STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DESIGN DIVISION
NASHVILLE, TENNESSEE 37243-0348

INSTRUCTIONAL BULLETIN NO. 10-03

Regarding Revised Standard Drawings

Effective for the September 17, 2010 letting (July 14, 2010 turn-in), the Roadway Standard Drawings, **RD01-S-12, RD-L-6, D-PB-2, D-PE-4, D-PE-6B(2), D-SEW-6DA, D-SEW-6DC, D-SEW-12D, S-F-10, S-F-10A, S-F-10B, S-F-10C, S-FG-11, S-GR-19, S-GR-19A, S-GR-21, S-GR-22, S-GR-38, T-M-4, T-M-6, T-M-11, T-M-12, T-PBR-1, T-SG-10, T-SG-13, EC-STR-2, EC-STR-4, EC-STR-4A and EC-STR-39A** are revised.

Until the drawings are formally distributed and added to the standard drawings book, they are to be printed with the plans. The drawings shall be identified on the lower left side of the index sheet **"To be printed with plans"**.

Drawing Number	**Current Revision Date**	**Drawing Title**
RD01-S-12	08-01-09	CLEAR ZONE CRITERIA
RD-L-6	03-30-10	STANDARD LEGEND FOR EROSION PREVENTION AND SEDIMENT CONTROL
D-PB-2	06-01-09	STANDARD DETAILS FOR PLASTIC PIPE INSTALLATION
D-PE-4	06-01-09	STRAIGHT "L" AND "U' TYPE CONCRETE ENDWALL
D-PE-6B(2)	06-01-09	CONCRETE ENDWALL TYPE "U" WITH STEEL PIPE GRATE (FOR 18" THRU 48" PIPES) (6:1 SLOPE)
D-SEW-6DA	06-01-09	CONCRETE ENDWALL TYPE "SD" WITH STEEL PIPE GRATE (FOR 15" THRU 48" PIPES) (6:1 SLOPE)
D-SEW-6DC	06-01-09	CONCRETE ENDWALL TYPE "SD" WITH STEEL PIPE GRATE (FOR 18" THRU 30" PIPES) (6:1 SLOPE)
D-SEW-12D	06-01-09	CONCRETE ENDWALL TYPE "SD" WITH STEEL PIPE GRATE (FOR 15" AND 18" PIPES) (12:1 SLOPE)
S-F-10	06-01-09	STANDARD RIGHT-OF-WAY STOCK FENCE
S-F-10A	06-01-09	STANDARD RIGHT-OF-WAY STOCK FENCE WITH TIMBER POSTS
S-F-10B	05-14-10	STANDARD RIGHT-OF-WAY CHAIN LINK FENCE

S-F-10C	05-14-10	RIGHT-OF-WAY FENCE AT BRIDGES AND BOX CULVERTS
S-FG-11	05-14-10	STANDARD STOCK FENCE GATE
S-GR-19	06-01-09	GUARDRAIL TERMINAL ANCHORS, TYPE 12 AND TYPE 13
S-GR-19A	06-30-09	TYPE 12 BURIED-IN-BACKSLOPE GUARDRAIL TERMINAL
S-GR-21	06-30-09	LENGTH OF NEED AND TERMINAL REQUIREMENTS IN FILLS
S-GR-22	03-10-10	GUARDRAIL ATTACHMENT TO CONCRETE DECKS OF BOX AND SLAB CULVERTS AND BRIDGES
S-GR-38	06-30-09	DETAILS FOR CONSTRUCTION OF EARTH PAD FOR TYPE 38 GUARDRAIL END TERMINALS
T-M-4	06-01-09	STANDARD INTERSECTION PAVEMENT MARKINGS
T-M-6	09-01-09	MARKING DETAIL FOR EXPRESSWAY & FREEWAY INTERCHANGES
T-M-11	12-01-09	SIGNING AND PAVEMENT MARKINGS FOR BICYCLE LANES AND ROUTES ON RURAL ROADS
T-M-12	12-01-09	SIGNING AND PAVEMENT MARKINGS FOR BICYCLE LANES ON URBAN ROADWAYS
T-PBR-1	06-30-09	INTERCONNECTED PORTABLE BARRIER RAIL
T-SG-10	01-05-10	MAST ARM POLE AND STRAIN POLES FOUNDATION DETAILS
T-SG-13	06-01-09	FLASHING BEACON DETAIL
EC-STR-2	05-14-10	SEDIMENT FILTER BAG
EC-STR-4	01-01-10	ENHANCED SILT FENCE CHECK (TRAPEZOIDAL DITCH)
EC-STR-4A	01-01-10	ENHANCED SILT FENCE CHECK (V-DITCH)
EC-STR-39A	06-24-10	CURB INLET PROTECTION TYPE 3 &4

Copies of the revised standard drawings are attached.

Original signed by Jeff C. Jones
Jeff C. Jones, Civil Engineering Director
Design Division

June 24, 2010
JCJ:arh

REV. 10-15-02: NEW SHEET.

REV. 8-1-09: UPDATED PER "ROADSIDE DESIGN GUIDE", AASHTO 2006.

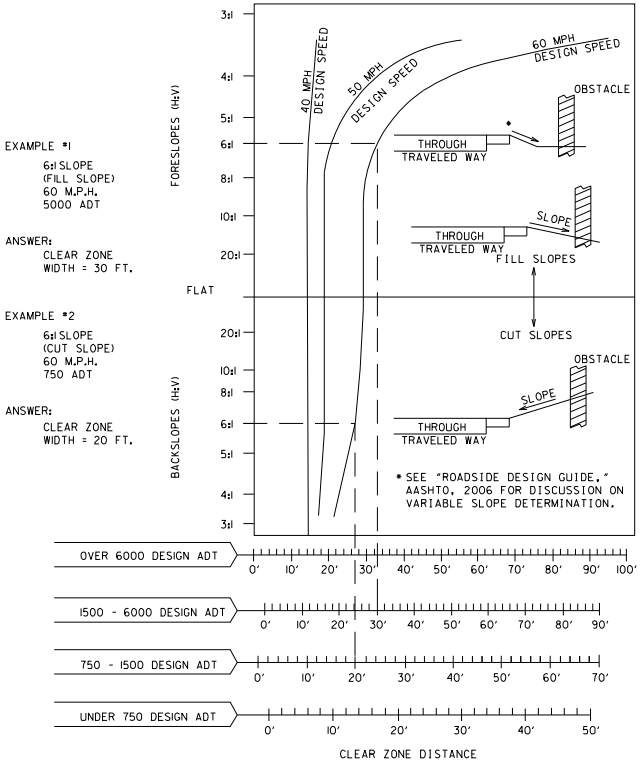


FIGURE A. CLEAR ZONE DISTANCE

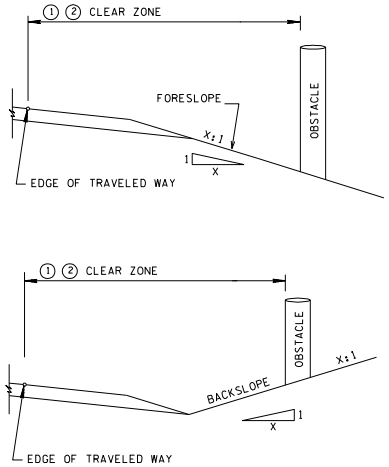


FIGURE B.
FORESLOPE AND BACKSLOPE DIAGRAMS ⑥

TABLE A. CLEAR ZONE DISTANCE (FEET)

DESIGN SPEED	DESIGN ADT	FORESLOPES (H:V)			BACKSLOPES (H:V)		
		6:1 OR FLATTER	5:1 TO 4:1	3:1	6:1 OR FLATTER	5:1 TO 4:1	3:1
40 MPH OR LESS	UNDER 750	7 - 10	7 - 10	④	7 - 10	7 - 10	7 - 10
	750 - 1500	10 - 12	12 - 14	④	10 - 12	10 - 12	10 - 12
	1500 - 6000	12 - 14	14 - 16	④	12 - 14	12 - 14	12 - 14
	OVER 6000	14 - 16	16 - 18	④	14 - 16	14 - 16	14 - 16
45-50 MPH	UNDER 750	10 - 12	12 - 14	④	10 - 12	8 - 10	8 - 10
	750 - 1500	14 - 16	16 - 20	④	14 - 16	12 - 14	10 - 12
	1500 - 6000	16 - 18	20 - 26	④	16 - 18	14 - 16	12 - 14
	OVER 6000	20 - 22	24 - 28	④	20 - 22	18 - 20	14 - 16
55 MPH	UNDER 750	12 - 14	14 - 18	④	10 - 12	10 - 12	8 - 10
	750 - 1500	16 - 18	20 - 24	④	16 - 18	14 - 16	10 - 12
	1500 - 6000	20 - 22	24 - 30	④	20 - 22	16 - 18	14 - 16
	OVER 6000	22 - 24	26 - 32 ③	④	22 - 24	20 - 22	16 - 18
60 MPH	UNDER 750	16 - 18	20 - 24	④	14 - 16	12 - 14	10 - 12
	750 - 1500	20 - 24	26 - 32 ③	④	20 - 22	16 - 18	12 - 14
	1500 - 6000	26 - 30	32 - 40 ③	④	24 - 26	18 - 22	14 - 18
	OVER 6000	30 - 32 ③	36 - 44 ③	④	26 - 28	24 - 26	20 - 22
65-70 MPH	UNDER 750	18 - 20	20 - 26	④	14 - 16	14 - 16	10 - 12
	750 - 1500	24 - 26	28 - 36 ③	④	20 - 22	18 - 20	12 - 16
	1500 - 6000	28 - 32 ③	34 - 42 ③	④	26 - 28	22 - 24	16 - 20
	OVER 6000	30 - 34 ③	38 - 46 ③	④	28 - 30	26 - 30	22 - 24

ADAPTED FROM TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE," AASHTO, 2006.

TABLE B. HORIZONTAL CURVE CORRECTION FACTORS ⑤

RADIUS (FT)	DESIGN SPEEDS (MPH)						
	40	45	50	55	60	65	70
2,860	1.1	1.1	1.1	1.2	1.2	1.2	1.3
2,290	1.1	1.1	1.2	1.2	1.2	1.3	1.3
1,910	1.1	1.2	1.2	1.2	1.3	1.3	1.4
1,640	1.1	1.2	1.2	1.3	1.3	1.4	1.5
1,430	1.2	1.2	1.3	1.3	1.4	1.4	-
1,270	1.2	1.2	1.3	1.3	1.4	1.5	-
1,150	1.2	1.2	1.3	1.4	1.5	-	-
950	1.2	1.3	1.4	1.5	1.5	-	-
820	1.3	1.3	1.4	1.5	-	-	-
720	1.3	1.4	1.5	-	-	-	-
640	1.3	1.4	1.5	-	-	-	-
570	1.4	1.5	-	-	-	-	-
380	1.5	-	-	-	-	-	-

ADAPTED FROM TABLE 3.2 OF THE "ROADSIDE DESIGN GUIDE," AASHTO, 2006.

CZc = (Lc)(Kcz)
WHERE CZc = CLEAR ZONE ON OUTSIDE OF CURVATURE, (FEET)
Lc = CLEAR ZONE DISTANCE, (FEET) (FROM TABLE-A)
Kcz = CURVE CORRECTION FACTOR

NOTE: THE CLEAR ZONE CORRECTION FACTOR IS APPLIED TO THE OUTSIDE OF CURVES ONLY. CURVES FLATTER THAN 2,860 FEET DO NOT REQUIRE AN ADJUSTED CLEAR ZONE.

FOOTNOTES

① CLEAR ZONE IS DEFINED IN THE "ROADSIDE DESIGN GUIDE," AASHTO, 2006, AS THE TOTAL ROADSIDE BORDER AREA, STARTING AT THE EDGE OF THE TRAVELED WAY, AVAILABLE FOR SAFE USE BY ERRANT VEHICLES. THIS AREA MAY CONSIST OF A SHOULDER, A RECOVERABLE SLOPE, A NON-RECOVERABLE SLOPE, AND/OR A CLEAR RUN-OUT AREA. THE DESIRED WIDTH IS DEPENDENT UPON THE TRAFFIC VOLUMES AND SPEEDS, AND ON THE ROADSIDE GEOMETRY. SEE THE "ROADSIDE DESIGN GUIDE," AASHTO, 2006 FOR MORE DETAILED INFORMATION.

② CLEAR ZONE DISTANCES ARE RELATED TO DESIGN SPEED AND TRAFFIC VOLUME AS SHOWN IN TABLE A.

③ WHERE A SITE SPECIFIC INVESTIGATION INDICATES A HIGH PROBABILITY OF CONTINUING CRASHES, OR SUCH OCCURRENCES ARE INDICATED BY CRASH HISTORY, THE DESIGNER MAY PROVIDE CLEAR-ZONE DISTANCES GREATER THAN THE CLEAR ZONE SHOWN IN THE TABLE. CLEAR ZONES MAY BE LIMITED TO 30 FT FOR PRACTICALITY AND TO PROVIDE A CONSISTENT ROADWAY TEMPLATE IF PREVIOUS EXPERIENCE WITH SIMILAR PROJECTS OR DESIGNS INDICATES SATISFACTORY PERFORMANCE.

④ SINCE RECOVERY IS LESS LIKELY ON THE UNSHIELDED, TRAVERSABLE 3:1 SLOPES, FIXED OBJECTS SHOULD NOT BE PRESENT IN THE VICINITY OF THE TOES OF THESE SLOPES. RECOVERY OF HIGH-SPEED VEHICLES THAT ENCROACH BEYOND THE EDGE OF THE SHOULDER MAY BE EXPECTED TO OCCUR BEYOND THE TOE OF THE SLOPE. DETERMINATION OF THE WIDTH OF THE RECOVERY AREA AT THE TOE OF THE SLOPE SHOULD TAKE INTO CONSIDERATION RIGHT-OF-WAY AVAILABILITY, ENVIRONMENTAL CONCERNS, ECONOMIC FACTORS, SAFETY NEEDS, AND CRASH HISTORIES. ALSO, THE DISTANCE BETWEEN THE EDGE OF THE THROUGH TRAVELED LANE AND THE BEGINNING OF THE 3:1 SLOPE SHOULD INFLUENCE THE RECOVERY AREA PROVIDED AT THE TOE OF THE SLOPE. WHILE THE APPLICATION MAY BE LIMITED BY SEVERAL FACTORS, THE FORESLOPE PARAMETERS THAT MAY ENTER INTO DETERMINING A MAXIMUM DESIRABLE RECOVERY AREA ARE COVERED IN DETAIL IN THE "ROADSIDE DESIGN GUIDE," AASHTO, 2006.

⑤ THESE MODIFICATIONS ARE NORMALLY CONSIDERED ONLY WHEN CRASH HISTORIES INDICATE A NEED OR A SPECIFIC SITE INVESTIGATION SHOWS A DEFINITE CRASH POTENTIAL THAT COULD BE SIGNIFICANTLY LESSENED BY INCREASING THE CLEAR-ZONE WIDTH, AND WHEN SUCH INCREASES ARE COST EFFECTIVE.

⑥ SEE THE "ROADSIDE DESIGN GUIDE," AASHTO, 2006, FOR COMPOSITE ROADSIDE SECTIONS AND DISCUSSION ON OUTSIDE DITCHES AND CHANNELS.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CLEAR ZONE CRITERIA

10-15-02 | RD01-S-12

STANDARD LEGEND

CATCH BASIN PROTECTION (TYPE A)

CATCH BASIN PROTECTION (TYPE B)

CATCH BASIN PROTECTION (TYPE C)

CATCH BASIN PROTECTION (TYPE D)

CATCH BASIN PROTECTION (TYPE E)

PERMANENT RIPRAP ENERGY DISSIPATOR

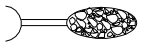
TEMPORARY CULVERT CROSSING (DESCRIBE NUMBER AND SIZE OF PIPES)

TEMPORARY CONSTRUCTION EXIT

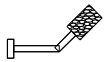
TEMPORARY CONSTRUCTION FORD

TEMPORARY BERM

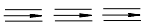
INSTREAM DIVERSION



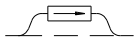
TEMPORARY SLOPE DRAIN



PERMANENT SLOPE DRAIN PIPE (SHOW SIZE)



TEMPORARY DIVERSION CHANNEL
(DESCRIBE - SIZE AND TYPE OF LINING)



TEMPORARY DIVERSION CULVERT
(DESCRIBE NUMBER AND SIZE OF PIPES)

SUSPENDED PIPE DIVERSION

EROSION CONTROL BLANKET

COMPOST FILTER BERM

MULCH FILTER BERM

TURF REINFORCEMENT MAT

SEDIMENT TUBE

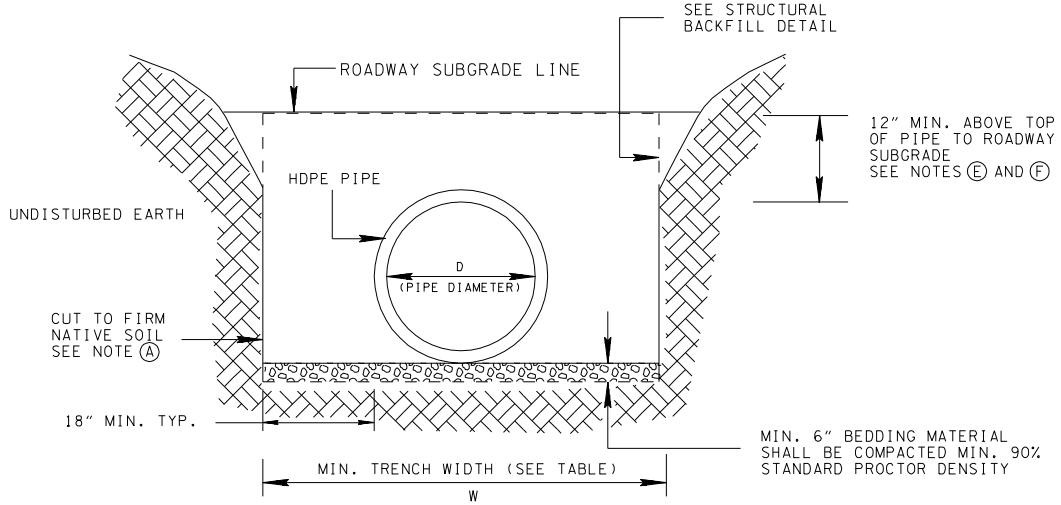
- REV. 10-26-94: MOVED EROSION AND SEDIMENT CONTROL LEGENDS FROM OLD STANDARD DRAWING NO. RD-L-2 AND THE ESC-STR SERIES OF DETAIL SHEETS.
- REV. 5-27-95: ADDED NEW SYMBOLS.
- REV. 5-27-96: MODIFIED SYMBOL FOR TEMPORARY CATCH BASIN.
- REV. 7-29-97: CHANGED LEGEND FOR TEMPORARY SLOPE DRAIN PIPE.
- REV. 5-27-01: CHANGED REFERENCE IN LEGEND FROM DUMPED ROCK TO RIP-RAP.
- REV. 12-18-02: REMOVED SYMBOLS FOR TYPE IA, IB, IC, AND ID EROSION DITCH CHECKS. ADDED SYMBOL FOR TYPE I EROSION DITCH CHECK, TEMPORARY SILT FENCE (WITH BACKING), AND TEMPORARY ENHANCED SILT FENCE.
- REV. 1-22-03: ADDED SYMBOL FOR TYPE EC IA FILTER BARRIER DITCH CHECK.
- REV. 10-26-03: DELETED LEGEND FOR TYPE EC V FILTER BARRIER.
- REV.3-15-04: MOVED PART OF LEGEND BEGINNING WITH TEMPORARY ROCK AND SEDIMENT DAM TO NEW SHEET RD-L-5. CHANGED LEGEND FOR TEMPORARY CATCH BASIN SILT FENCE SILT TRAP. ADD TEMPORARY CATCH BASIN FILTER ASSEMBLY (TYPE 1 THROUGH 9).
- REV. 4-15-04: CHANGED DRAWING NUMBER FROM RD-L-4 TO RD-L-5.
- REV.5-1-08: REFORMATTED DRAWING IN CONJUNCTION WITH RD-L-5.
- REV. 3-15-10: ADDED SYMBOL FOR INSTREAM DIVERSON

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD LEGEND FOR EROSION PREVENTION AND SEDIMENT CONTROL

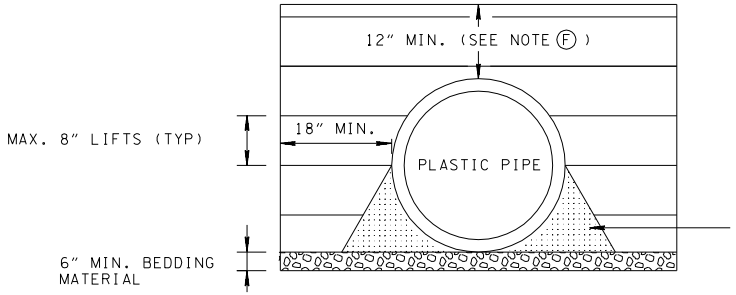
10-26-94 | RD-L-6



OPEN DITCH INSTALLATION (TYPICAL CROSS-SECTION)

PIPE DIAMETER (INCHES)	W TRENCH WIDTH (MIN.) (INCHES)	CY. OF BEDDING MATL.(CLASS B) PER LIN. FT
12	50	0.356
15	53	0.404
18	57	0.462
24	63	0.563
30	68	0,657
36	80	0.848
42 *	85	0.954
48 *	92	1.095

* SEE NOTE (J)



STRUCTURAL BACKFILL DETAIL (TYPE "A" OR TYPE "B" AGGREGATE, GRADING D OR E)

GENERAL NOTES

(A) THE STIFFNESS OF INSITU SOIL FOR THE VERTICAL SIDE WALLS OF THE TRENCH SHALL BE VERIFIED BY ENGINEER. HDPE PIPE SHOULD NOT BE INSTALLED IF THE INSITU SOIL IS NOT STABLE AND FIRM.

(B) PLASTIC PIPE SHALL BE ASSEMBLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. PIPE SHALL BE PLACED IN THE BED STARTING AT THE DOWNSTREAM END. FOR MIN. INSTALLATION REQUIREMENTS REFER TO ASTM D2321 OR AASHTO SECTION 30.

(C) JOINTS FOR HDPE PIPE SHALL MEET THE PERFORMANCE REQUIREMENT FOR SOILTIGHTNESS UNLESS WATERTIGHTNESS IS SPECIFIED. JOINTS SHALL BE INSTALLED SO THAT THE CONNECTION OF PIPE SECTIONS, FOR A CONTINUOUS LINE, WILL BE FREE FROM IRREGULARITIES IN THE FLOW LINE.

(D) ONLY AS MUCH TRENCH AS CAN BE SAFELY MAINTAINED SHALL BE OPENED. ALL TRENCHES SHALL BE BACKFILLED AND COMPACTED AS SOON AS PRACTICABLE, BUT NOT LATER THAN THE END OF EACH WORKING DAY.

(E) BACKFILL REQUIREMENTS: THE BACKFILL SHALL BE GRANULAR COMPACTABLE TYPE "A" OR TYPE "B" AGGREGATE, GRADING D OR E MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 903.05. A MINIMUM OF 6 INCHES OF BEDDING COMPACTED TO A MIN. 90% STANDARD PROCTOR DENSITY SHALL BE PROVIDED PRIOR TO PLACEMENT OF THE PIPE UNLESS OTHERWISE SPECIFIED.

STRUCTURAL BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING AN 8 INCH LOOSE LIFT THICKNESS AND BROUGHT UP EVENLY AND SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE TO AN ELEVATION NOT LESS THAN ONE FOOT ABOVE THE TOP OF THE PIPE.

A MINIMUM COMPACTION LEVEL OF 90% STANDARD PROCTOR DENSITY PER AASHTO T99 SHALL BE ACHIEVED BY USE OF VIBRATORY PLATE. HYDROHAMMER TYPE COMPACTORS SHALL NOT BE USED OVER THE PIPE. ALL COMPACTION EQUIPMENT USED SHALL BE APPROVED BY THE ENGINEER.

(F) COVER OF AT LEAST 24 INCHES SHALL BE PROVIDED BEFORE ALLOWING CONSTRUCTION EQUIPMENT TO CROSS THE PLASTIC PIPE.

(G) ALL PLASTIC PIPE INSTALLATIONS REQUIRE CONCRETE ENDWALLS.

(H) PLASTIC PIPE SHALL NOT BE INSTALLED IF WATER IS PRESENT IN THE TRENCH OR LOCATION WHERE THE WATER TABLE IS FOUND HIGH. ALSO, AT THE SITES WHERE THE INLET OR THE OUTLET OF THE DRAINAGE PIPE WILL BE SUBMERGED DUE TO PONDING HDPE PIPE SHALL NOT BE INSTALLED.

(I) ALL HIGH-DENSITY POLYETHYLENE (HDPE) PIPE USED FOR CULVERT AND STORMDRAIN APPLICATIONS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M294, TYPE S, CURRENT EDITION AND VERIFIED THROUGH THE PLASTIC PIPE INSTITUTE (PPI) THIRD PARTY CERTIFICATION PROGRAM. ALL HDPE PIPE DELIVERED AND USED SHALL BE PARTICIPATED IN NTPEP.

(J) PVC (POLY VINYL CHLORIDE) PROFILE WALL DRAINAGE PIPE SHALL MEET AASHTO DESIGNATION M-304(2007). THE MAXIMUM PIPE DIAMETER FOR PVC PIPE IS 36 INCHES.

(K) ACCEPTANCE REQUIREMENT FOR PLASTIC PIPE PER AASHTO, SECTION 30.5.6 (AS ADOPTED BY THE AASHTO SUBCOMMITTEE ON BRIDGES AND STRUCTURES, JUNE 29, 2005) ARE AS FOLLOWS:

(1) ALL PIPES SHALL UNDERGO INSPECTION DURING INSTALLATION.

(2) FINAL INSPECTIONS SHALL BE CONDUCTED NO SOONER THAN 30 DAYS AFTER COMPLETIONS OF INSTALLATION AND FINAL FILL.

(3) THE PIPE SHALL BE EVALUATED TO DETERMINE WHETHER THE INTERNAL DIAMETER OF THE BARREL HAS BEEN REDUCED MORE THAN 5% WHEN MEASURED NOT LESS THAN 30 DAYS FOLLOWING COMPLETION OF THE INSTALLATION.

(4) FOR LOCATIONS WHERE PIPE DEFLECTION EXCEEDS 5% OF THE INSIDE DIAMETER, AN EVALUATION SHALL BE CONDUCTED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL CONSIDERING THE SEVERITY OF THE DEFLECTION, STRUCTURAL INTEGRITY, ENVIRONMENTAL CONDITIONS,AND THE DESIGN SERVICE LIFE OF THE PIPE. PIPE REMEDIATION OR REPLACEMENT SHALL BE REQUIRED FOR LOCATIONS WHERE THE EVALUATION FINDS THAT THE DEFLECTION COULD BE PROBLEMATIC.

(5) INSTALLED PIPE DEFLECTIONS THAT EXCEED 5% OF THE INITIAL INSIDE DIAMETER MAY INDICATE THAT THE INSTALLATION WAS SUBSTANDARD. APPROPRIATE REMEDIATION, IF ANY, WILL DEPEND UPON THE SEVERITY OF THE DEFLECTION.

(6) IN ALL PIPE INSTALLATIONS, AT LEAST 10% OF THE TOTAL NUMBER OF PIPE RUNS REPRESENTING AT LEAST 10% OF THE TOTAL PROJECT FOOTAGE ON THE PROJECT SHALL BE RANDOMLY SELECTED BY THE ENGINEER AND INSPECTED FOR DEFLECTION. ALSO AS DETERMINED BY THE 100% VISUAL INSPECTION IN AASHTO SECTION 30.5.6.1, ALL AREAS IN WHICH DEFLECTION CAN BE VISUALLY DETECTED SHALL BE INSPECTED FOR DEFLECTION.

(L) EXCAVATION FOR PLASTIC PIPE WILL NOT BE MEASURED AND PAID FOR DIRECTLY, BUT THE COST WILL BE INCLUDED IN THE COST OF THE PROPOSED PIPE CULVERT.

(M) PAYMENT FOR TYPE "A" OR TYPE "B" BACKFILL INCLUDING BEDDING MATERIAL WILL BE INCLUDED IN THE UNIT PRICE OF THE HDPE PIPE.

- REV. 7-12-07: REVISED GENERAL NOTE (J).
- REV. 6-1-09: REVISED GENERAL NOTE (I) AND TITLE NAME. ADDED GENERAL NOTE (J).

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD DETAILS FOR PLASTIC PIPE INSTALLATION

3-15-07 | D-PB-2

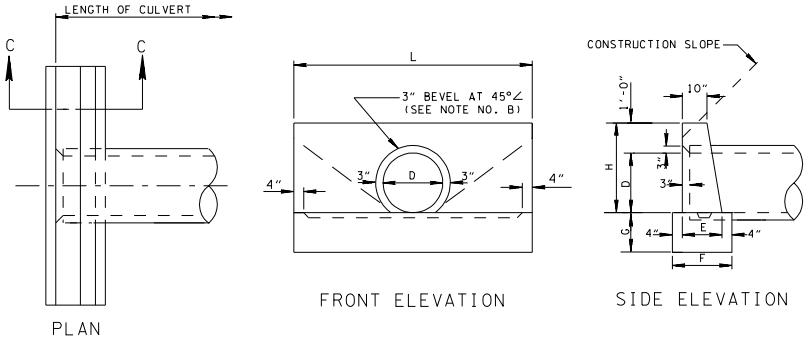
REV. 9-28-83: REDREW AND ADDED TABLE FOR STRAIGHT ENDWALL WHEN PIPE IS SKEWED.

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 Ⓓ.



STRAIGHT TYPE CONCRETE ENDWALL

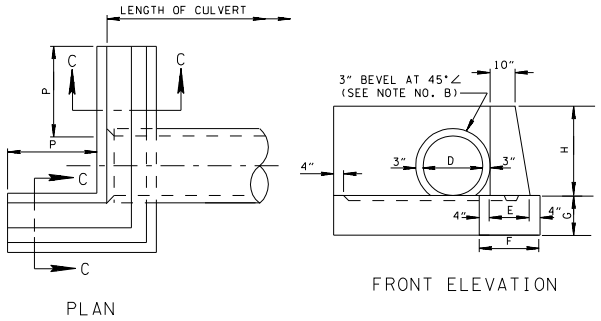
TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES FOR ONE STRAIGHT CONCRETE ENDWALL (SKEW 90°)

DIMENSIONS							CONC. IN ONE ENDWALL			C.Y. FOR EACH ADDITIONAL LINE OF PIPE	C.Y. PER FOOT OF LENGTH "L"		
OPENING		WALL			FOOTING		WALL	FOOTING	TOTAL		WALL	FOOTING	TOTAL
D	AREA	L	H	E	F	G	C.Y.	C.Y.	C.Y.				
1'-6"	1.77	6'-0"	2'-6"	1'-3"	1'-11"	1'-3"	0.51	0.53	1.04	0.39	0.096	0.089	0.185
2'-0"	3.14	8'-0"	3'-0"	1'-4"	2'-0"	1'-4"	0.83	0.79	1.62	0.52	0.120	0.099	0.219
2'-6"	4.91	10'-0"	3'-6"	1'-6"	2'-2"	1'-6"	1.29	1.21	2.50	0.74	0.151	0.121	0.272

ESTIMATED QUANTITIES FOR TWO STRAIGHT CONCRETE ENDWALLS WHEN PIPE IS SKEWED (CUBIC YARD)

D	SKEW											
	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°
1'-6"	4.15	3.61	3.23	2.93	2.71	2.53	2.39	2.29	2.21	2.15	2.11	2.08
2'-0"	6.45	5.62	5.02	4.56	4.21	3.94	3.73	3.56	3.43	3.34	3.28	3.24
2'-6"	9.96	8.68	7.75	7.05	6.50	6.08	5.75	5.50	5.30	5.16	5.06	5.00

NOTE : WHEN PIPE IS ON A SKEW USE TWO STRAIGHT ENDWALLS AND MAKE "L" EQUAL TO " L " IN TABLE ABOVE DIVIDED BY SINE OF ANGLE OF SKEW.

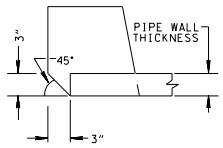


" L " TYPE CONCRETE ENDWALL

ESTIMATED QUANTITIES FOR ONE "L" TYPE CONCRETE ENDWALL

DIAMETER	P	CONC. C.Y.
1'-6"	2'-3"	1.28
2'-0"	3'-0"	1.91
2'-6"	3'-9"	2.90

NOTE : DIMENSIONS NOT SHOWN ARE SAME AS FOR STRAIGHT ENDWALL.



DETAIL OF BEVEL

GENERAL NOTES

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

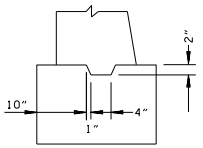
Ⓑ ALL STRAIGHT AND "L "TYPE CONCRETE ENDWALLS ON INLET END OF PIPE, AND AT 90° SKEW SHALL BE BEVELED AT 3" AT 45° ANGLE. BEVEL WILL NOT BE REQUIRED WHEN ENDWALL IS CONSTRUCTED ON THE "BELLED "END OF CONCRETE PIPE.

Ⓒ WHEN MORE THAN ONE LINE OF PIPE IS REQUIRED THE DISTANCE FROM CENTER TO CENTER OF PIPE SHALL BE D + 1'-0".

