STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN DIVISION
SUITE 1300 JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-3848
(615) 741-2221

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

INSTRUCTIONAL BULLETIN NO. 16-02

Regarding Revised Standard Drawings

Effective June 24, 2016 letting (April 13, 2016 Turn-in), the following Standard Drawings have been revised. Also, Section V of the Roadway Design Guidelines has been revised to incorporate these changes.

DRAWING NUMBER	CURRENT REVISION DATE	DESCRIPTION
D-CB-25RA	01-27-16	STANDARD PRECAST 48” CIRCULAR NO. 25 CATCH BASIN (FOR USE WITH 6” MOUNTABLE CURB)
D-CB-25RB	01-27-16	STANDARD PRECAST CIRCULAR NO. 25 CATCH BASIN (FOR USE WITH 6” MOUNTABLE CURB)
D-MH-2	02-02-16	STANDARD MASONRY & PRECAST NO. 3 MANHOLE
D-PE-4	02-03-16	STRAIGHT CONCRETE ENDWALL
D-PE-24A	01-21-16	24” CONCRETE ENDWALL CROSSDRAIN
D-PE-30A	01-21-16	30” CONCRETE ENDWALL CROSSDRAIN WITH STEEL PIPE GRATE
D-FR-1	02-02-16	STANDARD PRECAST RISER
D-SLD-1	02-02-16	SLOTTED DRAINS
D-SLD-3	02-02-16	SLOTTED DRAINS
RD01-TS-1	02-05-16	DESIGN STANDARDS FOR LOCAL ROADS AND STREETS
RD01-TS-1A	02-05-16	DESIGN STANDARDS FOR LOW-VOLUME LOCAL

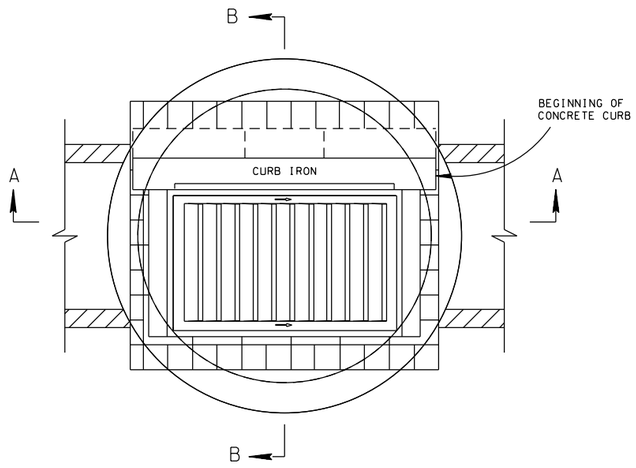
		ROADS (ADT<= 400)
RD01-TS-6	01-25-16	TYPICAL CURB AND GUTTER SECTIONS WITH SHOULDER
RD-UD-4	01-25-16	UNDERDRAIN LATERAL DETAILS
RP-H-8	02-05-16	PERPENDICULAR CURB RAMP PLACED OUTSIDE CURVE
RP-S-7	02-05-16	DETAILS FOR CONCRETE SIDEWALKS
RP-S-8	02-05-16	DETAILS FOR CONCRETE STEPS AND PIPE HANDRAILS
RP-S-9	02-05-16	ALTERNATE DETAILS FOR PEDESTRIAN FACILITIES
S-BPR-1	02-05-16	BIKE/PEDESTRIAN SAFETY RAIL
S-GRS-1	02-05-16	SPECIAL CASE LONG SPAN GUARDRAIL ONE POST OMITTED
S-PL-4	02-05-16	SAFETY PLAN FOR BRIDGE PIERS IN CLEAR ZONE
S-PL-6	02-08-16	SAFETY PLAN FOR BRIDGE PIERS IN CLEAR ZONE
S-RP-2	02-08-16	STANDARD CONCRETE RIGHT OF WAY MARKERS

A copy of the revised standard drawings is attached.

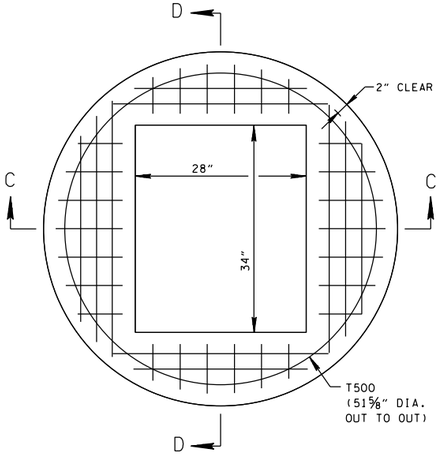
Jennifer Lloyd

Jennifer Lloyd, PE
Civil Engineering Director
Roadway Design Division

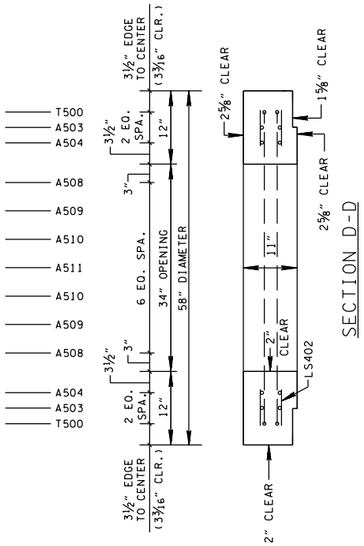
JKL:ARH
03/21/2016



PLAN VIEW



LID REINFORCING



SECTION D-D

CATCH BASIN MAXIMUM DEPTH NOTE
MAXIMUM DEPTH FOR THIS STRUCTURE IS 20.00'.

CATCH BASIN DIMENSIONS				FOR DESIGN USE ONLY CATCH BASIN MINIMUM DESIGN DEPTH (FEET)
INSIDE DIAMETER (D) OF PIPE (INCHES)	PIPE WALL THICKNESS (INCHES)	DIAMETER OF CUT-OUT HOLES (INCHES)	PRECAST SECTION MIN. HEIGHTS (INCHES)	
18	2½	25	49	3.88
24	3	32	56	4.42

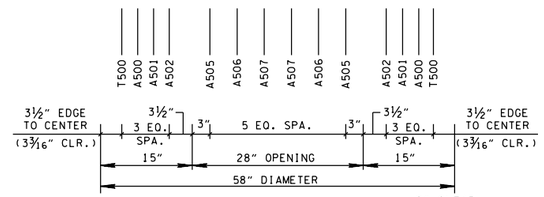
(1) CUT-OUT HOLES BASED ON REINFORCED CONCRETE PIPE WITH WALL TYPE "B".

(2) ALL FLEXIBLE PIPE MATERIALS REQUIRE GASKET. SEE STANDARD DRAWING D-PB-2.

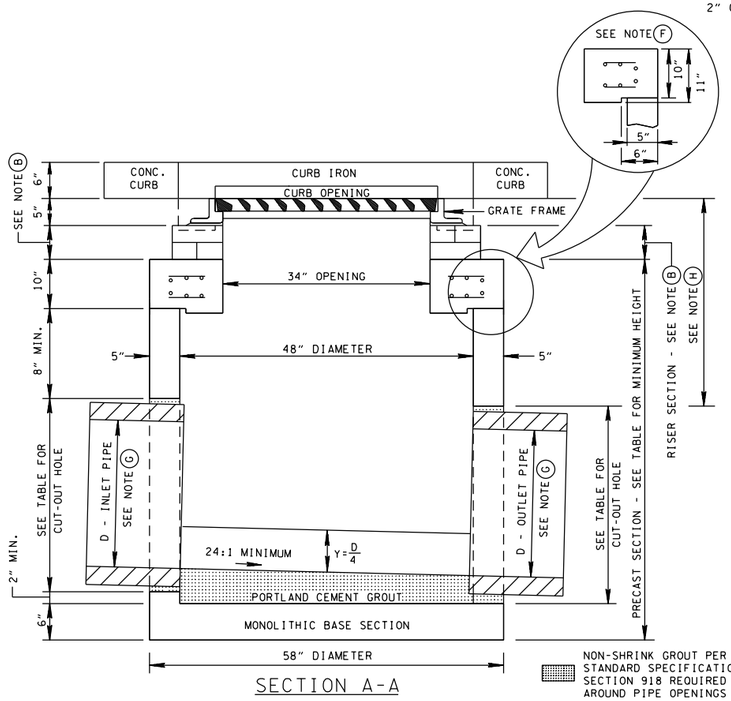
(3) CUT-OUT HOLES FOR PRECAST STRUCTURES TO BE FORMED IN ORDER TO OBTAIN A SMOOTH EDGED HOLE. SCORED OR ETCHED HOLES WITH REINFORCING STEEL LEFT UNCUT WILL NOT BE PERMITTED.

- REV. 12-18-95: CHANGED DRAWING NO. FROM D-CB-12RC TO D-CB-25RA. CHANGED BASE THICKNESS AND VERTICAL DEPTH REQUIREMENTS. ADDED HANDLING AND CUT-OUT HOLE NOTES.
- REV. 2-14-96: CHANGED SHEET NAME.
- REV. 12-18-96: REMOVED 0.5" PREMOLDED FIBER EXPANSION JOINT FROM SECTION "B-B". REMOVED OLD GENERAL NOTE (F). CHANGED LABEL OF LAST FOUR GENERAL NOTES.
- REV. 4-15-97: CHANGED CATCH BASIN DIMENSION TABLE.
- REV. 1-19-99: CHANGED MINMUM DEPTH TABLE AND DRAWING IN GENERAL TO REFLECT REDUCTION IN INVERT DROP ACROSS CATCH BASIN.
- REV. 12-18-99: MODIFIED CATCH BASIN DIMENSION TABLE.
- REV. 5-27-01: CHANGED PAY ITEMS IN GENERAL NOTE (I). ADDED CATCH BASIN MAXIMUM DEPTH NOTE.

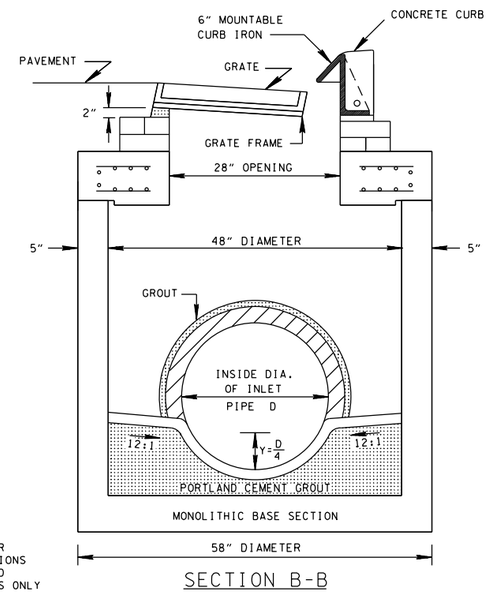
  REV. 8-01-12: REVISED CATCH BASIN LID FOR COMPLIANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION WITH INTERIMS. REVISED REINFORCING, GENERAL NOTES AND ADDITIONAL MISC. DRAFTING EDITS.
- REV. 9-24-12: MODIFIED TOP SLAB AND MINIMUM DEPTH.
- REV. 3-11-14: ELIMINATED STIRRUPS.
- REV. 1-27-16: CORRECTED GENERAL NOTE (J)



SECTION C-C



SECTION A-A



SECTION B-B

GENERAL NOTES

(A) ALL PRECAST ELEMENTS TO MEET ASTM C478 (CURRENT EDITION) AND AASHTO M199 (CURRENT EDITION) UNLESS SUPERSEDED BY THIS DRAWING.

CONCRETE: f'_c = 4,000 POUNDS PER SQUARE INCH AT 28 DAYS
REINFORCING STEEL: ASTM A615, F_y = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.

(B) THIS DIMENSION MAY VARY FROM A MINIMUM OF 0 INCHES TO A MAXIMUM OF 24 INCHES AS LONG AS 23 INCHES IS SATISFIED. THE CONTRACTOR HAS THE OPTION OF USING BRICK OR STANDARD PRECAST CONCRETE RISER FRAMES. THE USE OF BRICK SHALL BE LIMITED TO 6 INCHES. IF THIS DIMENSION EXCEEDS 6 INCHES, PRECAST CONCRETE RISER FRAMES SHALL BE USED AS SHOWN ON STANDARD DRAWING D-RF-1.

(C) PRECAST CATCH BASIN UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED CATCH BASIN UNITS AT HIS OWN EXPENSE.

(D) APPROPRIATE SIZING AND LOCATION OF LIFTING DEVICES SHALL BE THE RESPONSIBILITY OF THE FABRICATOR.

(E) THE CONTRACTOR IS TO PATCH ALL LIFTING DEVICE HOLES WITH GROUT AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.

(F) ALTERNATIVE JOINT DETAILS MAY BE ACCEPTABLE. SEE STANDARD DRAWING D-CB-99R FOR ADDITIONAL DETAILS.

(G) SEE ROADWAY PLANS DRAINAGE TABULATION FOR PIPE INLET AND OUTLET ELEVATIONS. IF NEEDED, INVERT ELEVATIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER IN ORDER TO ACCOMMODATE INLET AND OUTLET PIPES.

(H) FOR CASES WHERE THE OUTLET PIPE DIAMETER IS LARGER THAN THE INLET PIPE DIAMETER, A MINIMUM 23 INCH DEPTH SHALL BE MAINTAINED ABOVE THE OUTLET PIPE.

(I) SEE STANDARD DRAWING D-CBB-12B FOR DETAILS REGARDING CAST IRON GRATES, FRAMES AND CURB INLETS.

(J) SEE STANDARD DRAWING D-CB-25RB FOR DETAILS REGARDING 60" AND LARGER CIRCULAR NO. 25 CATCH BASIN (FOR USE WITH 6" MOUNTABLE CURB).

(K) PAY DEPTH MEASUREMENT MADE FROM TOP OF GRATE TO OUTLET FLOW ELEVATION. PAYMENT FOR CATCH BASIN WILL BE MADE UNDER ITEM NUMBERS 611-25.01 CATCH BASINS, TYPE 25, 0'-4' DEPTH THROUGH 611-25.05 CATCH BASINS, TYPE 25, > 16'-20' DEPTH PER EACH. PAYMENT INCLUDES RISER SECTION AND GRATE.

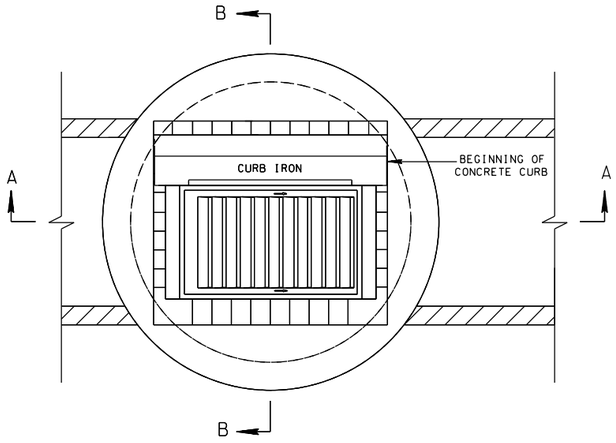
☒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

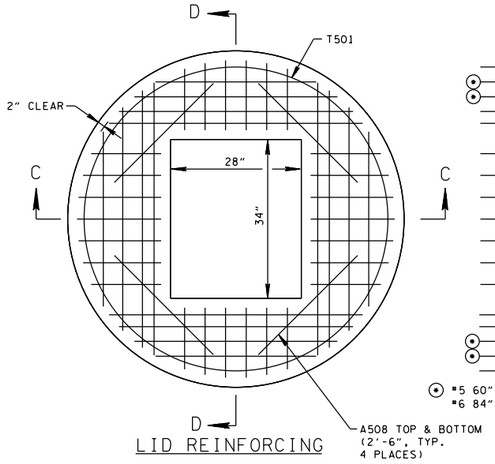
STANDARD PRECAST 48" CIRCULAR NO. 25 CATCH BASIN

(FOR USE WITH 6" MOUNTABLE CURB)

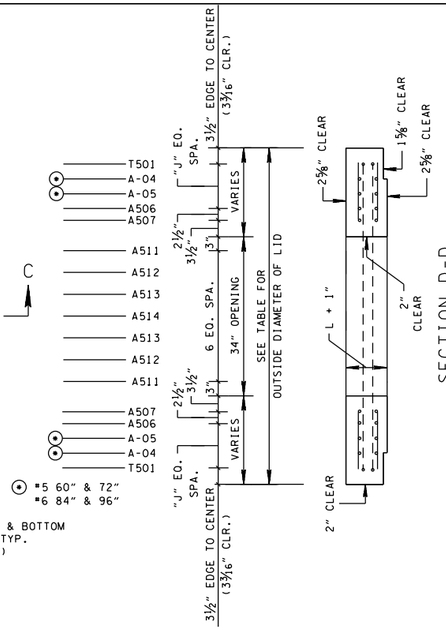
NOT TO SCALE | 5-27-95 | D-CB-25RA



PLAN VIEW



LID REINFORCING



SECTION D-D

REV. 3-11-14: ELIMINATED STIRRUPS.

REV. 1-27-16: CORRECTED GENERAL NOTE (J)

REV. 1-19-99: CHANGED MINIMUM DEPTH TABLE AND DRAWING IN GENERAL TO REFLECT REDUCTION IN INVERT DROP ACROSS CATCH BASIN.

REV. 5-27-01: CHANGED PAY ITEMS IN GENERAL NOTE (1) ADDED CATCH BASIN MAXIMUM DEPTH NOTE. CHANGED REINFORCING STEEL IN LID.

REV. 8-01-12: REVISED CATCH BASIN LID FOR COMPLIANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION WITH INTERIMS. REVISED REINFORCING, GENERAL NOTES AND ADDITIONAL MISC. DRAFTING EDITS.

REV. 9-24-12: MODIFIED TOP SLAB AND MINIMUM DEPTH.

CATCH BASIN MAXIMUM DEPTH NOTE
MAXIMUM DEPTH FOR THIS STRUCTURE IS 40.00'.

CATCH BASIN DIMENSIONS											
INSIDE DIAMETER (D) OF PIPE (INCHES)	PIPE WALL THICKNESS (INCHES)	DIAMETER OF CUT-OUT HOLES (INCHES)	PRECAST SECTION MIN. HEIGHTS (INCHES)				FOR DESIGN USE ONLY CATCH BASIN MINIMUM DESIGN DEPTH (FEET)				
			60"	72"	84"	96"	60"	72"	84"	96"	
18	2½	25	51½	53	57½	59	3.92	3.97	4.34	4.38	(1)
24	3	32	58½	60	64½	66	4.46	4.51	4.88	4.92	
30	3½	39	65½	67	71½	73	5.00	5.05	5.42	5.46	
36	4	46	72½	74	78½	80	5.55	5.59	5.97	6.00	
42	4½	53	79½	81	85½	87	6.09	6.13	6.51	6.54	
48	5	60	86½	88	92½	94	6.63	6.67	7.05	7.08	
54	5½	67	93½	95	99½	101	7.17	7.22	7.59	7.63	
60	6	74	100½	102	106½	108	7.71	7.76	8.13	8.17	
66	6½	81	107½	109	113½	115	8.25	8.30	8.67	8.71	

(1) CUT-OUT HOLES BASED ON REINFORCED CONCRETE PIPE WITH WALL TYPE "B".

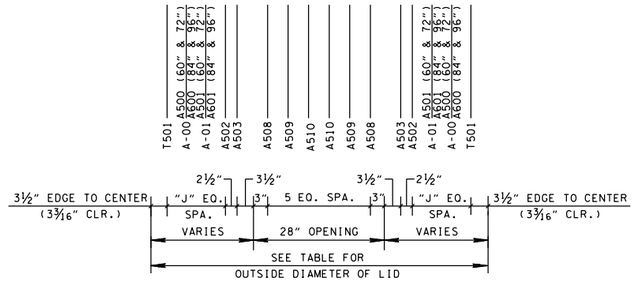
(2) ALL FLEXIBLE PIPE MATERIALS REQUIRE GASKET. SEE STANDARD DRAWING D-PB-2.

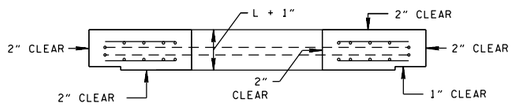
(3) CUT-OUT HOLES FOR PRECAST STRUCTURES TO BE FORMED IN ORDER TO OBTAIN A SMOOTH EDGED HOLE. SCORED OR ETCHED HOLES WITH REINFORCING STEEL LEFT UNCUT WILL NOT BE PERMITTED.

VARIABLE REINFORCING DIMENSIONS AND SPACING IN CONCRETE LID		
INSIDE DIA. OF CATCH BASIN (INCHES)	OUTSIDE DIA. OF LID (INCHES)	NO. OF EQUAL SPACES "J"
60	72	3
72	86	4
84	100	5
96	114	6

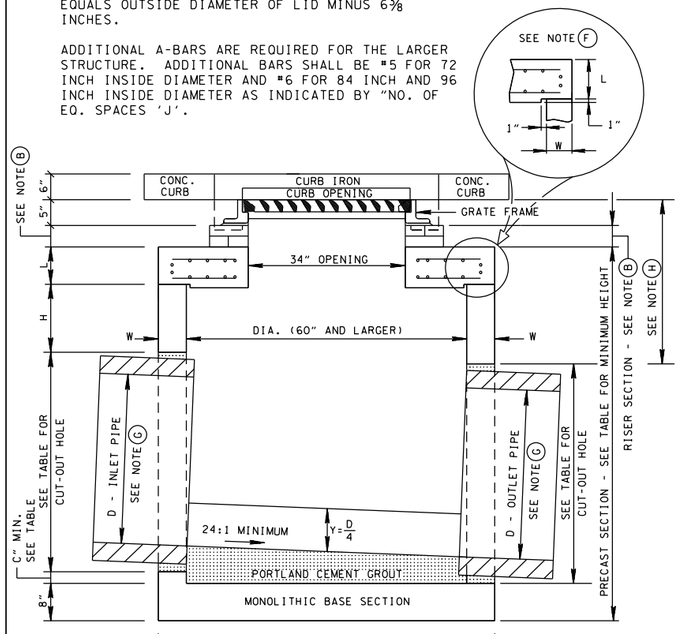
OUT-TO-OUT DIAMETER FOR T501 REINFORCING BARS EQUALS OUTSIDE DIAMETER OF LID MINUS 6⅜ INCHES.

ADDITIONAL A-BARS ARE REQUIRED FOR THE LARGER STRUCTURE. ADDITIONAL BARS SHALL BE #5 FOR 72 INCH INSIDE DIAMETER AND #6 FOR 84 INCH AND 96 INCH INSIDE DIAMETER AS INDICATED BY "NO. OF EQ. SPACES 'J'.



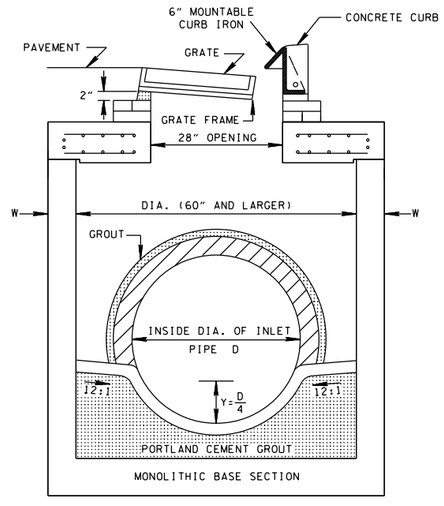


SECTION C-C



SECTION A-A

NON-SHRINK GROUT PER STANDARD SPECIFICATIONS SECTION 918 REQUIRED AROUND PIPE OPENINGS ONLY



SECTION B-B

GENERAL NOTES

(A) ALL PRECAST ELEMENTS TO MEET ASTM C478 (CURRENT EDITION) AND AASHTO M199 (CURRENT EDITION) UNLESS SUPERSEDED BY THIS DRAWING.

CONCRETE: f'_c = 4,000 POUNDS PER SQUARE INCH AT 28 DAYS
REINFORCING STEEL: ASTM A615, F_y = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.

(B) THIS DIMENSION MAY VARY FROM A MINIMUM OF 0 INCHES TO A MAXIMUM OF 24 INCHES AS LONG AS 23 INCHES (FOR 60 OR 72 INCH INSIDE DIAMETER CATCH BASIN) OR 27 INCHES (FOR 84 OR 96 INCH INSIDE DIAMETER CATCH BASIN) IS SATISFIED. THE CONTRACTOR HAS THE OPTION OF USING BRICK OR STANDARD PRECAST CONCRETE RISER FRAMES. THE USE OF BRICK SHALL BE LIMITED TO 6 INCHES. IF THIS DIMENSION EXCEEDS 6 INCHES, PRECAST CONCRETE RISER FRAMES SHALL BE USED AS SHOWN ON STANDARD DRAWING D-RF-1.

(C) PRECAST CATCH BASIN UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED CATCH BASIN UNITS AT HIS OWN EXPENSE.

(D) APPROPRIATE SIZING AND LOCATION OF LIFTING DEVICES SHALL BE THE RESPONSIBILITY OF THE FABRICATOR.

(E) THE CONTRACTOR IS TO PATCH ALL LIFTING DEVICE HOLES WITH GROUT AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.

(F) ALTERNATIVE JOINT DETAILS MAY BE ACCEPTABLE. SEE STANDARD DRAWING D-CB-99R FOR ADDITIONAL DETAILS.

(G) SEE ROADWAY PLANS DRAINAGE TABULATION FOR PIPE INLET AND OUTLET ELEVATIONS. IF NEEDED, INVERT ELEVATIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER IN ORDER TO ACCOMMODATE INLET AND OUTLET PIPES.

(H) FOR CASES WHERE THE OUTLET PIPE DIAMETER IS LARGER THAN THE INLET PIPE DIAMETER, A MINIMUM 23 INCH DEPTH (FOR 60 OR 72 INCH INSIDE DIAMETER CATCH BASIN) OR 27 INCH DEPTH (FOR 84 OR 96 INCH INSIDE DIAMETER CATCH BASIN) SHALL BE MAINTAINED ABOVE THE OUTLET PIPE.

(I) SEE STANDARD DRAWING D-CBB-12B FOR DETAILS REGARDING CAST IRON GRATES, FRAMES AND CURB INLETS.

(J) SEE STANDARD DRAWING D-CB-25RA FOR DETAILS REGARDING 48" CIRCULAR NO. 25 CATCH BASIN (FOR USE WITH 6" MOUNTABLE CURB).

(K) PAY DEPTH MEASUREMENT MADE FROM TOP OF GRATE TO OUTLET FLOW ELEVATION. PAYMENT FOR CATCH BASIN WILL BE MADE UNDER ITEM NUMBERS 611-25.01 CATCH BASINS, TYPE 25, 0'-4' DEPTH THROUGH 611-25.07, CATCH BASINS, TYPE 25, > 24'-28' DEPTH PER EACH. PAYMENT FOR CATCH BASINS DEEPER THAN 28' WILL BE MADE UNDER ITEM NUMBER 611-25.08, CATCH BASINS, TYPE 25, ____'- ____' DEPTH PER EACH. PAYMENT INCLUDES RISER SECTION AND GRATE.

