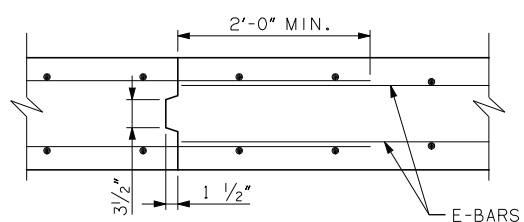
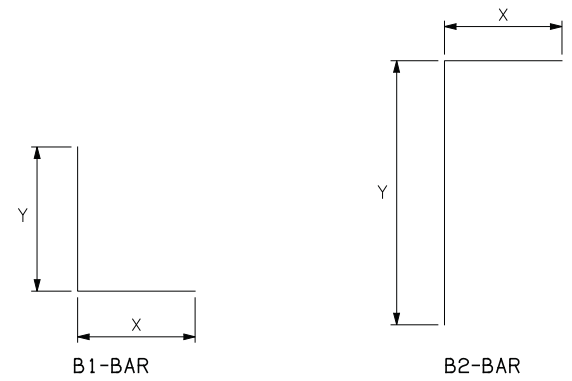


DESCRIPTION	REVISIONS	DATE

SECTION DIMENSIONS																														REINFORCING STEEL																																			
A1-BARS						A2-BARS						A3-BARS						B1-BARS						B2-BARS						C1-BARS						C2-BARS						C3-BARS						C4-BARS						E1-BARS AT 12" MAX.						E2-BARS AT 12" MAX.					
S	H	T	U	W	Z	SIZE	SPA	LENGTH	WEIGHT PER FT.	SIZE	SPA	LENGTH	WEIGHT PER FT.	SIZE	SPA	LENGTH	WEIGHT PER FT.	SIZE	SPA	*X*	*Y*	LENGTH	WEIGHT PER FT.	SIZE	SPA	*X*	*Y*	LENGTH	WEIGHT PER FT.	SIZE	SPA	LENGTH	WEIGHT PER FT.	SIZE	SPA	LENGTH	WEIGHT PER FT.	SIZE	SPA	LENGTH	WEIGHT PER FT.	NO.	SIZE	WEIGHT PER FT.	NO.	SIZE	WEIGHT PER FT.																		
10'	3'	12"	13"	10"	10"	#6	6"	33'-0"	198.3	#7	6"	17'-8"	144.4	#4	12"	9'-10"	26.3	#6	9"	2'-1"	2'-10"	4'-11"	19.7	#6	9"	2'-1"	2'-10"	4'-11"	19.7	#6	9"	2'-1"	2'-10"	4'-11"	19.7	#5	12"	2'-2"	9.0	#5	12"	3'-10"	16.0	#4	12"	2'-2"	2.9	#4	12"	3'-10"	5.1	152	#4	101.5	24	#4	16.0								
10'	4'	12"	13"	10"	10"	#6	6"	33'-0"	198.3	#7	6"	17'-11"	146.5	#4	12"	9'-10"	26.3	#6	9"	2'-1"	2'-10"	4'-11"	19.7	#6	9"	2'-1"	2'-10"	4'-11"	19.7	#4	12"	2'-2"	5.8	#4	12"	4'-10"	12.9	#4	12"	2'-2"	2.9	#4	12"	4'-10"	6.5	152	#4	101.5	32	#4	21.4														
10'	5'	12"	13"	10"	10"	#6	6"	33'-0"	198.3	#7	6"	18'-1"	147.8	#4	12"	9'-10"	26.3	#6	9"	2'-1"	2'-10"	4'-11"	19.7	#6	9"	2'-1"	2'-10"	4'-11"	19.7	#4	12"	2'-2"	5.8	#4	12"	5'-10"	15.6	#4	12"	2'-2"	2.9	#4	12"	5'-10"	7.8	152	#4	101.5	40	#4	26.7														
10'	6'	12"	13"	12"	12"	#5	6"	33'-8"	140.5	#7	6"	18'-1"	147.8	#4	12"	10'-0"	26.7	#5	6"	2'-3"	2'-6"	4'-9"	19.8	#5	6"	2'-3"	2'-6"	4'-9"	19.8	#4	12"	2'-2"	5.8	#4	12"	6'-10"	18.3	#4	12"	2'-2"	2.9	#4	12"	6'-10"	9.1	152	#4	101.5	48	#4	32.1														
10'	7'	12"	13"	12"	12"	#5	6"	33'-8"	140.5	#7	6"	18'-3"	147.8	#4	12"	10'-0"	26.7	#5	6"	2'-3"	2'-6"	4'-9"	19.8	#5	6"	2'-3"	2'-6"	4'-9"	19.8	#4	12"	2'-2"	5.8	#4	12"	7'-10"	20.9	#4	12"	2'-2"	2.9	#4	12"	7'-10"	10.5	152	#4	101.5	56	#4	37.4														
10'	8'	12"	13"	12"	12"	#5	6"	33'-8"	140.5	#7	6"	18'-3"	149.2	#4	12"	10'-0"	26.7	#5	6"	2'-3"	2'-6"	4'-9"	19.8	#5	6"	2'-3"	2'-6"	4'-9"	19.8	#4	12"	2'-2"	5.8	#4	12"	8'-10"	23.6	#4	12"	2'-2"	2.9	#4	12"	8'-10"	11.8	152	#4	101.5	64	#4	42.8														
10'	9'	12"	13"	12"	12"	#5	6"	33'-8"	140.5	#7	6"	18'-5"	150.6	#4	12"	10'-0"	26.7	#5	6"	2'-5"	2'-6"	4'-11"	20.5	#5	6"	2'-5"	2'-6"	4'-11"	20.5	#4	12"	2'-2"	5.8	#4	12"	9'-10"	26.3	#5	12"	2'-6"	5.2	#5	12"	9'-10"	20.5	152	#4	101.5	72	#4	48.1														
10'	10'	12"	13"	12"	12"	#5	6"	33'-8"	140.5	#7	6"	18'-7"	151.9	#4	12"	10'-0"	26.7	#5	6"	2'-7"	2'-6"	5'-1"	21.2	#5	6"	2'-7"	2'-6"	5'-1"	21.2	#4	12"	2'-2"	5.8	#4	12"	10'-10"	28.9	#5	12"	2'-6"	5.2	#5	12"	10'-10"	22.6	152	#4	101.5	80	#4	53.4														



TRANSV. CONSTR. JOINT



BAR BEND DIAGRAMS

NOTE: ALL *X* DIMENSIONS ARE HORIZONTAL IN BARREL SECTION.
ALL *Y* DIMENSIONS ARE VERTICAL IN BARREL SECTION.

SECTION DIMENSIONS		QUANTITIES PER FOOT OF BARREL	
S	H	CONC. (C.Y.)	REINF. (LB.)
10'	3'	2.94	562.9
10'	4'	3.07	569.5
10'	5'	3.19	584.1
10'	6'	3.51	542.4
10'	7'	3.66	555.9
10'	8'	3.81	570.8
10'	9'	3.96	596.8
10'	10'	4.10	613.7

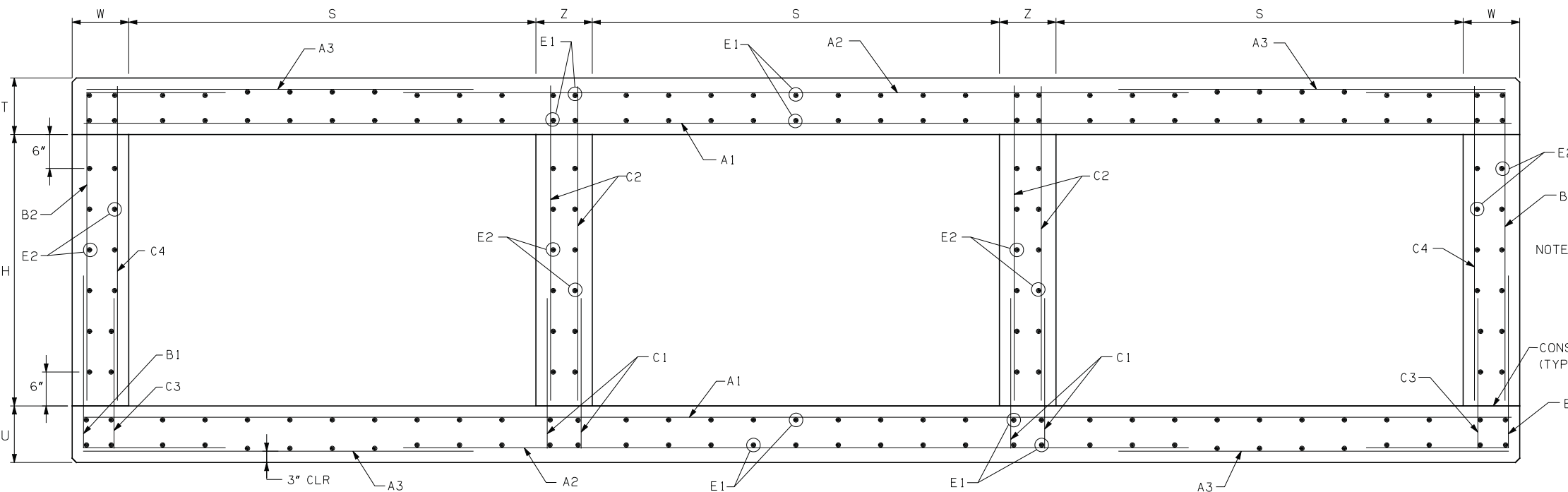
DESIGN DATA:

- DESIGNED IN ACCORDANCE WITH 2007 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND INTERIM SPECIFICATIONS FROM 2008.
- DESIGNED FOR HL-93 LOADING AND ODOT OVERLOAD TRUCK.
- MATERIALS:
CONCRETE (CLASS AA) $f'_c = 4$ KSI
REINFORCING STEEL $f_y = 60$ KSI

GENERAL NOTES:

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
- ALL CONCRETE EDGES SHALL HAVE A 1 1/2" CHAMFER UNLESS OTHERWISE SHOWN OR NOTED. ALL CHAMFER STRIPS SHALL BE SIZED LUMBER.
- ALL REINFORCING STEEL SHALL HAVE A 2" MINIMUM CLEAR COVER UNLESS OTHERWISE SHOWN.
- THE QUANTITY FOR REINFORCING STEEL DOES NOT INCLUDE LAP SPLICES OF E1-BARS OR E2-BARS IN THE LENGTH OF THE BARREL OR AT TRANSVERSE CONSTRUCTION JOINTS. THE SPLICE LENGTH FOR E-BARS SHALL BE 24" MINIMUM. THE NUMBER OF SPLICES USED IS TO BE APPROVED BY THE ENGINEER. REINFORCING STEEL FOR SPLICES SHALL NOT BE MEASURED FOR PAYMENT, AND ALL COSTS WILL BE INCLUDED IN THE UNIT BID PRICE FOR REINFORCING STEEL.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE PLACED IN ALL CULVERTS 100 FT. OR MORE IN LENGTH. JOINTS SHALL BE SPACED AT 60 FT. MAX.
- REINFORCING STEEL SHALL BE CONTINUOUS THROUGH THE TRANSVERSE CONSTRUCTION JOINT AND EXTEND A MIN. OF 24" INTO ADJACENT SECTION.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
509.06 (A)	CLASS AA CONCRETE	C.Y.
511.06 (A)	REINFORCING STEEL	LB.