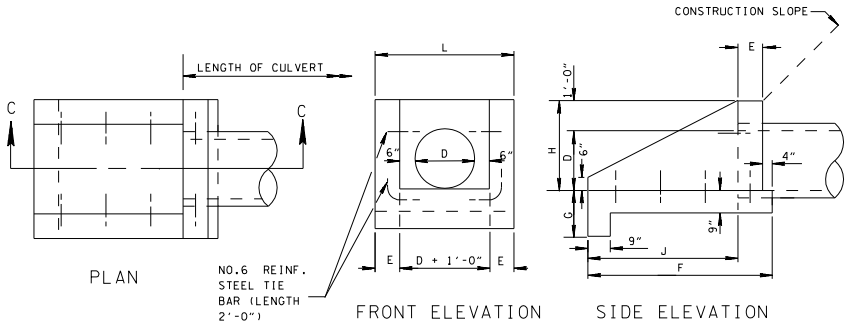
Ⓓ 3"X 3"REBAR MASH MAY BE USED IN LIEU OF REINFORCING AS SHOWN AND PAYED UNDER ITEM NO. 611-07.02

Ⓔ PAYMENT FOR ENDWALLS WILL BE MADE FOLLOWS:

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



SECTION C- C
SHOWING CONSTRUCTION JOINT



" U " TYPE CONCRETE ENDWALL

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES FOR ONE " U " TYPE CONCRETE ENDWALL (SLOPE 1½ : 1 & 2:1)

DIMENSIONS								CONC.IN ONE ENDWALL			C.Y. FOR EACH ADDITIONAL LINE OF PIPE	C.Y. PER FOOT OF LENGTH "L"	REINF STEEL LB.
OPENING		WALL			FOOTING			C.Y.	C.Y.	C.Y.			
D	AREA	L	H	E	J	F	G	WALL	FOOTING	TOTAL			
1'-6"	1.77	4'-0"	2'-6"	9"	4'-0"	5'-1"	1'-3"	0.61	0.62	1.23	0.554	0.225	20
2'-0"	3.14	4'-8"	3'-0"	10"	5'-0"	6'-2"	1'-6"	0.86	0.90	1.76	0.728	0.275	20
2'-6"	4.91	5'-2"	3'-6"	10"	6'-0"	7'-2"	1'-6"	1.12	1.14	2.26	0.996	0.328	20

NOTE : USE " U " TYPE ENDWALL SHOWN ON STANDARD DRAWINGS D-PE-3B (FOR 3:1 SLOPES), D-PE-4B (FOR 4:1 SLOPES) AND D-PE-6B (FOR 6:1 SLOPE) WITHOUT GRATES OUTSIDE THE CLEAR ZONE.

☒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

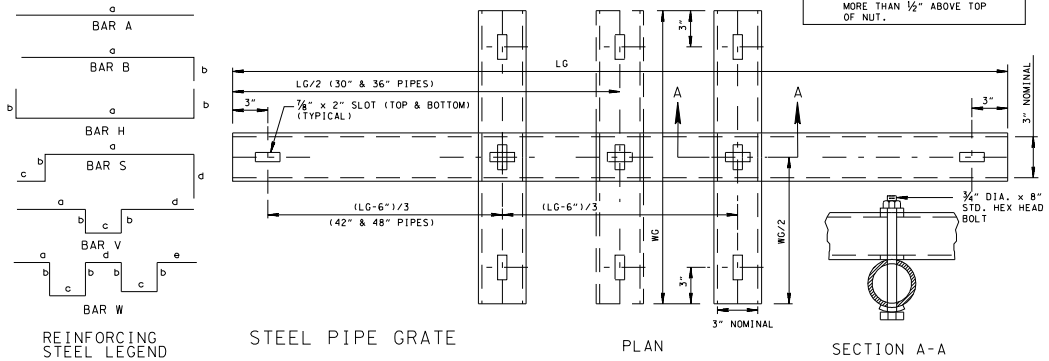
STRAIGHT, "L " AND "U " TYPE CONCRETE ENDWALL

3-1-94 | D-PE-4

- REV. 7-17-07: ADDED GENERAL NOTE (6).
- REV. 6-1-09: ADDED GENERAL NOTE (7).
- REV. 4-15-00: MODIFIED BENDING DIMENSIONS IN BILL OF STEEL TABLE.
- REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NO. 611-07.03.
- REV. 3-20-86: CHANGED FEDERAL PAINT SPECIFICATION.
- REV. 5-27-99: CHANGED PAINT SPECIFICATION TO TT-E-489J.

BILL OF STEEL

CODE NO.	LOCATION	BAR SIZE	18" PIPE BENDING DIMENSIONS a	b	c	d	e	NO. REQ'D.	LENGTH	24" PIPE BENDING DIMENSIONS a	b	c	d	e	NO. REQ'D.	LENGTH	30" PIPE BENDING DIMENSIONS a	b	c	d	e	NO. REQ'D.	LENGTH	36" PIPE BENDING DIMENSIONS a	b	c	d	e	NO. REQ'D.	LENGTH	42" PIPE BENDING DIMENSIONS a	b	c	d	e	NO. REQ'D.	LENGTH	48" PIPE BENDING DIMENSIONS a	b	c	d	e	NO. REQ'D.	LENGTH
A400	TOEWALL	4	2'-7"	—	—	—	—	3	2'-7"	3'-2"	—	—	—	—	3	3'-2"	3'-9"	—	—	—	—	3	3'-9"	4'-4"	—	—	—	—	3	4'-4"	4'-11"	—	—	—	—	3	4'-11"	5'-6"	—	—	—	—	3	5'-6"
A401	WINGWALLS	4	11'-8"	—	—	—	—	2	11'-8"	15'-2"	—	—	—	—	2	15'-2"	19'-2"	—	—	—	—	2	19'-2"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A402	WINGWALLS	4	—	—	—	—	—	—	—	9'-2"	—	—	—	—	2	9'-2"	13'-2"	—	—	—	—	2	13'-2"	16'-8"	—	—	—	—	2	16'-8"	19'-8"	—	—	—	—	2	19'-8"	23'-2"	—	—	—	—	2	23'-2"
A403	WINGWALLS	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7'-2"	—	—	—	—	2	7'-2"	10'-8"	—	—	—	—	2	10'-8"	13'-8"	—	—	—	—	2	13'-8"	17'-2"	—	—	—	—	2	17'-2"
A404	WINGWALLS	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7'-8"	—	—	—	—	2	7'-8"	11'-2"	—	—	—	—	2	11'-2"
A405	WINGWALLS	4	5'-8"	—	—	—	—	2	5'-8"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A500	WINGWALLS	5	11'-10"	—	—	—	—	4	11'-10"	15'-5"	—	—	—	—	4	15'-5"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A700	HEADWALL	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2'-2"	—	—	—	—	4	2'-2"	2'-3"	—	—	—	—	4	2'-3"	2'-6"	—	—	—	—	4	2'-6"
A701	HEADWALL	7	1'-5"	—	—	—	—	2	1'-5"	1'-10"	—	—	—	—	2	1'-10"	2'-2"	—	—	—	—	2	2'-2"	2'-6"	—	—	—	—	2	2'-6"	2'-10"	—	—	—	—	2	2'-10"	3'-1"	—	—	—	—	2	3'-1"
A702	HEADWALL	7	1'-4"	—	—	—	—	2	1'-4"	1'-9"	—	—	—	—	2	1'-9"	2'-2"	—	—	—	—	2	2'-2"	2'-5"	—	—	—	—	2	2'-5"	2'-9"	—	—	—	—	2	2'-9"	3'-0"	—	—	—	—	2	3'-0"
A703	HEADWALL	7	2'-7"	—	—	—	—	2	2'-7"	3'-2"	—	—	—	—	2	3'-2"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B400	BOTTOM SLAB & WINGWALL	4	1'-11"	1'-2"	—	—	—	2	3'-1"	2'-6"	1'-0"	—	—	—	2	3'-6"	3'-2"	1'-3"	—	—	—	2	4'-5"	3'-9"	1'-6"	—	—	—	2	5'-3"	4'-3"	1'-10"	—	—	—	2	6'-1"	4'-10"	1'-1"	—	—	—	2	5'-11"
B401	BOTTOM SLAB & WINGWALL	4	1'-3"	1'-2"	—	—	—	2	2'-5"	1'-10"	1'-0"	—	—	—	2	2'-10"	2'-6"	1'-3"	—	—	—	2	3'-9"	3'-1"	1'-6"	—	—	—	2	4'-7"	3'-7"	1'-10"	—	—	—	2	5'-5"	4'-2"	1'-1"	—	—	—	2	5'-3"
B402	BOTTOM SLAB & WINGWALL	4	0'-7"	1'-2"	—	—	—	2	1'-9"	1'-2"	1'-0"	—	—	—	2	2'-2"	1'-10"	1'-3"	—	—	—	2	3'-1"	2'-5"	1'-6"	—	—	—	2	3'-11"	2'-11"	1'-10"	—	—	—	2	4'-9"	3'-6"	1'-1"	—	—	—	2	4'-7"
B403	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	0'-6"	1'-0"	—	—	—	2	1'-6"	1'-2"	1'-3"	—	—	—	2	2'-6"	1'-9"	1'-6"	—	—	—	2	3'-3"	2'-3"	1'-10"	—	—	—	2	4'-1"	2'-10"	1'-1"	—	—	—	2	3'-11"
B404	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0'-6"	1'-3"	—	—	—	2	1'-9"	1'-1"	1'-6"	—	—	—	2	2'-7"	1'-7"	1'-10"	—	—	—	2	3'-5"	2'-2"	1'-1"	—	—	—	2	3'-3"
B405	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0'-7"	1'-6"	—	—	—	2	2'-1"	0'-11"	1'-10"	—	—	—	2	2'-9"	1'-6"	1'-1"	—	—	—	2	2'-7"
B406	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0'-7"	1'-10"	—	—	—	2	2'-5"	0'-10"	1'-1"	—	—	—	2	1'-11"
B407	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0'-6"	1'-1"	—	—	—	2	1'-7"
B408	HEADWALL & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22'-8"	0'-10"	—	—	—	2	23'-6"	25'-8"	0'-10"	—	—	—	2	26'-6"	29'-2"	0'-11"	—	—	—	2	30'-1"
B409	HEADWALL & WINGWALL	4	—	—	—	—	—	—	—	3'-2"	0'-9"	—	—	—	2	3'-11"	1'-2"	0'-10"	—	—	—	2	2'-0"	4'-8"	1'-0"	—	—	—	2	5'-8"	1'-8"	1'-8"	—	—	—	2	3'-4"	5'-2"	1'-4"	—	—	—	2	6'-6"
H400	BOTTOM SLAB & HEADWALL	4	2'-7"	2'-10"	—	—	—	1	8'-3"	3'-2"	3'-5"	—	—	—	1	10'-0"	3'-9"	4'-1"	—	—	—	1	11'-11"	4'-4"	4'-8"	—	—	—	1	13'-8"	4'-11"	5'-2"	—	—	—	1	15'-3"	5'-6"	5'-9"	—	—	—	1	17'-0"
H401	BOTTOM SLAB & WINGWALL	4	2'-7"	2'-9"	—	—	—	1	8'-1"	3'-2"	3'-4"	—	—	—	1	9'-10"	3'-9"	4'-0"	—	—	—	1	11'-9"	4'-4"	4'-7"	—	—	—	1	13'-6"	4'-11"	5'-1"	—	—	—	1	15'-1"	5'-6"	5'-8"	—	—	—	1	16'-10"
H402	BOTTOM SLAB & WINGWALL	4	2'-7"	2'-3"	—	—	—	1	7'-1"	3'-2"	2'-10"	—	—	—	1	8'-10"	3'-9"	3'-6"	—	—	—	1	10'-9"	4'-4"	4'-1"	—	—	—	1	12'-6"	4'-11"	4'-7"	—	—	—	1	14'-1"	5'-6"	5'-2"	—	—	—	1	15'-10"
H403	BOTTOM SLAB & WINGWALL	4	2'-7"	2'-1"	—	—	—	1	6'-9"	3'-2"	2'-8"	—	—	—	1	8'-6"	3'-9"	3'-4"	—	—	—	1	10'-5"	4'-4"	3'-11"	—	—	—	1	12'-2"	4'-11"	4'-5"	—	—	—	1	13'-9"	5'-6"	5'-0"	—	—	—	1	15'-6"
H404	BOTTOM SLAB & WINGWALL	4	2'-7"	1'-11"	—	—	—	1	6'-5"	3'-2"	2'-6"	—	—	—	1	8'-2"	3'-9"	3'-2"	—	—	—	1	10'-1"	4'-4"	3'-9"	—	—	—	1	11'-10"	4'-11"	4'-3"	—	—	—	1	13'-5"	5'-6"	4'-10"	—	—	—	1	15'-2"
H405	BOTTOM SLAB & WINGWALL	4	2'-7"	1'-9"	—	—	—	1	6'-1"	3'-2"	2'-4"	—	—	—	1	7'-10"	3'-9"	3'-0"	—	—	—	1	9'-9"	4'-4"	3'-7"	—	—	—	1	11'-6"	4'-11"	4'-1"	—	—	—	1	13'-1"	5'-6"	4'-8"	—	—	—	1	14'-10"
H406	BOTTOM SLAB & WINGWALL	4	2'-7"	1'-7"	—	—	—	1	5'-9"	3'-2"	2'-2"	—	—	—	1	7'-6"	3'-9"	2'-10"	—	—	—	1	9'-5"	4'-4"	3'-5"	—	—	—	1	11'-2"	4'-11"	3'-11"	—	—	—	1	12'-9"	5'-6"	4'-6"	—	—	—	1	14'-6"
H407	BOTTOM SLAB & WINGWALL	4	2'-7"	1'-5"	—	—	—	1	5'-5"	3'-2"	2'-0"	—	—	—	1	7'-2"	3'-9"	2'-8"	—	—	—	1	9'-1"	4'-4"	3'-3"	—	—	—	1	10'-10"	4'-11"	3'-9"	—	—	—	1	12'-5"	5'-6"	4'-4"	—	—	—	1	14'-2"
H408	BOTTOM SLAB & WINGWALL	4	2'-7"	1'-3"	—	—	—	1	5'-1"	3'-2"	1'-10"	—	—	—	1	6'-10"	3'-9"	2'-6"	—	—	—	1	8'-9"	4'-4"	3'-1"	—	—	—	1	10'-6"	4'-11"	3'-7"	—	—	—	1	12'-1"	5'-6"	4'-2"	—	—	—	1	13'-10"
H409	BOTTOM SLAB & WINGWALL	4	2'-7"	1'-1"	—	—	—	1	4'-9"	3'-2"	1'-8"	—	—	—	1	6'-6"	3'-9"	2'-4"	—	—	—	1	8'-5"	4'-4"	2'-11"	—	—	—	1	10'-2"	4'-11"	3'-5"	—	—	—	1	11'-9"	5'-6"	4'-0"	—	—	—	1	13'-6"
H410	BOTTOM SLAB & WINGWALL	4	2'-7"	0'-11"	—	—	—	1	4'-5"	3'-2"	1'-6"	—	—	—	1	6'-2"	3'-9"	2'-2"	—	—	—	1	8'-1"	4'-4"	2'-9"	—	—	—	1	9'-10"	4'-11"	3'-3"	—	—	—	1	11'-5"	5'-6"	3'-10"	—	—	—	1	13'-2"
H411	BOTTOM SLAB & WINGWALL	4	2'-7"	0'-9"	—	—	—	1	4'-1"	3'-2"	1'-4"	—	—	—	1	5'-10"	3'-9"	2'-0"	—	—	—	1	7'-9"	4'-4"	2'-7"	—	—	—	1	9'-6"	4'-11"	3'-1"	—	—	—	1	11'-1"	5'-6"	3'-8"	—	—	—	1	12'-10"
H412	BOTTOM SLAB & WINGWALL	4	2'-7"	0'-7"	—	—	—	1	3'-9"	3'-2"	1'-2"	—	—	—	1	5'-6"	3'-9"	1'-10"	—	—	—	1	7'-5"	4'-4"	2'-5"	—	—	—	1	9'-2"	4'-11"	2'-11"	—	—	—	1	10'-9"	5'-6"	3'-6"	—	—	—	1	12'-6"
H413	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	3'-2"	1'-0"	—	—	—	1	5'-2"	3'-9"	1'-8"	—	—	—	1	7'-1"	4'-4"	2'-3"	—	—	—	1	8'-10"	4'-11"	2'-9"	—	—	—	1	10'-5"	5'-6"	3'-4"	—	—	—	1	12'-2"
H414	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	3'-2"	0'-10"	—	—	—	1	4'-10"	3'-9"	1'-6"	—	—	—	1	6'-9"	4'-4"	2'-1"	—	—	—	1	8'-6"	4'-11"	2'-7"	—	—	—	1	10'-1"	5'-6"	3'-2"	—	—	—	1	11'-10"
H415	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	3'-2"	0'-8"	—	—	—	1	4'-6"	3'-9"	1'-4"	—	—	—	1	6'-5"	4'-4"	1'-11"	—	—	—	1	8'-2"	4'-11"	2'-5"	—	—	—	1	9'-9"	5'-6"	3'-0"	—	—	—	1	11'-6"
H416	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	3'-2"	0'-6"	—	—	—	1	4'-2"	3'-9"	1'-2"	—	—	—	1	6'-1"	4'-4"	1'-9"	—	—	—	1	7'-10"	4'-11"	2'-3"	—	—	—	1	9'-5"	5'-6"	2'-10"	—	—	—	1	11'-2"
H417	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3'-9"	1'-0"	—	—	—	1	5'-9"	4'-4"	1'-7"	—	—	—	1	7'-6"	4'-11"	2'-1"	—	—	—	1	9'-1"	5'-6"	2'-8"	—	—	—	1	10'-10"
H418	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3'-9"	0'-10"	—	—	—	1	5'-5"	4'-4"	1'-5"	—	—	—	1	7'-2"	4'-11"	1'-11"	—	—	—	1	8'-9"	5'-6"	2'-6"	—	—	—	1	10'-6"
H419	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3'-9"	0'-8"	—	—	—	1	5'-1"	4'-4"	1'-3"	—	—	—	1	6'-10"	4'-11"	1'-9"	—	—	—	1	8'-5"	5'-6"	2'-4"	—	—	—	1	10'-2"
H420	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3'-9"	0'-6"	—	—	—	1	4'-9"	4'-4"	1'-1"	—	—	—	1	6'-6"	4'-11"	1'-7"	—	—	—	1	8'-1"	5'-6"	2'-2"	—	—	—	1	9'-10"
H421	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4'-4"	0'-11"	—	—	—	1	6'-2"	4'-11"	1'-5"	—	—	—	1	7'-9"	5'-6"	2'-0"	—	—	—	1	9'-6"
H422	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4'-4"	0'-9"	—	—	—	1	5'-10"	4'-11"	1'-3"	—	—	—	1	7'-5"	5'-6"	1'-10"	—	—	—	1	9'-2"
H423	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4'-4"	0'-7"	—	—	—	1	5'-6"	4'-11"	1'-1"	—	—	—	1	7'-1"	5'-6"	1'-8"	—	—	—	1	8'-10"
H424	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4'-11"	0'-11"	—	—	—	1	6'-9"	5'-6"	1'-6"	—	—	—	1	8'-6"
H425	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4'-11"	0'-9"	—	—	—	1	6'-5"	5'-6"	1'-4"	—	—	—	1	8'-2"
H426	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4'-11"	0'-7"	—	—	—	1	6'-1"	5'-6"	1'-2"	—	—	—	1	7'-10"
H427	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5'-6"	1'-0"	—	—	—	1	7'-6"
H428	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5'-6"	0'-10"	—	—	—	1	7'-2"
H429	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5'-6"	0'-8"	—	—	—	1	6'-10"
H430	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5'-6"	0'-6"	—	—	—	1	6'-6"
S400	BOTTOM SLAB & TOEWALL	4	11'-8"	0'-4"	0'-8"	1'-4"	—	4	14'-0"	15'-2"	0'-4"	0'-8"	1'-4"	—	6	17'-6"	19'-2"	0'-4"	0'-8"	1'-4"	—	6	21'-6"	22'-8"	0'-4"	0'-8"	1'-4"	—	6	25'-0"	25'-8"	0'-4"	0'-8"	1'-4"	—	6	28'-0"	29'-2"	0'-4"	0'-8"	1'-4"	—	8	31'-6"
V500	WINGWALL	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9'-9"	0'-8"	0'-8"	9'-1"	—	4	20'-10"	11'-6"	0'-8"	0'-8"	10'-10"	—	4	24'-4"	—	—	—	—	—	—	—	—	—	—	—	—	—	—
V700	HEADWALL	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1'-6"	0'-4"	0'-9"	1'-6"	—	2	4'-5"	1'-10"	0'-4"	0'-8"	1'-10"	—	2	5'-0"	2'-1"	0'-4"	0'-9"	2'-1"	—	2	5'-7"	2'-5"	0'-4"	0'-8"	2'-5"	—	2	6'-2"
W500	WINGWALL	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8'-4"	0'-8"	0'-8"	8'-2"	8'-6"	4	29'-0"	9'-7"	0'-8"	0'-8"	9'-4"	9'-2"	4	32'-1"



GENERAL NOTES

1. CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.
2. THE MATERIAL AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   - (A) STEEL PIPE ASTM A53, TYPE E OR S, GRADE A OR B, SCHEDULE 40.
   - (B) THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPEC. TT-E-489J, AFTER FABRICATION.
3. THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   - (A) BOLTS, NUTS AND WASHERS ASTM A307
   - (B) GALVANIZING ASTM A153
4. THE COST OF FURNISHING BOLTS, NUTS, AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR PIPE ENDWALL.
5. PAYMENT WILL BE MADE UNDER:

   ITEM NO. 611-07.01, CLASS A CONCRETE (PIPE ENDWALLS) -----CU. YD.
   ITEM NO. 611-07.02, STEEL BAR REINFORCING (PIPE ENDWALLS) -----LB.
   ITEM NO. 611-07.03, STRUCTURAL STEEL (PIPE ENDWALLS) -----LB.
6. SEE D-PE-3B(1) FOR SKEWED CONNECTION DETAIL.
7. 3"X 3"REBAR MASH MAY BE USED IN LIEU OF REINFORCING AS SHOWN AND PAYED UNDER ITEM NO.611-07.02

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONCRETE ENDWALL TYPE "U" WITH STEEL PIPE GRATE

FOR 18" THRU 48" PIPES
6:1 SLOPE

D-PE-6B(2)

REV. 6-1-09: ADDED GENERAL NOTE (5) UNDER (E).

REV. 3-30-00: MODIFIES TOE WALL AND CLASS "A" CONCRETE QUANTITIES.

REV. 5-15-00: ADDED SIDEDRAIN ENDWALL ALTERNATE NOTE.

REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NO. 611-07.03.

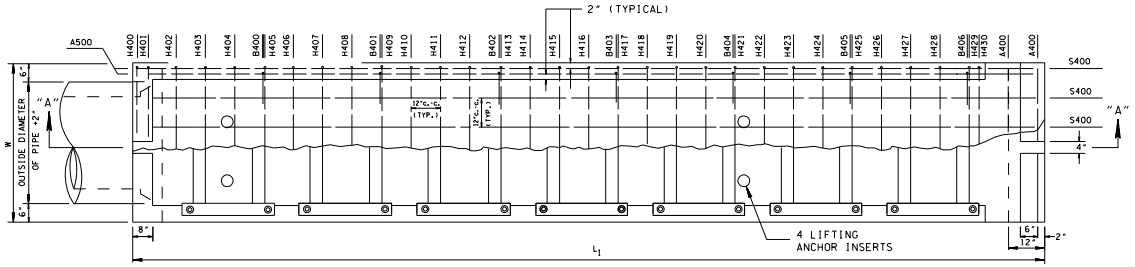
REV. 10-26-92: CHANGED SHEET NUMBER FROM D-SEW-6D(1) TO D-SEW-6DA. CHANGED REFERENCE TO BILL OF STEEL FROM D-SEW-6D(2) TO D-SEW-6DB.

REV. 5-27-94: ADDED ALTERNATE DRILLED - IN ANCHORS.

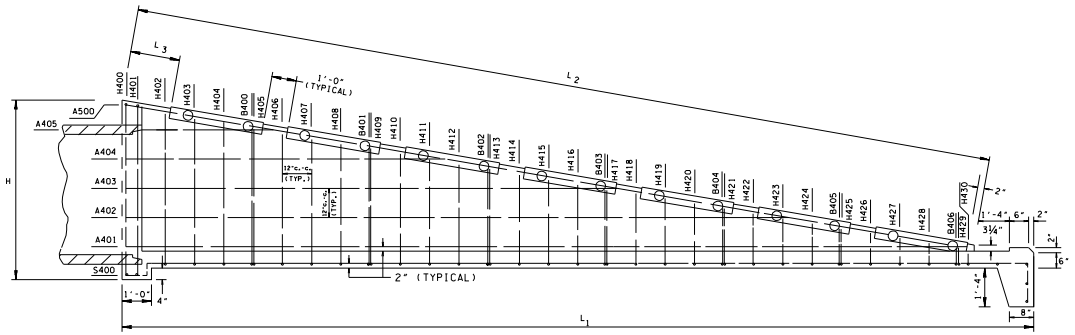
REV. 5-27-99: CHANGED PAINT SPECIFICATION TO TT-E-489J.

REV. 11-6-89: ADDED FOOTNOTE NO. (1) UNDER DIMENSION AND QUANTITIES FOR ONE ENDWALL TABULATED BLOCK.

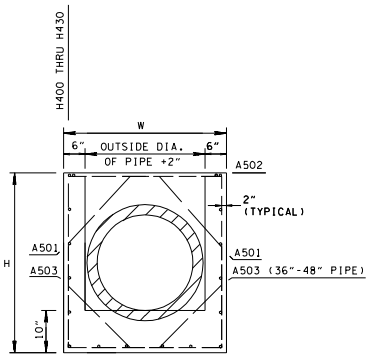
REV. 7-29-92: REDREW, RENAMED AND REORGANIZED SHEET. CHANGED SHEET NUMBER FROM D-PE-6D(1) TO D-SEW-6D(1). ADDED REFERENCE TO TYPE "SD" ENDWALL. UPDATED SPECIFICATIONS IN THE GENERAL NOTES. CHANGED ALL ESTIMATED QUANTITIES IN THE TABULATED BLOCK.



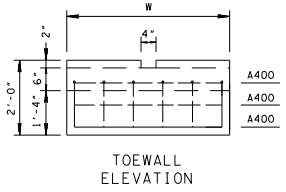
PLAN



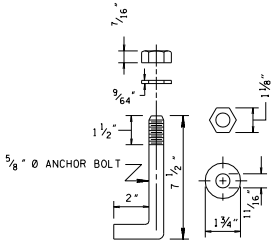
SECTION "A"-"A"



HEADWALL ELEVATION



TOEWALL ELEVATION



ANCHOR BOLT ASSEMBLY

GENERAL NOTES

1. CAST-IN-PLACE CONCRETE ENDWALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.

2. THE MATERIALS, WELDING AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   - (A) ANGLES ASTM A36
   - (B) STEEL PIPE ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS STANDARD, SCHEDULE 40 (WALL THICKNESS 0.216") - FOR 15" THRU 24" DIAMETER PIPE CULVERT. ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS XXS (WALL THICKNESS 0.600") - FOR 30" THRU 48" DIAMETER PIPE CULVERT.
   - (C) WELDING AWS SPECIFICATIONS D1.1 (LATEST EDITION) AS MODIFIED BY CURRENT AASHTO STANDARD SPECIFICATIONS FOR THE WELDING OF STRUCTURAL STEEL HIGHWAY BRIDGES AND SUBSEQUENT AASHTO SPECIFICATION-BRIDGES.
   - (D) THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPECIFICATION TT-E-489J, AFTER FABRICATION.

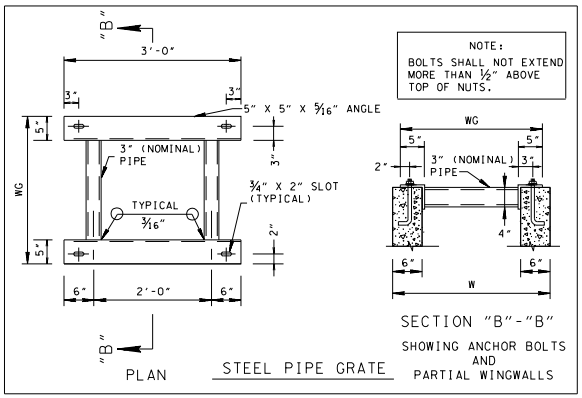
3. THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   - (A) BOLTS, NUTS AND WASHERS ASTM A307
   - (B) GALVANIZING ASTM A153

4. THE COST OF FURNISHING BOLTS, NUTS AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR PIPE ENDWALL.

5. PRECAST UNIT NOTE
   THE CONTRACTOR MAY, WITH PERMISSION FROM THE ENGINEER, SUBSTITUTE PRECAST ENDWALLS FOR CAST-IN-PLACE ENDWALLS PROVIDED THAT:
   - (A) APPROPRIATE SIZING AND LOCATION OF THE FOUR (4) LIFTING INSERTS SHALL BE THE RESPONSIBILITY OF THE FABRICATOR TO ASSURE BALANCED HANDLING DURING INSTALLATION OF THE PRECAST ENDWALL.
   - (B) THE CONTRACTOR TO PATCH ALL LIFTING INSERT HOLES AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.
   - (C) PIPE OPENINGS THROUGH HEADWALL ARE CAST TWO INCHES GREATER THAN THE OUTSIDE DIAMETER OF THE PROPOSED PIPE.
   - (D) PAYMENT FOR PRECAST ENDWALLS BASED ON THE QUANTITIES FOR CAST-IN-PLACE ENDWALLS IS ACCEPTABLE.
   - (E) 3"X 3"REBAR MASH MAY BE USED IN LIEU OF REINFORCING AS SHOWN AND PAYED UNDER ITEM NO. 611-07.02

   CONCRETE: Fc=4,500 POUNDS PER SQUARE INCH MINIMUM AT 28 DAYS.
   REINFORCING STEEL: ASTM A615, Fy=60,000 POUNDS PER SQUARE INCH.
   ALL REINFORCING STEEL IS TO BE INSTALLED AS DETAILED ON THIS STANDARD DRAWING.
   ENDWALL UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED ENDWALL UNITS AT HIS EXPENSE.

6. PAYMENT WILL BE MADE UNDER:
   ITEM NUMBER 611-07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)----CUBIC YARD.
   ITEM NUMBER 611-07.02, STEEL BAR REINFORCING (PIPE ENDWALLS)----POUND.
   ITEM NUMBER 611-07.03, STRUCTURAL STEEL (PIPE ENDWALLS)----POUND.



PLAN

SECTION "B"-"B" SHOWING ANCHOR BOLTS AND PARTIAL WINGWALLS

STEEL PIPE GRATE

ALTERNATE DRILLED IN ANCHORS

CERTIFICATION :
THE CONTRACTOR SHALL FURNISH CERTIFIED ANCHOR PULL OUT DATA FROM AN INDEPENDENT TESTING LABORATORY USING CLASS "A" CONCRETE AS PRESCRIBED BY TENNESSEE HIGHWAY SPECIFICATIONS. THE REQUIRED ULTIMATE LOAD FOR ⅝" DIAMETER ANCHORS IS 11,000 POUNDS.

IN PLACE REQUIREMENTS :
THE UNITS SHALL BE SUBSET 3/32" TO ¼" AND TORQUED, WITH STEEL PIPE GRATE IN PLACE, TO AN EQUIVALENT DIRECT PULL OUT LOAD 60 PERCENT OF REQUIRED ULTIMATE LOAD. SLIPPAGE SHALL NOT EXCEED ¼". THE DEPARTMENT WILL PERFORM TESTING OF ANCHORS ON SITE TO INSURE THE SPECIFIED IN PLACE REQUIREMENTS. INSTALLATIONS NOT MEETING THESE REQUIREMENTS MUST BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SAFETY ENDWALL SHOWN ON STANDARD DRAWING D-SEW-6DC MAY BE SUBSTITUTED FOR THIS SAFETY ENDWALL. BOTH THESE ENDWALLS ARE TO BE USED FOR SIDEDRAINS ONLY.

