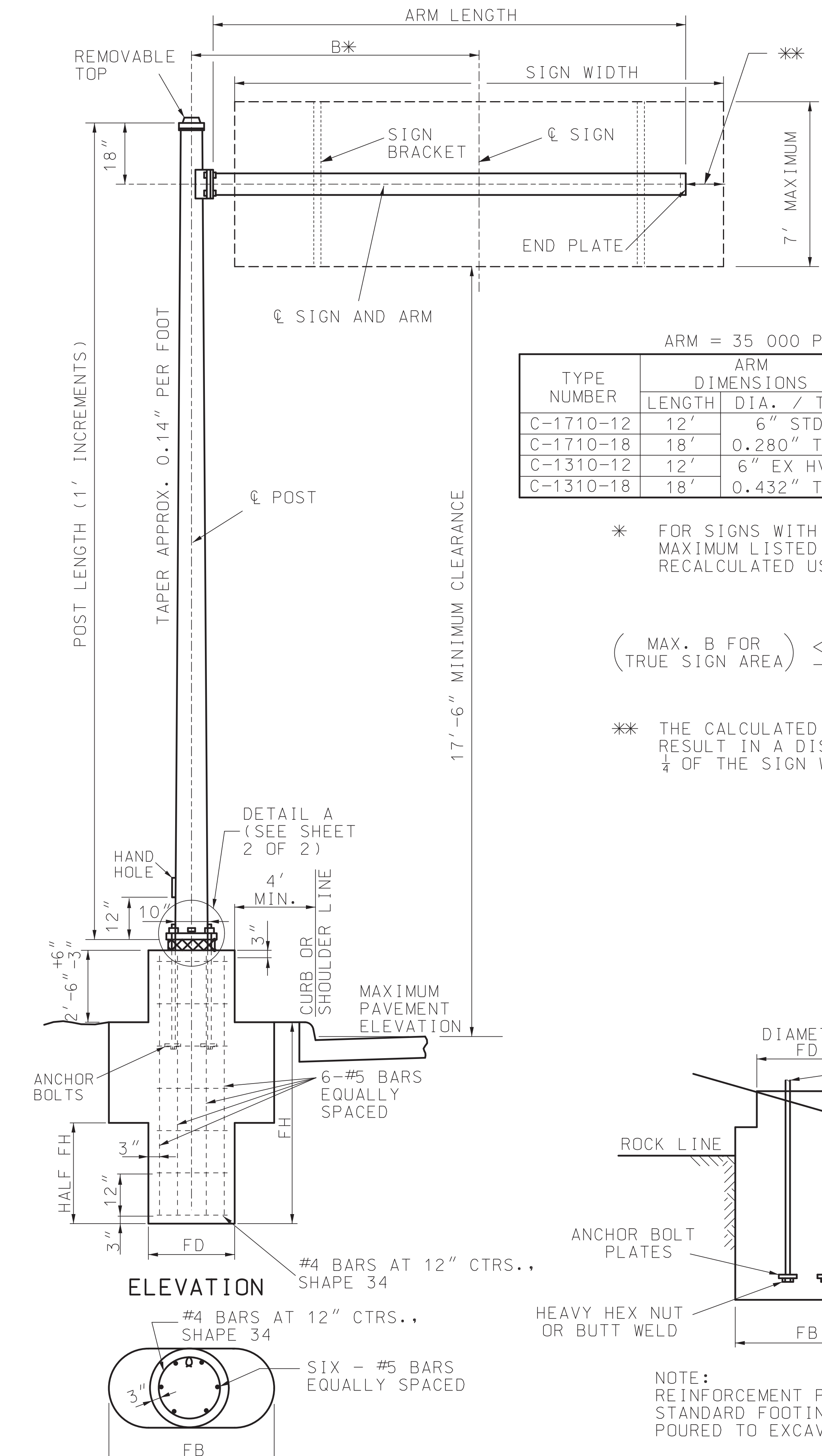
HIGHWAY SIGNING

TUBULAR SUPPORT STEEL TYPE S TWO TUBES

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

903.06L

SHEET NO. 2 OF 2



SINGLE ARM CANTILEVER

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

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

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

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

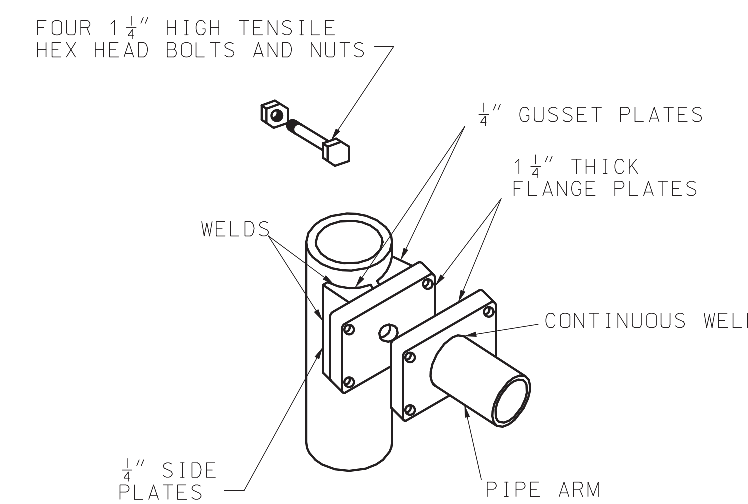
ESTIMATED QUANTITIES

TYPE NUMBER	DIAMETER FD	DIAMETER FB	CU YD CLASS B CONCRETE FOOTING: FD SECTION 1' DEPTH	FD SECTION 1" DEPTH	FB SECTION 1' DEPTH	FB SECTION 1" DEPTH	REINFORCING STEEL #5 NO.	#5 FT-IN	#4 (1) NO.	#4 (1) FT-IN	TOTAL 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.

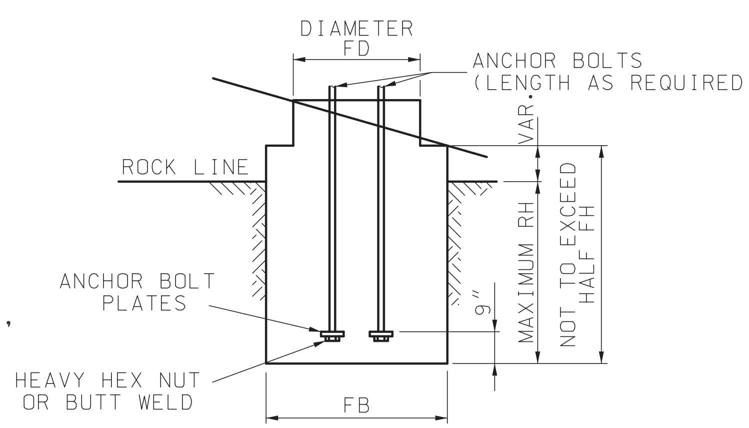
MODIFIED FOOTING IN SOLID ROCK

TYPE NUMBER	ANCHOR BOLT DIA.	ANCHOR BOLT PLATE	FOOTING RH	FOOTING FD	FOOTING FB	CLASS B CONCRETE FOOTING FB SECTION CU. YD. 1' DEPTH	1" DEPTH
C-1710 & C-1310	$1\frac{1}{2}$"	$3\frac{1}{2}$" x $3\frac{1}{2}$" x $\frac{3}{4}$"	2'-6"	2'-0"	3'-0"	0.1904	0.0159
C-2315	2"	$3\frac{1}{2}$" x $3\frac{1}{2}$" x $\frac{3}{4}$"	3'-0"	3'-0"	3'-6"	0.3173	0.0264
C-2318	2"	$3\frac{1}{2}$" x $3\frac{1}{2}$" x $\frac{3}{4}$"	3'-6"	3'-6"	3'-6"	0.3563	0.0297
C-2018	$2\frac{1}{4}$"	$4\frac{1}{2}$" x $4\frac{1}{2}$" x $\frac{3}{4}$"	3'-6"	3'-6"	3'-6"	0.3563	0.0297



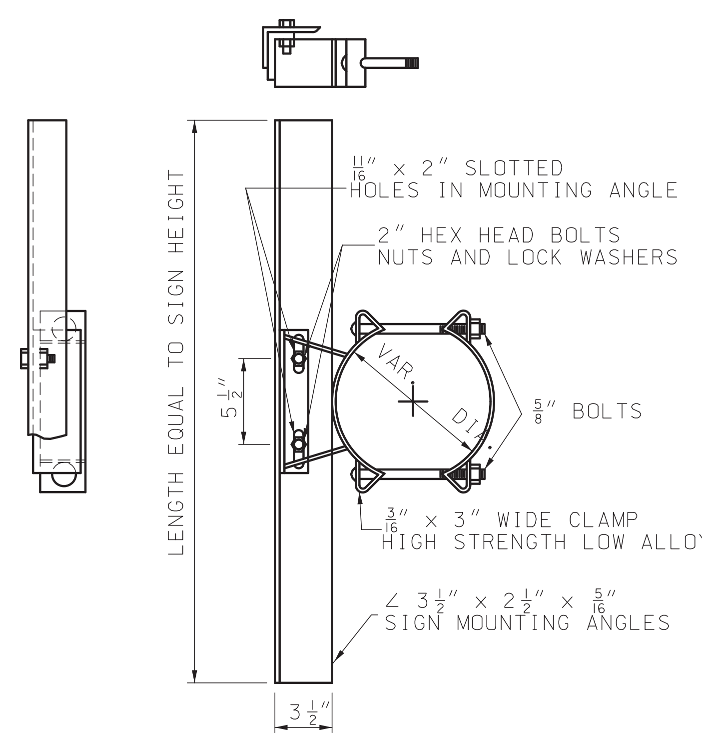
FOR POLE DIAMETER UNDER 12"

ARM ATTACHMENT



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

MODIFIED FOOTING IN SOLID ROCK



GALVANIZED SIGN BRACKET ASSEMBLY

GENERAL NOTE:

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ℄ 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)

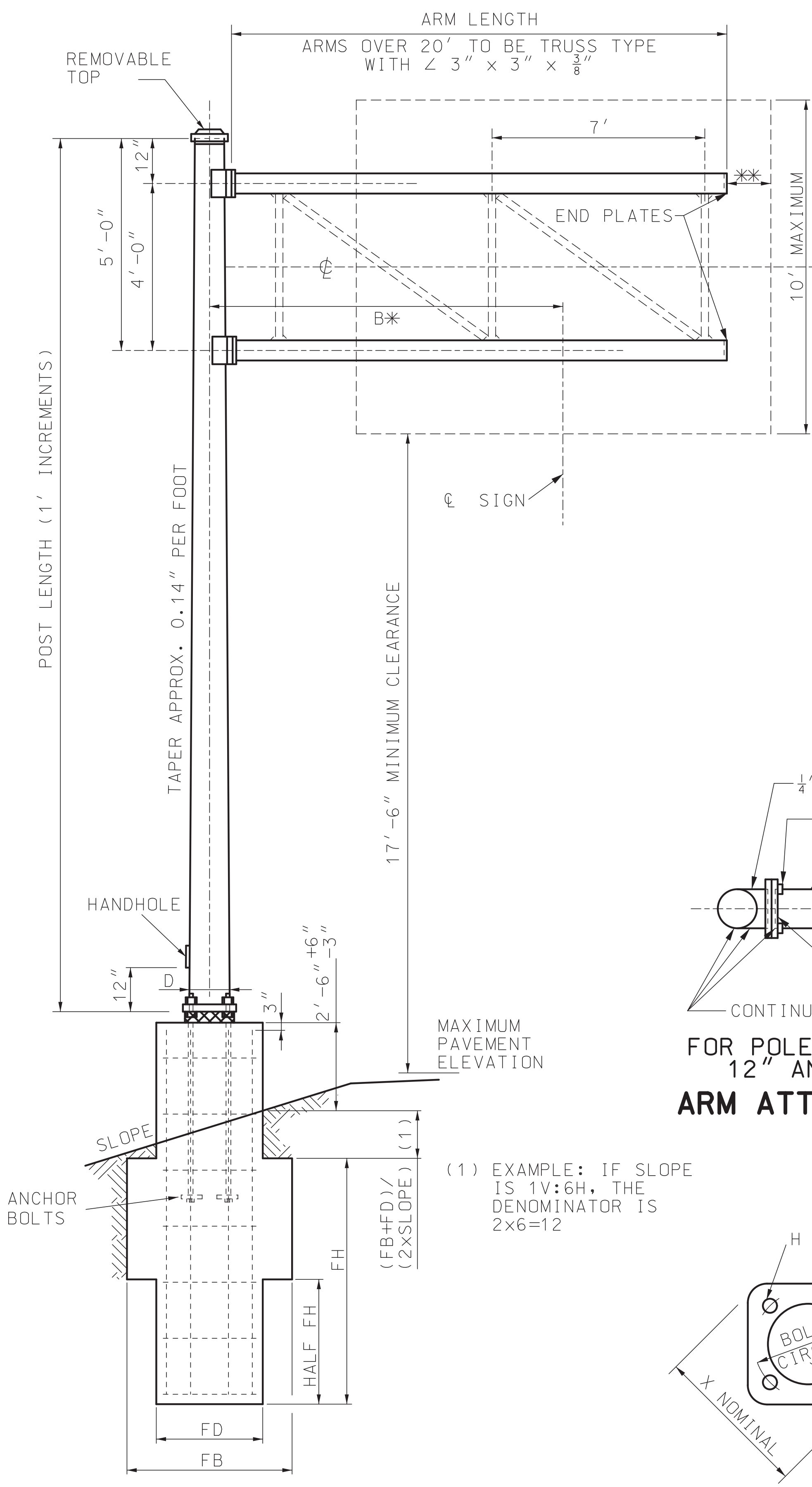
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY SIGNING
TUBULAR SUPPORT STEEL
TYPE C

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 10/6/2022

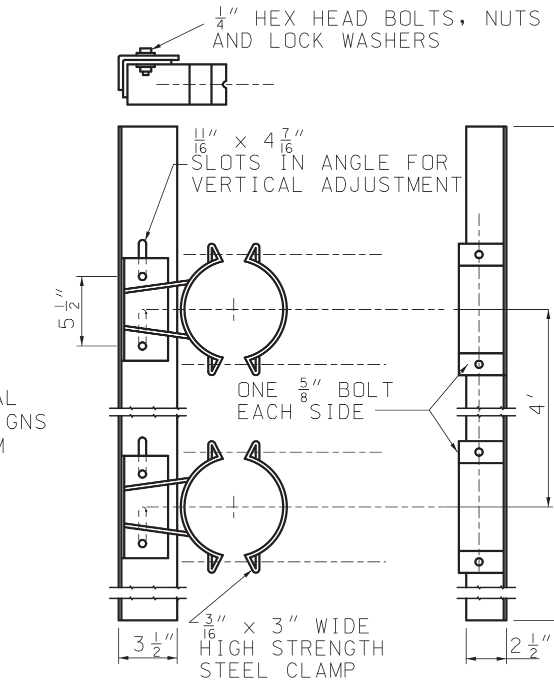
903.07L

SHEET NO. 1 OF 2



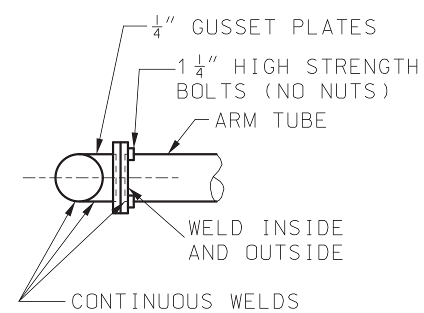
ELEVATION

DOUBLE ARM CANTILEVER



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

GALVANIZED SIGN BRACKET ASSEMBLY



FOR POLE DIAMETER 12" AND OVER

ARM ATTACHMENT

ESTIMATED QUANTITIES												
TYPE NUMBER	DIAMETER		CU. YD. CLASS B CONCRETE FOOTING				REINFORCING STEEL					
			FD SECTION		FB SECTION		#5		#4 (2)		TOTAL LBS.
	FD	FB	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

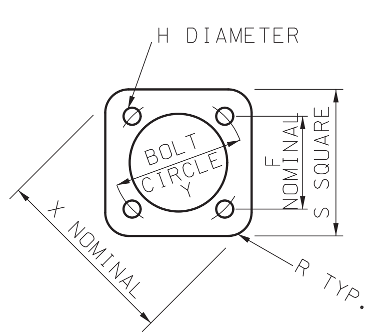
SIGN HT. (IN.)	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET 2 CLAMP TYPE
42	16
48	16
60	16
72	15
84	11
96	6
108	4
120	3

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

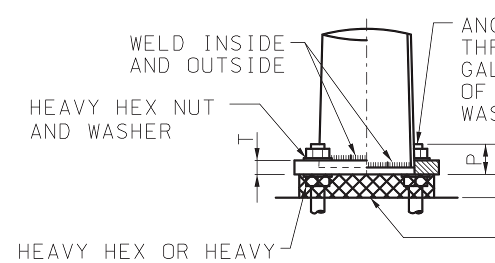
$$\left(\text{MAX. B FOR TRUE SIGN AREA}\right) \leq \frac{\left(\text{MAX SIGN AREA}\right) \times \left(\text{MAX. B WITH MAX. SIGN AREA}\right)}{\left(\text{TRUE SIGN AREA}\right)}$$

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

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



PLAN



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.

ELEVATION

DETAIL A

POST BASE DETAIL

MoDOT

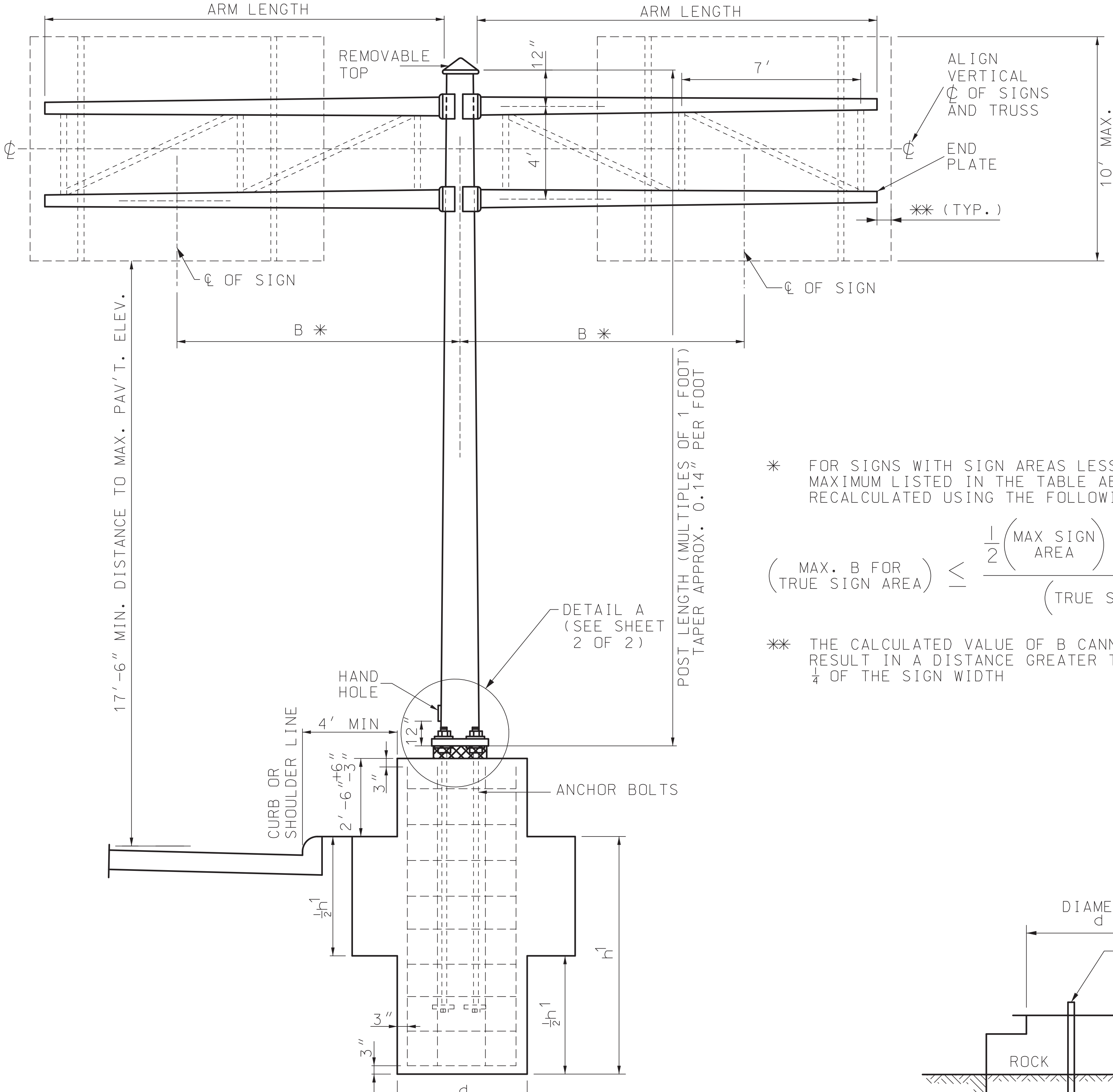
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

HIGHWAY SIGNING
TUBULAR SUPPORT STEEL
TYPE C

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

903.07L



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 ∠ 3" x 3" x ⅜" ANGLES.

(2) MAX SIGN AREA ON EACH SIDE EQUALS HALF THE TOTAL IN CHART.

W = 40# PER SQUARE FOOT

ESTIMATED QUANTITIES											
TYPE NUMBER	DIA. "d"	DIA. "b"	CLASS B CONCRETE FOOTING (C.Y.)				REINFORCING STEEL				
			"d" SECTION		"b" SECTION		#5		#4 (3)		TOTAL LBS.
			1' DEPTH	1" DEPTH	1' DEPTH	1" DEPTH	NO.	FT.-IN.	NO.	FT.-IN.	
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.

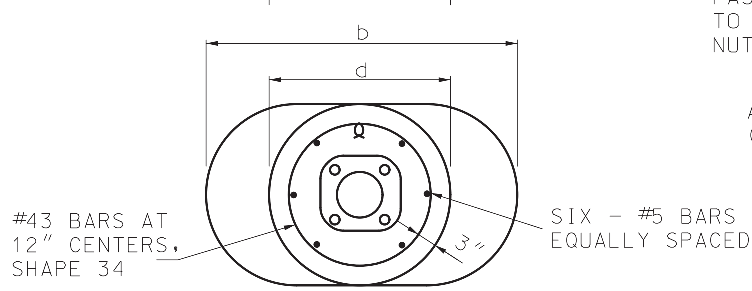
MODIFIED FOOTING IN SOLID ROCK						CLASS B CONCRETE FOOTING CU. YD.	
TYPE NUMBER	ANCHOR BOLT (4) (DIA.)	ANCHOR BOLT PLATE	FOOTING			"b" SECTION	
			"h²"	"d"	"b"	1' DEPTH	1" DEPTH
B-2018	2¼"	4½" x 4½" x ¾"	3'-6"	3'-6"	3'-6"	0.3563	0.0297
B-23318	3"	5½" x 5½" x 1"	4'-0"	3'-6"	4'-6"	0.4860	0.0405
B-20018	3"	5½" x 5½" x 1"	5'-0"	3'-6"	4'-6"	0.4860	0.0405

(4) ANCHOR BOLT LENGTH AS REQUIRED

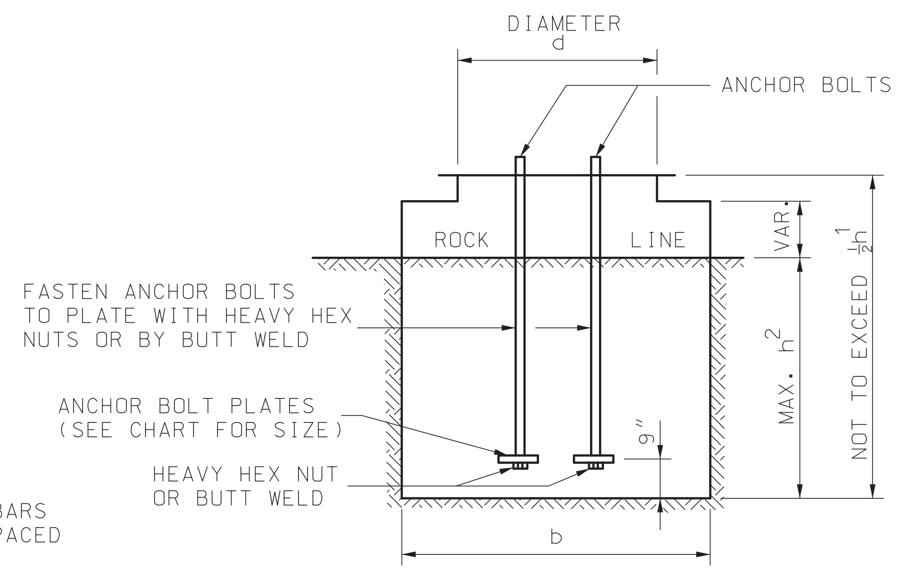
* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left(\begin{array}{c}\text{MAX. B FOR}\\ \text{TRUE SIGN AREA}\end{array}\right) \le \frac{\frac{1}{2}\left(\begin{array}{c}\text{MAX SIGN}\\ \text{AREA}\end{array}\right) \times \left(\begin{array}{c}\text{MAX. B}\\ \text{WITH MAX.}\\ \text{SIGN AREA}\end{array}\right)}{\left(\text{TRUE SIGN AREA}\right)}$$

** THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN ¼ OF THE SIGN WIDTH



PLAN FOOTING



REINFORCEMENT SAME AS STANDARD FOOTING

CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK

MODIFIED FOOTINGS IN SOLID ROCK

GENERAL NOTE:

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

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

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.