BARREL SECTION

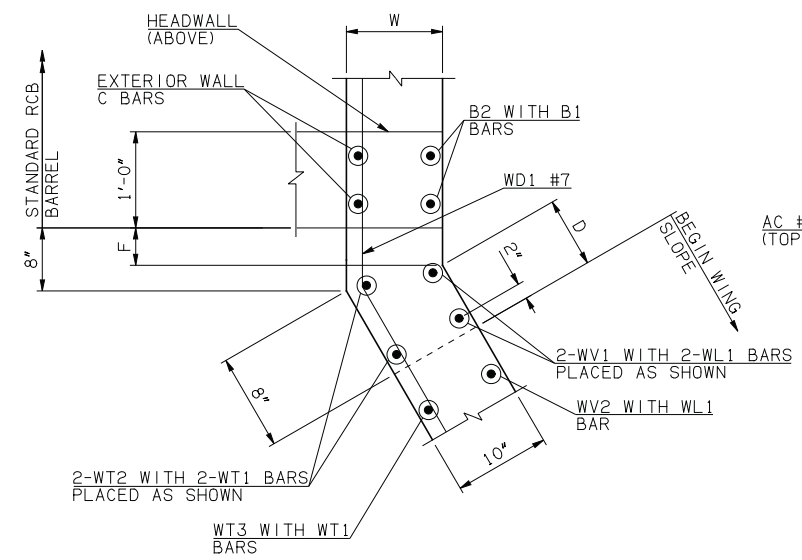
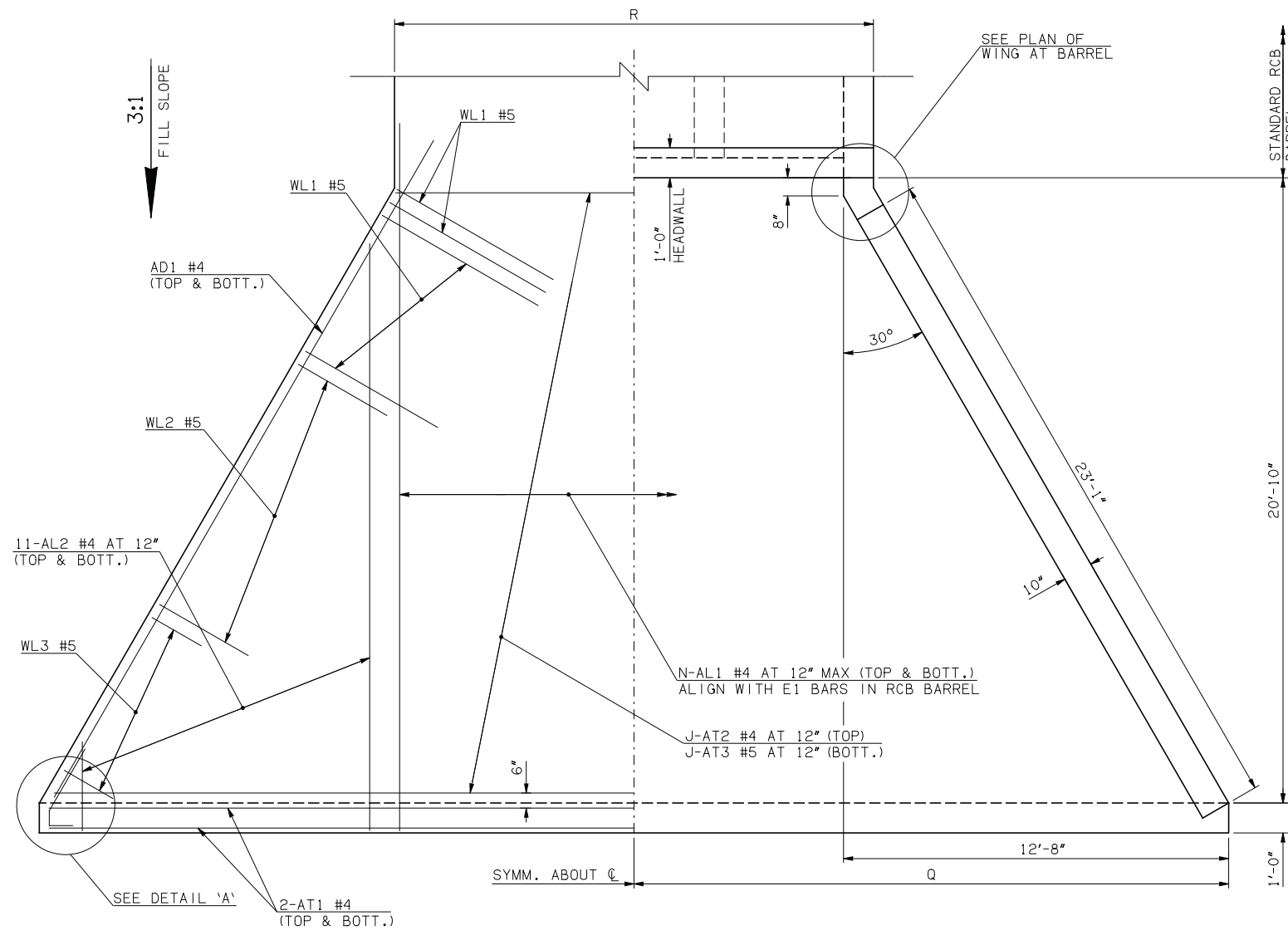
NOTE: NUMBER AND SPACING OF E-BARS SHOWN MAY NOT BE REPRESENTATIVE OF ACTUAL CULVERT SECTIONS, SEE SCHEDULE ABOVE FOR NUMBER AND SPACING OF E-BARS.

APPROVED BY BRIDGE ENGINEER *Kevin J. Lynch* DATE 4/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)
RCB CULVERTS - BARREL DETAILS
10'-0" SPAN - TRIPLE CELL
2 FT. TO 12 FT. FILL

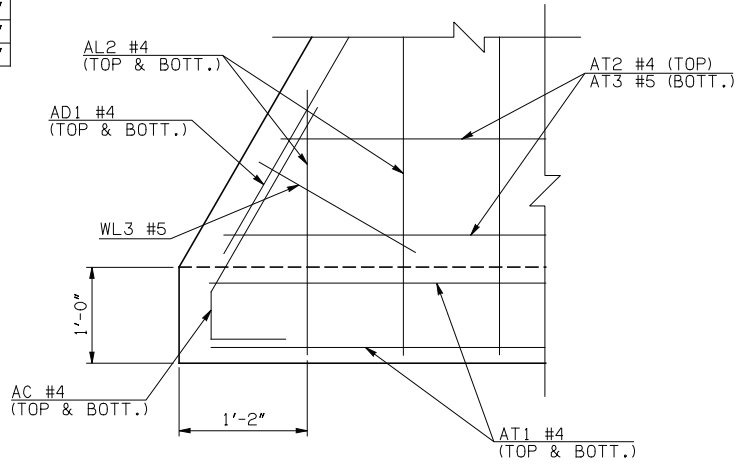
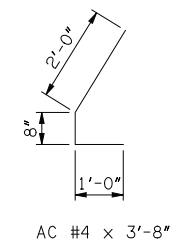
DESCRIPTION	REVISIONS	DATE

WINGWALL DIMENSIONS			
SPAN	W	D	F
5'	10"	5/4"	5/4"
6'	10"	5/4"	5/4"
8'	10"	5/4"	5/4"
10'	10"	5/4"	5/4"



PLAN OF WING AT BARREL

APRON VARIABLES					
SPAN	DIM. R	DIM. Q	QTY. J	QTY. N	
5'	18'-4"	21'-0"	21	23	
6'	21'-4"	22'-6"	21	26	
8'	27'-4"	25'-6"	21	32	
10'	33'-4"	28'-6"	21	38	



DETAIL 'A'

WINGWALL BAR LIST					
ONE WINGWALL SHOWN; TWO REQUIRED					
MARK	SIZE	QTY.	FORM	LENGTH	REMARKS
WD1	#7	6	BNT	8'-4"	
WH1	#4	2	STR	23'-7"	
WH2	#4	12	STR	12'-2" AVG.	3'-6" TO 20'-10"
WH3	#5	2	STR	23'-10"	
WL1	#5	13	BNT	7'-7"	
WL2	#5	7	BNT	4'-10"	
WL3	#5	10	BNT	4'-5" AVG.	3'-1" TO 5'-9"
WT1	#4	15	STR	2'-10"	
WT2	#4	2	STR	7'-0"	
WT3	#4	13	STR	5'-1/2" AVG.	3'-5" TO 6'-10"
WT4	#4	10	STR	2'-5" AVG.	1'-1" TO 3'-9"
WV1	#5	2	STR	7'-0"	
WV2	#5	13	STR	5'-1/2" AVG.	3'-5" TO 6'-10"
U1	#4	1	BNT	2'-4"	

- ① 4-SETS OF 11-AL2 BARS REQUIRED
- ② 2-SETS OF 6-WH2 BARS REQUIRED

APRON AND HEADWALL BAR LIST

APRON AND HEADWALL BAR LIST														
ONE APRON AND ONE HEADWALL SHOWN														
MARK	SIZE	FORM	5' SPAN			6' SPAN			8' SPAN			10' SPAN		
			QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS
AC	#4	BNT	4	3'-8"		4	3'-8"		4	3'-8"		4	3'-8"	
AD1	#4	STR	4	25'-7"		4	25'-7"		4	25'-7"		4	25'-7"	
AL1	#4	STR	46	23'-8"		52	23'-8"		64	23'-8"		76	23'-8"	
AL2	#4	STR	44	11'-1/2" AVG.	2'-6" TO 19'-9"	44	11'-1/2" AVG.	2'-6" TO 19'-9"	44	11'-1/2" AVG.	2'-6" TO 19'-9"	44	11'-1/2" AVG.	2'-6" TO 19'-9"
AT1	#4	STR	4	41'-8"		4	44'-8"		4	50'-8"		4	56'-8"	
AT2	#4	STR	21	29'-7" AVG.	18'-0" TO 41'-2"	21	32'-7" AVG.	21'-0" TO 44'-2"	21	38'-7" AVG.	27'-0" TO 50'-2"	21	44'-7" AVG.	33'-0" TO 56'-2"
AT3	#5	STR	21	29'-7" AVG.	18'-0" TO 41'-2"	21	32'-7" AVG.	21'-0" TO 44'-2"	21	38'-7" AVG.	27'-0" TO 50'-2"	21	44'-7" AVG.	33'-0" TO 56'-2"
CH	#4	STR	4	18'-0"		4	21'-0"		4	27'-0"		4	33'-0"	
CL1	#4	BNT	23	4'-4"		26	4'-4"		32	4'-4"		38	4'-4"	
CL2	#4	BNT	23	4'-3"		26	4'-3"		32	4'-3"		38	4'-3"	

QUANTITIES

ITEM	UNIT	5' SPAN	6' SPAN	8' SPAN	10' SPAN
CLASS AA CONCRETE	CY	27.30	29.40	33.70	38.00
REINFORCING STEEL	LB	3850.00	4090.00	4590.00	5100.00

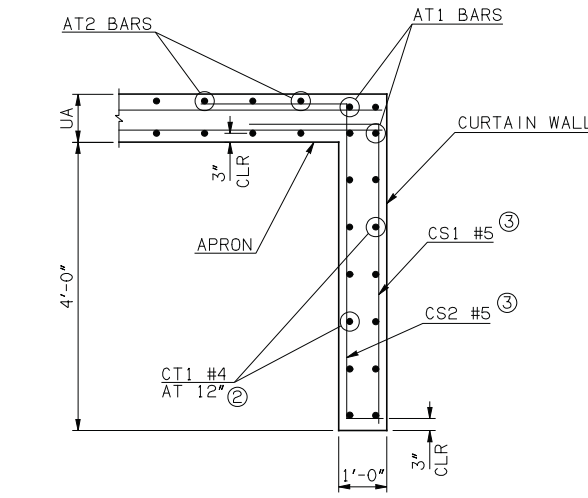
NOTE: QUANTITIES ABOVE ARE FOR ONE END SECTION, WHICH IS COMPRISED OF ONE HEADWALL, ONE APRON, AND TWO WINGWALLS. INCLUDED IN REINFORCING STEEL PAY ITEM QUANTITY IS THE WEIGHT OF ADDITIONAL RCB BARREL REINFORCING STEEL REQUIRED AS SHOWN.