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL

PIPE CULV. DIA.	CONCRETE ENDWALL DIMENSIONS					STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY		ESTIMATED QUANTITIES		
	H	L_1	L_2	L_3	W	WG	NO. REQD.	CLASS "A" CONCRETE CU. YD.	STEEL BAR REINF. (1) LB.	STRUCT. STEEL LB.
15"	3'-1¾"	14'-0"	12'-2"	1'-0"	2'-10"	2'-7"	3	1.55	203	266
18"	3'-3¾"	15'-0"	13'-2¼"	2'-¼"	3'-1"	2'-10"	3	1.78	222	277
24"	3'-9¼"	18'-0"	16'-2¾"	1'-¾"	3'-8"	3'-5"	4	2.49	292	405
30"	4'-5¼"	22'-0"	20'-3½"	1'-1½"	4'-3"	4'-0"	5	3.55	403	898
36"	5'-1¼"	26'-0"	24'-4"	1'-2"	4'-10"	4'-7"	6	4.82	521	1,207
42"	5'-9¼"	30'-0"	28'-4¾"	1'-2¾"	5'-5"	5'-2"	7	6.27	653	1,560
48"	5'-11¼"	31'-0"	29'-5"	2'-2¾"	6'-0"	5'-9"	7	6.91	707	1,712

(1) SEE D-SEW-6DB FOR BILL OF STEEL.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

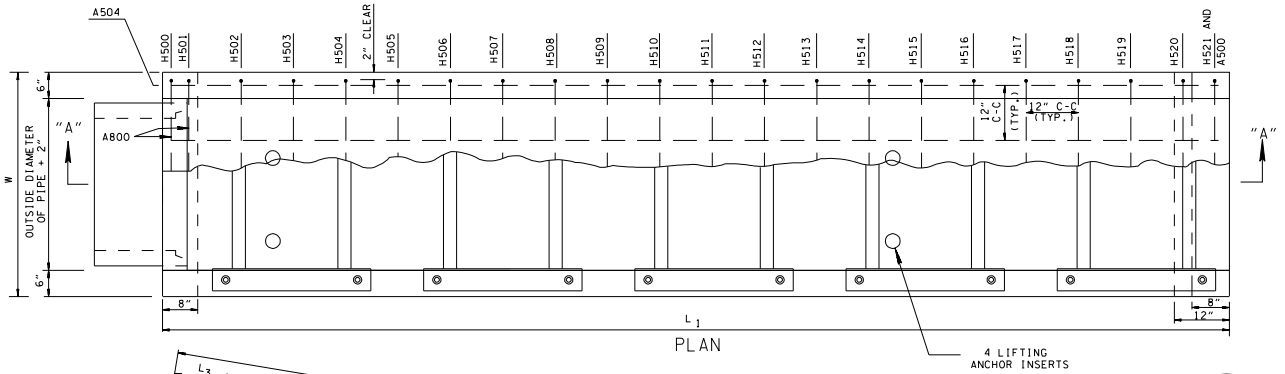
CONCRETE ENDWALL TYPE "SD" WITH STEEL PIPE GRATE FOR 15" THRU 48" PIPES - 6:1 SLOPE

2-26-87 | D-SEW-6DA

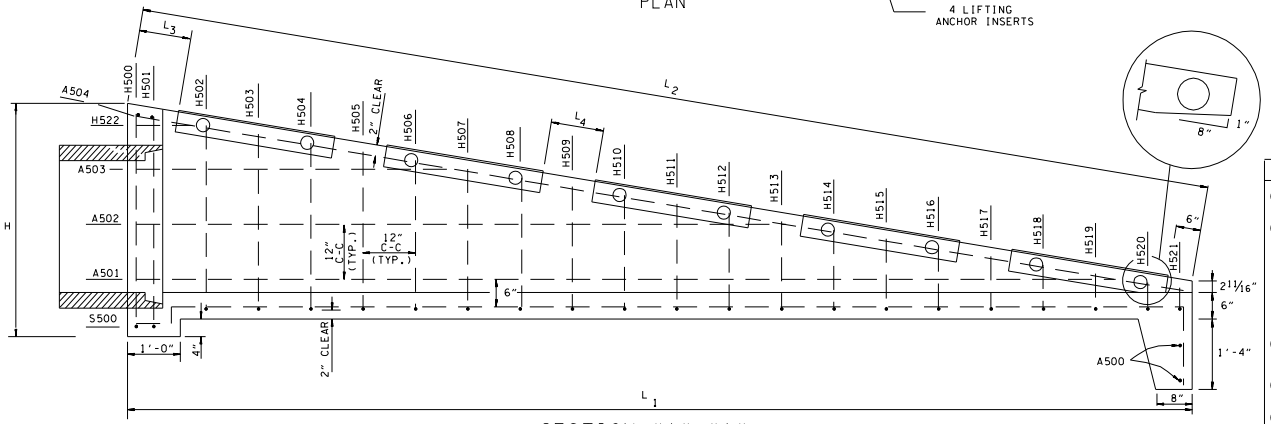
REV. 4-15-05: MODIFIED REINFORCING STEEL IN HEADWALL AND INCREASED REINFORCING STEEL ACCORDINGLY IN TABLE.

REV. 6-1-09: ADDED GENERAL NOTE (5) UNDER (E).

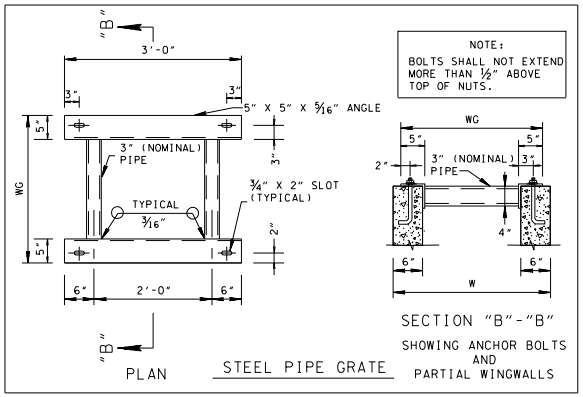
REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NO. 611-07.03. IN GENERAL NOTE (2) ADDED SUB-SECTION NOTE (F).



PLAN



SECTION "A"-"A"



PLAN

STEEL PIPE GRATE

SECTION "B"-"B"
SHOWING ANCHOR BOLTS AND PARTIAL WINGWALLS

GENERAL NOTES

(1) CAST-IN-PLACE CONCRETE ENDWALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.

(2) THE MATERIALS, WELDING AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
- (A) ANGLES ASTM A36
- (B) STEEL PIPE ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS STANDARD, SCHEDULE 40 (WALL THICKNESS 0.216") - FOR 15" THRU 24" DIAMETER PIPE CULVERT. ASTM A53, TYPE E OR S, GRADE A OR B, WEIGHT CLASS XXS (WALL THICKNESS 0.600") - FOR 30" THRU 48" DIAMETER PIPE CULVERT.
- (C) WELDING AWS SPECIFICATIONS D1.1 (LATEST EDITION) AS MODIFIED BY CURRENT AASHTO STANDARD SPECIFICATIONS FOR THE WELDING OF STRUCTURAL STEEL HIGHWAY BRIDGES AND SUBSEQUENT AASHTO SPECIFICATION-BRIDGES.
- (D) THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPECIFICATION TT-E-489J, AFTER FABRICATION.

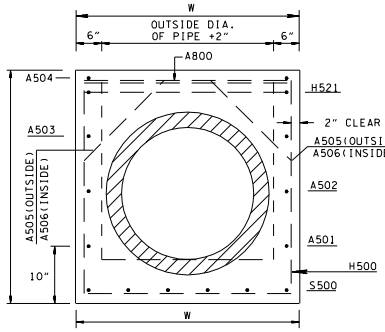
(3) THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
- (A) BOLTS, NUTS AND WASHERS ASTM A307
- (B) GALVANIZING ASTM A153

(4) THE COST OF FURNISHING BOLTS, NUTS AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR PIPE ENDWALL.

(5) PRECAST UNIT NOTE
THE CONTRACTOR MAY, WITH PERMISSION FROM THE ENGINEER, SUBSTITUTE PRECAST ENDWALLS FOR CAST-IN-PLACE ENDWALLS PROVIDED THAT:
- (A) APPROPRIATE SIZING AND LOCATION OF THE FOUR (4) LIFTING INSERTS SHALL BE THE RESPONSIBILITY OF THE FABRICATOR TO ASSURE BALANCED HANDLING DURING INSTALLATION OF THE PRECAST ENDWALL.
- (B) THE CONTRACTOR TO PATCH ALL LIFTING INSERT HOLES AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.
- (C) PIPE OPENINGS THROUGH HEADWALL ARE CAST TWO INCHES GREATER THAN THE OUTSIDE DIAMETER OF THE PROPOSED PIPE.
- (D) PAYMENT FOR PRECAST ENDWALLS BASED ON THE QUANTITIES FOR CAST-IN-PLACE ENDWALLS IS ACCEPTABLE.
- (E) 3"X 3" REBAR MASH MAY BE USED IN LIEU OF REINFORCING AS SHOWN AND PAYED UNDER ITEM NO. 611-07.02

CONCRETE: Fc=4,500 POUNDS PER SQUARE INCH MINIMUM AT 28 DAYS.
REINFORCING STEEL: ASTM A615, Fy=60,000 POUNDS PER SQUARE INCH.
ALL REINFORCING STEEL IS TO BE INSTALLED AS DETAILED ON THIS STANDARD DRAWING.
ENDWALL UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE DAMAGED ENDWALL UNITS AT HIS EXPENSE.

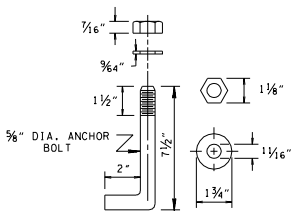
(6) PAYMENT WILL BE MADE UNDER:
ITEM NUMBER 611-07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)----CUBIC YARD.
ITEM NUMBER 611-07.02, STEEL BAR REINFORCING (PIPE ENDWALLS)----POUND.
ITEM NUMBER 611-07.03, STRUCTURAL STEEL (PIPE ENDWALLS)----POUND.



HEADWALL ELEVATION

PIPE CULV. DIA.	CONCRETE ENDWALL DIMENSIONS						STRUCTURAL STEEL GRATE DIMENSIONS AND QUANTITY		ESTIMATED QUANTITIES		
	H	L_1	L_2	L_3	L_4	W	WG	NO. REQD.	CLASS "A" CONCRETE CU. YD.	STEEL BAR REINF. (1) LB.	STRUCT. STEEL LB.
18"	3'-2"	12'-8"	12'-10 1/8"	1'-4 1/8"	1'-0"	3'-1"	2'-10"	3	1.84	238	277
24"	3'-9"	16'-2"	16'-4 1/16"	0'-10 1/16"	1'-0"	3'-8"	3'-5"	4	2.57	360	405
30"	4'-5"	20'-2"	20'-5 5/16"	0'-11 3/8"	1'-0"	4'-3"	4'-0"	5	3.64	491	898

(1) SEE D-SEW-6DD FOR BILL OF STEEL.



ANCHOR BOLT ASSEMBLY

ALTERNATE DRILLED IN ANCHORS

CERTIFICATION :
THE CONTRACTOR SHALL FURNISH CERTIFIED ANCHOR PULL OUT DATA FROM AN INDEPENDENT TESTING LABORATORY USING CLASS "A" CONCRETE AS PRESCRIBED BY TENNESSEE HIGHWAY SPECIFICATIONS. THE REQUIRED ULTIMATE LOAD FOR 5/8" DIAMETER ANCHORS IS 11,000 POUNDS.

IN PLACE REQUIREMENTS :
THE UNITS SHALL BE SUBSET 3/32" TO 1/4" AND TORQUED, WITH STEEL PIPE GRATE IN PLACE, TO AN EQUIVALENT DIRECT PULL OUT LOAD 60 PERCENT OF REQUIRED ULTIMATE LOAD. SLIPPAGE SHALL NOT EXCEED 1/4". THE DEPARTMENT WILL PERFORM TESTING OF ANCHORS ON SITE TO INSURE THE SPECIFIED IN PLACE REQUIREMENTS. INSTALLATIONS NOT MEETING THESE REQUIREMENTS MUST BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

THIS ENDWALL MAY BE USED FOR SIDEDRAINS IN LIEU OF THE SAFETY ENDWALL SHOWN ON STANDARD DRAWING D-SEW-6DA. IT IS TO BE USED FOR SIDEDRAINS ONLY.

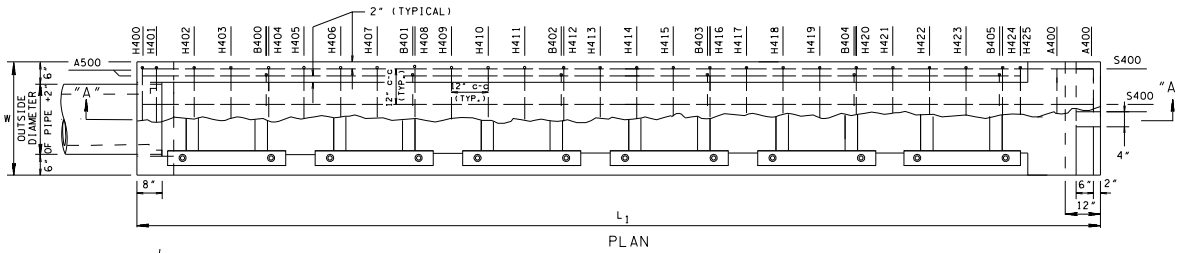
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

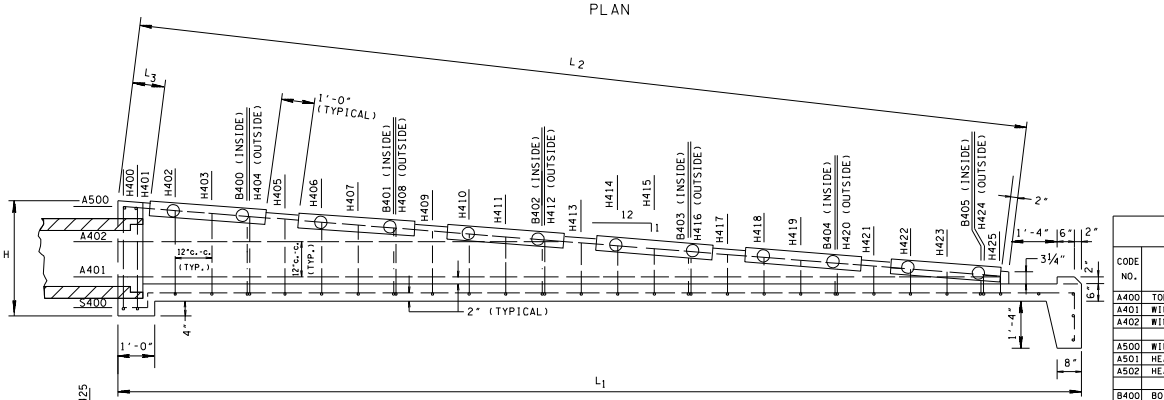
CONCRETE ENDWALL TYPE "SD" WITH STEEL PIPE GRATE

FOR 18" THRU 30" PIPES - 6:1 SLOPE

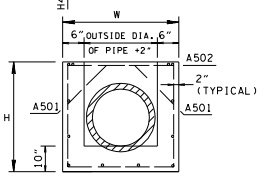
5-15-00 | D-SEW-6DC



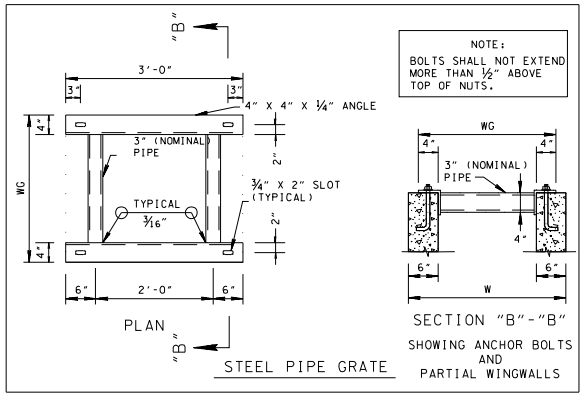
PLAN



SECTION "A"-"A"



HEADWALL ELEVATION

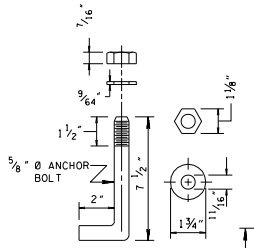


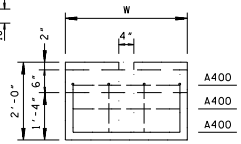
PLAN

SECTION "B"-"B"

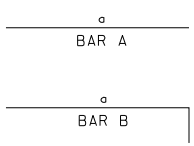
SHOWING ANCHOR BOLTS AND PARTIAL WINGWALLS

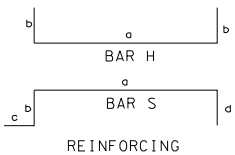
STEEL PIPE GRATE





TOEWALL ELEVATION





REINFORCING STEEL LEGEND

GENERAL NOTES

1. CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.
2. THE MATERIALS, WELDING AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   - (A) ANGLES ASTM A36
   - (B) STEEL PIPE ASTM A53, TYPE E OR S, GRADE A OR B, SCHEDULE 40 (MINIMUM WALL THICKNESS 0.216"),
   - (C) WELDING AWS SPECIFICATIONS D1.1 (LATEST EDITION) AS MODIFIED BY CURRENT AASHTO STANDARD SPECIFICATIONS FOR THE WELDING OF STRUCTURAL STEEL HIGHWAY BRIDGES AND SUBSEQUENT AASHTO SPECIFICATIONS-BRIDGES.
   - (D) THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPECIFICATION TT-E-489J, AFTER FABRICATION.
3. THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   - (A) BOLTS, NUTS AND WASHERS ASTM A307
   - (B) GALVANIZING ASTM A153
4. THE COST OF FURNISHING BOLTS, NUTS AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR PIPE ENDWALL.
5. PAYMENT WILL BE MADE UNDER:

   ITEM NUMBER 611-07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)----CUBIC YARD.
   ITEM NUMBER 611-07.02, STEEL BAR REINFORCING (PIPE ENDWALLS)----POUND.
   ITEM NUMBER 611-07.03, STRUCTURAL STEEL (PIPE ENDWALLS)----POUND.
6. 3"X 3"REBAR MASH MAY BE USED IN LIEU OF REINFORCING AS SHOWN AND PAYED UNDER ITEM NO.611-07.02

REV. 7-28-84: CHANGED MATERIAL SPECIFICATIONS FOR STRUCTURAL STEEL PIPES AND PAINT SPECIFICATIONS.

REV. 3-20-86: CHANGED FEDERAL PAINT SPECIFICATION.

☒ REV. 7-29-92: REDREW, RENAMED AND REORGANIZED SHEET. CHANGED SHEET NUMBER FROM D-PE-12 TO D-SEW-12D. CHANGED ENDWALL FROM TYPE "U" TO TYPE "SD". UPDATED SPECIFICATIONS IN THE GENERAL NOTES. CORRECTED DIMENSIONS AND ESTIMATED QUANTITIES IN THE DIMENSION AND QUANTITY BLOCK. CORRECTED DIMENSIONS IN BILL OF STEEL.

☒ REV. 10-26-95: IN GENERAL NOTE (2) CHANGED MINIMUM WALL THICKNESS FROM 0.25" TO 0.216".

☒ REV. 1-19-97: CHANGED WEIGHT OF STRUCTURAL STEEL GRATES.

☒ REV. 5-27-99: CHANGED PAINT SPECIFICATION TO TT-E-489J.

☒ REV. 4-15-00: MODIFIED TOE WALL AND CLASS "A" CONCRETE QUANTITIES.

☒ REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NO. 611-07.03.

☒ REV. 6-1-09: ADDED GENERAL NOTE (6).

BILL OF STEEL

CODE NO.	LOCATION	BAR SIZE	15" PIPE BENDING DIMENSIONS a	b	c	d	NO. REQD.	LENGTH	18" PIPE BENDING DIMENSIONS a	b	c	d	NO. REQD.	LENGTH
A400	TOEWALL	4	2'-6"	—	—	—	4	2'-6"	2'-9"	—	—	—	4	2'-9"
A401	WINGWALLS	4	20'-1"	—	—	—	2	20'-1"	23'-1"	—	—	—	2	23'-1"
A402	WINGWALLS	4	8'-1"	—	—	—	2	8'-1"	11'-1"	—	—	—	2	11'-1"
A500	WINGWALLS	5	20'-9"	—	—	—	4	20'-9"	23'-9"	—	—	—	4	23'-9"
A501	HEADWALL	5	1'-8"	—	—	—	4	1'-8"	1'-8"	—	—	—	4	1'-8"
A502	HEADWALL	5	2'-6"	—	—	—	2	2'-6"	2'-9"	—	—	—	2	2'-9"
B400	BOTTOM SLAB & WINGWALL	4	0'-10"	1'-11"	—	—	2	2'-9"	1'-0"	2'-2"	—	—	2	3'-2"
B401	BOTTOM SLAB & WINGWALL	4	0'-10"	1'-7"	—	—	2	2'-5"	1'-0"	1'-10"	—	—	2	2'-10"
B402	BOTTOM SLAB & WINGWALL	4	0'-10"	1'-3"	—	—	2	2'-1"	1'-0"	1'-6"	—	—	2	2'-6"
B403	BOTTOM SLAB & WINGWALL	4	0'-10"	0'-11"	—	—	2	1'-9"	1'-0"	1'-2"	—	—	2	2'-2"
B404	BOTTOM SLAB & WINGWALL	4	0'-10"	0'-7"	—	—	2	1'-5"	1'-0"	0'-10"	—	—	2	1'-10"
B405	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	1'-0"	0'-6"	—	—	2	1'-6"
H400	BOTTOM SLAB & HEADWALL	4	2'-6"	2'-6"	—	—	1	7'-4"	2'-9"	2'-9"	—	—	1	8'-1"
H401	BOTTOM SLAB & WINGWALL	4	2'-6"	2'-6"	—	—	1	7'-4"	2'-9"	2'-9"	—	—	1	8'-1"
H402	BOTTOM SLAB & WINGWALL	4	2'-6"	2'-1"	—	—	1	6'-6"	2'-9"	2'-4"	—	—	1	7'-3"
H403	BOTTOM SLAB & WINGWALL	4	2'-6"	2'-0"	—	—	1	6'-4"	2'-9"	2'-3"	—	—	1	7'-1"
H404	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-11"	—	—	1	6'-2"	2'-9"	2'-2"	—	—	1	6'-11"
H405	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-10"	—	—	1	6'-0"	2'-9"	2'-1"	—	—	1	6'-9"
H406	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-9"	—	—	1	5'-10"	2'-9"	2'-0"	—	—	1	6'-7"
H407	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-8"	—	—	1	5'-8"	2'-9"	1'-11"	—	—	1	6'-5"
H408	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-7"	—	—	1	5'-6"	2'-9"	1'-10"	—	—	1	6'-3"
H409	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-6"	—	—	1	5'-4"	2'-9"	1'-9"	—	—	1	6'-1"
H410	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-5"	—	—	1	5'-2"	2'-9"	1'-8"	—	—	1	5'-11"
H411	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-4"	—	—	1	5'-0"	2'-9"	1'-7"	—	—	1	5'-9"
H412	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-3"	—	—	1	4'-10"	2'-9"	1'-6"	—	—	1	5'-7"
H413	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-2"	—	—	1	4'-8"	2'-9"	1'-5"	—	—	1	5'-5"
H414	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-1"	—	—	1	4'-6"	2'-9"	1'-4"	—	—	1	5'-3"
H415	BOTTOM SLAB & WINGWALL	4	2'-6"	1'-0"	—	—	1	4'-4"	2'-9"	1'-3"	—	—	1	5'-1"
H416	BOTTOM SLAB & WINGWALL	4	2'-6"	0'-11"	—	—	1	4'-2"	2'-9"	1'-2"	—	—	1	4'-11"
H417	BOTTOM SLAB & WINGWALL	4	2'-6"	0'-10"	—	—	1	4'-0"	2'-9"	1'-1"	—	—	1	4'-9"
H418	BOTTOM SLAB & WINGWALL	4	2'-6"	0'-9"	—	—	1	3'-10"	2'-9"	1'-0"	—	—	1	4'-7"
H419	BOTTOM SLAB & WINGWALL	4	2'-6"	0'-8"	—	—	1	3'-8"	2'-9"	0'-11"	—	—	1	4'-5"
H420	BOTTOM SLAB & WINGWALL	4	2'-6"	0'-7"	—	—	1	3'-6"	2'-9"	0'-10"	—	—	1	4'-3"
H421	BOTTOM SLAB & WINGWALL	4	2'-6"	0'-6"	—	—	1	3'-4"	2'-9"	0'-9"	—	—	1	4'-1"
H422	BOTTOM SLAB & WINGWALL	4	2'-6"	0'-6"	—	—	1	3'-4"	2'-9"	0'-8"	—	—	1	3'-11"
H423	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	2'-9"	0'-7"	—	—	1	3'-9"
H424	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	2'-9"	0'-6"	—	—	1	3'-7"
H425	BOTTOM SLAB & WINGWALL	4	—	—	—	—	—	—	2'-9"	0'-6"	—	—	1	3'-7"
S400	BOTTOM SLAB & TOEWALL	4	22'-0"	0'-4"	0'-8"	1'-4"	4	24'-1"	24'-11"	0'-4"	0'-8"	1'-4"	4	27'-0"

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL

PIPE CULV. DIA.	CONCRETE ENDWALL DIMENSIONS H	L_1	L_2	L_3	W	STRUCTURAL STEEL GRATE DIMENSION AND QUANTITY WG	NO. REQD.	ESTIMATED QUANTITIES CLASS "A" CONCRETE CU. YD.	STEEL BAR REINF. LB.	STRUCT. STEEL LB.
15"	2'-10¼"	23'-0"	21'-0"	1'-10"	2'-10"	2'-5"	5	2.70	302	331
18"	3'-1¼"	25'-11"	24'-0"	0'-10"	3'-1"	2'-8"	6	3.30	354	420

☒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONCRETE ENDWALL TYPE "SD" WITH STEEL PIPE GRATE FOR 15" AND 18" PIPES - 12:1 SLOPE

D-SEW-12D

REV. 7-17-81: CHANGED ITEM NO. TO AGREE WITH NEW SPECIFICATION BOOK.

REV. 1-24-08: REDREW SHEET AND CHANGED LENGTH OF ALL FENCE POSTS. MOVE STOCK FENCE AND CHAIN LINK FENCE TO S-F-10C.

REV. 6-1-09: REMOVED TIE WIRES BETWEEN LINE POSTS.

REV. 1-1-76: CHANGED DRAWING NUMBER FROM RD-F-10(68), (SHEET 1) TO S-F-10.

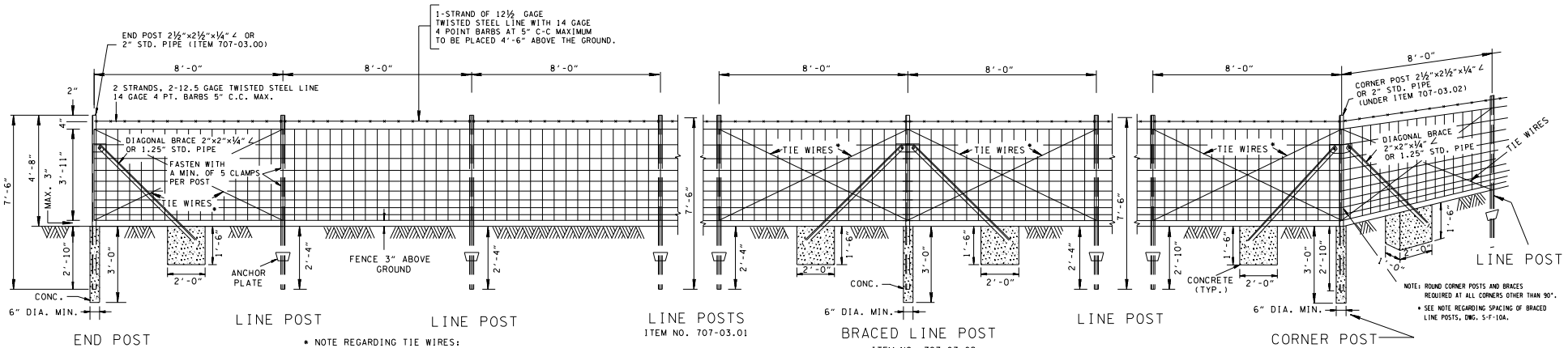
REV. 11-9-76: REMOVED CHAIN LINK FENCE DETAILS AND SPECES FROM THIS SHEET.

REV. 2-25-77: DELETED BARED WIRE AT BOTTOM OF FENCE, CHANGED POST SPACING ON BRACED LINE POSTS AND CORNER POSTS FROM 10' TO 8'.

REV. 6-3-69: ADDED NOTE REGARDING ALTERNATE TYPE TRUSS ROD AND FITTINGS.

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

REV. 12-7-75: ADDED ITEM NO'S FOR END BRACED LINE AND CORNER POSTS.



END POST
ITEM NO. 707-03.02

LINE POST

LINE POST

LINE POSTS
ITEM NO. 707-03.01

BRACED LINE POST
ITEM NO. 707-03.02

LINE POST

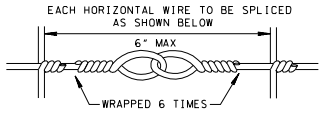
CORNER POST
ITEM NO. 707-03.02

* NOTE REGARDING TIE WIRES:
NO. 9 GAGE DOUBLE STRAND GALVANIZED TIE WIRE TWISTED TO SINGING TIGHTNESS, DOUBLE WRAPPED AROUND POSTS.

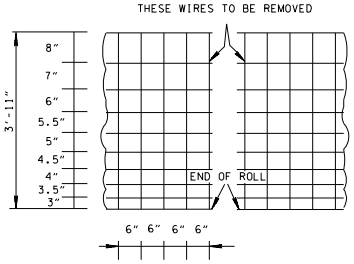
REQUIRED, AT 324' MAX. INTERVALS FOR FIRST ROLL FROM THE BEGINNING CORNER 330' MAXIMUM THEREAFTER. THIS SPACING WILL PERMIT A 6' LENGTH OF FABRIC TO EXTEND BEYOND THE BRACED LINE POST ASSEMBLY, FOR ATTACHING THE STRETCHING DEVICE, AND FOR SPLICING TO THE NEXT ROLL.

NOTE: ROUND CORNER POSTS AND BRACES REQUIRED AT ALL CORNERS OTHER THAN 90°.

* SEE NOTE REGARDING SPACING OF BRACED LINE POSTS, DWG. S-F-10A.

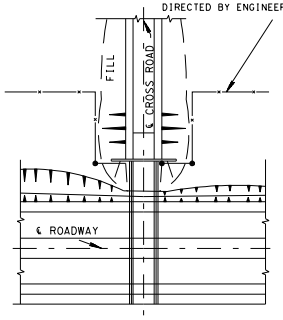


SPLICE DETAIL FOR FENCE

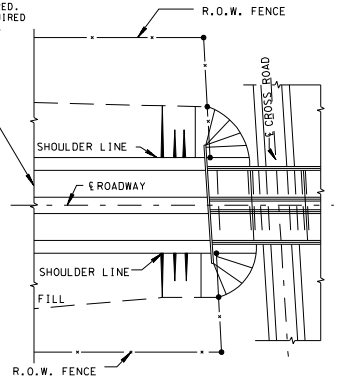


FARM FENCE WIRE DETAILS

NOTE: THESE INSTALLATION SCHEMES ARE TYPICAL AND ARE NOT TO BE CONSTRUED AS REPRESENTATIVE OF ALL CONDITIONS WHICH WILL BE ENCOUNTERED. CONSTRUCTION MAY BE VARIED AS REQUIRED TO MEET FIELD CONDITIONS AND/OR AS DIRECTED BY ENGINEER.



PLAN
ROADWAY UNDER
CROSS ROAD



PLAN
ROADWAY OVER
CROSS ROAD

GENERAL NOTES

Ⓐ WIRE FABRIC WILL MEET REQUIREMENTS FOR ASTM A-116 FOR NO. 11 FARM, DESIGN NO. 1047-6-11, CLASS III COATING.

Ⓑ SEE STANDARD DRAWING S-FG-20 FOR DETAILS OF FENCING OVER DITCHES AND AT OTHER ABRUPT DEPRESSIONS.

Ⓒ SEE STANDARD SPECIFICATIONS, SUB-SECTION 707.05 REGARDING FURNISHING AND PLACING ADDITIONAL BRACED LINE POSTS WHERE TERRAIN IS IRREGULAR.

Ⓓ FENCE TO BE ANGLED TO EDGE OF CULVERTS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

Ⓔ PAYMENT WILL BE MADE UNDER:

ITEM NO. 707-03.01-STOCK FENCE PER LIN. FT.
ITEM NO. 707-03.02-END, BRACED LINE & CORNER POST ASSEMBLIES (STOCK FENCE) PER EACH

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD RIGHT-OF-WAY STOCK FENCE

6-1-59 | S-F-10

REV. 7-17-81: CHANGED ITEM NO. TO AGREE WITH NEW SPECIFICATION BOOK.

REV. 1-24-08: REDREW SHEET AND CHANGED LENGTH OF ALL FENCE POSTS. ADDED NOTE (H).

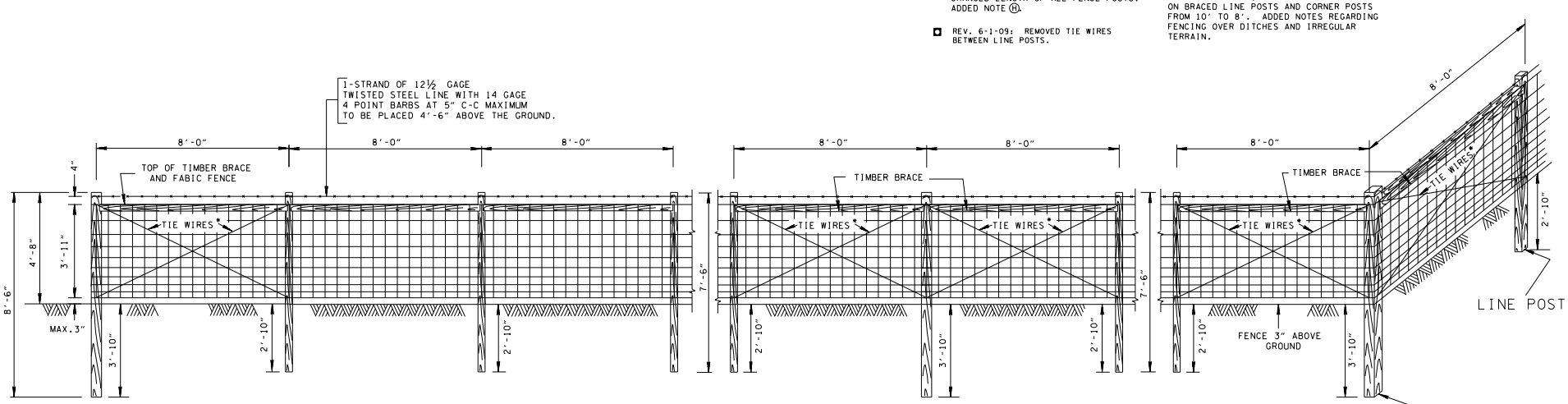
REV. 6-1-09: REMOVED TIE WIRES BETWEEN LINE POSTS.