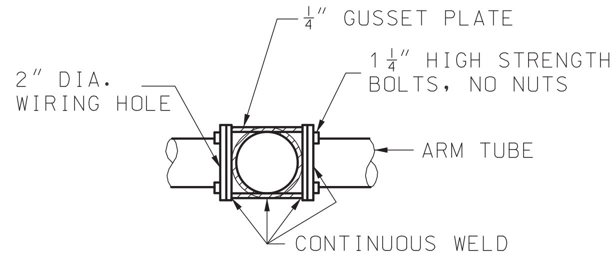
HIGHWAY SIGNING
TUBULAR SUPPORT STEEL TYPE B

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

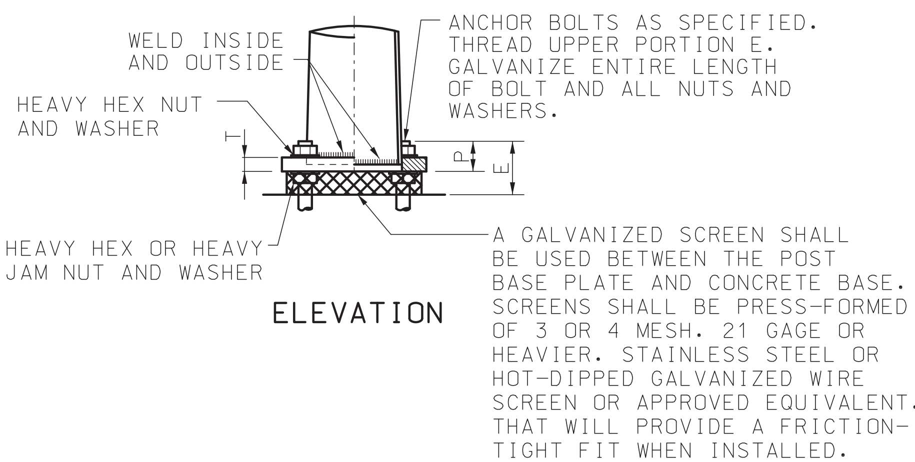
903.08K

SHEET NO. 1 OF 2

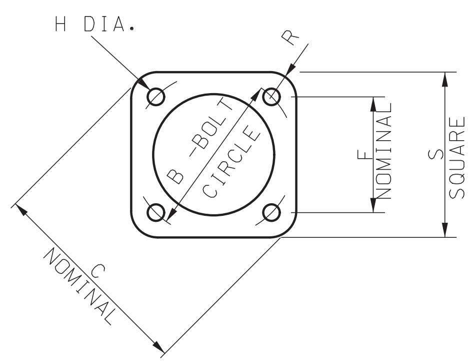
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



ARM ATTACHMENT DETAIL



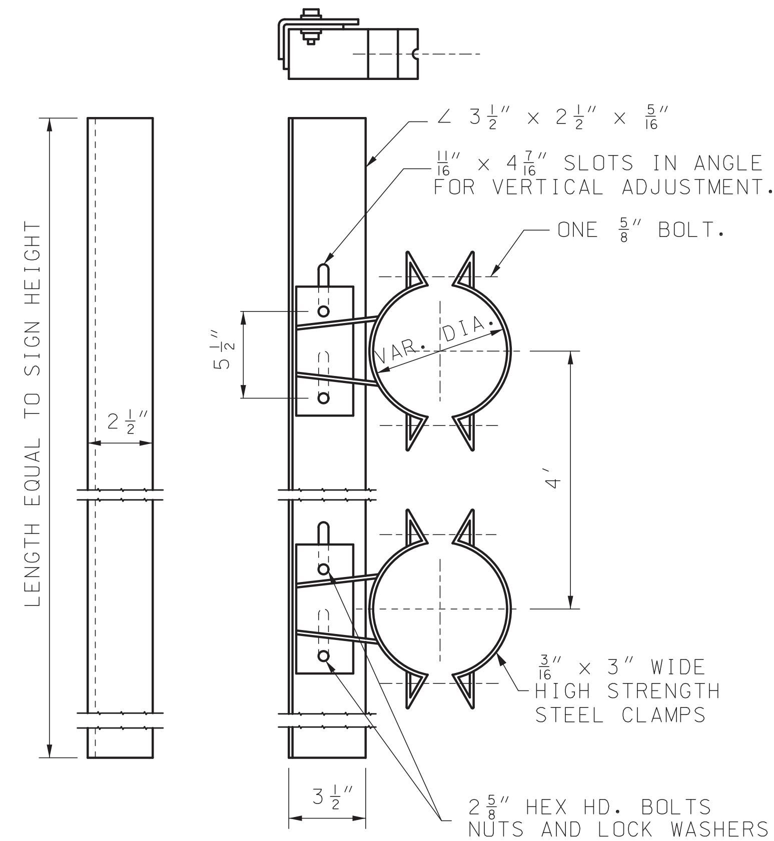
ELEVATION



PLAN

DETAIL A
POST BASE DETAIL

POST BASE DIMENSIONS													
TYPE NUMBER	B	C	F	H	S	R	P	T	E	ANCHOR BOLTS	FOOTING "h[1]"	FOOTING "d"	FOOTING "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"	6'-0"
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 3/8"	26 1/2"	5 1/2"	7"	3"	12"	3" x 120"	9'-6"	3'-6"	7'-0"



GALVANIZED SIGN BRACKET ASSEMBLY *

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

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

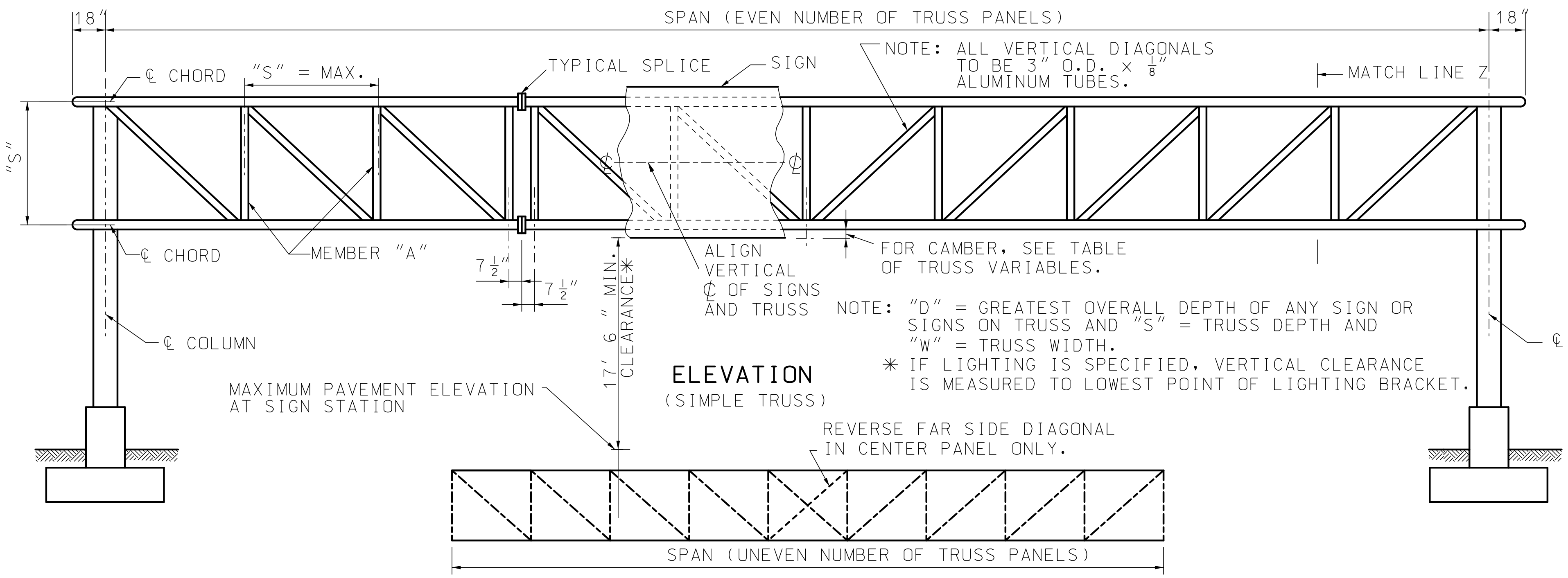
HIGHWAY SIGNING
TUBULAR SUPPORT STEEL
TYPE B

DATE EFFECTIVE: 10/01/2022
DATE PREPARED: 7/19/2022

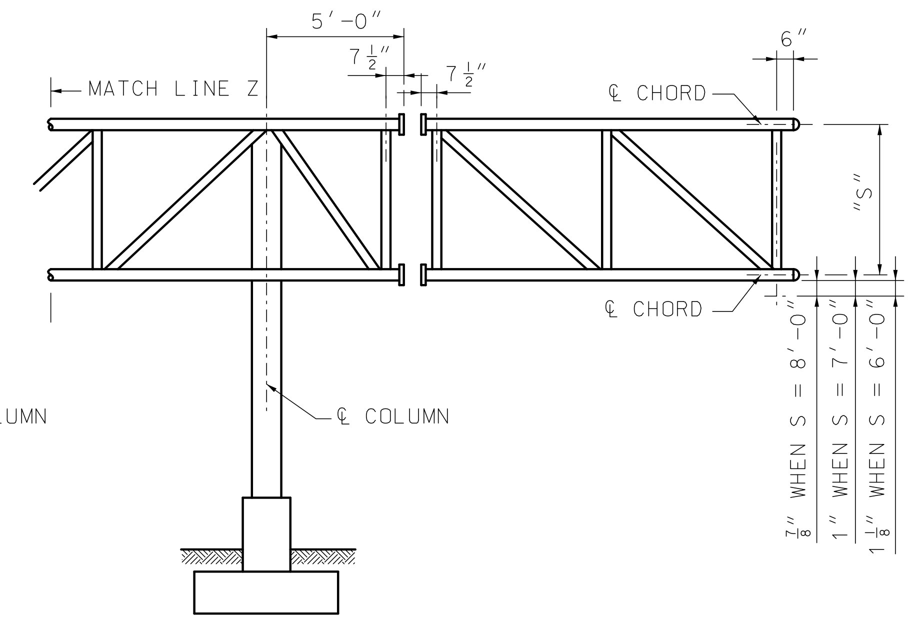
903.08K

SHEET NO. 2 OF 2

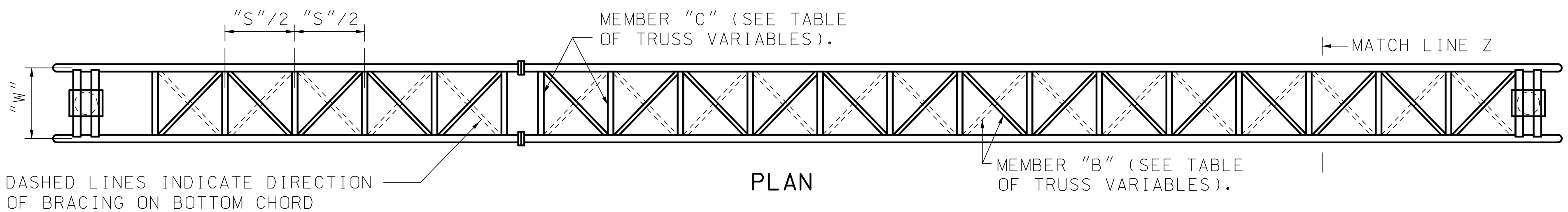
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



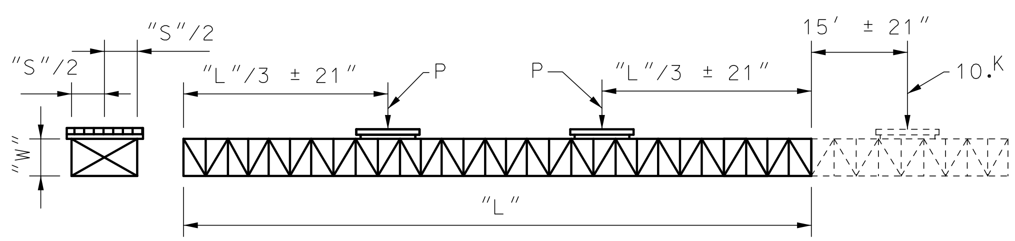
TRUSS ELEVATION

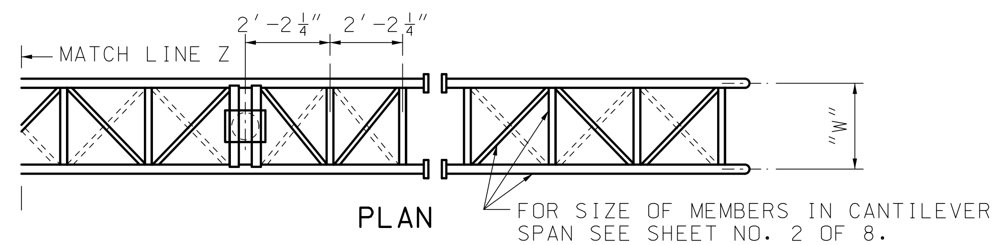


ELEVATION
(SIMPLE TRUSS MODIFIED FOR CANTILEVER SPAN)



PLAN





PLAN

$$P = \frac{84aW}{L} - 0.02\,L \text{ WHERE}$$

- P = CONCENTRATED LOAD IN KIPS.
- a = AREA OF ONE CHORD TUBE IN SQUARE INCHES. (USE 0.76a FOR 4" DIA. × $\frac{1}{4}$" AND 4$\frac{1}{2}$" DIA. × $\frac{1}{4}$" CHORDS)
- W = WIDTH OF TRUSS IN FEET.
- L = SPAN LENGTH IN FEET.

SAMPLE, GIVEN: a = 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"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$1\frac{3}{4}$" DIA. × $\frac{1}{8}$"	$\frac{3}{4}$"
71' TO 80'-6"	6'-0"	6'-0"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	2" DIA. × $\frac{1}{8}$"	$1\frac{1}{4}$"
81' TO 90'-6"	6'-0"	6'-0"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$2\frac{3}{4}$" DIA. × $\frac{1}{8}$"	2" DIA. × $\frac{1}{8}$"	$1\frac{1}{2}$"
91' TO 100'-6"	6'-0"	6'-0"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$2\frac{3}{4}$" DIA. × $\frac{1}{8}$"	2" DIA. × $\frac{1}{8}$"	$2\frac{1}{4}$"
101' TO 110'-6"	7'-0"	7'-0"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	3" DIA. × $\frac{1}{8}$"	$2\frac{1}{4}$" DIA. × $\frac{1}{8}$"	$2\frac{1}{2}$"
111' TO 120'-6"	7'-0"	7'-0"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$3\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$2\frac{1}{4}$" DIA. × $\frac{1}{8}$"	$2\frac{3}{4}$"
121' TO 130'-6"	7'-0"	7'-0"	3" DIA. × $\frac{1}{8}$"	$3\frac{1}{2}$" DIA. × $\frac{1}{8}$"	$2\frac{1}{4}$" DIA. × $\frac{1}{8}$"	$3\frac{1}{4}$"
131' TO 140'-6"	8'-0"	7'-0"	3" DIA. × $\frac{1}{8}$"	$3\frac{3}{4}$" DIA. × $\frac{1}{8}$"	$2\frac{1}{2}$" DIA. × $\frac{1}{8}$"	3"
141' TO 150'-6"	8'-0"	7'-0"	3" DIA. × $\frac{1}{8}$"	$3\frac{3}{4}$" DIA. × $\frac{1}{8}$"	$2\frac{3}{4}$" DIA. × $\frac{1}{8}$"	$3\frac{1}{4}$"
151' TO 160'-6"	8'-0"	7'-0"	3" DIA. × $\frac{1}{8}$"	$3\frac{3}{4}$" DIA. × $\frac{1}{8}$"	$2\frac{3}{4}$" DIA. × $\frac{1}{8}$"	$4\frac{1}{2}$"

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 $\frac{1}{8}$ 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 ℄ OF THE TRUSS.

FOR ADDITIONAL INFORMATION SEE DATA SHEET.

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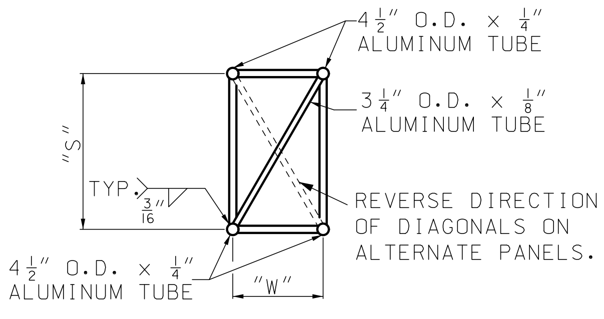
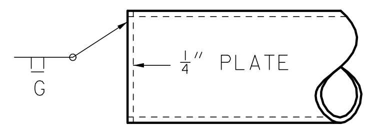
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES
ALUMINUM

DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020
903.10BD



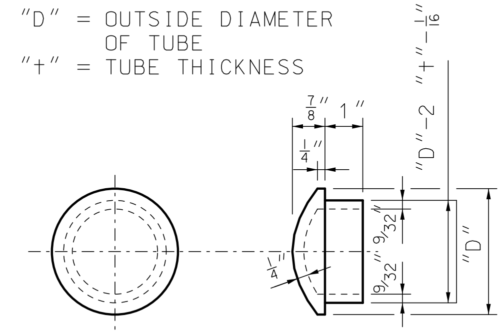
SECTION A-A



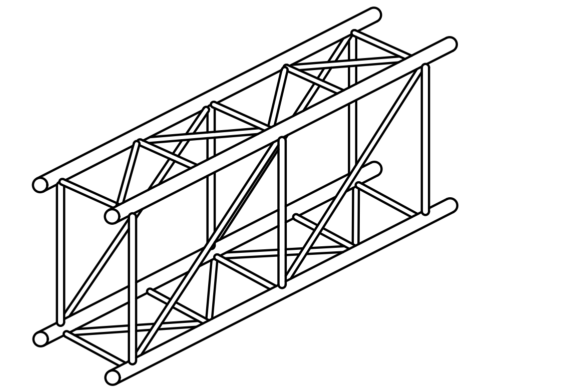
DETAIL OF ALTERNATE END CAP

NOTE:
WHEN THE VERTICALS, STRUTS AND SWAYS OBSTRUCT THE PLACING OF BOLTS IN THE FLANGES THESE MEMBERS MAY BE MOVED BACK IN ORDER TO CLEAR THE BOLTS. (ONE SIDE OF SPLICE ONLY).

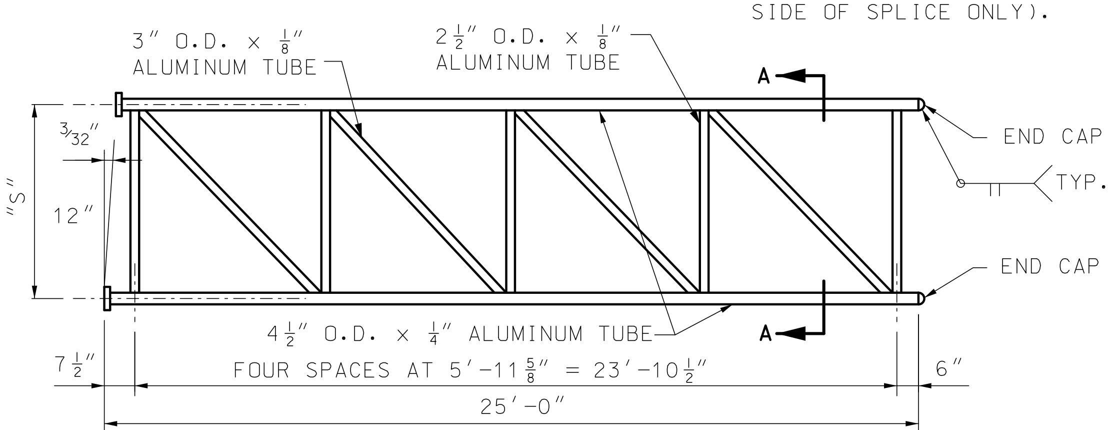
"D" = OUTSIDE DIAMETER OF TUBE
"t" = TUBE THICKNESS



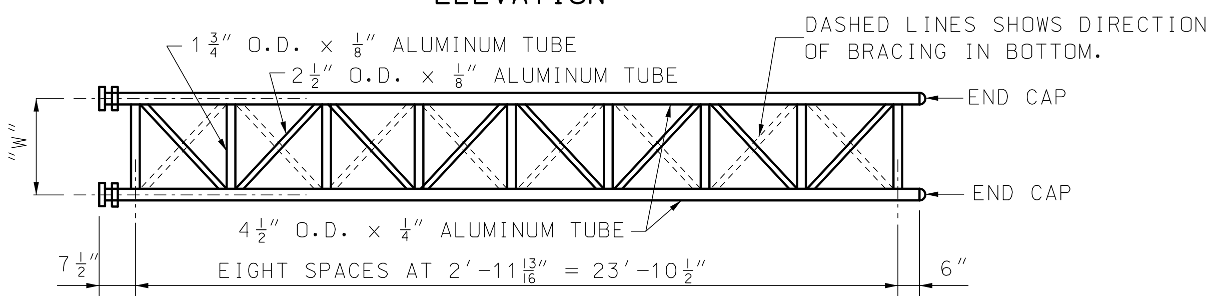
DETAIL OF END CAP CASTING (DRIVE FIT TYPE)



TYPICAL ISOMETRIC VIEW OF TRUSS

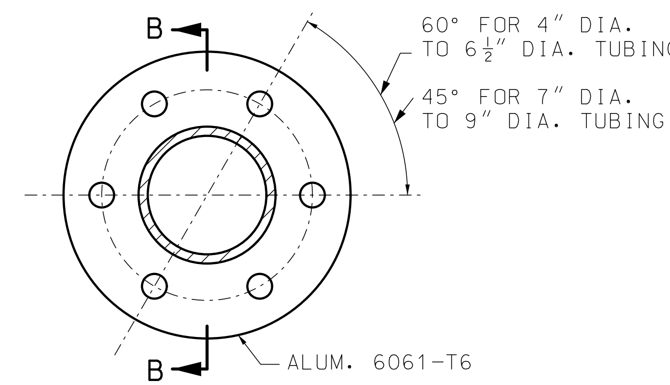


ELEVATION

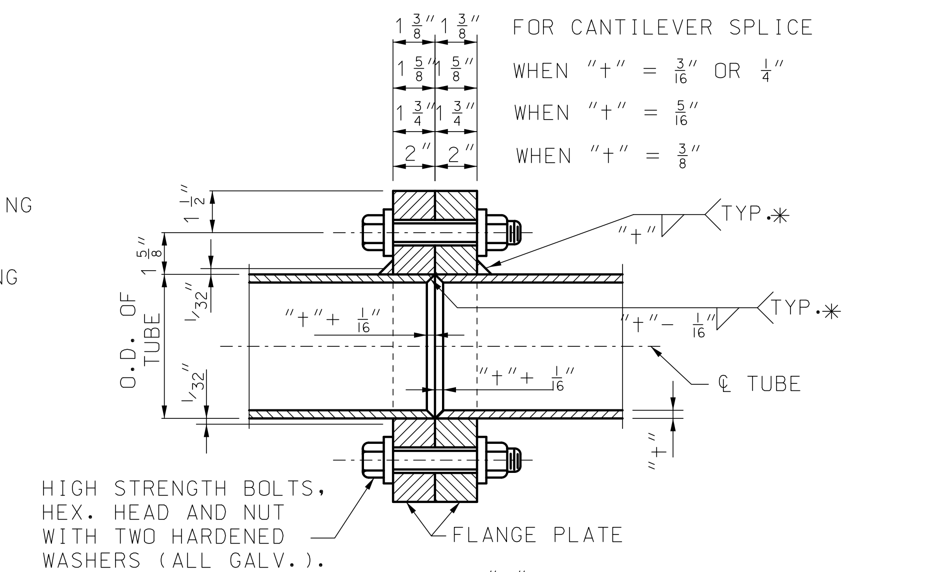


PLAN

25' − CANTILEVER SECTIONS



PLAN OF FLANGE PLATE

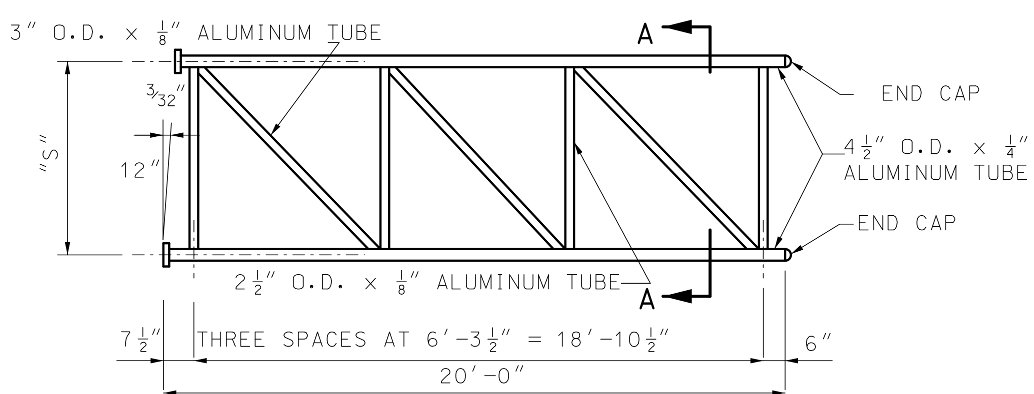


✻ "t" = SMALLER TUBE WALL THICKNESS.

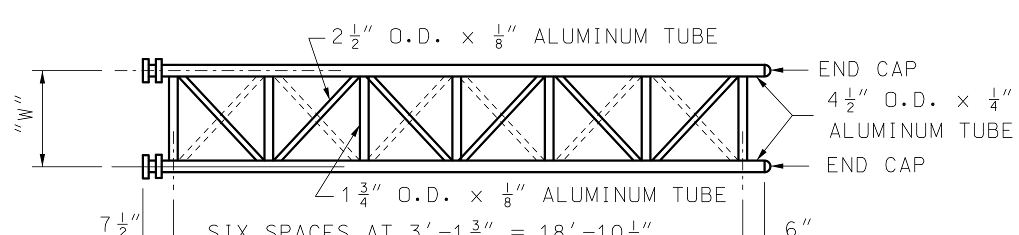
SECTION B-B

NOTE:
A WELDING SEQUENCE ASSURING FULL CONTACT OF FLANGE FACES SHALL BE REQUIRED. DRILL OR REAM FLANGE HOLES $\frac{1}{16}$" LARGER THAN NORMAL DIAMETER OF BOLTS OR TUBING.