APPROVED BY BRIDGE ENGINEER *Scott Lusk* DATE 4/2/10

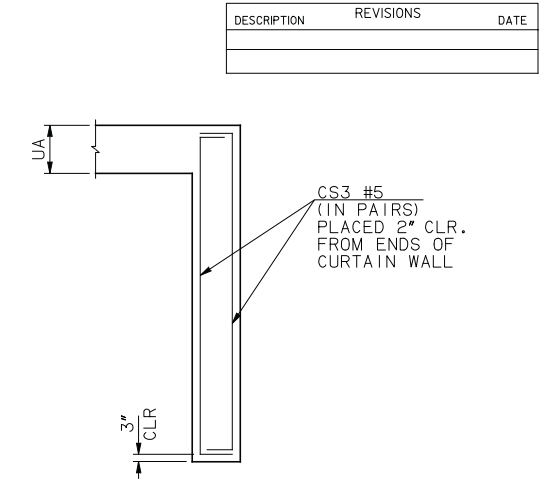
OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)
RCB CULVERTS - END SECTION DETAILS
TRIPLE CELL - 5'-0" HEIGHT - 0°
SHEET NO. 1 OF 2

SECTION ① DIMENSIONS			REINFORCING STEEL									
S	H	UA	CS1-#5 AT 12" MAX		CS2-#5 AT 12" MAX		CS3-#5 BARS		CT1-#4 AT 12"			
			QTY	LENGTH	QTY	*M*	LENGTH	QTY	*M*	LENGTH	QTY	LENGTH
4'	3'	8"	36	5'-9"	36	4'-3"	6'-8"	4	4'-3"	5'-7"	8	31'-4"
4'	4'	10"	38	5'-9"	38	4'-5"	6'-10"	4	4'-5"	5'-9"	8	34'-10"
5'	3'	8"	39	5'-9"	39	4'-3"	6'-8"	4	4'-3"	5'-7"	8	34'-4"
5'	4'	10"	41	5'-9"	41	4'-5"	6'-10"	4	4'-5"	5'-9"	8	37'-10"
5'	5'	10"	45	5'-9"	45	4'-5"	6'-10"	4	4'-5"	5'-9"	8	41'-8"
6'	3'	8"	42	5'-9"	42	4'-3"	6'-8"	4	4'-3"	5'-7"	8	37'-4"
6'	4'	10"	44	5'-9"	44	4'-5"	6'-10"	4	4'-5"	5'-9"	8	40'-10"
6'	5'	10"	48	5'-9"	48	4'-5"	6'-10"	4	4'-5"	5'-9"	8	44'-8"
6'	6'	11"	52	5'-9"	52	4'-6"	6'-11"	4	4'-6"	5'-10"	8	48'-8"
8'	3'	8"	48	5'-9"	48	4'-3"	6'-8"	4	4'-3"	5'-7"	8	43'-4"
8'	4'	10"	50	5'-9"	50	4'-5"	6'-10"	4	4'-5"	5'-9"	8	46'-10"
8'	5'	10"	54	5'-9"	54	4'-5"	6'-10"	4	4'-5"	5'-9"	8	50'-8"
8'	6'	11"	58	5'-9"	58	4'-6"	6'-11"	4	4'-6"	5'-10"	8	54'-8"
8'	7'	11"	62	5'-9"	62	4'-6"	6'-11"	4	4'-6"	5'-10"	8	58'-4"
8'	8'	12"	64	5'-9"	64	4'-7"	7'-0"	4	4'-7"	5'-11"	8	64'-4"
10'	3'	8"	54	5'-9"	54	4'-3"	6'-8"	4	4'-3"	5'-7"	8	49'-4"
10'	4'	10"	56	5'-9"	56	4'-5"	6'-10"	4	4'-5"	5'-9"	8	52'-10"
10'	5'	10"	60	5'-9"	60	4'-5"	6'-10"	4	4'-5"	5'-9"	8	56'-8"
10'	6'	11"	64	5'-9"	64	4'-6"	6'-11"	4	4'-6"	5'-10"	8	63'-2"
10'	7'	11"	68	5'-9"	68	4'-6"	6'-11"	4	4'-6"	5'-10"	8	66'-10"
10'	8'	12"	70	5'-9"	70	4'-7"	7'-0"	4	4'-7"	5'-11"	8	70'-4"
10'	9'	13"	74	5'-9"	74	4'-8"	7'-1"	4	4'-8"	6'-0"	8	73'-10"
10'	10'	13"	78	5'-9"	78	4'-8"	7'-1"	4	4'-8"	6'-0"	8	77'-4"
12'	6'	11"	70	5'-9"	70	4'-6"	6'-11"	4	4'-6"	5'-10"	8	69'-2"
12'	7'	11"	74	5'-9"	74	4'-6"	6'-11"	4	4'-6"	5'-10"	8	72'-10"
12'	8'	12"	76	5'-9"	76	4'-7"	7'-0"	4	4'-7"	5'-11"	8	76'-4"
12'	9'	13"	80	5'-9"	80	4'-8"	7'-1"	4	4'-8"	6'-0"	8	79'-10"
12'	10'	13"	84	5'-9"	84	4'-8"	7'-1"	4	4'-8"	6'-0"	8	83'-4"
12'	11'	14"	88	5'-9"	88	4'-9"	7'-2"	4	4'-9"	6'-1"	8	86'-10"
12'	12'	14"	90	5'-9"	90	4'-9"	7'-2"	4	4'-9"	6'-1"	8	90'-4"
14'	7'	11"	80	5'-9"	80	4'-6"	6'-11"	4	4'-6"	5'-10"	8	78'-10"
14'	8'	12"	82	5'-9"	82	4'-7"	7'-0"	4	4'-7"	5'-11"	8	82'-4"
14'	9'	13"	86	5'-9"	86	4'-8"	7'-1"	4	4'-8"	6'-0"	8	85'-10"
14'	10'	13"	90	5'-9"	90	4'-8"	7'-1"	4	4'-8"	6'-0"	8	89'-4"
14'	11'	14"	94	5'-9"	94	4'-9"	7'-2"	4	4'-9"	6'-1"	8	92'-10"
14'	12'	14"	96	5'-9"	96	4'-9"	7'-2"	4	4'-9"	6'-1"	8	96'-4"
16'	8'	12"	88	5'-9"	88	4'-7"	7'-0"	4	4'-7"	5'-11"	8	88'-4"
16'	9'	13"	92	5'-9"	92	4'-8"	7'-1"	4	4'-8"	6'-0"	8	91'-10"
16'	10'	13"	96	5'-9"	96	4'-8"	7'-1"	4	4'-8"	6'-0"	8	95'-4"
16'	11'	14"	100	5'-9"	100	4'-9"	7'-2"	4	4'-9"	6'-1"	8	98'-10"
16'	12'	14"	102	5'-9"	102	4'-9"	7'-2"	4	4'-9"	6'-1"	8	102'-4"
16'	15'	16"	112	5'-9"	112	4'-11"	7'-4"	4	4'-11"	6'-3"	8	112'-8"
18'	9'	13"	98	5'-9"	98	4'-8"	7'-1"	4	4'-8"	6'-0"	8	97'-10"
18'	10'	13"	102	5'-9"	102	4'-8"	7'-1"	4	4'-8"	6'-0"	8	101'-4"
18'	11'	14"	106	5'-9"	106	4'-9"	7'-2"	4	4'-9"	6'-1"	8	104'-10"
18'	12'	14"	108	5'-9"	108	4'-9"	7'-2"	4	4'-9"	6'-1"	8	108'-4"
18'	15'	16"	118	5'-9"	118	4'-11"	7'-4"	4	4'-11"	6'-3"	8	118'-8"
20'	10'	13"	108	5'-9"	108	4'-8"	7'-1"	4	4'-8"	6'-0"	8	107'-4"
20'	11'	14"	112	5'-9"	112	4'-9"	7'-2"	4	4'-9"	6'-1"	8	110'-10"
20'	12'	14"	114	5'-9"	114	4'-9"	7'-2"	4	4'-9"	6'-1"	8	114'-4"
20'	15'	16"	124	5'-9"	124	4'-11"	7'-4"	4	4'-11"	6'-3"	8	127'-2"

QUANTITIES	
CONC. (C.Y.)	REINF. (LB.)
4.70	660.00
5.30	710.00
5.20	720.00
5.70	770.00
6.30	840.00
5.60	770.00
6.10	820.00
6.70	900.00
7.30	980.00
6.50	880.00
7.00	940.00
7.60	1010.00
8.20	1090.00
8.70	1160.00
9.30	1220.00
7.40	990.00
7.90	1050.00
8.50	1120.00
9.10	1210.00
9.60	1280.00
10.10	1340.00
10.70	1420.00
11.20	1490.00
10.00	1320.00
10.50	1400.00
11.00	1450.00
11.60	1530.00
12.10	1600.00
12.60	1680.00
13.10	1730.00
11.40	1510.00
11.90	1560.00
12.40	1640.00
13.00	1710.00
13.50	1790.00
14.00	1840.00
12.80	1670.00
13.30	1750.00
13.90	1820.00
14.40	1910.00
14.90	1950.00
16.40	2160.00
14.20	1860.00
14.70	1940.00
15.30	2020.00
15.80	2060.00
17.30	2280.00
15.60	2050.00
16.10	2130.00
16.70	2180.00
18.20	2400.00

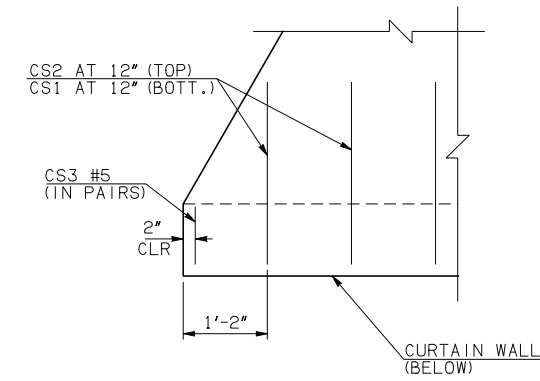


CURTAIN WALL DETAIL

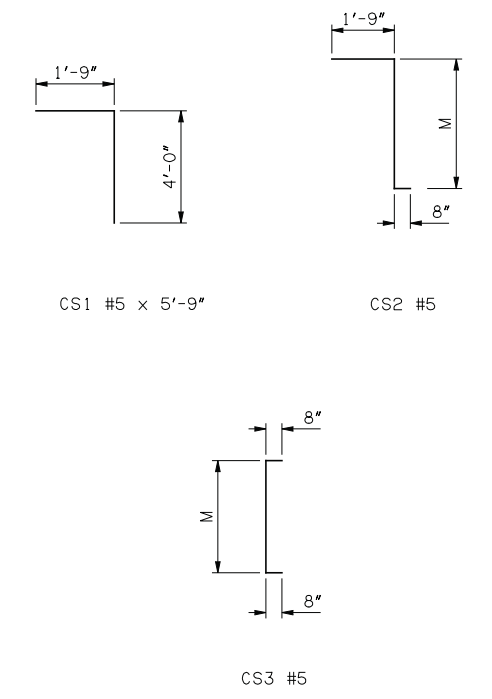


CURTAIN WALL END DETAIL

- NOTE: ① SEE RCB CULVERTS - BARREL DETAILS FOR ADDITIONAL INFORMATION
- ② NUMBER & SPACING OF CT1 BARS SHOWN IN DETAIL MAY NOT BE REPRESENTATIVE OF ACTUAL CURTAIN WALL SECTION. SEE SCHEDULE FOR NUMBER AND SPACING OF CT1 BARS.
- ③ CS1 AND CS2 BARS ALIGN WITH AL BARS IN APRON SLAB.
- ④ INCLUDES 2'-6" LAP
- ⑤ INCLUDES TWO 2'-6" LAP