REV. 1-1-76: CHANGED DRAWING NUMBER FROM RD-F-10(68), (SHEET 2) TO S-F-10a.

REV. 2-25-77: DELETED BARED WIRE AT BOTTEM OF FENCE, CHANGED POST SPACING ON BRACED LINE POSTS AND CORNER POSTS FROM 10' TO 8'. ADDED NOTES REGARDING FENCING OVER DITCHES AND IRREGULAR TERRAIN.

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

REV. 12-7-75: ADDED ITEM NO'S FOR END BRACED LINE AND CORNER POST.



END POST
ITEM NO. 707-03.02

LINE POST

LINE POST

LINE POSTS
ITEM NO. 707-03.01

BRACED LINE POST
ITEM NO. 707-03.02

LINE POST

CORNER POST
ITEM NO. 707-03.02

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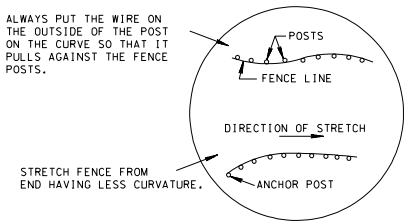
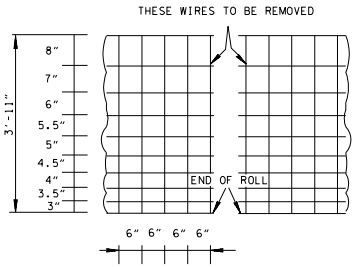
NO. 9 GAGE DOUBLE STRAND GALVANIZED TIE WIRE TWISTED TO SINGING TIGHTNESS, DOUBLE WRAPPED AROUND POSTS.

REQUIRED, AT 324' MAX. INTERVALS FOR FIRST ROLL FROM THE BEGINNING CORNER 330' MAXIMUM THEREAFTER. THIS SPACING WILL PERMIT A 6' LENGTH OF FABRIC TO EXTEND BEYOND THE BRACED LINE POST ASSEMBLY, FOR ATTACHING THE STRETCHING DEVICE, AND FOR SPLICING TO THE NEXT ROLL.



DETAIL OF FENCING ON CURVE

FENCE POST DIMENSIONS			
TYPE	SIZE		LENGTH
	ROUND (DIA.)	SQUARE (EDGE WIDTH)	
LINE POST	3½"	3½"	7'-6"
BRACED LINE POST CORNER POST END POST	5"	5"	8'-6"
TIMBER BRACE	3½"	3½"	7'-9"



FARM FENCE WIRE DETAILS

GENERAL NOTES

(A) WIRE FABRIC WILL MEET REQUIREMENTS FOR ASTM A-116 FOR NO. 11 FARM, DESIGN NO. 1047-6-11, CLASS III COATING.

(B) USE EITHER ROUND POST AND ROUND BRACING OR SQUARE POST AND SQUARE BRACING.

(C) USE 1.5" LONG NO.9 GAGE GALVANIZED STAPLES FOR TIMBER POSTS.

(D) AT ABRUPT CHANGES IN GRADE OR ALIGNMENT STAPLE EVERY LINE WIRE. AT LINE POSTS STAPLE EVERY LINE WIRE IN THE TOP HALF AND ALTERNATE LINE WIRE IN THE BOTTOM HALF. SEE STAPLING DETAILS.

(E) SEE STANDARD DRAWING S-FG-20 FOR DETAILS OF FENCING OVER DITCHES AND AT OTHER ABRUPT DEPRESSIONS.

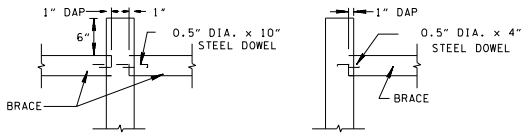
(F) SEE STANDARD SPECIFICATIONS, SUB-SECTION 707.05 REGARDING FURNISHING AND PLACING ADDITIONAL BRACED LINE POSTS WHERE TERRAIN IS IRREGULAR.

(G) SEE S-F-10C FOR FENCEING AT BRIDGES AND CULVERTS.

(H) IF BARBED WIRE IS BEING USED FOR STOCK FENCE, IT IS TO BE FIVE STRAND BARBED WIRE AND TOP STRAND OF BARBED WIRE IS TO BE PLACED 54" ABOVE THE GROUND. THE BOTTOM STRAND OF BARBED WIRE IS TO BE PLACED NOT LESS THAN 6" ABOVE THE GROUND. THE NEXT TO THE BOTTOM STRAND OF BARBED WIRE IS TO BE PLACED NOT LESS THAN THAT 15" ABOVE THE GROUND. PAYMENT WILL BE MADE UNDER ITEM NO. 707-03.14, FIVE STRAND BARBED WIRE FENCE, PER LINEAR FOOT.

(I) PAYMENT WILL BE MADE UNDER:

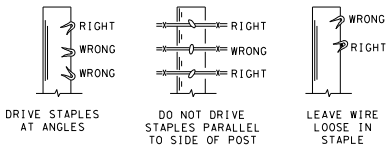
ITEM NO. 707-03.01-STOCK FENCE PER LIN. FT.
ITEM NO. 707-03.02-END, BRACED LINE & CORNER POST ASSEMBLIES (STOCK FENCE) PER EACH



LINE POST

END POST

TIMBER BRACING DETAILS

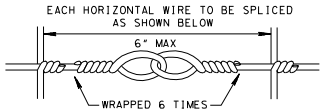


DRIVE STAPLES AT ANGLES

DO NOT DRIVE STAPLES PARALLEL TO SIDE OF POST

LEAVE WIRE LOOSE IN STAPLE

STAPLING DETAILS



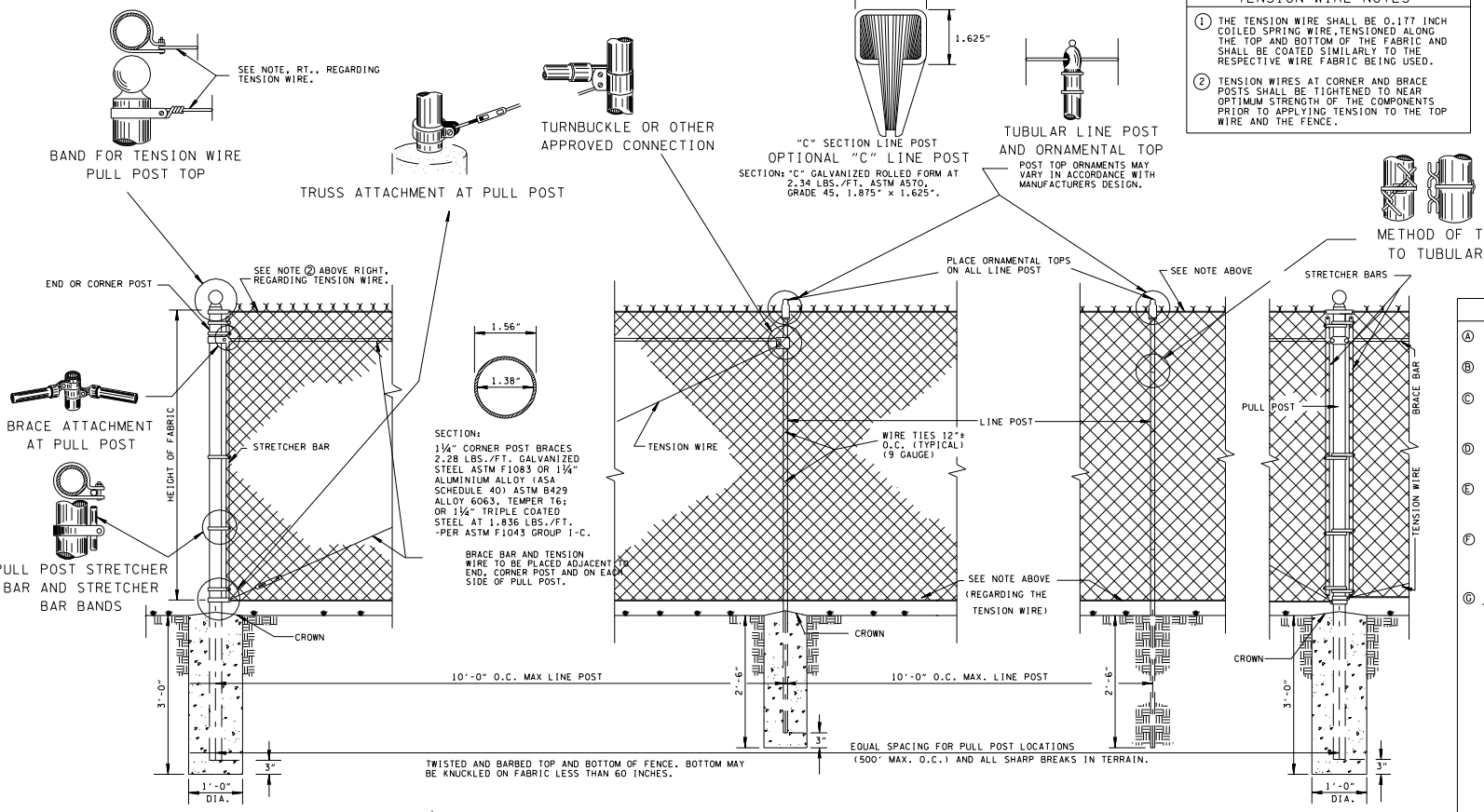
SPLICE DETAIL FOR FENCE

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD RIGHT-OF-WAY STOCK FENCE WITH TIMBER POSTS

1-1-68 | S-F-10A



TENSION WIRE NOTES

1. THE TENSION WIRE SHALL BE 0.177 INCH COILED SPRING WIRE,TENSIONED ALONG THE TOP AND BOTTOM OF THE FABRIC AND SHALL BE COATED SIMILARLY TO THE RESPECTIVE WIRE FABRIC BEING USED.
2. TENSION WIRES AT CORNER AND BRACE POSTS SHALL BE TIGHTENED TO NEAR OPTIMUM STRENGTH OF THE COMPONENTS PRIOR TO APPLYING TENSION TO THE TOP WIRE AND THE FENCE.

REV. 2-25-77: DELETED NOTE REGARDING GRADING AND ADDED NOTE REGARDING CLEARING AND GRUBBING, ADDING OPTIONAL "C" AND "H" LINE POST, DELETED "2" BATTER AND ADDED "CROWN" FOR TOP OF CONC. FOOTING, ADDED TENSION WIRE AT BOTTOM OF FENCE.

REV. 7-17-81: CHANGE ITEM NO. TO AGREE WITH NEW SPECIFICATION BOOK.

☐ REV. 1-19-99: CHANGED VARIOUS SPECIFICATIONS AND GENERAL NOTES.

☐ REV. 6-30-00: MOVED TOP HORIZONTAL BRACE PIECE TO A POINT 6" BELOW TOP OF CHAIN LINK FABRIC.

☐ REV. 5-27-01: CHANGED PAY ITEMS IN GENERAL NOTE Ⓖ.

☐ REV. 5-14-10: ADDED GATE ITEM NUMBERS.

GENERAL NOTES

Ⓐ FENCE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 707 OF STANDARD SPECIFICATIONS.

Ⓑ MATERIALS SPECIFICATIONS SHALL COMPLY WITH SECTION 909, AND ALL REVISIONS THERETO.

Ⓒ CONCRETE FOR BRACE, CORNER AND GATE POSTS SHALL BE CLASS "A" IN ACCORDANCE WITH SECTION 604 OF THE STANDARD SPECIFICATION AND OF SIZE AND DIMENSION AS SHOWN.

Ⓓ CLEARING AND GRUBBING PRIOR TO SETTING FENCE FENCE SHALL BE DONE IN ACCORDANCE WITH SPECIFICATIONS SECTION 707.

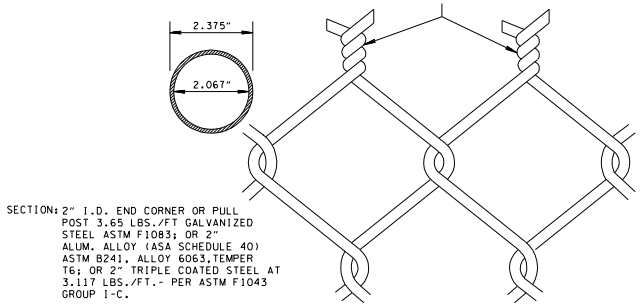
Ⓔ POLYVINYL CHORIDE FABRIC IN ACCORDANCE WITH AASHTO M181, TYPE IV, CLASS B, MAY BE SUPPLIED ONLY WHEN CALLED FOR ELSEWHERE ON THE PLANS.

Ⓕ ACCEPTED QUANTITIES OF FENCE WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER LINEAR FOOT, COMPLETE IN PLACE, FOR THE KIND, SHAPES, AND DIMENSIONS OF FENCE STIPULATED OR SHOWN ON PLANS.

Ⓖ PAYMENT WILL BE MADE UNDER ITEM NUMBERS:

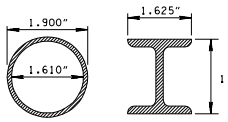
707-01.01	CHAIN LINK FENCE (4 FOOT) PER LINEAR FOOT.
707-01.11	CHAIN LINK FENCE (6 FOOT) PER LINEAR FOOT.
707-01.02	END AND CORNER POST ASSEMBLY (CHAIN LINK FENCE 4 FOOT) PER EACH.
707-01.12	END AND CORNER POST ASSEMBLY (CHAIN LINK FENCE 6 FOOT) PER EACH.
707-01.03	GATE-CHAIN-LINK FENCE-4 FOOT (DESCRIPTION) EACH
707-01.04	GATE-CHAIN-LINK FENCE-4 FOOT (DESCRIPTION) EACH
707-01.13	GATE-CHAIN-LINK FENCE-6 FOOT (DESCRIPTION) EACH
707-01.14	GATE-CHAIN-LINK FENCE-6 FOOT (DESCRIPTION) EACH
707-01.52	GATE-CHAIN-LINK FENCE (_ FOOT -DESCRIPTION) EACH
707-01.53	GATE-CHAIN-LINK FENCE (_ FOOT -DESCRIPTION) EACH

SEE STD. DWG. S-F-11 FOR GATE DETAILS.



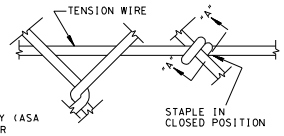
SECTION: 2" I.D. END CORNER OR PULL POST 3.65 LBS./FT GALVANIZED STEEL ASTM F1083; OR 2" ALUM. ALLOY (ASA SCHEDULE 40) ASTM B241, ALLOY 6063,TEMPER T6; OR 2" TRIPLE COATED STEEL AT 3.117 LBS./FT.- PER ASTM F1043 GROUP I-C.

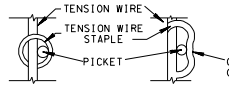
CHAIN LINK FABRIC NO. 9 WIRE 2" MESH



GAL. WT./FT. 3.26 LBS. H-BEAM OPTIONAL LINE POST

SCETOIN: 1½" I.D. LINE POST AT 2.72 LBS./FT. GALVANIZED STEEL ASTM F1083, OR 1½" ALUM. ALLOY (ASA SCHEDULE 40) ASTM B429, ALLOY 6063,TEMPER T6, OR 1½" TRIPLE COATED STEEL AT 2.281 LBS./FT. - PER ASTM F1043 GROUP I-C.





ATTACHMENT OF FABRIC TO TENSION WIRE

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

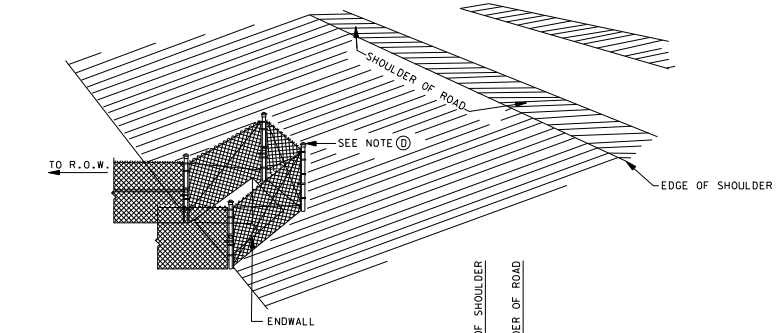
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

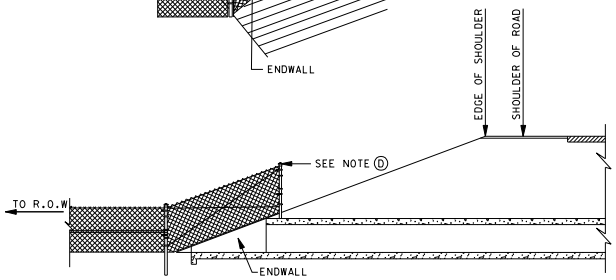
STANDARD RIGHT-OF-WAY CHAIN LINK FENCE

S-F-10B

■ REV. 5-14-10: REMOVED ITEM NUMBERS.

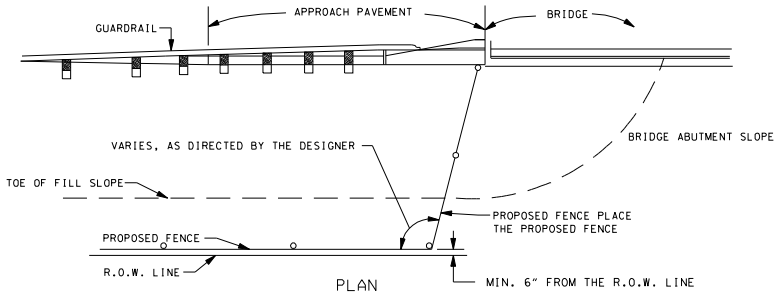
FENCE UP AND OVER DRAINAGE STRUCTURES WITHOUT WINGWALLS



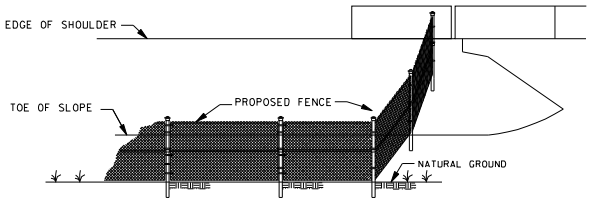


ELEVATION

FENCING TERMINALS AT BRIDGE ABUTMENTS

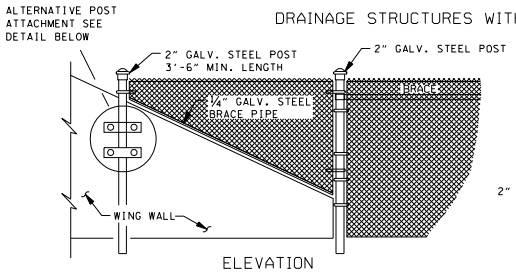


PLAN

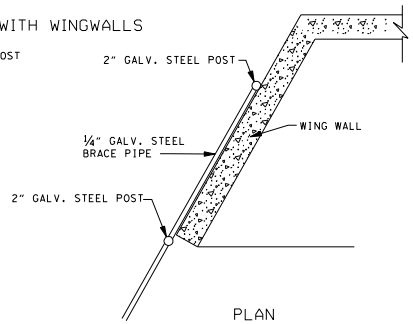


ELEVATION

DRAINAGE STRUCTURES WITH WINGWALLS

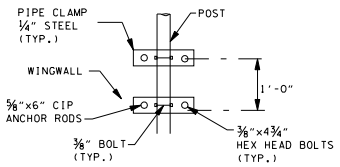


ELEVATION



PLAN

1. FOR USE WHEN DRAINAGE STRUCTURE HEIGHT IS 5'-8" OR GREATER AND WHEN IT IS NOT FEASIBLE TO GO UP AND OVER THE DRAINAGE STRUCTURE AS SHOWN ON THIS SHEET.
2. FENCING TERMINALS AT RETAINING WALL DETAIL ON S-F-10D MAY BE USED AS AN ALTERNATE.



PIPE CLAMP CONNECTION DETAIL

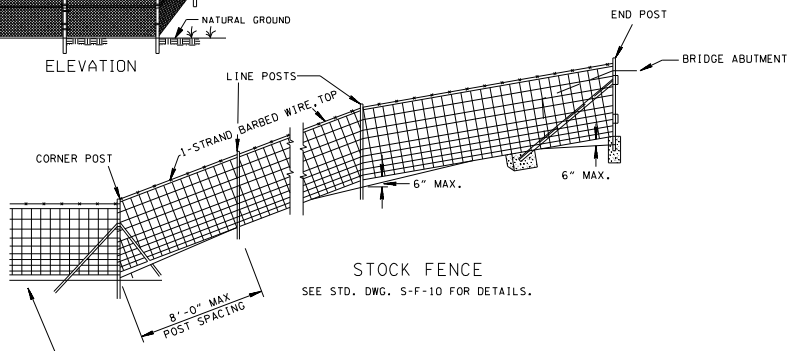
GENERAL NOTES

(A) RIGHT-OF-WAY FENCE SHALL CONFORM TO NOTES AND DETAILS SPECIFIED ON STANDARD DRAWING NO. S-F-10B FOR URBAN AREAS AND S-F-10 AND S-F-10A FOR RURAL AREAS.

(B) SEE S-FG-20 FOR WATER CROSSING DETAILS.

(C) EXPLORE EVERY OPTION NOT TO DISTURB EXISTING VEGETATION DURING THE INSTALLATION OF THE FENCE.

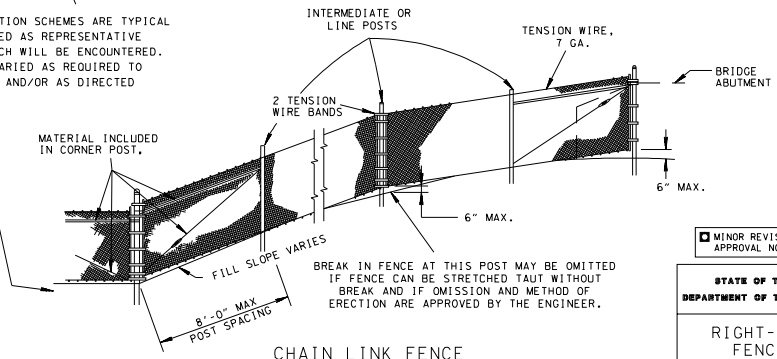
(D) THE ELEVATION OF THE FENCE POST TOP SHALL BE LOWER THAN THE ROADWAY SHOULDER AND THE NEAREST PORTION OF THE FENCE SHALL BE OUTSIDE THE CLEAR ZONE.



STOCK FENCE

SEE STD. DWG. S-F-10 FOR DETAILS.

NOTE: THESE INSTALLATION SCHEMES ARE TYPICAL AND NOT TO BE CONSTRUED AS REPRESENTATIVE OF ALL CONDITIONS WHICH WILL BE ENCOUNTERED. CONSTRUCTION MAY BE VARIED AS REQUIRED TO MEET FIELD CONDITIONS AND/OR AS DIRECTED BY THE ENGINEER.



CHAIN LINK FENCE

SEE DWG. NO. S-F-10B FOR CHAIN LINK FENCE DETAILS AND SPECS.

■ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT-OF-WAY FENCE AT BRIDGES AND BOX CULVERTS

1-24-08 | S-F-10C

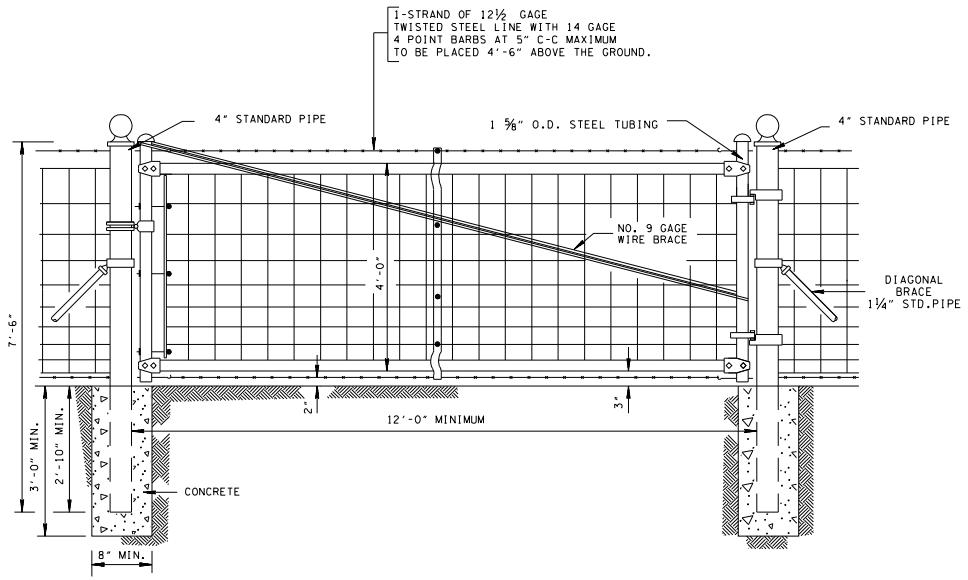
REV. 7-1-72: CHANGED DEPARTMENT NAME.

REV. 1-1-76: CHANGED DRAWING NUMBER FROM RD-F-11(68) TO S-F-11.

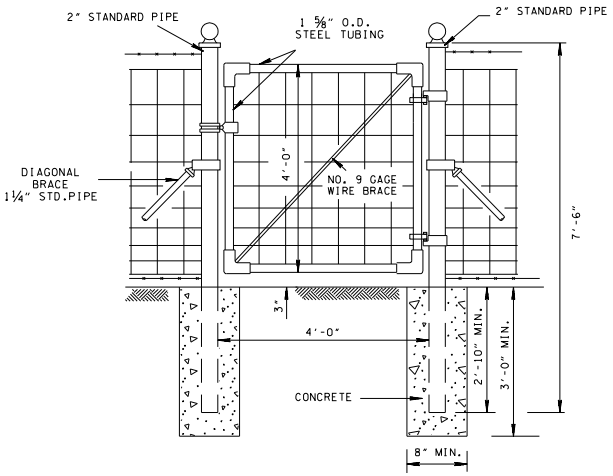
REV. 5-2-90: ADDED PAY ITEMS.

☐ REV. 1-24-08: REDREW SHEET AND CHANGED LENGTH OF ALL FENCE POSTS.

☐ REV. 5-14-10: MODIFIED ITEM NUMBER DESCRIPTIONS.



STOCK FENCE DRIVE GATE (12' X 4')



STOCK FENCE WALK GATE (4' X 4')

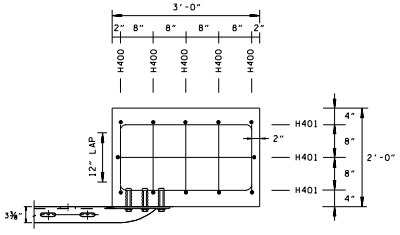
DESCRIPTION	CONSTRUCTION
STOCK FENCE DRIVE GATE SHALL BE A TUBULAR STEEL FRAME 4 FEET HIGH AND OF SPECIFIED LENGTH WITH WIRE FABRIC FILLER WITHIN THE GATE FRAME, AND WITH TWO STRANDS OF BARBED WIRE ABOVE THE FRAME AND ONE STRAND OF BARBED WIRE BELOW THE FRAME, AND SHALL BE CONSTRUCTED OF THE MATERIALS INDICATED BELOW. STOCK FENCE WALK GATE SHALL BE A TUBULAR STEEL FRAME 4 FEET HIGH AND 4 FEET LONG WITH WIRE FABRIC FILLER WITHIN THE GATE FRAME, AND SHALL BE CONSTUCTED OF THE MATERIALS INDICATED BELOW.	GATES SHALL BE INSTALLED AT THE LOCATIONS INDICATED IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE GATE SHALL BE INSTALLED BETWEEN AND FASTENED TO PROPERLY SPACED GATE POSTS, WHICH SHALL BE SET IN THE GROUND A FULL 34 INCHES. THE POSTS AND BRACES SHALL BE SET IN CONCRETE BASES WHICH SHALL BE AT LEAST 8 INCHES IN DIAMETER AND SHALL EXTEND 3 FEET OR MORE BELOW THE SURFACE OF THE GROUND.
MATERIALS	**PAYMENT WILL BE MADE UNDER :**
DRIVE GATE: THE GATE SHALL CONSIST OF 1⅝" O.D. HIGH CARBON STEEL TUBING FASTENED AT EACH CORNER WITH MALLEABLE IRON OR PRESSED STEEL FITTINGS BOLTED TO THE TUBULAR FRAME. THE GATE FRAME SHALL BE BRACED VERTICALLY AT THE CENTER WITH TWO 1" X 1" ANGLE IRONS OR TWO ⅜" X 3¾" CHANNEL IRONS BOLTED TOGETHER, AND SHALL BE BRACED DIAGONALLY WITH A NO. 9 GALVANIZED WIRE BRACE ATTACHED IN A MANNER TO PROVIDE ADJUSTMENT. GATES MORE THAN 12 FEET IN LENGTH SHALL HAVE TWO EQUALLY SPACED VERTICAL BRACES. THE END MEMBERS OF THE GATE FRAME SHALL BE PROVIDED WITH METAL CAPS. WALK GATE: THE WALK GATE SHALL CONSIST OF 1⅝" O.D. HIGH CARBON STEEL TUBING FASTENED AT EACH CORNER WITH MALLEABLE IRON OR PRESSED STEEL FITTINGS ATTACHED IN A MANNER SATISFACTORY TO THE THE ENGINEER. THE FRAME SHALL BE BRACED DIAGONALLY WITH A NO. 9 GALVANIZED WIRE BRACE ATTACHED IN A MANNER TO PROVIDE ADJUSTMENT.	ITEM NO. 707-03.20 DRIVE GATE (STOCK FENCE) (DESCRIPTION) PER EACH ITEM NO. 707-03.21 WALK GATE (STOCK FENCE) (DESCRIPTION) PER EACH ETC. FOR VARIOUS DESCRIPTIONS.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

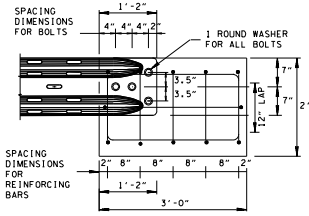
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD STOCK FENCE GATE

1-1-68 | S-FG-11

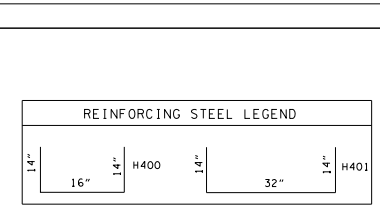


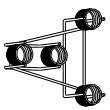
ELEVATION
(END)



ELEVATION
(FRONT)

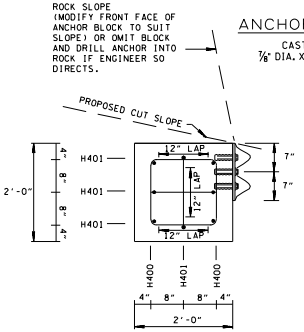
GUARDRAIL TERMINAL (TYPE 12)
ITEM NO. 705-04.02 PER EACH

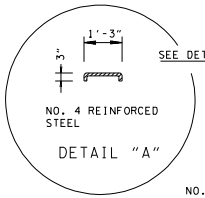


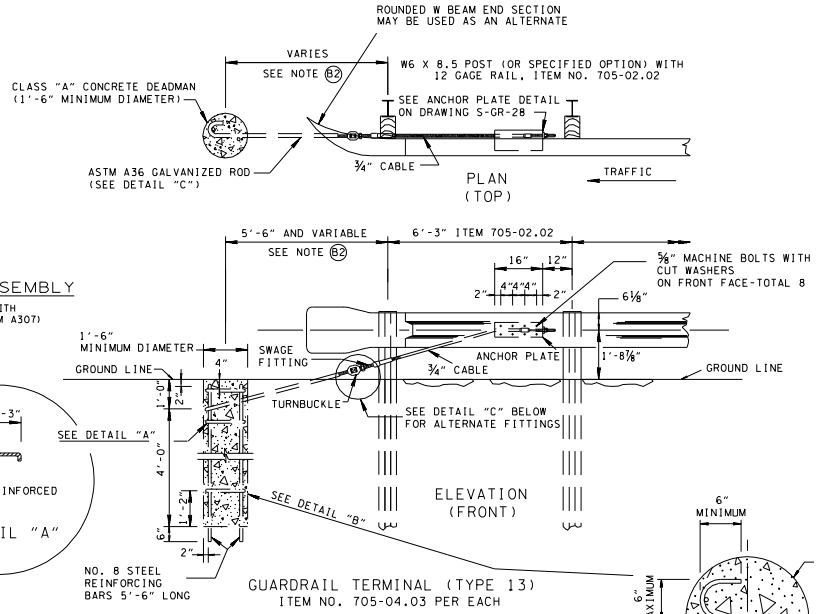


ANCHOR BLOCK INSERT ASSEMBLY

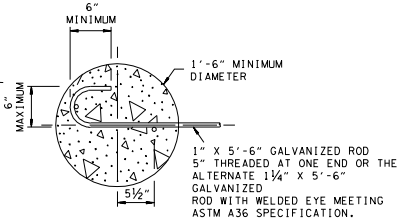
CAST IN PLACE THREADED STEEL INSERT WITH
⅞" DIA. X 2" HEX HEAD GALVANIZED BOLTS (ASTM A307)
HOT DIP ZINC COATING ASTM A153







GUARDRAIL TERMINAL (TYPE 13)
ITEM NO. 705-04.03 PER EACH



DETAIL "B" SECTION THRU DEADMAN

- REV. 5-27-96: MODIFIED LOCATION OF TERMINAL ANCHOR (TYPE 13) IN DETAIL ON LOWER RIGHT CORNER.
- REV. 7-29-96: MADE MINOR DIMENSIONING CHANGES.
  REV. 7-29-98: MODIFIED DETAIL "C".
  REV. 12-18-98: MODIFIED ALL DETAILS FOR GUARDRAIL TERMINAL ANCHOR (TYPE 13).
- REV. 5-27-01: CHANGED DESCRIPTION FOR ITEM NUMBERS 705-04.02 AND 705-04.03. CHANGED SHEET NAME.
  REV. 7-29-03: CHANGED CONCRETE ANCHOR BLOCK.
- REV. 10-26-03: ADDED SPECIAL GUARDRAIL TERMINAL (TYPE 12) NOTE.
- REV. 10-06-06: ADDED GENERAL NOTES B5 AND A8.
- REV. 6-1-09: ADDED ALTERNATE END SECTION NOTE.