TUBE SIZE	BOLT NO. AND DIA.	TORQUE
4" DIA. TO ALL DIAMETERS	6− $\frac{3}{4}$" DIA.	320 FT.LB. OR ONE-HALF TURN
$4\frac{1}{2}$" DIA. THROUGH $6\frac{1}{2}$" DIA.	6− $\frac{3}{4}$" DIA.	320 FT.LB. OR ONE-HALF TURN
7" DIA. THROUGH $7\frac{1}{2}$" DIA.	8− $\frac{3}{4}$" DIA.	320 FT.LB. OR ONE-HALF TURN
8" DIA. THROUGH 9" DIA.	8− $\frac{7}{8}$" DIA.	470 FT.LB. OR ONE-HALF TURN

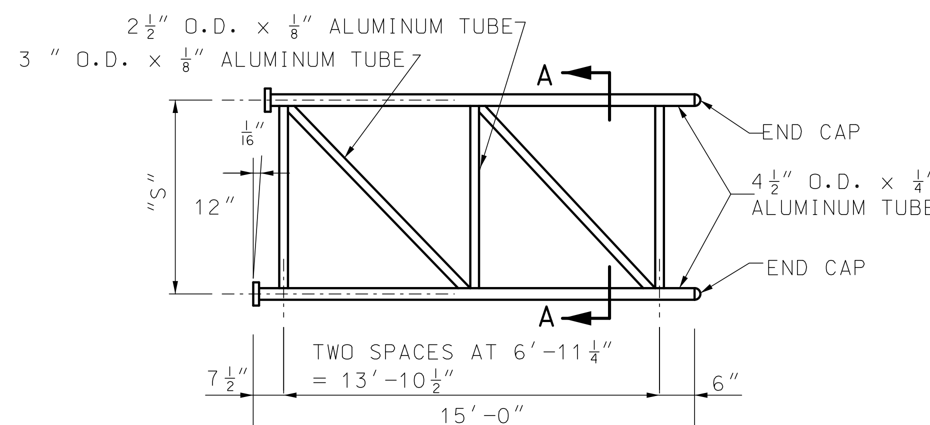


ELEVATION

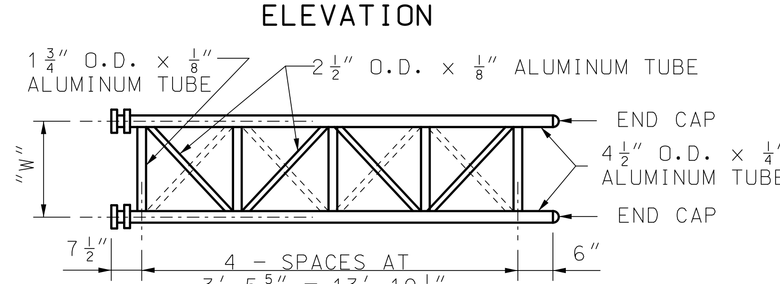


PLAN

20' − CANTILEVER SECTIONS



ELEVATION



PLAN

15' − CANTILEVER SECTIONS

MoDOT

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

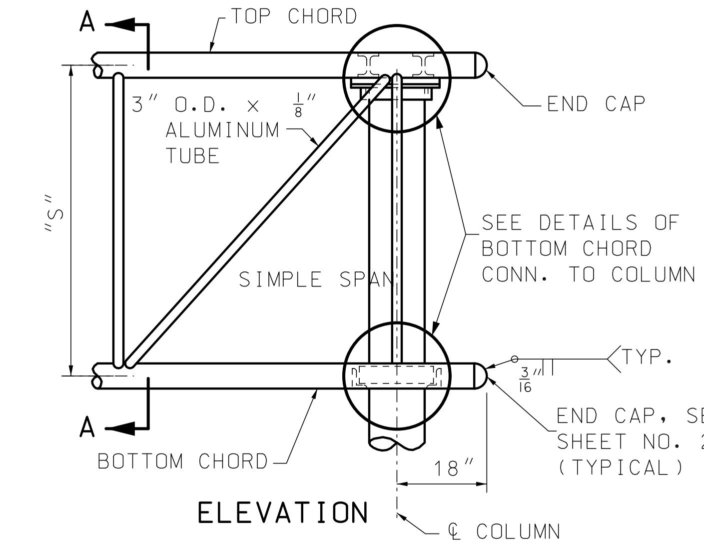
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES

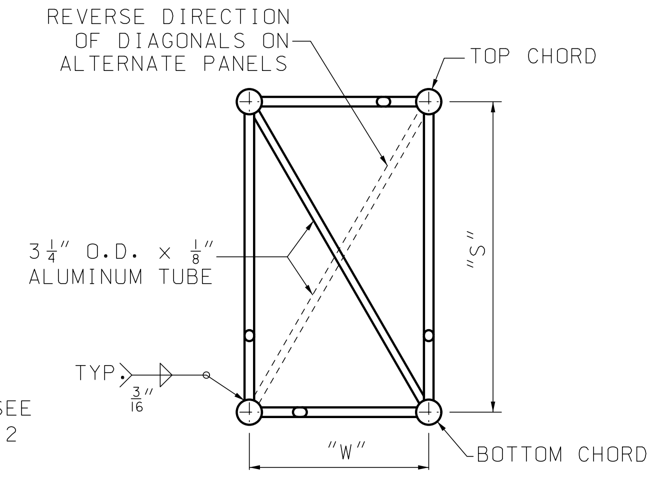
ALUMINUM

DATE EFFECTIVE: 01/01/2021	903.10BD	SHEET NO.
DATE PREPARED: 10/14/2020		2 OF 6

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

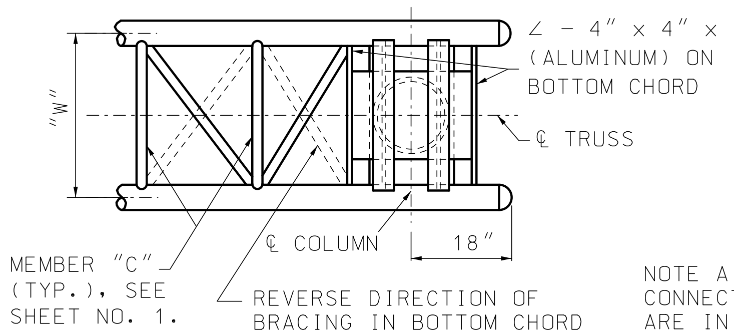


ELEVATION



SECTION A-A

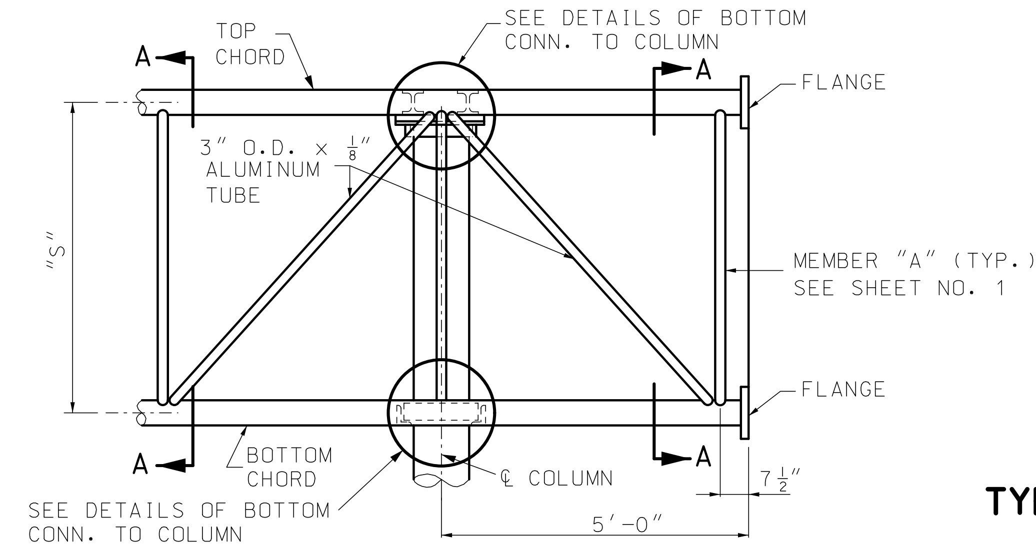
NOTE:
FOR DIMENSIONS "S" AND "W" SEE SHEET NO. 1.



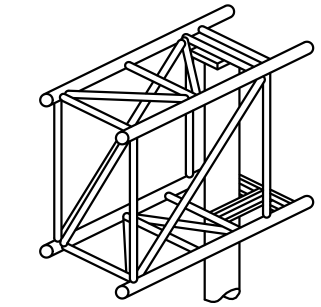
PLAN

TRUSS END WITHOUT CANTILEVER

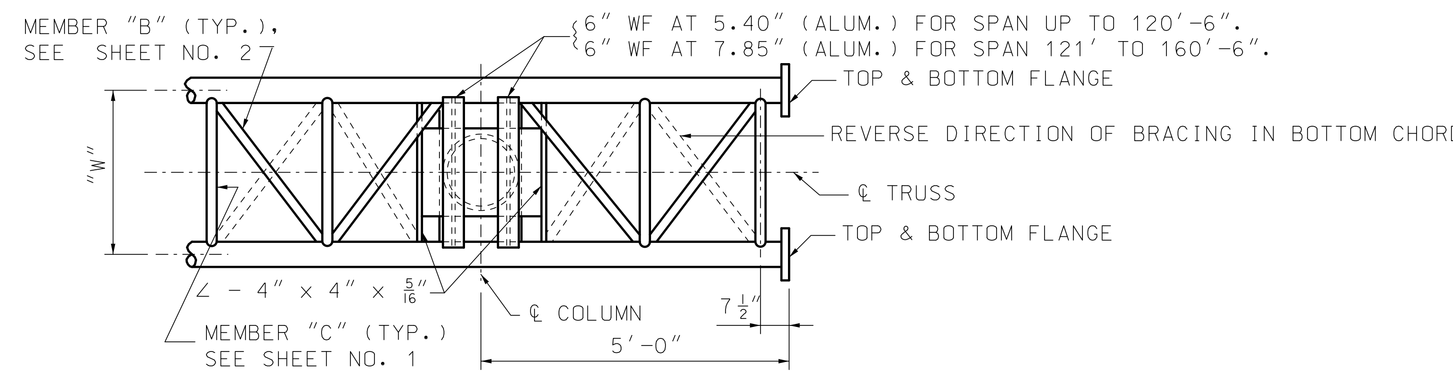
NOTE A:
CONNECTIONS IN WHICH STEEL AND ALUMINUM ARE IN CONTACT SHALL BE PROTECTED AS FOLLOWS:
ONE COAT ZINC CHROMATE ON ALUMINUM SURFACES.
NORMAL CLEANING AND PAINTING ON STEEL SURFACES.
NO ZINC CHROMATE REQUIRED IF STEEL IS GALVANIZED.



ELEVATION

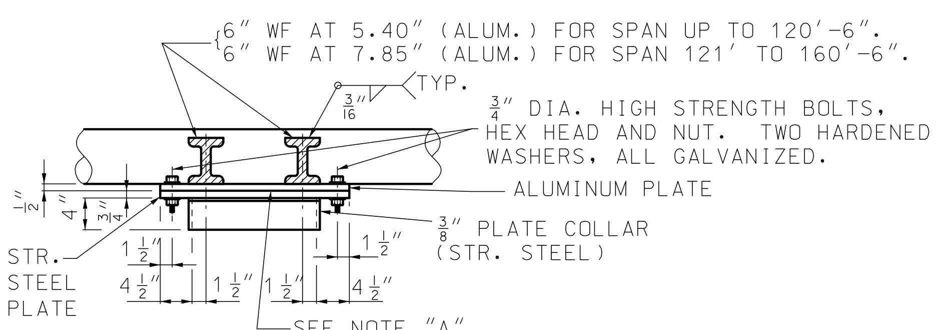


TYPICAL ISOMETRIC VIEW OF END SECTION



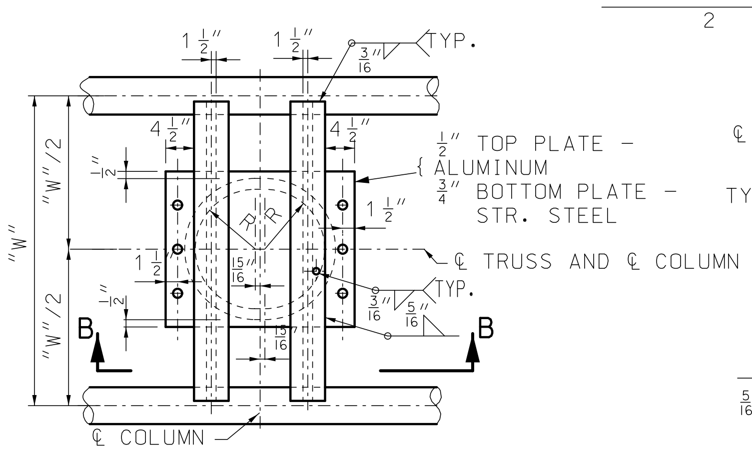
PLAN

TRUSS END MODIFIED FOR CANTILEVER

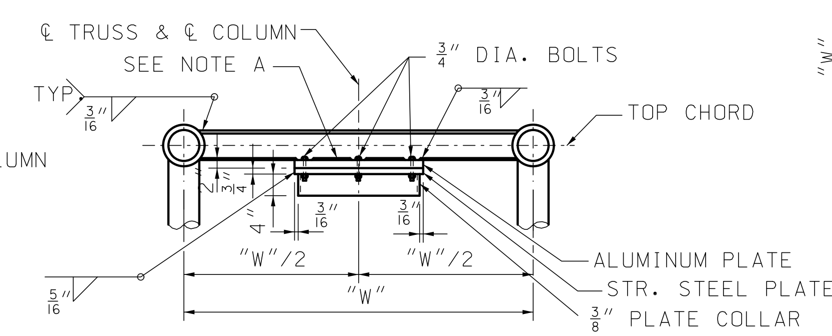


SECTION B-B

NOTE: $R = \frac{\text{O.D. PIPE COL.}}{2} + \frac{1}{16}"$

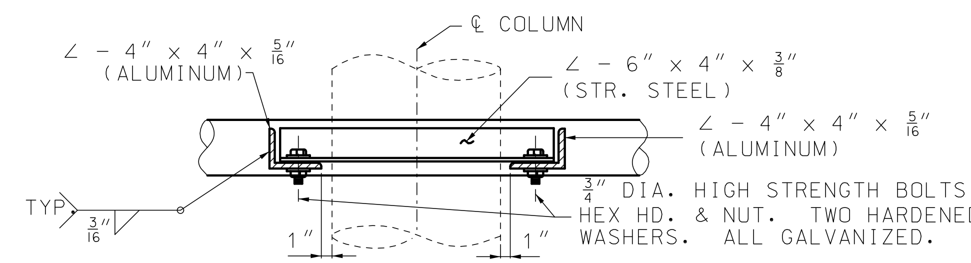


PLAN



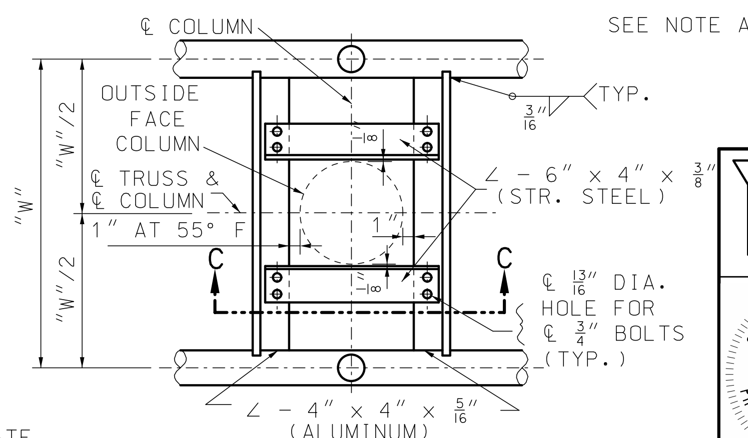
END ELEVATION

DETAIL OF TOP CHORD CONNECTION TO COLUMN



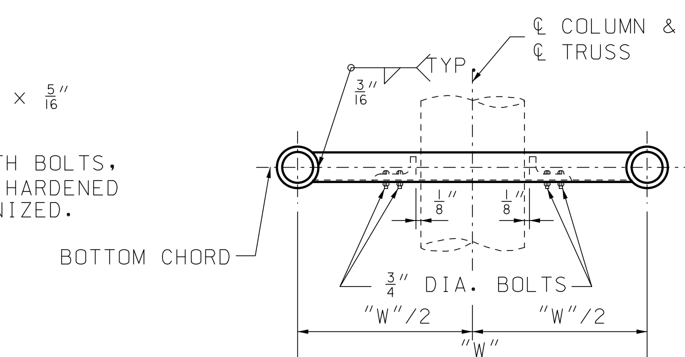
SECTION C-C

SEE NOTE A



PLAN

DETAILS OF BOTTOM CHORD CONNECTION TO COLUMN



END ELEVATION

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.

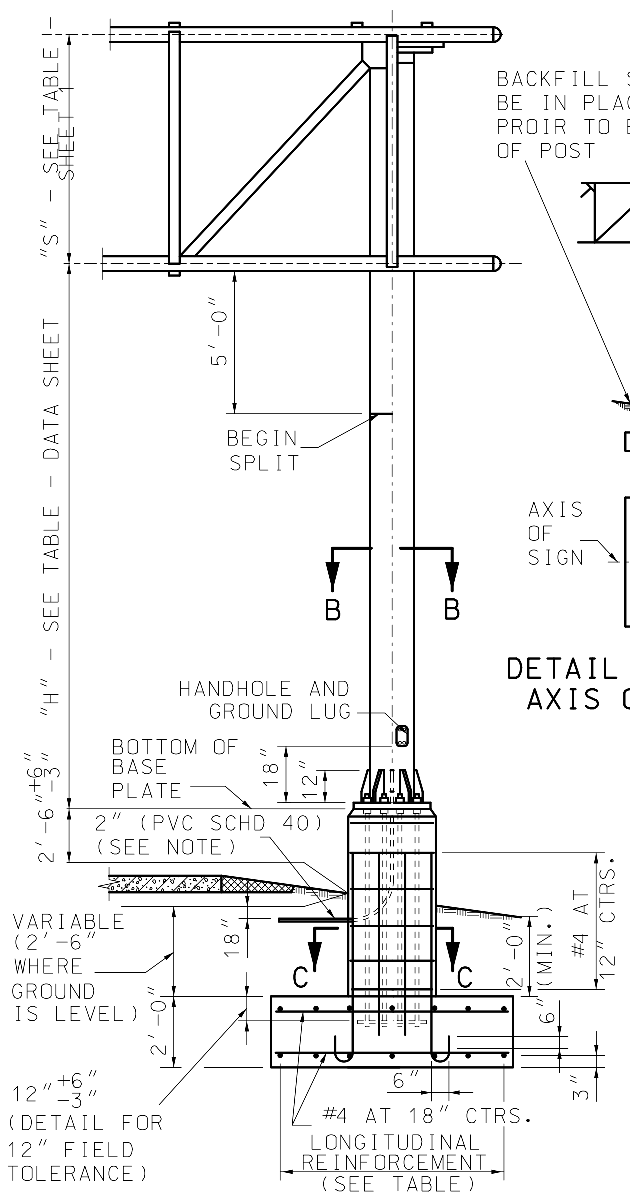
OVERHEAD SIGN TRUSSES
ALUMINUM

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

903.10BD

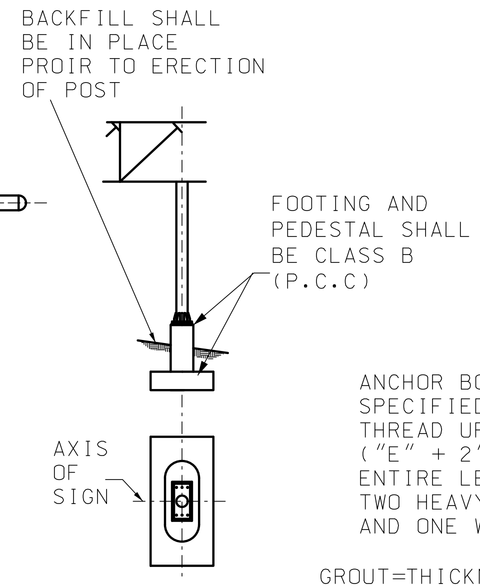
SHEET NO. 3 OF 6

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

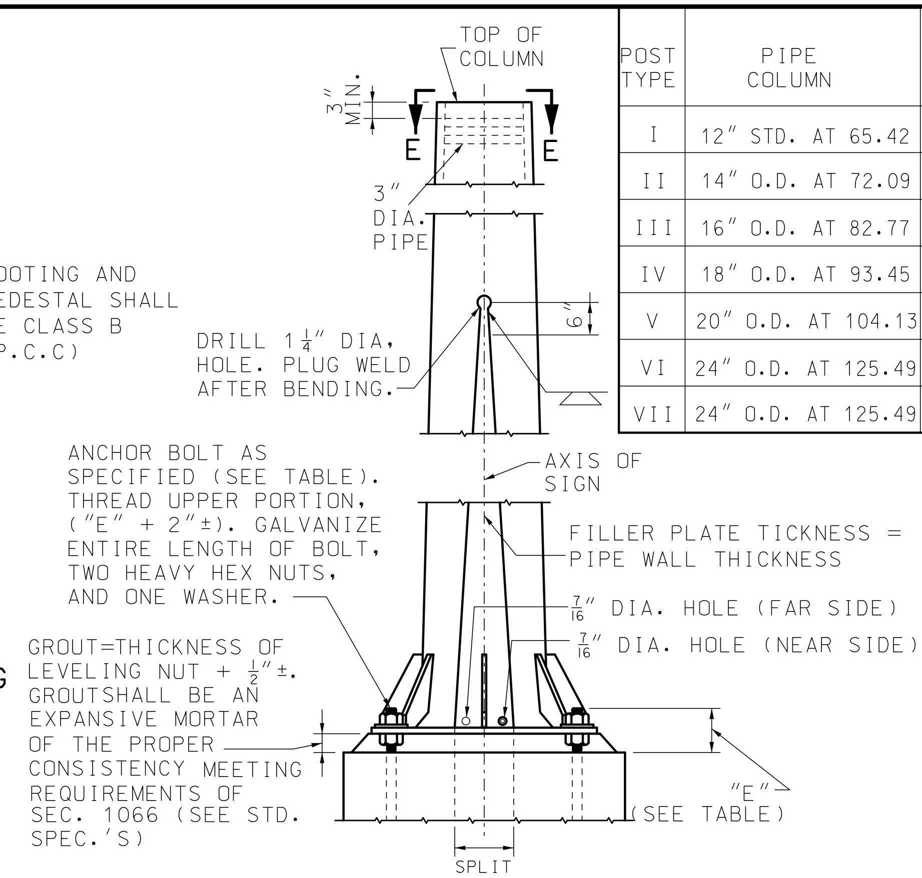


ELEVATION

NOTE:
THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINUMUM RADIUS BEND OF $9\frac{1}{2}$".



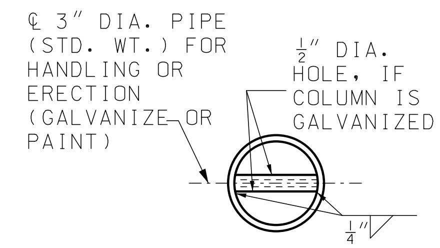
DETAIL SHOWING AXIS OF SIGN



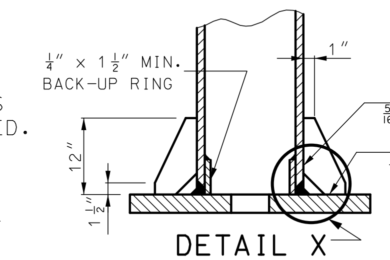
PART ELEVATION

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

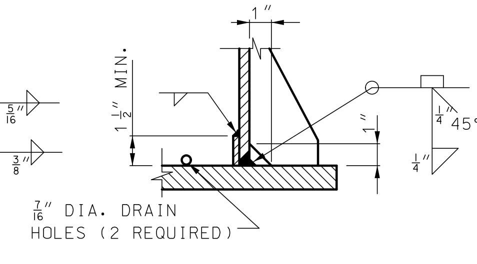
* BASE PLATES, PEDESTAL, AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



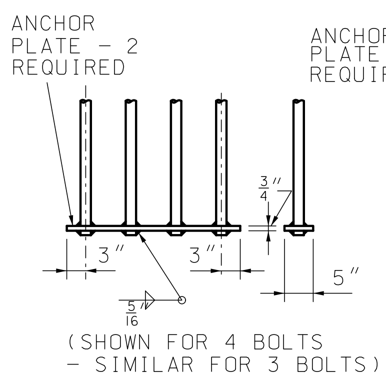
PART SECTION E-E



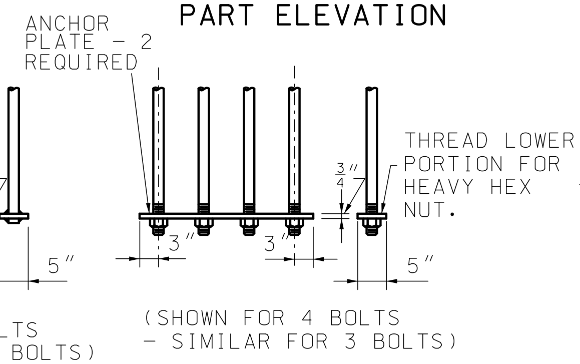
PART SECTION A-A



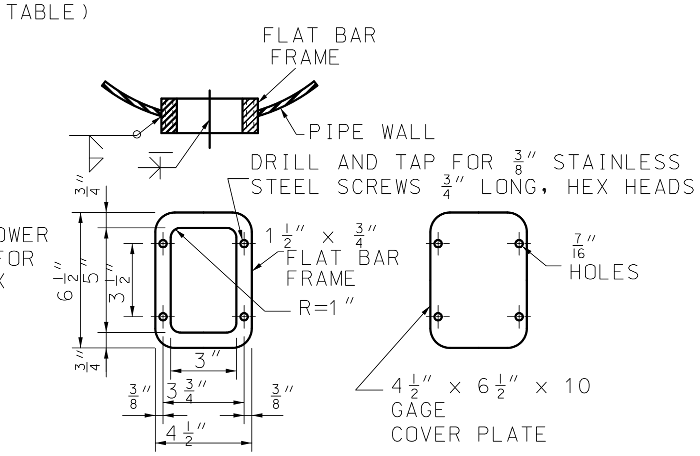
DETAIL X



ANCHORAGE DETAIL A



ANCHORAGE DETAIL B
(OPTIONAL)



HANDHOLE AND COVER DETAIL

NOTE: HANDHOLE REQUIRED ONLY IN POWER COLUMN.

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.

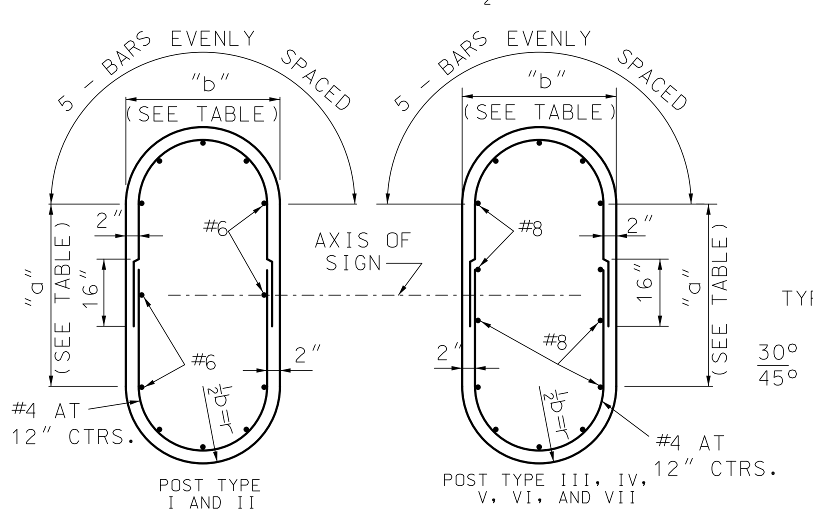
A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

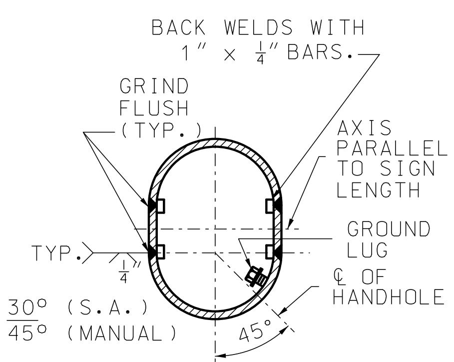
QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5'-0".