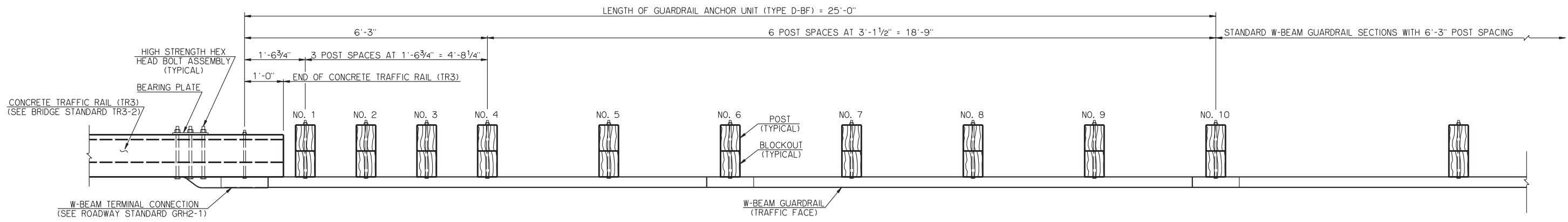
CURTAIN WALL-APRON PLAN



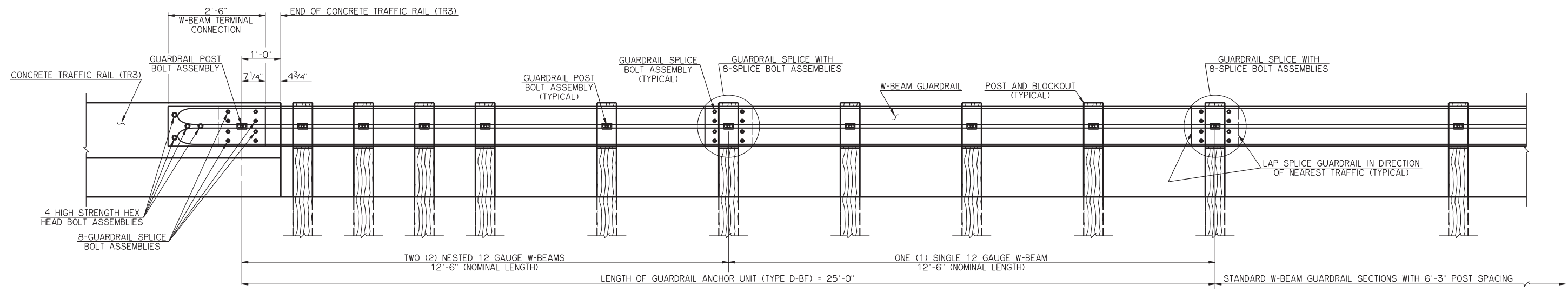
APPROVED BY BRIDGE ENGINEER *Scott L. Smith* DATE 4/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)
RCB CULVERTS - CURTAIN WALL DETAILS
TRIPLE CELL - 4'-0" DEPTH - 0°

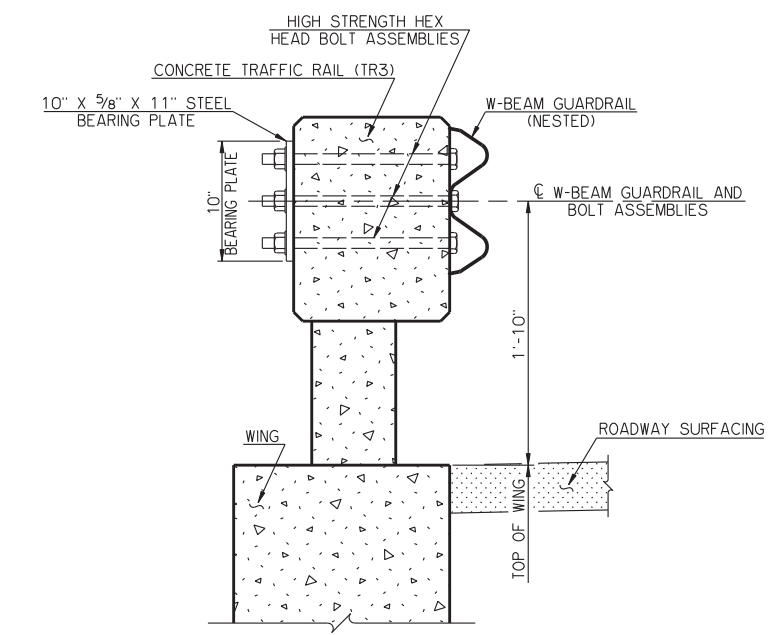
2009 SPECIFICATIONS | RCB-CW3-D4-0 | 01E
B-810E



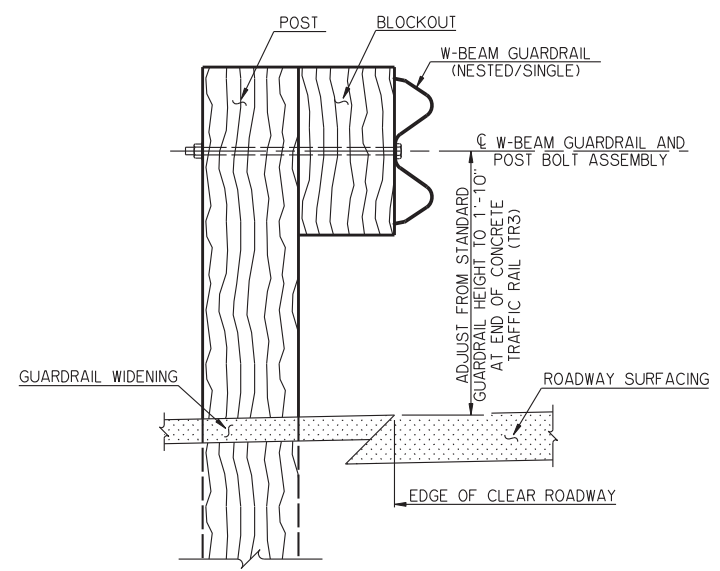
PLAN



ELEVATION



SECTION THRU GUARDRAIL BRIDGE CONNECTION AT CONCRETE TRAFFIC RAIL (TR3)



SECTION THRU GUARDRAIL BRIDGE CONNECTION AT GUARDRAIL POST AND BLOCKOUT

NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE ODOT 2009 STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
2. SEE ROADWAY STANDARDS GRH1-1 AND GRH2-1 FOR DETAILS OF GUARDRAIL, W-BEAM TERMINAL CONNECTION, POSTS, BLOCKOUTS, BOLT ASSEMBLIES AND HARDWARE NOT SHOWN. SEE "STATE" BRIDGE STANDARD TR3-2 FOR DETAILS OF CONCRETE TRAFFIC RAIL (TR3) NOT SHOWN.
3. ALL GUARDRAIL, METAL POSTS, BEARING PLATES, BOLTS, WASHERS AND NUTS SHALL BE GALVANIZED AFTER FABRICATION.
4. ANY FIELD CUTS OR HOLES MADE IN GALVANIZED MATERIALS SHALL BE COATED WITH A ZINC OXIDE PAINT SATISFYING SECTION 730.02 OF THE STANDARD SPECIFICATIONS.
5. ALL SPLICE BOLT ASSEMBLIES SHALL BE 5/8" DIAMETER BUTTON HEAD BOLTS WITH RECESSED NUTS AS SHOWN ON ROADWAY STANDARDS GRH1-1 OR GRH2-1. ALL POST BOLT ASSEMBLIES SHALL BE 5/8" DIAMETER BUTTON HEAD BOLTS WITH 1 3/4" OUTSIDE DIAMETER WASHERS AND RECESSED NUTS AS SHOWN ON ROADWAY STANDARDS GRH1-1 OR GRH2-1.
6. ALL HIGH STRENGTH HEX HEAD BOLT ASSEMBLIES SHALL BE 7/8" DIAMETER X 1'-4" LONG BOLTS WITH TWO WASHERS AND ONE NUT. ALL NUTS SHALL BE TIGHTENED WITH THE TURN-OF-THE-NUT METHOD TO BETWEEN 1/12 TURN AND 1/4 TURN IN EXCESS OF SNUG TIGHT.
7. THE PAY ITEM "GUARDRAIL ANCHOR UNIT (TYPE D-BF)" INCLUDES ALL COST OF MATERIAL AND INSTALLATION OF THE GUARDRAIL ANCHOR UNIT - BRIDGE CONNECTION INCLUDING THE COST OF POST AND BLOCKOUT NOS. 1 THRU 10, SINGLE AND NESTED W-BEAM GUARDRAIL, W-BEAM TERMINAL CONNECTION, SPLICE BOLT ASSEMBLIES, POST BOLT ASSEMBLIES, HIGH STRENGTH HEX HEAD BOLT ASSEMBLIES, BEARING PLATE, GALVANIZING, PAINTING, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS.

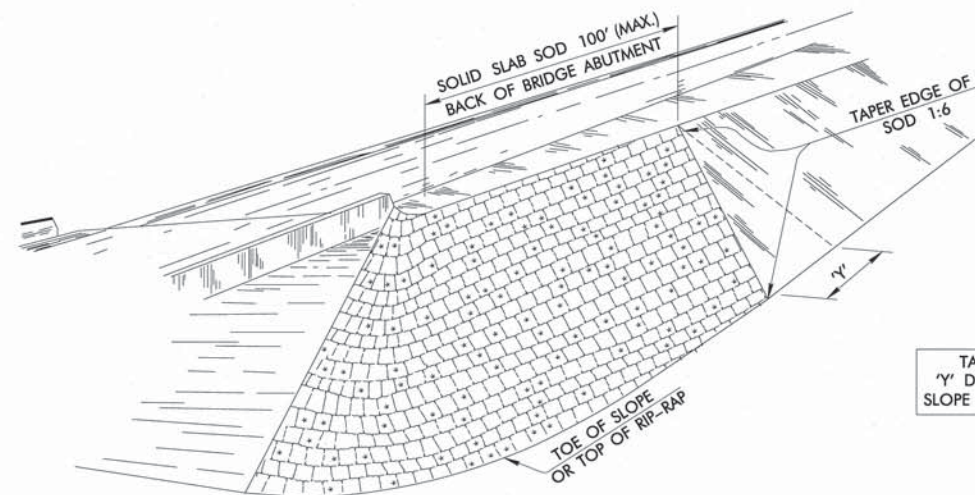
APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

GUARDRAIL ANCHOR UNIT - BRIDGE CONNECTION

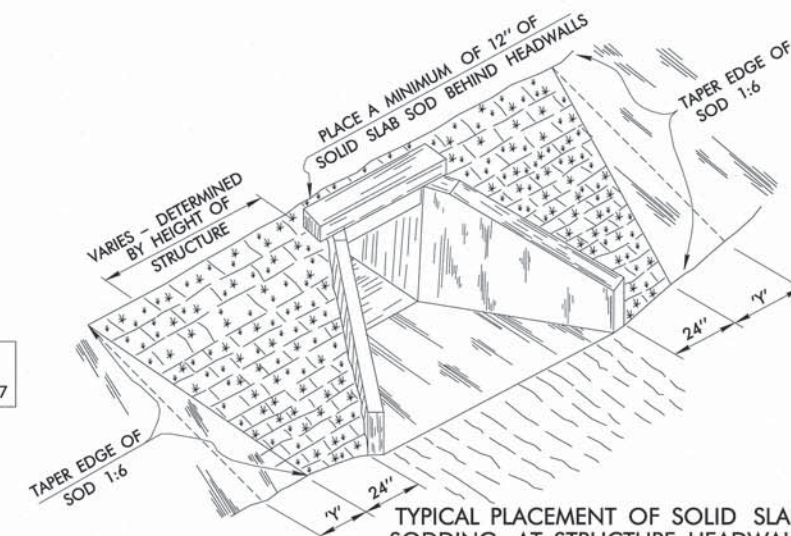
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623(F)	GUARDRAIL ANCHOR UNIT (TYPE D-BF)	EA

26' AND 32' CLEAR ROADWAYS - CONVENTIONAL AND INTEGRAL - SKEWED 0° AND 30°
2009 SPECIFICATIONS CB26.32-C.I-SKO.30-GRAU-BC OOE CB-969E



TYPICAL PLACEMENT OF SOLID SLAB SODDING ON FILL SLOPES, APPROACHES TO OVERPASSES AND BRIDGES.