CATCH BASIN DIMENSIONS							
INSIDE DIA. OF CATCH BASIN DIA. (INCHES)	WALL THICKNESS W (INCHES)	LID THICKNESS L (INCHES)	OUTSIDE DIA. OF CATCH BASIN DIA. + 2W (INCHES)	MAX. INLET OR OUTLET CONC. PIPE SIZE - STR. (INCHES)	MAX. INLET OR OUTLET CONC. PIPE SIZE - 90° (INCHES)	DIMENSION	
						C (INCHES)	H (INCHES)
60	6	10	72	36	24	2.5	8
72	7	10	86	48	30	3.0	8
84	8	10	100	60	36	3.5	12
96	9	10	114	66	42	4.0	12

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

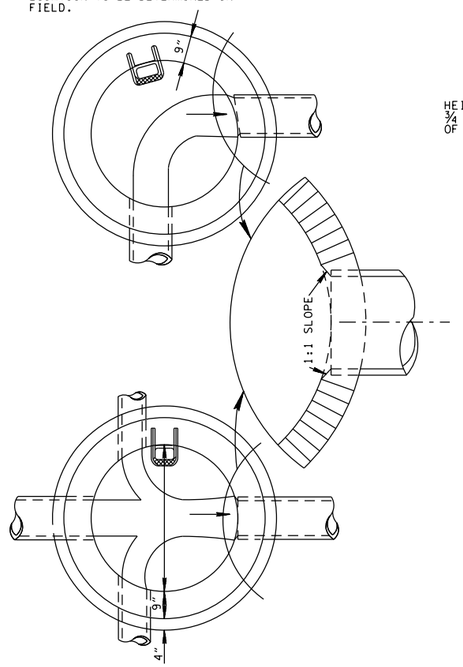
STANDARD PRECAST CIRCULAR NO. 25 CATCH BASIN

(FOR USE WITH 6" MOUNTABLE CURB)

NOT TO SCALE | 12-18-93 | D-CB-25RB

NOTE:

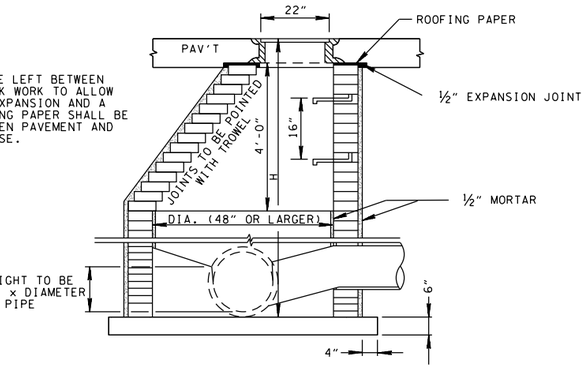
PIPE OFF CENTER. EXACT LOCATION TO BE DETERMINED IN FIELD.



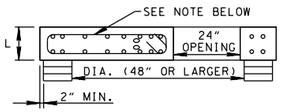
TYPICAL PLANS

NOTE:

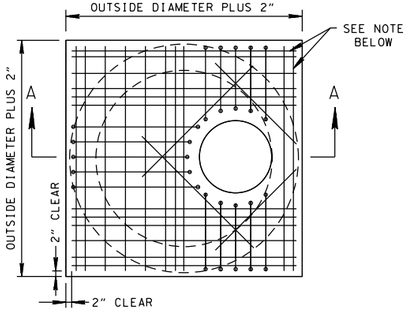
½" SPACE TO BE LEFT BETWEEN FRAME AND BRICK WORK TO ALLOW FOR PAVEMENT EXPANSION AND A LAYER OF ROOFING PAPER SHALL BE REQUIRED BETWEEN PAVEMENT AND TOP BRICK COURSE.



BRICK MANHOLE WITH ECCENTRIC TAPER



SECTION A-A



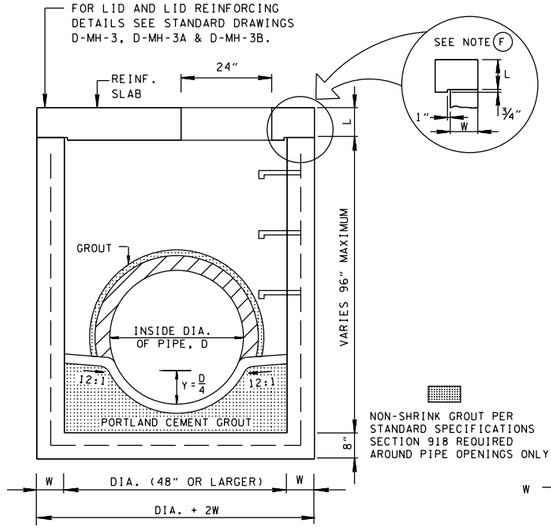
LID REINFORCING

COST OF REINFORCED CONCRETE SLAB TO BE INCLUDED IN PRICE BID FOR MANHOLE OF REQUIRED DEPTH.

SHALLOW BRICK MANHOLE TOP SLAB DETAIL

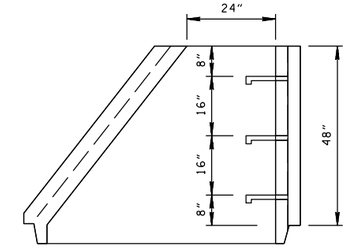
WHEN MANHOLES OF BRICK ARE TOO SHALLOW TO SECURE PROPER BATTER, THE WALLS SHALL BE BUILT VERTICALLY AND THE STRUCTURE CAPPED WITH A CONCRETE SLAB WITH HOLE FOR MANHOLE FRAME LOCATED ECCENTRICALLY IN THE SLAB. SEE TABLE FOR LID THICKNESS, (L). REINFORCEMENT IN THE TOP SLAB SHALL BE PROVIDED AS DETAILED ON STANDARD DRAWINGS D-MH-3, FOR THE APPROPRIATE DIAMETER OF MANHOLE, WITH THE FOLLOWING EXCEPTIONS. T-BARS SPECIFIED AT OUTER EDGE OF SLAB SHALL BE REPLACED BY A-BARS OF THE SAME SIZE AND ALL REINFORCING SHALL EXTEND TO THE EDGE OF THE SLAB WITH 2 INCHES CLEAR AT ENDS.

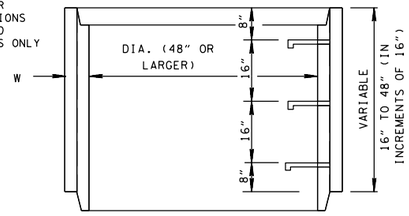
FOR LID AND LID REINFORCING DETAILS SEE STANDARD DRAWINGS D-MH-3, D-MH-3A & D-MH-3B.

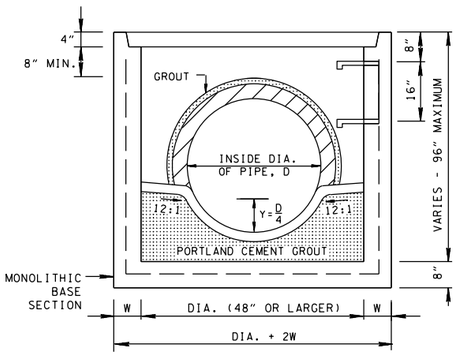


NON-SHRINK GROUT PER STANDARD SPECIFICATIONS SECTION 918 REQUIRED AROUND PIPE OPENINGS ONLY

STANDARD FLAT TOP MANHOLE







STANDARD ECCENTRIC CONCRETE RISER SECTION AND BASE SECTION

GENERAL NOTES

(A) THIS MANHOLE WILL CONFORM TO THE STANDARD DRAWING UNLESS OTHERWISE SHOWN OR DIRECTED BY THE ENGINEER TO MEET SPECIAL CONDITIONS. THERE WILL BE NO VARIATION FROM THE CONTRACT PRICE DUE TO SUCH CHANGES. IN ALL CASES IT MUST BE BUILT LARGE ENOUGH TO ACCOMMODATE INLET AND OUTLET PIPES.

(B) THE PRECAST CONCRETE MANHOLE SHALL MEET THE REQUIREMENTS AND SPECIFICATIONS SET OUT IN ASTM-C478 LATEST REVISION.

(C) THE FOLLOWING MATERIAL PROPERTIES ARE REQUIRED FOR MANHOLES:

CONCRETE: f'_c = 4,000 POUNDS PER SQUARE INCH AT 28 DAYS
REINFORCING STEEL: ASTM A615, F_y = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.

(D) FOR MASONRY MANHOLES, ALL WALLS WILL BE LAID IN COURSES CONSISTING OF HEADERS ONLY.

(E) THE COST OF CASTINGS FOR COVERS AND RIMS AND OF MANHOLE STEPS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR MANHOLES.

(F) ALTERNATIVE JOINT DETAILS MAY BE ACCEPTABLE. SEE STANDARD DRAWING D-CB-99R FOR ADDITIONAL DETAILS.

(G) THE PLACING OF CONCRETE AND FORMING OF INVERTS AS INDICATED FOR BRICK MANHOLES SHALL APPLY IN LIKE MANNER FOR PRECAST MANHOLES. COST OF FURNISHING AND PLACING THE CONCRETE TO BE INCLUDED IN UNIT PRICE BID PER MANHOLE.

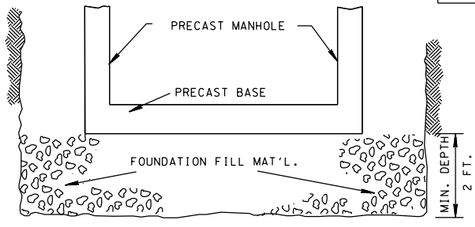
(H) PAYMENT FOR BRICK MANHOLES WILL BE MADE UNDER ITEM NUMBERS 611-01.02 MANHOLES, > 4'-8' DEPTH AND 611-01.03, MANHOLES, > 8'-12' DEPTH PER EACH.

(I) PAYMENT FOR PRECAST CONCRETE CIRCULAR MANHOLES WILL BE MADE UNDER ITEM NUMBERS 611-01.02 MANHOLES, > 4'-8' DEPTH THROUGH 611-01.07, MANHOLES, > 24'-28' DEPTH PER EACH. PAYMENT FOR MANHOLES DEEPER THAN 28' WILL BE MADE UNDER ITEMS NUMBERS 611-01.10 THROUGH 611-01.19, MANHOLE ____' TO ____' DEPTH PER EACH.

MANHOLE MAXIMUM DEPTH NOTES

(1) MAXIMUM DEPTH FOR BRICK MANHOLES IS 12.00'.

(2) MAXIMUM DEPTH FOR PRECAST CONCRETE CIRCULAR MANHOLES IS 40.00'.



FOUNDATION DETAIL FOR PRECAST BASE

NOTE:

COST OF FURNISHING AND PLACING FOUNDATION FILL MATERIAL TO BE INCLUDED IN UNIT PRICE BID FOR 611-01.XX, MANHOLES. FOUNDATION FILL MATERIAL SHALL BE IN CONFORMANCE WITH SECTION 204 OF THE T.D.O.T. STANDARD SPECIFICATIONS.

CUT-OUT HOLES		
INSIDE DIAMETER (D) OF PIPE (INCHES)	PIPE WALL THICKNESS (INCHES)	DIAMETER OF CUT-OUT HOLES (INCHES)
18	2½	25
24	3	32
30	3½	39
36	4	46
42	4½	53
48	5	60
54	5½	67
60	6	74
66	6½	81
72	7	88
78	7½	95

(1) CUT-OUT HOLES BASED ON REINFORCED CONCRETE PIPE WITH WALL TYPE "B".

(2) ALL FLEXIBLE PIPE MATERIALS REQUIRE GASKET. SEE STANDARD DRAWING D-PB-2.

(3) CUT-OUT HOLES FOR PRECAST STRUCTURES TO BE FORMED IN ORDER TO OBTAIN A SMOOTH EDGED HOLE. SCORED OR ETCHED HOLES WITH REINFORCING STEEL LEFT UNCUT WILL NOT BE PERMITTED.

MANHOLE DIMENSIONS					
INSIDE DIA. OF MANHOLE DIA. (INCHES)	WALL THICKNESS W (INCHES)	LID THICKNESS L (INCHES)	OUTSIDE DIA. OF MANHOLE DIA. + 2W (INCHES)	MAX. INLET OR OUTLET CONC. PIPE SIZE - STR. (INCHES)	MAX. INLET OR OUTLET CONC. PIPE SIZE - 90° (INCHES)
48	5	8	58	24	15
60	6	8	72	36	24
72	7	9	86	48	30
84	8	9	100	60	36
96	9	10	114	66	42
108	10	10	128	72	48
120	11	10	142	78	54

REV. 11-20-72: WALL THICKNESS DELETED ON PRECAST SECTIONS.

REV. 1-15-73: ENTRANCE TO OUTLET PIPE BEVELED.
REV. 2-1-73: SKETCH ADDED SHOWING BEVELED ENTRY.
REV. 1-1-76: CHANGED DWG. NO. FROM S-M-3 TO D-MH-3 (MASONRY DETAILS ADAPTED FROM OLD DWG. NO. S-M-2a).

REV. 7-2-84: ADDED NOTE TO FOUNDATION DETAIL.

☒ REV.7-29-96: REDREW SHEET ON CADD AND MADE MINOR CHANGES.

☒ REV. 1-19-97: ADDED GENERAL NOTE (G) ADDED CUT-OUT HOLE TABLE. ADDED MANHOLE DIMENSION TABLE.

☒ REV. 4-15-97: CHANGED MANHOLE DIMENSION TABLE.

☒ REV. 5-1-97: CHANGED DRAWING NO. FROM D-MH-3 TO D-MH-2. CHANGED BASE SECTION TO MONOLITHIC BASE SECTION.

☒ REV. 5-27-97: ADDED 108 AND 120 INCH DIAMETER MANHOLES.

☒ REV. 5-27-01: CHANGED GENERAL NOTE (C) AND ADDED GENERAL NOTE (H) ADDED MANHOLE MAXIMUM DEPTH NOTES.

REV. 8-01-12: REVISED CUT-OUT HOLES TABLE, SHALLOW BRICK MANHOLE TOP SLAB DETAIL AND ADDITIONAL MISC. DRAFTING EDITS. ADDED 48" MANHOLE.

☒ REV. 2-2-16: CORRECTED SHALLOW BRICK MANHOLE TOP SLAB DETAIL NOTE.

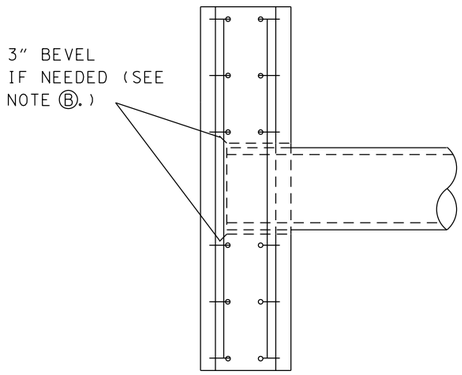
☒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

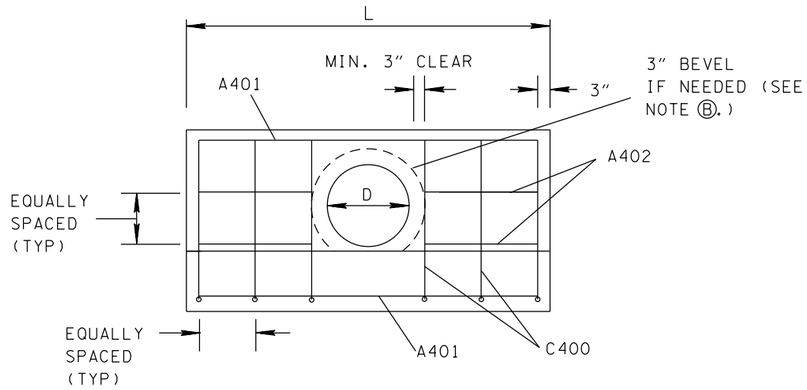
STANDARD MASONRY & PRECAST NO. 3 MANHOLE

NOT TO SCALE | AUG 1972 | D-MH-2

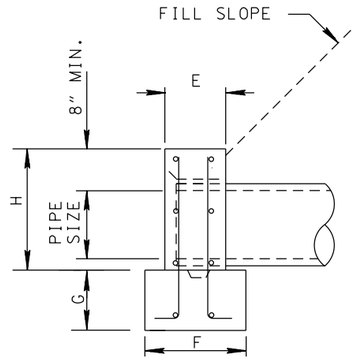
STRAIGHT TYPE CONCRETE ENDWALL



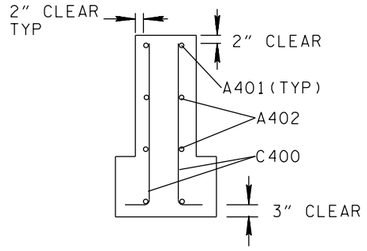
PLAN



FRONT ELEVATION
VIEW



SIDE ELEVATION
VIEW



REINFORCEMENT DETAILS

REINFORCING STEEL LEGEND

a ——— A400

b ⌊ a ——— C400

DIMENSIONS AND ESTIMATED QUANTITIES
FOR STRAIGHT CONCRETE ENDWALL

PIPE SIZE	HOLE SIZE	WALL			FOOTING		CONC.	REINF. STEEL
IN	D(IN)	L	H	E	F	G	C.Y.	LB
18"	26"	6'-0"	2'-6"	1'-3"	2'-1"	1'-3"	1.16	40
24"	33"	8'-0"	3'-0"	1'-4"	2'-2"	1'-4"	1.86	68
30"	40"	10'-0"	3'-6"	1'-6"	2'-4"	1'-6"	2.98	90

BILL OF STEEL

	18" PIPE				24" PIPE				30" PIPE			
BAR	a	b	LENGTH	NUMBER	a	b	LENGTH	NUMBER	a	b	LENGTH	NUMBER
A401	66	0	66	4	90	0	90	4	114	0	114	4
C400	40	6	46	8	47	6	53	12	55	6	61	12
A402	18.5	0	18.5	8	27	0	27	8	35.5	0	35.5	12
	TOTAL LB		706 in 40		TOTAL LB		1212 in 68		TOTAL LB		1614 in 90	

GENERAL NOTES

Ⓐ CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD CONSTRUCTION SPECIFICATIONS,SECTION 611, AND/OR SPECIAL PROVISIONS.

Ⓑ ALL STRAIGHT CONCRETE ENDWALLS ON THE INLET END OF PIPE, AND AT 90° SKEW SHALL BE BEVELED AT 3"AT AN 45° ANGLE. BEVEL WILL NOT BE REQUIRED WHEN ENDWALL IS CONSTRUCTED ON THE "BELLED "END OF CONCRETE PIPE.

Ⓒ ENDWALL MAY BE MODIFIED TO ACCOMMODATE MULTIPLE PIPES WHEN MORE THAN ONE PIPE IS PROPOSED, THE DISTANCE FROM CENTER TO CENTER OF PIPE SHALL BE D + 1'-0".

Ⓓ PAYMENT FOR ENDWALLS WILL BE MADE AS FOLLOWS:

ITEM 611-07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)----CUBIC YARD.
ITEM 611-07.02. STEEL BAR REINFORCING (PIPE ENDWALLS)----POUND.

Ⓔ SEE SECTION 6.04.3.3 IN THE TDOT DESIGN MANUAL FOR RIPRAP APRON REQUIREMENT.

Ⓕ PRECASTING IS ALLOWED.

Ⓖ PIPE OPENING TO BE BASED ON TYPE "B" WALL THICKNESS (AASHTO M170).

Ⓗ PIPE ENDWALLS FOR SLOPES STEEPER THAN 3:1 (PREVIOUSLY TYPE "U") WILL NOW USE TYPE "B" SEE D-PE-9.

REV. 9-28-83: REDREW AND ADDED TABLE FOR STRAIGHT ENDWALL WHEN PIPE IS SKEWED.

REV. 2-19-88: ADDED SAFETY ADJUSTMENTS " U " TYPE ENDWALL.

☐ REV. 1-19-94 : REDREW AND REORGANIZED DRAWING. ELIMINATED TYPE " U " ENDWALL FOR 3:1 SLOPE.

☐ REV. 1-19-97: ADDED UNITS TO HEADING FOR TABLE FOR SKEWED PIPE.

☐ REV. 6-1-09: ADDED GENERAL NOTE Ⓓ.

☐ REV. 7-19-10: REMOVED GENERAL NOTE Ⓓ.

☐ REV. 1-15-13: ADDED REINFORCEMENT AND CHANGED NOTES. ADDED BILL OF STEEL, REMOVED "U" AND "L" TYPE ENDWALL.

☐ REV. 12-1-14: REVISED BAR DESIGNATION MINOR EDITING.

☐ REV. 4-23-15: REVISED DIMENSIONS AND ESTIMATED QUANTITIES FOR STRAIGHT CONCRETE ENDWALL.

☐ REV. 2-3-16: REVISED FRONT AND SIDE ELEVATION VIEW.

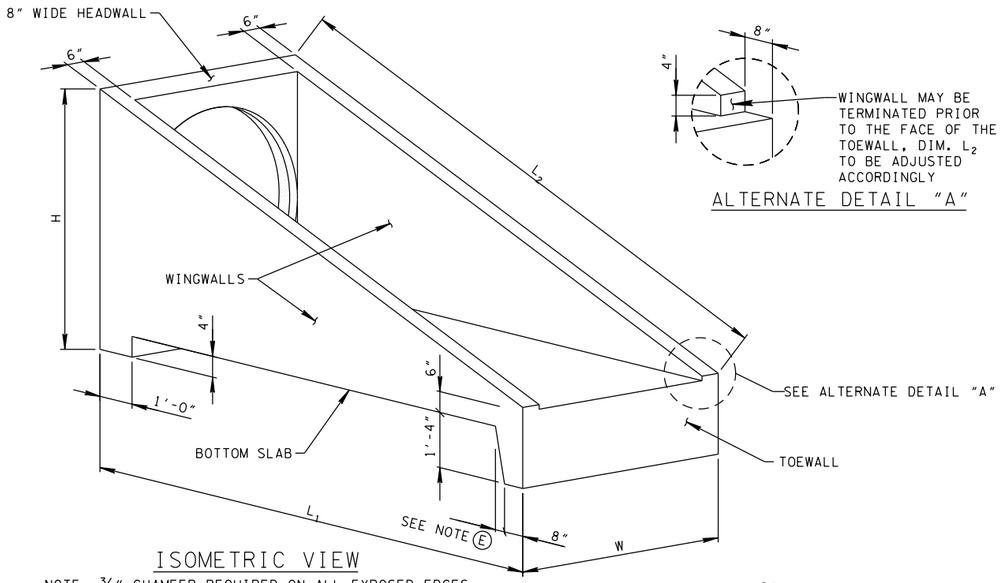
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STRAIGHT
CONCRETE ENDWALL

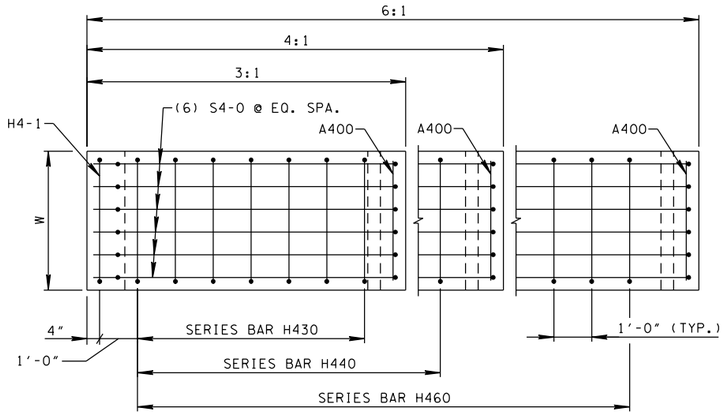
3-1-94 | D-PE-4

- ☐ REV. 6-14-13: REVISED NOTEG. ADDED NOTE Ⓗ AND Ⓘ.
- ☐ REV. 1-6-15: REVISED HOLE OPENING SIZE. ADDED STEPPED HOLE DETAIL.
- ☐ REV. 1-21-16: REVISED GENERAL NOTE Ⓑ.



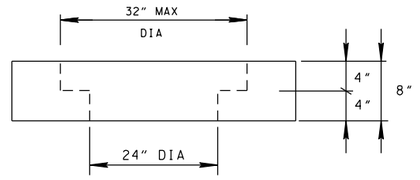
ISOMETRIC VIEW

ALTERNATE DETAIL "A"



BOTTOM SLAB PLAN

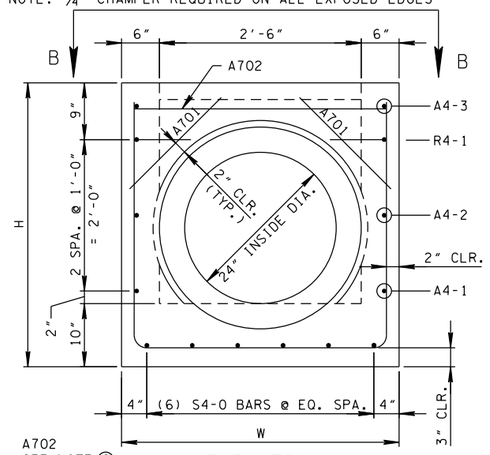
STEPPED HOLE DETAIL



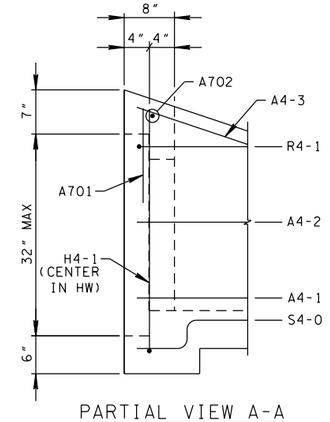
PARTIAL VIEW B-B

SEE NOTE Ⓕ

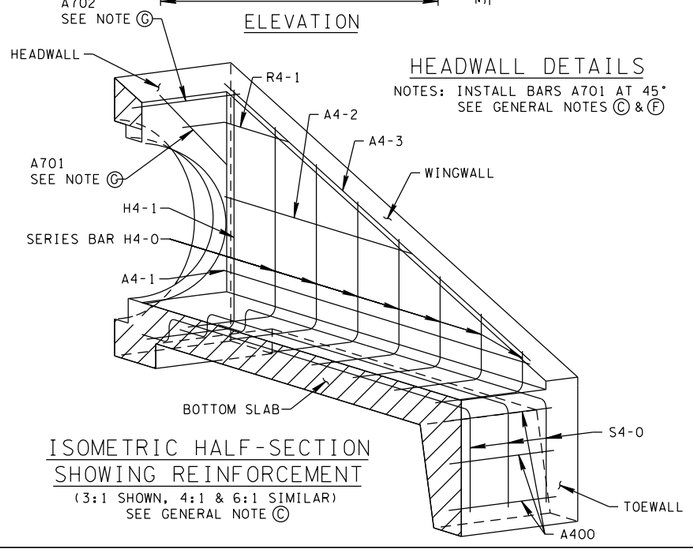
NOTE: ¾" CHAMFER REQUIRED ON ALL EXPOSED EDGES



ELEVATION



PARTIAL VIEW A-A

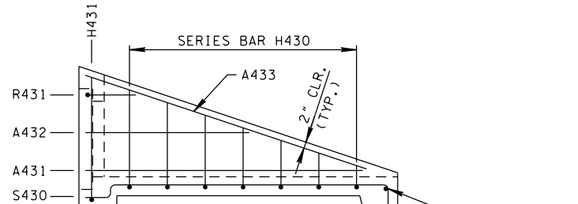


HEADWALL DETAILS

NOTES: INSTALL BARS A701 AT 45°
SEE GENERAL NOTES Ⓒ & Ⓕ

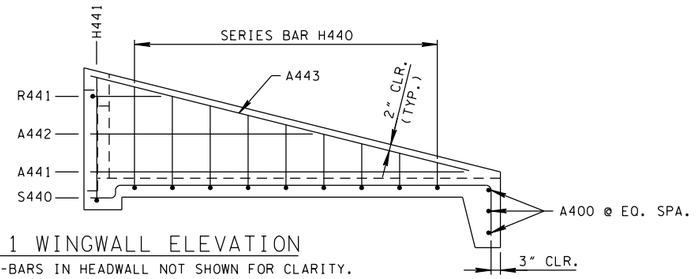
ISOMETRIC HALF-SECTION SHOWING REINFORCEMENT

(3:1 SHOWN, 4:1 & 6:1 SIMILAR)
SEE GENERAL NOTE Ⓒ



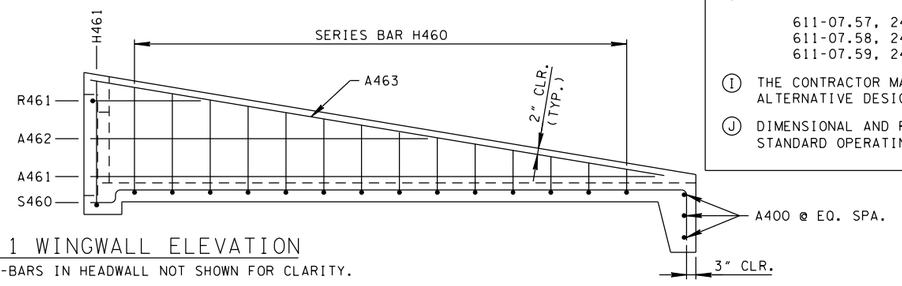
3:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



4:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



6:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.