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

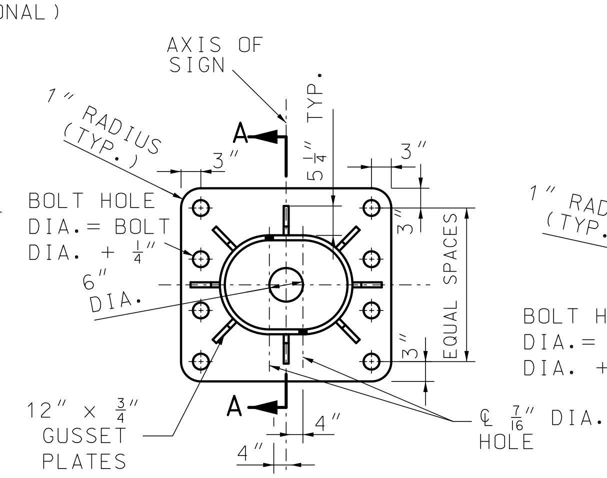
QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.



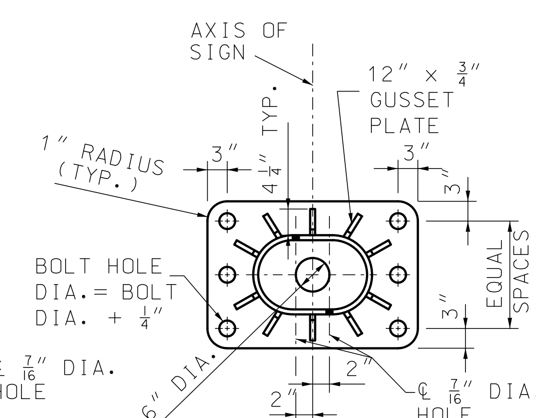
SECTION C-C
(TYPICAL SECTION SHOWING REINFORCING STEEL)



SECTION B-B
(FOR SPLIT COLUMNS ONLY)



8 ANCHOR TYPE



6 ANCHOR TYPE

TYPICAL BASE PLATES

NOTE: FOR DETAILS OF ALTERNATE PEDESTAL, SEE SHEET NO. 5 OF 6.

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 TRUSSES
ALUMINUM

DATE EFFECTIVE: 01/01/2021
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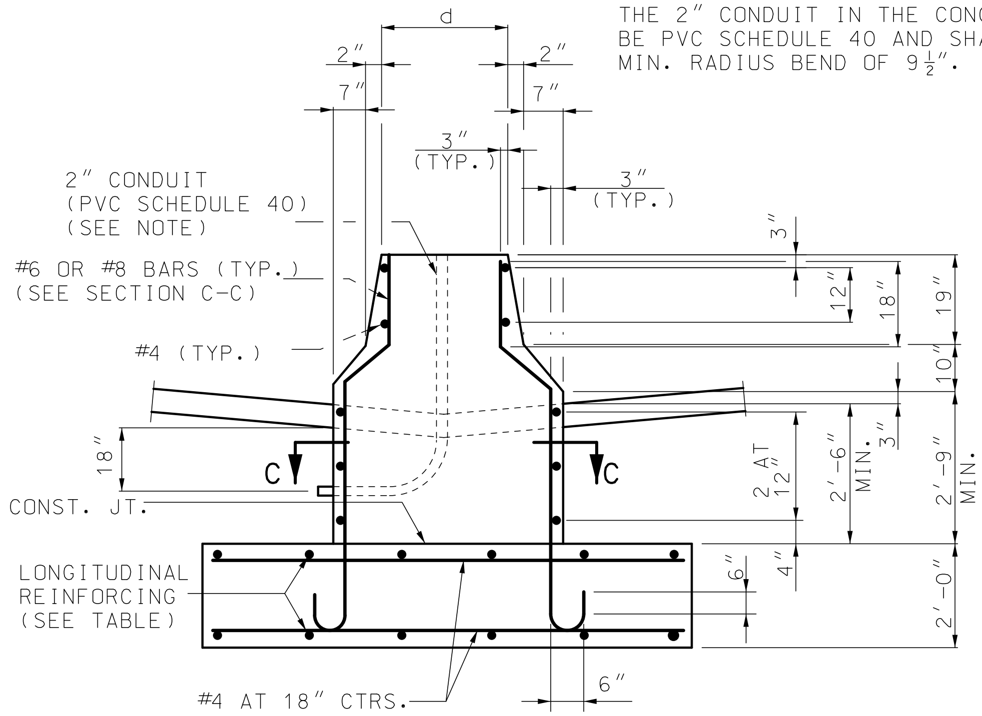
903.10BD

SHEET NO. 4 OF 6

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

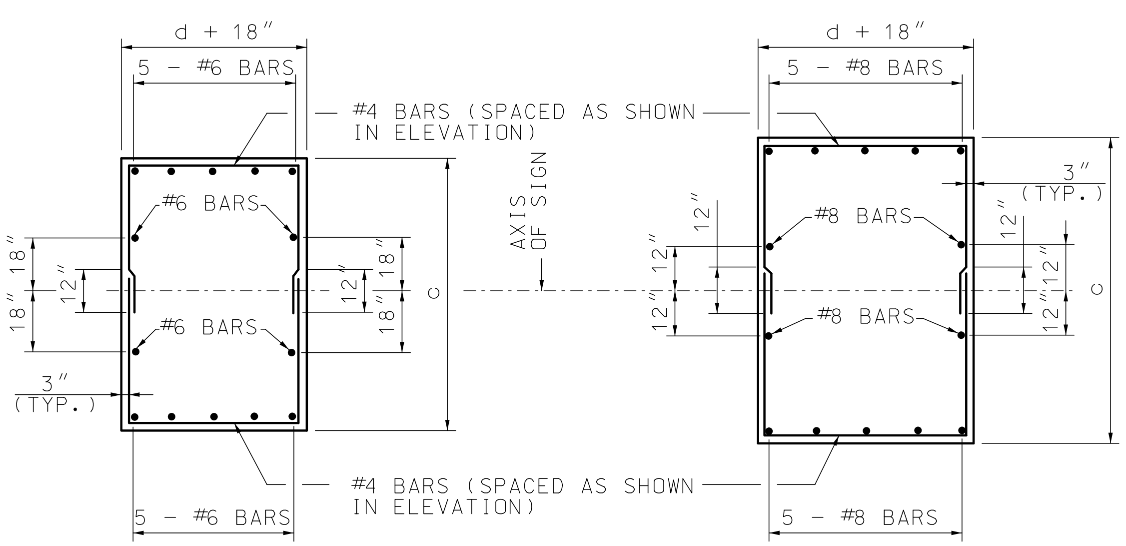
✳ BASE PLATES, PEDESTAL, AND FOOTINGS LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.

NOTE:
THE 2″ CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF 9½″.



PART ELEVATION
(TYPE A CONCRETE TRAFFIC BARRIER)

NOTE:
THE 2″ CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF 9½″.

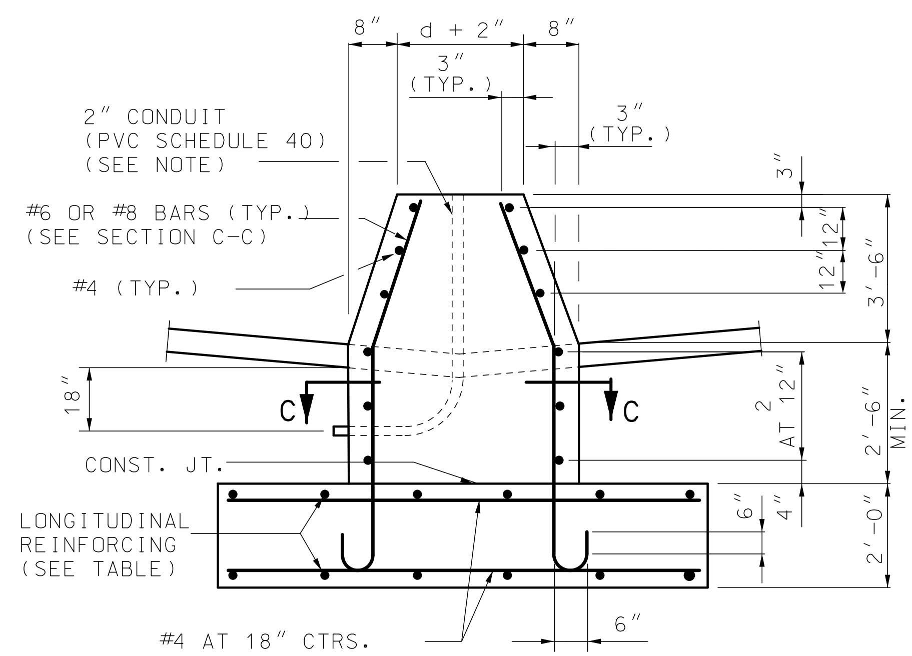


POST TYPE
I AND II

POST TYPE
III, IV, V, VI, AND VII

SECTION C-C

TYPICAL SECTION SHOWING REINFORCING STEEL



PART ELEVATION
(TYPE C CONCRETE TRAFFIC BARRIER)

GENERAL NOTES:

A TAPERED TUBE OF EQUILVALENT 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; A.S.T.M. 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 NO. 4 OF 6 FOR DETAILS OF THESE ITEMS.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5′-2″ (TYPE A MEDIAN BARRIER) OR 6′-0″ (TYPE C MEDIAN BARRIER).

QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF 2′-0″.

QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

DETAILS OF ALTERNATE PEDESTAL

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

MoDOT

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
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NUMBER PE-2001018754
PROFESSIONAL ENGINEER
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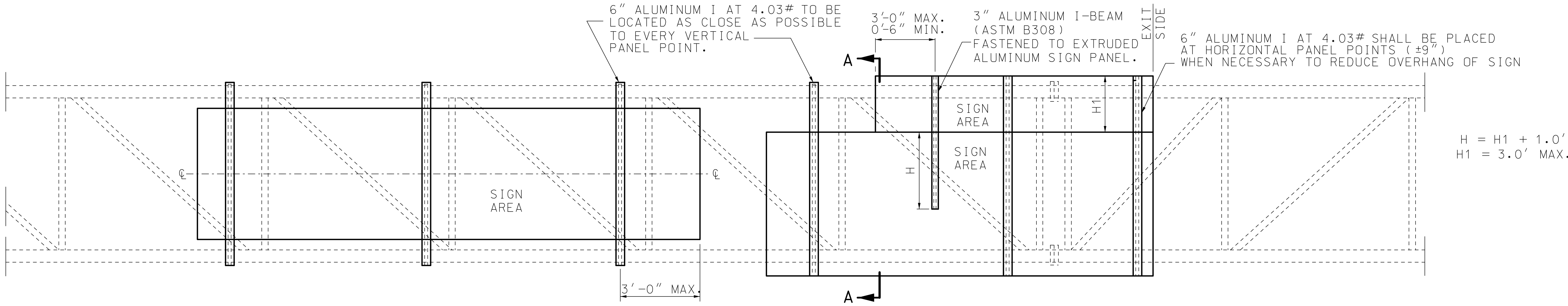
OVERHEAD SIGN TRUSSES
ALUMINUM

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

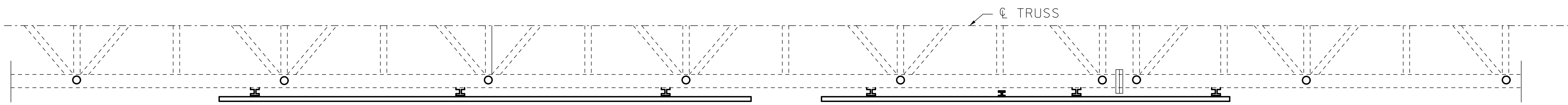
903.10BD

SHEET NO. 5 OF 6

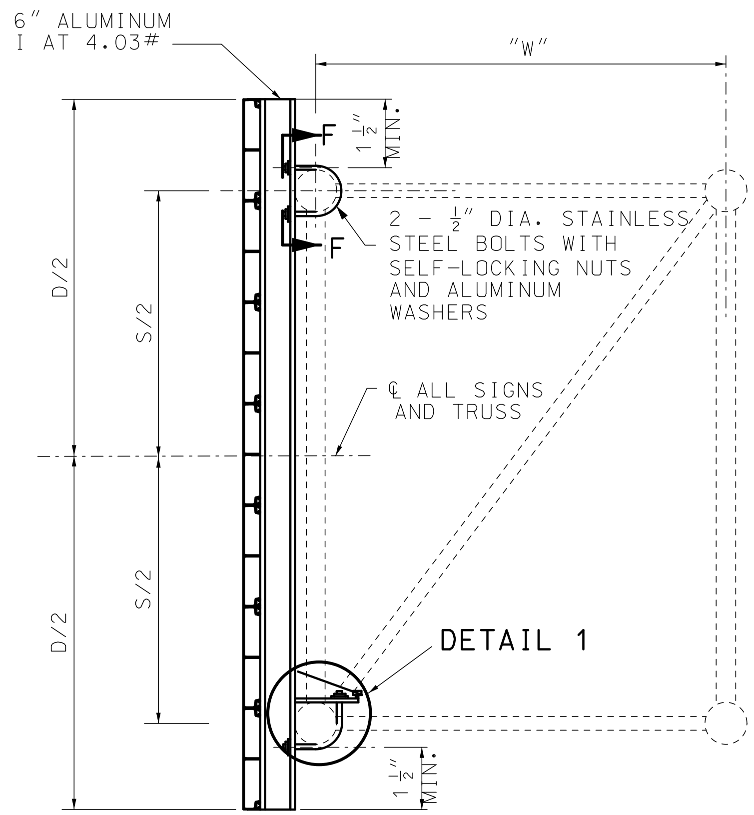
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPICAL ELEVATION OF SIGN COMPONENTS

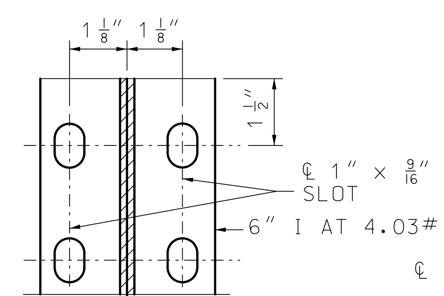


TYPICAL HALF PLAN OF SIGN COMPONENTS

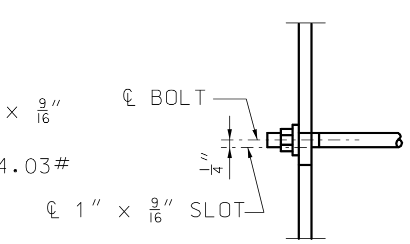


SECTION A-A

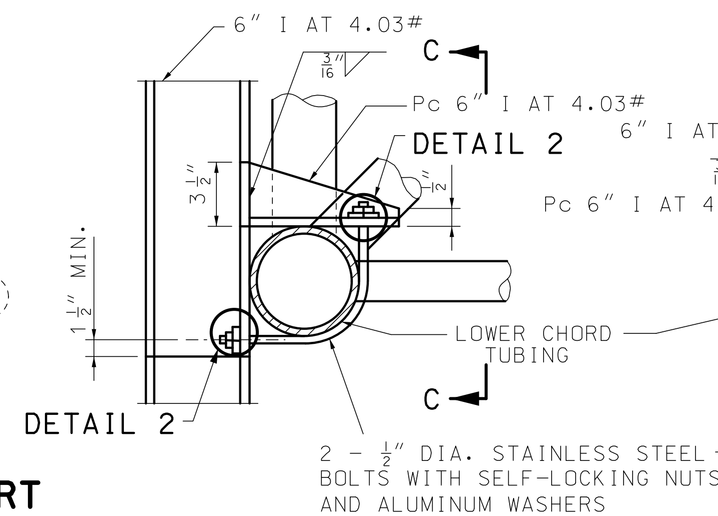
TYPICAL SECTION OF SIGN SUPPORT



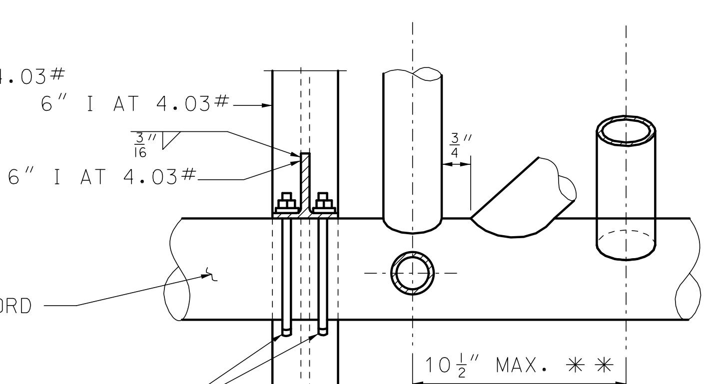
SECTION F-F



DETAIL 2



DETAIL 1



SECTION C-C

✱✱ LOCATE THE INTERIOR DIAGONAL AS CLOSE AS POSSIBLE TO THE CENTERLINE OF THE PANEL POINT WITHOUT OVER-LAPPING WELDS.

GENERAL NOTES:

EXIT NO. PANELS SHALL BE MOUNTED FLUSH WITH THE EXIT SIDE OF THE GUIDE SIGN.

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

SEE STD. PLAN 903.09 FOR LIGHTING DETAILS IF LIGHTING THE SIGN IS NECESSARY.

SEE STD. PLAN 903.03 FOR SIGN MOUNTING DETAILS.

ALL MATERIAL ALUMINUM EXCEPT AS NOTED.

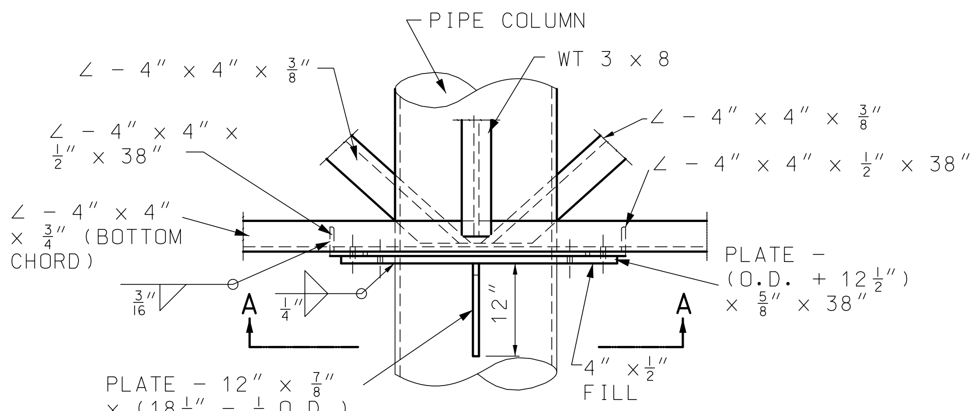
MODOT
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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

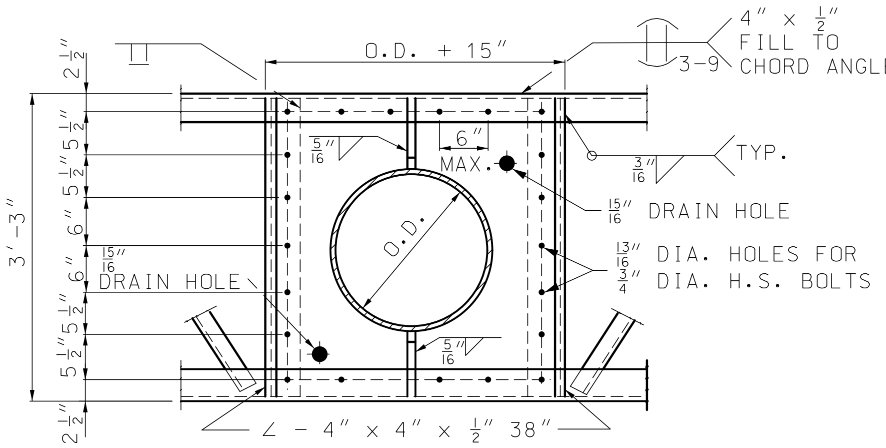
OVERHEAD SIGN TRUSSES

SIGN MOUNTING DETAIL

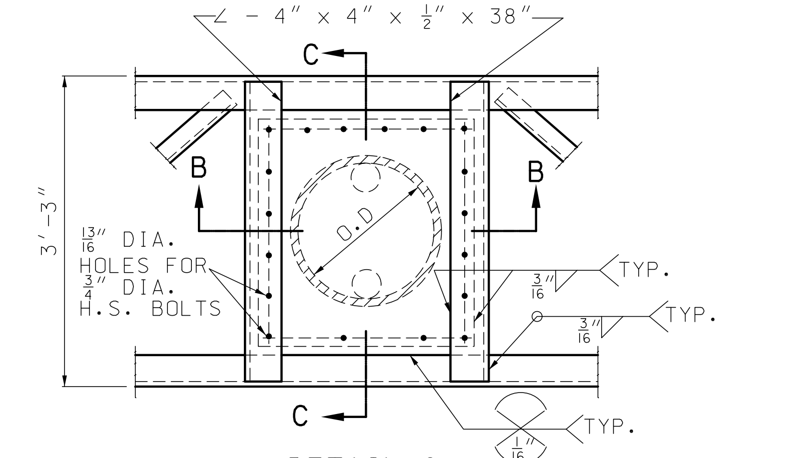
DATE EFFECTIVE: 01/01/2021		903.10BD	SHEET NO.
DATE PREPARED: 10/14/2020			6 OF 6



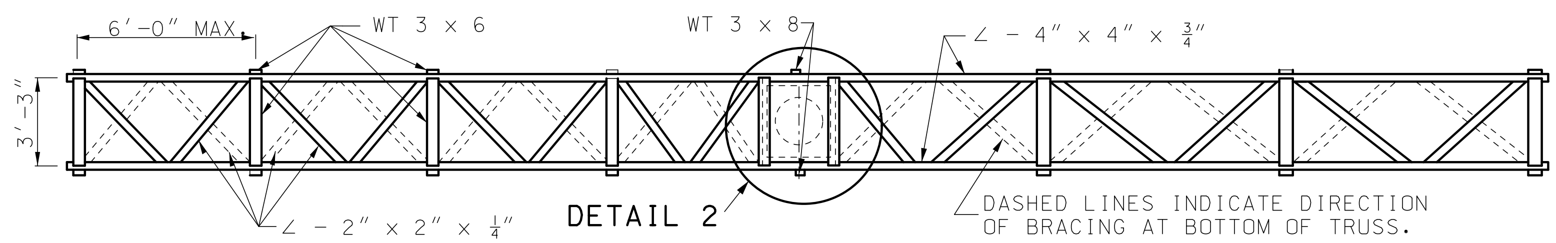
DETAIL 1
TRUSS BOTTOM CONNECTION TO COLUMN



SECTION A-A



DETAIL 2
TRUSS TOP CONNECTION TO COLUMN

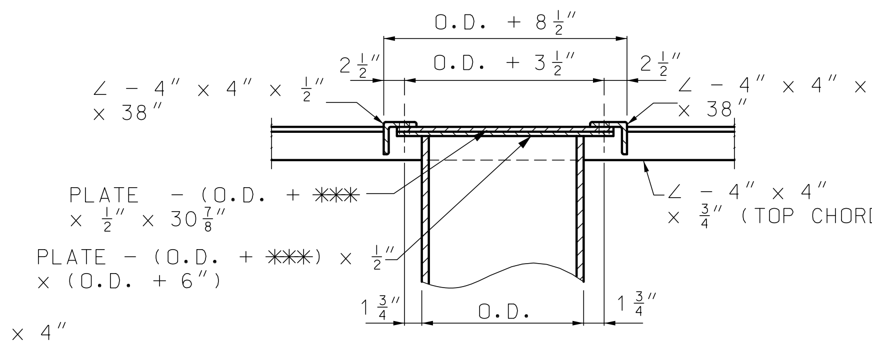


PLAN

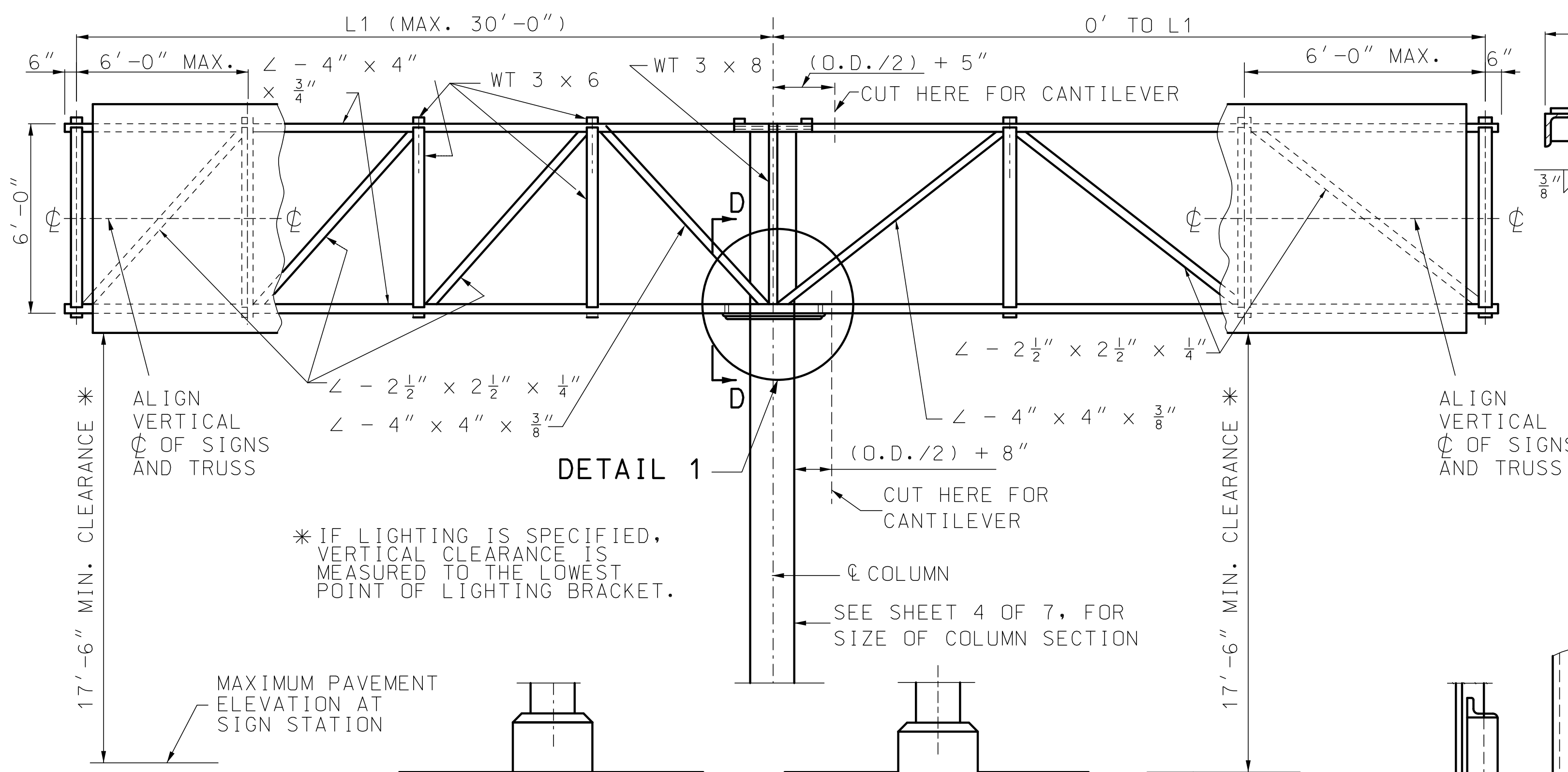
* 1 1/2" FOR POST TYPE VII
1 3/4" FOR ALL OTHER POST TYPES

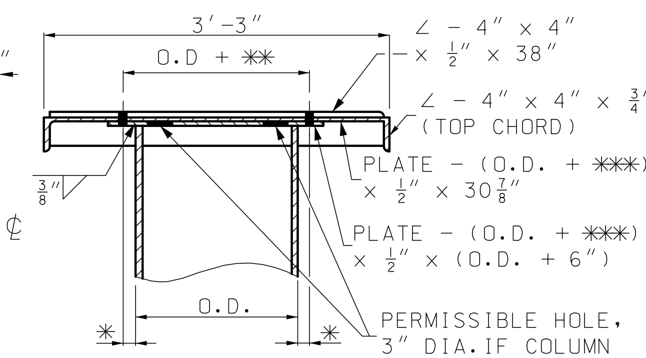
** 3" FOR POST TYPE VII
3 1/2" FOR ALL OTHER POST TYPES

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



SECTION B-B





SECTION C-C

GENERAL NOTES:

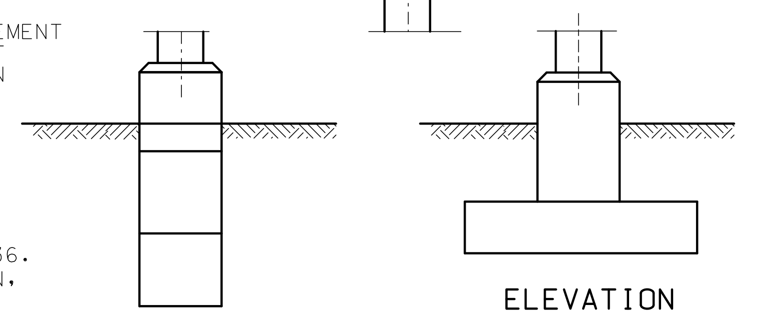
ALL FASTENERS SHALL HAVE A HARDENED WASHER UNDER THE NUT OR BOLT HEAD, WHICHEVER IS TURNED IN TIGHTENING.