SPECIAL INSTALLATION NOTE

FOR THE GUARDRAIL TERMINAL ANCHOR (TYPE 12) TO FUNCTION AS IT WAS CRASH TESTED UNDER NCHRP-350 TEST LEVEL 3 IT MUST BE CONSTRUCTED PER STANDARD DRAWING NO. S-GR-19A.

GUARDRAIL TERMINAL ANCHOR (TYPE 12) GENERAL NOTES

A1. REQUIREMENTS FOR ANCHOR INSERT BOLTS SHALL BE ⅞" HEX HEAD INSTALLED IN ⅞" MASONRY ANCHOR. THE INSERTS ARE TO BE THREADED A MINIMUM OF 1¾ INCHES. THE CONTRACTOR SHALL FURNISH ANCHOR PULL-OUT DATA FROM AN INDEPENDENT TESTING LABORATORY USING CLASS "A" CONCRETE IN ACCORDANCE WITH STATE OF TENNESSEE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION". THE ULTIMATE LOAD FOR ⅞" ANCHOR SHALL BE 19,000 POUNDS. BOLTS SHALL CONFORM TO ASTM A307.

A2. THE MASONRY ANCHORS SHALL BE SUB-SET IN THE CONCRETE AT A DEPTH OF BETWEEN 3½" TO ¼" AND TORQUED WITH THE END TERMINAL IN THE PLACE TO AN EQUIVALENT DIRECT PULL-OUT LOAD OF 12,000 POUNDS. SLIPPAGE SHALL NOT EXCEED ¼".

A3. THE CONTRACTOR WILL PERFORM ON-SITE TESTING OF EACH BOLT IN THE PRESENCE OF DOT PERSONNEL TO INSURE THESE REQUIREMENTS. ANY INSTALLATION NOT MEETING THESE REQUIREMENTS SHALL BE CORRECTED AT THE CONTRACTORS EXPENSE.

A4. THE CONTRACTOR MAY ELECT TO USE ⅞ INCH DIAMETER DRILLED IN ANCHORS WITH 50 KIPS PER SQUARE INCH OR GREATER YIELD STRENGTH WHEN ATTACHING THE TERMINAL END ELEMENTS INTO ROCK. SEE ABOVE GENERAL NOTE A2 FOR PULL OUT REQUIREMENTS.

A5. IF THE CONTRACTOR DRILLS THESE ANCHOR BOLTS IN ROCK, THE SAME FLARE RATE MUST BE USED THAT WOULD BE USED WITH THE CRASH TESTED CONCRETE ANCHOR BLOCK.

A6. UNIT PRICE FOR ITEM NO. 705-04.02, GUARDRAIL TERMINAL (TYPE 12) PER EACH SHALL INCLUDE COSTS OF FURNISHING AND INSTALLING ONE (1) REINFORCED CLASS "A" CONCRETE GUARDRAIL STATIONARY TERMINAL ANCHOR BLOCK, ONE(1) TERMINAL ELEMENT FOR ANCHOR BLOCK (MICHIGAN END SHOE), AND ALL BOLTS, MASONRY ANCHORS OR ANCHOR BLOCK INSERT ASSEMBLY, WASHERS AND LABOR NECESSARY TO COMPLETE THIS ITEM.

A7. ESTIMATED QUANTITIES OF CONCRETE AND STEEL FOR GUARDRAIL STATIONARY TERMINAL (TYPE 12) ARE:

CLASS "A" CONCRETE= 0.44 CUBIC YARD
NO. 4 STEEL REINFORCING BARS= 52 POUNDS

A8. SEE STD. DWG. S-GR-19B FOR ALTERNATE TYPE 12 TERMINAL ANCHOR.

GUARDRAIL TERMINAL ANCHOR (TYPE 13) GENERAL NOTES

B1. UNIT PRICE FOR ITEM NO. 705-04.03, GUARDRAIL TERMINAL (TYPE 13) PER EACH SHALL INCLUDE COSTS OF FURNISHING AND INSTALLING CABLE ANCHOR AND ALL COMPONENTS AS DETAILED, CONCRETE "DEADMAN", AND TERMINAL RAIL END ELEMENT, COMPLETE, IN PLACE. SEE STANDARD DRAWING NO S-GR-28 FOR DETAILS AND SPECIFICATIONS ON CABLE AND ANCHOR PLATE.

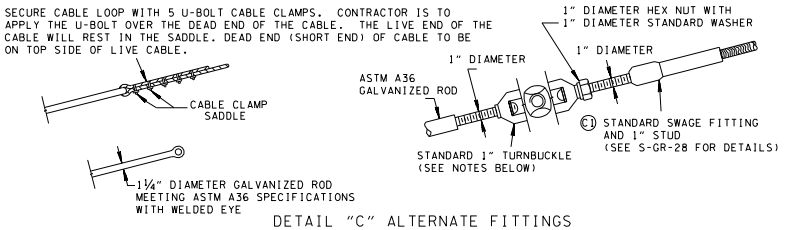
B2. CABLE TO BE PARALLEL TO GUARDRAIL FOR STRAIGHT RUNS OF RAIL. CABLE MAY HAVE ANGLE POINT AT ANCHOR PLATE IF GUARDRAIL IS CURVED.

B3. ESTIMATED QUANTITIES OF CONCRETE AND STEEL FOR GUARDRAIL TERMINAL (TYPE 13) ARE:

CLASS "A" CONCRETE= 0.33 CUBIC YARD
NO. 8 STEEL REINFORCING BAR= 77 POUNDS

B4. THIS TERMINAL SHALL NOT BE USED ON THE APPROACH END OF A SECTION OF GUARDRAIL.

B5. SEE STD. DWG. S-GR-19C FOR ALTERNATE TYPE 13 TERMINAL ANCHOR.



DETAIL "C" ALTERNATE FITTINGS

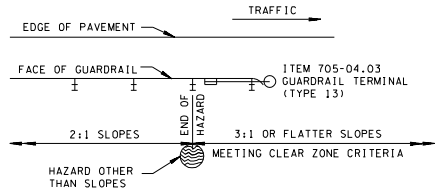
ALTERNATE FITTING GENERAL NOTES

C1. STANDARD SWAGE FITTING WITH ONE (1) INCH DIAMETER STUD TO BE USED ONLY WITH STANDARD ONE (1) INCH TURNBUCKLE. SWAGE FITTING ON ANCHOR PLATE IS SAME AS DETAIL ON STANDARD DRAWING S-GR-28.

C2. DROP FORGED GALVANIZED STEEL TURNBUCKLE SHALL PROVIDE A MINIMUM BREAKING STRENGTH OF 40,000 POUNDS.

C3. THE FINISHED CABLE ASSEMBLY WILL NOT BE ACCEPTABLE UNLESS IT IS IN TENSION WITH NO SAG.

C4. THESE FITTINGS SHALL BE INSTALLED ABOVE GROUND.



SKETCH SHOWING APPLICATION OF TRAILING END TREATMENT ON DIVIDED HIGHWAYS

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TERMINAL ANCHORS, TYPE 12 AND TYPE 13

S-GR-19

REV. 5-15-08: REDRAWN SHEET RENAMED TITLE BLOCK. REVISED GENERAL NOTES.

☐ REV. 6-1-09: FORE SLOPE NOTE CORRECTED.

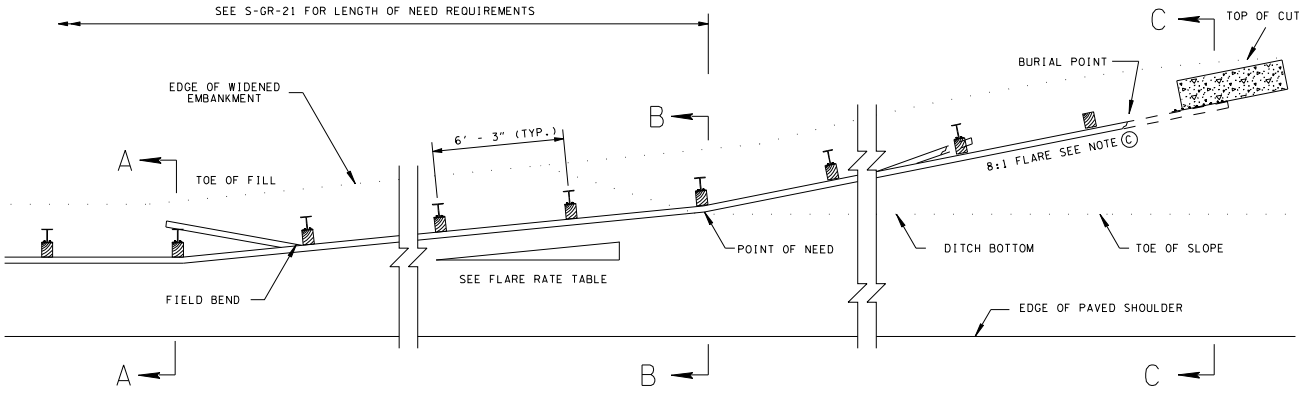
☐ REV. 6-30-09: FORESLOPE NOTE CORRECTED. AND MODIFIED PLAN VIEW, ELEVATION VIEW. CHANGED GENERAL NOTES (C) AND (J).

REV. 7-27-06: ADDED REFERENCE TO S-GR-19C GUARDRAIL TERMINAL ANCHOR, BURIED IN BACKSLOPE TYPE 12 ALTERNATE. ADDED GENERAL NOTE (E)

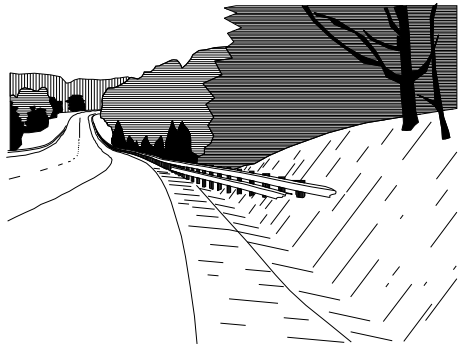
☐ REV. 10-06-06: ADDED REFERENCE TO S-GR-19B ALTERNATE TYPE 12 GUARDRAIL TERMINAL.

☐ REV. 5-27-04: PRODUCED AN ENLARGED MORE DETAILED VIEW FOR CONSTRUCTION OF TYPE 12 GUARDRAIL TERMINAL, SEE STANDARD DRAWING S-GR-21 FOR FURTHER DETAILS.

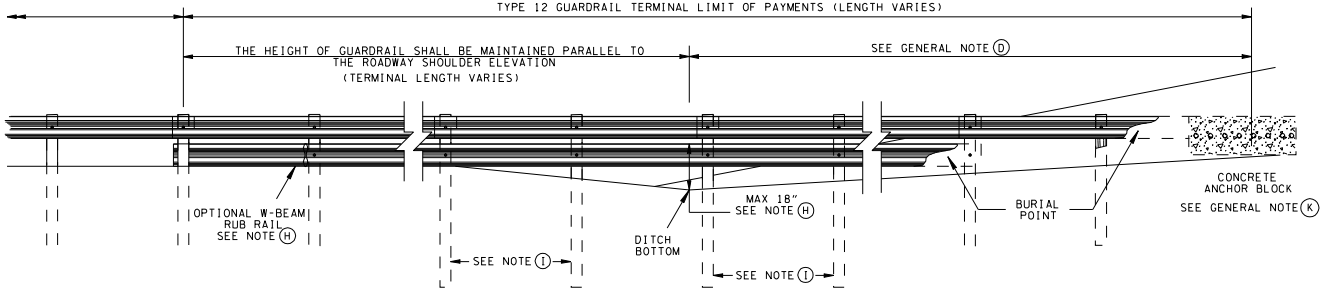
REV. 3-10-05: ELIMINATED REFERENCE TO 15 DEGREE EXIT ANGLE AND CHANGED GENERAL NOTE (A).



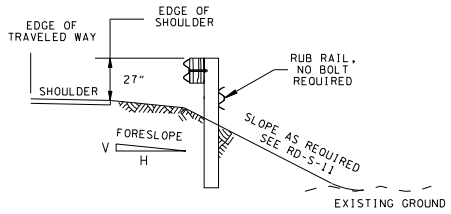
PLAN VIEW



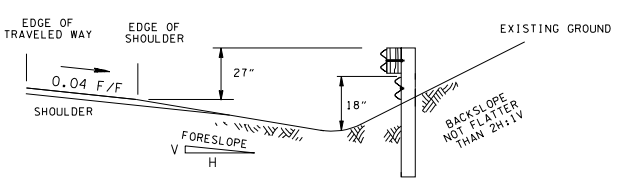
PERSPECTIVE VIEW



ELEVATION VIEW
(ALONG GUARD RAIL)

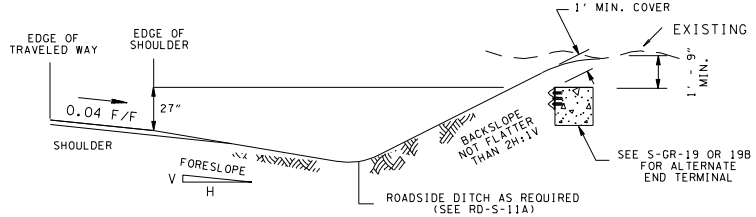


SECTION A-A



SECTION B-B

FORESLOPE THAN NOTE
NOT STEEPER THAN 4:1 10:1 IS RECOMENDED SEE RD-S-11



SECTION C-C

FLARE RATE TABLE	
RATE	**POSTED SPEED (mph)**
15:1	70
14:1	60
11:1	50
8:1	40
7:1	30

GENERAL NOTES

(A) THE TYPE 12 GUARDRAIL TERMINAL SHOULD BE USED ONLY WITH 2:1 BACK SLOPE. IF BACK SLOPE IS FLATTER, THE FULL DESIGN LENGTH OF NEED OF THE BARRIER MUST BE PROVIDED.

(B) THE FILL SLOPE MUST NOT BE ALLOWED TO SPILL UNDER THE RAIL THROUGHOUT THE LENGTH OF NEED BECAUSE THIS EFFECTIVELY DECREASES THE RAIL HEIGHT AND ALLOWED VEHICLE OVERRIDE RATHER THAN CONTAINMENT AND REDIRECTION.

(C) THE FLARE RATE OF THE GUARDRAIL MAY BE STEEPENED TO 8:1 AFTER CROSSING THE DITCH BOTTOM TO SHORTEN THE LENGTH OF THE TERMINAL.

(D) IF MIN. 1' COVER OVER THE CONCRETE BLOCK COULD NOT BE ACHIEVED THE ELEVATION OF GUARDRAIL MAY BE LOWERED 1:10 SLOPE RATE AFTER CROSSING THE DITCH BOTTOM.

(E) THE CONTRACTOR SHALL CONSTRUCT FOR SLOPES AS PART OF THE INITIAL GRADING OPERATIONS AS SHOWN ON THIS STANDARD DRAWING AFTER FIELD VERIFICATION OF HAZARD LOCATION AND ENGINEERS APPROVAL.

(F) FOR LENGTH OF NEED REQUIREMENTS SEE S-GR-21. FOR THE CONCRETE ANCHOR BLOCK DETAILS SEE S-GR-19.

(G) THE DESIGNER SHALL INCOPORATE THE DETAILS SHOWN ON THIS DRAWING IN THE RIGHT-OF-WAY AND CONSTRUCTION PLANS AS WELL AS THE ROADWAY CROSS-SECTION SHEETS.

(H) ADD W-BEAM RUB RAIL WHENEVER THE CLEARANCE FROM THE BOTTOM OF THE W-BEAM TO THE GROUND LINE EXCEEDS 18 INCHES.

(I) FOR THE RUB RAIL SECTION USE 8' LONG POSTS.

(J) UNIT PRICE FOR ITEM NO. 705-04.02 GUARDRAIL TERMINAL (TYPE 12) PER EACH SHALL INCLUDE COSTS OF FURNISHING AND INSTALLING ALL COMPONENTS AS SHOWN.

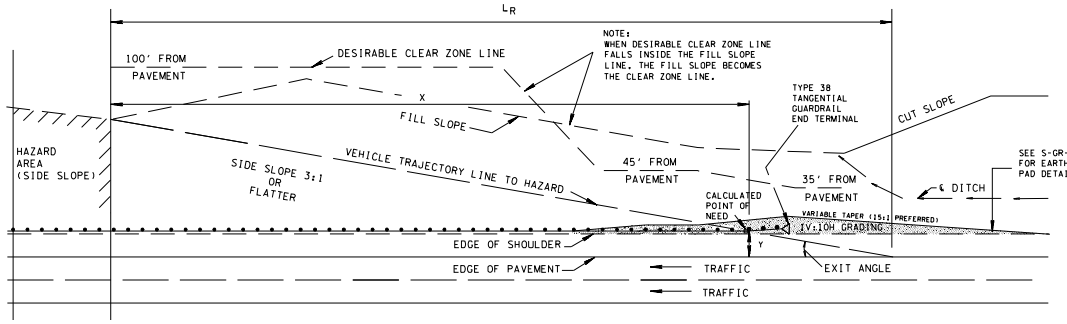
(K) SEE S-GR-19B FOR ALTERNATE.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPE 12 BURIED-IN-BACKSLOPE GUARDRAIL TERMINAL

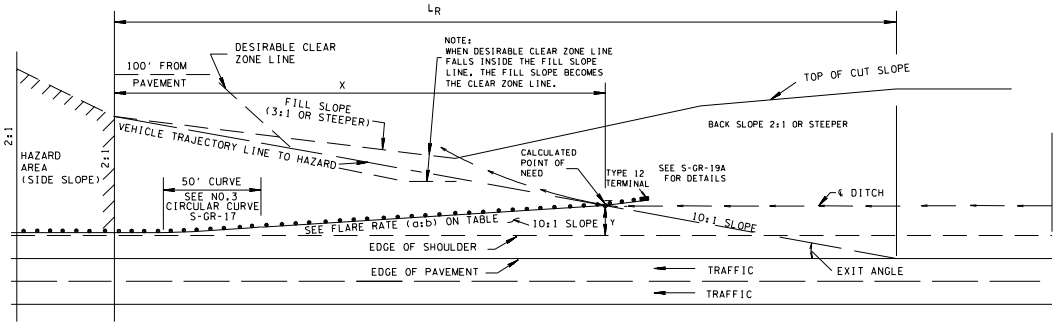
10-06-06 | S-GR-19A



TYPICAL LAYOUT-CASE I
AVERAGE TERRAIN-DIVIDED HIGHWAY

POINT OF THEORETICAL NEED FOR EMBANKMENT GUARDRAIL

THE POINT OF NEED SHALL BE CONSIDERED THAT POINT WHERE, TO ONE SIDE OF THE POINT, IT WOULD BE SAFER FOR THE VEHICLE TO CONTACT AND BE DIRECTED BY THE GUARDRAIL INSTEAD OF GOING OVER THE SLOPE, TO THE OTHER SIDE OF THE POINT, IT WOULD BE SAFER FOR THE VEHICLE TO GO OVER THE SLOPE. AN EXIT ANGLE FROM THE ROADWAY AS DETERMINED BY THE CASE I EQUATION ON THIS DRAWING SHOULD BE UTILIZED FOR DETERMINING THE POINT OF THEORETICAL NEED. WHERE FEASIBLE CONSIDERATION SHOULD BE GIVEN TO FLATTENING OR FURTHER WARPING OF THE SLOPE IN ORDER TO "MOVE BACK" THE POINT OF NEED AND THEREBY REDUCE THE LENGTH OF NEEDED GUARDRAIL.



TYPICAL LAYOUT-CASE II
STEEPER TERRAIN-DIVIDED HIGHWAY

MEDIAN APPLICATION
TAPERED TANGENTIAL GUARDRAIL END TERMINAL

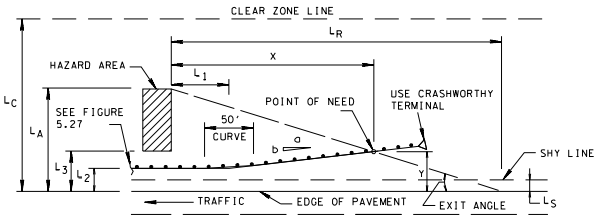


FIGURE 5.24 APPROACH BARRIER LAYOUT VARIABLES

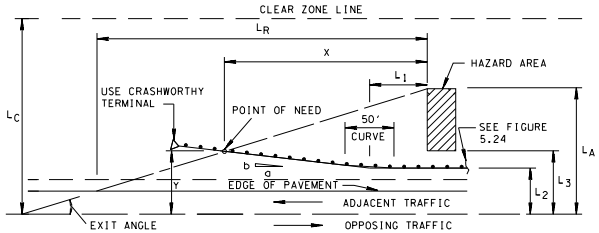


FIGURE 5.27 APPROACH BARRIER LAYOUT FOR OPPOSING TRAFFIC

DETAILS AND EQUATIONS COME FROM "ROADSIDE DESIGN GUIDE (2006)", CHAPTER 5. THE FOLLOWING EQUATIONS ARE TO BE USED TO CALCULATE THE "POINT OF NEED".

RUNOUT LENGTHS (L_R) FOR BARRIER DESIGN (FT)					SHY LINE OFFSET	MEDIAN APPLICATION	
DESIGN SPEED (MPH)	DESIGN TRAFFIC VOLUME (ADT)				L_S (FT)	FLARE RATE (a:b)	
	OVER 6000 VPD	2000-6000 VPD	800-2000 VPD	UNDER 800 VPD		CONCRETE BARRIER	W-BEAM BARRIER
70	480	445	400	360	10.0	20:1	15:1
60	425	400	345	330	8.0	18:1	14:1
50	330	300	260	245	6.5	14:1	11:1
40	240	200	200	180	5.0	10:1	8:1
30	165	165	150	130	3.5	8:1	7:1

NOTES

CASE I

(1) IF ANY OBSTACLE (HAZARD) APPEARS IN THE DESIRABLE CLEAR ZONE AREA, IT MUST BE REMOVED. IF IT CANNOT BE REMOVED, THEN A NEW "POINT OF NEED" MUST BE COMPUTED USING THE OBSTACLE AS THE HAZARD AND NOT THE STEEP SIDE SLOPE WHICH WAS FIRST CONSIDERED AS THE HAZARD.

CASE II

(1) THE ROADWAY EMBANKMENT IS SHOWN GOING FROM A CUT SECTION INTO A STEEP FILL SECTION VERY CLOSE TO THE CUT TO FILL GRADE POINT. HERE THE "POINT OF NEED" FOR PROTECTION FROM THE STEEP SIDE SLOPE FALLS WITHIN THE CUT SLOPE AREA. THEREFORE, THE GUARDRAIL SHALL BE ANCHORED INTO THE CUT SECTION BACKSLOPE USING A STATIONARY GUARDRAIL TERMINAL ANCHOR TYPE 12.

GENERAL NOTES

(A) EVERY LOCATION WHERE GUARDRAIL IS REQUIRED MUST BE INVESTIGATED SEPARATELY. THE HAZARD MUST BE IDENTIFIED AND THE "POINT OF NEED" CALCULATED TO DETERMINE THE BEST TREATMENT FOR PROTECTION OF VEHICLES FROM THE HAZARD.

(B) R.O.W. FENCES WILL NOT BE CONSIDERED A HAZARD, BUT HAZARDS WHICH ARE OUTSIDE THE R.O.W. LINE BUT INSIDE THE DESIRABLE CLEAR ZONE SHOULD BE CONSIDERED AND APPROPRIATE ACTION TAKEN FOR VEHICLE PROTECTION. COST EFFECTIVE EVALUATION MAY BE NEEDED TO HELP DECIDE THE APPROPRIATE ACTION NEEDED.

(C) WHERE THE HAZARD APPEARS ON THE OUTSIDE OF A ROADWAY CURVE, GOOD ENGINEERING JUDGEMENT MUST BE USED TO DETERMINE THE LIMITS OF GUARDRAIL NEEDED. REFER TO THE "ROADSIDE DESIGN GUIDE (2006)", SECTION 3.2 AND STANDARD DRAWING NO. RD01-S-12 TO HELP DECIDE WHAT THE NECESSARY CLEAR ZONE REQUIREMENTS ARE AND THE TYPE AND LOCATION OF THE PROTECTIVE MEASURE NEEDED.

"POINT OF NEED" EQUATIONS FOR STRAIGHT OR NEAR STRAIGHT ROAD SECTIONS

CASE I

FOR TYPE 38 (SEE DRAWING NO. S-GR-43)

TANGENTIAL b/a=0, THE POINT OF NEED WILL BE LOCATED AT POST NO. 3 OF THE TYPE 38 ANCHOR USING THE FOLLOWING EQUATIONS:

$$X = \frac{L_A - L_2 - 0.75}{L_A / L_R} \qquad Y = L_2 + 0.75$$

CASE II

FOR TYPE 12, TYPE 38 AT MEDIANS, OR TYPE 21 SEE STANDARD DRAWING NOS. S-GR-19 AND S-GR-19A)

FLARED b/a HAS A VALUE, THE POINT OF NEED WILL BE LOCATED AS SHOWN AT LEFT AND GUARDRAIL SHALL PASS THROUGH IT USING THE FOLLOWING EQUATIONS:

$$X = \frac{L_A + \left(\frac{b}{a}\right)(L_1) - L_2}{\left(\frac{b}{a}\right) + \left(\frac{L_A}{L_R}\right)} \qquad Y = L_A - \left(\frac{L_A}{L_R}\right)(X)$$

EQUATION VARIABLE LEGEND

L_C = THE CLEAR DISTANCE

L_A = DISTANCE FROM EDGE OF TRAVELED WAY (EDGE OF PAVEMENT) TO THE LATERAL EXTENT OF HAZARD. NOTE THAT L_H SHOULD NEVER EXCEED THE "CLEAR DISTANCE" (L_C).

b/a = SLOPE OF FLARE

L_1 = LENGTH OF TANGENT SECTION OF BARRIER FROM HAZARD. TENNESSEE DEPARTMENT OF TRANSPORTATION WILL USE THIS POINT AS THE P.I. FOR A 50' CIRCULAR CURVE.

L_2 = DISTANCE FROM EDGE OF PAVEMENT TO TANGENT SECTION OF BARRIER.

L_R = RUNOUT LENGTH (SEE TABLE BELOW FOR VALUE).

L_3 = DISTANCE FROM EDGE OF PAVEMENT TO NEAR FACE OF HAZARD.

L_3-L_2 = SHOULD BE GREATER THAN 4.0 FEET.

REV. 9-15-82: S-GR-9 REDRAWN, NO. CHANGED TO S-GR-21.

REV. 7-1-84: ADDED REFERENCE FOR POST NO. 3 UNDER CASE (1) NOTE.

■ REV. 1-19-92: REDREW AND REORGANIZED SHEET. CHANGED ALL REFERENCES AND CROSS-REFERENCING FROM THE "BARRIER GUIDE" TO THE "ROADSIDE DESIGN GUIDE (1989)".

■ REV. 7-29-95: IN TYPICAL LAYOUT-CASE I DETAIL CHANGED GUARDRAIL APPROACH TERMINAL.

■ REV. 9-5-95: CORRECTED SECTION "D-D".

■ REV. 2-14-96: IN TYPICAL LAYOUT-CASE I DETAIL CHANGED GUARDRAIL APPROACH TERMINAL.

■ REV. 5-27-96: IN TYPICAL LAYOUT-CASE I DETAIL ELIMINATED 4' FLARE DIMENSION.

REV.7-29-98: REMOVED REFERENCE TO TYPE 11, 16, AND 20 GUARDRAIL TERMINALS. ADDED TYPE 38 GUARDRAIL TERMINAL.

■ REV. 5-27-01: MODIFIED REFERENCE REGARDING GUARDRAIL TERMINALS.

REV. 9-11-03: MADE GENERAL CHANGES TO TYPE 12 GUARDRAIL TERMINAL.

■ REV. 4-15-04: CHANGED CASE I EQUATION AND REFERENCES TO ROADSIDE DESIGN GUIDE.

REV. 3-10-05: ELIMINATED REFERENCE TO 15 DEGREE EXIT ANGLE ON THIS DRAWING.

REV. 6-2-08: REMOVED CROSS SECTIONS, REFERRED TO S-GR-19A, INCLUDED EARTH PAD, REFERRED TO S-GR-38 RUNOUT LENGTHS TABLE UPDATED TO ROADSIDE DESIGN GUIDE 2006.

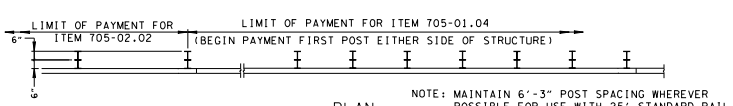
■ REV. 6-30-09: MODIFIED TYPICAL LAYOUT-CASE II.

■ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

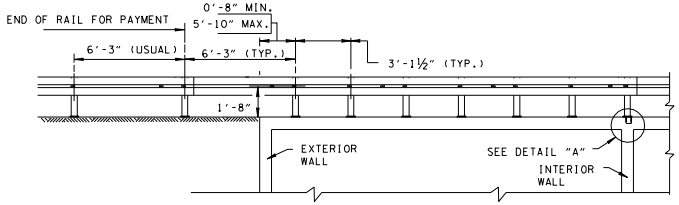
LENGTH OF NEED AND TERMINAL REQUIREMENTS IN FILLS

S-GR-21

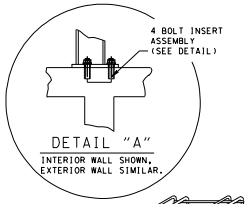


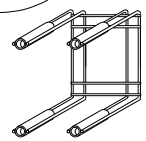
PLAN

NOTE: MAINTAIN 6'-3" POST SPACING WHEREVER POSSIBLE FOR USE WITH 25' STANDARD RAIL SECTION. SYMMETRY OF POST SPACING IS NECESSARY.



INSIDE ELEVATION GUARDRAIL

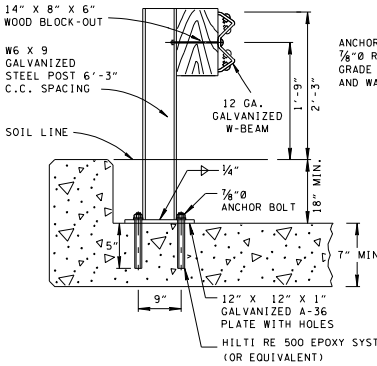




INSERT ASSEMBLY

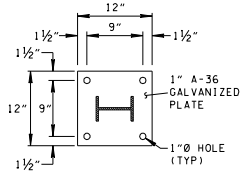
FOR ¾" DIAMETER X 4" HEX HEAD BOLTS (ASTM A-307 SPECIFICATION)

INSERT ASSEMBLY IS FOR CONNECTION OF POSTS OVER WALLS ONLY AND NOT A SUBSTITUTE FOR PLATE ASSEMBLY ELSEWHERE.