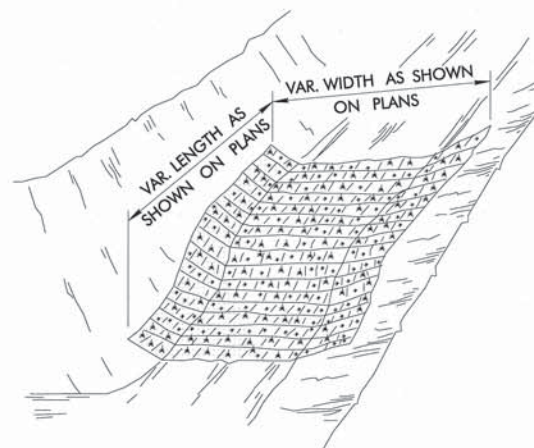
TAPER NOTE
 'Y' DIMENSION =
 SLOPE LENGTH x 0.17



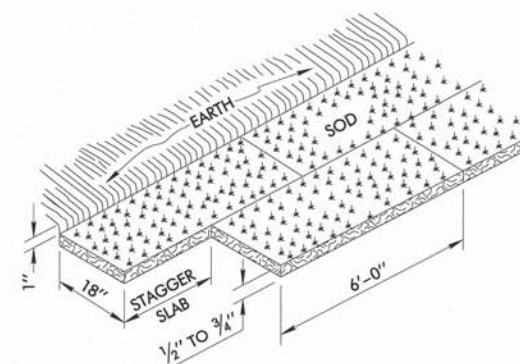
TYPICAL PLACEMENT OF SOLID SLAB SODDING AT STRUCTURE HEADWALLS

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. SOLID SLAB SOD SHALL BE PLACED IN HORIZONTAL ROWS WITH THE LONGEST SIDE OF EACH SLAB RUNNING PARALLEL TO THE ROADWAY, AND THE SLABS IN ALTERNATE ROWS STAGGERED HALF THE LENGTH OF EACH INDIVIDUAL SLAB. ENSURE THE ROWS RUN PARALLEL TO THE ROADWAY.
3. SLABS SHALL BE CUT AND HARVESTED WITH A COMMERCIAL SOD CUTTER TO THE DIMENSIONS SHOWN, THEN LOADED, TRANSPORTED AND HANDLED ON PALLETS.
4. AFTER PLACEMENT OF SOLID SLAB SOD, EARTH AT THE OUTER EDGES OF THE PLACEMENT SHALL BE BACKFILLED AND LOOSELY COMPACTED TO AT LEAST 1" ABOVE THE TOP OF THE SOLID SLAB SODDING.
5. STAKE SOD ON ALL SLOPES 1:2 OR STEEPER, AND ON ANY AREAS THAT ARE IN SUCH CONDITION THAT THERE IS DANGER OF SOD SLIPPING. PERFORM STAKING CONCURRENTLY WITH SOD PLACEMENT AND PRIOR TO TAMPING WITH SOUND WOODEN STAKES APPROXIMATELY 1 INCH SQUARE OR 1 INCH IN DIAMETER AND NOT LESS THAN 12 INCHES IN LENGTH, OR USE METAL STAPLES IN PLACE OF WOODEN STAKES. PLACE, STAKE AND STAPLE THE SOD WHERE NECESSARY, AND AS DETERMINED BY THE ENGINEER.



TYPICAL PLACEMENT OF SOLID SLAB SODDING IN DITCHES



SOLID SLAB SODDING
 (MARCH 1 THRU AUGUST 31)

THE PLACEMENT OF SOLID SLAB SOD SHALL BE RESTRICTED TO THE PERIOD FROM MARCH 1 THRU AUGUST 31, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

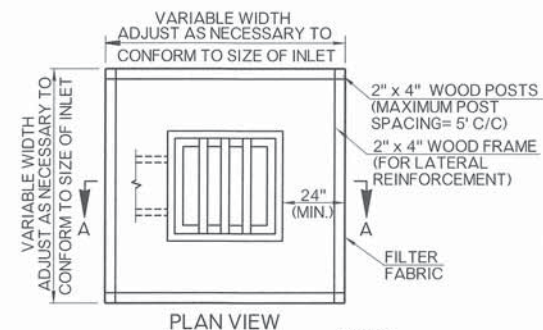
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
230(A)	SOLID SLAB SODDING	S.Y.



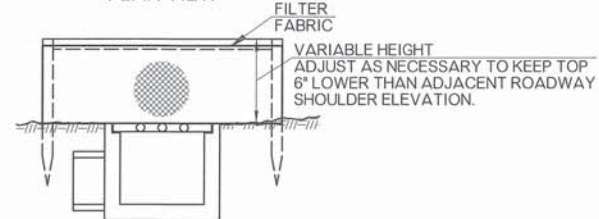
APPROVED BY ROADWAY ENGINEER: *Shirley A. Pegala* DATE: 6/24/11
 ROADWAY STANDARD

SOLID SLAB SODDING

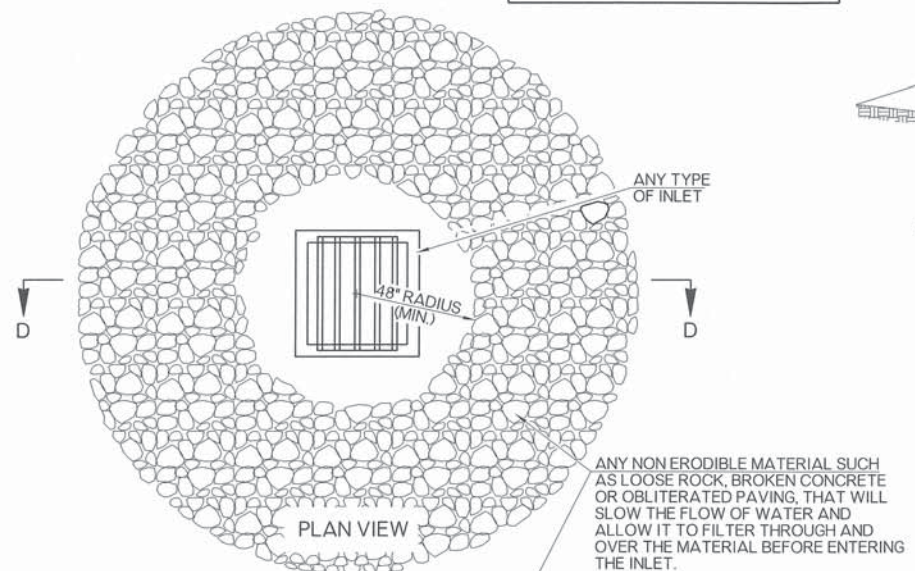
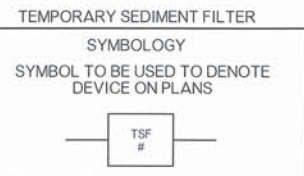
OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	



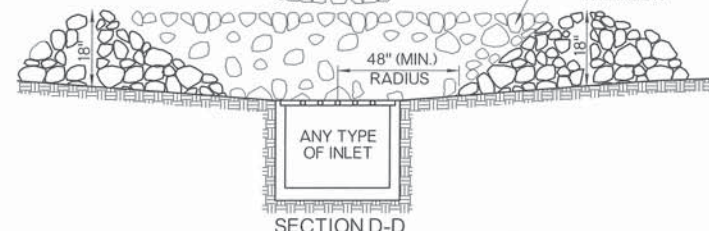
PLAN VIEW



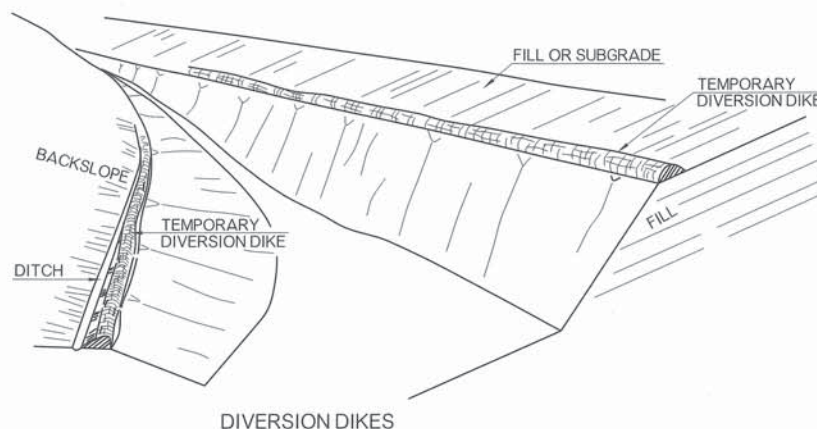
SECTION A - A
SEDIMENT FILTER



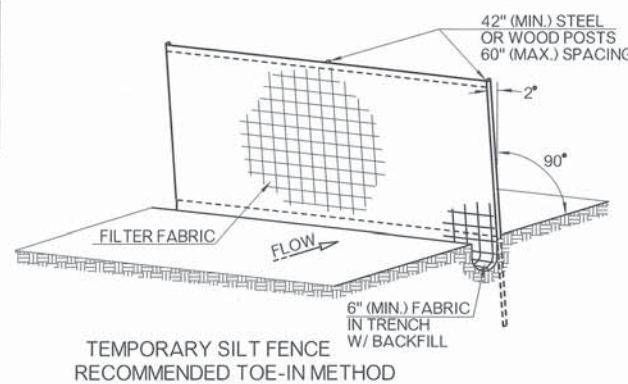
PLAN VIEW



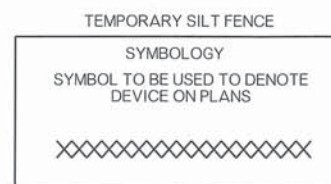
SECTION D-D
SEDIMENT FILTER
(TYPE II)



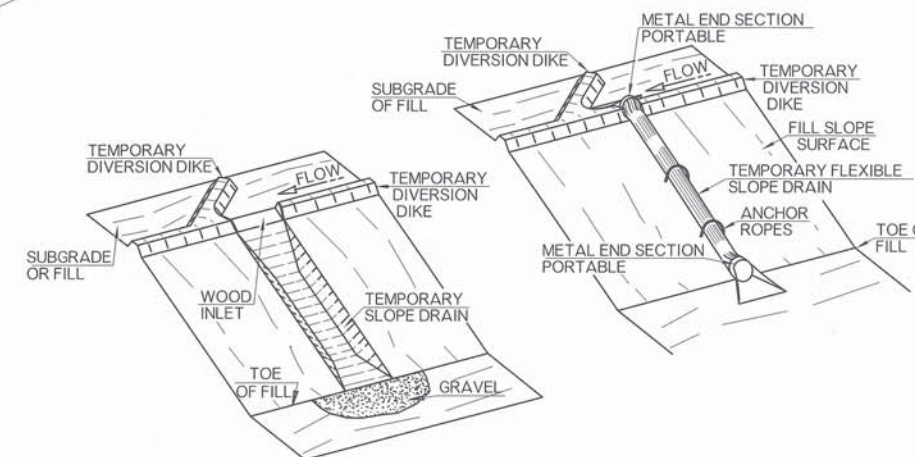
DIVERSION DIKES



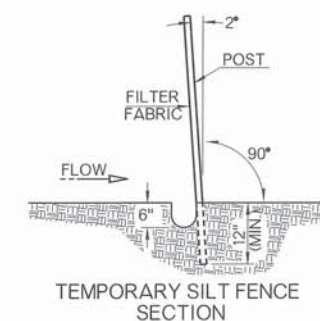
TEMPORARY SILT FENCE
RECOMMENDED TOE-IN METHOD