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.

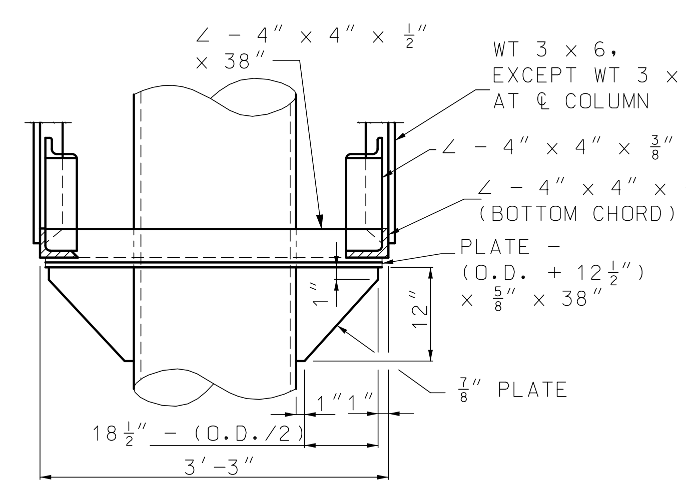
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ℄ OF THE TRUSS.



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

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

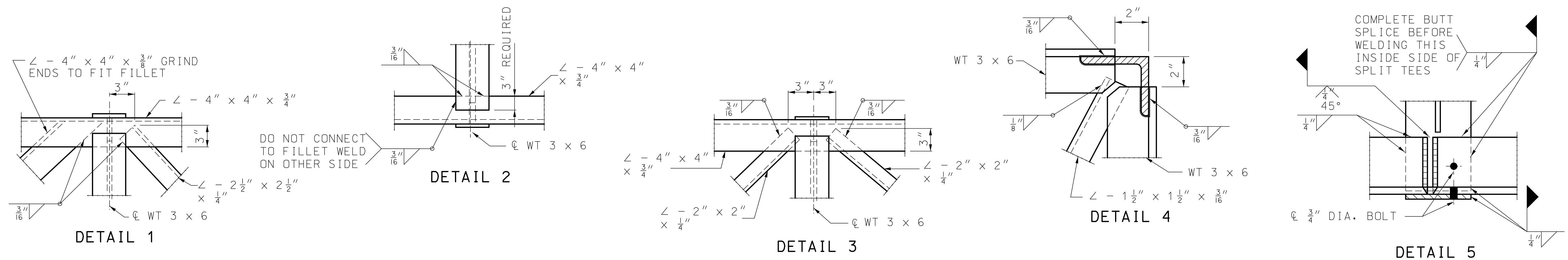
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

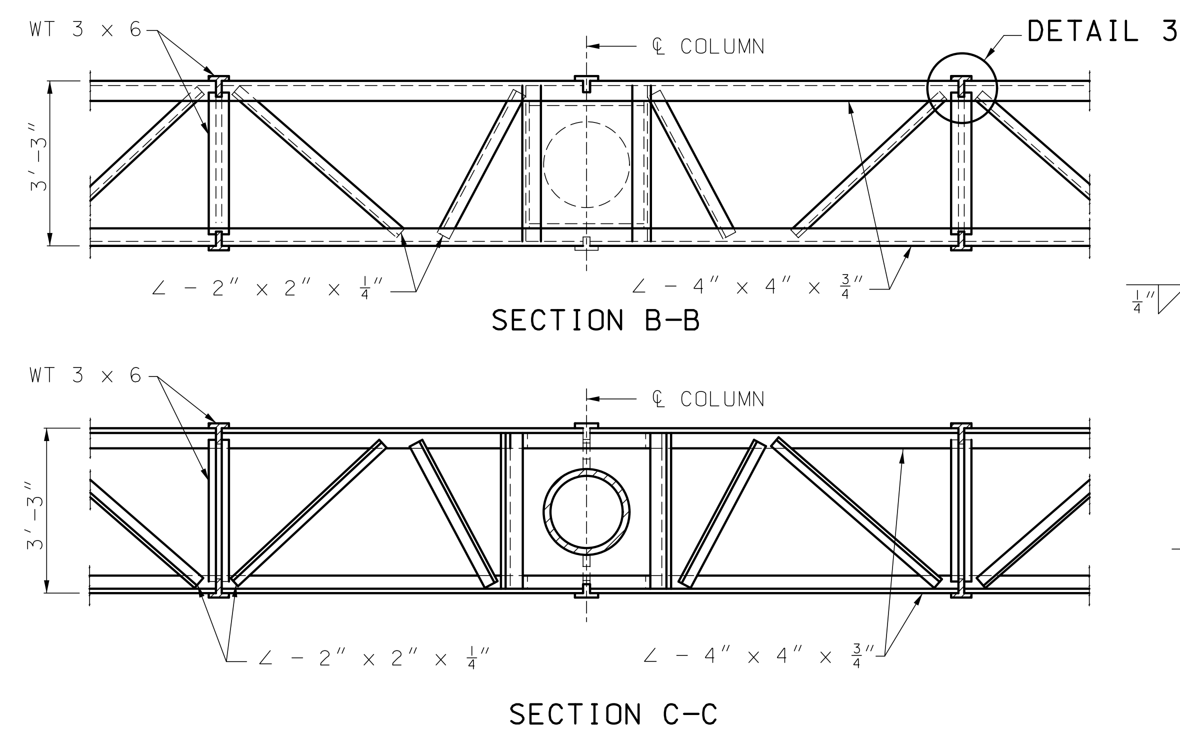
OVERHEAD SIGN TRUSSES
BUTTERFLY AND CANTILEVER
STRUCTURAL STEEL

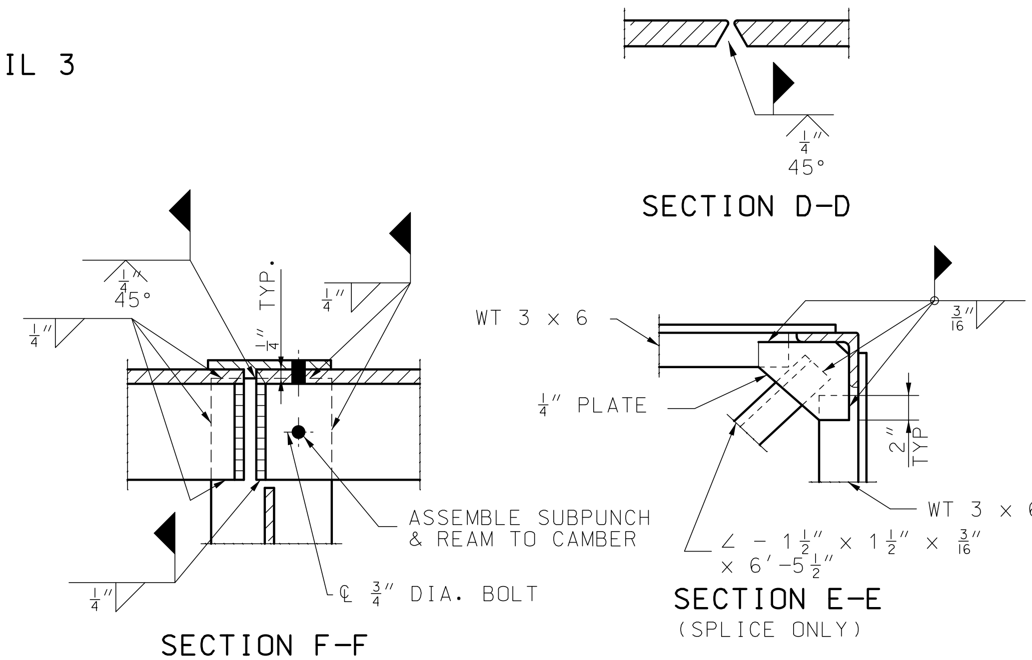
DATE EFFECTIVE: 01-01-2021
DATE PREPARED: 10/14/2020

903.12AA

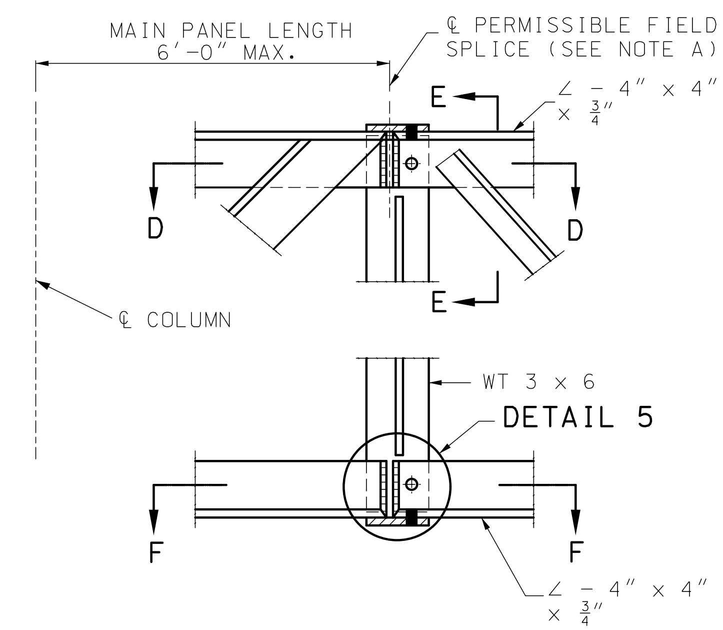
SHEET NO. 1 OF 7



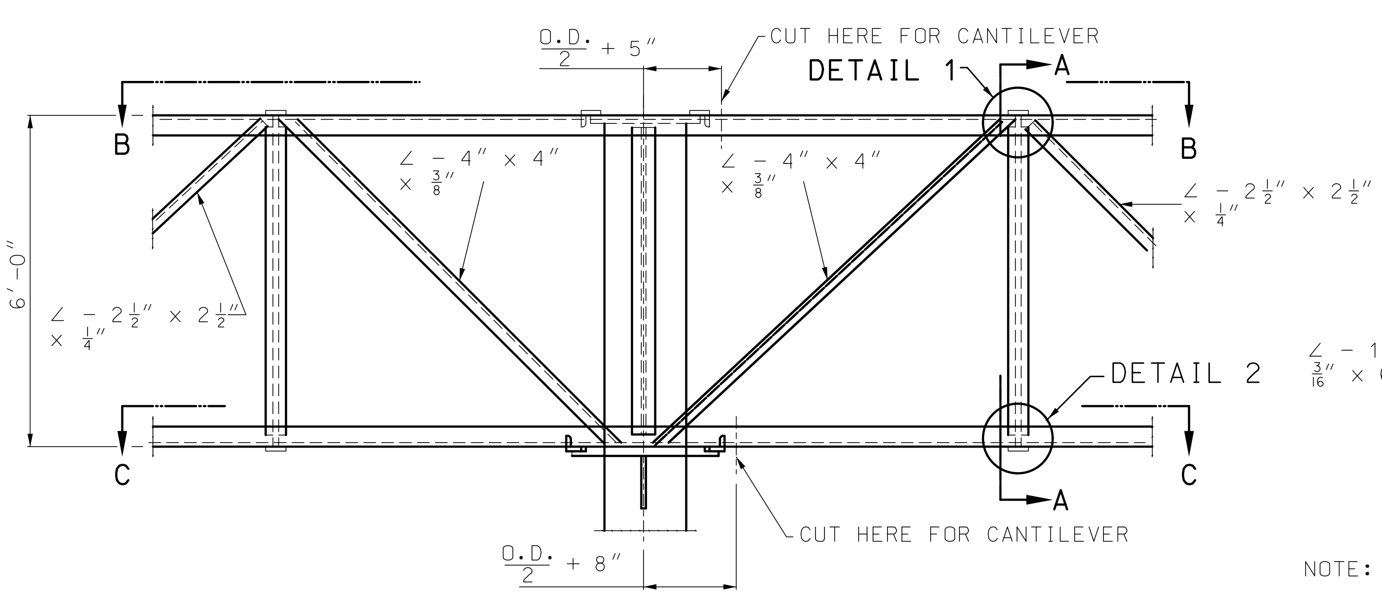




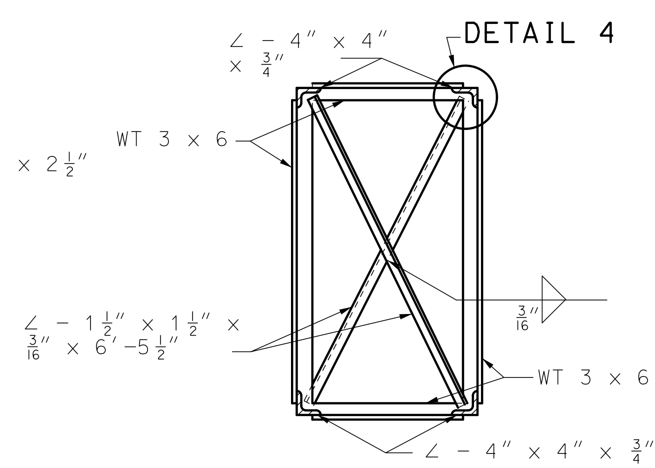
NOTE: 3/4" DIA. BOLTS SHALL BE REMOVED AFTER WELDING IS COMPLETE. BOLT HOLES SHALL BE PLUGGED AND THE OUTSIDE FACE GROUND SMOOTH.



LOCATION OF FIELD SPLICE



PART ELEVATION OF BUTTERFLY TRUSS



SECTION A–A

NOTE: SHRINK ∠ – 1 1/2" x 1 1/2" x 3/16" IF NECESSARY TO TAKE UP DISTORTIONAL SLACK.

NOTE A: SPLICING CHORD ANGLES IN THE SHOP AND THE FIELD SPLICE SHOWN IN THIS SHEET WILL NOT BE ALLOWED WITHOUT SPECIAL PERMISSION. IF PERMISSION IS GRANTED SUCH SPLICES SHALL BE LOCATED AT THE CENTER LINE OF MAIN PANEL POINT NEXT TO COLUMN.

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STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
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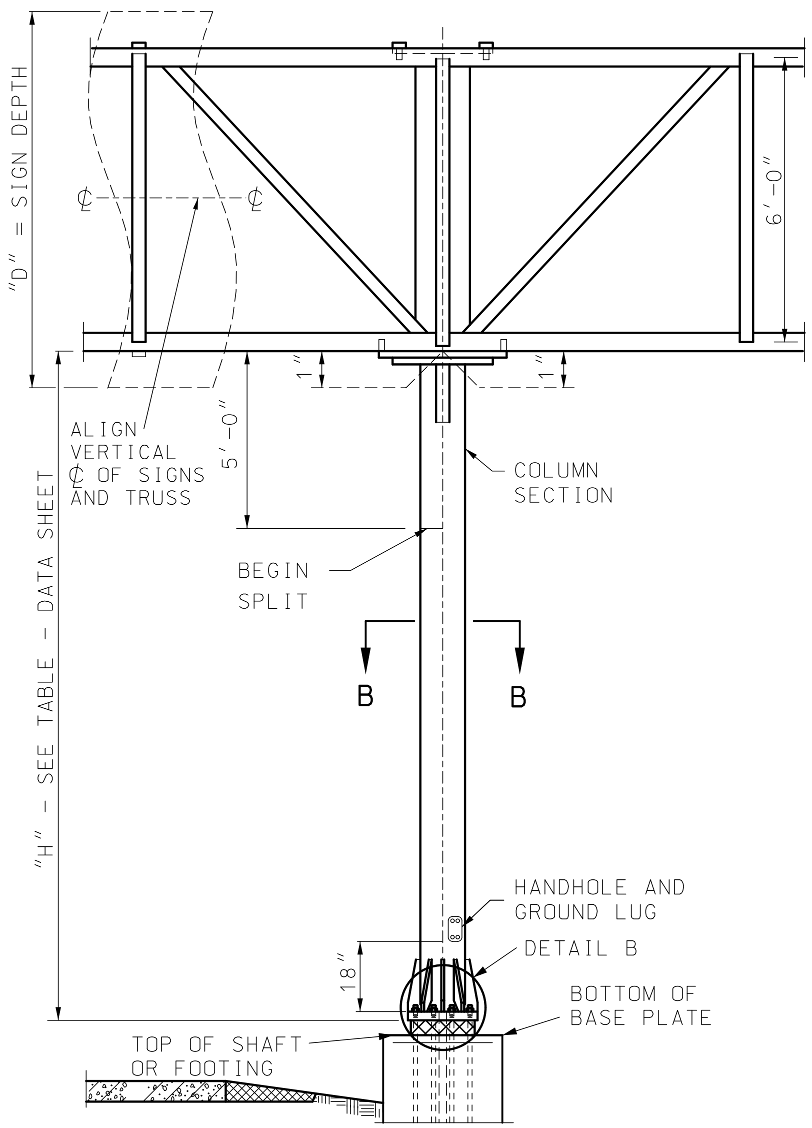
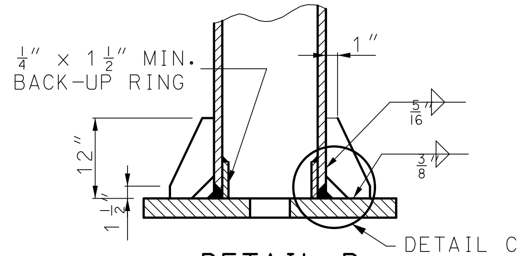
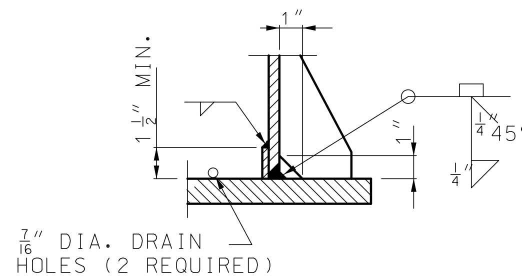
OVERHEAD SIGN TRUSSES
BUTTERFLY & CANTILEVER STRUCTURAL STEEL

DATE EFFECTIVE:	01-01-2021	903.12AA	SHEET NO. 2 OF 7
DATE PREPARED:	10/14/2020		

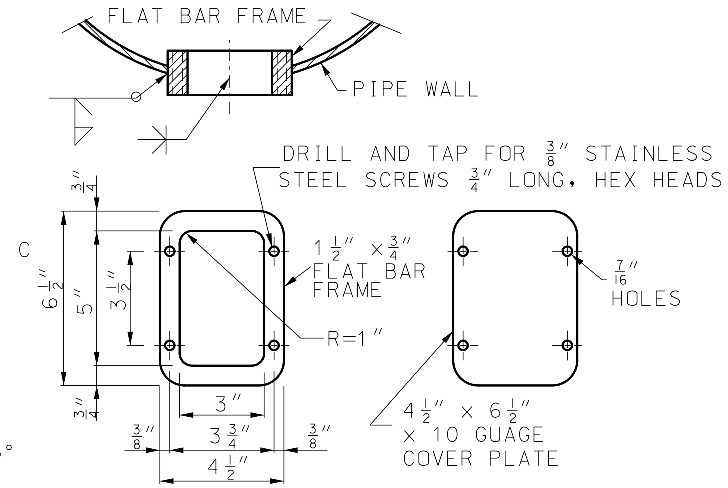




DETAIL B
(SECTION VIEW SHOWN)

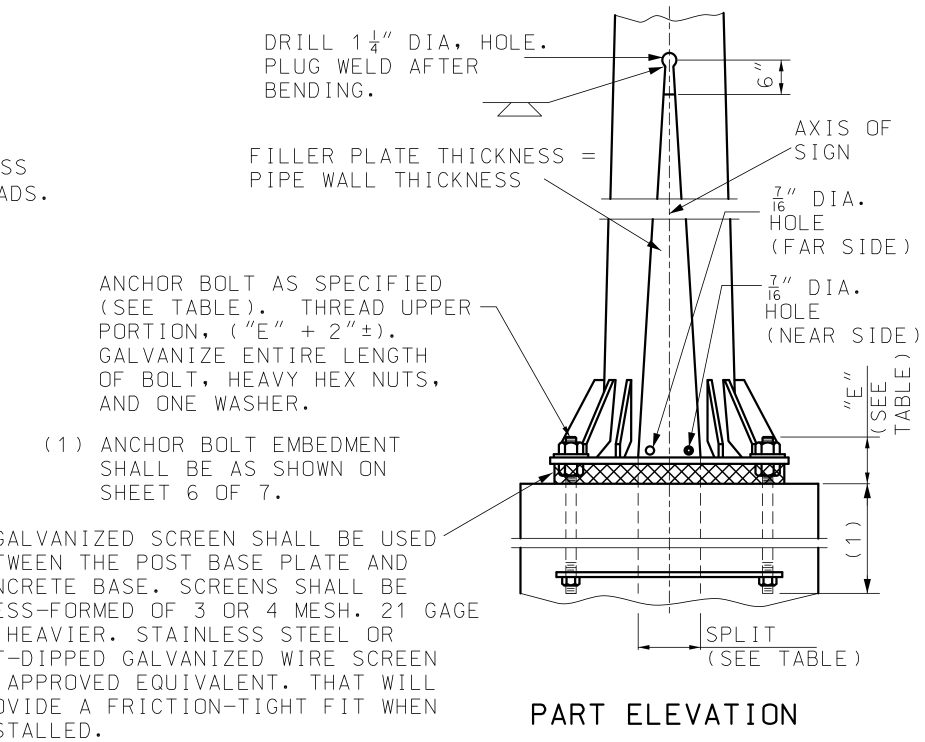


DETAIL C

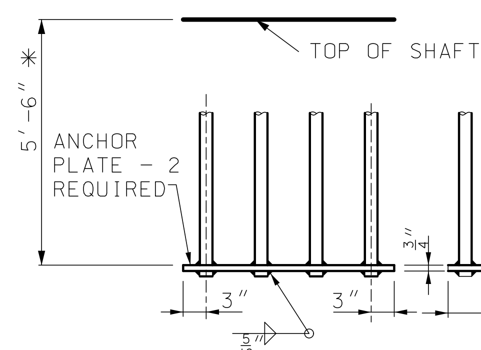


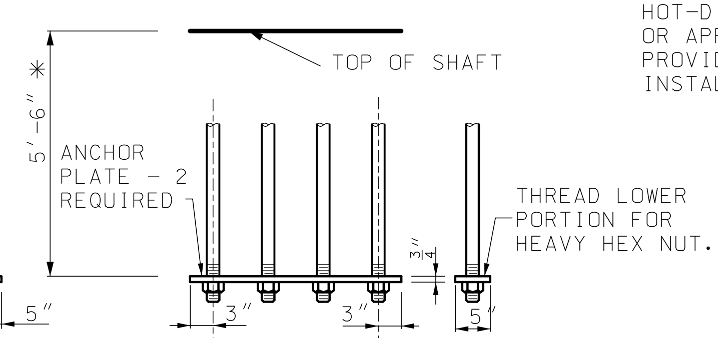
HANDHOLE AND COVER DETAILS

NOTE:
HANDHOLE REQUIRED ONLY IN POWER COLUMN.



PART ELEVATION





DETAIL A ANCHORAGE

DETAIL A OPTIONAL 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.

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.

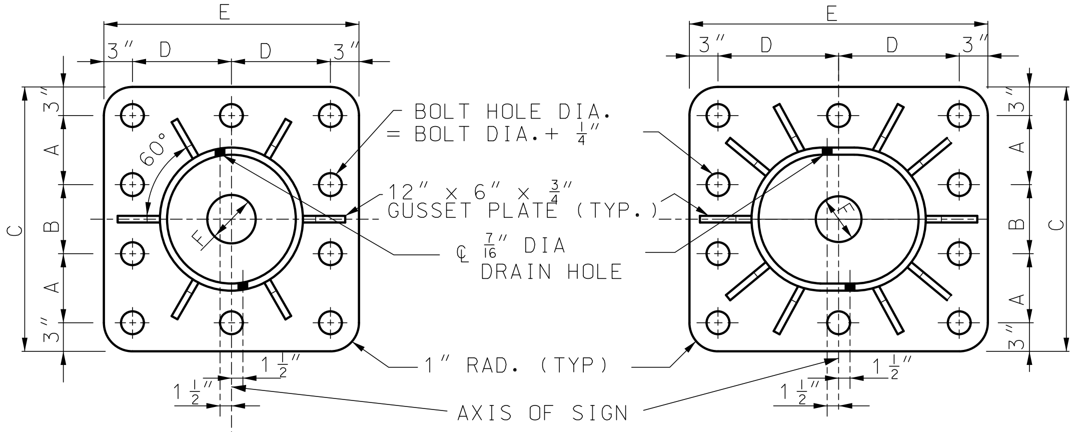
A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

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

TYPICAL BASE PLATE
(10 ANCHOR TYPE)
BUTTERFLY AND CANTILEVER (B.C.)