GENERAL NOTES

Ⓐ DRAWING TO BE USED FOR ALL CAST-IN-PLACE AND ALL PRECAST 18" CONCRETE ENDWALLS (TYPE "U") FOR CROSS DRAINS ONLY. "U" ENDWALL TO BE PLACED AT 90° SKEW TO CENTERLINE. SEE STD. DWG. D-PE-99 FOR SKEWED CONNECTION DETAIL WHEN CROSS DRAIN IS NOT PERPENDICULAR TO CENTERLINE. CAST-IN-PLACE CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.

Ⓑ SEE STD. DWG. D-PE-24B FOR BILL OF STEEL & PRECAST NOTES.

Ⓒ "-" IN BAR DESIGNATION REPRESENTS 3, 4 OR 6 FOR 3:1, 4:1 OR 6:1 SLOPES, RESPECTIVELY.

Ⓓ SPLICING OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 21" SPLICE LENGTH IS USED.

Ⓔ TOEWALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15°.

Ⓕ 90° STEPS ARE SHOWN ON THE STEPPED HOLE DETAIL, HOWEVER MINOR VARIATIONS OF THE TAPER ARE ACCEPTABLE.

Ⓖ OPTIONAL STEPPED HOLE OR HOLE FORMERS ARE ALLOWED PROVIDED THE AMOUNT OF COVER BETWEEN THE PIPE OPENING AND BARS A701 AND A702 IS THE SAME OR GREATER THAN SHOWN ON THIS DRAWING.

Ⓗ PAYMENT WILL BE MADE UNDER:

611-07.57, 24" ENDWALL (CROSS DRAIN) 3:1 EACH
611-07.58, 24" ENDWALL (CROSS DRAIN) 4:1 EACH
611-07.59, 24" ENDWALL (CROSS DRAIN) 6:1 EACH

Ⓘ THE CONTRACTOR MAY BE ELECT TO SUBSTITUTE AN APPROVED ALTERNATIVE DESIGN.

Ⓙ DIMENSIONAL AND REINFORCING TOLERANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE 9SOP) 5-3.

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 24" PIPE						
SLOPE	CONCRETE ENDWALL DIMENSIONS				ESTIMATED QUANTITIES	
	H	L_1	L_2	W	CLASS "A" CONC. CU. YD.	STEEL BAR REINF. LB.
3:1	3' - 9"	8' - 5"	8' - 10½"	3' - 6"	1.28	124
4:1		11' - 0"	11' - 4"		1.61	153
6:1		16' - 2"	16' - 4⅜"		2.26	215

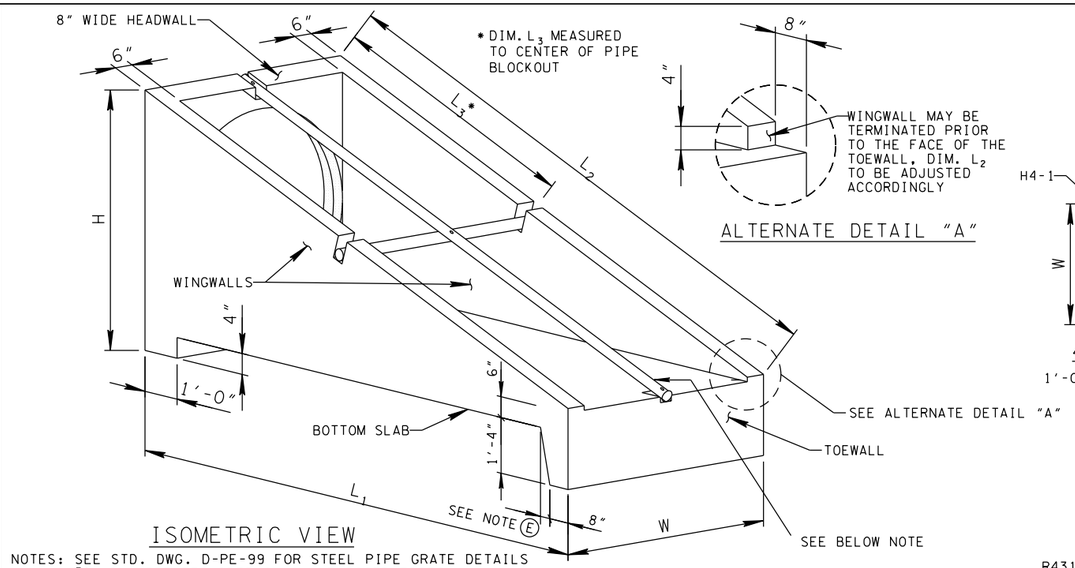
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

24"
CONCRETE ENDWALL
CROSS DRAIN

(FOR 3:1, 4:1 & 6:1 SLOPES)

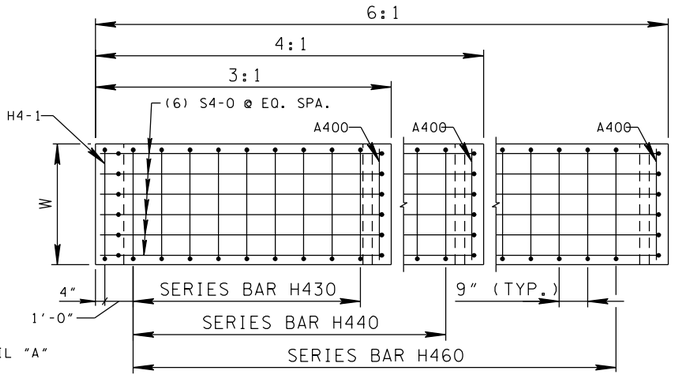
NOT TO SCALE | 3-01-12 | D-PE-24A



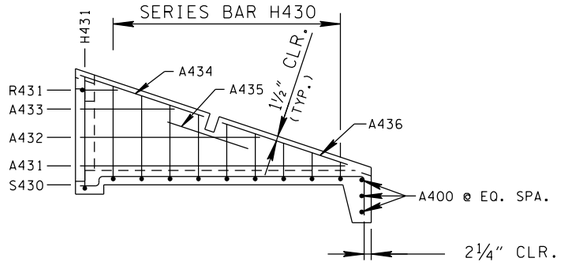
ISOMETRIC VIEW

NOTES: SEE STD. DWG. D-PE-99 FOR STEEL PIPE GRATE DETAILS
¾" CHAMFER REQUIRED ON ALL EXPOSED EDGES

ALTERNATE DETAIL "A"

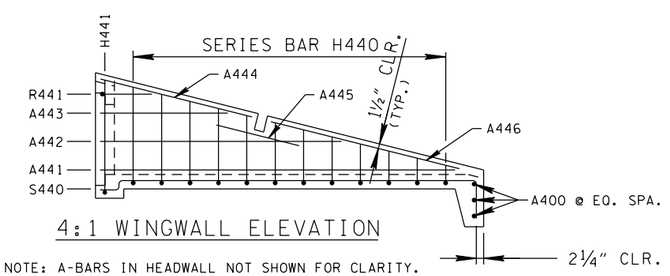


BOTTOM SLAB PLAN



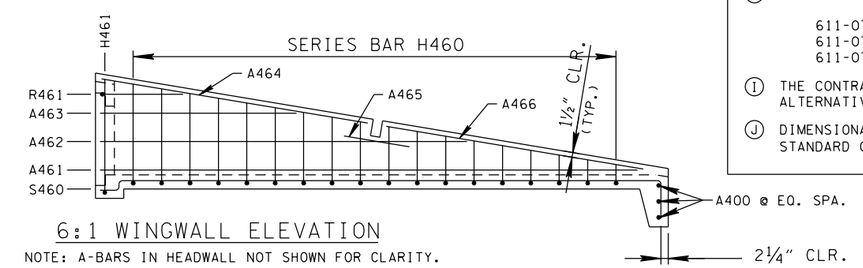
3:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



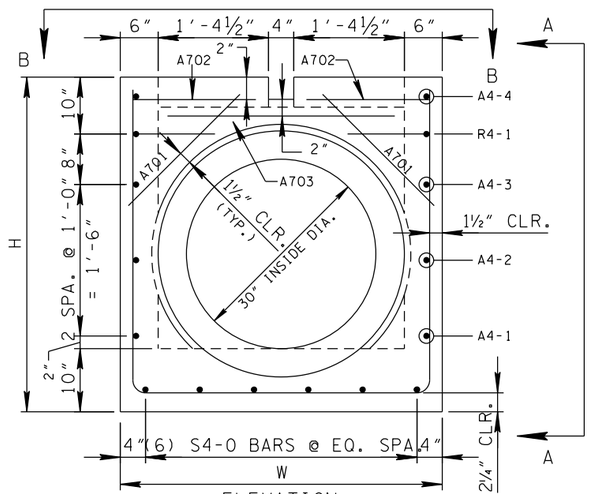
4:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.

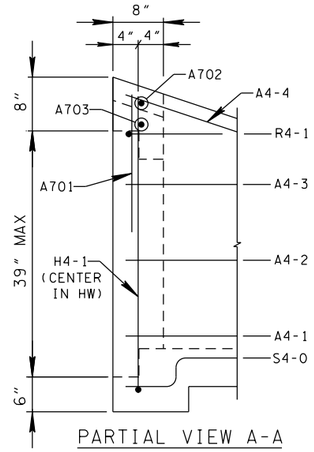


6:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



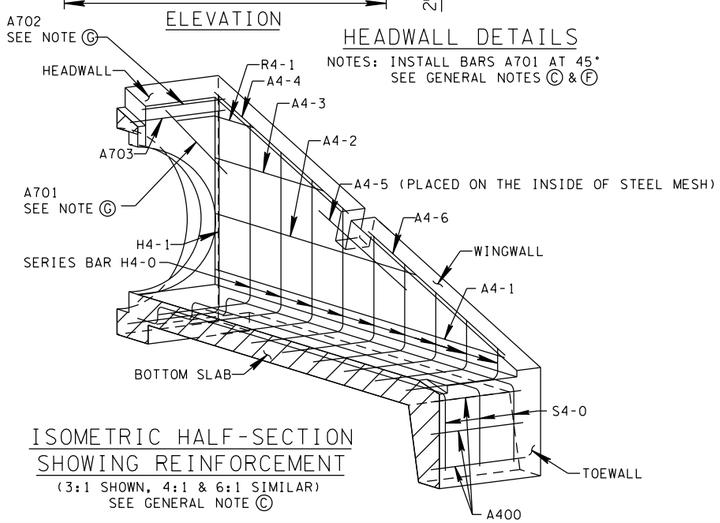
ELEVATION



PARTIAL VIEW A-A

HEADWALL DETAILS

NOTES: INSTALL BARS A701 AT 45°
SEE GENERAL NOTES (C) & (F)



ISOMETRIC HALF-SECTION SHOWING REINFORCEMENT

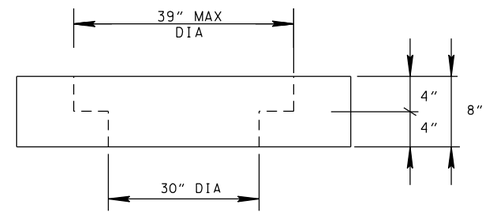
(3:1 SHOWN, 4:1 & 6:1 SIMILAR)
SEE GENERAL NOTE (C)

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 30" PIPE										
SLOPE	CONCRETE ENDWALL DIMENSIONS					STRUCTURAL STEEL PIPE DIMENSIONS		ESTIMATED QUANTITIES		
	H	L_1	L_2	L_3	W	LG	WG	CLASS "A" CONC. CU. YD.	STEEL BAR REINF. LB.	STRUCTURAL STEEL LB.
3:1	4' - 5"	10' - 5"	10' - 11¾"	5' - 2"	4' - 1"	10' - 10⅝"	4' - 1"	1.84	174	114
4:1		13' - 8"	14' - 1"	6' - 1"		14' - 0⅛"		2.32	216	137
6:1		20' - 2"	20' - 5⅜"	10' - 1"		20' - 4¾"		3.29	303	186

NOTE: SEE STD. DWG. D-PE-99 FOR STRUCTURAL STEEL PIPE DIMENSIONS LG & WG.

- ☐ REV. 6-14-13: REVISED NOTEG. ADDED NOTE (H) AND (I).
- ☐ REV. 1-6-15: REVISED HOLE OPENING SIZE. ADDED STEPPED HOLE DETAIL.
- ☐ REV. 1-21-16: REVISED GENERAL NOTE (B).

STEPPED HOLE DETAIL



PARTIAL VIEW B-B

SEE NOTE (F)

GENERAL NOTES

(A) DRAWING TO BE USED FOR ALL CAST-IN-PLACE AND ALL PRECAST 18" CONCRETE ENDWALLS (TYPE "U") FOR CROSS DRAINS ONLY. "U" ENDWALL TO BE PLACED AT 90° SKEW TO CENTERLINE. SEE STD. DWG. D-PE-99 FOR SKEWED CONNECTION DETAIL WHEN CROSS DRAIN IS NOT PERPENDICULAR TO CENTERLINE. CAST-IN-PLACE CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.

(B) SEE STD. DWG. D-PE-30B FOR BILL OF STEEL & PRECAST NOTES.

(C) "-" IN BAR DESIGNATION REPRESENTS 3, 4 OR 6 FOR 3:1, 4:1 OR 6:1 SLOPES, RESPECTIVELY.

(D) SPLICING OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 21" SPLICE LENGTH IS USED.

(E) TOEWALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15°.

(F) 90° STEPS ARE SHOWN ON THE STEPPED HOLE DETAIL, HOWEVER MINOR VARIATIONS OF THE TAPER ARE ACCEPTABLE.

(G) OPTIONAL STEPPED HOLE OR HOLE FORMERS ARE ALLOWED PROVIDED THE AMOUNT OF COVER BETWEEN THE PIPE OPENING AND BARS A701 AND A702 IS THE SAME OR GREATER THAN SHOWN ON THIS DRAWING.

(H) PAYMENT WILL BE MADE UNDER:

611-07.60, 30" ENDWALL (CROSS DRAIN) 3:1 EACH
611-07.61, 30" ENDWALL (CROSS DRAIN) 4:1 EACH
611-07.62, 30" ENDWALL (CROSS DRAIN) 6:1 EACH

(I) THE CONTRACTOR MAY BE ELECT TO SUBSTITUTE AN APPROVED ALTERNATIVE DESIGN.

(J) DIMENSIONAL AND REINFORCING TOLERANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE 9SOP) 5-3.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

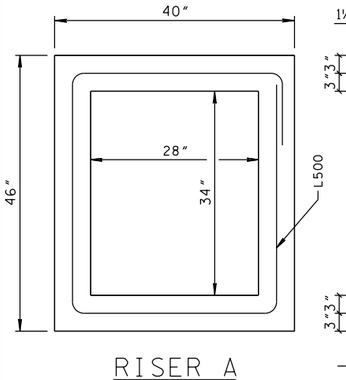
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

30" CONCRETE ENDWALL CROSS DRAIN WITH STEEL PIPE GRATE

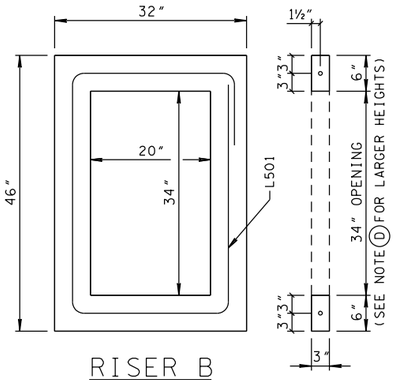
(FOR 3:1, 4:1 & 6:1 SLOPES)

NOT TO SCALE | 3-01-12 | D-PE-30A

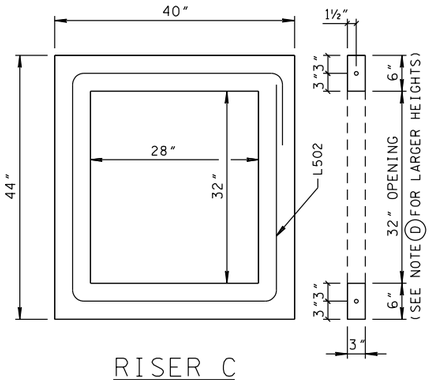
REV. 2-2-16: UPDATED LIST OF REFERENCED STANDARD DRAWINGS.



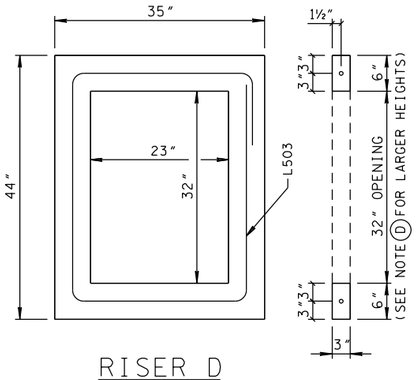
RISER A



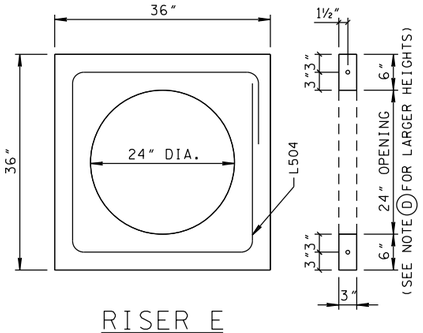
RISER B



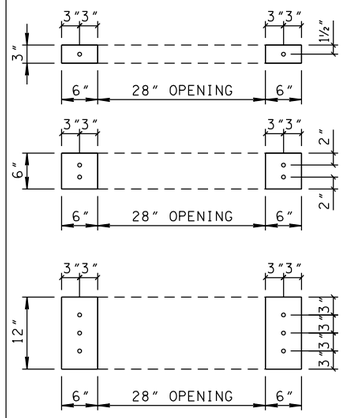
RISER C

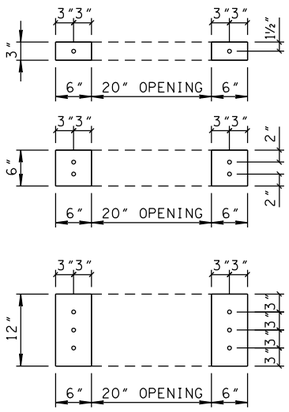


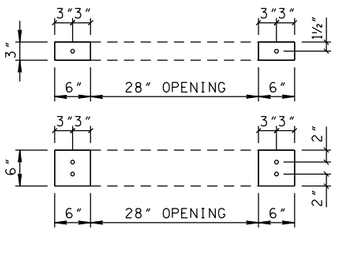
RISER D

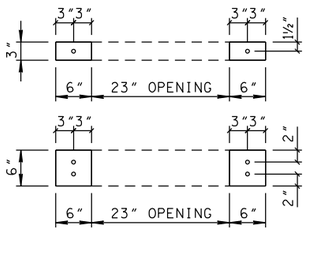


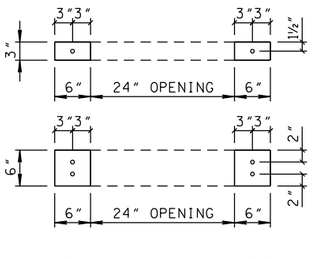
RISER E











RISER A MAY BE USED WITH THE FOLLOWING STANDARD DRAWINGS:

D-CB-12P
D-CB-12RA
D-CB-12RB
D-CB-12RC
D-CB-12S
D-CB-12SB
D-CB-12SC
D-CB-12SD
D-CB-12SE
D-CB-13P
D-CB-13RA
D-CB-13RB
D-CB-13RC
D-CB-13S
D-CB-14P
D-CB-14RB
D-CB-14S
D-CB-14SE
D-CB-16B
D-CB-16S
D-CB-17S
D-CB-25P
D-CB-25RA
D-CB-25RB
D-CB-25S
D-CB-25SC
D-CB-25SD
D-CB-25SE
D-CB-25S
D-CB-25SB
D-CB-26P
D-CB-26S
D-CB-27S
D-CB-28P
D-CB-28RA
D-CB-28RB
D-CB-28S
D-CB-29P
D-CB-29S
D-CB-31R
D-CB-31SD
D-CB-31SE
D-CB-41P
D-CB-41RB
D-CB-41SC
D-CB-41SD
D-CB-41SE
D-CB-41S
D-CB-41SB
D-CB-46SE
D-CB-51SC
D-CB-51SD
D-CB-51SE
D-CB-52SE

RISER B MAY BE USED WITH THE FOLLOWING STANDARD DRAWINGS:

D-CB-10RA
D-CB-10S
D-CB-10SB

RISER C MAY BE USED WITH THE FOLLOWING STANDARD DRAWINGS:

D-CB-12LP
D-CB-25LP
D-CB-28LP
D-CB-41LP

RISER D MAY BE USED WITH THE FOLLOWING STANDARD DRAWING:

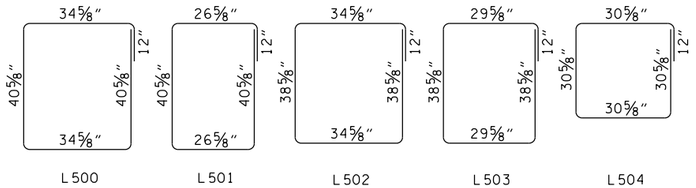
D-CB-10LPC

RISER E MAY BE USED WITH THE FOLLOWING STANDARD DRAWINGS:

D-MH-5
D-MH-6
D-MH-7

NOTE:
CIRCULAR RISER SECTION WITH A 24 INCH INSIDE DIAMETER AND A 30 INCH OUTSIDE DIAMETER WITH T500 DIA. 30⅝ INCHES IS AN ACCEPTABLE ALTERNATE.

REINFORCING STEEL LEGEND



GENERAL NOTES

(A) RISER FRAMES MAY BE USED TO SUBSTITUTE BRICK RISERS AS SHOWN ON STANDARD DRAWINGS. THE REQUIRED ADJUSTMENT HEIGHT MAY BE ACCOMPLISHED BY STACKING TWO RISER FRAMES. GROUT OR CONCRETE SEAL IS REQUIRED BETWEEN STACKED FRAMES.

(B) CONCRETE: f'_c = 4,000 POUNDS PER SQUARE INCH AT 28 DAYS
REINFORCING STEEL: ASTM A615, F_y = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.
MIN. 1″ CONCRETE COVER SHALL BE MAINTAINED DURING MANUFACTURING.

(C) PAYMENT OF PRECAST RISER FRAMES SHALL BE INCLUDED IN THE TOTAL COST OF STRUCTURE.

(D) VERTICAL SPACING OF REINFORCING STEEL IS TYPICAL FOR ALL PRECAST RISER HEIGHTS.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

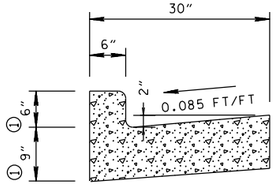
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD PRECAST RISER

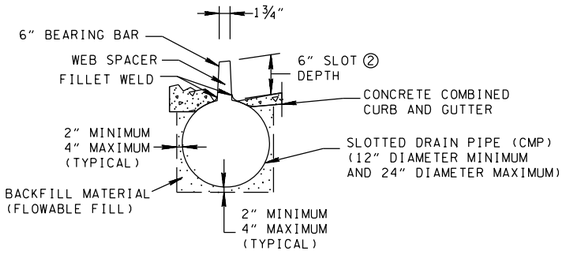
8-01-12

D-RF-1

- REV. 10-26-95: CHANGED DESCRIPTION OF PAY ITEM NO. 204-08.01.
- REV. 7-29-96: CHANGED LOCATION OF UNDERDRAINS IN CURB AND GUTTER DETAILS.
- REV.10-26-96: CHANGED ALL REFERENCE OF ITEM NO. 702-03.05 TO 702-03.
- REV. 12-18-97: CHANGED REFERENCE THROUGHOUT DRAWING OF FLOWABLE MORTAR TO BACKFILL MATERIAL (FLOWABLE FILL).
- REV. 5-27-01: MODIFIED PAY ITEMS.
- REV. 2-2-16: CORRECTED PAY ITEM NUMBER FOR FLOWABLE FILL.



TYPICAL DETAIL FOR
CONCRETE COMBINED CURB AND GUTTER



BACKFILL MATERIAL (FLOWABLE FILL)
DETAIL AT SLOTTED DRAINS

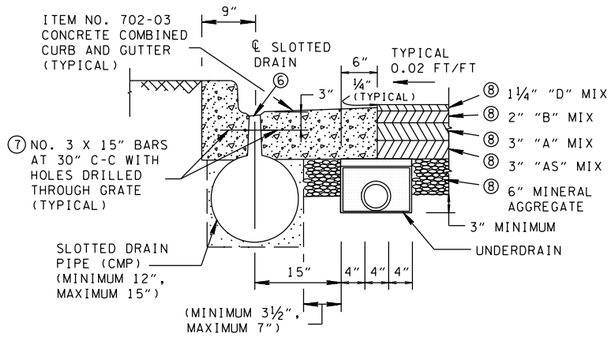
ESTIMATED QUANTITIES BACKFILL MATERIAL (FLOWABLE FILL) ③④		
DIAMETER CMP	TOTAL VOLUME PER LINEAR FOOT (CUBIC YARD)	TOTAL VOLUME PER CLEANOUT PLUG OR TEE (CUBIC YARD)
12"	0.046	0.574
15"	0.057	0.648
18"	0.078	0.773
⑤ 24"	0.084	0.759

ITEM NO. 204-08.01 BACKFILL MATERIAL
(FLOWABLE FILL) CUBIC METER

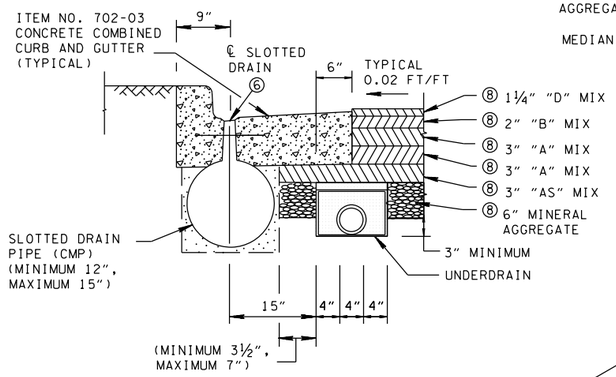
NOTE:

CONCRETE COMBINED CURB AND GUTTER TO BE PAID FOR UNDER ITEM NO. 702-03 CONCRETE COMBINED CURB AND GUTTER (LINEAR FOOT). PRICE PER LINEAR FOOT SHALL INCLUDE CURB AND GUTTER, TIE BARS, AND ALL OTHER ITEMS FOR TYING THE CURB AND GUTTER TO THE SLOTTED DRAIN.