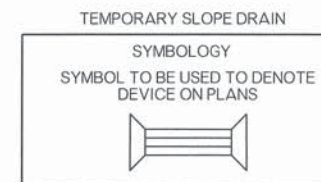
TEMPORARY SILT FENCE
SYMBOL TO BE USED TO DENOTE
DEVICE ON PLANS



SLOPE DRAINS



TEMPORARY SILT FENCE
SECTION

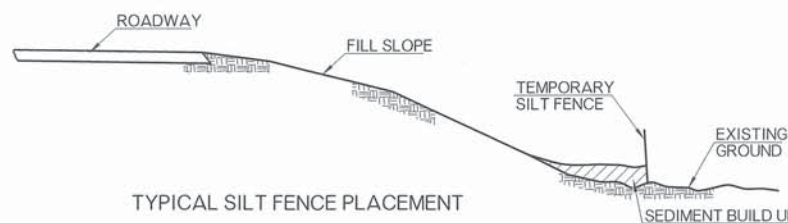


TEMPORARY SLOPE DRAIN
SYMBOL TO BE USED TO DENOTE
DEVICE ON PLANS

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. COST OF TEMPORARY DIVERSION DIKES TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS OF WORK.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
221 (A)	TEMPORARY SLOPE DRAINS	LF
221 (C)	TEMPORARY SILT FENCE	LF
221 (D)	TEMPORARY SEDIMENT FILTER	EA



TYPICAL SILT FENCE PLACEMENT

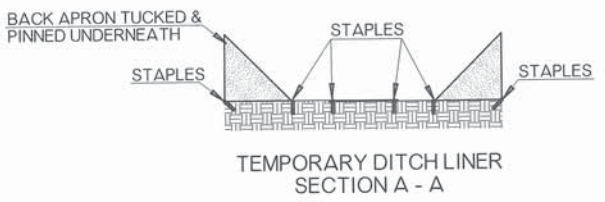
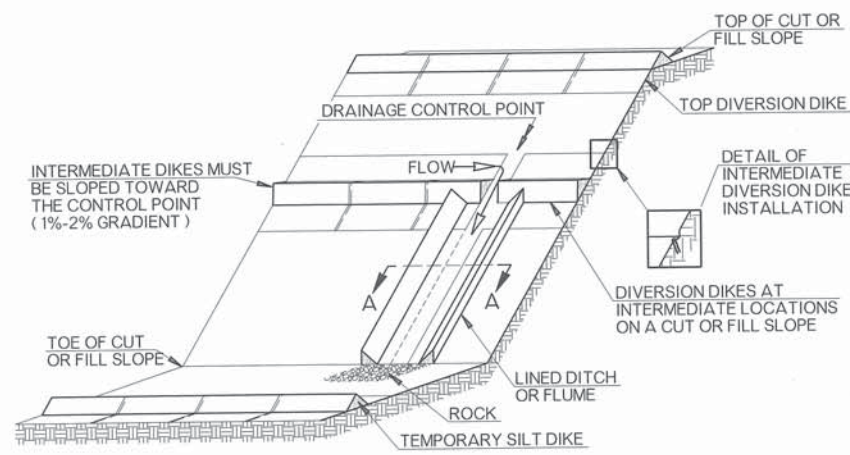
APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: *08/11/15*

ROADWAY DESIGN DIVISION STANDARD

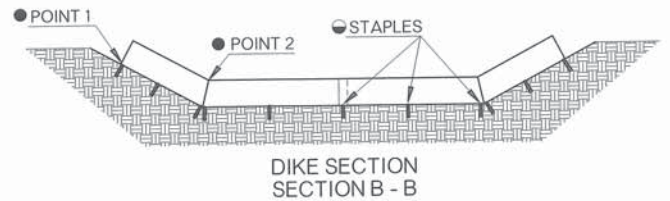
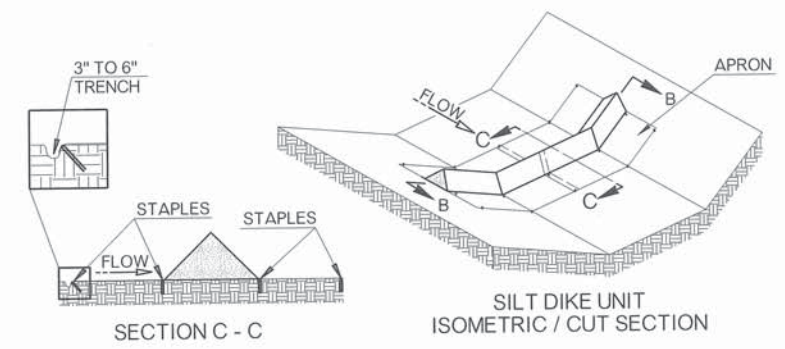
DOT

TEMPORARY SEDIMENT CONTROLS

OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	

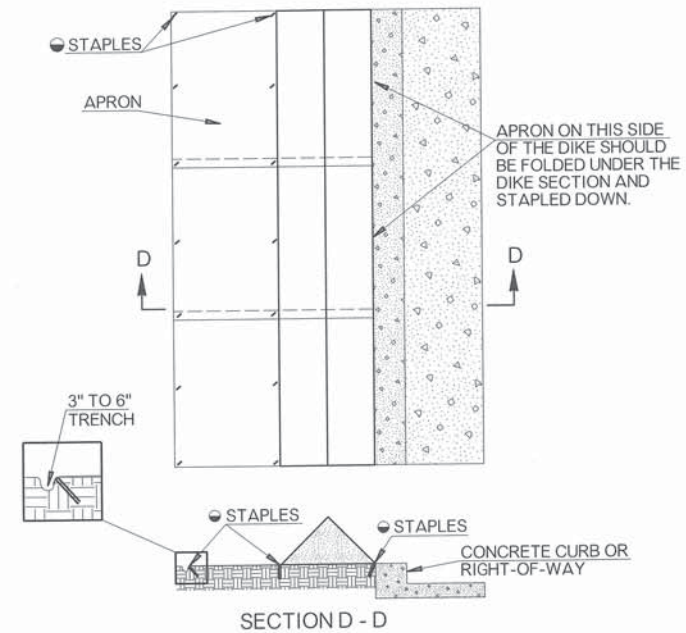


TEMPORARY SILT DIKE INSTALLATION FOR DIVERSION DIKES AND / OR DITCH LINER

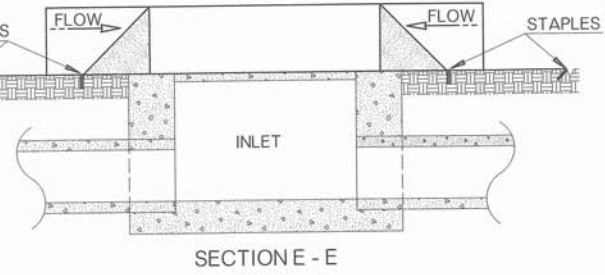
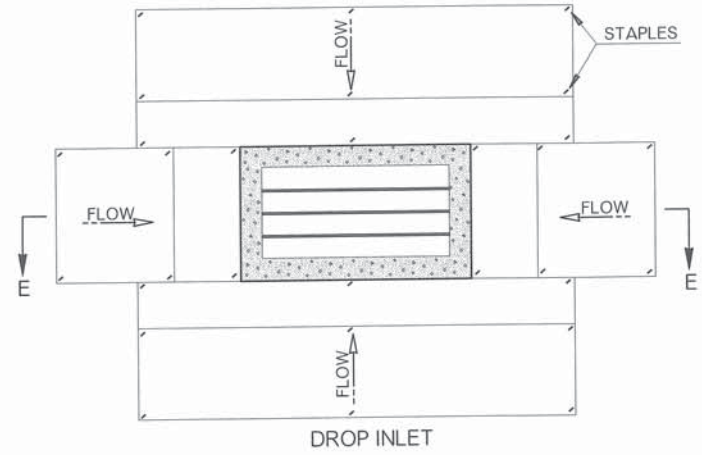


TEMPORARY SILT DIKE INSTALLATION FOR ROADWAY DITCH OR DRAINAGE DITCH

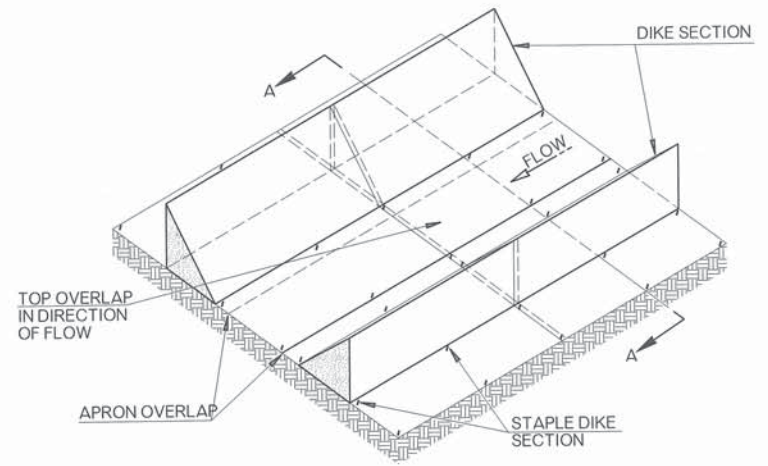
- POINT "1" MUST BE HIGHER THAN POINT "2" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE UNIT AS SHOWN ON THE DIAGRAM.



TEMPORARY SILT DIKE INSTALLATION FOR CONTINUOUS BARRIER



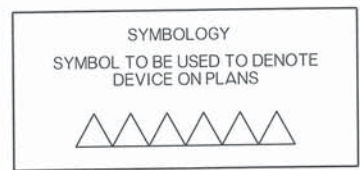
TEMPORARY SILT DIKE INSTALLATION FOR DROP INLETS



TEMPORARY SILT DIKE INSTALLATION FOR TEMPORARY DITCH LINER

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. THIS WORK SHALL CONSIST OF FURNISHING, INSTALLING, AND MAINTAINING THE TEMPORARY SILT DIKE. THE DIKES SHALL BE USED AS A CONTINUOUS LINE BARRIER AT THE TOE OF SLOPE OR ACROSS THE ROADWAY DITCH TO CONTAIN SEDIMENT AND MINIMIZE EROSION, OR AS DIRECTED BY THE ENGINEER. THESE DIKES SHALL BE INSTALLED AND LOCATED AS SOON AS CONSTRUCTION WILL ALLOW OR AS DIRECTED BY THE ENGINEER.
3. TEMPORARY SILT DIKE SHALL BE TRIANGULAR SHAPED HAVING A HEIGHT OF AT LEAST 8" TO 10" IN THE CENTER WITH EQUAL SIDES AND A 16" TO 20" BASE. THE TRIANGULAR SHAPED INNER MATERIAL SHALL BE URETHANE FOAM MEETING THE REQUIREMENTS FOR ASTM D3574. THE OUTER COVER SHALL BE A WOVEN GEOTEXTILE FABRIC PLACED AROUND THE INNER MATERIAL & ALLOWED TO EXTEND BEYOND BOTH SIDES OF THE TRIANGLE 24" TO 36". THIS FABRIC SHOULD BE MILDEW RESISTANT, ROT-PROOF AND RESISTANT TO HEAT AND ULTRAVIOLET RADIATION MEETING REQUIREMENTS FOR SEDIMENT CONTROL IN AASHTO M 288. THE DIKES SHALL BE ATTACHED TO THE GROUND WITH WIRE STAPLES. THE STAPLES SHALL BE NO. 11 GAUGE WIRE AND BE AT LEAST 6" TO 8" LONG. STAPLES SHALL BE PLACED AS SHOWN ON THESE DETAILS.
4. ACCEPTED TEMPORARY SILT DIKE, MEASURED AS PROVIDED ABOVE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID FOR TEMPORARY SILT DIKE. PRICE BID WILL INCLUDE THE COST OF FURNISHING THE DIKES, INSTALLING, MAINTAINING AND REMOVAL WHEN DIRECTED BY THE ENGINEER.