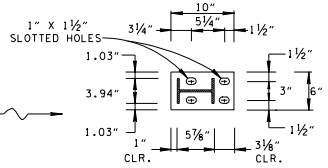
ALTERNATE POST ATTACHMENT USING ANCHOR BOLTS

SEE NOTE ⑥

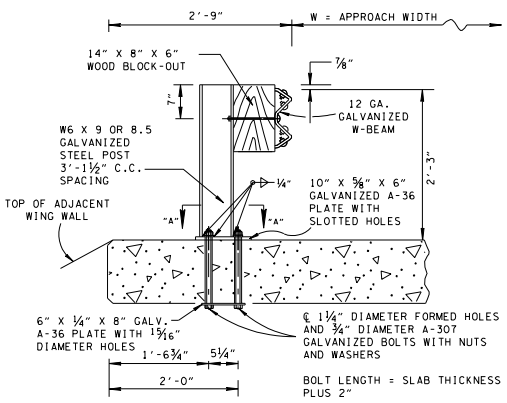


BASEPLATE DETAILS

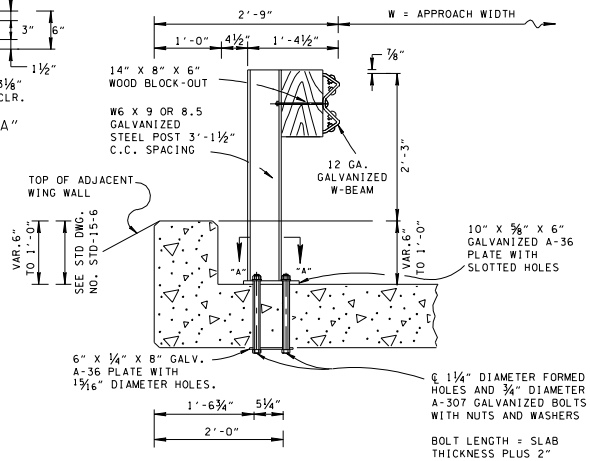
- REV. 9-5-97: MODIFIED INSIDE ELEVATION OF GUARDRAIL DETAIL.
  REV. 7-29-98: CHANGED STEEL BLOCK-OUTS TO WOOD BLOCK-OUTS IN ALL DETAILS AND NOTES.
- REV. 5-27-99: RELOCATED 1¼" DIAMETER FORMED HOLES OUTWARDLY 1½".
- REV. 10-26-00: ELIMINATED DETAILS FOR PRECAST, PRESTRESSED CONCRETE DECK PANELS FOR HEIGHT OF FILLS OVER 1'-6". CHANGED DESIGN NOTE ②.
- REV. 5-27-01: CHANGED ITEM NO. 705-06.01 TO 705-01.04.
- REV. 4-15-02: CHANGED SHEET NAME. ELIMINATED DETAILS FOR PRECAST, PRESTRESSED CONCRETE DECK PANCELS FOR HEIGHTS LESS THAN 1'-6". CHANGED TYPE OF CUEB TO COMPLY WITH NEW STANDARD DRAWINGS STD-15-6 AND STD-15-7.
- REV. 11-21-07: REVISED GUARDRAIL POST SPACING.
- REV. 3-13-08: REVISED FILLED WELD SIZE BETWEEN POST/BASE PLATE.
- REV. 3-10-10: ADDED ALTERNATE GUARDRAIL AND BASE PLATE ATTACHMENT DETAILS AND REVISED NOTE ④. ADDED DESIGN NOTE ⑥.



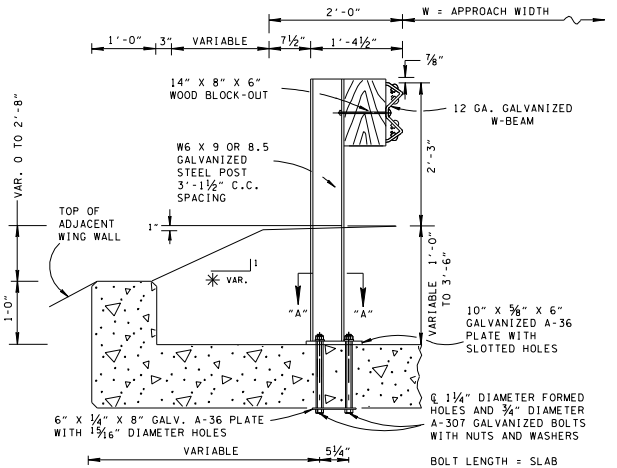
SECTION "A-A"



DETAIL FOR CONCRETE DECK USED AS A RIDING SURFACE SHOWING OUTLET END



DETAIL FOR CONCRETE DECK WITH 6" TO 1'-0" OF ROADWAY FILL COVER



DETAIL FOR CONCRETE DECK WITH 1'-0" TO 3'-6" OF ROADWAY FILL COVER

✳ DENOTES ADJOINING ROADWAY SIDE SLOPE

GENERAL NOTES

Ⓐ THE EXACT POSITION OF GUARDRAIL SHALL BE AS SHOWN ELSEWHERE ON THE PLANS OR AS DIRECTED BY THE ENGINEER. GUARDRAIL SHALL BE TRANSITIONED TO A SMOOTH CONNECTION WITH OTHER GUARDRAIL OR STRUCTURE RAILING AS SHOWN ELSEWHERE ON PLANS.

Ⓑ AT THE OPTION OF THE CONTRACTOR THE RAIL ELEMENTS FOR THE GUARDRAIL MAY BE FURNISHED IN EITHER 12½' OR 25 FOOT NOMINAL LENGTHS WITH POST BOLT SLOTS FOR CONNECTION TO POSTS.

Ⓒ BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN ¾" BEYOND IT.

Ⓓ GUARDRAIL THAT IS INSTALLED ON CURVE WITH A RADIUS OF 150 FEET OR LESS SHALL BE SHOP BENT.

Ⓔ STEEL POST SHALL BE BLOCKED OUT. A 8" X 6" WOOD BLOCK-OUT SHALL BE USED WITH EACH STEEL POST. SEE STANDARD DRAWING S-GR-13 FOR SPECIFICATIONS AND DETAILS.

Ⓕ WELDED STEEL POSTS SHALL MEET THE REQUIREMENTS OF ASTM A-769. THE FLANGE WIDTH AND THICKNESS, WEB THICKNESS, AND DEPTH OF WELDED POSTS SHALL EQUAL OR EXCEED THE DIMENSIONS OF A STANDARD ROLLED W6 X 8.5 OR W6 X 9.0 STEEL POST.

Ⓖ STEEL POSTS SHALL MEET THE REQUIREMENTS OF ASTM A-36. BOLT HOLES SHALL BE APPROXIMATELY CENTERED BETWEEN WEB AND EDGE OF FLANGE OF SPACERS AND POSTS.

Ⓗ FOR DIMENSIONS AND DETAILS NOT SHOWN SEE STANDARD DRAWING NOS. STD-15-6, STD-15-7, AND THE S-GR-SERIES.

DESIGN NOTES

① GUARDRAIL POST SPACING SHALL BE REDUCED TO 3'-1½" AT CONCRETE DECK ATTACHMENTS.

② WHEN DEPTH OF FILL AT FACE OF GUARDRAIL EXCEEDS 3'-6" DELETE THE USE OF BOLTED BASE PLATES AND DRIVE POSTS.

③ THE USE OF PRECAST, PRESTRESSED CONCRETE DECK PANELS IN BOX AND SLAB TYPE CULVERTS IS PROHIBITED.

④ THIS RAIL SYSTEM HAS BEEN TESTED BY MIDWEST ROADSIDE SAFETY FACILITY IN ACCORDANCE WITH THE CRITERIA SET FORTH IN NCHRP REPORT NUMBER 350 TL-3, REFERENCE REPORT STR-3(017), NOVEMBER 1986.

⑤ ANY REINFORCING STEEL THAT INTERFERES WITH THE 1¼" DIAMETER FORMED HOLES SHALL BE MOVED HORIZONTALLY TO PROVIDE A 1" MINIMUM CLEARANCE TO THE HOLE.

⑥ GUARDRAIL POST ATTACHMENT USING BASE PLATE AND ANCHOR BOLTS HAS BEEN TESTED PER NCHRP 350-TL3 BY TEXAS TRANSPORTATION INSTITUTE. REPORT NUMBER 405160-12, JANUARY 29, 2009.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL ATTACHMENT TO CONCRETE DECKS OF BOX AND SLAB CULVERTS AND BRIDGES

6-22-89 | S-GR-22

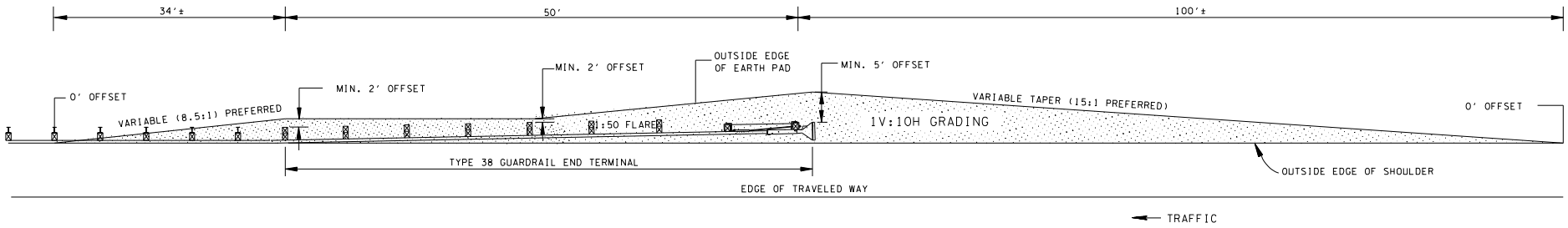
REV. 6-30-09: CHANGED GENERAL NOTE (D) AND ADDED (G). CHANGED PLAN VIEW.

REV. 5-5-05: ADDED NEW GENERAL NOTE (F).

REV. 5-15-08: GENERAL MODIFICATIONS REMOVED DITCH DETAIL. S-GR-38A DELETED AND INCORPORATED, RENAMED.

REV. 12-18-98: CHANGED DRAWING NAME AND MODIFIED GENERAL NOTE (C).

REV. 5-27-01: CHANGED GENERAL NOTE (B).



PLAN VIEW OF EARTH PAD CONSTRUCTION

GENERAL NOTES

(A) REFER TO RD01-S-SERIES FOR ROADSIDE SLOPE DEVELOPMENT AND ROADSIDE DITCH DETAILS.

(B) FOR DETAILS NOT SHOWN SEE OTHER GUARDRAIL STANDARD DRAWINGS.

(C) THE DESIGNER SHALL INCOPORATE THIS EARTH PAD IN CONJUNCTION WITH ALL TYPE 38 GUARDRAIL TERMINALS IN THE RIGHT-OF-WAY AND CONSTRUCTION PLANS AS WELL AS THE ROADWAY CROSS-SECTION SHEETS.

(D) THE CONTRACTOR SHALL CONSTRUCT THIS EARTH PAD AS PART OF THE INITIAL GRADING OPERATIONS AS SHOWN ON THIS STANDARD DRAWING AFTER FIELD VERIFICATION OF HAZARD LOCATION AND ENGINEERS APPROVAL. THE OFFSETS SHOWN INDICATE THE MINIMUM OFFSETS REQUIRED BEHIND THE GUARDRAIL END TERMINAL, ACTUAL OFFSETS FROM THE OUTSIDE SHOULDER FOR THE GRADED PAD WILL DEPEND ON THE APPROVED TYPE 38 GUARDRAIL END TERMINAL WHICH IS UTILIZED IN THE LOCATION.

(E) ON ALL NEW GRADE AND DRAIN PROJECTS THE EARTH PAD SHALL BE BUILT AS SHOWN ON THIS STANDARD DRAWING WITHOUT EXCEPTION AND PAID UNDER ROADWAY GRADING.

(F) REFER TO STANDARD DRAWING S-GR-21 FOR LENGTH OF NEED AND CLEAR ZONE REQUIREMENTS.

(G) EARTH PAD SHALL BE PAID UNDER THE ITEM NUMBER:

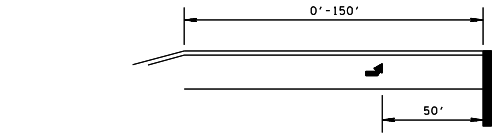
705-04.09 EARTH PAD FOR TYPE 38 GUARDRAIL END TERMINAL.

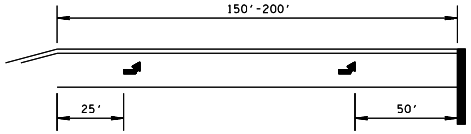
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

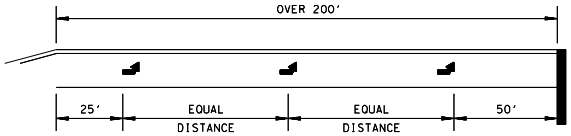
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

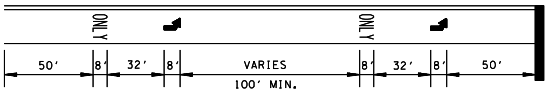
DETAILS FOR CONSTRUCTION OF EARTH PAD FOR TYPE 38 GUARDRAIL END TERMINAL

7-29-98 | S-GR-38





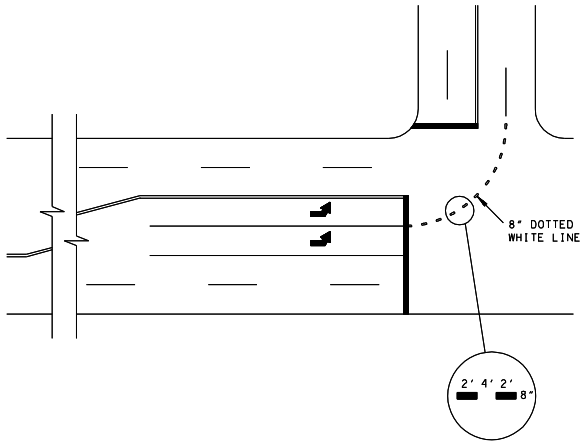




IF A THROUGH LANE BECOMES AN EXCLUSIVE LEFT TURN LANE, AN "ONLY" MESSAGE IS REQUIRED FOR EACH ARROW. THE "ONLY" MESSAGE SHALL BE PAID FOR UNDER ITEM NO. 716-03.01, PLASTIC WORD PAVEMENT MARKING (ONLY) PER EACH.

TYPICAL MARKING FOR LEFT TURN LANES
ALSO APPLICABLE FOR RIGHT TURN LANES

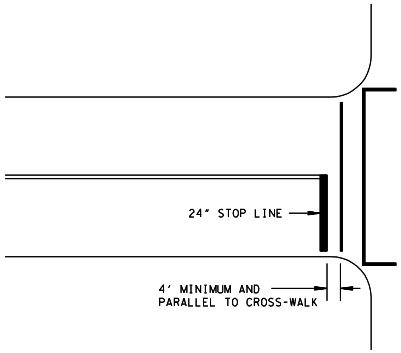
NOTE: STOP LINES REQUIRED ONLY ON APPROACHES CONTROLLED BY STOP SIGNS OR TRAFFIC SIGNALS.



LEFT TURN ARROWS SHALL BE PAID FOR UNDER ITEM NO. 716-02.06, PLASTIC PAVEMENT MARKING (TURN LANE ARROWS) PER EACH.

EIGHT INCH DOTTED WHITE LINE SHALL BE PAID FOR UNDER ITEM NO. 716-02.08, PLASTIC PAVEMENT MARKING (8" DOTTED LINE) PER LINEAR FOOT.

TYPICAL MARKING FOR DOUBLE LEFT TURN LANES



IF CROSS-WALKS ARE NOT USED, STOP LINE SHALL BE NOT MORE THAN 30 FEET NOR LESS THAN 4' FROM NEAREST EDGE OF INTERSECTING TRAVELED WAY. LOCATION SHALL BE DETERMINED BY VEHICLE TURNING PATHS FROM THE INTERSECTING ROADWAY, AND IF SIGNALIZED, ITS POSITION RELATIVE TO SIGNAL HEADS, PER MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

STOP LINES SHALL BE PAID FOR UNDER ITEM NO. 716-02.05, PLASTIC PAVEMENT MARKING (STOP LINE) PER LINEAR FOOT.

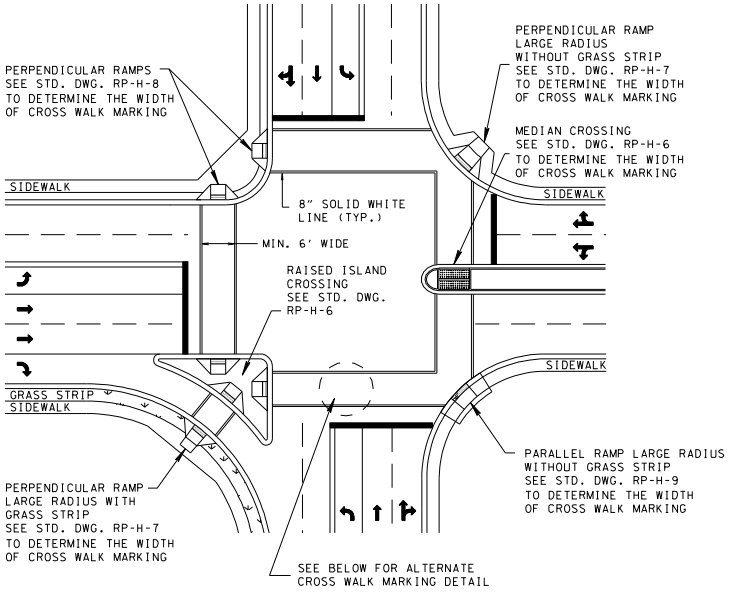
TYPICAL STOP LINE PLACEMENT

- REV.3-15-07: REVISED TO REFER THE HANDICAP RAMP STANDARDS TO DETERMINE THE MINMUM WIDTH OF CROSS WALK MARKINGS.
- REV.6-1-09: TYPICAL STOP LINE PLACEMENT NOTE REVISED.

REV. 2-22-88: REVISED DETAIL LEFT TURN LANE MARKING. ADDED NOTE FOR STOP LINE TO BE PARALLEL TO CROSS-WALK. NOTED LONGITUDINAL CROSS-WALK LINES TO BE WHITE. CHANGED DWG. NO. FROM T-M-11 TO T-M-4. ADDED DETAIL FOR DOUBLE LEFT TURN LANE.

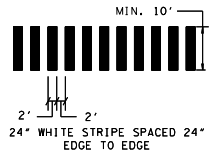
REV. 3-20-91: REDREW AND REORGANIZED SHEET. ADDED PAY ITEMS AND THEIR DESCRIPTIONS.

- REV. 5-27-01: CHANGED DESCRIPTION IN ITEM NO. 716-02.09.
- REV. 9-5-01: CHANGED DESCRIPTION IN ITEM NO. 716-02.03.
- REV.1-19-05: CHANGED HANDICAP RAMP DETAIL SHOWN ON CROSSWALK MARKING DETAILS.



TYPICAL PLAN VIEW OF STANDARD CROSS WALK MARKING

STANDARD CROSS-WALK MARKING SHALL BE PAID FOR UNDER ITEM NO. 716-02.03, PLASTIC PAVEMENT MARKING (CROSS-WALK) PER LINEAR FOOT.



CROSS-WALK MARKING WITH LONGITUDINAL LINES SHALL BE PAID FOR UNDER ITEM NO. 716-02.09, PLASTIC PAVEMENT MARKING (LONGITUDINAL CROSS-WALK) PER LINEAR FOOT.

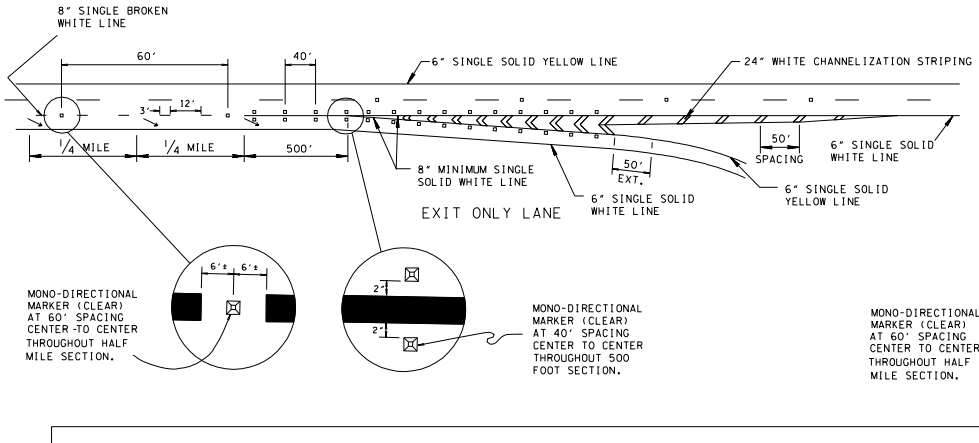
CROSS-WALK MARKING WITH LONGITUDINAL LINES

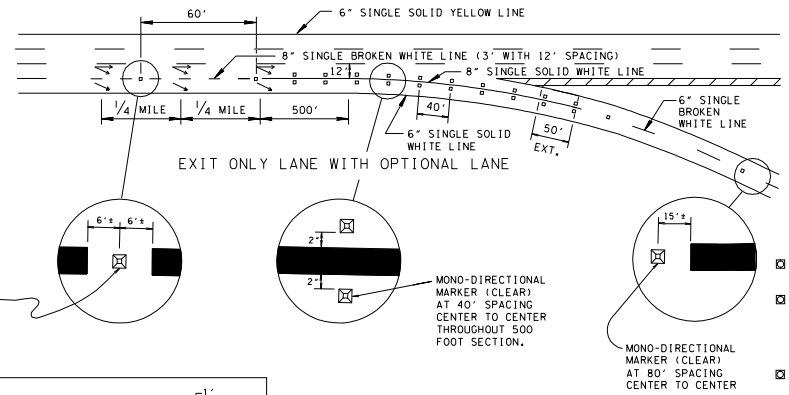
- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

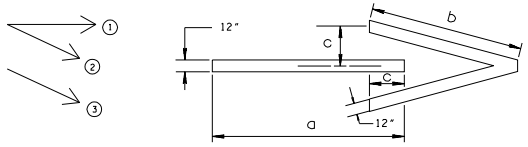
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD INTERSECTION PAVEMENT MARKINGS

T-M-4



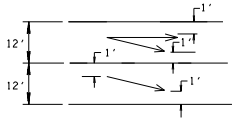




DIMENSIONS

ARROW	a	b	c
1	14'-0"	8'-6"	2'-2"
2	10'-4"	8'-6"	2'-2"
3	16'-6"	10'-0"	2'-6"

DETAILS FOR EXIT PAVEMENT ARROWS AT 1/4 MILE SPACING

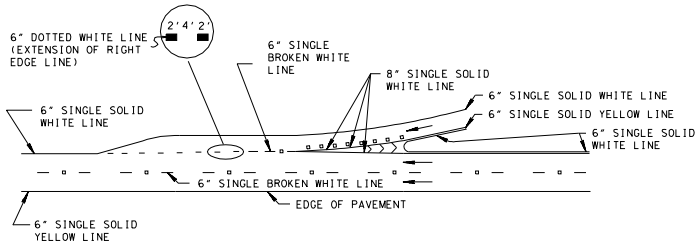


ARROW LOCATION SKETCH

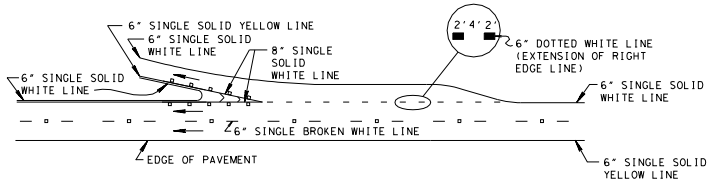
GENERAL NOTES

(A) SEE STANDARD DRAWING NO. T-M-7 FOR GORE MARKING DETAILS.

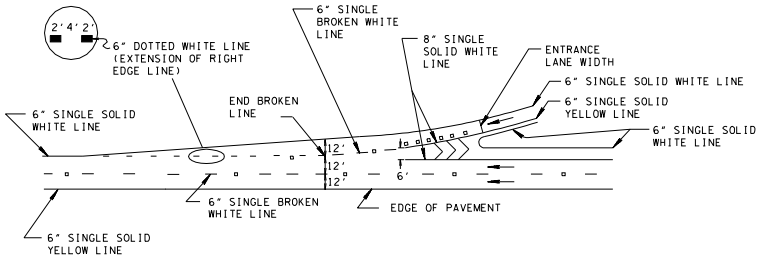
(B) PAVEMENT MARKERS ARE REQUIRED ONLY WHEN SPECIFIED IN THE PLANS.



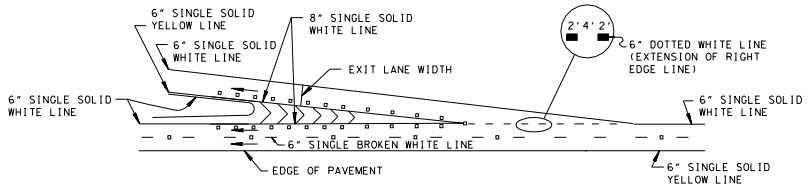
PARALLEL ACCELERATION LANE



PARALLEL DECELERATION LANE



TAPERED ACCELERATION LANE
ENTRANCE RAMPS



TAPERED DECELERATION LANE
EXIT RAMP

REV. 2-22-88: ADDED DETAIL FOR "EXIT ONLY" AND FOR PARALLEL ACCELERATION LANE MARKING. CHANGED SHEET TITLE AND DWG. NO. FROM T-M-3 TO T-M-6. ADDED NOTES. ADDED DETAILS FOR TWO LANE EXIT AND PAVEMENT ARROWS. ADDED DOTTED LINES AT EXIT RAMPS.

REV. 10-30-90: REDREW AND REORGANIZED SHEET. CHANGED WIDTH OF EXIT PAVEMENT ARROWS TO 12".

REV. 3-20-91: ADDED MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR) TO EXIT ONLY LANE DETAIL AND TWO LANE EXIT WITH OPTIONAL LANE DETAIL. CHANGED GENERAL NOTES. ON REMAINDER OF SHEET CHANGED TYPE 2 PAVEMENT MARKERS (CLEAR) TO MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR).

Ⓒ REV. 10-26-92: ADDED GENERAL NOTE Ⓑ.

Ⓒ REV. 12-18-92: MOVED MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR) FROM INSIDE OF CHANNELIZATION MARKING TO OUTSIDE OF CHANNELIZATION MARKING.

Ⓒ REV. 1-19-94: IN DETAIL FOR TWO LANE EXIT WITH OPTIONAL LANE, EXTEND RAMP AND ADD PAVEMENT MARKERS.

Ⓒ REV. 7-29-98: CHANGED WIDTH OF CENTERLINES, EDGELINES AND DOTTED WHITE LANE LINES FROM 4 TO 6 INCHES. CHANGED USE OF DOTTED WHITE LANE LINES IN PARALLEL AND TAPERED ACCELERATION AND DECELERATION DETAILS.

Ⓜ REV. 9-1-09: ADDED 6" BROKEN WHITE LINE TO PARALLEL ACCELERATION LANE.

Ⓒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

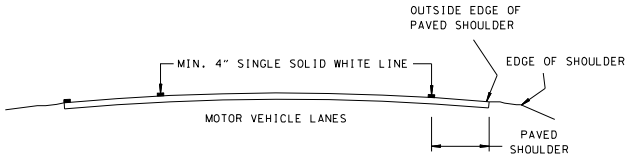
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

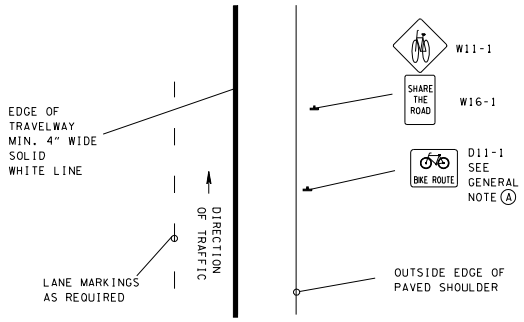
MARKING DETAIL FOR EXPRESSWAY & FREEWAY INTERCHANGES

T-M-6

■ REV. 12-1-09: REMOVED RUMBLE DETAILS TO T-M-15 AND 15A.

TYPICAL BIKE ROUTE CROSS SECTION FOR NON-ACCESS CONTROLLED RURAL ROUTES





GENERAL NOTES

(A) SIGNS SHOULD BE PLACED APPROXIMATELY EVERY 0.25 MILES, AT EVERY TURN, AND AT ALL SIGNALIZED INTERSECTIONS. SIGN SPACING SHOULD NOT EXCEED A MILE ON RURAL ROADS.

(B) SEE STD. DWG. T-M-15 & 15A IF RUMBLE STRIP OR RUMBLE STRIPE IS PROPOSED IN CONJUNCTION WITH BIKE ROUTE.

(C) BIKE LANES AND BIKE ROUTES ARE NOT PERMITED FOR ALL ACCESS CONTROLLED FACILITIES.

(D) IF BIKE LANE IS PROPOSED ON PAVED SHOULDER, RUMBLE STRIPS SHOULD NOT BE USED WHEN THEIR INSTALLATION WOULD LEAVE A CLEAR SHOULDER PATHWAY LESS THAN 4 FEET WIDE (OR LESS THAN 5 FEET WIDE IF THERE IS AN OBSTRUCTION SUCH AS A CURB OR GUARDRAIL) TO THE RIGHT OF THE RUMBLE STRIP FOR BICYCLE USE SEE T-M-15 FOR FURTHER INFORMATION.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

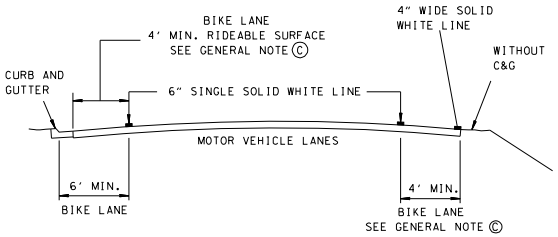
SIGNING AND PAVEMENT MARKINGS FOR BICYCLE ROUTES ON RURAL ROADS

5-1-07 | T-M-11

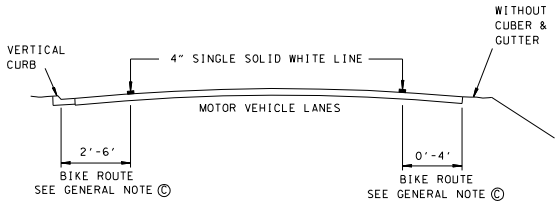
REV. 12-1-09: ADDED SIGN NO.W5-4a AND CHANGED GENERAL NOTE (D) REARRANGED.

TYPICAL BIKE LANE CROSS SECTIONS FOR URBAN COLLECTORS AND STREETS

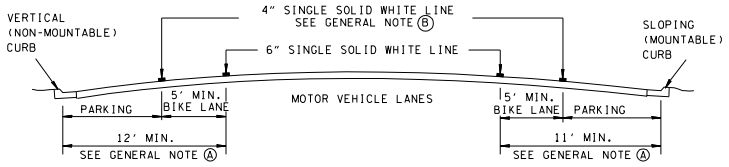
URBAN COLLECTORS AND STREETS WITH BIKE LANE MIN. PAVED SHOULDER WIDTH 4′ - 8′



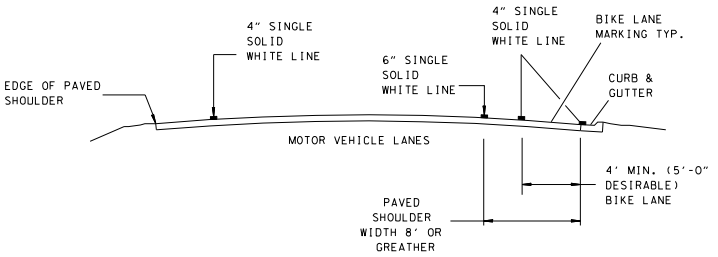
URBAN COLLECTORS AND STREETS WITH BIKE ROUTE MIN. PAVED SHOULDER WIDTH LESS THAN 4′



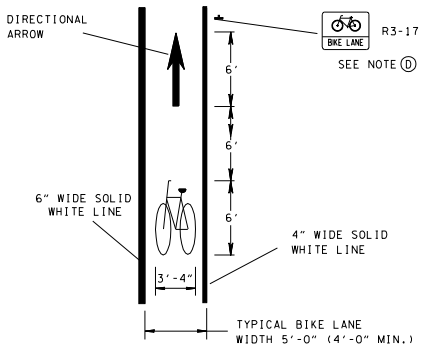
4-5 LANE URBAN COLLECTORS AND STREETS (CURB AND GUTTER) WITH BIKE LANE MIN. PAVED SHOULDER WIDTH 8′ OR GREATER



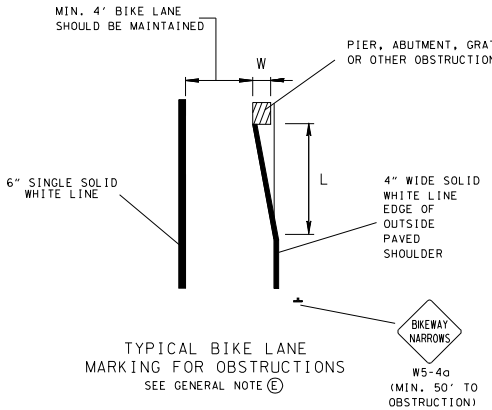
PARKING IS PERMITTED



PARKING IS PROHIBITED



TYPICAL PAVEMENT MARKING FOR BICYCLE LANES (MIN. 1000′ INTERVALS)



TYPICAL BIKE LANE MARKING FOR OBSTRUCTIONS
SEE GENERAL NOTE (E)

NOTE:
WHERE THE ROADWAY DESIGN SPEEDS IS MORE THAN 40 mph SHARED USE BIKE ROUTES ARE NOT RECOMMENDED.

GENERAL NOTES

(A) 13′ IS RECOMMENDED WHERE THERE IS SUBSTANTIAL PARKING OR TURNOVER OF PARKED CARS IS HIGH (E.G. COMMERCIAL AREAS).