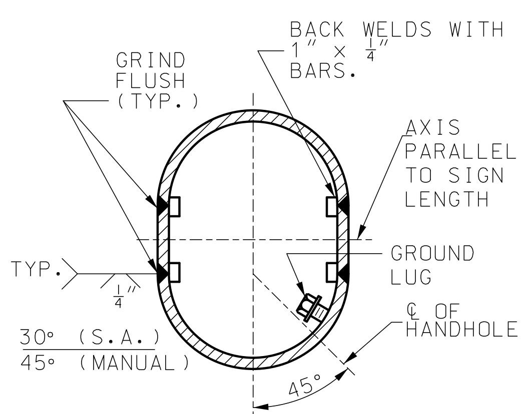
	III	IV	V	VI	VII
A	8"	9"	8"	9"	$10\frac{1}{2}''$
B	10"	10"	10"	10"	11"
C	32"	34"	32"	34"	38"
D	13"	14"	$16\frac{1}{2}''$	18"	20"
E	32"	34"	39"	42"	46"
F	6"	6"	6"	6"	6"



III AND IV B.C.

V, VI, AND VII B.C.

TYPICAL BASE PLATES



SECTION B-B
(FOR SPLIT COLUMNS ONLY)

NOTE:
FOR DETAILS OF OPTIONAL SUBSTRUCTURES, SEE OTHER SHEETS.

ANCHOR BOLTS AND PLATE NOT SHOWN.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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NUMBER PE-2001018754
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OVERHEAD SIGN TRUSS
COLUMN AND BASE PLATES

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

DRILLED SHAFT OPTION / ALTERNATE PEDESTALS

POST TYPE	PIPE COLUMN O.D.	PIPE COLUMN WEIGHT (LBS.)	"E"	SPLIT	BASE PLATE SIZE**	ANCHOR BOLT NO.	ANCHOR BOLT DIA.	C	FA	FB	FC	FD	FH	COLLAR REINFORCEMENT MOMENT-C1 BARS	MOMENT-C1 SPACING	SHEAR-C2 BARS	SHEAR-C2 SPACING	SKIN-C3 BARS	SKIN-C3 SPACING	SHAFT REINFORCEMENT LONGITUDINAL S1 QUANTITY	LONGITUDINAL S1 BARS	SHEAR-S2 BARS	SHEAR-S2 SPACING	REBAR TOTAL (LBS.)	CONCRETE (CU.YDS.)	ALTERNATE PEDESTALS REBAR TOTAL (LBS.) TYPE A	REBAR TOTAL (LBS.) TYPE C	CONCRETE (CU.YDS.) TYPE A	CONCRETE (CU.YDS.) TYPE C
III	18″	93.45	8 1/2″	0″	2′-8″ x 2′-8″ x 1 3/4″	10	2″	2′-10″	4′-0″	7′-6″	1′-6″	4′-6″	14′-0″	#6	6″	#4	12″	#4	12″	19	#10	#5	6″	2126	12.4	2066	2077	13.4	14.5
IV	20″	104.13	8 1/2″	0″	2′-10″ x 2′-10″ x 2″	10	2 1/4″	3′-0″	4′-0″	7′-6″	1′-6″	4′-6″	14′-0″	#6	6″	#4	12″	#4	12″	19	#10	#5	6″	2126	12.4	2066	2077	13.5	14.6
V	18″	93.45	8 1/2″	7″	3′-3″ x 2′-8″ x 2″	10	2 1/4″	2′-10″	5′-0″	13′-6″	4′-0″	5′-6″	17′-0″	#6	6″	#4	12″	#4	12″	22	#11	#6	6″	3901	26.5	3763	3782	28.8	30.7
VI	20″	104.13	8 1/2″	8″	3′-6′ x 2′-10″ x 2 1/4″	10	2 1/4″	3′-0″	5′-0″	14′-0″	4′-0″	6′-0″	18′-0″	#6	6″	#4	12″	#4	12″	27	#11	#6	6″	4742	31.8	4528	4547	34.1	36.2
VII	24″	125.49	9″	8″	3′-10″ x 3′-2″ x 2 1/4″	10	2 1/2″	3′-4″	5′-0″	14′-0″	4′-0″	6′-0″	18′-0″	#6	6″	#4	12″	#4	12″	27	#11	#6	6″	4742	31.8	4528	4547	34.5	36.8

SPREAD FOOTING OPTION

POST TYPE	PIPE COLUMN O.D.	PIPE COLUMN WEIGHT (LBS.)	"E"	SPLIT	BASE PLATE SIZE**	ANCHOR BOLT NO.	ANCHOR BOLT DIA.	PEDESTAL SIZE * a	PEDESTAL SIZE * b	FOOTING SIZE *	LONGITUDINAL FOOTING REINFORCEMENT TOP NO.	TOP BARS	BOTTOM NO.	BOTTOM BARS	PEDESTAL REINFORCEMENT NO.	BARS	NO.	BARS	REBAR TOTAL (LBS.)	CON-CRETE (CU.YDS.)
III	18″	93.45	8 1/2″	0″	2′-8″ x 2′-8″ x 1 3/4″	10	2″	4′-2″	3′-8″	10′-0″ x 13′-0″	10	#5	10	#5	10	#4	14	#8	695	14.4
IV	20″	104.13	8 1/2″	0″	2′-10″ x 2′-10″ x 2″	10	2 1/4″	4′-4″	3′-10″	10′-0′ x 14′-0″	10	#5	10	#5	10	#4	14	#8	733	15.6
V	18″	93.45	8 1/2″	7″	3′-3″ x 2′-8″ x 2″	10	2 1/4″	4′-9″	3′-8″	9′-0″ x 17′-0″	9	#5	10	#7	10	#4	14	#8	955	16.5
VI	20″	104.13	8 1/2″	8″	3′-6′ x 2′-10″ x 2 1/4″	10	2 1/4″	5′-0″	3′-10″	9′-0″ x 19′-0″	9	#5	10	#7	10	#4	14	#8	1028	18.4
VII	24″	125.49	9″	8″	3′-10″ x 3′-2″ x 2 1/4″	10	2 1/2″	5′-4″	4′-2″	10′-0″ x 20′-0″	9	#5	12	#7	10	#4	14	#8	1196	21.5

SPREAD FOOTING OPTION WITH ALTERNATE PEDESTALS

POST TYPE	PIPE COLUMN O.D.	PIPE COLUMN WEIGHT (LBS.)	"E"	SPLIT	BASE PLATE SIZE**	ANCHOR BOLT NO.	ANCHOR BOLT DIA.	PEDESTAL SIZE * c	PEDESTAL SIZE * d	PEDESTAL SIZE * e	FOOTING SIZE *	TYPE A LONGITUDINAL FOOTING REINFORCEMENT TOP NO.	TOP BARS	BOTTOM NO.	BOTTOM BARS	TYPE A PEDESTAL REINFORCEMENT NO.	BARS	NO.	BARS	TYPE A REBAR TOTAL (LBS.)	TYPE A CONCRETE (CU.YDS.)	TYPE C LONGITUDINAL FOOTING REINFORCEMENT TOP NO.	TOP BARS	BOTTOM NO.	BOTTOM BARS	TYPE C PEDESTAL REINFORCEMENT NO.	BARS	NO.	BARS	TYPE C REBAR TOTAL (LBS.)	TYPE C CONCRETE (CU.YDS.)
III	18″	93.45	8 1/2″	0″	2′-8″ x 2′-8″ x 1 3/4″	10	2″	2′-10″	6′-6″	15″	10′-0″ x 13′-0″	10	#5	10	#5	10	#4	14	#8	757	14.4	10	#4	10	#5	12	#4	14	#8	800	15.3
IV	20″	104.13	8 1/2″	0″	2′-10″ x 2′-10″ x 2″	10	2 1/4″	3′-0″	6′-9″	18″	10′-0′ x 14′-0″	10	#5	10	#5	10	#4	14	#8	795	15.6	10	#4	10	#5	12	#4	14	#8	839	16.5
V	18″	93.45	8 1/2″	7″	3′-3″ x 2′-8″ x 2″	10	2 1/4″	2′-10″	7′-0″	12″	9′-0″ x 17′-0″	9	#5	10	#7	10	#4	14	#8	1015	16.5	10	#4	10	#7	12	#4	14	#8	1059	17.5
VI	20″	104.13	8 1/2″	8″	3′-6′ x 2′-10″ x 2 1/4″	10	2 1/4″	3′-0″	7′-6″	15″	9′-0″ x 19′-0″	9	#5	10	#7	10	#4	14	#8	1099	18.4	10	#4	10	#7	12	#4	14	#8	1134	19.5
VII	24″	125.49	9″	8″	3′-10″ x 3′-2″ x 2 1/4″	10	2 1/2″	3′-4″	7′-10″	15″	10′-0″ x 20′-0″	9	#5	12	#7	10	#4	14	#8	1257	21.5	10	#4	12	#7	12	#4	14	#8	1302	22.6

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

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NICOLE A. KOLB HOOD
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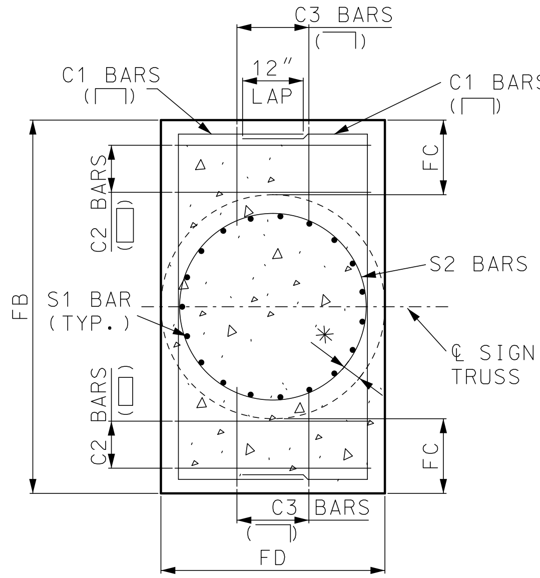
OVERHEAD SIGN TRUSSES
OPTIONAL SUBSTRUCTURE DATA

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

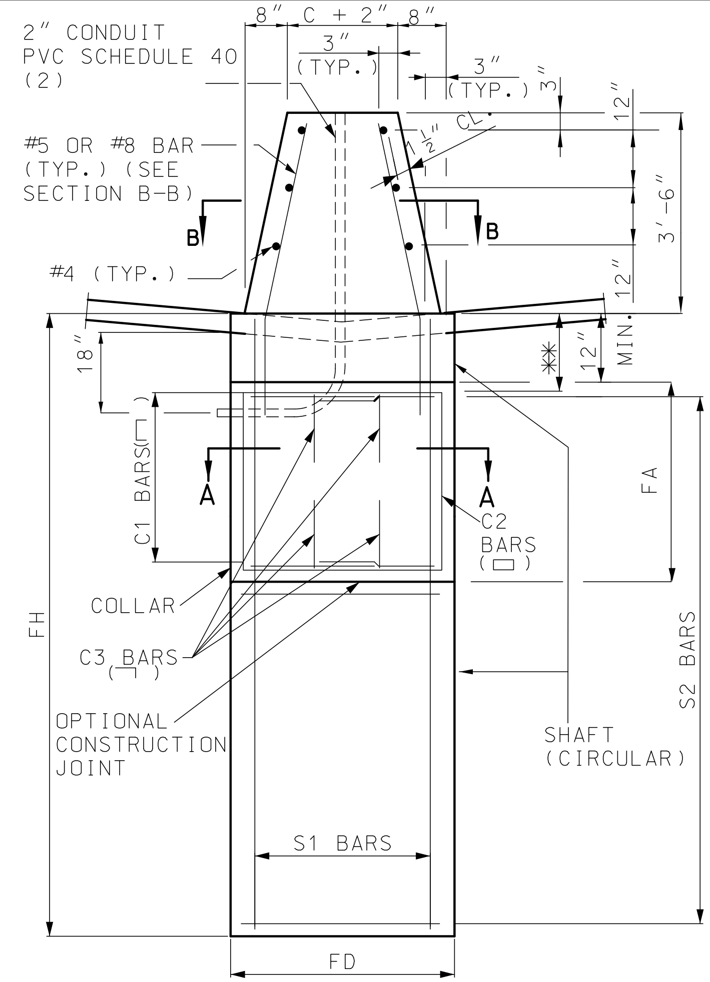
903.12AA



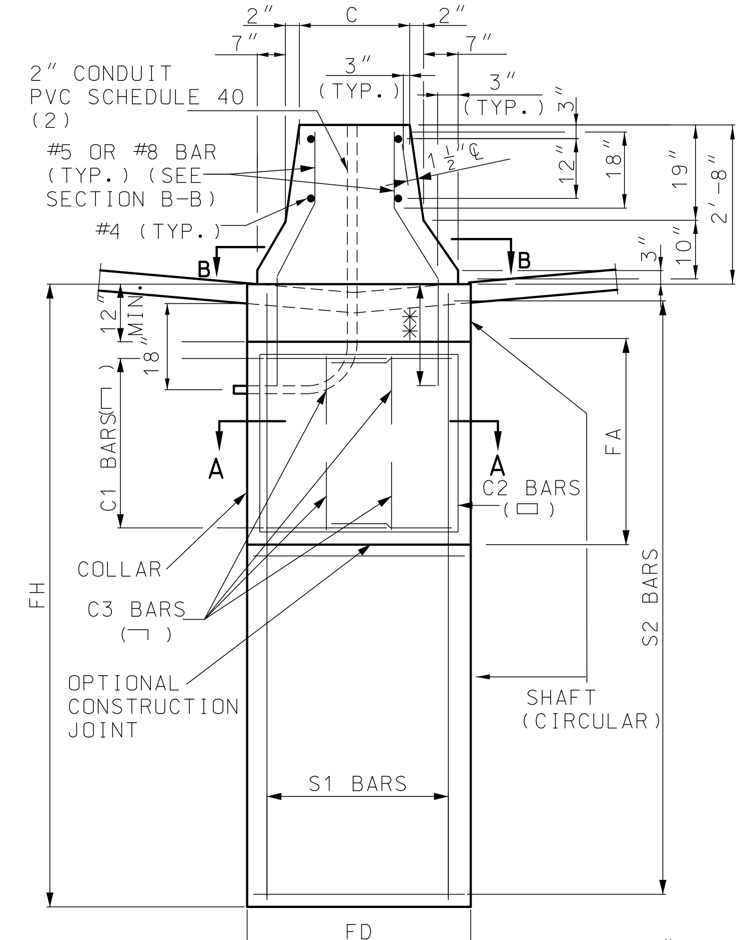
SECTION A-A
(TYPICAL SECTION SHOWING REINFORCING STEEL)

✳ 4" CLEAR FOR FD = 4'-6"
6" CLEAR FOR FD > 4'-6"

VERTICAL LEG OF C3 SHALL BE PLACED INSIDE SHAFT S2 BARS.



PART ELEVATION
(TYPE C CONCRETE TRAFFIC BARRIER)

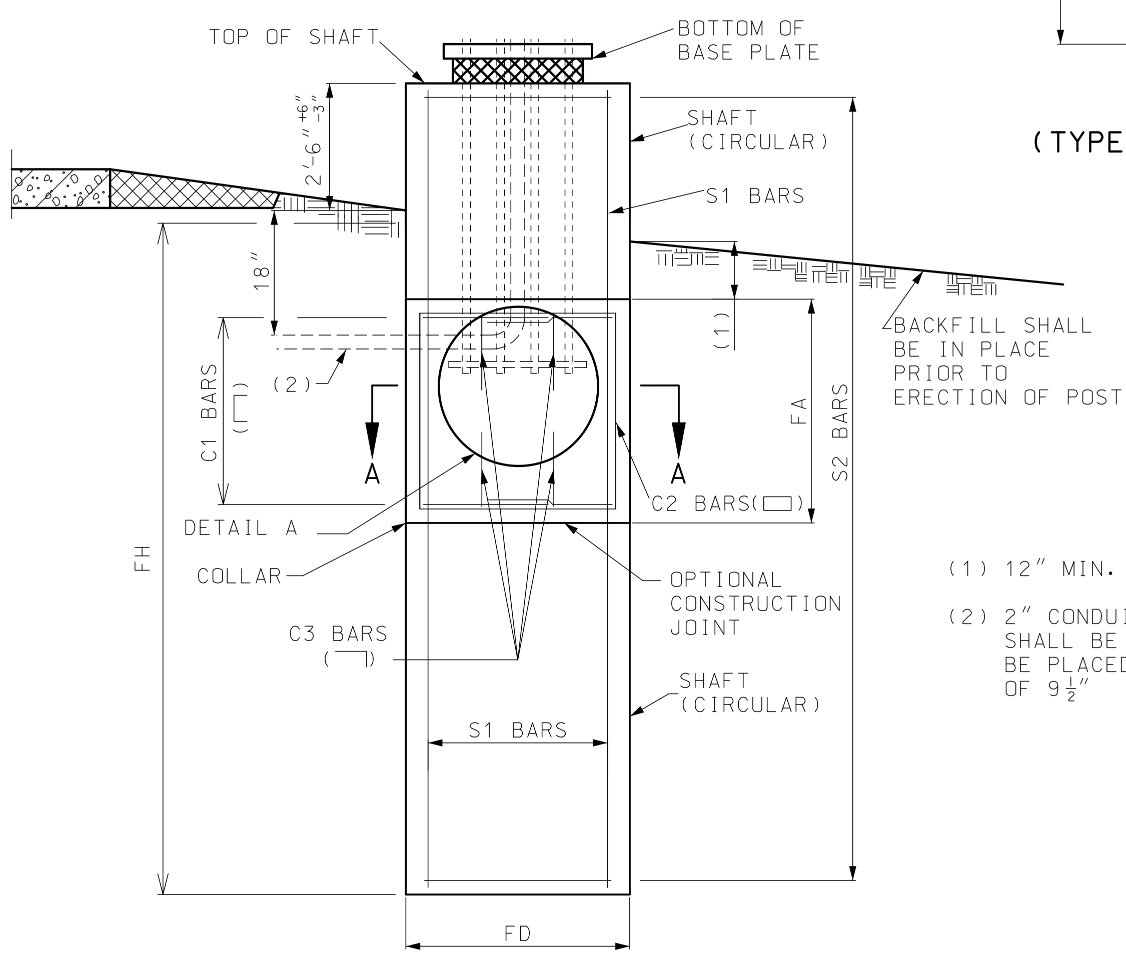


PART ELEVATION
(TYPE A CONCRETE TRAFFIC BARRIER)

✳✳ 12" (#5 BAR)
2'-4" (#8 BAR)

DETAILS OF ALTERNATE PEDESTAL

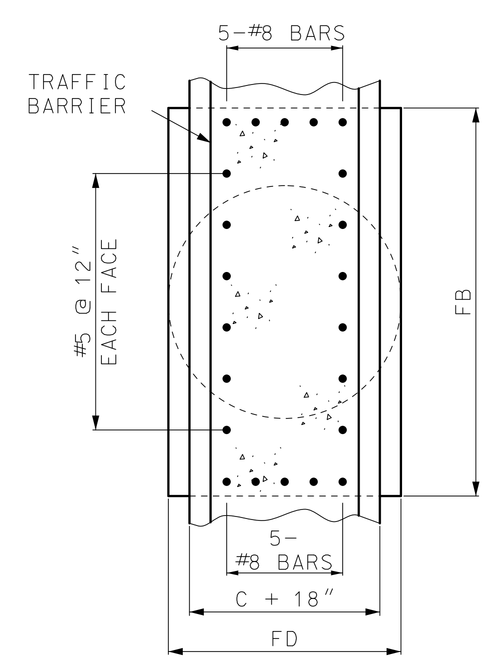
(TO BE USED ADJACENT TO TYPE A OR TYPE C MEDIAN BARRIER)



ELEVATION

(1) 12" MIN. TO 24" MAX.

(2) 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM BEND RADIUS OF 9½"



SECTION B-B

GENERAL NOTES:

SHAFT AND COLLAR SHALL BE CLASS B (P.C.C.).

MINIMUM CLEARANCE TO REINFORCEMENT IS 3" EXCEPT AS SHOWN.

WHEN ROCK IS ENCOUNTERED AT A DEPTH NOT EXCEEDING "FH"/2 FOR FD > 3'-0" OR "FH"/4 FOR FD ≤ 3'-0", THE DIMENSION "FH" MAY BE ADJUSTED TO A MINIMUM OF 3 X "FD", SUBJECT TO APPROVAL BY THE ENGINEER.

CONTACT THE ENGINEER IF WATER TABLE IS ENCOUNTERED DURING EXCAVATION.

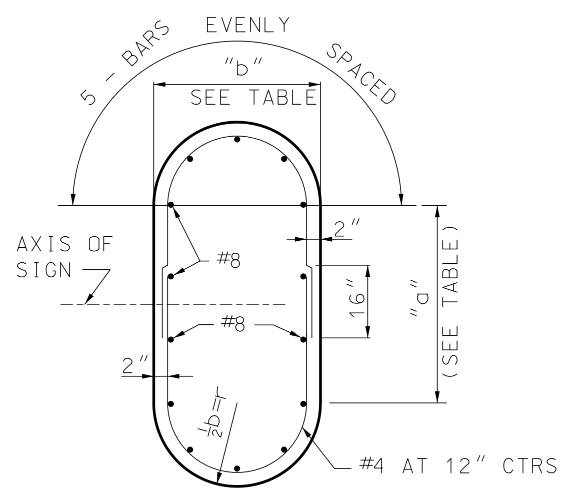
PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 7 FOR DETAILS OF THESE ITEMS.

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

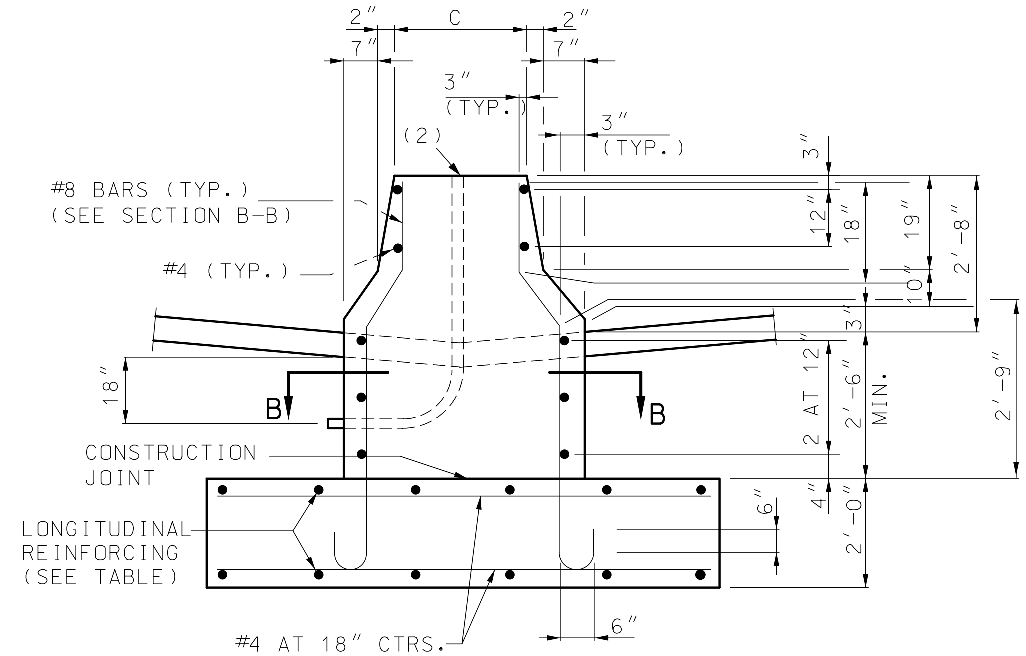
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES
DRILLED SHAFT OPTION

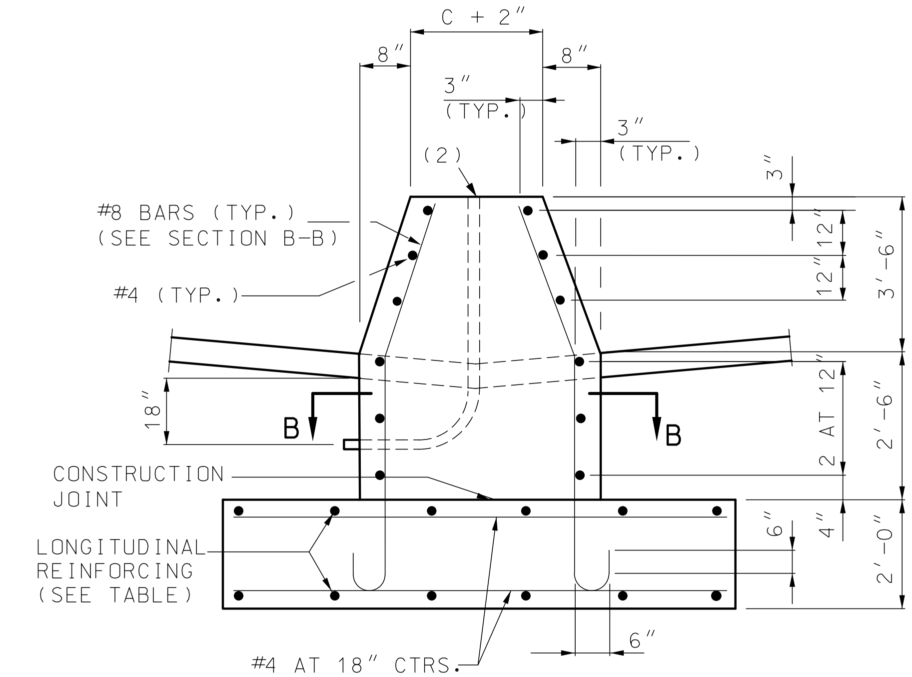
DATE EFFECTIVE: 01-01-2021
DATE PREPARED: 10/14/2020
903.12AA



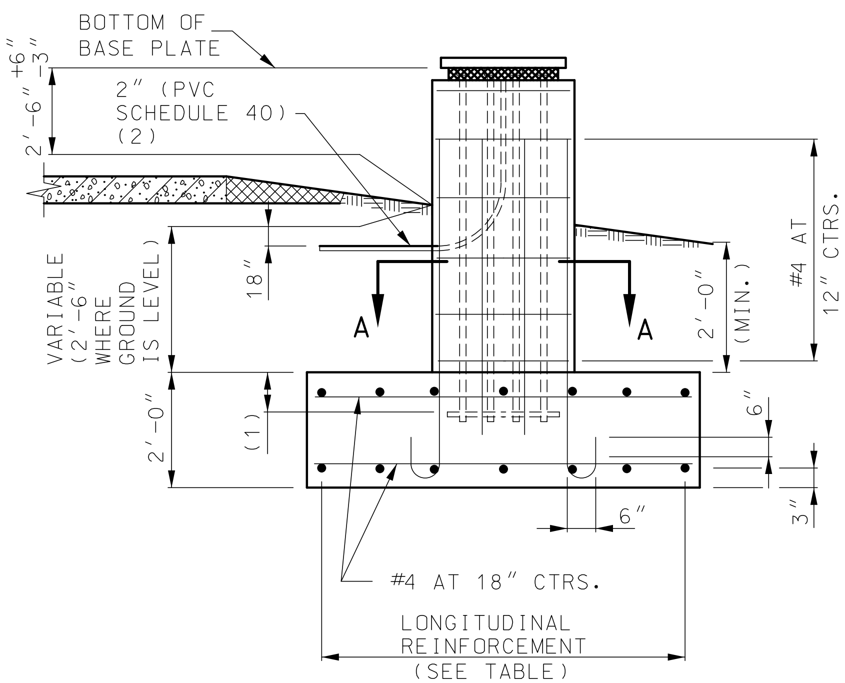
SECTION A-A
(TYPICAL SECTION SHOWING REINFORCING STEEL)



PART ELEVATION
(TYPE A CONCRETE TRAFFIC BARRIER)



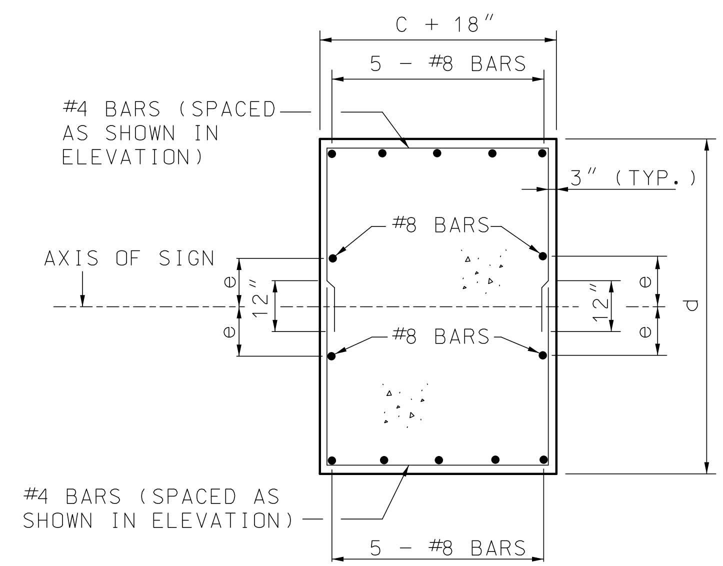
PART ELEVATION
(TYPE C CONCRETE TRAFFIC BARRIER)



ELEVATION

(1) $12''^{+6''}_{-3''}$ (DETAIL FOR 12" FIELD TOLERANCE)

(2) 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINUMUM BEND RADIUS OF $9\frac{1}{2}$".