NOTE: SILT DIKE SHOULD ONLY BE USED FOR DROP INLETS IN SUMP LOCATIONS. FOR DROP INLETS ON GRADE, USE SEDIMENT TRAPS OR OTHER CONTROLS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
221 (F)	TEMPORARY SILT DIKE	LF

NOTE: SILT DIKES ARE ONLY FURNISHED IN 7' INCREMENTS.

APPROVED BY ROADWAY ENGINEER: *Caleb F. A.* DATE: *04/14/15*
 ROADWAY DESIGN DIVISION STANDARD

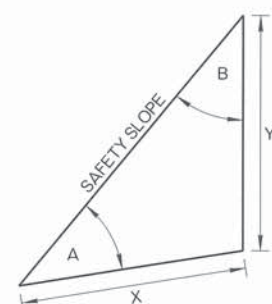
TEMPORARY SILT DIKE

OKLAHOMA DEPARTMENT OF TRANSPORTATION
 2009 SPECIFICATIONS

TSD-2	0
R-6	

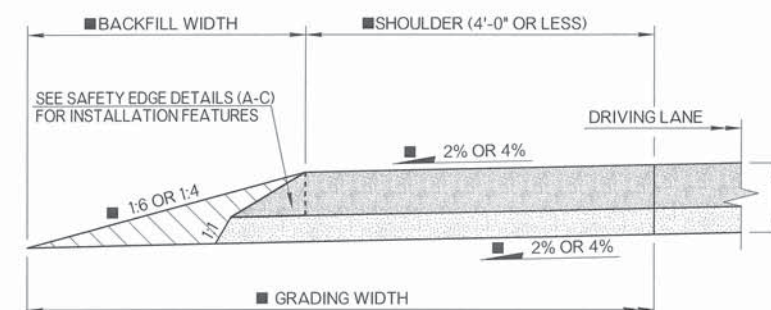
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

X - ASPHALT PAVEMENT SAFETY EDGE WIDTH			
Y	X (2% SLOPE)		X (-4% SLOPE)
	IN	IN	IN
0.50	0.86	0.88	0.89
0.75	1.28	1.31	1.33
1.00	1.71	1.75	1.77
1.50	2.57	2.63	2.66
2.00	3.42	3.50	3.54
2.50	4.28	4.38	4.43
3.00	5.14	5.26	5.31
3.50	5.99	6.13	6.20
4.00	6.85	7.01	7.08
4.50	7.70	7.88	7.97
5.00	8.56	8.76	8.85



$$X = \frac{Y \cdot \sin(B)}{\sin(A)}$$

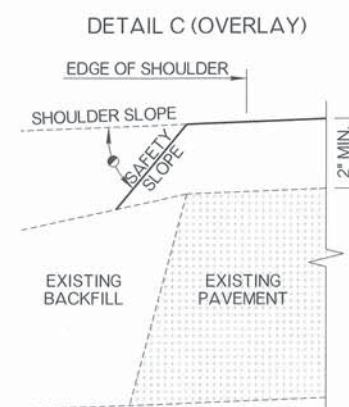
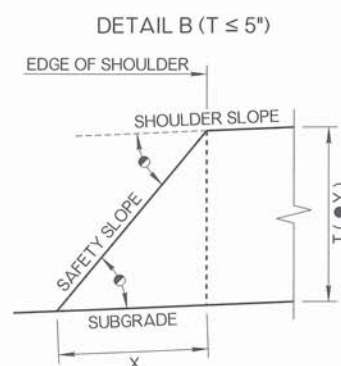
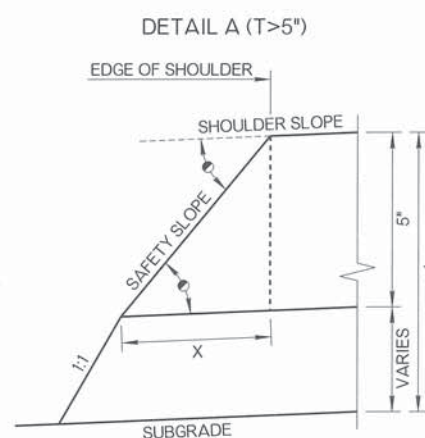
CALCULATE X USING 30° FOR ANGLE A.



TYPICAL SECTION VIEW OF AN ASPHALT PAVEMENT SAFETY EDGE

NOTE: SAFETY EDGE SHALL BE INSTALLED ON SHOULDERS OF WIDTH 4'-0" OR LESS.

SEE TYPICAL SECTION FOR DIMENSIONS AND SLOPES.



SAFETY EDGE DETAILS (A-C)

- VARIES BETWEEN 2" AND 5" WITH A 5" MAXIMUM HEIGHT.
- 30°±5° (ANGLE IS MEASURED FROM SLOPED EDGE OF SHOULDER.)

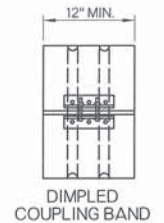
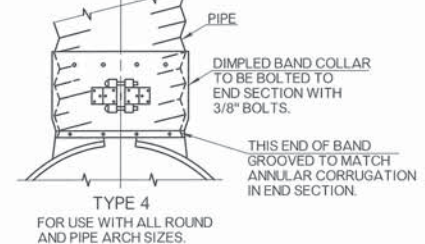
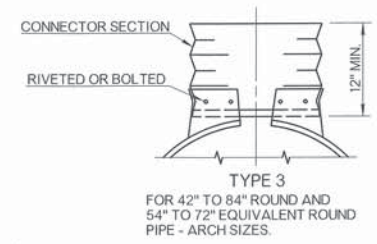
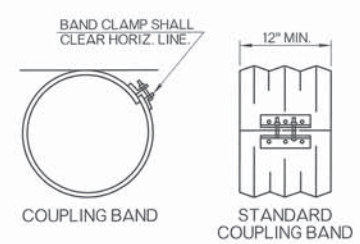
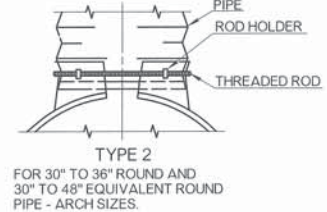
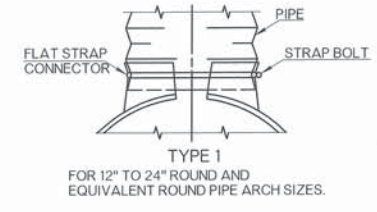
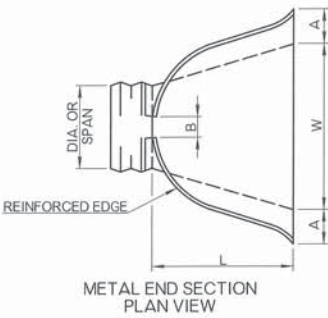
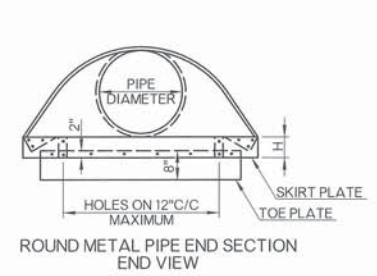
GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- SAFETY EDGE SHALL BE CONSTRUCTED IN UNION WITH THE ASPHALT CONCRETE PAVEMENT.
- THE SAFETY EDGE, AS SHOWN, CAN BE APPLIED TO NEW CONSTRUCTION AND TO OVERLAYS OF AT LEAST 2".
- INSTALLATION OF SAFETY EDGE IS NOT REQUIRED IN CURB AND GUTTER AREAS.
- ALL SAFETY EDGES MUST MEET THE APPROVAL OF THE ENGINEER. THE ENGINEER MAY REQUIRE PROOF THAT THE SYSTEM HAS BEEN USED ON PREVIOUS PROJECTS WITH ACCEPTABLE RESULTS OR MAY REQUIRE THAT A TEST SECTION BE CONSTRUCTED PRIOR TO THE BEGINNING OF WORK TO DEMONSTRATE THAT THE EDGE SHAPE AND COMPACTION IS TO THE SATISFACTION OF THE ENGINEER.
- PRIOR TO PAVING SAFETY EDGE, GRADE AN AREA 10' WIDE BEGINNING AT EDGE OF PAVED SHOULDER TO PROVIDE A LEVEL SURFACE FREE OF VEGETATION.

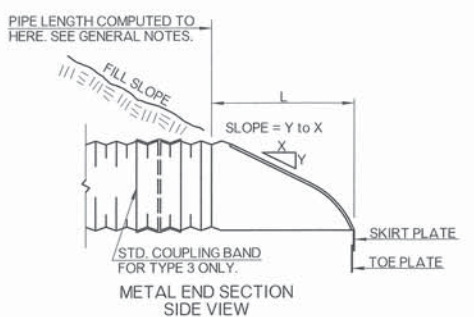
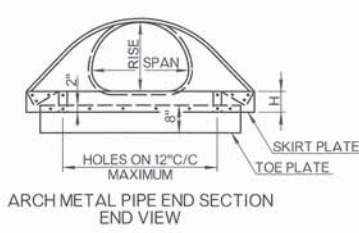
APPROVED BY ROADWAY ENGINEER: *Calvin F. H.* DATE: 09/16/15
 ROADWAY DESIGN DIVISION STANDARD
 PAVEMENT SAFETY EDGE

OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	

PIPE DIA.	GA.	A	B	H	L	W	APPROX. SLOPE	BODY TYPE
12"	16	6"	6"	6"	21"	24"	1:2 1/2	1 PC.
15"	16	7"	8"	6"	26"	30"	1:2 1/2	1 PC.
18"	16	8"	10"	6"	31"	36"	1:2 1/2	1 PC.
21"	16	9"	12"	6"	36"	42"	1:2 1/2	1 PC.
24"	16	10"	13"	6"	41"	48"	1:2 1/2	1 PC.
30"	14	12"	16"	8"	51"	60"	1:2 1/2	1 PC.
36"	14	14"	19"	9"	60"	72"	1:2 1/2	2 PC.
42"	12	16"	22"	11"	69"	84"	1:2 1/2	2 PC.
48"	12	18"	27"	12"	78"	90"	1:2 1/4	2 PC.
54"	12	18"	30"	12"	84"	102"	1:2	2 PC.
60"	12	18"	33"	12"	87"	114"	1:1 3/4	3 PC.
66"	12	18"	36"	12"	87"	120"	1:1 1/2	3 PC.
72"	12	18"	39"	12"	87"	126"	1:1 1/3	3 PC.
78"	12	18"	42"	12"	87"	132"	1:1 1/4	3 PC.
84"	12	18"	45"	12"	87"	138"	1:1 1/6	3 PC.