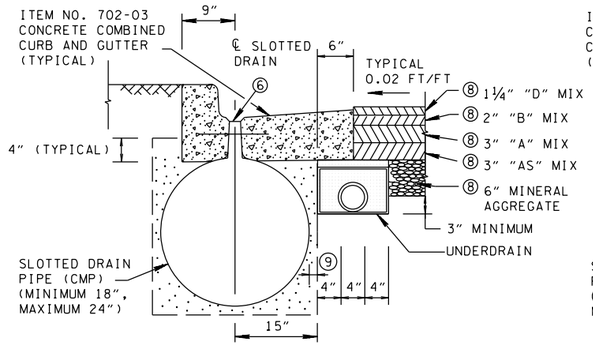
EXPANSION JOINTS SHALL BE PROVIDED AT 20' INTERVALS IN ACCORDANCE WITH SECTION 702.06 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.



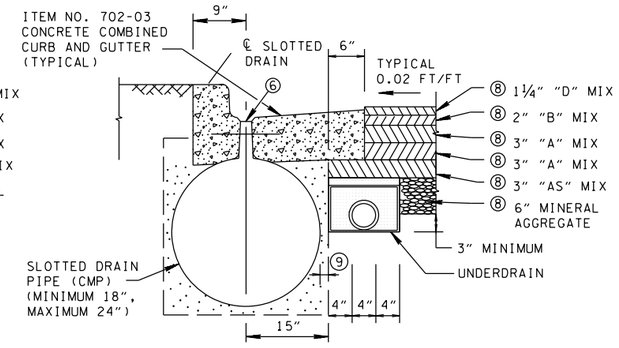
ROADWAY USE
FOR SLOTTED DRAINS
IN THIN PAVEMENT SECTIONS WITH
MINIMUM 12" DIAMETER SLOTTED DRAIN PIPE



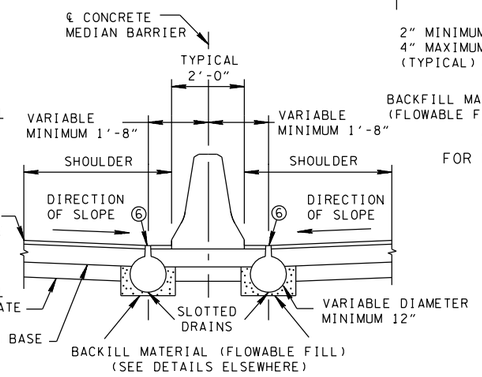
ROADWAY USE
FOR SLOTTED DRAINS
IN THICK PAVEMENT SECTIONS WITH
MINIMUM 12" DIAMETER SLOTTED DRAIN PIPE



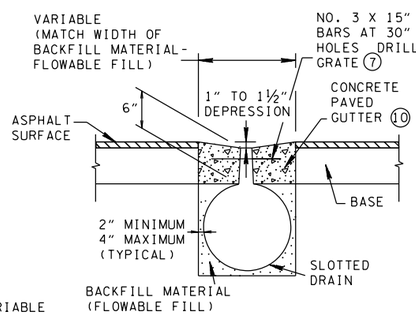
ROADWAY USE
FOR SLOTTED DRAINS
IN THIN PAVEMENT SECTIONS WITH
MAXIMUM 24" DIAMETER SLOTTED DRAIN PIPE



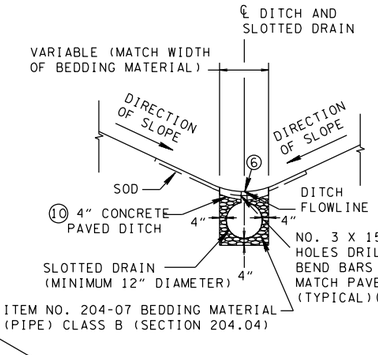
ROADWAY USE
FOR SLOTTED DRAINS
IN THICK PAVEMENT SECTIONS WITH
MAXIMUM 24" DIAMETER SLOTTED DRAIN PIPE

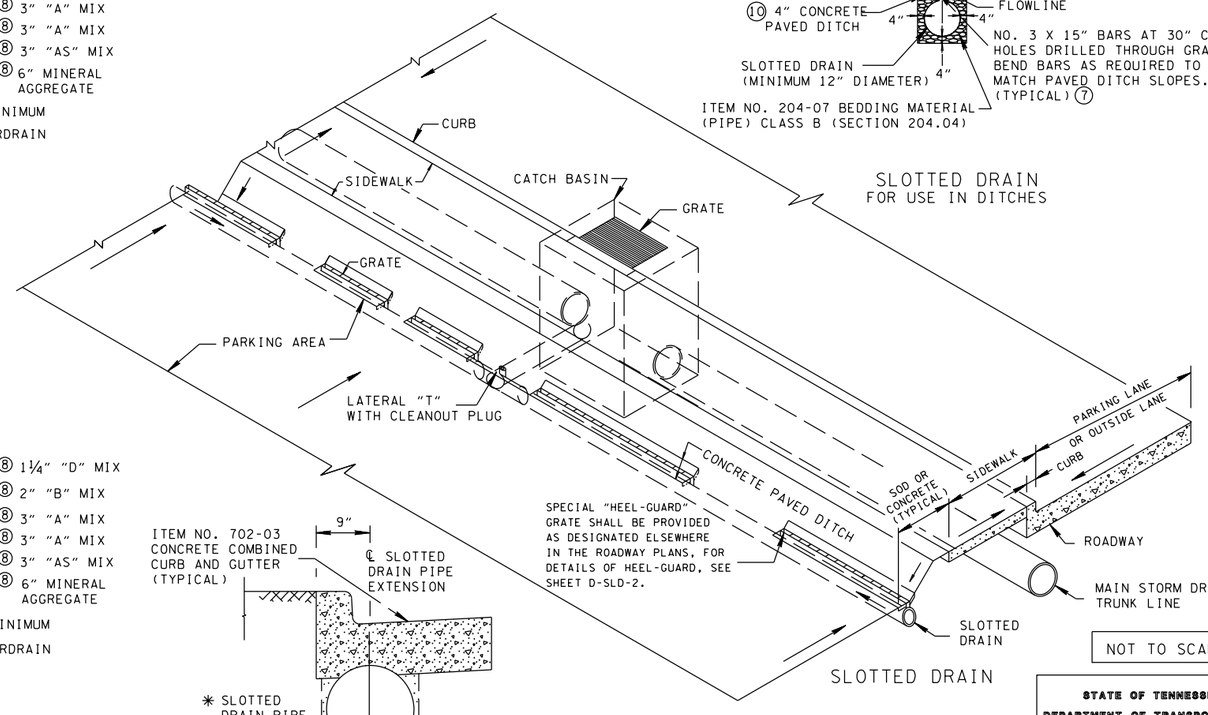


SLOTTED DRAINS
FOR USE IN MEDIANS

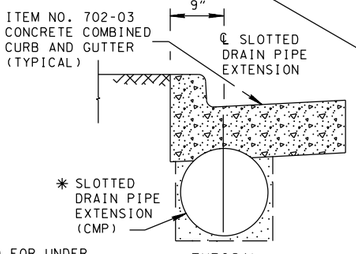


SLOTTED DRAIN
FOR USE IN PARKING AREAS
AND DRIVEWAYS





SLOTTED DRAIN
FOR USE IN DITCHES



✳ TO BE PAID FOR UNDER ITEM NO. 607-37.01 THROUGH ITEM NO. 607-37.05

TYPICAL
SLOTTED DRAIN PIPE
EXTENSION
(WITHOUT GRATES)

NOTE:
SEE SHEET D-SLD-2 AND D-SLD-3 FOR ADDITIONAL DETAILS

NOT TO SCALE

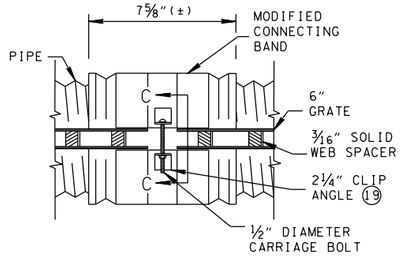
SLOTTED DRAIN

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

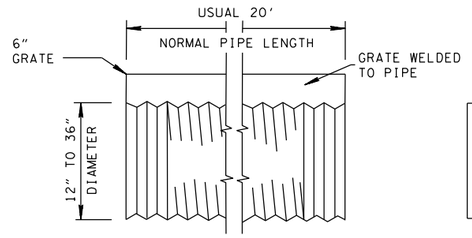
SLOTTED DRAINS

1-28-92 | D-SLD-1

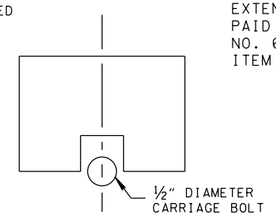
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.



MODIFIED CONNECTING BAND
TOP VIEW



TYPICAL PIPE SECTION



GAP PLATE (OPTIONAL)
MAY BE PLACED DIRECTLY OVER BAND BOLT TO PROVIDE CONTINUOUS FORM FOR GROUTING.

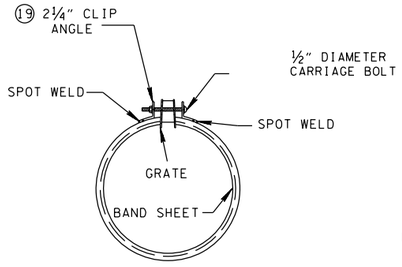
* SLOTTED DRAIN PIPE EXTENSIONS TO BE PAID FOR UNDER ITEM NO. 607-45 THROUGH ITEM NO. 607-45.05

MANUFACTURING TOLERANCES FOR 20' CMP SECTION
1. VERTICAL BOW ± ⅜"
2. HORIZONTAL BOW ± ⅝"
3. TWIST ± ½"

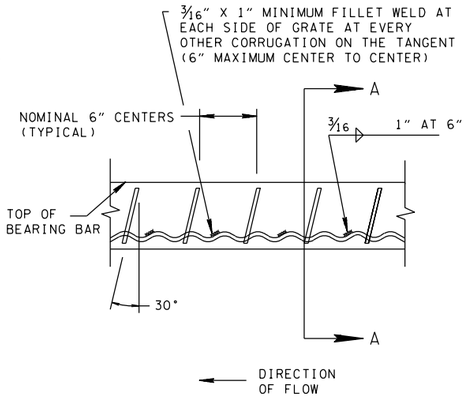
SLOTTED DRAIN PIPE ITEM LISTING *		
ITEM NO.	DESCRIPTION	UNIT
607-45	12" SLOTTED DRAIN PIPE	L.F.
607-45.01	15" SLOTTED DRAIN PIPE	L.F.
607-45.02	18" SLOTTED DRAIN PIPE	L.F.
607-45.03	24" SLOTTED DRAIN PIPE	L.F.
607-45.04	30" SLOTTED DRAIN PIPE	L.F.
607-45.05	36" SLOTTED DRAIN PIPE	L.F.

MISCELLANEOUS ITEM LISTING		
ITEM NO.	DESCRIPTION	UNIT
204-07	BEDDING MATERIAL (PIPE) (CLASS B)	C.Y.
204-08.01	BACKFILL MATERIAL (FLOWABLE FILL)	C.Y.
702-03	CONCRETE COMBINED CURB AND GUTTER	C.Y.
703-02.05	CEMENT CONCRETE DITCH PAVING (SLOTTED DRAINS)	C.Y.

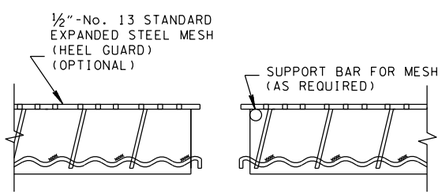
- REV. 10-26-95: CHANGED DESCRIPTION OF PAY ITEM NO. 204-08.01. CHANGED FOOTNOTE NOS. (4) AND (7).
- REV. 10-26-96: IN MISCELLANEOUS ITEM LISTING CHANGED ITEM NO. 702-03.05 TO 702-03.
- REV. 12-18-97: CHANGED REFERENCE THROUGHOUT DRAWING OF FLOWABLE MORTAR TO BACKFILL MATERIAL (FLOWABLE FILL).
- REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NO. 204-07.
- REV. 2-2-16: CORRECTED PAY ITEM NUMBERS.



MODIFIED CONNECTING BAND
END VIEW
(SECTION C-C)

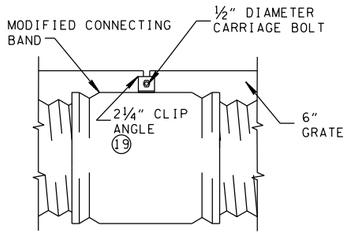


GRATE (BEARING BAR) WELDING DETAIL
(WITH SLANTED WEB SPACERS)

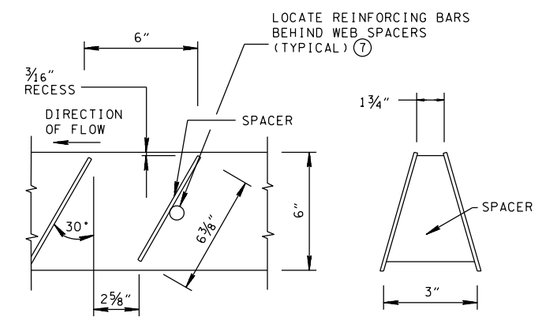


SECTION B-B

GENERAL NOTES
(A) DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
(B) SLOTTED DRAIN SHALL BE GALVANIZED CORRUGATED METAL PIPE AND GRATE, CORRUGATED ALUMINUM PIPE AND GRATE OR ALUMINUM COATED STEEL PIPE AND GRATE MEETING THE REQUIREMENTS OF SECTION 607 (PIPE CULVERTS AND STORM SEWERS) AND SECTION 915 (METALLIC PIPE). GAGE 14 PIPE SHALL BE USED.
(C) BACKFILL MATERIAL (FLOWABLE FILL) SHALL BE USED IN LOCATIONS SUBJECT TO TRAFFIC LOADS. BEDDING MATERIAL CLASS "B" MAY BE USED IN ALL OTHER LOCATIONS.

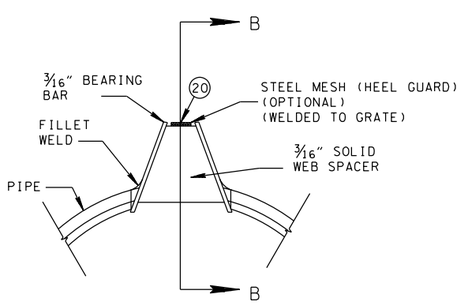


MODIFIED CONNECTING BAND
SIDE VIEW

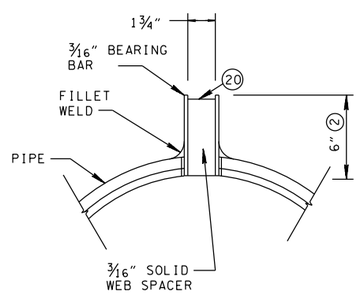


SLANTED WEB SPACERS DETAILS
SIDE VIEW
(FOR USE WITH TRAPEZOIDAL GRATES ONLY)

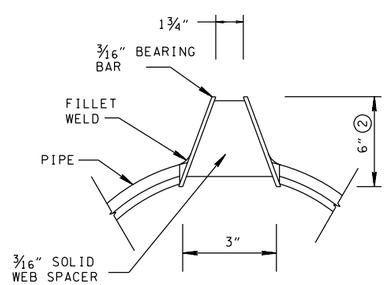
SECTION



ALTERNATE TRAPEZOIDAL
GRATE DETAIL WITH MESH
(SECTION A-A)



STANDARD PARALLEL (VERTICAL)
SIDE GRATE DETAIL
(SECTION A-A)
(WITH VERTICAL WEB SPACERS)



ALTERNATE TRAPEZOIDAL
GRATE DETAIL
(SECTION A-A)

FOOTNOTES
(1) TYPICAL DETAIL ONLY; DIMENSIONS AND CURB TYPE WILL VARY.
(2) TYPICAL GRATING SHALL BE 6" IN DEPTH. 3" DEPTH GRATING IS AVAILABLE FOR SPECIAL CASES IF NEEDED AND AS SPECIFIED IN THE ROADWAY PLANS.
(3) FOR USE IN CURB AND GUTTER, PAVED AREA, OR MEDIAN SECTIONS WHICH ARE SUBJECT TO TRAFFIC LOADS.
(4) BACKFILL MATERIAL (FLOWABLE FILL) SHALL MEET THE REQUIREMENTS OF SECTION 204 OF THE STANDARD SPECIATIONS AND SHALL BE PAID FOR UNDER ITEM 204-08.01, BACKFILL MATERIAL (FLOWABLE FILL) BY THE CUBIC YARD.
(5) MAXIMUM SIZE FOR USE WITH CURB AND GUTTER.
(6) RECESS TOP OF SLOTTED DRAIN GRATE ⅛" TO ½" BELOW FINISHED SURFACE OF THE CONCRETE GUTTER.
(7) REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH SECTION 907 OF THE STANDARD SPECIFICATIONS. DRILLING THROUGH THE GRATE SHALL BE DONE IN THE SHOP.
(8) EXAMPLE ONLY: PAVEMENT DESIGN REQUIRED TO SET ACTUAL PROJECT MATERIAL THICKNESS.
(9) VARIABLE 6" MAXIMUM FOR 18" CMP, 3" MINIMUM FOR 24" CMP.
(10) TO BE PAID FOR AS ITEM NO. 703-02.05 "CEMENT CONCRETE DITCH PAVING (SLOTTED DRAINS)" (CUBIC YARD).
(11) A 3-PIECE 90° ELBOW MAY BE USED AS APPROVED BY THE ENGINEER.
(12) REQUIRED AT ALL JUNCTIONS OF LATERALS AND AT ALL ENDS OF LINES, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
(13) SLOTTED DRAIN SHALL BE INSTALLED IN 20 FOOT LENGTHS WHEREVER PRACTICAL TO MINIMIZE THE NUMBER OF JOINTS REQUIRED.
(14) LATERAL CONNECTION SLIP JOINT SHALL BE BACKED WITH A SUITABLE COMPRESSIBLE MATERIAL TO RETAIN GROUT IN PLACE DURING CURING. SLIP JOINTS SHALL BE GROUTED WITH BACKFILL MATERIAL (FLOWABLE FILL), AS REQUIRED.
(15) LATERALS MAY BE A SERIES OF PIPE JOINTS PLACED AT ANGLES AS DETERMINED BY MANUFACTURING AVAILABILITY.
(16) DESIRABLE MINIMUM SLOPE = 0.40% FOR FLATTER SLOPES, AS MAY BE REQUIRED, INCREASE PIPE DIAMETER AND/OR THE NUMBER OF OUTLETS (LATERALS).
(17) UNIT PRICE PER LINEAR FOOT (L.F.) FOR SLOTTED DRAINS SHALL INCLUDE TEES, WYES, ELBOWS, PLUGS, BANDS, JUNCTIONS, ANGLE/TEE COMBINATIONS, GRATES, PLATE REDUCERS, END CAPS, STRUCTURAL EXCAVATION, HEEL GUARD GRATE, AND PLATES.
(18) IN AREAS WHERE THE SLOTTED DRAIN PIPE PROFILE GRADE IS LESS THAN 0.40%, THE GRATE DEPTH MAY VARY AS SHOWN TO MAINTAIN A STEEPER PROFILE GRADE OF THE PIPE. THE MANUFACTURER SHALL CONSTRUCT THIS IN THE SHOP.
(19) FOR 6" VERTICAL AND TRAPIZOIDAL REQUIREMENTS, THE SLOTTED DRAIN BAND MAY BE FURNISHED WITH A 4" BAND ANGLE.
(20) VERTICAL GRATE EXTENSIONS ARE AVAILABLE FOR FUTURE RAISING OF THE PAVEMENT GRADE DUE TO RESURFACING.

NOTE:
SEE SHEET D-SLD-1 AND D-SLD-2 FOR ADDITIONAL DETAILS

NOT TO SCALE

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SLOTTED DRAINS

1-28-92 | D-SLD-3

REV. 10-15-02: NEW SHEET. REPLACES RD-TS-1.

REV. 2-5-16: REMOVE DETAIL A AND DETAIL B.

DESIGN LOADING: ALL NEW AND REHABILITATED BRIDGES SHALL BE DESIGNED FOR HS-20 LOADING.

FOR NEW ROUTE CONSTRUCTION OR ROUTE RECONSTRUCTION PROJECTS:

THE MINIMUM CLEAR WIDTH FOR NEW BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY (CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE).

TABLE I.
MINIMUM CLEAR ROADWAY WIDTHS AND DESIGN LOADINGS FOR NEW AND RECONSTRUCTED BRIDGES (SEE PAGE 390)

DESIGN ADT (VEH/DAY)	DESIGN LOADING	MINIMUM CLEAR ROADWAY WIDTH OF BRIDGE (1)
UNDER 400	HS-20	TRAVELED WAY + 4 FT. (2 FT. EACH SIDE)
400 TO 2,000	HS-20	TRAVELED WAY + 6 FT. (3 FT. EACH SIDE)
OVER 2,000	HS-20	APPROACH ROADWAY WIDTH

TABLE II.
MINIMUM STRUCTURAL CAPACITIES AND MINIMUM ROADWAY WIDTHS FOR EXISTING BRIDGES TO REMAIN IN PLACE (SEE PAGE 390) (3)

DESIGN ADT (VEH/DAY)	DESIGN LOADING (STRUCTURAL CAPACITY)	MINIMUM CLEAR ROADWAY WIDTH (FT) (4)
0 TO 50	H-15	20
50 TO 250	H-15	20
250 TO 1,500	H-15	22
1,500 TO 2,000	H-15	24
OVER 2,000	H-15	28

TABLE III. MINIMUM DESIGN SPEEDS FOR LOCAL RURAL ROADS

TYPE OF TERRAIN	DESIGN SPEED (MPH) FOR SPECIFIED DESIGN ADT (VEH/DAY)					
	UNDER 50	50-250	250-400	400 TO 1,500	1,500 TO 2,000	2,000 AND OVER
LEVEL	30	30	40	50	50	50
ROLLING	20 (6)	30	30	40	40	40
MOUNTAINOUS	20 (6)	20 (6)	20 (6)	30	30	30

TABLE IV. LOCAL ROADS AND STREETS - DESIGN STANDARDS (8)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)		DESIGN SPEEDS (MPH)										MINIMUM WIDTH OF SHOULDERS FOR ALL SPEEDS (FEET) (SEE PAGE 388)
		15	20	25	30	35	40	45	50	55	60	
MINIMUM WIDTH OF TRAVELED WAY IN RURAL AREAS (FEET) (SEE PAGE 388)	DESIGN ADT UNDER 400	18	18	18	18	18	18	20	20	22	22	4 (7)
	DESIGN ADT 400 - 1,500	20 (7)	20 (7)	20 (7)	20 (7)	20 (7)	20 (7)	22	22	22	22	5 (7) (9)
	DESIGN ADT 1,500 - 2,000	20	22	22	22	22	22	22	22	24 (10)	24 (10)	6
	DESIGN ADT OVER 2,000	22	24 (10)	24 (10)	24 (10)	24 (10)	24 (10)	24 (10)	24 (10)	24 (10)	24 (10)	8
MINIMUM RADIUS (FEET) 0.04 MAX. S.E.		70	125	205	300	420	565	730	930	1190	1505	SEE PAGE 145
MINIMUM RADIUS (FEET) 0.06 MAX. S.E.		65	115	185	275	380	510	660	835	1065	1340	
MINIMUM RADIUS (FEET) 0.08 MAX. S.E.		60	105	170	250	350	465	600	760	965	1205	
MAXIMUM RURAL GRADES %	LEVEL TERRAIN	9	8	7	7	7	7	7	6	6	5	SEE PAGE 386
	ROLLING TERRAIN	12	11	11	10	10	10	9	8	7	6	
	MOUNTAINOUS TERRAIN	17	16	15	14	14	13	12	10	10	X	
MINIMUM STOPPING SIGHT DISTANCE (FEET)		80	115	155	200	250	305	360	425	495	570	SEE PAGE 385
MINIMUM "K" VALUE	CREST VERTICAL CURVE	3	7	12	19	29	44	61	84	114	151	
	SAG VERTICAL CURVE	10	17	26	37	49	64	79	96	115	136	
MINIMUM PASSING SIGHT DISTANCE (FEET)		X	710	900	1090	1280	1470	1625	1835	1985	2135	SEE PAGE 386
MINIMUM "K" VALUE FOR CREST VERTICAL CURVE		X	180	289	424	585	772	943	1203	1407	1628	
SUPERELEVATION		SEE STANDARD DRAWINGS RD01-SE-2 AND RD01-SE-3										

GENERAL NOTES

(A) FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO 2001.

(B) FOR URBAN DESIGN GUIDANCE AND CRITERIA, REFERENCE IS MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO, 2001, PAGES 393 TO 408.

(C) PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO, 2001.

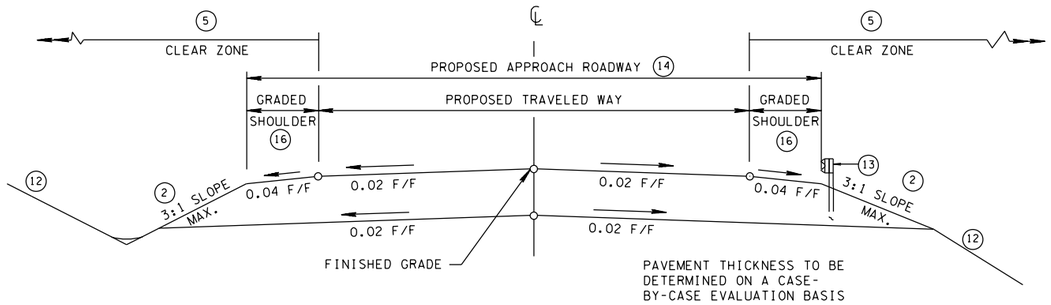
(D) REFERENCE IS ALSO MADE TO THE "ROADSIDE DESIGN GUIDE," AASHTO, 2011.

(E) FOR CORNER SIGHT DISTANCE AT RURAL INTERSECTIONS SEE PAGES 654 THROUGH 681. ALSO STANDARD DRAWING SD-SERIES.