(B) THE OPTIONAL SOLID WHITE LINE MAY BE ADVISABLE WHERE PARKING STALLS ARE UNNECESSARY (BECAUSE PARKING IS LIGHT) BUT THERE IS CONCERN THAT MOTORISTS MAY MISCONSTRUE THE BIKE LANE TO BE A TRAFFIC LANE.

(C) AREAS WHERE MIN. OF 4′ BIKE LANE CAN NOT BE PROVIDED " SHARE THE ROAD" (W16-1) SIGN SHOULD BE PLACED TO WARN THE MOTOREST FOR SHARED ROADWAY USE SEE T-M-11 FOR BIKE ROUTE PAVEMENT MARKINGS AND SIGNING REQUIREMENTS.

(D) SIGNS SHOULD BE PLACED APPROXIMATELY EVERY 0.25 MILES AND ALL MAJOR INTERSECTIONS.

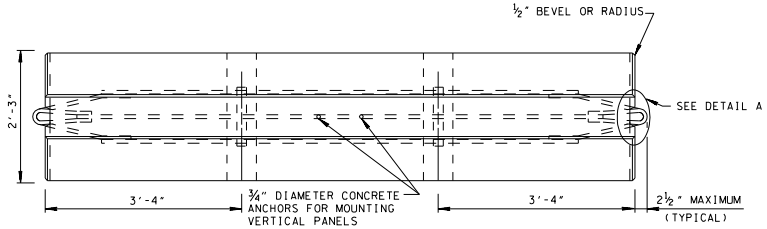
(E) WHEN PIER, BRIDGE ABUTMENT, GRATE, OR OTHER ROADWAY OBSTRUCTION THAT IS INAPPROPRIATE FOR BICYCLE TRAVEL, THE BIKE LANE SHOULD BE MARKED AS SHOWN, L=WS, WHERE W IS WIDTH OF OBSTRUCTION IN BIKE LANE AND S IS BICYCLE AVERAGE APPROACH SPEED 20 MPH.

(F) FOR BIKE ROUTE SIGNING REQUIREMENTS SEE T-M-11.

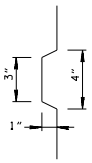
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIGNING AND PAVEMENT MARKINGS FOR BICYCLE LANES ON URBAN ROADWAYS

5-1-07 | T-M-12

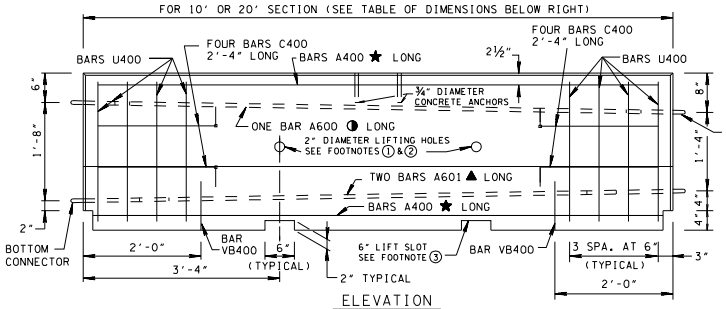


PLAN

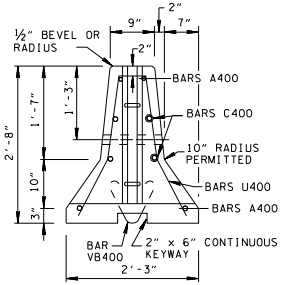


DETAIL 'A'

(TOP & BOTTOM CONNECTOR NOT SHOWN)



ELEVATION



END ELEVATION

GENERAL NOTES

(A) PRECAST CONCRETE BARRIER SHALL BE CONSTRUCTED WITH CLASS 'A' CONCRETE MANUFACTURED IN ACCORDANCE WITH SECTION 604 OF THE STANDARD SPECIFICATIONS.

(B) REINFORCING STEEL: TO BE ASTM A615.

(C) THE CONNECTOR PIN, 1¼" X 25⅛" THREADED ROD OR 1¼" X 25⅛" BOLT SHALL HAVE A MINIMUM OF 50,000 POUNDS TENSILE STRENGTH. THE HEAVY HEX NUTS AND THE TWO HEAVY FLAT WASHERS SHALL MEET ASTM A-325. THE CONNECTOR PIN, TOP CONNECTOR, BOTTOM CONNECTOR, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M-111.

(D) PLACE ALL STEEL REINFORCEMENT 2" MINIMUM FROM OUTSIDE FACE OF WALL, EXCEPT AS OTHERWISE SHOWN.

(E) PAYMENT WILL BE MADE UNDER ITEM NO. 712-02.02, INTERCONNECTED PORTABLE BARRIER RAIL PER LINEAR FOOT.

(F) ANY SALVABLE VALUE OF THE PORTABLE BARRIER RAIL WILL BECOME THE PROPERTY OF THE CONTRACTOR. THE PORTABLE BARRIER RAIL SHALL BE MOVED OFF THE PROJECT IN A MANNER AND TIME SUITABLE TO THE ENGINEER.

(G) WHEN INTERCONNECTED PORTABLE BARRIER RAIL IS CONSTRUCTED IN THE UPRIGHT POSITION AS SHOWN ON THIS DRAWING THE VB400 BAR WILL BECOME OPTIONAL AND MAYBE OMITTED FROM THE INSTALLATION.

(H) ALTERNATE PRECAST BARRIERS OF THE SAME EXACT CROSS-SECTION HAVING EQUIVALENT REINFORCEMENT, BUT EQUIPPED WITH OTHER FEDERALLY APPROVED, CRASH TESTED INTERCONNECTING HARDWARE MEETING TL-3 EVALUATION CRITERIA SPECIFIED IN NCHRP REPORT 350 MAY BE SUBMITTED TO THE DIVISION OF STRUCTURES FOR AN APPROVAL. IF APPROVED, THE ALTERNATE WILL BE ADDED TO THE TDOT APPROVED QUALIFIED PRODUCT LISTS FOR ACCEPTABLE PRODUCTS.

(I) THE CONTRACTORS, IF THEY WISH TO USE AN ALTERNATE, SHOULD CONSULT THE TDOT APPROVED QUALIFIED PRODUCT LISTS FOR ALTERNATES TO THE INTERCONNECTED PORTABLE BARRIER RAIL SHOWN ON THIS STANDARD DRAWING. THE DIVISION OF MATERIALS AND TESTS SHOULD BE CONTACTED FOR THIS LIST.

(J) DIFFERENT SECTION LENGTHS AND DIFFERENT APPROVED CONNECTIONS CAN BE USED ON A SPECIFIC PROJECT (REFER TO GENERAL NOTES H AND I ABOVE), ONLY ONE SECTION LENGTH AND CONNECTION TYPE SHALL BE USED IN A SINGLE RUN OF INTERCONNECTED PORTABLE BARRIER RAIL.

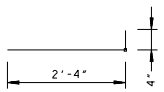
(K) IT IS IMPORTANT TO PROVIDE MIN. 4' DEFLECTION ZONE BEHIND THE BARRIER RAIL.

LIFTING HOLE AND SLOT FOOTNOTES

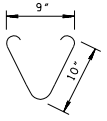
① 2" DIAMETER LIFTING HOLE - 2 REQUIRED FOR EACH SECTION TO BE PLACED 3'-4" FROM EITHER END OF THE BARRIER WALL. ADDITIONAL HOLES MAY BE ADDED TO 20 FOOT SECTION LENGTHS, PLACEMENT OF ADDITIONAL HOLES TO BE AT THE DISCRETION OF THE FABRICATOR. FORMED WITH 2" PVC PIPE OR EQUAL.

② LIFTING BARS SHALL BE REQUIRED TO PREVENT SPALLING OF CONCRETE AROUND HOLES.

③ 6" LIFT SLOTS PROVIDES DRAINAGE FOR PAVEMENT DO NOT BLOCK THE OPENINGS.

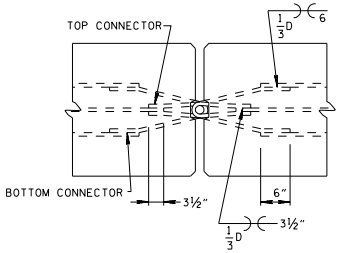


BAR C400

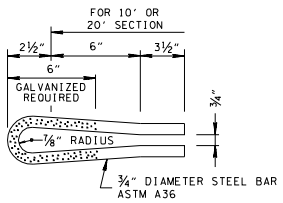


BAR VB400

(SEE GENERAL NOTE (G))

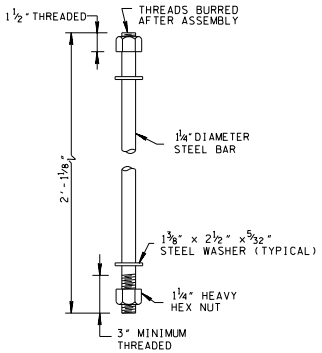


PLAN OF CONNECTION DETAIL



TOP CONNECTOR

(GALVANIZE AFTER FORMING)

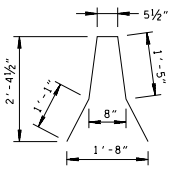


CONNECTOR PIN

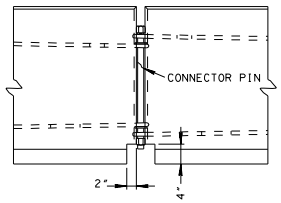
APPROXIMATE WEIGHT AND QUANTITIES			
SECTION LENGTH FEET	WEIGHT POUND	REINFORCING STEEL POUND	CONCRETE (CUBIC YARD)
10	4,860	108	1.2
20	9,720	180	2.4

BILL OF STEEL			
BAR	SIZE	NO. REQUIRED	LENGTH
A400	4	4	★
A600	6	1	◑
A601	6	2	▲
C400	4	8	2'-8"
U400	4	8	5'-6"
VB400	4	2	2'-1"

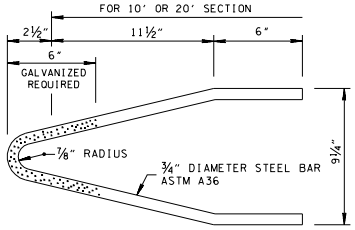
(SEE TABLE OF DIMENSIONS FOR SYMBOLS)



BAR U400



ELEVATION OF CONNECTION DETAIL



BOTTOM CONNECTOR

(GALVANIZE AFTER FORMING)

TABLE OF DIMENSIONS			
SECTION	◑	▲	★
10'	9'-0"	8'-1"	9'-6"
20'	19'-0"	18'-1"	19'-6"

(SEE ELEVATION FOR LOCATION)

REV. 4-22-91: CHANGED GENERAL NOTE (C) TO INCLUDE TOP CONNECTOR AND BOTTOM CONNECTOR UNDER GALVANIZING SPECIFICATION AASHTO M-111.

REV. 7-29-91: ADDED GENERAL NOTE (G).

REV. 1-19-92: CHANGED DRAWING NUMBER FROM S-PR-1 TO T-PBR-1. ADDED ¾" DIAMETER CONCRETE ANCHORS. CHANGED FOOTNOTE ①. ADDED FOOTNOTE ③.

REV. 1-19-96: CHANGED DIMENSION ON C400 BAR.

REV. 5-27-99: ADDED GENERAL NOTES (H) AND (I).

REV. 3-10-00: ADDED GENERAL NOTE (J).

REV. 2-22-04: ADDED C400 BAR TO BILL OF STEEL TABLE.

REV. 6-30-09: ADDED GENERAL NOTE (K) AND CHANGED GENERAL NOTE (H). CHANGED SLOT FOOTNOTES ③ AND APPROXIMATE WEIGHT AND QUANTITIES

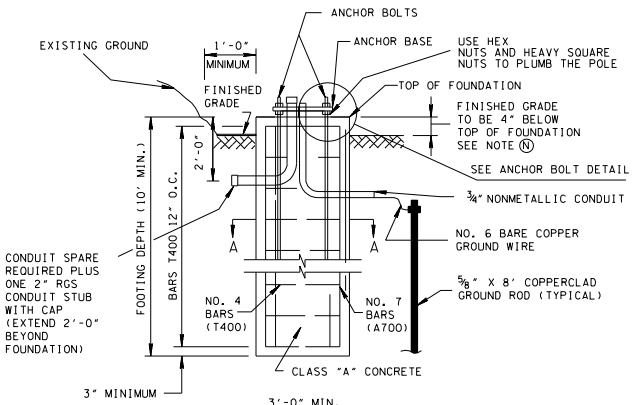
SEE STANDARD DRAWING NO. T-PBR-2 FOR DETAILS REGARDING VERTICAL PANELS

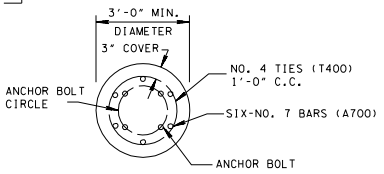
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERCONNECTED PORTABLE BARRIER RAIL

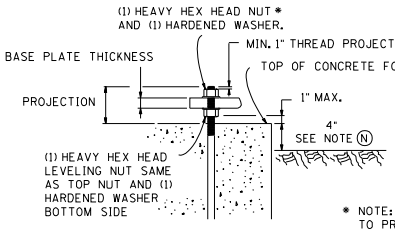
2-28-91 | T-PBR-1





SECTION A-A

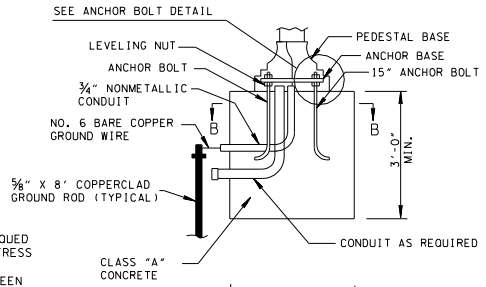
FOUNDATION DETAIL FOR STRAIN OR MAST ARM POLE

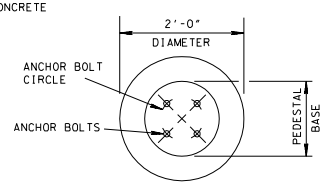


ANCHOR BOLT DETAIL

UNDER NO CONDITIONS WILL DRILLED AND GROUTED ANCHOR BOLTS BE ALLOWED) (CANTILEVER AND BUTTERFLY SIGN BASES SHALL REQUIRE A MINIMUM OF 8 ANCHOR BOLTS 1 ½" IN DIAMETER)

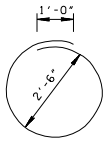
* NOTE: TOP NUT TO BE TORQUED TO PRODUCE 60% YIELD STRESS OF ANCHOR BOLT.
NOTE: DO NOT GROUT BETWEEN BOTTOM OF BASE PLATE AND TOP OF CONCRETE FOUNDATION.



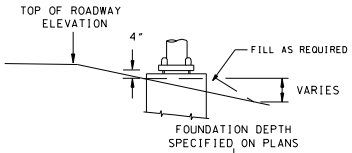


SECTION B-B

FOOTING DETAIL FOR STEEL PEDESTAL POLE



T400 BARS SHALL LAP 1'-0"



LOW SHOULDER FOUNDATION DETAIL

GENERAL NOTES

(A) ALL STEEL STRAIN POLES SHALL CONFORM TO "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 730 - TRFFIC SIGNALS.

(B) STRAIN POLES SHALL BE DESIGNED ACCORDING TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (CURRENT EDITION).

(C) THE CONTRACTOR SHALL FURNISH POLES DESIGNED FOR A WIND VELOCITY ACCORDING TO THE CURRENT STANDARDS AS SPECIFIED IN AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS".

(D) ANCHOR BOLTS SHALL BE DESIGNED BY THE POLE FABRICATOR. THEY SHALL BE CAPABLE OF RESISTING THE FULL BENDING MOMENT OF THE SHAFT AT ITS YIELD STRENGTH STRESS.

MATERIAL SPECIFICATIONS - BOLTS:

1.) ANCHOR BOLTS SHALL BE ASTM F1554 GRADE 55 ksi WITH THREADS CONFORMING TO THE REQUIREMENTS OF ASTM A563.

2.) NUTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A563.

3.) ALL HARDWARE, EXCEPT STAINLESS STEEL, SHALL BE HOT DIPPED GALVANIZED ACCORDING TO ASTM A153 OR MECHANICALLY GALVANIZED ACCORDING TO ASTM B695.

(E) THE COST OF ALL FOOTING MATERIALS AND INSTALLATION SHALL BE INCLUDED IN THE PRICE BID FOR STEEL POLES

(F) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND NOTES TO THE ENGINEER OF STRUCTURES FOR APPROVAL PRIOR TO FABRICATION.

(G) THE MOMENT CAPACITY OF THE STRAIN POLES AND THE FOOTING DEPTHS FOR BOTH STRAIN POLE AND MAST ARM POLE SHALL BE AS SPECIFIED IN THE PLANS.

(H) CANTILEVER SIGNAL SUPPORTS SHALL BE DESIGNED BY THE POLE FABRICATOR.

(J) TOP OF FOOTING SHALL BE FLUSH IN SIDEWALK OR PAVED ISLANDS. TOP OF FOOTING SHALL NOT EXTEND MORE THAN 4" ABOVE THE GROUND LINE IN OTHER AREAS.

(K) IF ROCK IS ENCOUNTERED WHILE DRILLING FOR FOOTING, AND CORE AND THE DRILLING INDICATES ROCK IS SOLID, DRILL SIX 1⅛" DIAMETER HOLES INTO ROCK A MINIMUM DISTANCE OF THREE FEET. FILL HOLES WITH A-B EPOXY MIX AND ROTATE THE A700 BARS UNTIL FULL DEPTH IS ACHIEVED. THE A-B EPOXY MIX SHALL BE APPROVED BY TENNESSEE DEPARTMENT OF TRANSPORTATION, MATERIALS AND TEST DIVISION. GROUND ROD MAY BE PLACED HORIZONTALLY, AS DEEP AS ROCK ALLOWS, WITH A 3" MINIMUM SEPARATION FROM ANY CONDUIT.

(L) ALL STRAIN POLES AND MAST ARM POLES TO HAVE SPARE 2" RGS CONDUIT STUB EXTENDING 24" BEYOND POLE FOUNDATION.

(M) ALL CONDUIT BENDS IN POLE FOUNDATION TO BE 6" RADIUS.

(N) BASE OF POLE SHALL REMAIN OPEN TO PERMIT DRAINAGE AND AIR CIRCULATION. FINISHED GROUND PROFILE SHOULD DRAIN WATER AWAY FROM FOUNDATION.

ESTIMATED FOUNDATION QUANTITIES

FOOTING DEPTH	T400 REINFORCING BARS			A700 REINFORCING BARS			CONCRETE (CUBIC YARDS)
	NUMBER OF BARS	LENGTH OF EACH BAR	TOTAL WEIGHT IN POUNDS	NUMBER OF BARS	LENGTH OF EACH BAR	TOTAL WEIGHT	
15'-0"	15	8'-10"	89	6	14'-6"	178	3.9
15'-6"	16	8'-10"	95	6	15'-0"	184	4.1
16'-0"	16	8'-10"	95	6	15'-6"	190	4.2
16'-6"	17	8'-10"	101	6	16'-0"	197	4.3
17'-0"	17	8'-10"	101	6	16'-6"	203	4.5
17'-6"	18	8'-10"	107	6	17'-0"	209	4.6
18'-0"	18	8'-10"	107	6	17'-6"	215	4.7
18'-6"	19	8'-10"	113	6	18'-0"	221	4.8
19'-0"	19	8'-10"	113	6	18'-6"	227	5.0
19'-6"	20	8'-10"	119	6	19'-0"	233	5.1
20'-0"	20	8'-10"	119	6	19'-6"	240	5.2
20'-6"	21	8'-10"	125	6	20'-0"	246	5.4
21'-0"	21	8'-10"	125	6	20'-6"	252	5.5
21'-6"	22	8'-10"	130	6	21'-0"	258	5.6
22'-0"	22	8'-10"	130	6	21'-6"	264	5.8
22'-6"	23	8'-10"	136	6	22'-0"	270	5.9
23'-0"	23	8'-10"	136	6	22'-6"	276	6.0
23'-6"	24	8'-10"	142	6	23'-0"	282	6.2
24'-0"	24	8'-10"	142	6	23'-6"	289	6.3
24'-6"	25	8'-10"	148	6	24'-0"	295	6.4
25'-0"	25	8'-10"	148	6	24'-6"	301	6.6

- REV. 9-18-89: ADDED NOTE (J) AND GRADE DETAILS TO FOOTING DETAIL.
- REV. 1-18-91: REDREW AND REORGANIZED SHEET. ADDED GENERAL NOTE (K) REGARDING FOOTINGS IN ROCK.
- REV. 1-19-96: CHANGED GENERAL NOTE (A).
- REV. 2-14-99: REVISED GENERAL NOTE (K).

  REV. 12-16-03: REVISED SHEET TITLE. DELETED ESTIMATED QUANTITY FOR FOUNDATIONS LESS THAN 10'. ADDED SPARE CONDUIT TO STRAIN OR MAST ARM FOUNDATION DETAIL. ADDED LOW SHOULDER FOUNDATION DETAIL. DELETED NOTE G, RE LETTERED REMAINING NOTES AND ADDED NOTES (L) TO (N).

  REV. 7-29-04: MODIFIED ESTIMATED FOOTING QUANTITIES FOR STRAIN POLE TABLE. ADDED LOWER SHOULDER FOUNDATION DETAIL.
- REV. 02-15-07: ADDED ANCHOR BOLT DETAIL. REVISED GENERAL NOTES (D),(G) & (N) AND CHANGED TITLE
- REV. 1-5-10: MODIFIED ESTIMATED FOUNDATION QUANTITIES TABLE.

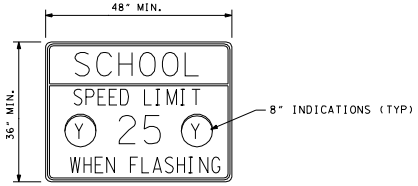
- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

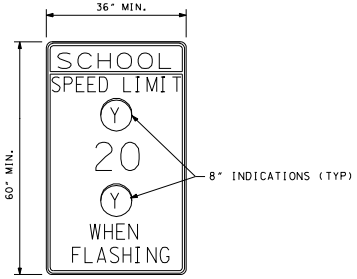
MAST ARM POLE AND STRAIN POLES FOUNDATION DETAILS

T-SG-10

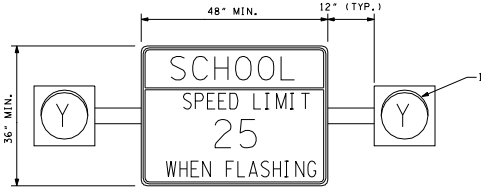
REV. 6-1-09: REVISED PEDESTAL POLE HEIGHT DIMENTION ADDED LOCKING SCREW.



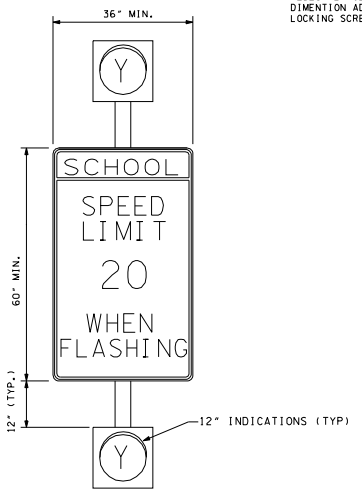
8" OVERHEAD FLASHING
SCHOOL ZONE SPEED LIMIT BEACON



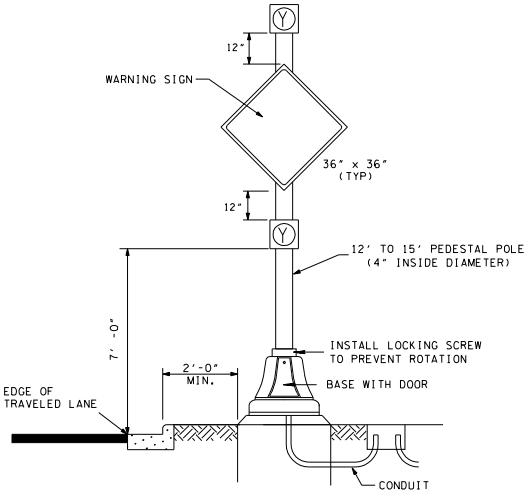
8" POLE MOUNTED FLASHING
SCHOOL ZONE SPEED LIMIT BEACON



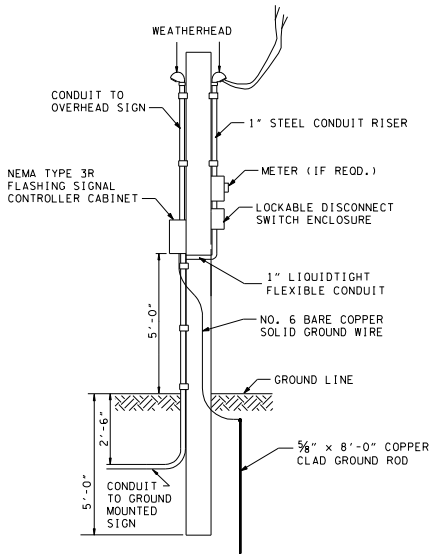
12" OVERHEAD FLASHING
SCHOOL ZONE SPEED LIMIT BEACON



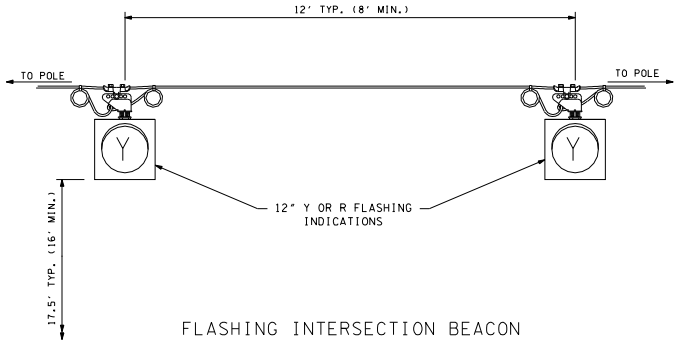
12" POLE MOUNTED FLASHING
SCHOOL ZONE SPEED LIMIT BEACON



FLASHING WARNING BEACON
SEE STD. DWG. NO. T-SG-10 FOR FOUNDATION DETAILS & NOTES



FLASHER CABINET AND
ELECTRICAL SERVICE



FLASHING INTERSECTION BEACON

GENERAL NOTES

Ⓐ THE FLASHER CONTROLLER SHALL BE ENCLOSED IN A NEMA 3R RAINTIGHT, LOCKABLE ENCLOSURE.

Ⓑ SIGNAL INDICATIONS SHALL BE MOUNTED 12" FROM WARNING SIGNS. (EXCEPT 8" INDICATIONS MOUNTED INSIDE SCHOOL ZONE SPEED LIMIT BEACON.)

Ⓒ SIGNAL INDICATIONS FOR FLASHING WARNING BEACON AND SCHOOL ZONE SPEED LIMIT BEACON SHALL FLASH ALTERNATELY.

Ⓓ SIGNAL INDICATIONS FOR FLASHING INTERSECTION BEACON TO FLASH SIMULTANEOUSLY.

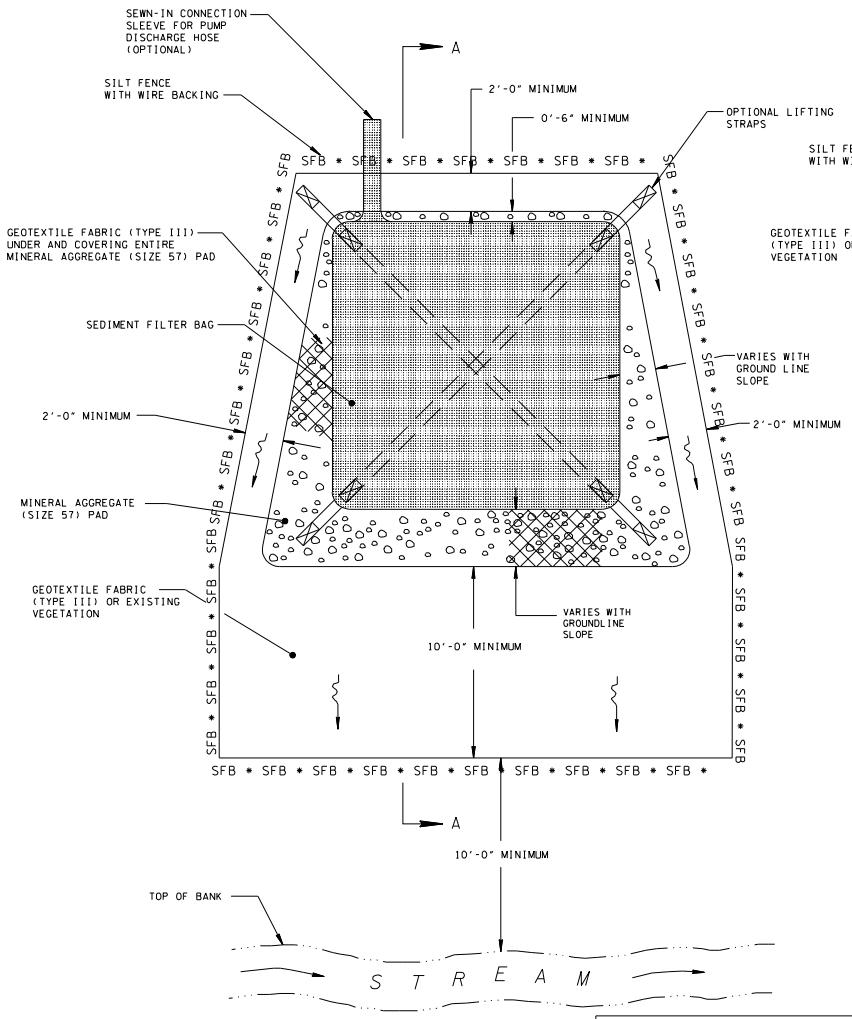
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

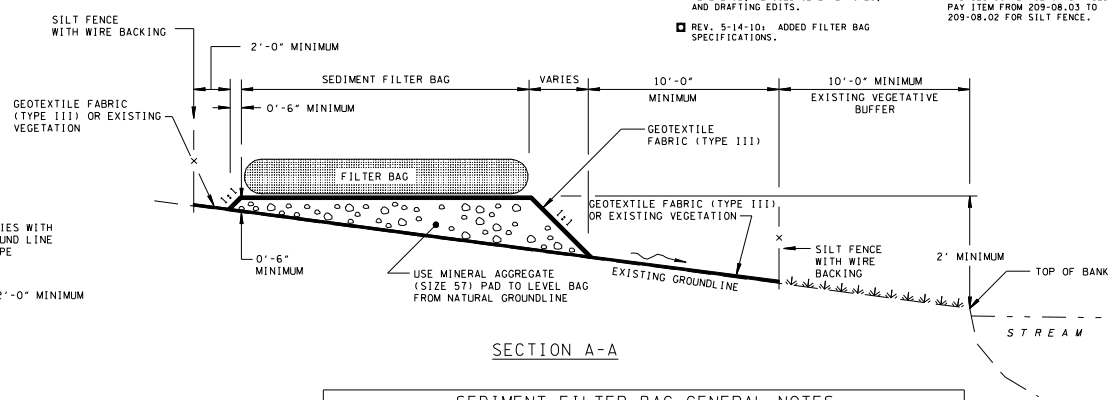
FLASHING
BEACON
DETAIL

7-29-04 | T-SG-13

- REV. 10-26-03: ADDED EROSION CONTROL SYMBOL.
- REV. 5-27-04: CORRECTED DIMENSION IN SECTION A-A.
- REV. 4-15-06: ADDED CONNECTION SLEEVE AND OPTIONAL LIFTING STRAPS. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED GENERAL NOTES, AND DRAFTING EDITS.
- REV. 5-14-10: ADDED FILTER BAG SPECIFICATIONS.
- REV. 2-28-01: CORRECTED PAY ITEM NUMBER IN PLAN VIEW.
- REV. 5-27-01: CHANGED ITEM NOS. 209-08 TO 209-08.03, 209-08.10 TO 209-09.02 AND 303-15.01 TO 303-10.01. CHANGED DESCRIPTION IN ITEM NO. 209-20.03.
- REV. 12-18-02: CHANGED SILT FENCE (WITHOUT BACKING) TO SILT FENCE (WITH BACKING) IN PLAN AND SECTIONAL VIEW. CHANGED PAY ITEM FROM 209-08.03 TO 209-08.02 FOR SILT FENCE.



PLAN VIEW



SECTION A-A

FILTER BAG SPECIFICATIONS

PROPERTIES		TEST METHOD
WEIGHT	10.0 oz/yd.	ASTM D3776
TENSILE STRENGTH	250 lbs.	ASTM D4632
TENSILE ELONGATION AT BREAK	50%	ASTM D4632
PUNCTURE STRENGTH	115 lbs.	ASTM D4833
TRAPEZOIDAL TEAR	100 lbs.	ASTM D4533
MULLEN BURST	350 lbs.	ASTM D3786
WATER, FLOW RATE	80 gpm/ft.2	ASTM D4491
PERMITTIVITY	1.2 sec.-1	ASTM D4491
UV RESISTANCE	70% str. Ret.	ASTM D4355

STANDARD BAG MINIMUM DIMENSIONS	MAXIMUM FLOW RATE
15 X 10 ft.	up to 1500 gpm
15 X 15 ft.	up to 2000 gpm

NOTE:
THE MATERIAL SHALL BE A NON-WOVEN GEOTEXTILE FABRIC BAG RESISTANT TO ROT, MILDEW, PUNCTURE AND TEARING, WITH A MINIMUM SEAM BREAKING STRENGTH OF 200 LBS (90 Kgs) THE SEAMS SHALL DEMONSTRATE LESS ELONGATION AND DEFORMATION OF THE GEOTEXTILE FABRIC.