SECTION B-B
TYPICAL SECTION SHOWING REINFORCING STEEL

DETAILS OF ALTERNATE PEDESTAL

GENERAL NOTES:

PEDESTAL AND FOOTING SHALL BE CLASS B (P.C.C.).

MINIMUM CLEARANCE TO REINFORCEMENT IS 3" EXCEPT AS SHOWN.

CONTACT THE ENGINEER IF WATER TABLE IS ENCOUNTERED DURING EXCAVATION.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PETAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 7 FOR DETAILS OF THESE ITEMS.

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

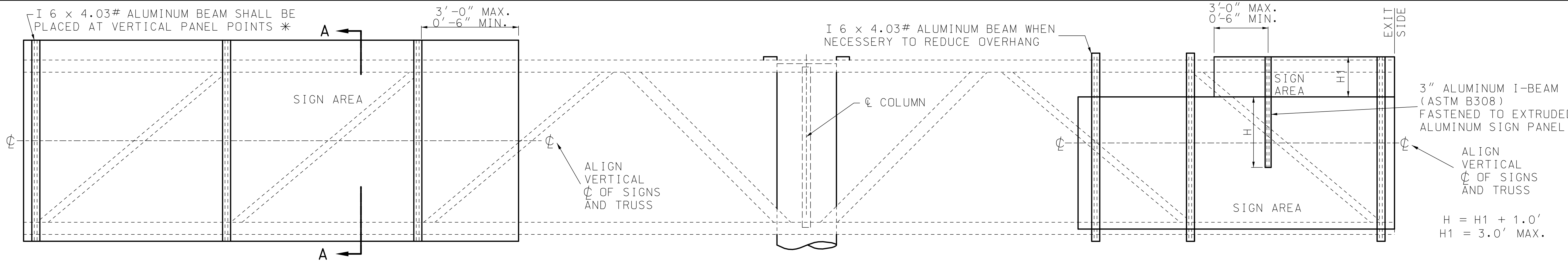
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES
SPREAD FOOTING

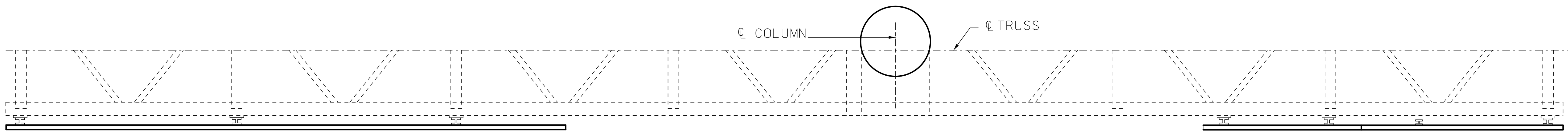
DATE EFFECTIVE: 01-01-2021
DATE PREPARED: 10/14/2020

903.12AA

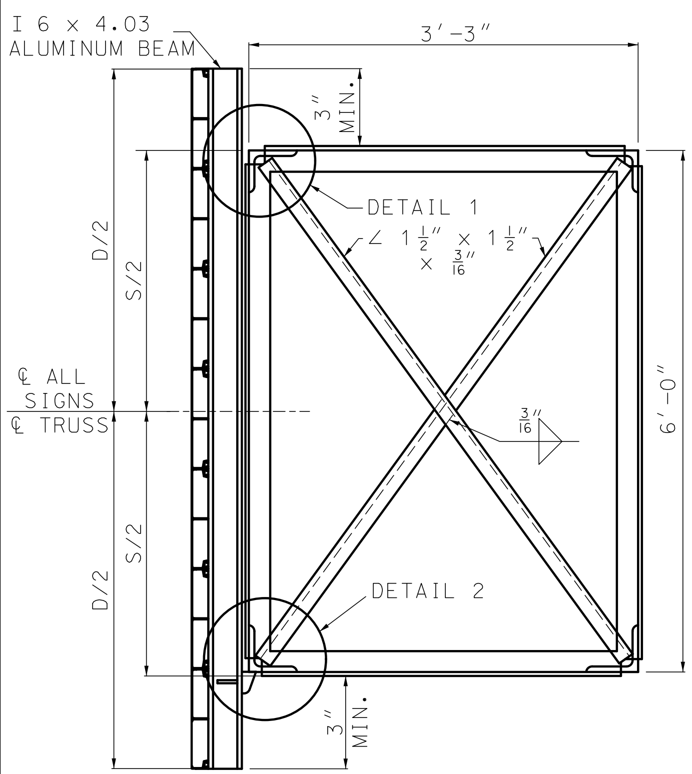
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPICAL ELEVATION OF SIGNS COMPONENTS

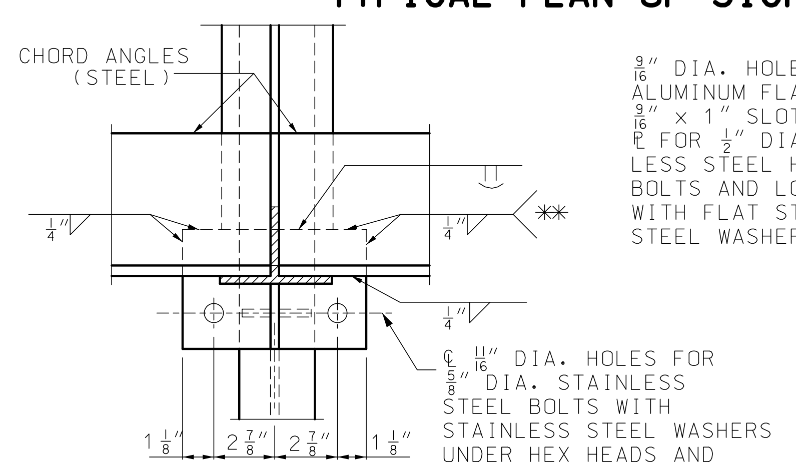


TYPICAL PLAN OF SIGN COMPONENTS

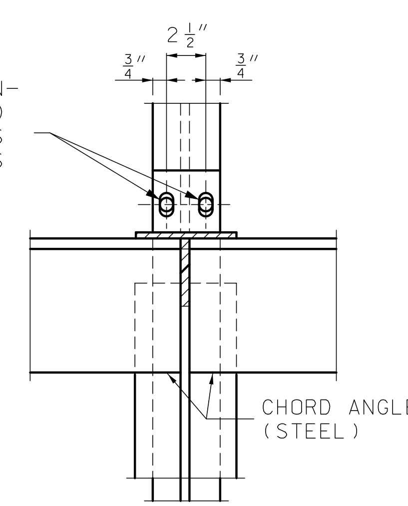


SECTION A-A
TYPICAL SECTION
OF SIGN SUPPORT

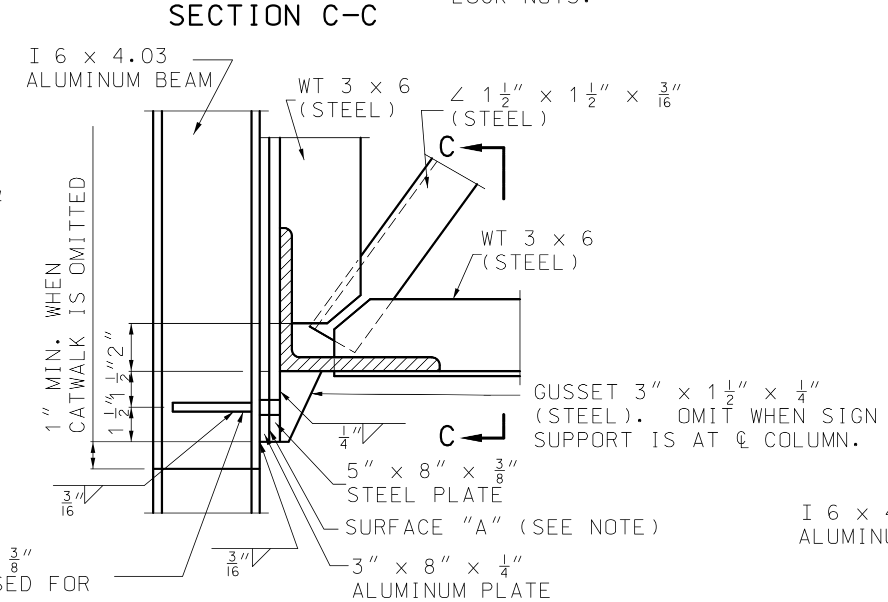
NOTE:
"D" = GREATEST OVERALL DEPTH OF ANY SIGNS ON TRUSSES.



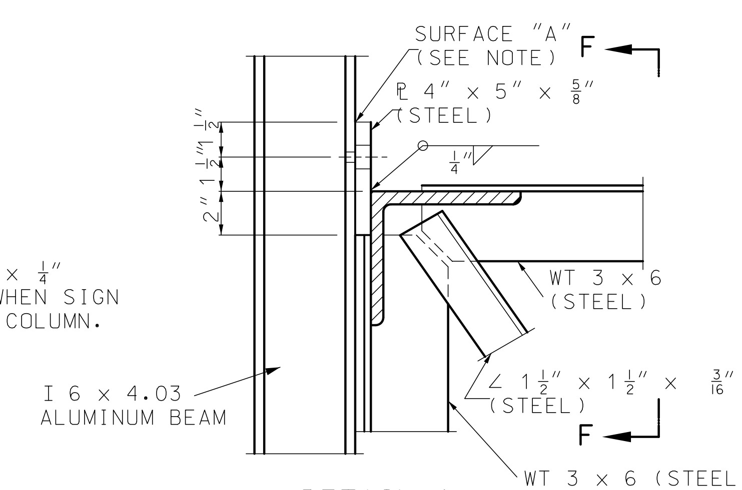
SECTION C-C



SECTION F-F



DETAIL 2



DETAIL 1

NOTE:
SURFACE "A", ZINC CHROMATE ON ALUMINUM SURFACES. NORMAL CLEANING AND PAINTING ON STEEL SURFACES. ZINC CHROMATE IS NOT REQUIRED WHEN STEEL IS GALVANIZED.

✱ FOR SIGN HEIGHTS GREATER THAN 17'-0", BUT LESS THAN OR EQUAL TO 20'-0" USE ADDITIONAL I 6 x 4.03 ALUMINUM BEAMS TO ACHIEVE A MAXIMUM SPACING OF 4'-0" BETWEEN SIGN SUPPORTS.

✱✱ WHEN SIGN SUPPORTS ARE PLACED BETWEEN VERTICAL PANEL POINTS AS ILLUSTRATED IN TYPICAL ELEVATION OF SIGNS COMPONENTS, WELD THE 3/8" STEEL PLATE TO THE BOTTOM CHORD WITH A ¼" FILLET WELD.

GENERAL NOTES:

EXIT NO. PANELS SHALL BE MONTED FLUSH WITH THE EXIT SIDE OF THE GUIDE SIGN.

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

FOR SIGN MOUNTING DETAILS, SEE STANDARD PLANS 903.03.

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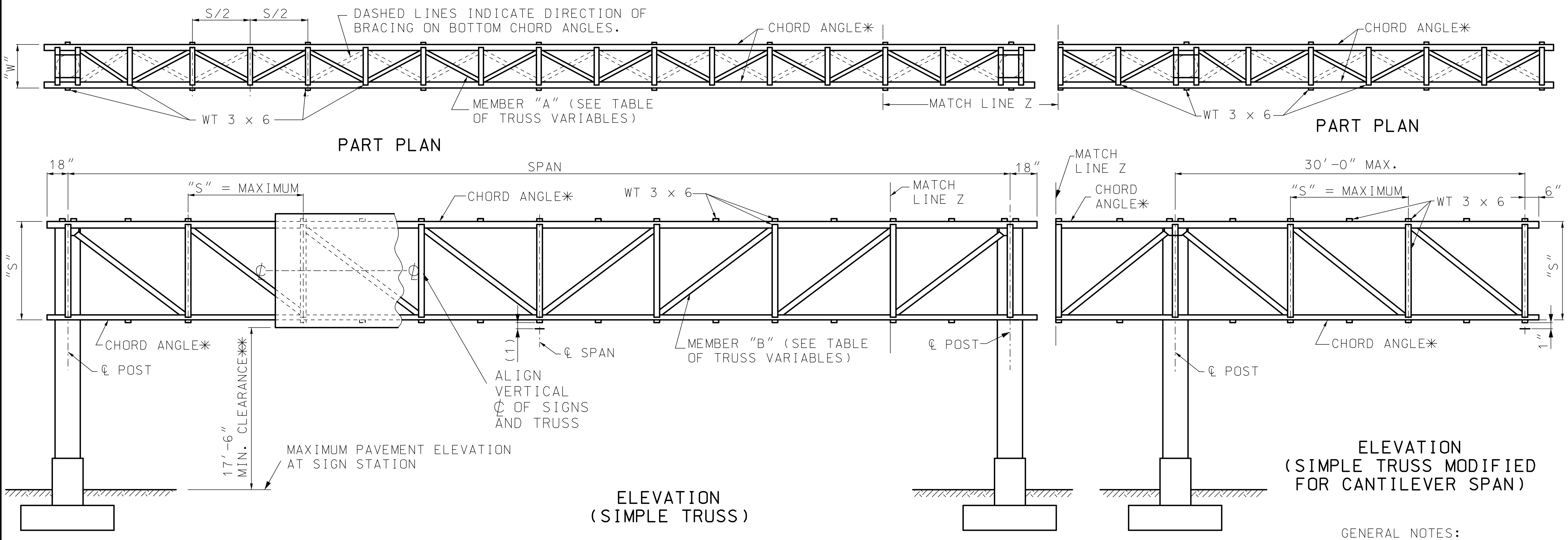
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES
STRUCTURAL STEEL
BUTTERFLY AND CANTILEVER

DATE EFFECTIVE: 01-01-2021
DATE PREPARED: 10/14/2020
903.12AA



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.

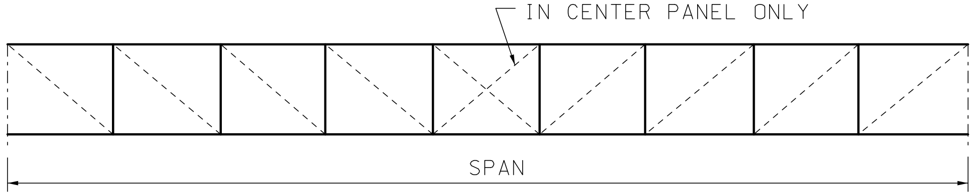
"D" = GREATEST OVERALL DEPTH OF ANY SIGN OR SIGNS ON TRUSS AND "S" = TRUSS DEPTH, AND "W" = TRUSS WIDTH.

¾" DIA. BOLTS SHALL BE REMOVED AFTER WELDING IS COMPLETE. BOLT HOLES SHALL BE PLUGGED AND THE OUTSIDE FACE GROUND SMOOTH.

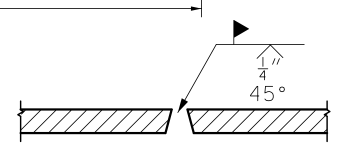
✱ SEE GENERAL NOTES THIS SHEET FOR CHARPY V-NOTCH REQUIREMENTS.

✱✱ 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)



SECTION A-A

TRUSS VARIABLES					
SPAN	"S"	"W"	MEMBER "A"	MEMBER "B"	SHOP CAMBER
UP TO 80'-6"	6'-0"	4'-0"	L 2½" × 2½" × ¼"	L 2½" × 2½" × ¼"	2"
81' TO 100'-6"	6'-0"	5'-0"	L 3" × 3" × ¼"	L 2½" × 2½" × ¼"	2½"
101' TO 130'-6"	7'-0"	6'-0"	L 3" × 3" × ¼"	L 3" × 3" × ¼"	3½"
131' TO 150'-6"	8'-0"	6'-0"	L 3½" × 3½" × 5/16"	L 3½" × 3½" × 5/16"	4½"
151' TO 160'-6"	8'-0"	7'-0"	L 3½" × 3½" × 5/16"	L 3½" × 3½" × 5/16"	5½"

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 ½" 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.

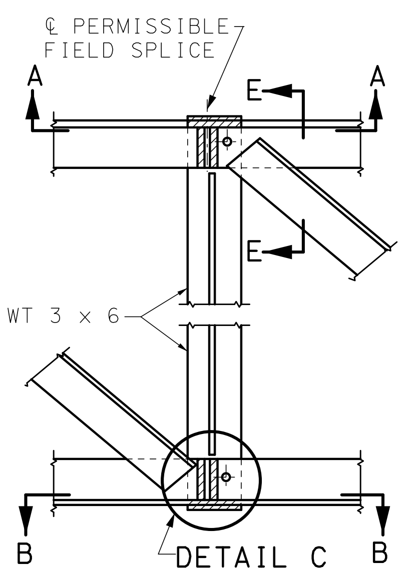
PROPOSED FIELD SPLICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL OF THE ENGINEER.

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.

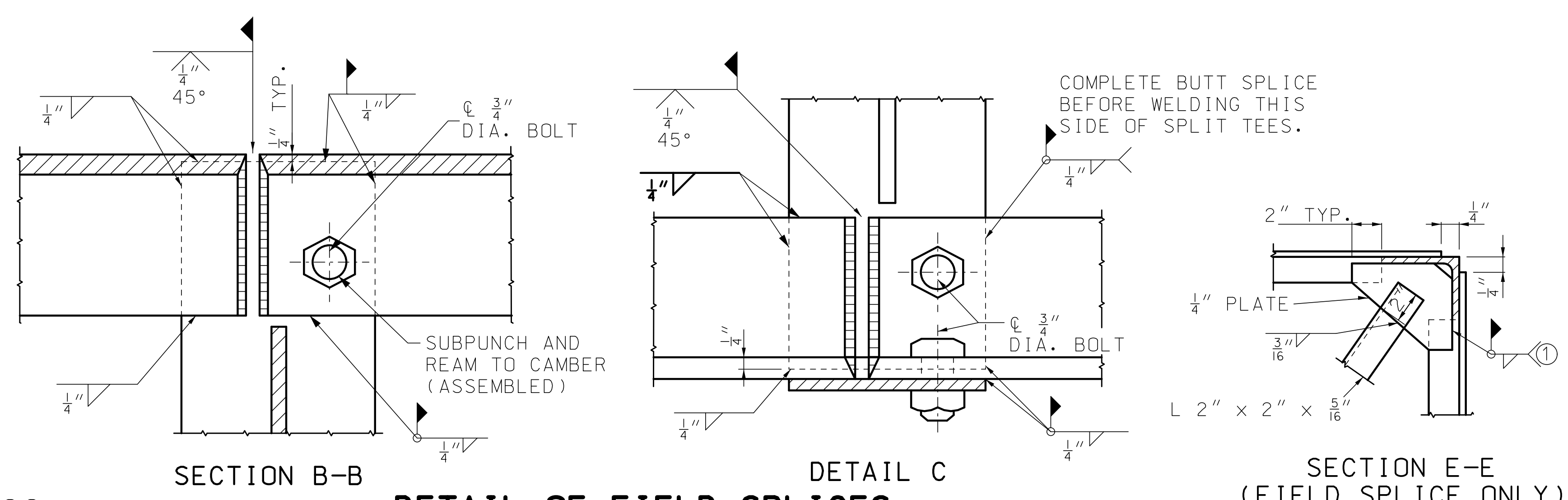
FOR ADDITIONAL INFORMATION SEE DATA SHEET.

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 ℄ OF THE TRUSS.



SECTION THROUGH TRUSS LOCATING SPLICES



DETAIL OF FIELD SPLICES
(IF ANY)

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

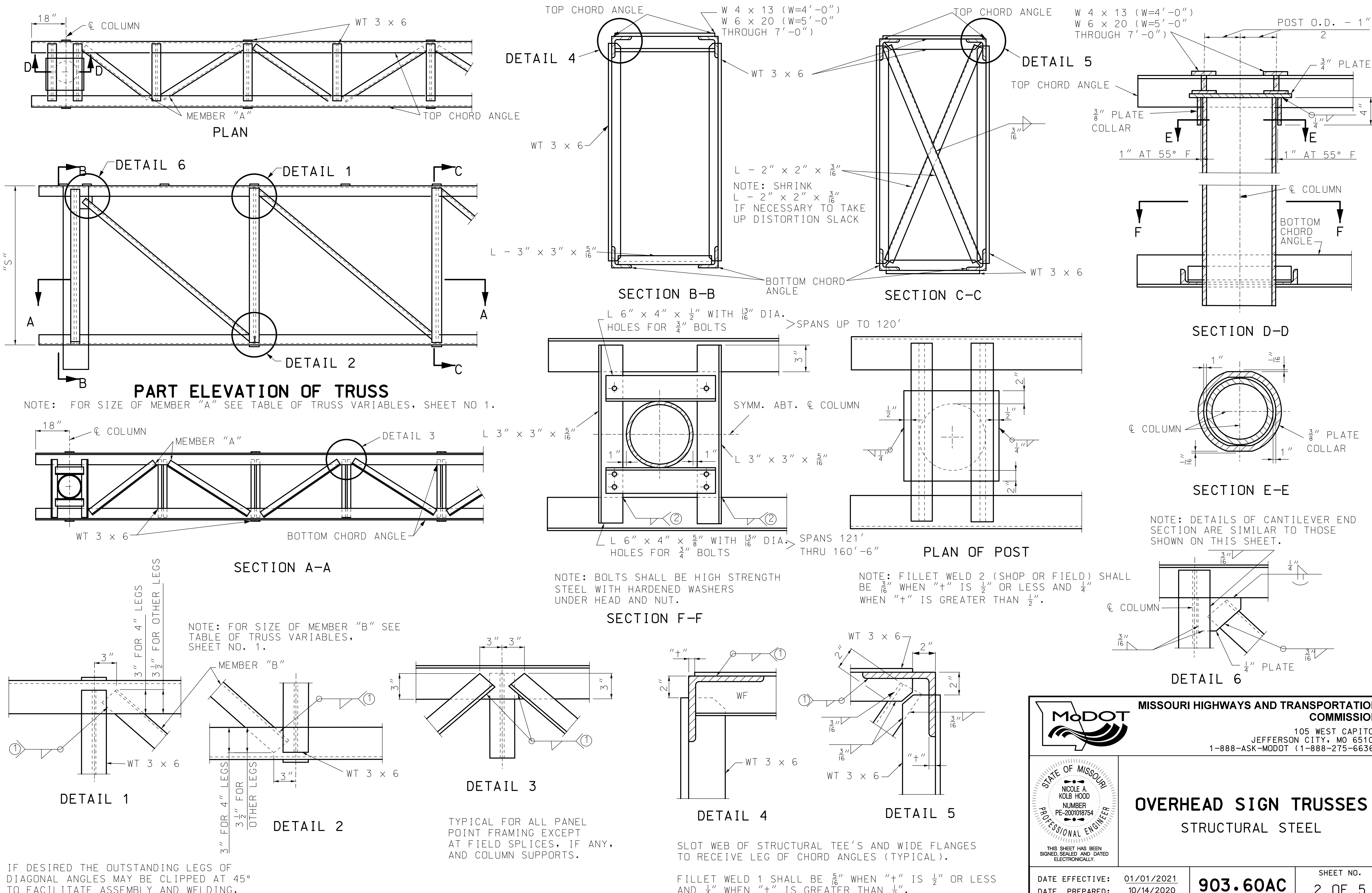
OVERHEAD SIGN TRUSSES
STRUCTURAL STEEL

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

903.60AC

SHEET NO. 1 OF 5

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



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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
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THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