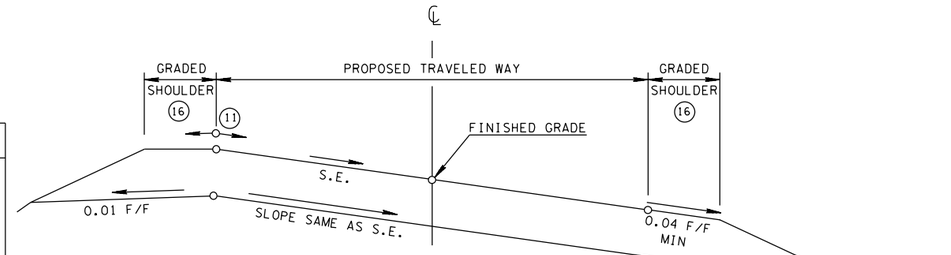
(F) IF NO ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE TRAVELED WAY PLUS CLEAR ZONE (MINIMUM OF 10 FEET EACH SIDE).

(G) IF ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHALL BE SUFFICIENT TO ACCOMMODATE THE UTILITIES OUTSIDE THE CLEAR ZONE.

(H) DESIRABLE RIGHT-OF-WAY IS SLOPE LINES PLUS TEN FEET.



TANGENT SECTION



SUPERELEVATED SECTION

TYPICAL CROSS-SECTIONS

FOOTNOTES

(1) WHERE THE APPROACH ROADWAY WIDTH (TRAVELED WAY PLUS SHOULDERS) IS SURFACED, THAT SURFACE WIDTH SHOULD BE CARRIED ACROSS THE STRUCTURE.

(2) 4:1 SLOPE FOR 40 MILES PER HOUR OR GREATER WITH A DESIGN ADT OF 1,000 OR GREATER OR ANY LOCATION GUARDRAIL IS USED.

(3) THESE STRUCTURES SHOULD BE ANALYZED INDIVIDUALLY, TAKING INTO CONSIDERATION THE CLEAR WIDTH PROVIDED, TRAFFIC VOLUMES, REMAINING LIFE OF THE STRUCTURE, PEDESTRIAN VOLUMES, SNOW STORAGE, DESIGN SPEED, ACCIDENT RECORD, AND OTHER PERTINENT FACTORS.

(4) CLEAR WIDTH BETWEEN CURBS OR RAILS, WHICHEVER IS THE LESSER. MINIMUM CLEAR WIDTHS THAT ARE TWO FEET NARROWER MAY BE USED ON ROADS WITH FEW TRUCKS. IN NO CASE SHALL THE MINIMUM CLEAR WIDTH BE LESS THAN THE APPROACH TRAVELED WAY WIDTH.

(5) THE CLEAR ZONE WIDTH SHALL BE DETERMINED FROM STANDARD DRAWING RD01-S-12. SEE THE "ROADSIDE DESIGN GUIDE," AASHTO, 2002, FOR FURTHER INFORMATION ON CLEAR ZONES.

(6) EFFORTS SHOULD BE MADE TO SELECT A DESIGN SPEED GREATER THAN 20 MILES PER HOUR. SEE PAGE 384 FOR FURTHER INFORMATION.

(7) FOR ROADS IN MOUNTAINOUS TERRAIN WITH A DESIGN YEAR ADT OF 0 TO 600 VEHICLES PER DAY AND THE DESIGN SPEED IS GREATER THAN OR EQUAL TO 15 MILES PER HOUR AND LESS THAN OR EQUAL TO 40 MPH, USE 18 FEET TRAVELED WAY WIDTH AND 2 FEET SHOULDER WIDTH.

(8) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHOULD BE USED IN DESIGN, THERE SHOULD BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 69).

(9) MAY BE USED TO ACHIEVE A MINIMUM ROADWAY WIDTH OF 30 FEET FOR DESIGN SPEEDS GREATER THAN 40 MILES PER HOUR.

(10) WHERE THE WIDTH OF THE TRAVELED WAY IS SHOWN AS 24 FEET, THE WIDTH MAY REMAIN AT 22 FEET ON RECONSTRUCTED HIGHWAYS WHERE ALIGNMENT AND SAFETY RECORDS ARE SATISFACTORY.

(11) THE SLOPES OF THE SHOULDER AND ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 0.07 FOOT PER FOOT.

(12) SEE STANDARD DRAWINGS RD01-S-11 (CASE II) AND RD01-S-11B FOR DESIRABLE SLOPES & NOTE REGARDING GEOLOGICAL RECOMMENDATIONS.

(13) SEE S-PL-6 FOR GUARDRAIL PLACEMENT.

(14) PROPOSED APPROACH ROADWAY WIDTH WILL NOT BE LESS THAN EXISTING WIDTH.

(15) WHEN GUARDRAIL IS PLACED BEHIND CURB AND GUTTER, THE SLOPING CURB HEIGHT MUST BE 4 INCHES OR LESS.

(16) SHOULDER SURFACE TREATMENT TO BE SPECIFIED BY THE DESIGN DIVISION'S PAVEMENT DESIGN SECTION. DESIGNERS SHOULD REFER TO THE DESIGN GUIDELINES FOR PAVEMENT REQUEST PROCEDURES. WHEN SHOULDERS ARE PAVED AND GRADED SHOULDER WIDTH IS 6 FEET OR GREATER, THE SHOULDER SHOULD BE PAVED THE GRADED SHOULDER WIDTH MINUS TWO FEET. WHEN SHOULDERS ARE PAVED AND THE GRADED SHOULDER WIDTH IS LESS THAN 6 FEET, THE SHOULDER SHOULD BE PAVED THE WIDTH OF THE GRADED SHOULDER.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS FOR LOCAL ROADS AND STREETS

10-15-02 | RD01-TS-1

REV. 2-5-16: UPDATE GENERAL NOTE (G).

GENERAL NOTES

(A) THIS STANDARD DRAWING IS INTENDED TO BE USED FOR THE DESIGN OF LOW-VOLUME (CURRENT ADT <= 400) ROADWAYS CLASSIFIED AS LOCAL ROADS. FOR ADDITIONAL GUIDANCE NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO AASHTO "GUIDELINES FOR GEOMETRIC DESIGN OF VERY LOW-VOLUME LOCAL ROADS (ADT <= 400)," 2001.

(B) PROJECT WITH DESIGN SPEEDS GREATER THAN 40 MPH SHALL USE STANDARD DRAWING RD01-TS-1.

(C) FOR INTERSECTION SIGHT DISTANCE, SEE PAGES 40 TO 47 OF THE AASHTO "GUIDELINES FOR GEOMETRIC DESIGN OF VERY LOW-VOLUME LOCAL ROADS (ADT <= 400)," 2001.

(D) IF NO ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHOULD BE TRAVELWAY PLUS CLEAR ZONE.

(E) IF ABOVE GROUND UTILITIES ARE INVOLVED, MINIMUM RIGHT-OF-WAY SHOULD BE SUFFICIENT TO ACCOMMODATE THE UTILITIES OUTSIDE THE CLEAR ZONE.

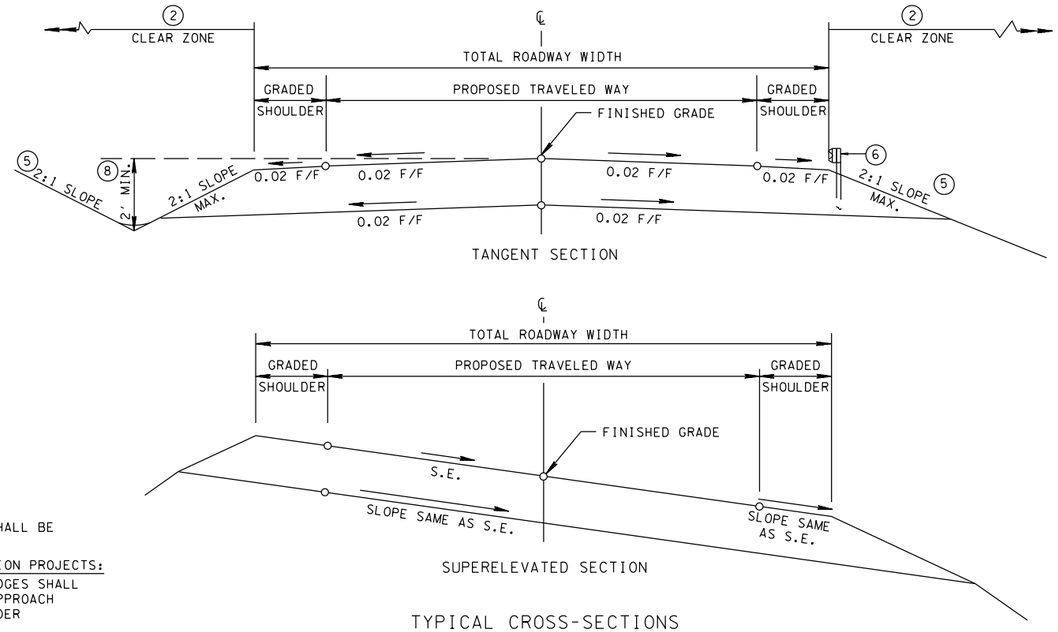
(F) DESIGNER SHOULD CONSIDER ANY KNOWN SITE-SPECIFIC SAFETY PROBLEMS AND TYPICAL DAILY USE OF THE ROADWAY WHEN DETERMINING ROADWAY GEOMETRICS ON A CASE-BY-CASE BASIS. SITE-SPECIFIC SAFETY PROBLEMS MAY BE INDICATED BY CRASH DATA, SKID MARKS, ROADSIDE DAMAGE, SPEED DATA, OR CONCERNS RAISED BY LOCAL OFFICIALS POLICE OR LOCAL RESIDENTS.

(G) FOR EXISTING ROADS, CROSS-SECTION WIDTHS NEED NOT BE MODIFIED, EXCEPT IN THOSE CASES WHERE THERE IS KNOWN EVIDENCE OF A SITE-SPECIFIC SAFETY PROBLEM AS LONG AS THE MINIMUM CRITERIA, AS SHOWN IN THE TABLE BELOW, IS MET.

(H) FOR THIS STANDARD THE FOLLOWING ARE THE POSSIBLE ROADWAY USES:

A. RURAL LOCAL ROADS SERVE A DUAL FUNCTION OF PROVIDING ACCESS TO ABUTTING PROPERTIES AS WELL AS PROVIDING THROUGH OR CONNECTING SERVICE BETWEEN OTHER LOCAL ROADS.
B. RECREATIONAL AND SCENIC ROADS SERVE SPECIALIZED LAND USES, INCLUDING PARKS, TOURIST ATTRACTIONS, AND RECREATION FACILITIES, SUCH AS CAMPSITE OR BOAT-LAUNCH RAMPS. WHEN AVAILABLE, PEAK-SEASON ADT SHOULD BE USED FOR DESIGN.
C. INDUSTRIAL OR COMMERCIAL ACCESS ROADS SERVE DEVELOPMENTS THAT MAY GENERATE A SIGNIFICANT PROPORTION OF TRUCK OR OTHER HEAVY VEHICLE TRAFFIC.
D. URBAN LOCAL ROADWAYS SERVE A DUAL FUNCTION OF PROVIDING ACCESS TO ABUTTING PROPERTIES AS WELL AS PROVIDING THROUGH OR CONNECTING SERVICE BETWEEN OTHER LOCAL ROADS.

(I) ROADWAY SURFACE TYPE SHOULD MATCH EXISTING SURFACE OR SHALL BE DETERMINED BY LOCAL GUIDELINES. WHEN EXISTING SURFACE IS ASPHALT, SEE DESIGN GUIDELINES FOR PAVEMENT DESIGN GUIDANCE.



TYPICAL CROSS-SECTIONS

DESIGN LOADING:
ALL NEW AND REHABILITATED BRIDGES SHALL BE DESIGNED FOR HL-93 LOADING.

FOR NEW CONSTRUCTION OR RECONSTRUCTION PROJECTS:
THE MINIMUM CLEAR WIDTH FOR NEW BRIDGES SHALL BE EQUAL TO THE FULL WIDTH OF THE APPROACH ROADWAY (CURB-TO-CURB OR FULL SHOULDER WIDTH AS APPLICABLE).

TABLE 1

DESIGN STANDARDS FOR LOW-VOLUME LOCAL ROADS AND STREETS (ADT≤400)

DESIGN SPEED (MPH) (9)				15	20	25	30	35	40
MINIMUM TOTAL ROADWAY WIDTH BY USE (FEET)	RURAL LOCAL ROADS			18	18	18	18	18	18
	RECREATIONAL AND SCENIC ROADS			18	18	18	18	18	20
	INDUSTRIAL/COMMERCIAL ACCESS			20	20	21	23	23	23
	URBAN LOCAL ROADS LOW DEVELOPMENT DENSITY (2.0 OR LESS DWELLINGS/ACRE)			20	20	20	20	20	20
	URBAN LOCAL ROADS MEDIUM DEVELOPMENT DENSITY (2.1 TO 6 DWELLINGS/ACRE)			28	28	28	28	28	28
MINIMUM HORIZONTAL CURVE RADIUS (FEET) BY SUPER ELEVATION RATE	ALL CLASSIFICATIONS (3)	NC	-2%	50	107	198	333	510	762
			0%	47	99	181	300	454	667
		RC	2%	44	92	167	273	408	593
			3%	43	89	160	261	389	561
			4%	42	86	154	250	371	533
			5%	41	83	149	240	355	508
			6%	39	81	144	231	340	485
			7%	38	78	139	222	327	464
			8%	38	76	134	214	314	444
MINIMUM STOPPING SIGHT DISTANCE (FEET)	ADT 0 TO 100 (VEH/DAY)			65	90	115	135	170	215
	ADT 101 TO 400 (VEH/DAY)			65	95	125	165	205	250
MINIMUM " K " VALUES	CREST VERTICAL CURVE	ADT 0 TO 100 (VEH/DAY)		2	4	7	9	14	22
		ADT 101 TO 400 (VEH/DAY)		2	5	8	13	20	29
	SAG VERTICAL CURVE			10	17	26	37	49	64
MAXIMUM GRADE (%)	TYPE OF TERRAIN	LEVEL		9	8	7	7	7	7
		ROLLING		12	11	11	10	10	9
		MOUNTAINOUS		17	16	15	14	13	12
SUPERELEVATION				SEE STANDARD DRAWING RD01-SE-2 AND RD01-SE-3 (3)					

TABLE 2

MINIMUM CLEAR WIDTHS AND DESIGN LOADINGS FOR NEW AND RECONSTRUCTED BRIDGES

DESIGN ADT (VEH/DAY)	DESIGN LOADING (STRUCTURAL CAPACITY)	MINIMUM CLEAR WIDTH (FEET) (1)
0 TO 100	HL-93	18
101 TO 400	HL-93	20

TABLE 3

MINIMUM CLEAR WIDTHS AND DESIGN LOADINGS (1) FOR EXISTING BRIDGES TO REMAIN IN PLACE (4)

DESIGN ADT (VEH/DAY)	DESIGN LOADING (STRUCTURAL CAPACITY)	MINIMUM CLEAR WIDTH (FEET) (7)
0 TO 100	H-15	18
101 TO 400	H-15	20

FOOTNOTES

(1) FOR BRIDGE PROJECTS WHERE THE TOTAL APPROACH ROADWAY WIDTH (TRAVELED WAY PLUS SHOULDERS) IS SURFACED, THAT SURFACE WIDTH SHOULD BE CARRIED ACROSS THE STRUCTURE. THE WIDTH OF THE BRIDGE CANNOT BE LESS THAN THE PROPOSED ROADWAY WIDTH SELECTED FROM TABLE 1. THE TOTAL APPROACH ROADWAY WIDTH CANNOT BE LESS THAN THE EXISTING ROADWAY WIDTH, AS DETERMINED ABOVE, HOWEVER, ON UN SURFACED RURAL ROADS, WITHOUT DEFINED TRAVELED WAY OR DEFINED SHOULDERS, THE WIDTH DETERMINED FROM TABLE 1 WILL SUFFICE.

(2) SITE-SPECIFIC CONDITIONS AND ENGINEERING JUDGMENT OF THE DESIGNER SHOULD BE THE TWO PRIMARY DETERMINANTS OF THE APPROPRIATE CLEAR ZONE WIDTH FOR LOW-VOLUME LOCAL ROADS. AT LOCATIONS WHERE A CLEAR ZONE OF 6 FEET OR MORE IN WIDTH CAN BE PROVIDED AT LOW COST AND WITH MINIMUM SOCIAL/ENVIRONMENTAL IMPACT, SUCH CLEAR ZONE SHOULD BE CONSIDERED. WHERE PROVISION OF A CLEAR ZONE IS NOT PRACTICAL, NONE IS REQUIRED.

(3) FOR THE DESIGN OF SUPER ELEVATION TRANSITIONS, USE THE SUPER ELEVATION DESIGN SPEED LISTED DIRECTLY ABOVE THE SELECTED MINIMUM HORIZONTAL CURVE RADIUS. FOR EXISTING ROADS WHERE SUPER ELEVATION IS NOT PRESENT AND NO SITE-SPECIFIC SAFETY PROBLEM IS KNOWN, SUPER ELEVATION MAY NOT BE NECESSARY. REMOVAL OF NORMAL CROWN BY SUPER ELEVATING THE ENTIRE ROADWAY AT THE NORMAL CROSS SLOPE MAY BE USED UNLESS SUPER ELEVATION IS NEEDED AS DETERMINED BY THE DESIGNER. THE DESIGNER SHOULD ASSESS THE PROJECT SITE AND USE ENGINEERING JUDGEMENT WHEN MAKING THIS DETERMINATION. FOR UNPAVED ROADS, REMOVAL OF NORMAL CROWN BY SUPER ELEVATING THE ENTIRE ROADWAY AT THE NORMAL CROSS SLOPE MAY BE USED OR SUPER ELEVATION MAY BE ELIMINATED.

(4) THESE STRUCTURES SHOULD BE ANALYZED INDIVIDUALLY, TAKING INTO CONSIDERATION THE CLEAR WIDTH PROVIDED, TRAFFIC VOLUMES, REMAINING LIFE OF THE STRUCTURE, PEDESTRIAN VOLUMES, SNOW STORAGE, DESIGN SPEED, ACCIDENT RECORD, AND OTHER PERTINENT FACTORS.

(5) MAXIMUM 2(H):1(V) OR AS RECOMMENDED BY THE GEOTECHNICAL OFFICE. WHEN A 2(H):1(V) SLOPE IS USED, AND THE FILL HEIGHT EXCEEDS SIX FEET, GUARDRAIL SHOULD BE CONSIDERED. WHERE RIGHT-OF-WAY IS NOT AN ISSUE, STANDARD DRAWING RD01-S-11 (CASE II) SLOPES MAY BE USED.

(6) SEE GUARDRAIL STANDARD DRAWINGS (S-GR-31, S-GRS, S-GRC-SERIES) FOR GUARDRAIL PLACEMENT. FOR LOW-VOLUME LOCAL ROAD BRIDGE REPLACEMENT PROJECTS, USE MINIMUM GUARDRAIL SHOWN ON STANDARD DRAWING S-PL-6. FOR ALL OTHER PROJECT REFERENCE SHOULD BE MADE TO THE AASHTO "ROADSIDE DESIGN GUIDE", 2002.

(7) CURB-TO-CURB OR BETWEEN RAILS, WHICHEVER IS THE LESSER.

(8) MINIMUM DITCH OR SWALE SHALL BE 2 FEET DEEP WITH 2(H):1(V) SIDE SLOPES. THIS V-DITCH OR SWALE SHALL BE USED UNLESS CONDITIONS NECESSITATE OTHERWISE (SUCH AS DISCHARGE IN DITCH OR UNDERMINING OF ROADWAY SURFACE).

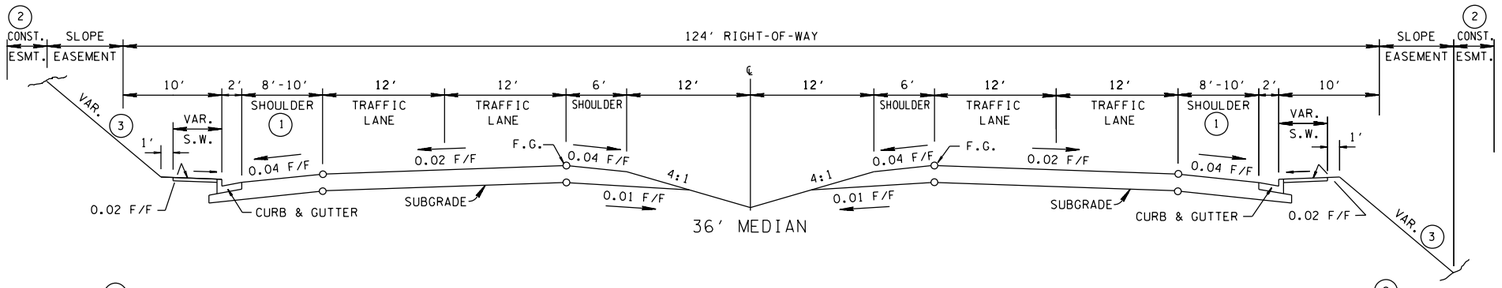
(9) DESIGN SPEED SHOULD BE SELECTED BASED ON ACTUAL OR ANTICIPATED OPERATING SPEED AND CONDITIONS ON THE ROAD BEING DESIGNED.

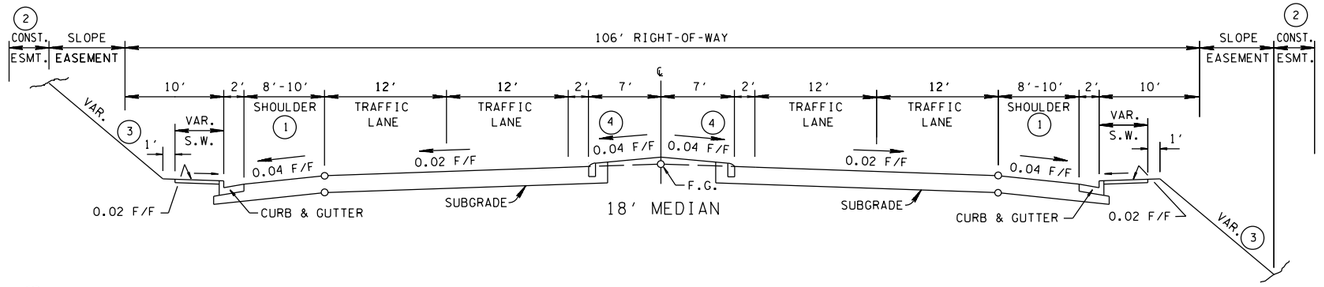
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

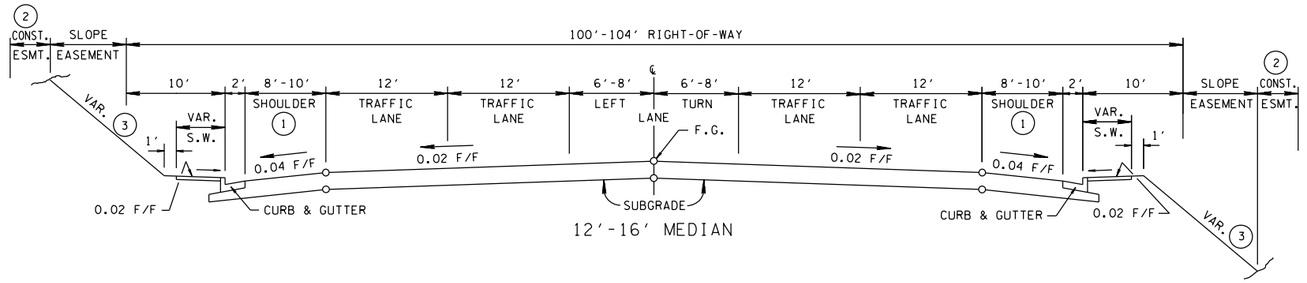
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

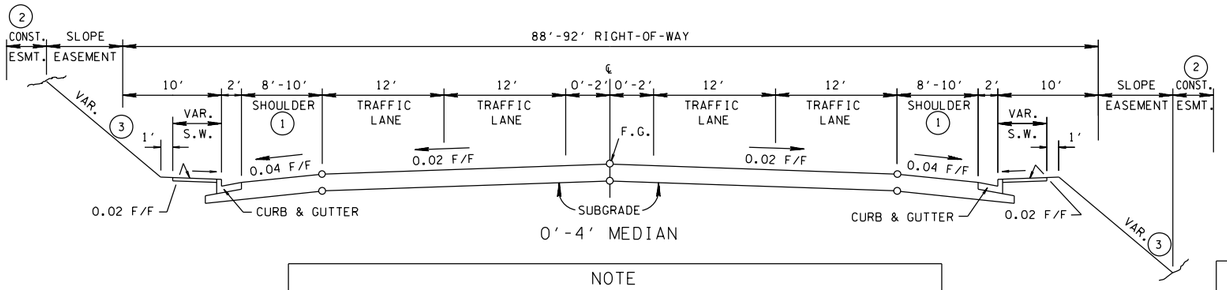
DESIGN STANDARDS FOR LOW-VOLUME LOCAL ROADS (ADT ≤ 400)

3-15-07 | RD01-TS-1A

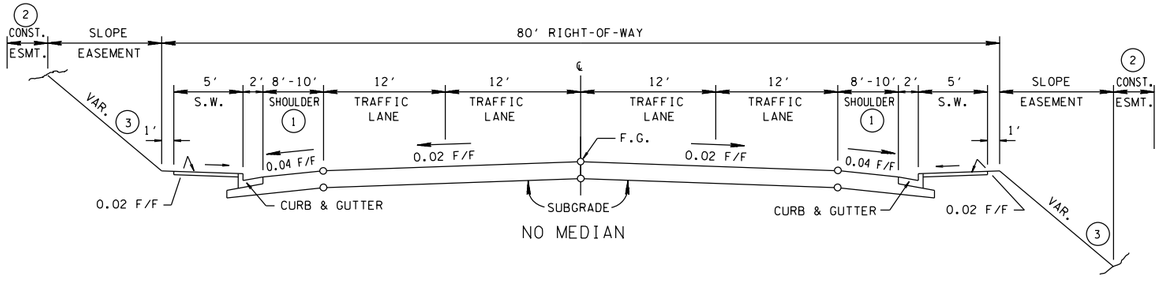








NOTE
THE "NO MEDIAN" TYPICAL, SHOWN BELOW IS NOT TO BE USED UNLESS THE OTHER TYPICALS SHOWN ABOVE ARE NOT APPLICABLE, BECAUSE THE COST OF RIGHT-OF-WAY REQUIREMENTS FOR WIDER SECTIONS WOULD BE PROHIBITIVE.



REV. 10-15-02: NEW SHEET. REPLACES RD-TS-6.

☐ REV. 7-31-13: REVISED SIDEWALK WIDTH.

☐ REV: 1-25-16: REVISED GENERAL NOTES.

GENERAL NOTES

DESIGN SPEED

THESE SECTIONS ARE FOR 45 MILES PER HOUR OR LESS. IF HIGHER SPEED IS PROPOSED USE RD01-TS-6B.

ALIGNMENT

SEE APPROPRIATE STANDARD DRAWING IN THE S-PL-6.