EROSION CONTROL PLAN LEGEND: SEDIMENT FILTER BAG

SEDIMENT FILTER BAG GENERAL NOTES

(A) SPECIAL PROVISION 209B IS TO BE USED FOR SEDIMENT FILTER BAGS. ALL REFERENCES IN SPECIAL PROVISION 209B TO PUMPING FROM SEDIMENT TRAPS ALSO APPLIES TO PUMPING FROM COFFER DAMS.

(B) SEDIMENT FILTER BAGS SHOULD NOT BE PLACED WITHIN A JURISDICTIONAL WETLAND OR WITHIN 20 FEET OF A STABILIZED OUTLET, STREAM, OR OTHER NATURAL WATER RESOURCE.

(C) CONTRACTOR SHALL EXERCISE CAUTION NOT TO BURST OR DAMAGE THE SEDIMENT FILTER BAG WHEN PUMPING.

(D) THE LENGTH AND WIDTH OF THE SEDIMENT BAG SHOWN ON THIS DRAWING MAY VARY PER VENDOR SPECIFICATIONS. THE MINIMUM "FOOTPRINT" OF THE BAG SHALL BE 150 SQUARE FEET.

(E) SEDIMENT FILTER BAGS MAY BE EQUIPPED WITH A SEWN-IN SLEEVE OF SUFFICIENT SIZE TO ACCEPT A MINIMUM FOUR-INCH DIAMETER PUMP DISCHARGE HOSE. A HOSE CONNECTION THROUGH A SLIT IN THE BAG IS ALSO ACCEPTABLE. THE DISCHARGE HOSE SHOULD BE EXTENDED INTO THIS SLEEVE A MINIMUM OF SIX INCHES AND BE TIGHTLY SECURED WITH A HOSE CLAMP OR OTHER SUITABLE MEANS TO PREVENT LEAKAGE.

(F) THE PUMP DISCHARGE HOSE CONNECTION SLEEVE, OR SLIT, SHALL BE SECURELY TIED OFF DURING DISPOSAL OF THE SEDIMENT FILTER BAG IN ORDER TO PREVENT LEAKAGE OF COLLECTED SEDIMENTS.

(G) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(H) SURROUND SEDIMENT FILTER BAG ASSEMBLY WITH SILT FENCE WITH WIRE BACKING. SEE STANDARD DRAWING EC-STR-3C AND EC-STR-3E FOR INSTALLATION DETAILS.

(I) EXISTING VEGETATIVE BUFFER TO REMAIN BETWEEN SILT FENCE WITH WIRE BACKING AND STABILIZED OUTLET, STREAM OR OTHER NATURAL WATER RESOURCE.

(J) SEDIMENT TUBES OR FILTER SOCKS MAY BE USED AS AN ALTERNATIVE TO SILT FENCE WITH WIRE BACKING. SEE STANDARD DRAWINGS EC-STR-37 AND EC-STR-8 FOR INSTALLATION DETAILS. FILTER SOCKS MAY NOT REQUIRE STAKING WHEN APPROVED BY THE ENGINEER.

(K) SEDIMENT FILTER BAGS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-09.03 SEDIMENT FILTER BAG (15' X 15') PER EACH
209-09.04 SEDIMENT FILTER BAG (15' X 10') PER EACH
303-10.01 MINERAL AGGREGATE (SIZE 57) PER TON
740-10.03 GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

SILT FENCE WITH BACKING, SEDIMENT TUBES, AND FILTER SOCKS SHALL BE PAID FOR ACCORDING TO ITS RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF SEDIMENT FILTER BAGS.

(L) WHEN SEDIMENT FILTER BAGS ARE REPLACED ONLY THE REPLACEMENT BAG SHALL BE PAID FOR. MAINTENANCE ON ALL OTHER PARTS OF THE SEDIMENT FILTER BAG ASSEMBLY SHALL BE INCLUDED IN THE INITIAL PAYMENT.

(M) ONLY SEDIMENT FILTER BAGS LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED.

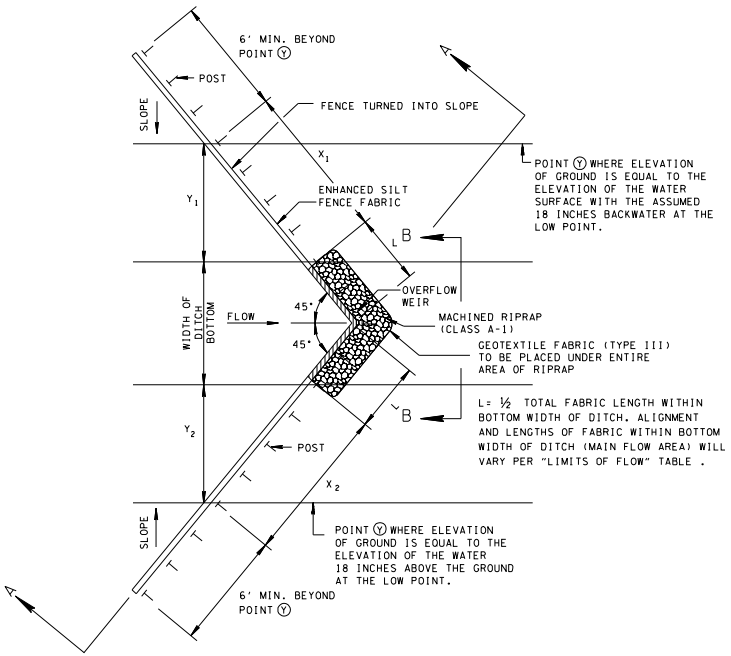
(N) SEDIMENT FILTER BAGS SHALL BE REPLACED WHEN SEDIMENT HAS ACCUMULATED TO ½ OF THE BAGS CAPACITY OR IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

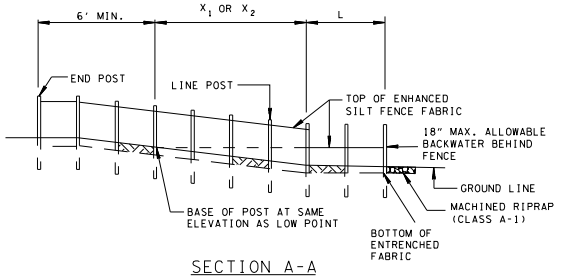
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SEDIMENT FILTER BAG

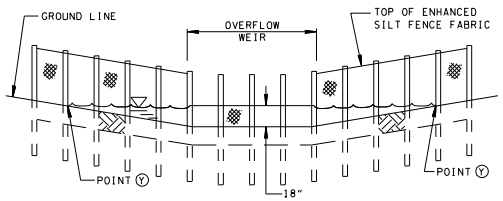
10-26-00 EC-STR-2



PLAN VIEW



SECTION A-A



ELEVATION VIEW B-B

- REV. 12-18-03: MODIFIED SPACING FOR ENHANCED SILT FENCE DETAIL AND ADDED SUPPORTING TABLE. MODIFIED TABLE 4 AND GENERAL NOTES.
- REV. 3-15-04: CHANGED PLANS LEGEND SYMBOL.
- REV. 4-15-06: ADDED OVERFLOW WIER, SECTION B-B, REVISED TABLE TITLE. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING. CHANGED PLAN SYMBOL. CHANGED DRAWING NAME.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, MISC. EDITS TO DRAWING. CHANGED DRAWING NAME, REVISED GENERAL NOTES.
- REV. 1-1-10: MOVED SPACING DETAILS TO EC-STR-4B. REVISED GENERAL NOTES.

LIMITS OF FLOW

WIDTH OF DITCH BOTTOM (FT) SEE NOTE Ⓔ	② TOTAL ENHANCED SILT FENCE CHECK LENGTH 2L (LENGTH L) WITHIN FLAT-BOTTOM ZONE OF DITCH, (FT)	X_1 OR X_2 (FT)			TOTAL AVALABLE SURFACE AREA OF FABRIC IN DITCH AT 18 INCHES OF FLOW DEPTH (FT^2)			① MAXIMUM ALLOWABLE PEAK FLOW (CFS)		
		2:1	3:1	4:1	2:1 SIDESLOPE	3:1 SIDESLOPE	4:1 SIDESLOPE	2:1 SIDESLOPE	3:1 SIDESLOPE	4:1 SIDESLOPE
3	4.2 (2.1)	4.2	6.4	8.5	12.6	15.8	19.0	4.6	5.5	6.4
4	5.7 (2.9)	4.2	6.4	8.5	14.9	18.0	21.2	5.6	6.5	7.4
5	7.0 (3.5)	4.2	6.4	8.5	16.8	20.0	23.2	6.4	7.3	8.3
6	8.5 (4.3)	4.2	6.4	8.5	19.1	22.2	25.4	7.4	8.3	9.2
7	9.9 (5.0)	4.2	6.4	8.5	21.2	24.3	27.5	8.3	9.2	10.1
8	11.3 (5.7)	4.2	6.4	8.5	23.3	26.4	29.6	9.2	10.1	11.1
9	12.7 (6.4)	4.2	6.4	8.5	25.4	28.5	31.7	10.1	11.0	12.0
10	14.1 (7.1)	4.2	6.4	8.5	27.5	30.6	33.8	11.0	12.0	12.9
12	17.0 (8.5)	4.2	6.4	8.5	31.8	35.0	38.2	12.9	13.8	14.8
15	21.2 (10.6)	4.2	6.4	8.5	38.1	41.3	44.5	15.7	16.6	17.5

① BASED ON 110 GPM/FT^2 (0.02 INCHES/SEC PERMEABILITY) ENHANCED SILT FENCE DITCH CHECK FABRIC AND TRAPEZOIDAL DITCH CROSS SECTION. SEE STANDARD DRAWING EC-STR-3D FOR FABRIC SPECIFICATIONS. A HEAD OF 18 INCHES BEHIND THE FENCE WAS USED TO DETERMINE MAXIMUM ALLOWABLE DESIGN PEAK FLOW THROUGH THE FILTER FABRIC. ALLOWABLE FLOWS DO NOT INCLUDE HYDRAULIC REDUCTION DUE TO ACCUMULATION OF CAPTURED SOIL PARTICLES ON THE FABRIC SURFACE AREA.

② THIS LENGTH IS TO BE ADDED TO CALCULATED LENGTHS X_1 AND X_2. LENGTH Y_1 AND Y_2 ARE BASED ON PERPENDICULAR SLOPE LENGTHS TO A POINT WHERE THE BASE OF POST ENTERING THE GROUND IS AT THE SAME ELEVATION AS A POINT 18 INCHES ABOVE THE GROUND AT THE LOW POINT OF THE DITCH. LENGTHS X_1 AND X_2 ARE CALCULATED BY MULTIPLYING THE LENGTHS OF SLOPE Y_1 OR Y_2 AT EACH INDIVIDUAL LOCATION BY 1.414.

EROSION CONTROL PLAN LEGEND: > ENHANCED SILT FENCE CHECK (TRAPEZOIDAL DITCH)

ENHANCED SILT FENCE CHECK GENERAL NOTES

Ⓐ ENHANCED SILT FENCE CHECKS ARE USED TO REMOVE SUSPENDED SEDIMENTS FROM STORM WATER FLOW VIA SETTLING AND FILTRATION. THEY ARE ALSO USED FOR VELOCITY REDUCTION. ENHANCED SILT FENCE CHECKS SHOULD NOT BE PLACED IN STREAMS OR OTHER NATURAL WATER RESOURCES.

Ⓑ A DITCH WITH A TRAPEZOIDAL CROSS-SECTION IS ASSUMED WITH SIDE SLOPES AS NOTED.

Ⓒ CHECK LENGTH DESIGNATED IN THE "LIMITS OF FLOW" TABLE ONLY INCLUDES THE LENGTH OF FENCE STAKED WITHIN THE BOTTOM WIDTH OF DITCH (2L).

Ⓓ SELECT A DITCH BOTTOM WIDTH FROM THE "LIMITS OF FLOW" TABLE SUCH THAT THE MAXIMUM ALLOWABLE DESIGN PEAK FLOW OBTAINED FROM THE APPROPRIATE COLUMN AT THE RIGHT SIDE OF THE TABLE IS EQUAL TO OR GREATER THAN THE 2-YEAR, 24-HOUR FLOW RATE AT THE CHECK. IF THE SITE DRAINS TO A SEDIMENT-IMPAIRED OR HIGH-QUALITY STREAM, THE FLOW OBTAINED FROM THE TABLE MUST BE EQUAL TO OR GREATER THAN THE 5-YEAR, 24-HOUR FLOW RATE. FLOWS IN EXCESS OF THESE VALUES MAY BE PASSED OVER THE WEIR.

Ⓔ IT MAY BE NECESSARY TO FLATTEN THE DITCH SIDE SLOPES AND/OR WIDEN THE DITCH BOTTOM WIDTH IN THE VICINITY OF THE CHECK IN ORDER TO ACHIEVE THE SURFACE AREA OF FABRIC REQUIRED FOR THE CHECK. REFER TO EC-STR-4B.

Ⓕ THE SPACING OF ENHANCED SILT FENCE CHECKS ALONG A DITCH SHOULD BE BASED ON A COMBINATION OF HYDRAULIC PROPERTIES OF THE FENCE MATERIAL, LIMITS OF FLOW TABLE, AND THE SPACING TABLE (EC-STR-4B).

Ⓖ THE FLOW VALUES IN THE LIMITS OF FLOW TABLE ASSUME NO CLOGGING OF THE ENHANCED SILT FENCE CHECK FABRIC SURFACE. IN ORDER TO INSURE MINIMAL INFLUENCE FROM CLOGGING, ENHANCED SILT FENCE CHECKS SHOULD BE REGULARLY CLEANED BY DRY BRUSHING AND/OR PRESSURE WASHING THE FABRIC SURFACE.

Ⓗ FOR INSTALLATION DETAILS FOR ENHANCED SILT FENCE SEE STANDARD DRAWINGS EC-STR-3D AND EC-STR-3E.

Ⓘ UPON REMOVAL OF THE ENHANCED SILT FENCE CHECK THE AREA BENEATH THE ENHANCED SILT FENCE CHECK LOCATION SHOULD BE IMMEDIATELY COVERED WITH SEEDING AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS OR IT SHOULD BE SODDED.

Ⓙ ANY PRODUCTS LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE MAY ALSO BE USED.

Ⓚ ENHANCED SILT FENCE CHECKS SHOULD BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.06 ENHANCED SILT FENCE CHECK (TRAPEZOIDAL) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE ENHANCED SILT FENCE CHECK.

Ⓛ SEDIMENT SHALL BE REMOVED FROM BEHIND THE ENHANCED SILT FENCE CHECK WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT TO THE STRUCTURE AND PAID FOR UNDER ITEM NO. 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

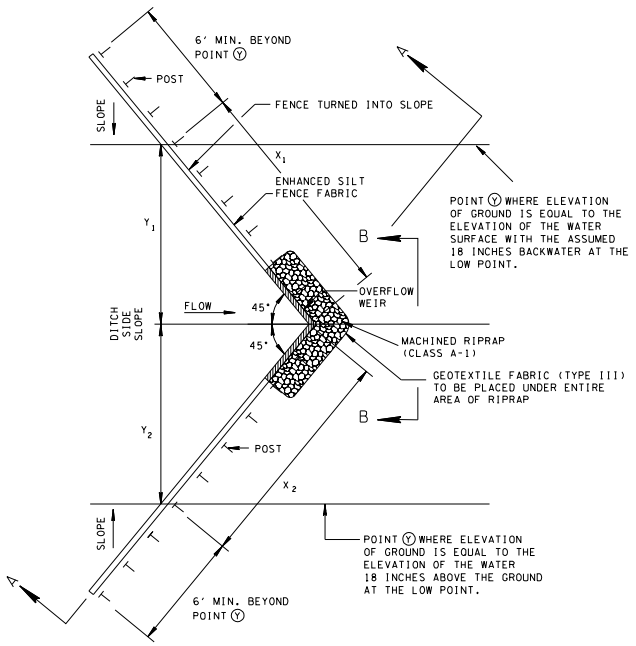
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

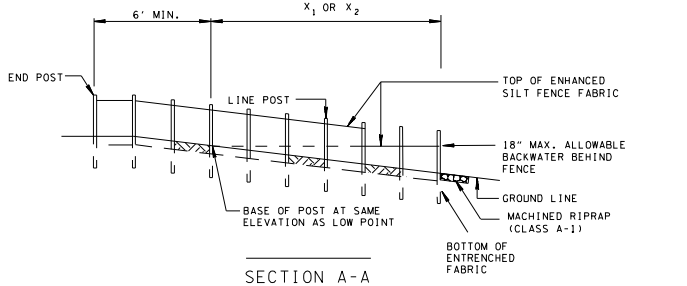
ENHANCED SILT FENCE CHECK (TRAPEZOIDAL DITCH)

12-28-02 | EC-STR-4

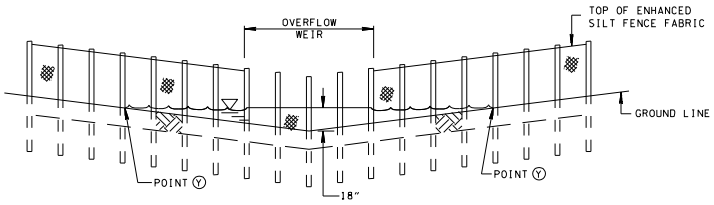
- REV. 12-18-03: MODIFIED SPACING FOR ENHANCED SILT FENCE DETAIL AND ADDED SUPPORTING TABLE. MODIFIED TABLE 5 AND GENERAL NOTES.
- REV. 3-15-04: CHANGED PLANS LEGEND SYMBOL.
- REV. 4-15-06: ADDED OVERFLOW WIER AND SECTION B-B, REVISED TABLE TITLE, REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING. CHANGED DRAWING NAME.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, MISC. EDITS TO DRAWING, CHANGED DRAWING NAME, REVISED GENERAL NOTES.
- REV. 1-1-10: MOVED SPACING DETAILS TO EC-STR-4B. REVISED GENERAL NOTES.



PLAN VIEW



SECTION A-A



ELEVATION VIEW B-B

LIMITS OF FLOW			
DITCH SIDESLOPES (SEE NOTE D)	② X_1 OR X_2 (FT)	TOTAL AVALABLE SURFACE AREA OF FABRIC IN DITCH AT 18 INCHES OF FLOW DEPTH (FT^2)	① MAXIMUM ALLOWABLE PEAK FLOW (CFS)
2:1	4.2	6.4	1.9
3:1	6.4	9.5	2.8
4:1	8.5	12.7	3.7
5:1	10.6	15.9	4.6
6:1	12.7	19.1	5.6
7:1	14.8	22.3	6.5
8:1	17.0	25.4	7.4
9:1	19.1	28.6	8.3
10:1	21.2	31.8	9.3

① BASED ON 110 GPM/FT^2 (0.02 INCHES/SEC PERMEABILITY) ENHANCED SILT FENCE DITCH CHECK FABRIC AND TRIANGULAR DITCH CROSS SECTION. SEE STANDARD DRAWING EC-STR-3D FOR FABRIC SPECIFICATIONS. A HEAD OF 18 INCHES BEHIND THE FENCE WAS USED TO DETERMINE MAXIMUM ALLOWABLE DESIGN PEAK FLOW THROUGH THE FILTER FABRIC. ALLOWABLE FLOWS DO NOT INCLUDE HYDRAULIC REDUCTION DUE TO ACCUMULATION OF CAPTURED SOIL PARTICLES ON THE FABRIC SURFACE AREA.

② LENGTHS Y_1 AND Y_2 ARE BASED ON PERPENDICULAR SLOPE LENGTHS TO A POINT WHERE THE BASE OF THE POST ENTERING THE GROUND IS AT THE SAME ELEVATION AS A POINT 18 INCHES ABOVE THE GROUND AT THE LOW POINT OF THE DITCH. LENGTHS X_1 AND X_2 ARE CALCULATED BY MULTIPLYING THE LENGTHS OF THE SLOPE Y_1 OR Y_2 AT EACH INDIVIDUAL LOCATION BY 1.414.

EROSION CONTROL PLAN LEGEND: ≫ ENHANCED SILT FENCE CHECK (V-DITCH)

ENHANCED SILT FENCE CHECK GENERAL NOTES

Ⓐ ENHANCED SILT FENCE CHECKS ARE USED TO REMOVE SUSPENDED SEDIMENTS FROM STORM WATER FLOW VIA SETTLING AND FILTRATION. THEY ARE ALSO USED FOR VELOCITY REDUCTION. ENHANCED SILT FENCE CHECKS SHOULD NOT BE PLACED IN STREAMS OR OTHER NATURAL WATER RESOURCES. ENHANCED SILT FENCE CHECKS SHOULD NOT BE USED WITHIN THE CLEAR ZONE OF A ROADWAY WHERE TRAFFIC IS TO BE MAINTAINED DURING CONSTRUCTION.

Ⓑ A DITCH WITH A TRIANGULAR CROSS-SECTION IS ASSUMED WITH SIDE SLOPES AS NOTED.

Ⓒ SELECT DITCH SIDE SLOPES FROM THE "LIMITS OF FLOW" TABLE SUCH THAT THE MAXIMUM ALLOWABLE DESIGN PEAK FLOW OBTAINED FROM THE APPROPRIATE COLUMN AT THE RIGHT SIDE OF THE TABLE IS EQUAL TO OR GREATER THAN THE 2-YEAR, 24-HOUR FLOW RATE AT THE CHECK. IF THE SITE DRAINS TO A SEDIMENT-IMPAIRED OR HIGH-QUALITY STREAM, THE FLOW OBTAINED FROM THE TABLE MUST BE EQUAL TO OR GREATER THAN THE 5-YEAR, 24-HOUR FLOW RATE. FLOWS IN EXCESS OF THESE VALUES MAY BE PASSED OVER THE WEIR.

Ⓓ IT MAY BE NECESSARY TO FLATTEN THE DITCH SIDE SLOPES AND/OR WIDEN THE DITCH BOTTOM WIDTH IN THE VICINITY OF THE CHECK IN ORDER TO ACHIEVE THE SURFACE AREA OF FABRIC REQUIRED FOR THE CHECK. REFER TO EC-STR-4B.

Ⓔ THE SPACING OF ENHANCED SILT FENCE CHECK ALONG A DITCH SHOULD BE BASED ON A COMBINATION OF HYDRAULIC PROPERTIES OF THE FENCE MATERIAL, THE LIMITS OF FLOW TABLE, AND THE SPACING TABLE (EC-STR-4B).

Ⓕ THE FLOW VALUES IN THE LIMITS OF FLOW TABLE ASSUME NO CLOGGING OF THE ENHANCED SILT FENCE CHECK FABRIC SURFACE. IN ORDER TO INSURE MINIMAL INFLUENCE FROM CLOGGING, ENHANCED SILT FENCE CHECKS SHOULD BE REGULARLY CLEANED BY DRY BRUSHING AND/OR PRESSURE WASHING THE FABRIC SURFACE.

Ⓖ FOR INSTALLATION DETAILS FOR ENHANCED SILT FENCE SEE STANDARD DRAWINGS EC-STR-3D AND EC-STR-3E.

Ⓘ UPON REMOVAL OF THE ENHANCED SILT FENCE CHECK THE AREA BENEATH THE ENHANCED SILT FENCE CHECK LOCATION SHOULD BE IMMEDIATELY COVERED WITH SEEDING AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS OR IT SHOULD BE SODDED.

Ⓙ ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE MAY ALSO BE USED.

Ⓚ ENHANCED SILT FENCE CHECKS SHOULD BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.05 ENHANCED SILT FENCE CHECK (V-DITCH) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE ENHANCED SILT FENCE CHECK.

Ⓛ SEDIMENT SHALL BE REMOVED FROM BEHIND THE ENHANCED SILT FENCE CHECK WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT TO THE STRUCTURE AND PAID FOR UNDER ITEM NO. 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

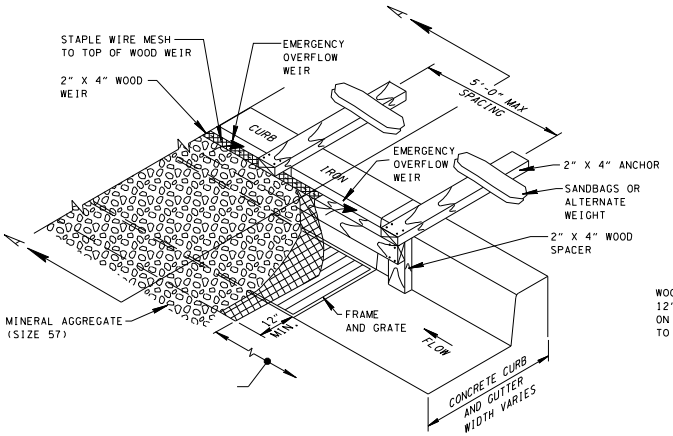
ENHANCED SILT FENCE CHECK (V-DITCH)

12-28-02 EC-STR-4A

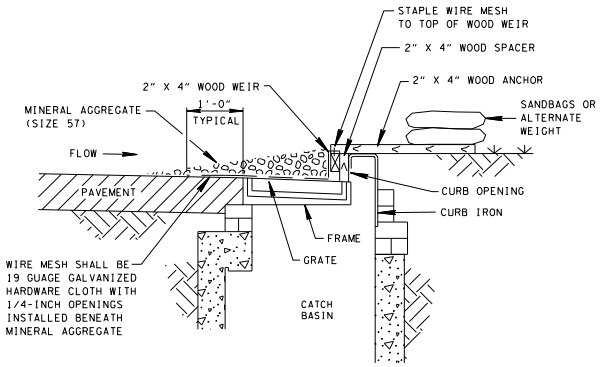
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: MISC. MINOR EDITS AND GENERAL NOTE REVISIONS.
- REV.6-24-10: MISC. MINOR EDITS.

CURB INLET PROTECTION TYPE 3

LOW VOLUME, LOW SPEED TRAFFIC AREAS ONLY



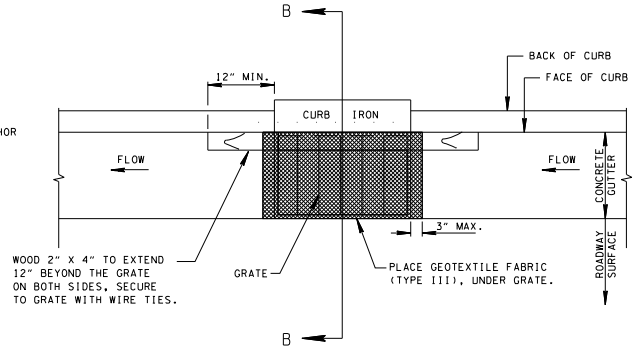
ISOMETRIC VIEW



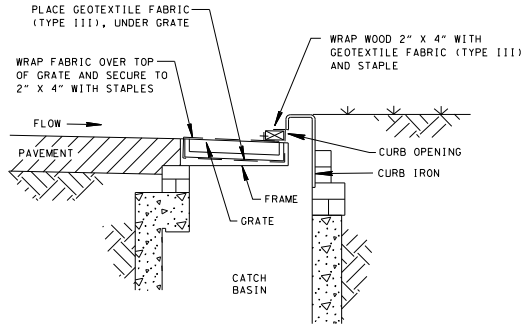
SECTION A-A

EROSION CONTROL PLAN LEGEND: ③ CURB INLET PROTECTION (TYPE 3)

CURB INLET PROTECTION TYPE 4



PLAN VIEW



SECTION B-B

EROSION CONTROL PLAN LEGEND: ④ CURB INLET PROTECTION (TYPE 4)

CURB INLET PROTECTION TYPE 3 GENERAL NOTES

A1. CURB INLET PROTECTION (TYPE 3) IS A SEDIMENT CONTROL DEVICE USED TO INTERCEPT SEDIMENT LADEN WATER AND PREVENT TRANSPORTED SEDIMENT FROM ENTERING AN EXISTING STORM SEWER SYSTEM. THIS SEDIMENT CONTROL DEVICE SHOULD BE CONSIDERED, AND IS INTENDED TO BE, A SECONDARY TREATMENT DEVICE.

A2. CURB INLET PROTECTION (TYPE 3) IS APPLICABLE TO CURB AND GUTTER INLETS WHERE A STURDY, COMPACT INSTALLATION IS DESIRED AND WHERE PONDING IS NOT A CONCERN. EMERGENCY OVERFLOW CAPABILITIES ARE MINIMAL, SO EXPECT THE POTENTIAL FOR SIGNIFICANT PONDING WITH THIS DEVICE.

A3. MAXIMUM DRAINAGE AREA IS 1 ACRE.

A4. CURB INLET PROTECTION (TYPE3) SHALL NOT BE USED WHERE LARGE QUANTITIES OF SEDIMENT ARE EXPECTED OR WHERE THE LONGITUDINAL GRADE OF CURB AND GUTTER EXCEEDS ONE (1) PERCENT.

A5. WIRE MESH SHALL BE 19 GAUGE GALVANIZED HARDWARE CLOTH WITH ½ INCH OPENINGS. MESH SHALL BE PLACED OVER THE CURB INLET OPENING AND AGAINST THE FACE OF CURB ON BOTH SIDES OF THE INLET SO THAT AT LEAST 12 INCHES OF WIRE EXTENDS ACROSS THE PAVEMENT AND AT LEAST 12 INCHES ACROSS THE CONCRETE GUTTER BEYOND THE EDGES OF THE INLET OPENING.

A6. THE WIRE MESH USED FOR THIS SEDIMENT CONTROL DEVICE SHALL BE A CONTINUOUS PIECE OF MATERIAL FORMED AND SHAPED TO MATCH THE SHAPE OF THE CURB AND GUTTER AND SECURED TO THE WOOD FRAME AS NEEDED BY WIRE STAPLES.

A7. MINERAL AGGREGATE (SIZE 57) SHALL BE PLACED AGAINST THE WIRE MESH SO AS TO ANCHOR IT AGAINST THE CONCRETE GUTTER, PAVEMENT, AND WOOD FRAME.

A8. 2" X 4" WOOD ANCHORS SHALL BE NAILED TO THE TOP OF THE WEIR AND VERTICAL WOOD SPACERS AT SPACER LOCATIONS AND SHALL BE SECURED BEHIND THE CURB IRON WITH SANDBAGS OR OTHER APPROVED ANCHORING DEVICE.

A9. CURB INLET PROTECTION (TYPE 3) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-09.42 CURB INLET PROTECTION (TYPE 3) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CURB INLET PROTECTION (TYPE 3).

A10. ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

A11. MAINTENANCE SHALL BE PERFORMED AS NEEDED. FOR PROPER FUNCTION, SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY AND/OR AFTER EVERY RAIN EVENT AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

CURB INLET PROTECTION TYPE 4 GENERAL NOTES

B1. CURB INLET PROTECTION (TYPE 4) IS A SEDIMENT CONTROL DEVICE USED TO PREVENT TRANSPORTED SEDIMENT FROM ENTERING AN EXISTING STORM SEWER SYSTEM. THIS SEDIMENT CONTROL DEVICE SHOULD BE CONSIDERED, AND IS INTENDED TO BE, A SECONDARY TREATMENT DEVICE.

B2. CURB INLET PROTECTION (TYPE 4) IS APPLICABLE TO CURB AND GUTTER INLETS WHERE A COMPACT INSTALLATION IS DESIRED AND POST PAVING CONDITIONS ARE PRESENT. THIS DEVICE WILL REQUIRE FREQUENT MAINTENANCE WHILE IN USE.

B3. MAXIMUM DRAINAGE AREA IS 1 ACRE.

B4. TYPE 4 INLET PROTECTION SHALL NOT BE USED WHERE LARGE QUANTITIES OF SEDIMENT ARE EXPECTED OR WHERE HIGH VELOCITIES OF APPROACHING WATER ARE ANTICIPATED DUE TO LONGITUDINAL GRADE OF CURB AND GUTTER.

B5. GEOTEXTILE FABRIC (TYPE III) SHALL BE A CONTINUOUS PIECE WRAPPED AROUND THE 2" X 4" AND SECURED WITH STAPLES. TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3 INCHES OF THE GRATE.

B6. ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

B7. WOOD 2" X 4" SHALL BE PRESSURE TREATED YELLOW PINE. THE WOOD SHALL NOT BLOCK THE ENTIRE OPENING HEIGHT OF THE CURB IRON, AS THIS WILL OBSTRUCT THE EMERGENCY OVERFLOW CAPABILITIES OF THE DEVICE.

B8. THE CONTRACTOR SHALL SECURE THE DEVICE WHEN REMOVING THE GRATE TO PREVENT SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM. WHEN REPLACING THE GRATE, CARE MUST BE TAKEN TO INSURE THAT THE 2" X 4" REST FIRMLY AGAINST THE FACE OF THE CURB AND/OR THE CONCRETE GUTTER.

B9. CURB INLET PROTECTION (TYPE 4) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-09.43 CURB INLET PROTECTION (TYPE 4) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CURB INLET PROTECTION (TYPE 4).

B10. ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

B11. MAINTENANCE SHALL BE PERFORMED AS NEEDED. FOR PROPER FUNCTION, SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY AND/OR AFTER EVERY RAIN EVENT AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CURB INLET PROTECTION TYPE 3 & 4

1-20-06 | EC-STR-39A