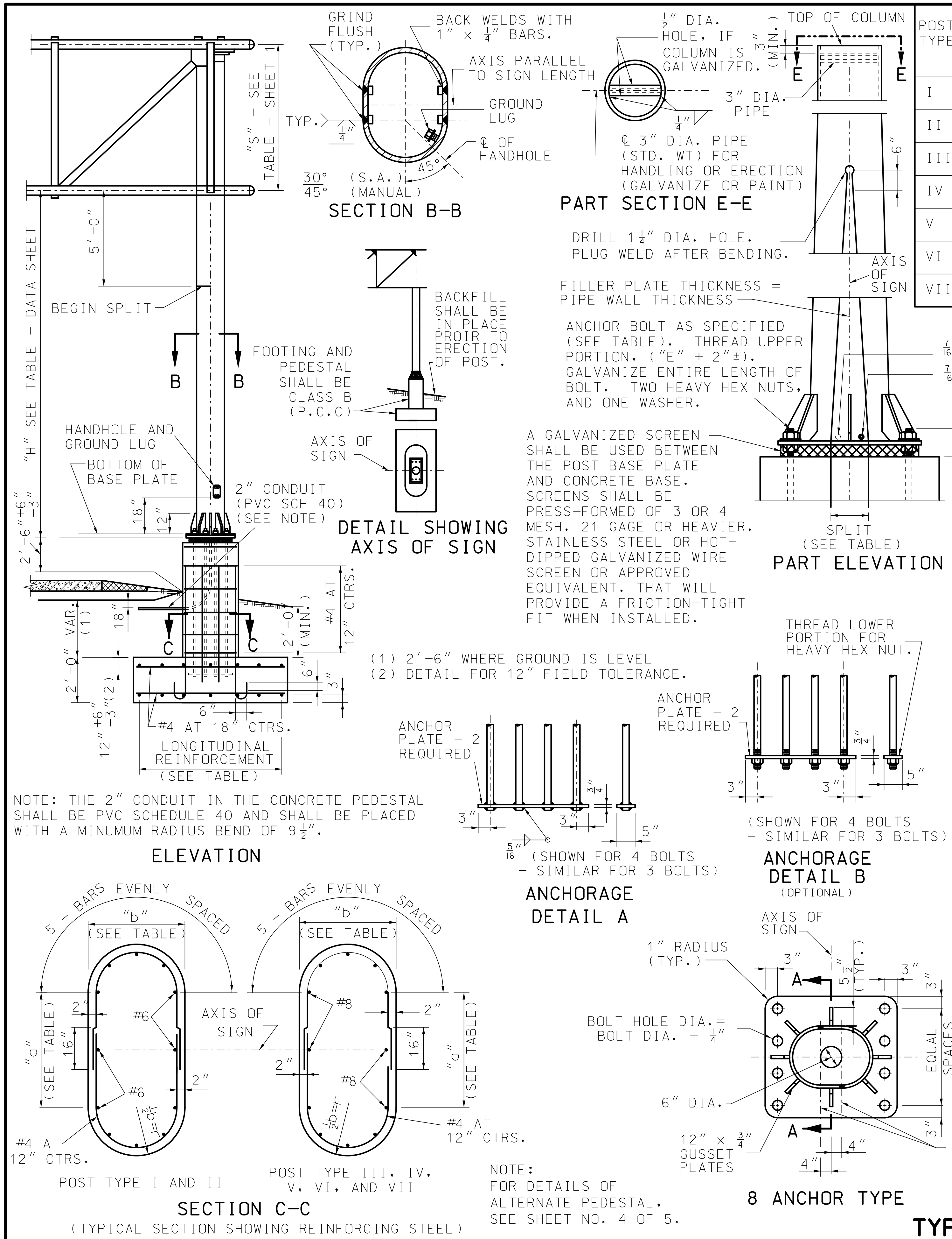
OVERHEAD SIGN TRUSSES

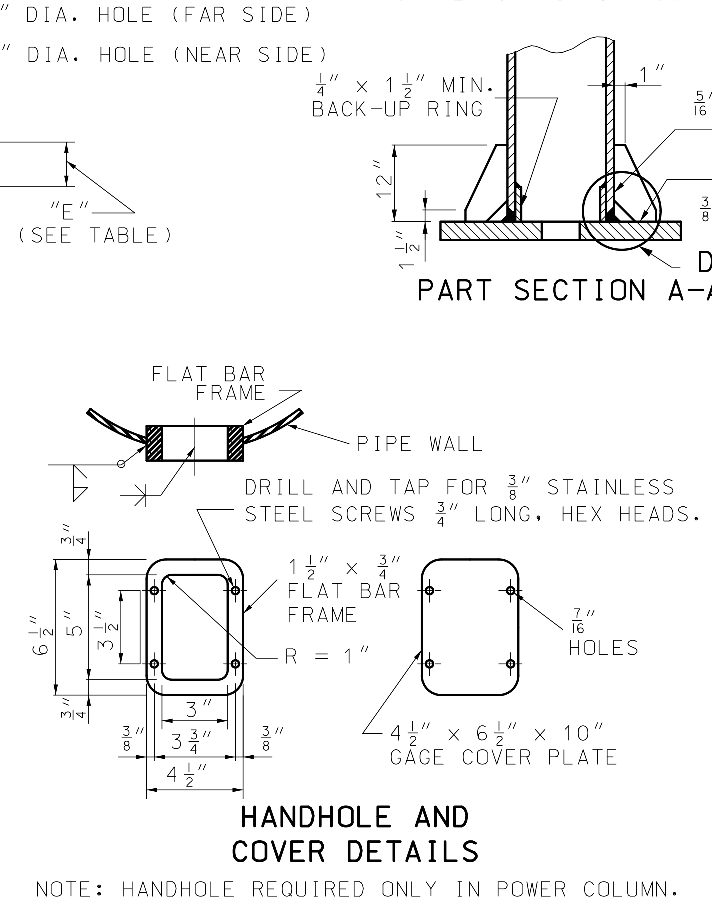
STRUCTURAL STEEL

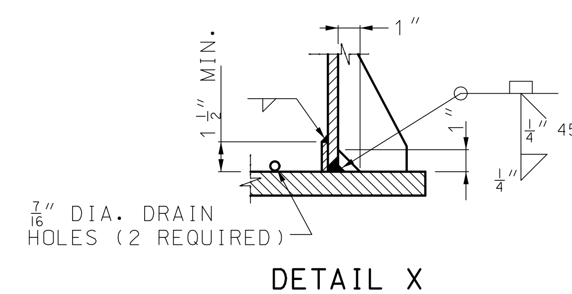
DATE EFFECTIVE:	01/01/2021	903.60AC	SHEET NO.
DATE PREPARED:	10/14/2020		2 OF 5

POST TYPE	PIPE COLUMN	DIMENSION "E"	SPLIT	BASE PLATE SIZE✳	ANCHOR BOLTS DIA.	PEDESTAL SIZE✳ a	PEDESTAL SIZE✳ b	FOOTING SIZE✳	LONGITUDINAL FOOTING REINFORCEMENT TOP	LONGITUDINAL FOOTING REINFORCEMENT BOTTOM	CONCRETE C.Y.
I	12" STD. AT 65.42	8½"	6"	2'-6"x 23"x 1½"	6 AT 2¼"	4'-0"	2'-11"	7'-0"x 14'-6"	7-#5 BARS	7-#6 BARS	10.9
II	14" O.D. AT 72.09	8½"	9½"	3'-0"x 2'-0"x 1½"	6 AT 2¼"	4'-4"	3'-0"	8'-0"x 16'-0"	8-#5 BARS	9-#6 BARS	13.2
III	16" O.D. AT 82.77	8¾"	11½"	3'-4"x 2'-2"x 1¾"	6 AT 2¼"	4'-8"	3'-2"	8'-6"x 17'-6"	9-#5 BARS	9-#7 BARS	15.2
IV	18" O.D. AT 93.45	9½"	12½"	3'-7"x 2'-4"x 2"	6 AT 2½"	5'-1"	3'-4"	9'-6"x 19'-0"	10-#5 BARS	10-#8 BARS	18.1
V	20" O.D. AT 104.13	9½"	13"	3'-10"x 2'-9"x 2"	8 AT 2½"	5'-4"	3'-9"	10'-0"x 20'-0"	10-#5 BARS	10-#8 BARS	20.6
VI	24" O.D. AT 125.49	9½"	10½"	4'-0"x 3'-3"x 2"	8 AT 2½"	5'-6"	4'-3"	10'-6"x 21'-0"	11-#5 BARS	11-#8 BARS	23.3
VII	24" O.D. AT 125.49	9½"	13½"	4'-3"x 3'-3"x 2"	8 AT 2½"	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 STEEEL 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.

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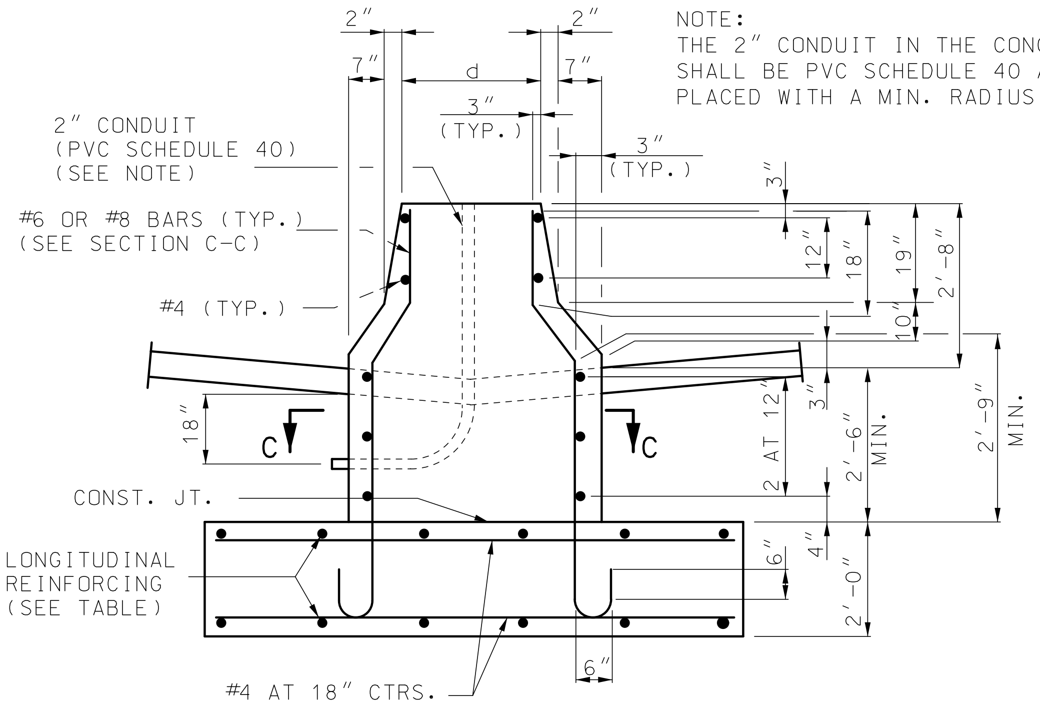
STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES

STRUCTURAL STEEL

DATE EFFECTIVE: 01/01/2021		903.60AC	SHEET NO. 3 OF 5
DATE PREPARED: 10/14/2020			

NOTE:
THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF 9½".



PART ELEVATION
(TYPE A CONCRETE TRAFFIC BARRIER)

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.

GENERAL NOTES:

A TAPERED TUBE OF EQUILVALENT 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.

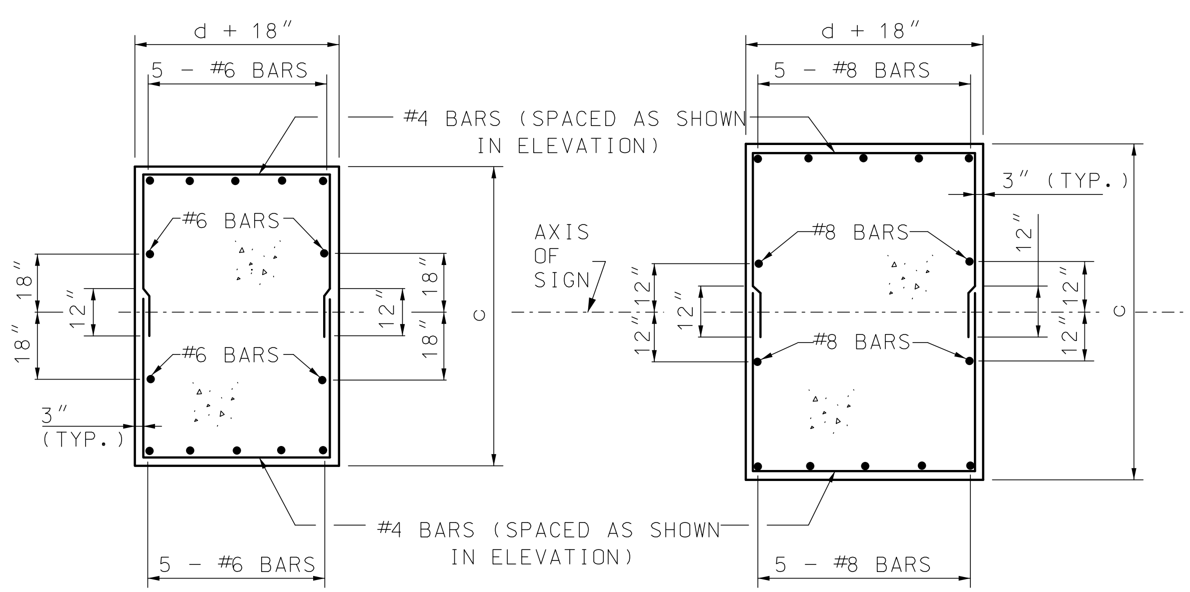
PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 5 FOR DETAILS OF THESE ITEMS.

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.

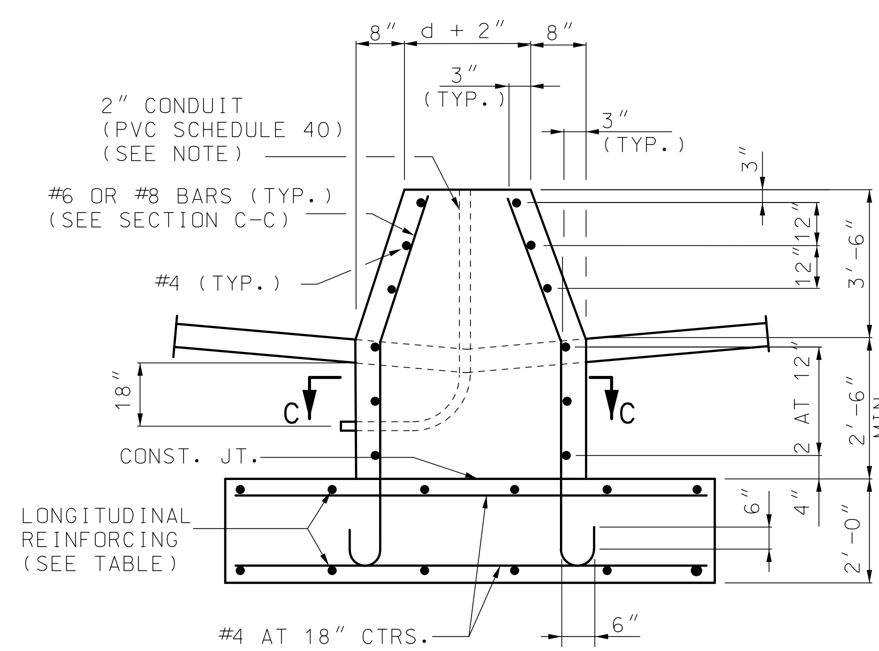


POST TYPE I AND II

POST TYPEIII, IV, V, VI, AND VII

SECTION C-C
TYPICAL SECTION SHOWING REINFORCING STEEL

NOTE:
THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF 9½".



PART ELEVATION
(TYPE C CONCRETE TRAFFIC BARRIER)

DETAILS OF ALTERNATE PEDESTAL

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

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 TRUSSES

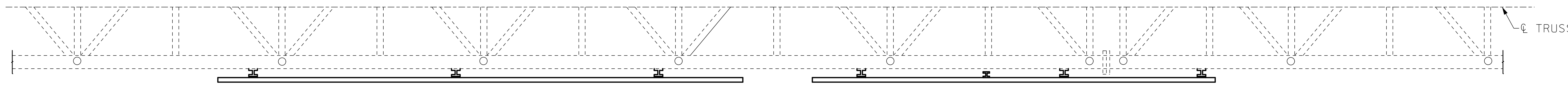
STRUCTURAL STEEL

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

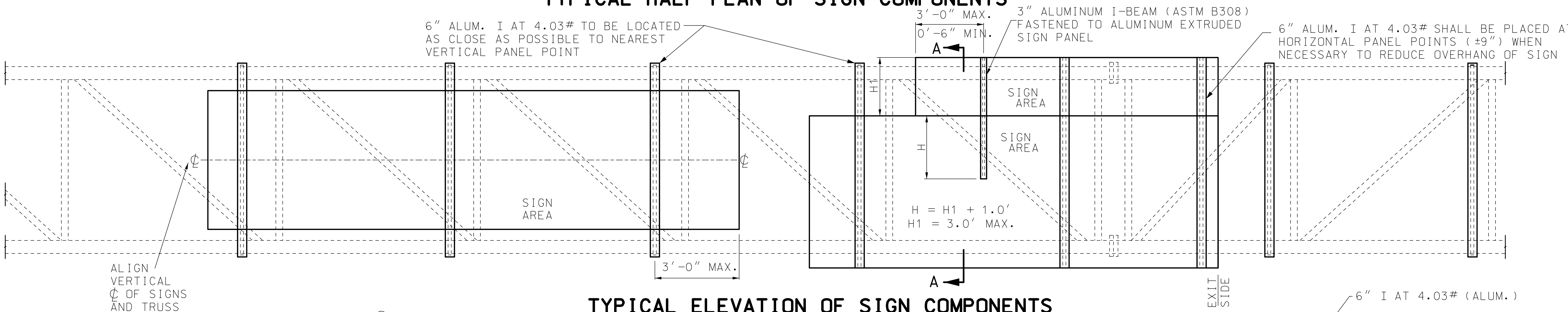
903.60AC

SHEET NO. 4 OF 5

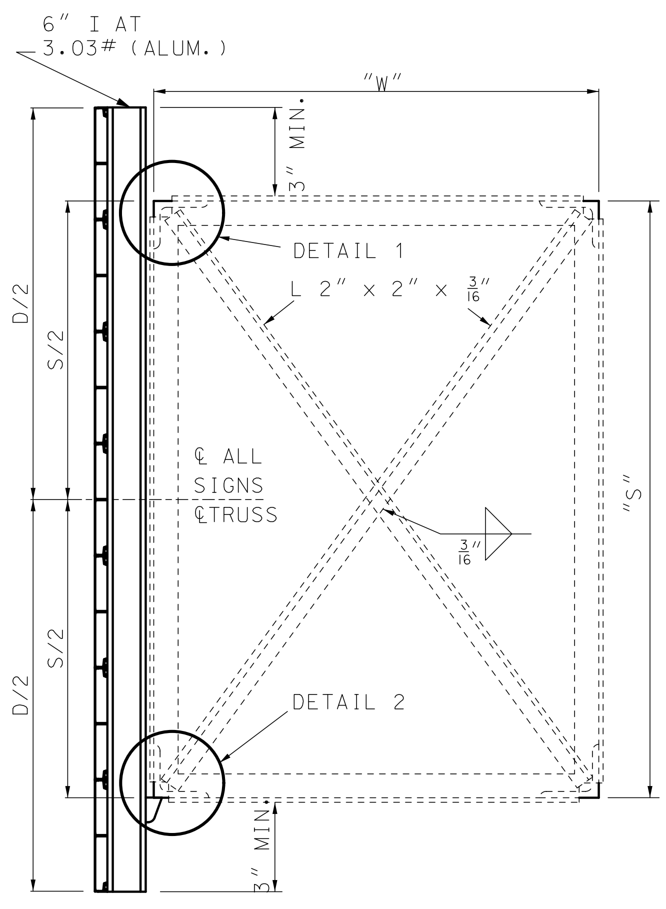
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPICAL HALF PLAN OF SIGN COMPONENTS



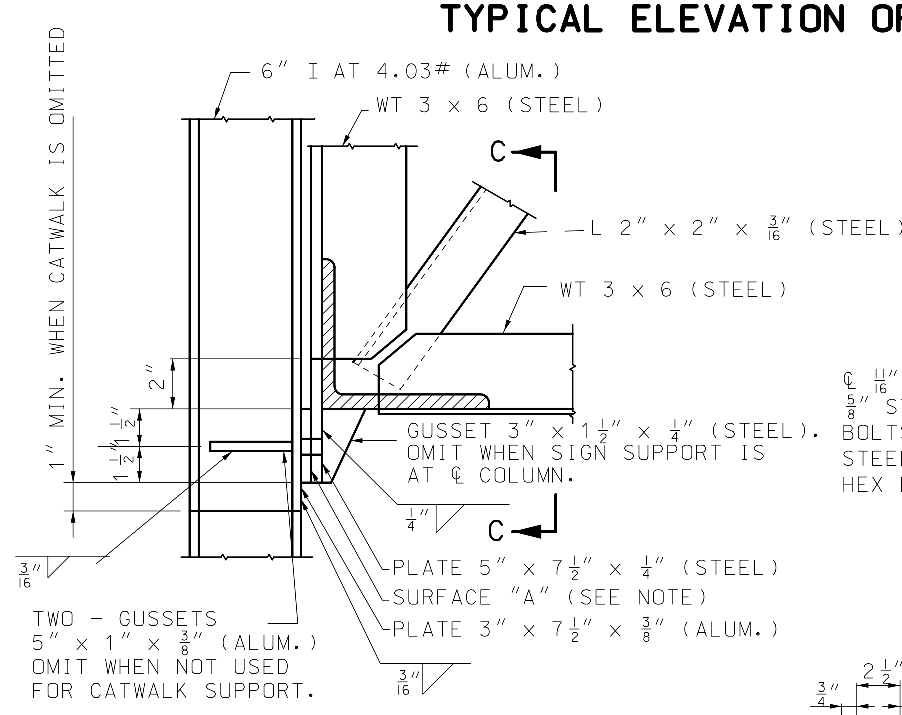
TYPICAL ELEVATION OF SIGN COMPONENTS



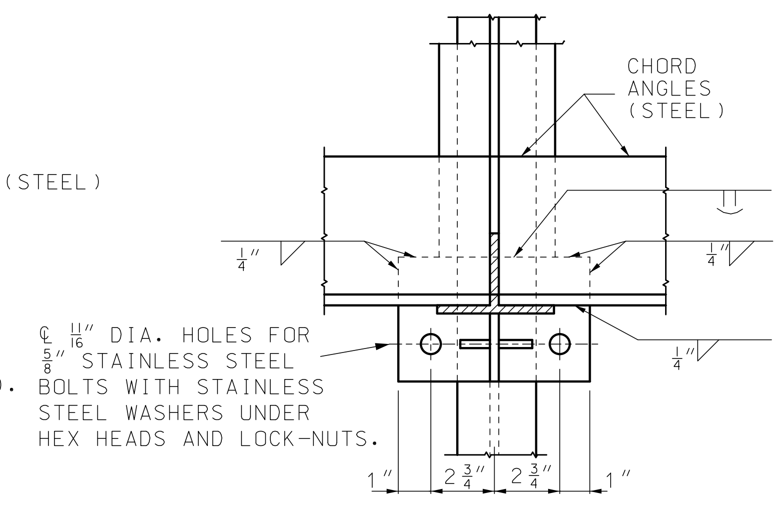
SECTION A-A

TYPICAL SECTION OF SIGN SUPPORT

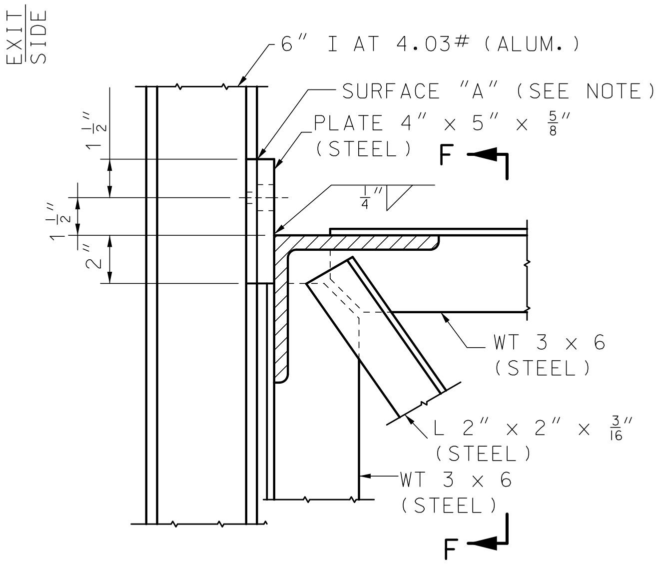
NOTE: "D" = GREATEST OVERALL DEPTH OF ANY SIGN OR SIGNS ON TRUSSES AND "S"= TRUSS DEPTH. SEE SHEET NO. 5 OF 7 FOR LOCATION OF SECTION A-A.



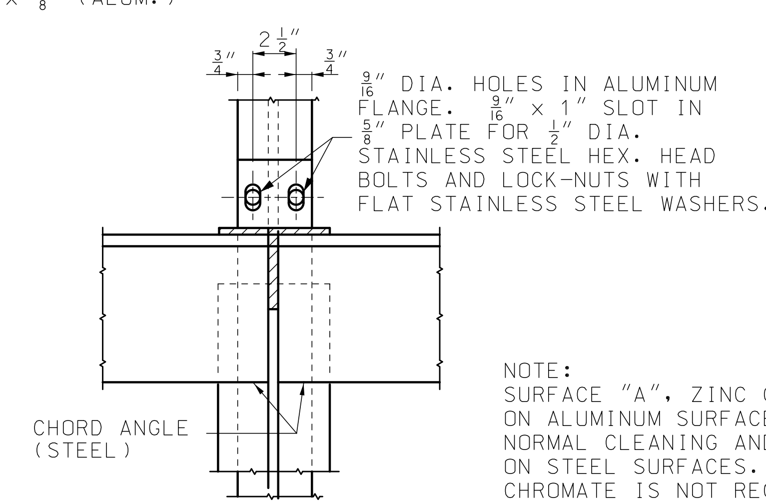
DETAIL 2



SECTION C-C



DETAIL 1



SECTION F-F

NOTE:
SURFACE "A", ZINC CHROMATE ON ALUMINUM SURFACES. NORMAL CLEANING AND PAINTING ON STEEL SURFACES. ZINC CHROMATE IS NOT REQUIRED WHEN STEEL IS GALVANIZED.

GENERAL NOTES:

EXIT NO. PANELS SHALL BE MOUNTED FLUSH WITH THE EXIT SIDE OF THE GUIDE SIGN.

ALL SIGNS SHALL BE CENTEREDVERTICALLY ABOUT THE HORIZONTAL ℄ OF THE TRUSS.

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