SUPERELEVATION AND MEDIAN BARRIERS

SEE APPROPRIATE STANDARD DRAWING IN THE RD01-SE-SERIES AND S-SSMB-SERIES.

SHOULDER

(1) SHOULDERS LESS THAN 8' USE RD01-TS-6A.

8' MIN. SHOULDER IS REQUIRED FOR VEHICLE EMERGENCIES AND TO PROVIDE PROPER HORIZONTAL OFFSET TO PEDESTRIAN FACILITIES. UNDER ANY CIRCUMSTANCES SHOULDER SHALL NOT BE CONSIDERED TO FACILITIE PEDESTRIAN ACCESS. LOCATIONS WHERE EXISTING ROADWAY IS LACKING MIN 8' SHOULDER WIDTH 3R PROJECTS MIN 4' SHALL BE PROVIDED. IN SOME INSTATES ADJUSTMENT TO LANE WIDTH MAY BE REQUIRED.

CONSTRUCTION EASEMENT

(2) 10 FEET MINIMUM DESIRABLE.

SLOPES

(3) ON URBAN PROJECTS THE BACKSLOPE AND FORESLOPE DESIGN WILL VARY FROM PROJECT TO PROJECT, AS A GENERAL RULE USE THE FOLLOWING:
3:1 SLOPES OR FLATTER ARE DESIRABLE AND ARE THE MAXIMUM IN REGION IV AND 2:1 SLOPES ARE APPLICABLE IN AREAS WHERE RIGHT-OF-WAY RESTRICTIONS OR COST WARRANTS A STEEPER THAN 3:1 SLOPE. THE MAXIMUM SLOPE IN REGION IV IS 3:1.

CURBS

(4) MEDIAN CURBS WILL BE 6" SLOPING CURBS. OUTSIDE CURBS WILL BE 4" SLOPING CURBS (SEE RP-MC-1). 6" VERTICAL CURBS MAY BE USED IN URBAN ZONES.

SIDEWALKS

SIDEWALK WIDTH SHALL NOT INCLUDE THE SIX INCH WIDTH OF PROPOSED CURB. SIDEWALK SHALL BE A MINIMUM OF FIVE FEET WIDE REFER TO RP-H-SERIES FOR CURB RAMP BIKE LANE DETAILS. IF BIKE LANE IS PROPOSED, BIKE LANE SHALL BE PLACED AS FAR AWAY AS POSSIBLE FROM THE EDGE OF TRAVELLED WAY. SEE BIKE LANE BUFFER DETAILS ON T-M-12.

PARKING LANES

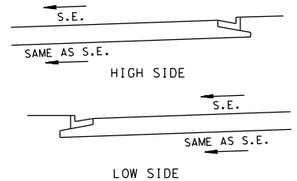
FOR SPECIFIC CONDITIONS NOT COVERED ON THIS SHEET, REFERENCE SHOULD BE MADE TO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS," AASHTO, 2001 PAGE NUMBERS 437-438 AND 482-483 AND MUTCD.

3R PROJECTS

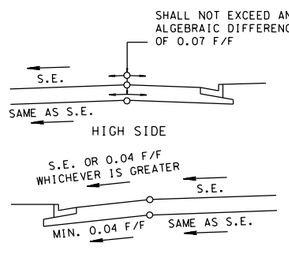
LOCATIONS WHERE EXISTING ROADWAY IS LACKING MIN 8' SHOULDER WIDTH, MIN 4' SHALL BE PROVIDED. IN SOME INSTANCES ADJUSTMENT TO LANE WIDTH MAY BE REQUIRED. IF MIN 4' SHOULDER CANNOT BE ACHIEVED DUE TO THE ROW LIMITATIONS, UTILITY CONFLICTS, ETC.; THAN ADDITIONAL MITIGATION STRATEGIES SUCH AS REDUCING DESIGN SPEED, OR GROUND MOUNTED ADVANCED WARNING SIGNS SHALL BE CONSIDERED.

BIKE LANE SHOULDER CROSS SLOPES

ON PROJECTS, WHERE IN THE NEAR FUTURE THE SHOULDER MAY BE USED AS A THROUGH TRAFFIC LANE, THE PAVEMENT SLOPE (0.02 FOOT/FOOT) SHOULD BE USED ON THE SHOULDER IN PLACE OF THE 0.04 FOOT/FOOT SLOPE SHOWN ON THE TYPICAL SECTION. SEE DETAIL FOR SUPERELEVATION OF SHOULDER WITH 0.02 FOOT/FOOT SLOPE.



SUPERELEVATION DETAIL FOR SHOULDERS



SUPERELEVATION DETAIL FOR SHOULDERS

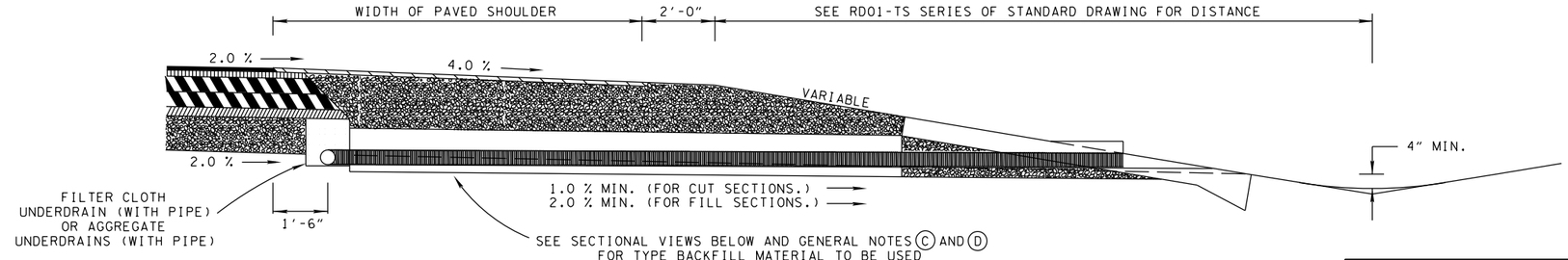
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL CURB AND GUTTER SECTIONS WITH SHOULDER

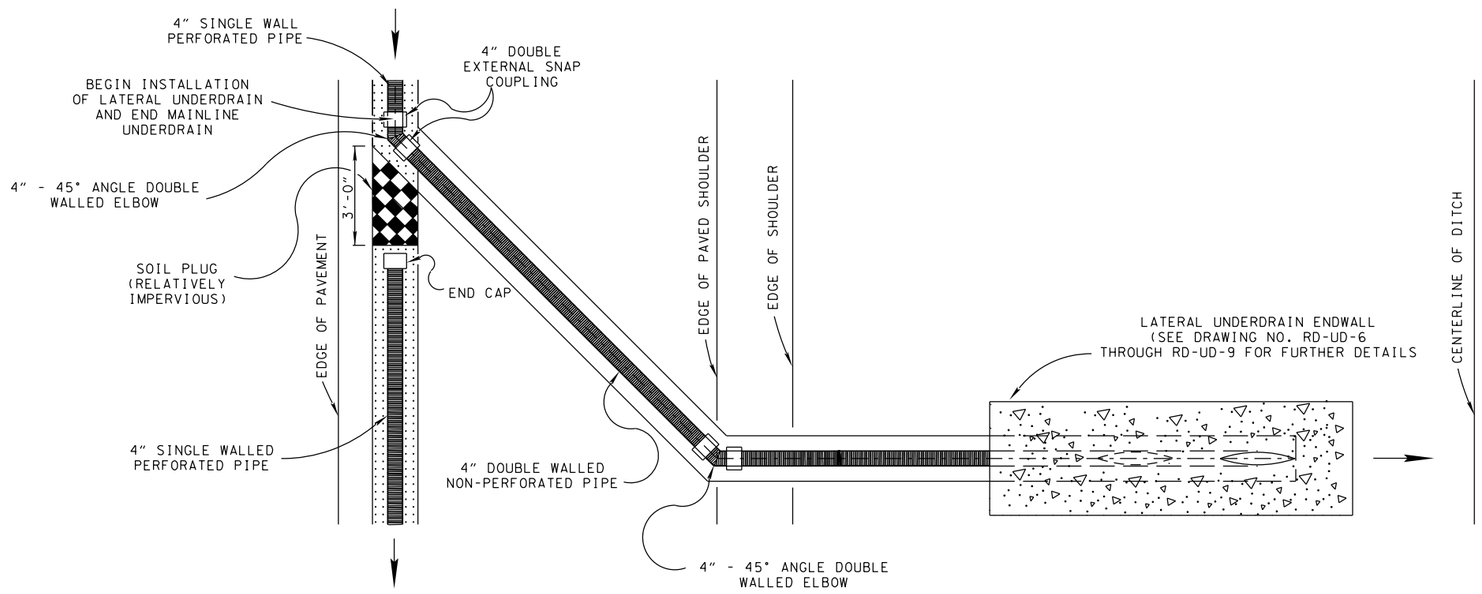
10-15-02 | RD01-TS-6

- REV. 7-29-96: REDREW AND REORGANIZED SHEET. MOVED MATERIAL REGARDING MAINLINE UNDER DRAINS TO STANDARD DRAWING NO. RD-UD-3. MOVED MATERIAL REGARDING LATERAL UNDER DRAINS FROM STANDARD DRAWING NO. RD-UD-3.
- REV. 9-5-96: INCREASED THE MINIMUM PERCENT OF GRADE IN THE LATERAL FROM 1 % TO 2 % FOR FILL SECTIONS.
- REV. 5-27-01: CORRECTED PAY ITEM IN GENERAL NOTE Ⓒ.
- REV. 1-25-16: CORRECTED REFERENCE TO RD01-TS IN PROFILE VIEW.



PROFILE VIEW

FOUR INCH MINIMUM REPRESENTS DROP FROM BOTTOM EDGE OF LATERAL ENDWALL TO FLOW LINE OF DITCH.



PLAN VIEW

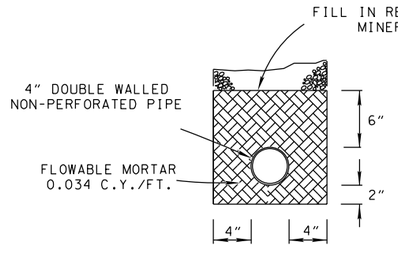
GENERAL NOTES

Ⓐ AGGREGATE OR FILTER CLOTH UNDERDRAINS AND UNDERDRAIN LATERAL OUTLETS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 710 AND/OR SPECIAL PROVISIONS.

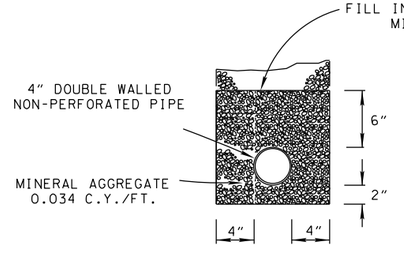
Ⓑ FOUR-INCH DOUBLE WALLED (CORRUGATED EXTERIOR AND SMOOTH INTERIOR WALL) NON-PERFORATED PIPE SHALL CONFORM TO REQUIREMENTS OF AASHTO M252, TYPE "S". IT SHALL BE PAID FOR UNDER THE PRICE BID FOR ITEM NO. 710-05, LATERAL UNDERDRAIN PER LINEAR FOOT.

Ⓒ BACKFILL MATERIAL USED WITH UNDERDRAIN LATERALS ON INTERSTATE AND FREEWAY SYSTEMS SHALL BE FLOWABLE MORTAR. FLOWABLE MORTAR BACKFILL SHALL MEET THE REQUIREMENTS OF SUBSECTION 204.06 OF THE STANDARD SPECIFICATIONS. IT SHALL BE PAID FOR UNDER THE PRICE BID FOR ITEM NO. 204-08.01, BACKFILL MATERIAL (FLOWABLE FILL) PER CUBIC YARD.

Ⓓ BACKFILL MATERIAL USED WITH UNDERDRAIN LATERALS ON ALL OTHER HIGHWAY SYSTEMS SHALL BE MINERAL AGGREGATE. MINERAL AGGREGATE BACKFILL SHALL MEET REQUIREMENTS OF SUBSECTION 903.05 OF THE STANDARD SPECIFICATIONS FOR CLASS "A" OR CLASS "B" GRADING "D". IT SHALL BE PAID FOR UNDER THE PRICE BID FOR ITEM NO. 710-05, LATERAL UNDERDRAIN PER LINEAR FOOT.



TYPICAL LATERAL UNDERDRAIN BACKFILL WITH FLOWABLE MORTAR SECTIONAL DETAIL



TYPICAL LATERAL UNDERDRAIN BACKFILL WITH MINERAL AGGREGATE SECTIONAL DETAIL

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

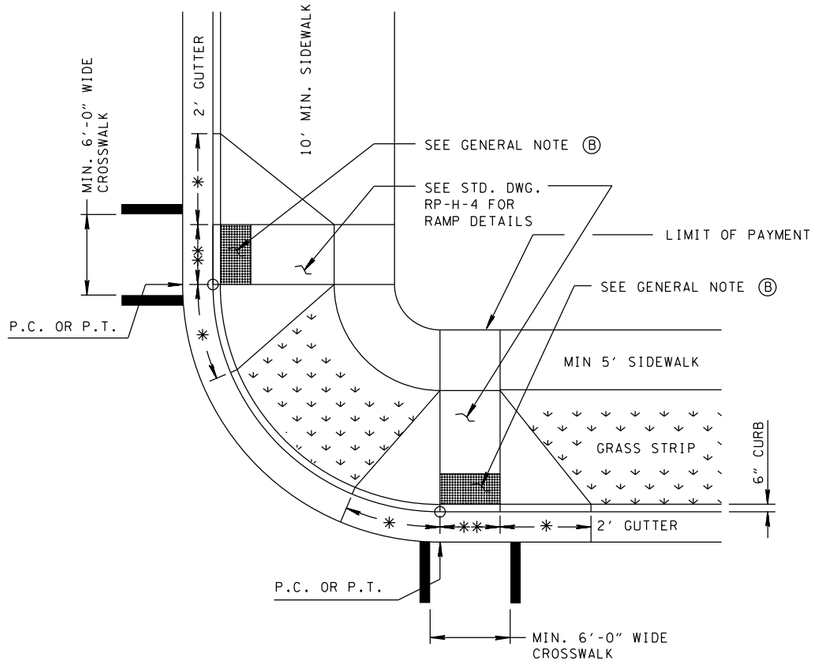
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

UNDERDRAIN LATERAL DETAILS

7-29-96 | RD-UD-4

- REV. 4-13-11: ADJUSTED CROSSWALK MARKINGS, ADDED TYPE 2 SIDEWALK DIMEMSION, MISC. EDITS TO DRAWING.
- REV. 5-8-13: REVISED TITLE FOR TERMINOLOGY.
- REV. 6-4-13: REVISED NOTE Ⓒ AND Ⓓ, CHANGED TITLE.
- REV. 1-15-14: REMOVED ALTERNATE, REMOVED NOTE Ⓔ, ADDED NOTE Ⓔ.

  REV. 2-5-16: RENAMED TITLE, REMOVED ALTERNATE. MINOR DRAFTING EDITS.



RAMP OUTSIDE RADIUS (WITH GRASS STRIP OR WIDE SIDEWALK)

✳ DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE

✳✳ 4'-0" MINIMUM REQUIRED

GENERAL NOTES

Ⓐ FOR SIGNALIZED INTERSECTIONS THAT REQUIRE PEDESTRIAN SIGNAL PUSH BUTTONS, SEE STANDARD DRAWING NO. T-SG-7.

Ⓑ SEE STANDARD DRAWING RP-H-3 FOR TRUNCATED DOMED SURFACE DETAILS.

Ⓒ SIDEWALK WIDTH SHALL NOT INCLUDE 6" CONCRETE CURB.

Ⓓ GRATES FOR STORM DRAINS SHALL NOT BE PLACED IN THE CROSSWALK OR IN FRONT OF THE CURB RAMP.

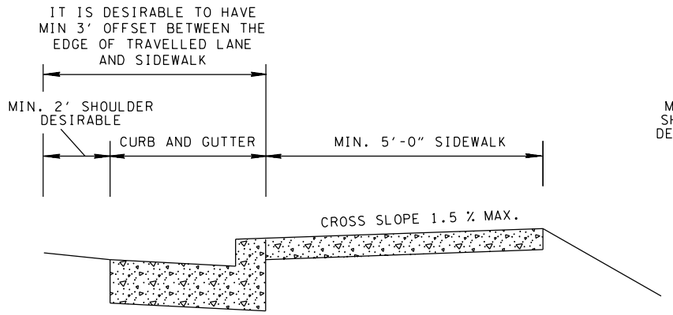
Ⓔ IF THE RAMP AND LANDING CAN NOT BE CONSTRUCTED DUE TO LIMITED RIGHT-OF-WAY USE PARALLEL RAMP INSTEAD.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

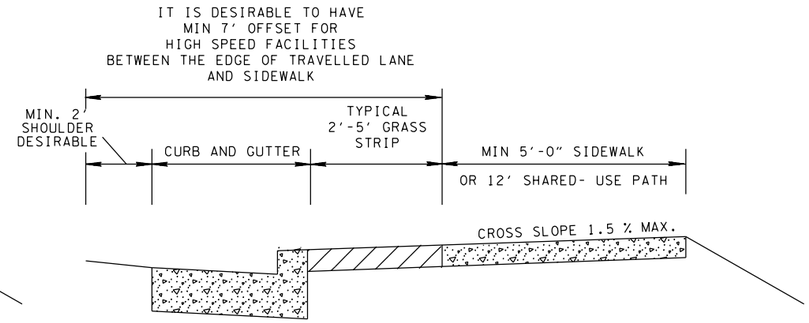
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP PLACED OUTSIDE CURVE

1-15-07 | RP-H-8

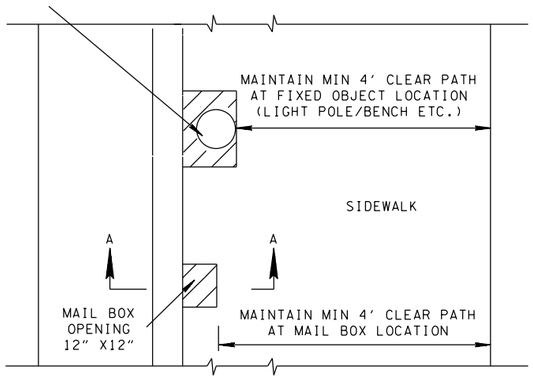


TYPICAL SIDEWALK CROSS SECTION

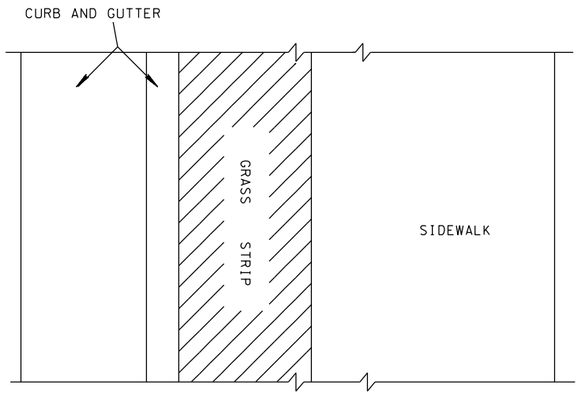


TYPICAL SIDEWALK CROSS SECTION
WITH GRASS STRIP

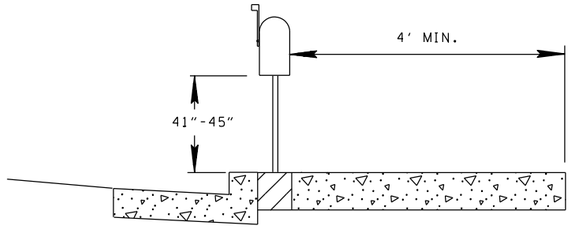
LEAVE SQUARE OPENING IN SIDEWALK. THE LENGTH OF THE SIDE OF THE SQUARE OPENING SHOULD BE EQUAL TO THE DIAMETER OF THE FIXED OBJECT PLUS SIXTEEN INCHES, IT WILL BE BORDERED BY HALF INCH EXPANSION JOINT.



SIDEWALK CONSTRUCTION DETAILS
PLAN VIEW



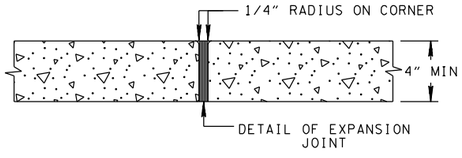
MIN. 5 FEET SIDEWALK WITH GRASS STRIP
PLAN VIEW



SECTION A-A

MAIL BOX DETAIL

LEAVE 12"X12" OPENING IN SIDEWALK FOR MAIL BOX POST. ORIENT BOXES TO FACE THE DIRECTION OF ONCOMING TRAFFIC. EDGE OF MAIL BOX SHALL NOT OVERHANG BEYOND THE FACE OF THE CURB. NOR SHALL THE MAIL BOX OVERHANG THE SIDEWALK SUCH THAT THE USABLE WIDTH IS LESS THAN 4 FEET.



EXPANSION JOINT DETAIL

REFERENCED STANDARD DRAWINGS

SEE T-M-4 FOR CROSS WALK MARKING
SEE RP-H-SERIES FOR CURB RAMP DETAILS
SEE S-BPR-1 FOR PEDESTRIAN RAIL REQUIREMENTS
SEE RP-S-9 FOR ALTERNATNE PEDESTRIAN FACILITY DETAILS FOR REHABILITATION PROJECTS
SEE RP-MC-1 OR 2 FOR CURB AND GUTTER DETAILS
SEE T-M-10, 11, 12, 13, 14, FOR BIKE LANE/ROUTE PAVEMENT MARKINGS
SEE RD01-TS-8 FOR SHARED USE PATH DETAILS

GENERAL NOTES

(A) ALWAYS PLACE SIDEWALK AS FAR AS AWAY FROM THE TRAVELLED WAY WHEN POSSIBLE FOR SPECIFICATIONS SEE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION.

(B) WHERE IT BECOMES NECESSARY TO REMOVE PARTS OF EXISTING CONCRETE SIDEWALKS OR RAMPS, THE RESULTING EDGES SHALL BE CUT TO A NEAT LINE, AND ANY OFFSETS IN SUCH LINES SHALL BE MADE AT RIGHT ANGLES.

(C) SIDEWALK WIDTHS DO NOT INCLUDE THE SIX INCH CURB WIDTH OF PROPOSED TOP OF CURB.

(D) DESIREABLE SIDEWALK CROSS SLOPE IS 1.5 %, ABSOLUTE MAXIMUM IS 2.0 %.

CONSTRUCTION NOTES

(E) EXPANSION JOINTS ARE TO BE PLACED 25 TO 30 FEET APART DEPENDING ON TRANSVERSE JOINT MARKINGS AND NEED TO MATCH CURB EXPANSION JOINT WHERE SIDEWALK IS BUILT DIRECTLY AGAINST CURB.

(F) CONCRETE JOINT MATERIAL TO BE FLUSH WITH THE SIDEWALK SURFACE, HALF INCH AND/OR ONE INCH PREMOLDED FIBER IN ACCORDANCE WITH SECTION 905 OF THE STANDARD SPECIFICATIONS.

(G) EXPANSION JOINTS ARE TO BE PLACED AS SHOWN ON THIS DRAWING OR AS DIRECTED BY THE ENGINEER WHERE THE PROPOSED SIDEWALK IS IN CONTACT WITH THE STREET RETURNS, ON BUILDING LINES PRODUCED AT STREET INTERSECTIONS, WHERE WALKS LEAD TO HOUSE OR OTHER ENTRANCES AND ANY OTHER LOCATIONS WHERE STRESSES MAY DEVELOP. THE COST OF ALL EXPANSION JOINTS IS TO BE INCLUDED IN THE UNIT PRICE BID FOR THE PROPOSED SIDEWALK.

(H) ONE INCH EXPANSION JOINTS ARE TO BE PLACED WHERE THE PROPOSED SIDEWALK IS IN CONTACT WITH CIRCULAR CURBS, BUILDINGS AND/OR RETAINING WALLS.

(I) HALF INCH EXPANSION JOINTS ARE TO BE USED AT ALL OTHER LOCATIONS.

(J) LONGITUDINAL JOINT MARKINGS WILL NOT BE REQUIRED ON SIDEWALKS 5 FEET OR LESS IN WIDTH.

(K) ONE LONGITUDINAL JOINT MARKING WILL BE REQUIRED ON SIDEWALKS OVER 5 FEET BUT LESS THAN 9 FEET IN WIDTH.

(L) TWO LONGITUDINAL JOINT MARKINGS WILL BE REQUIRED ON SIDEWALKS OVER 9 FEET BUT LESS THAN 12 FEET IN WIDTH.

(M) TRANSVERSE JOINT MARKINGS ARE TO BE MADE TO FORM BLOCKS AS NEARLY TO SQUARE AS PRACTICAL.

REV. 7-1-72: CHANGED DEPARTMENT NAME.

REV. 1-1-76: CHANGED DWG. NO. FROM P-S-7a(68) TO RP-S-7.

REV. 5-14-87: ADDED EXPANSION JOINTS BETWEEN CURB AND SIDEWALK.

REV. 4-15-91: REDREW, RENAMED AND REORGANIZED SHEET. MOVED INFORMATION REGARDING CONCRETE STEPS TO DWG. NO. RP-S-8.

☐ REV. 7-29-96: CHANGED GENERAL NOTE (G).

☐ REV. 5-7-13: ADDED MAIL BOX DETAIL.

☐ REV. 6-4-13: REVISED NOTES (C) AND (G) AND ADDED NOTE (L).

☐ REV. 11-25-13: REVISED NOTE (2).

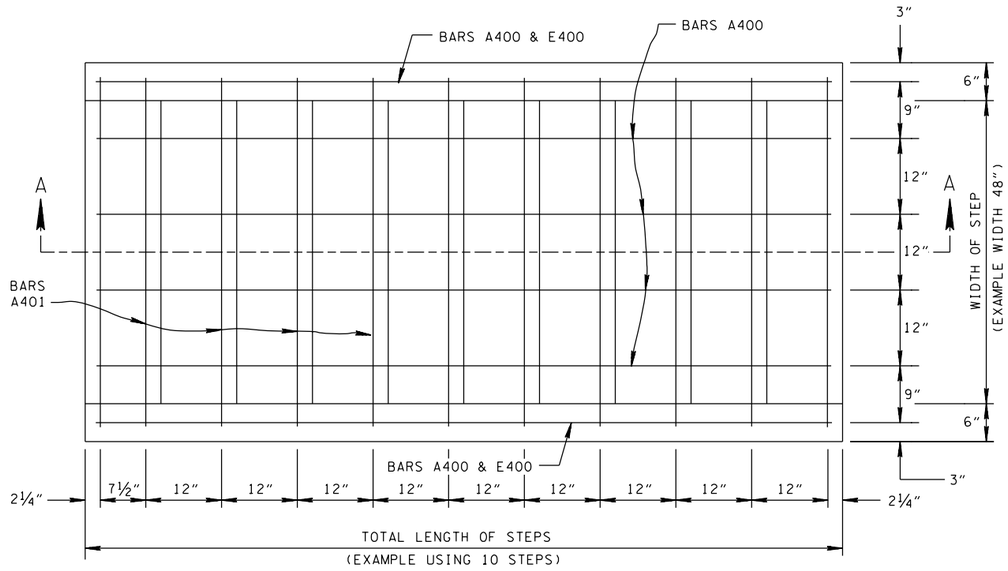
REV. 2-5-16: REDRAWN, REVISED NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

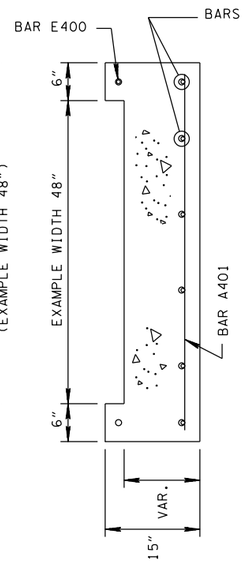
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DETAILS FOR CONCRETE SIDEWALKS

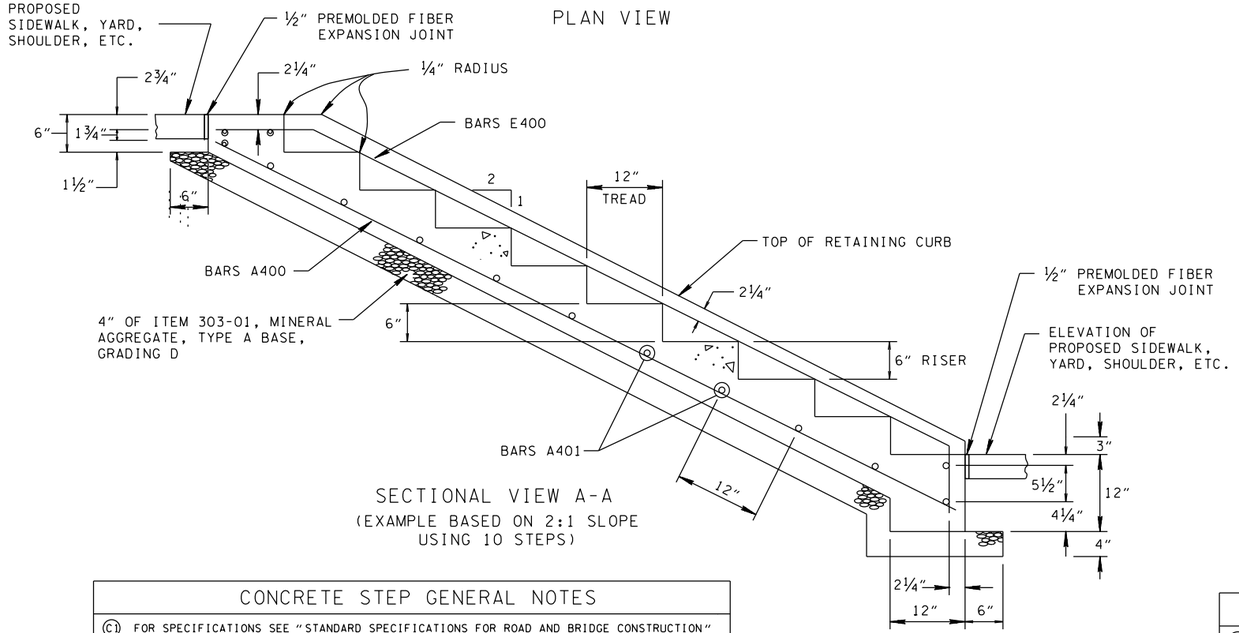
1-19-96 | RP-S-7



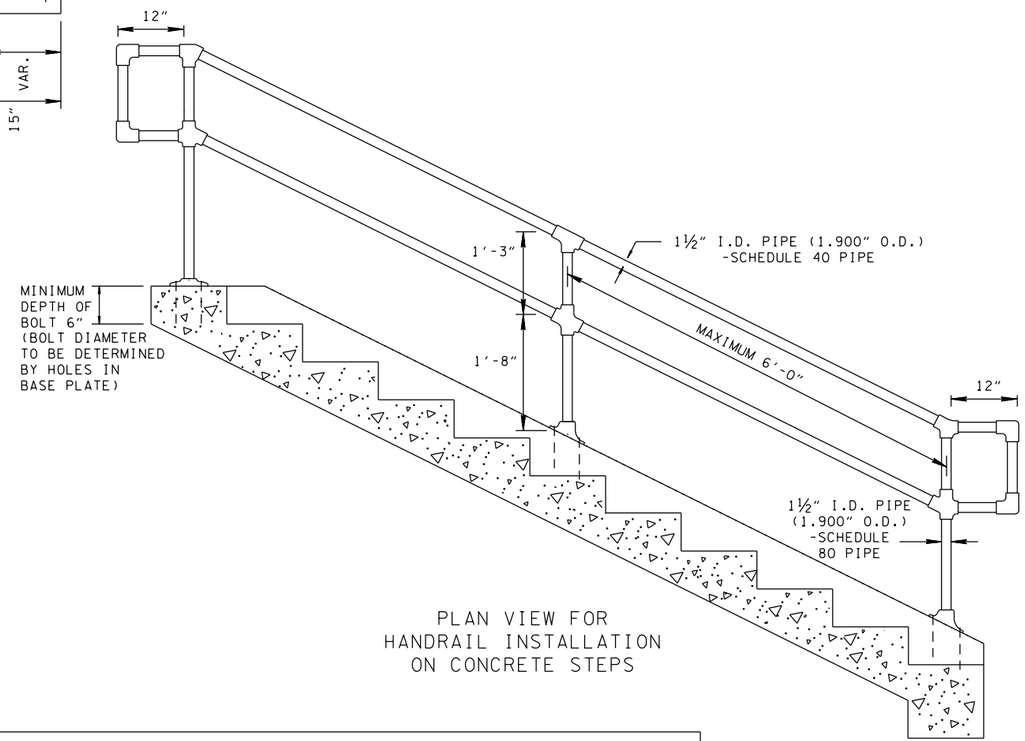
PLAN VIEW



STEP CROSS SECTION



SECTIONAL VIEW A-A
(EXAMPLE BASED ON 2:1 SLOPE USING 10 STEPS)



PLAN VIEW FOR HANDRAIL INSTALLATION ON CONCRETE STEPS

CONCRETE STEP GENERAL NOTES

(C1) FOR SPECIFICATIONS SEE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION.

(C2) CONCRETE STEPS MAY BE CAST IN PLACE OR PRECAST. ALL CONCRETE CAST IN PLACE TO BE CLASS "A". ALL PRECAST TO BE 4000 POUNDS PER SQUARE INCH.

(C3) ALL EXPOSED EDGES ARE TO BE ROUNDED USING A QUARTER INCH RADIUS.

(C4) THE TREAD IS TO BE TWELVE INCHES DEEP. THE RISER HEIGHT IS TO BE VARIED SO AS TO CONFORM TO THE PROPOSED SLOPE. A MAXIMUM RISER HEIGHT OF NINE INCHES IS NOT TO BE EXCEEDED.

(C5) CONCRETE JOINT MATERIAL TO BE ½" PREMOLDED FIBER IN ACCORDANCE WITH SECTION 905 OF THE STANDARD SPECIFICATIONS. COST OF JOINT MATERIAL WILL BE INCLUDED IN THE COST OF OTHER ITEMS.

(C6) ALL REINFORCING STEEL TO ADHERE TO SPECIFICATION ASTM A 615. ALL REINFORCING STEEL TO BE NO. 4 BARS.

(C7) THE COST OF EXCAVATION BELOW LEVEL ON PROPOSED SLOPE TO BE INCLUDED IN THE COST OF OTHER ITEMS.

(C8) PAYMENT FOR CONCRETE STEPS WILL BE MADE AS FOLLOWS:

ITEM NO. 604-01.01, CLASS "A" CONCRETE (ROADWAY) PER CUBIC YARD.

ITEM NO. 604-01.02, STEEL BAR REINFORCEMENT (ROADWAY) PER POUND.

HANDRAIL GENERAL NOTES

(H1) PIPE CROSS MEMBERS ARE TO ADHERE TO SPECIFICATION ASTM A 53 TYPE E OR S-GRADE A OR B.

(H2) THE PIPE HANDRAIL IS TO BE PAINTED BLACK IN COLOR AND ADHERE TO FEDERAL SPECIFICATION TT-E-489H.

(H3) THE PIPE HANDRAIL IS TO BE USED ONLY AS A PROTECTION FOR PEDESTRIANS AND SHOULD NOT BE PLACED IN ANY LOCATION WHERE IT MIGHT BE SUBJECT TO VEHICULAR IMPACT. FOR VEHICULAR PROTECTION STANDARD GUARD RAIL SHOULD BE USED.

(H4) THE PIPE HANDRAIL IS TO BE PAID FOR UNDER ITEM NO. 604-01.04, 1½" STEEL PIPE HANDRAIL PER LINEAR FEET.

(H5) THE PIPE HANDRAIL SHALL BE REQUIRED WITH FIVE OR MORE STEPS AND WILL MEET THE FOLLOWING CONDITIONS:

1. ON STEPS LESS THAN 44 INCHES WIDE HAVING BOTH SIDES ENCLOSED, AT LEAST ONE HANDRAIL PREFERABLY ON THE RIGHT SIDE DESCENDING.
2. ON STEPS LESS THAN 44 INCHES WIDE HAVING ONE SIDE OPEN, ONE HANDRAIL ON EACH SIDE.
3. ON STEPS LESS THAN 44 INCHES WIDE HAVING BOTH SIDES OPEN, ONE HANDRAIL ON EACH SIDE.
4. ON STEPS MORE THAN 44 INCHES WIDE BUT LESS THAN 88 INCHES WIDE, ONE HANDRAIL ON EACH SIDE.
5. ON STEPS 88 OR MORE INCHES WIDE, ONE HANDRAIL ON EACH SIDE, AND ONE INTERMEDIATE HANDRAIL LOCATED APPROXIMATELY MIDWAY OF THE WIDTH.

REV. 7-1-72: CHANGED DEPARTMENT NAME.

REV. 1-1-76: CHANGED DWG. NO. FROM P-S-7a(68) TO RP-S-7.

REV. 4-15-91: DREW NEW SHEET INCLUDING INFORMATION PREVIOUSLY ON DRAWING NUMBER RP-S-7 REGARDING CONCRETE STEPS. ADDED ADDITIONAL INFORMATION ABOUT CONSTRUCTION OF STEPS. ADDED PIPE HANDRAIL DETAILS.

☐ REV. 1-19-93: CHANGED PIPE SCHEDULES FOR HANDRAIL AND PAINT SPECIFICATIONS.

REV. 2-5-16: ADDED 12" EXTENTION BEYOND ENDS OF HAND RAIL.

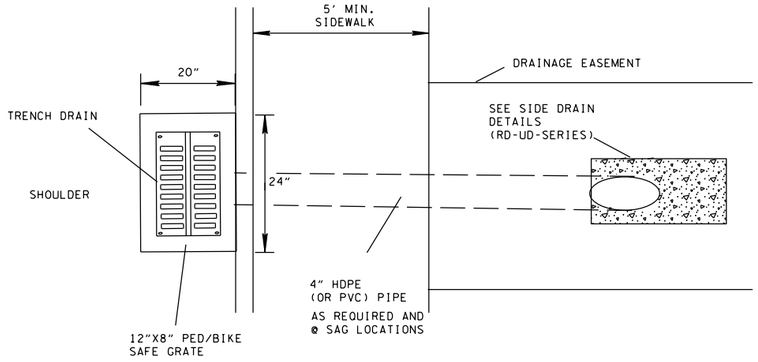
☒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

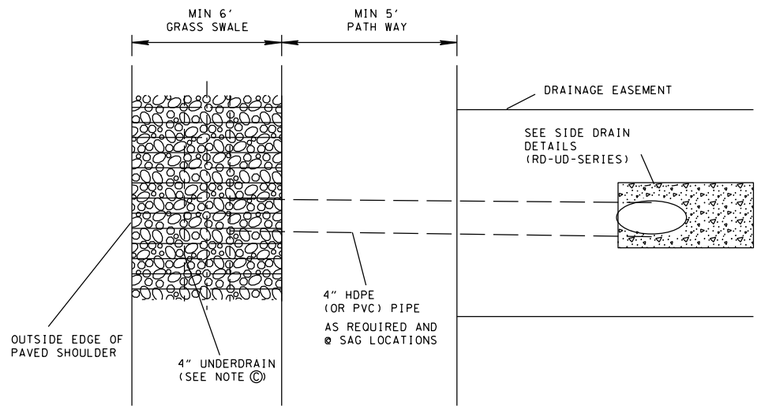
DETAILS FOR STANDARD CONCRETE STEPS AND PIPE HANDRAILS

4-15-91 | RP-S-8

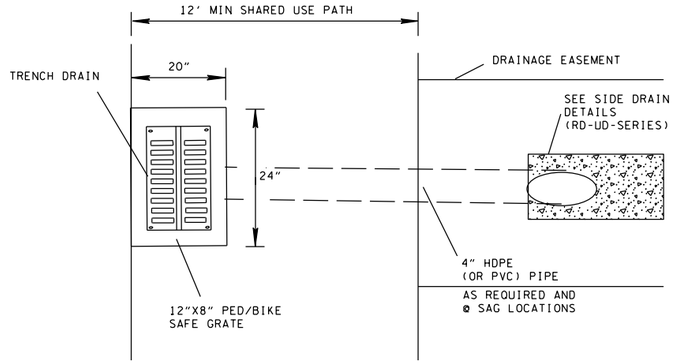
LOW-COST PEDESTRIAN FACILITY ALTERNATIVES FOR ROADS AND STREETS WITHOUT CURB AND GUTTER



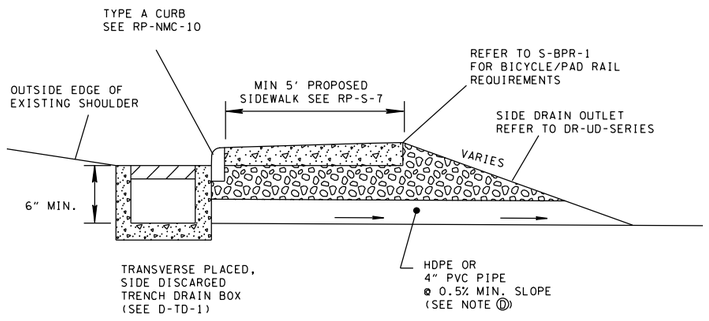
SIDEWALK
PLAN VIEW



SIDEWALK
PLAN VIEW



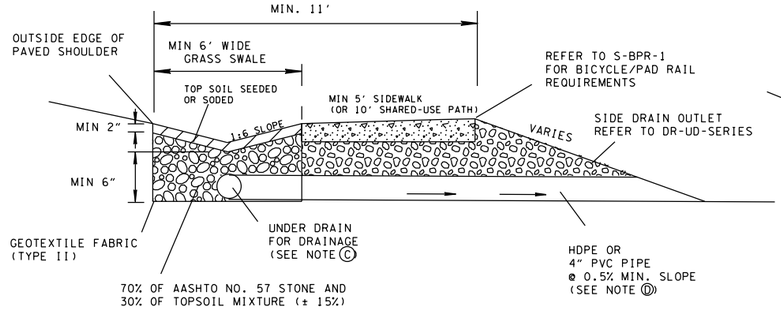
SHARED-USE-PATH
PLAN VIEW



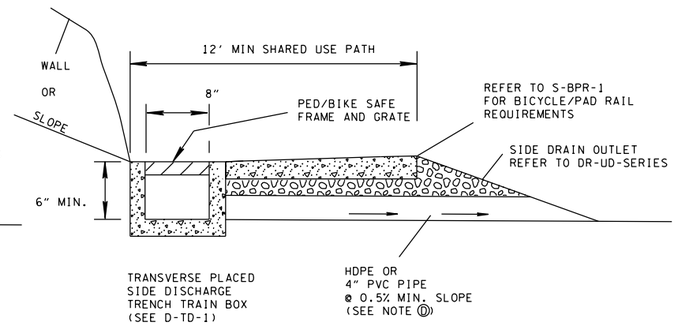
SIDEWALK WITH TYPE "A" OR 6" VERTICAL CURB
ALWAYS MAINTAIN MIN 3' OFFSET BETWEEN THE EDGE OF TRAVELLED WAY AND PEDESTRIAN FACILITY.

SECTION VIEW

EXISTING FACULTIES LACKING STORM WATER DRAINAGE SYSTEM A SEPARATED PATHWAY MAY BE USED TO EMBRACED THE NEED OF STORM WATER SYSTEM.



SECTION VIEW



SECTION VIEW

DRAINAGE DETAIL TO CAPTURE OFF SITE STORM WATER FOR SHARED USE PATHS

GENERAL NOTES

1. NOT FOR NEW CONSTRUCTION. LOW-COST PEDESTRIAN FACILITY DETAILS MAY BE USED FOR REHABILITATION PROJECTS ONLY.
2. DETAILS MAY BE USED ON LOCAL ROADS AND STREETS WHERE INSTALLING NEW STORM WATER SYSTEM MAY NOT BE POSSIBLE.
3. SEE RP-S-7 FOR SIDEWALK DETAILS.
4. SEE RP-H-SERIES FOR CURB RAMP DETAILS.

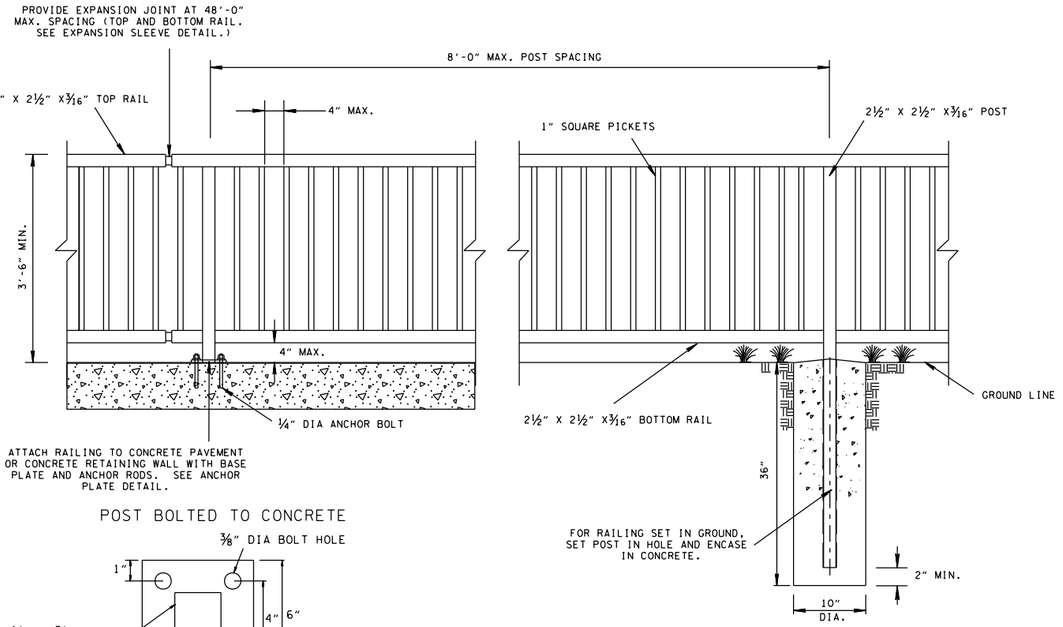
DRAINAGE GENERAL NOTES

- (A) ALTERNATE DRAINAGE DETAILS MAY BE USED AT LOCATIONS WHERE INSTALLING NEW STORM WATER SYSTEM IS NOT FEASIBLE.
- (B) PAYMENT FOR TRENCH DRAINS WILL BE MADE UNDER ITEM NUMBER 611-05.01, TRENCH DRAIN PER LINEAR FOOT.
- (C) ALL COST FOR TRENCHING, FURNISHING AND INSTALLING THE PIPE AND AGGREGATE FOR THE UNDERDRAIN WITH PIPE WILL BE INCLUDED IN THE BID PRICE FOR ITEM NO. 710-02, AGGREGATE UNDERDRAINS (WITH PIPE) OR ITEM NO. 710-04, FILTER CLOTH UNDERDRAIN (WITH PIPE). THE UNIT OF PAYMENT WILL BE PER LINEAR FOOT.
- (D) BACKFILL MATERIAL USED WITH UNDERDRAIN LATERALS ON ALL HIGHWAY SYSTEMS SHALL BE MINERAL AGGREGATE. MINERAL AGGREGATE BACKFILL SHALL MEET REQUIREMENTS OF SUBSECTION 903.05 OF THE STANDARD SPECIFICATIONS FOR CLASS "A" OR CLASS "B" GRADING "D". IT SHALL BE PAID FOR UNDER THE PRICE BID FOR ITEM NO. 710-05, LATERAL UNDERDRAIN PER LINEAR FOOT.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

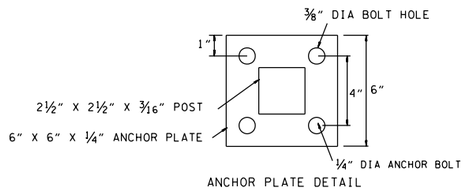
ALTERNATE DETAILS FOR PEDESTRIAN FACILITIES

2-5-16 | RP-S-9

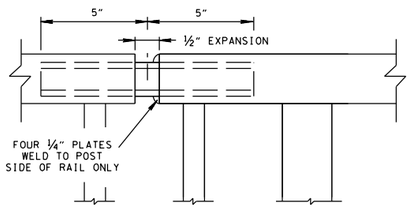


POST BOLTED TO CONCRETE

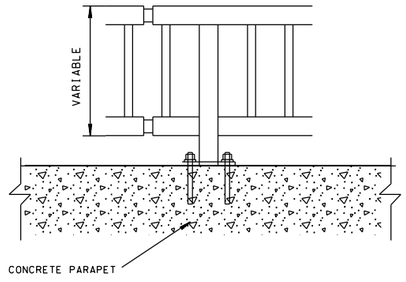
POST SET IN GROUND



ANCHOR PLATE DETAIL



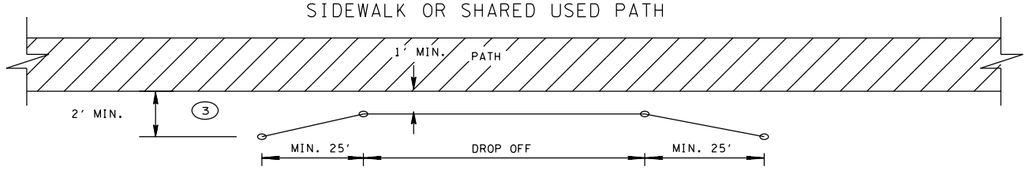
EXPANSION SLEEVE DETAIL ⑤



ALTERNATE INSTALLATION

RETROFITING EXISTING CONCRETE BARRIER TO MEET MIN 42" HIGH PED/BIKE SAFE RAIL

TYPICAL PLAN VIEW
SIDEWALK OR SHARED USED PATH



ALTERNATE PLAN VIEW

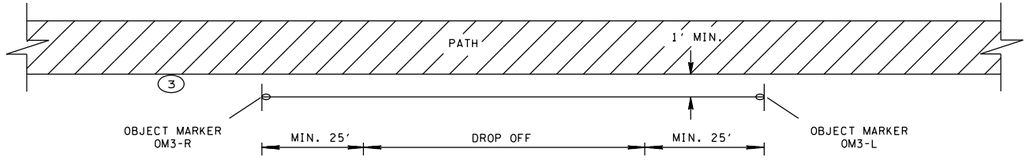
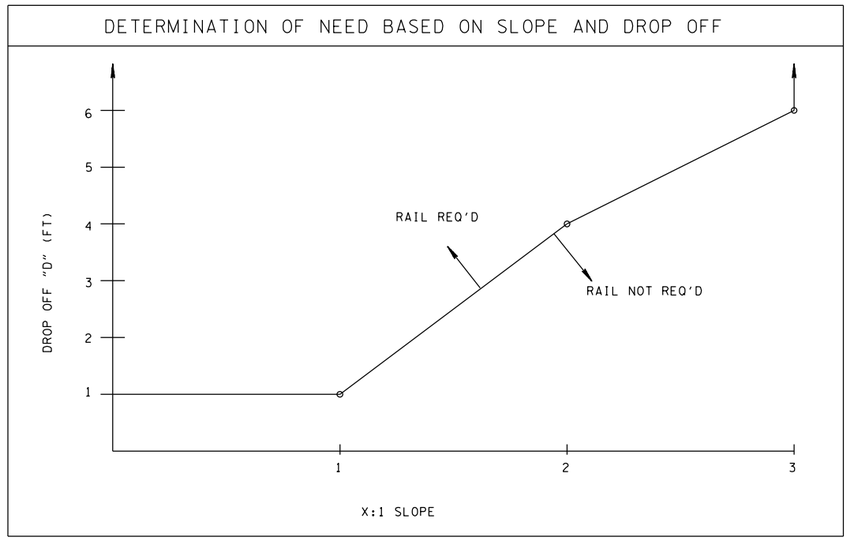
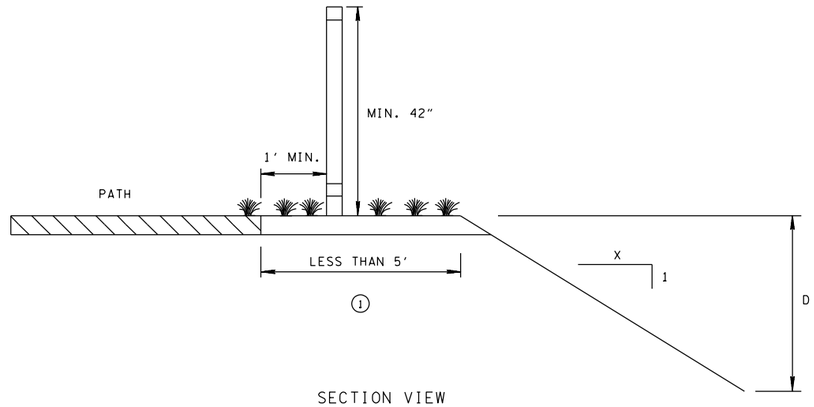


FIGURE Ⓐ

DETERMINATION OF NEED BASED ON SLOPE AND DROP OFF





SECTION VIEW

GENERAL NOTES

① TO DETERMINE IF SAFETY RAIL IS REQUIRED, REFER TO FIGURE Ⓐ WHEN SHARED USE PATH OR SIDEWALK EDGE DROP OFF IS WITHIN 5'. INFORMATION IS PROVIDED FOR GUIDANCE ONLY, SOME SITES MAY REQUIRE A RAIL PER ENGINEERING JUDGEMENT.

② SAFETY RAIL SHALL BEGIN 25' BEFORE AND EXTEND 25' BEYOND AREA OF NEED.

③ SAFETY RAIL ENDS SHALL BE FLARED TO BEYOND 2' OF THE EDGE OF THE PATH OR MARKED WITH OBJECT MARKERS.

④ STEEL SHALL CONFORM TO ASTM A36. WELD ALL COMPONENTS USE 3⁄16" FILLET WELDS. GRIND WELDS AND CONNECTIONS AS REQUIRED TO PROVIDE A SMOOTH SURFACE, FREE OF BURRS.

FIELD PAINT SAFETY RAIL AFTER INSTALLATION AS SPECIFIED IN THE CONTRACT DOCUMENTS.

⑤ DETAIL SHOWN IS FOR TOP RAIL. EXPANSION JOINT FOR BOTTOM RAIL IS SIMILAR.

⑥ SYSTEM REPLACEMENTS MAY BE ALLOWED PROVIDING THAT THE HEIGHT AND SPACING LIMITATIONS SHOWN ON THIS DRAWING ARE MET.

⑦ TO BE PAID FOR UNDER ITEM NO. 604-01.20 BOX TUBE SAFETY RAIL PER LINER FOOT.

☐ REV. 6-4-14: CHANGED PAY ITEM NO.

REV. 2-5-16: ADDED ALTERNATE INSTALL DETAIL.

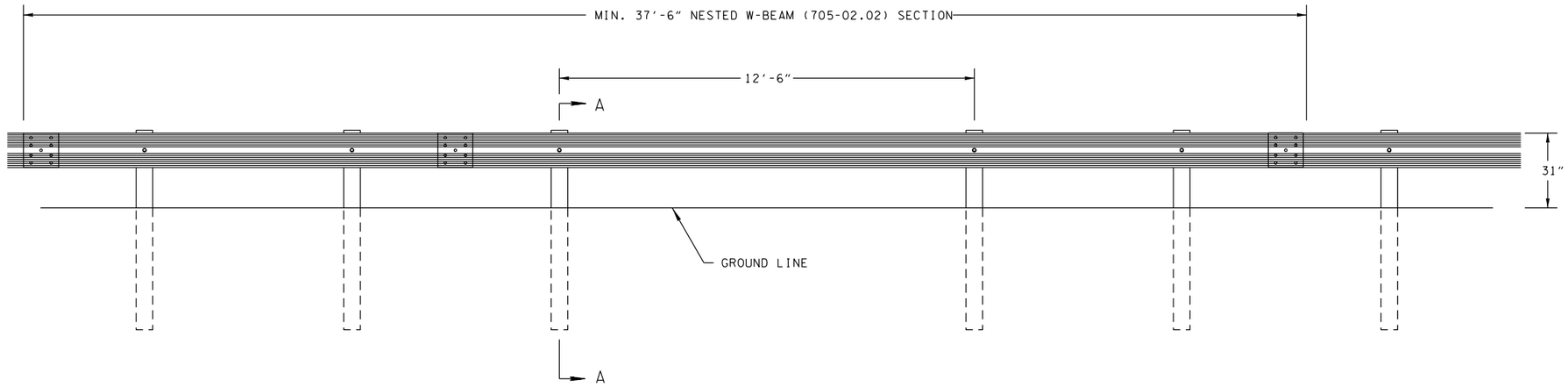
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

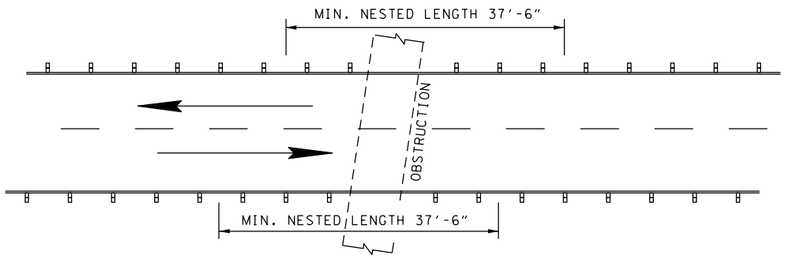
BIKE/PEDESTRIAN SAFETY RAIL

7-11-13 | S-BPR-1

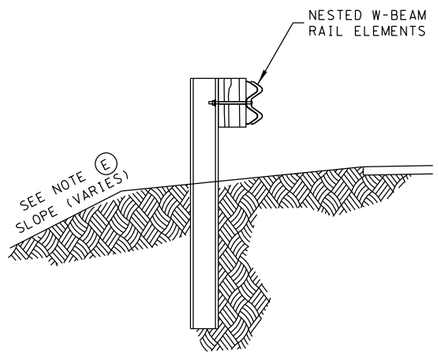
REV. 1-29-16: CORRECTED PAY ITEM NUMBER.



ELEVATION



EXAMPLE
TWO-WAY TRAFFIC LAYOUT



SECTION "A-A"

GENERAL NOTES

(A) DRAWING TO BE USED FOR GUARDRAIL PLACEMENT WHEN ENCOUNTERING AN OBSTRUCTION WHICH WILL PREVENT GUARDRAIL POST TO BE INSTALLED PROPERLY.

(B) A POST MAY BE OMITTED ON A RUN OF GUARDRAIL ONLY. THIS APPLICATION IS NOT TO BE USED AS PART OF AN END TERMINAL. IF OBSTRUCTION IS ENCOUNTERED AT TERMINAL LOCATION, EXTEND GUARDRAIL RUN TO A POINT WHERE TERMINAL MAY BE INSTALLED PROPERLY.

(C) ONLY ONE POST MAY BE OMITTED AT AN OBSTRUCTION.

(D) WHEN MORE THAN ONE OBSTRUCTION IS ENCOUNTERED ON A RUN OF GUARDRAIL, THREE CONSECUTIVE POSTS SHALL BE INSTALLED PRIOR TO OMITTING ANOTHER POST.

(E) SEE STANDARD DRAWING RD01-SERIES FOR SLOPE CRITERIA.

(F) IF ANY OF THE CONDITIONS NOTED IN GENERAL NOTES A, C, OR D CAN NOT BE MEET, USE GUARDRAIL WITH FOOTING OPTION SEE (S-GRS-3).

(G) THE NESTED SECTION WILL BE BUILT AS SHOWN BUT PAYMENT WILL BE MEASURED FOR A LENGTH OF 3 POSTS ON EITHER SIDE OF THE OMITTED POST.

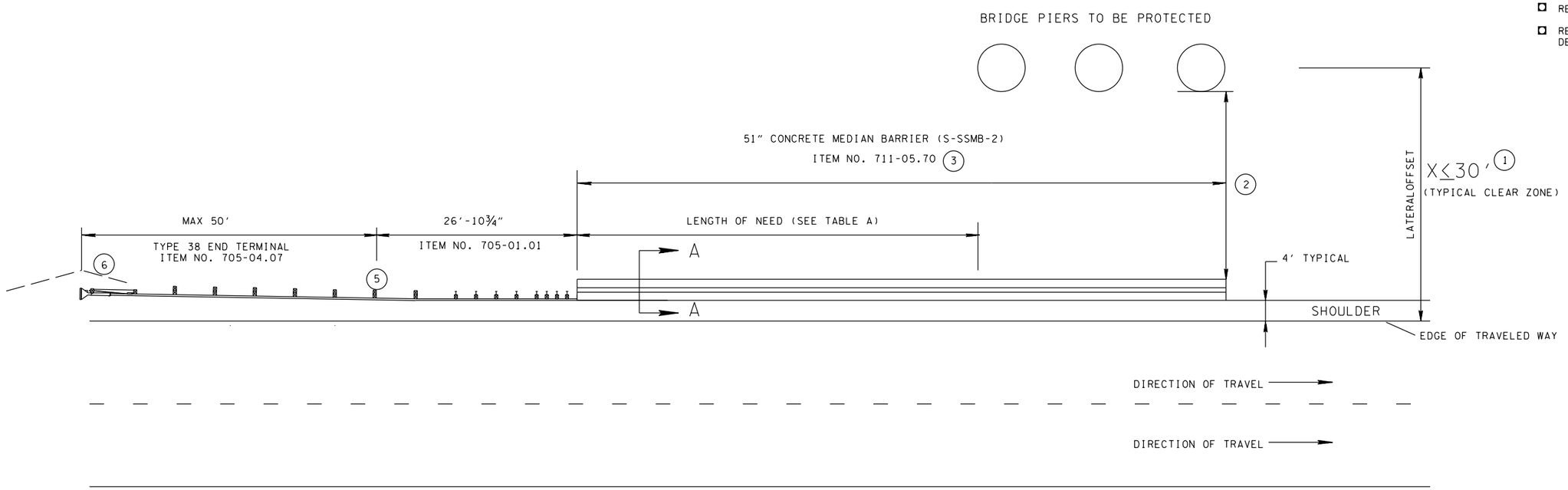
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

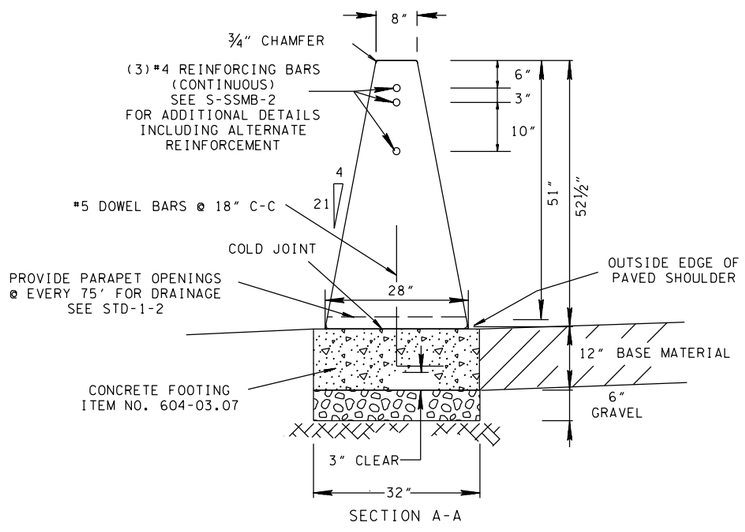
SPECIAL CASE LONG SPAN GUARDRAIL ONE POST OMITTED

7-11-13 | S-GRS-1

- REV. 4-11-14: ADDED NOTE (7).
- REV. 2-5-16: ADDED WALL SECTION DETAIL.



BRIDGE PIERS IN CLEAR ZONE



SECTION A-A

LENGTH OF NEED FOR CONCRETE MEDIAN BARRIER

OFFSET	LENGTH OF NEED (LON)		
X	50 MPH	60 MPH	70 MPH
12'	168'	218'	262'
18'	181'	236'	283'
24'	190'	247'	297'
30'	196'	255'	306'

NOTE:
THE LON DIMENSIONS SHOWN ON THIS TABLE ARE TO BE USED FOR TANGENT OR NEAR TANGENT CONDITIONS. IN THE CASE OF CURVATURE USE STANDARD DRAWING S-PL-1 TO DETERMINE THE POINT OF NEED.

GENERAL NOTES

1. THIS STANDARD MAY BE USED ON ALL HIGH SPEED FACILITIES (45 MPH AND ABOVE) WHERE THE DISTANCE FROM EDGE OF TRAVEL WAY TO THE PIER IS LESS THAN 30' FOR TL-5 (SEMI-TRAILER) BRIDGE PROTECTION.
2. IF THE DISTANCE FROM THE MEDIAN BARRIER TO THE FACE OF THE PIER IS LESS THAN 10 FEET, NOTIFY STRUCTURES DIVISION THAT THE REQUIREMENTS OF AASHTO BRIDGE DESIGN SPECIFICATION 3.6.5.CANNOT BE MET WITH STANDARD DESIGN AND SPECIAL DESIGN IS REQUIRED.
3. LENGTH OF ITEM 711-05.07 TO INCLUDE DISTANCE BETWEEN BEGIN AND END STATION OF BRIDGE PIERS PLUS LENGTH OF NEED (LON) DISTANCE FROM TABLE A.
4. PLAN SHOWN IS FOR TREATMENT ON ONE SIDE OF MEDIAN, BUT PLAN APPLIES TO STRUCTURAL BRIDGE COMPONENTS WITHIN 30 FEET OF THE ROADWAY ON THE RIGHT SIDE ALSO.
5. IF SPACE IS LIMITED, NON-GATING ATTENUATOR MAY BE SUBSTITUTED AND ATTACHED TO THE END OF THE CONCRETE BARRIER WALL.
6. FOR GRADING REQUIREMENTS AT END TERMINAL SEE S-GRT-2P OR S-GRT-2R.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

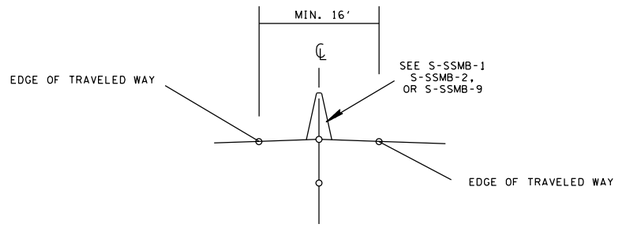
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SAFETY PLAN FOR BRIDGE PIERS IN CLEAR ZONE

7-11-13 | S-PL-4

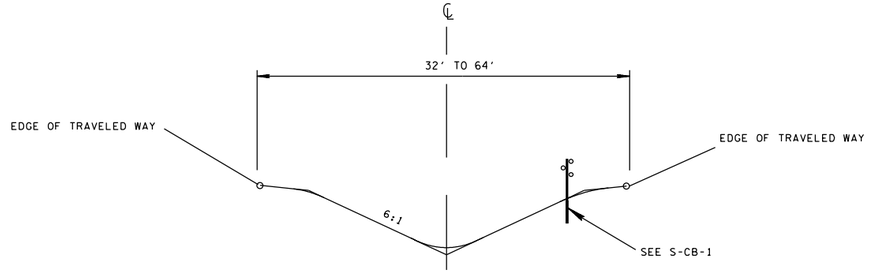
REV. 12-1-14: ADDED NOTE TO DETAIL (E) MINOR DRAFTING UPDATE. ADDED TABLE.

REV.2-8-16: ADDED SLOPE TO POST LENGTH TABLE.



DETAIL A

MEDIANS 16' TO 32'



DETAIL B

MEDIANS 32' TO 64'

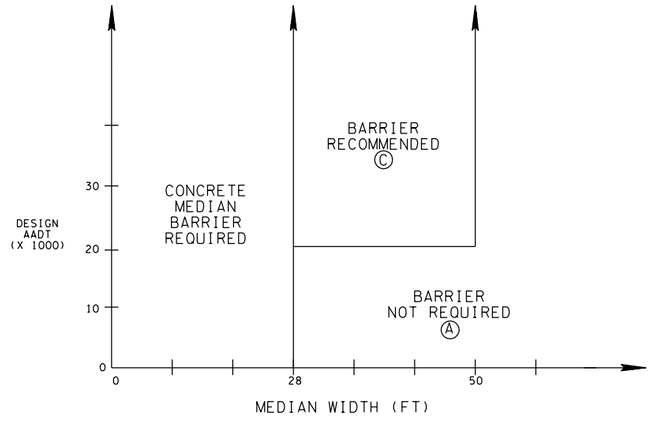


FIGURE A
THE NEED OF BARRIER DETERMINATION GUIDE
FOR MEDIAN INSTALLATION

GENERAL NOTES FOR MEDIAN DEVICES

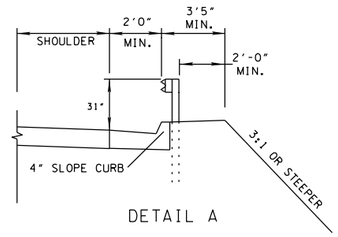
Ⓐ THIS STANDARD IS TO BE USED AS A GUIDE, BUT IS NOT A SUBSTITUE FOR GOOD ENGINEERING JUDGEMENT. OTHER CONSIDERATIONS, SUCH AS CRASH HISTORY, MAY BE USED TO JUSTIFY BARRIER INSTALLATION. THIS STANDARD DOES NOT APPLY TO FREEWAYS WITH INDEPENDENT ROADWAYS (SEE RD01-TS-5A)

Ⓑ MEDIAN WIDTH INCLUDES SHOULDERS.

Ⓒ SEE DETAIL A AND DETAIL B FOR APPROPRIATE CONFIGURATION AND BARRIER SYSTEM.

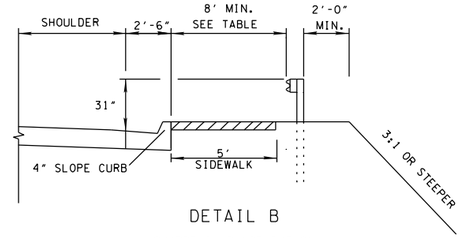
Ⓓ END OF BARRIER SYSTEMS (EXPECT CABLE BARRIER) REQUIRE END TERMINAL OR ATTENUATORS.

OUTSIDE SHOULDER GUARDRAIL PLACEMENT



DETAIL A

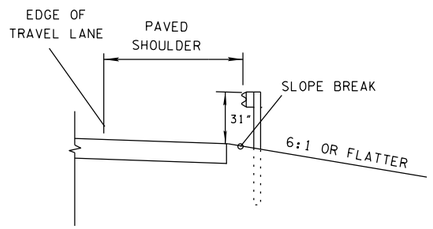
GUARDRAIL PLACEMENT ON
CURB AND GUTTER SECTION
(MAY BE USED FOR ALL SPEEDS)



DETAIL B

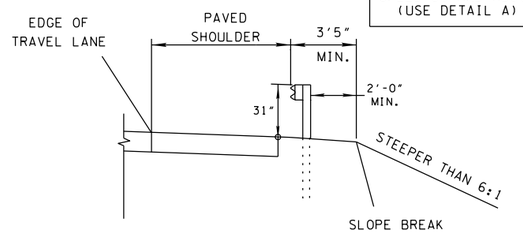
GUARDRAIL PLACEMENT ON
CURB AND GUTTER SECTION
SEE (D)

SPEED (MPH)	GUARDRAIL OFFSET DISTANCE
45 OR LESS	MIN 8'
45 -50	MIN 13'
SPEED 50 AND ABOVE (USE DETAIL A)	0'



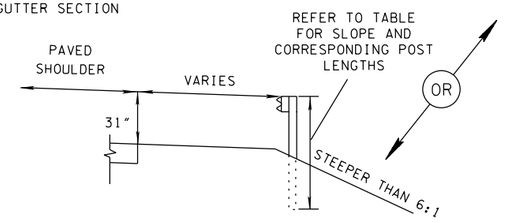
DETAIL C

GUARDRAIL PLACEMENT ON
NON-CURB AND GUTTER SECTION



DETAIL D

GUARDRAIL PLACEMENT ON
NON-CURB AND GUTTER SECTION
SEE (D)



DETAIL E

GUARDRAIL PLACEMENT ON
NON-CURB AND GUTTER SECTION

SLOPE	POST LENGTH
6:1	6'
4:1	7'
3:1	8'
2:1	9'
1:1	11'

GENERAL NOTES FOR GUARDRAIL

Ⓐ IF GUARDRAIL IN A CURB AND GUTTER SECTION IT SHALL BE PLACED SUCH THAT THE GUARDRAIL FACE IS EVEN WITH THE CURB (DETAIL A) OR A MINIMUM OF 6' FROM THE CURB (DETAIL B).

Ⓑ ON 6:1 OR FLATTER SLOPE GUARDRAIL MAY BE PLACED AT THE SLOPE BREAK.

Ⓒ ON SLOPES STEEPER THAN 6:1 GUARDRAIL SHALL BE PLACED A MINIMUM OF 2' IN FRONT OF SLOPE BREAK.

Ⓓ IF THE CONDITION IN NOTE Ⓒ CANNOT BE MET GUARDRAIL MAY BE PLACED AT SLOPE BREAK IF POSTS ARE LENGTHENED IN ACCORDANCE TO THE SLOPE TO POST LENGTH TABLE.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SAFETY PLAN
SAFETY HARDWARE
PLACEMENT

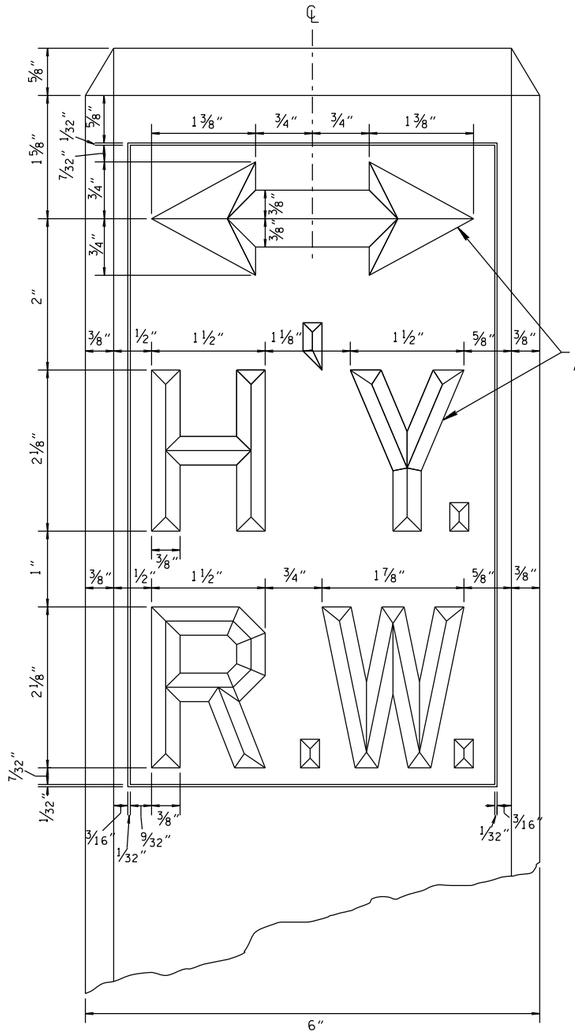
7-11-13 | S-PL-6

REV. 7-2-72: CHANGED DEPARTMENT NAME.

REV. 1-1-76: CHANGED DRAWING NUMBER FROM RW-M-2a(68) TO S-RP-2.

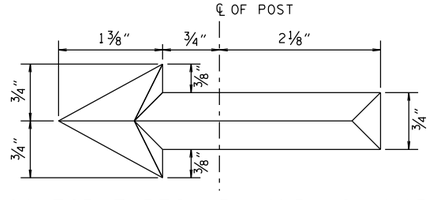
REV. 4-18-90: REDREW SHEET AND CHANGED SHEET NAME. THE DESIGNATION "POSTS" HAS BEEN CHANGED TO "MARKERS". MODIFIED GENERAL NOTES.

- ☐ REV. 5-27-96: CHANGED DIMENSION OF DETAIL ON TYPE "B" AND "C" MARKERS.
- ☐ REV. 1-19-99: MODIFIED GENERAL NOTES AND ADDED PRECAST SPECIFICATIONS.
- ☐ REV. 2-8-16: REVISED GENERAL NOTES.

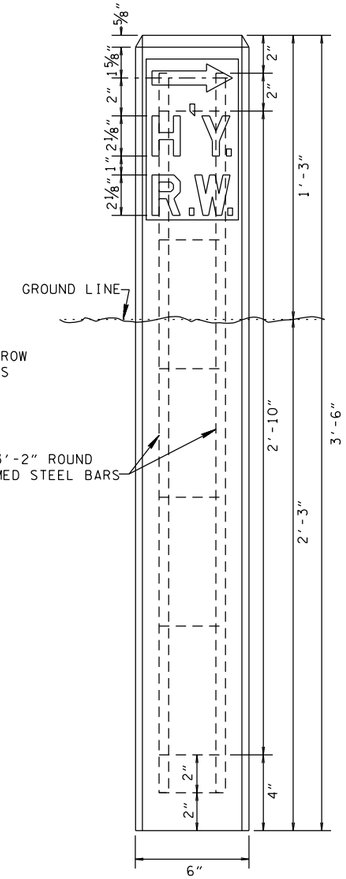


DETAIL OF INSCRIPTION

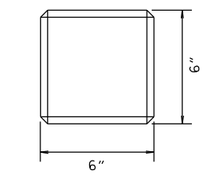
CROSS-SECTION



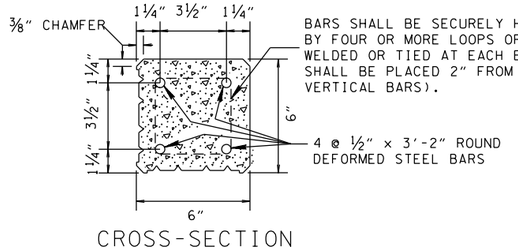
ARROW FOR TYPES "B" AND "C" MARKERS
SCALE = FULL SIZE



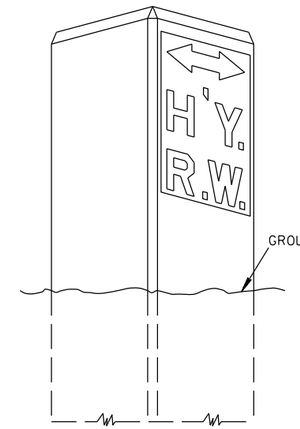
FRONT VIEW



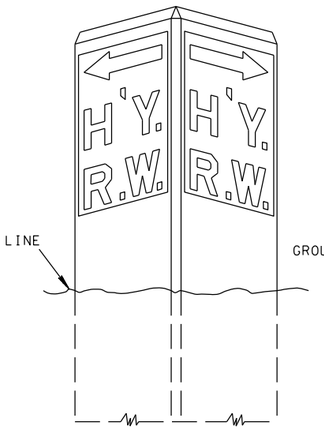
TOP VIEW



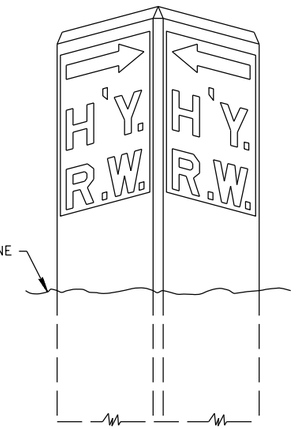
CROSS-SECTION
SCALE 3" = 1'



TYPE "A"
INSCRIPTION ON ONE SIDE
(PARALLEL TO CENTERLINE)



TYPE "B"
INSCRIPTION ON TWO SIDES
(TURNS TO CENTERLINE)



TYPE "C"
INSCRIPTION ON TWO SIDES
(TURNS AWAY FROM CENTERLINE)

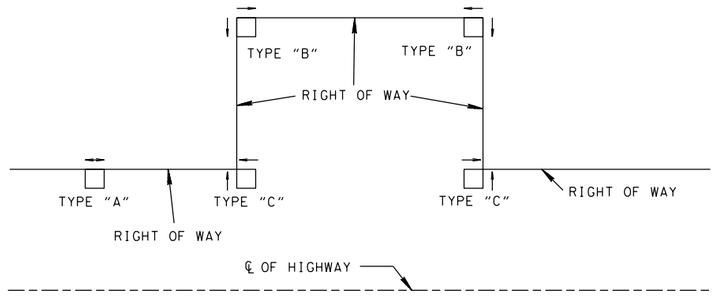


DIAGRAM SHOWING TYPES OF MARKERS TO USE

GENERAL NOTES

(A) CONCRETE RIGHT-OF-WAY MARKERS SHALL BE CONSTRUCTED AND ERECTED IN ACCORDANCE WITH THIS DRAWING AND SECTION 708, MONUMENTS AND MARKERS, OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

(B) CONCRETE: F_c = 4000 PSI AT 28 DAYS
REINFORCING STEEL: ASTM A615,
f_y = 60,000 PSI
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.

(C) PRECAST RIGHT-OF-WAY MARKERS UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED RIGHT-OF-WAY MARKERS UNITS AT HIS OWN EXPENSE.

(D) RIGHT-OF-WAY MARKERS ARE TO BE INSTALLED FLUSH WITH THE GROUND IN AREAS WHERE THEY MIGHT BE AN OBSTACLE TO VEHICLES, MOWERS, ETC.

(E) PAYMENT ITEM NO. 708-02.01 MARKERS (CONCRETE RIGHT-OF-WAY POSTS.) EACH

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD CONCRETE RIGHT-OF-WAY MARKERS

S-RP-2