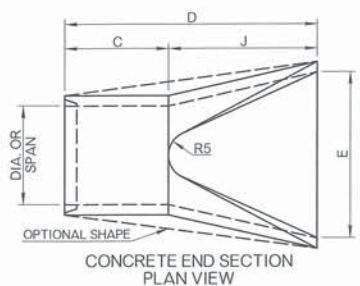
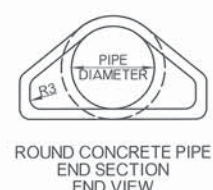
SPAN x RISE	EQUIV. ROUND	GA.	A	B	H	L	W	APPROX. SLOPE	BODY TYPE
17' x 13'	15"	16	7"	9"	6"	19"	30"	1:2 1/2	1 PC.
21' x 15'	18"	16	7"	10"	6"	23"	36"	1:2 1/2	1 PC.
24' x 18'	21"	16	8"	12"	6"	28"	42"	1:2 1/2	1 PC.
28' x 20'	24"	#16	9"	14"	6"	32"	48"	1:2 1/2	1 PC.
35' x 24'	30"	14	10"	16"	6"	39"	60"	1:2 1/2	1 PC.
42' x 29'	36"	#14	12"	18"	8"	46"	75"	1:2 1/2	1 PC.
49' x 33'	42"	12	13"	21"	9"	53"	85"	1:2 1/2	2 PC.
57' x 38'	48"	12	18"	26"	12"	63"	90"	1:2 1/2	2 PC.
64' x 43'	54"	12	18"	30"	12"	70"	102"	1:2 1/4	2 PC.
71' x 47'	60"	12	18"	33"	12"	77"	114"	1:2 1/4	3 PC.
77' x 52'	66"	12	18"	36"	12"	77"	126"	1:2	3 PC.
83' x 57'	72"	12	18"	39"	12"	77"	138"	1:2	3 PC.



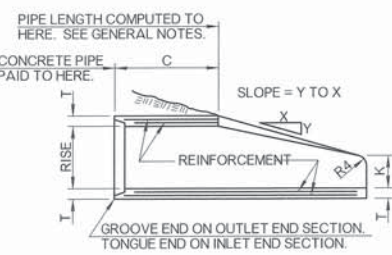
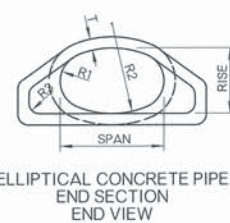
TYPICAL METAL END SECTION CONNECTIONS

FOR ALUMINUM END SECTIONS THE 28' x 20' SHALL BE 14 GAGE AND THE 42' x 29' SHALL BE 12 GAGE.

DIAMETER	R3	R4	R5	T	K	J	C	D	E	SLOPE
18"	3"	3"	6"	2 1/2"	9"	2.25'	3.83'	6.08'	3.00'	1:3
24"	3"	3"	7"	3"	9 1/2"	3.63'	2.50'	6.12'	4.00'	1:3
30"	3"	3"	8"	3 1/2"	12"	4.50'	1.65'	6.16'	5.00'	1:3
36"	3"	3"	10 1/2"	4"	15"	5.25'	2.90'	8.15'	6.00'	1:3
42"	3"	3"	10 1/2"	4 1/2"	21"	5.25'	2.92'	8.17'	6.50'	1:3
48"	6"	6"	14"	5"	24"	6.00'	2.17'	8.17'	7.00'	1:3
54"	6"	6"	-	5 1/2"	27"	5.42'	2.92'	8.33'	7.50'	1:2 1/2
60"	6"	6"	-	6"	30"	5.00'	3.25'	8.25'	8.00'	1:2
66"	6"	6"	-	6 1/2"	24"	6.50'	1.75'	8.25'	8.50'	1:2
72"	6"	6"	-	7"	24"	6.50'	1.75'	8.25'	9.00'	1:2



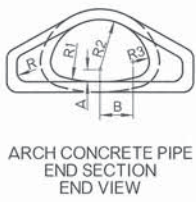
APPROX. EQUIV. DIAMETER	RISE	SPAN	R1	R2	R3	R4	R5	T	K	J	C	D	E	SLOPE
18"	14"	23"	6"	20"	3"	3"	6"	2 3/4"	8"	2.25'	3.75'	6.00'	3.00'	1:3
24"	19"	30"	8 1/4"	26 1/4"	3"	3"	7"	3 1/4"	8 1/2"	3.25'	2.75'	6.00'	4.00'	1:3
30"	24"	38"	10 1/4"	32 3/4"	3"	3"	9"	3 3/4"	9 1/2"	4.50'	1.50'	6.00'	5.00'	1:3
36"	29"	45"	12 1/4"	39 1/4"	3"	3"	12"	4 1/2"	11 1/4"	5.00'	3.00'	8.00'	6.00'	1:3
42"	34"	53"	14 1/2"	46"	6"	6"	13"	5"	15 3/4"	5.00'	3.00'	8.00'	6.50'	1:3
48"	38"	60"	16 1/2"	51 1/2"	6"	6"	14"	5 1/2"	21"	5.00'	3.00'	8.00'	7.00'	1:3
54"	43"	68"	18 3/4"	58 1/2"	6"	6"	16"	6"	25 1/2"	5.00'	3.00'	8.00'	7.50'	1:3
60"	48"	76"	20 3/4"	65"	6"	6"	36 1/16"	6 1/2"	30"	5.00'	3.25'	8.25'	8.00'	1:2
66"	53"	83"	22 3/4"	71 1/2"	6"	6"	36 1/8"	7 1/2"	24"	6.50'	1.75'	8.25'	8.50'	1:2
72"	58"	91"	24 3/4"	78"	6"	6"	38"	7 1/2"	24"	6.50'	1.75'	8.25'	9.00'	1:2



ITEM NO.	ITEM	UNIT
613 (L)	▼ PREFAB. CULVERT END SECTION, ROUND	EA
613 (L)	▼ PREFAB. CULVERT END SECTION, ARCH	EA
613 (L)	▼ PREFAB. CULVERT END SECTION, ELLIPTICAL	EA

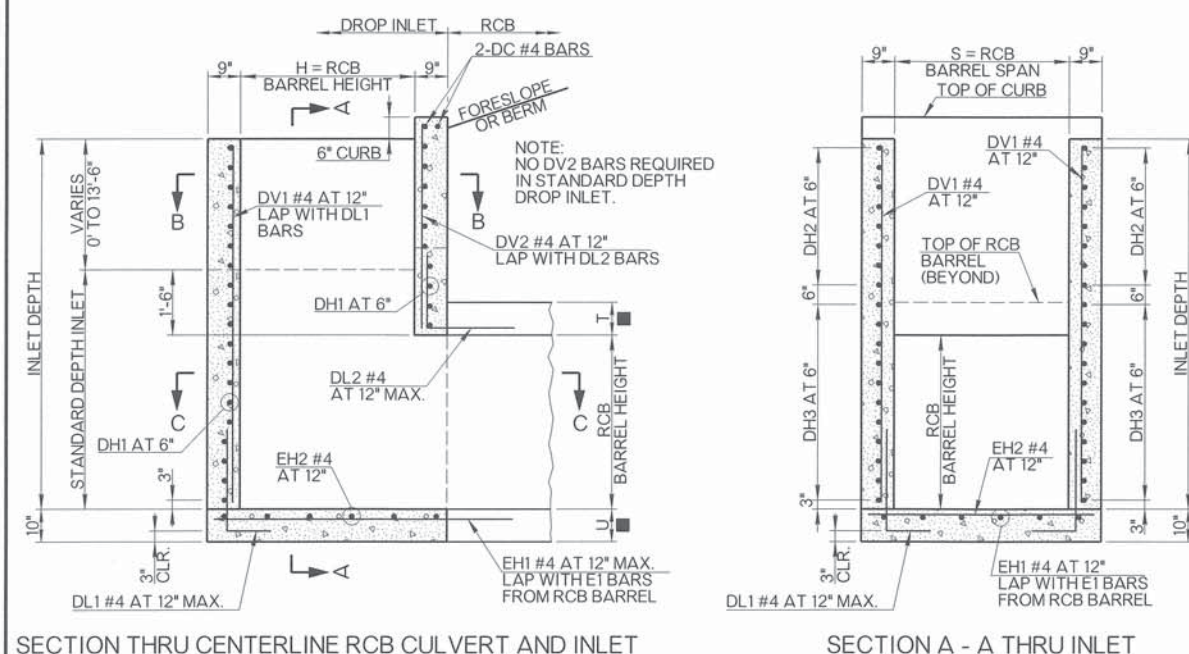
▼ END SECTION DIMENSION(S) SHALL BE SPECIFIED.

APPROX. EQUIV. DIAMETER	SPAN	RISE	A	B	R	R1	R2	R3	R4	R5	T	K	J	C	D	E	SLOPE
18"	22"	13"	-1/4"	5 3/4"	2"	27 1/2"	13 3/4"	5 1/4"	3"	13"	2 1/2"	7"	2.25'	3.75'	6.08'	3.00'	1:3
24"	28"	18"	3 7/8"	9 21/32"	3"	40 11/16"	14 9/16"	4 13/32"	3"	16 13/16"	3"	9 1/2"	3.58'	2.50'	6.08'	4.00'	1:3
30"	36"	22"	3 3/4"	12 3/32"	3"	51"	18 3/4"	6 1/32"	3"	18 1/2"	3 1/2"	12"	4.50'	1.58'	6.08'	5.00'	1:3
36"	43"	26"	4 1/8"	15 1/2"	6"	62"	22 1/2"	6 3/8"	3"	24 5/16"	4"	15"	5.25'	2.90'	8.15'	6.00'	1:3
42"	51"	31"	5 1/8"	18"	6"	73"	26 1/4"	7 9/16"	3"	27 1/2"	4 1/2"	21"	5.25'	2.92'	8.17'	6.50'	1:3
48"	58"	36"	6"	20 1/2"	6"	84"	30"	8 3/4"	3"	28 1/2"	5"	24"	6.00'	2.17'	8.17'	7.00'	1:3
54"	65"	40"	6 5/8"	22 1/16"	6"	92 1/2"	33 3/8"	9 13/16"	6"	33 1/8"	5 1/2"	27"	5.42'	2.92'	8.34'	7.50'	1:2.4
60"	73"	45"	7 1/2"	25 3/32"	6"	105"	37 1/2"	11 7/32"	6"	33 1/16"	6"	30"	5.00'	3.25'	8.25'	8.00'	1:2
72"	88"	54"	9"	31 7/16"	6"	126"	45"	12 9/16"	6"	38 15/16"	7"	24"	6.50'	1.75'	8.25'	9.00'	1:2

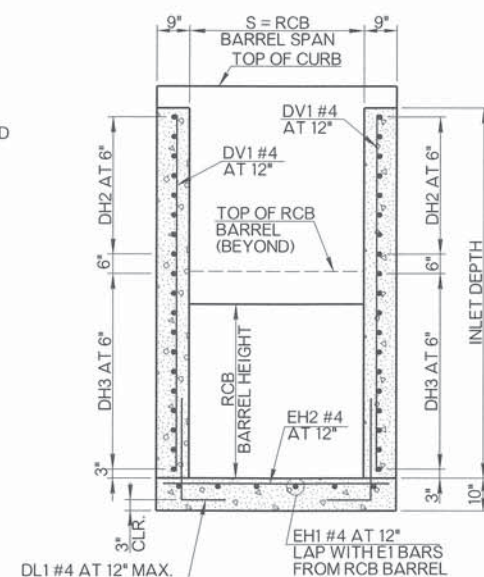


APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE 04/14/15
 ROADWAY DESIGN DIVISION STANDARD
DOT PREFABRICATED CULVERT END SECTIONS

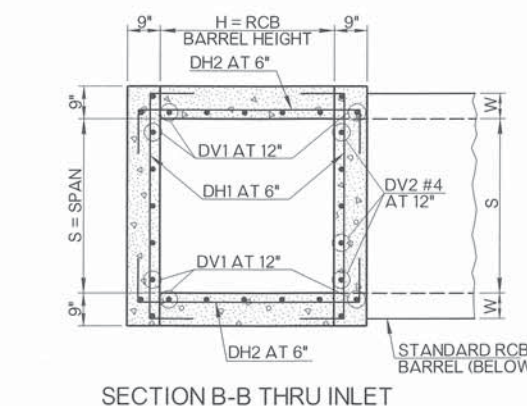
OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	



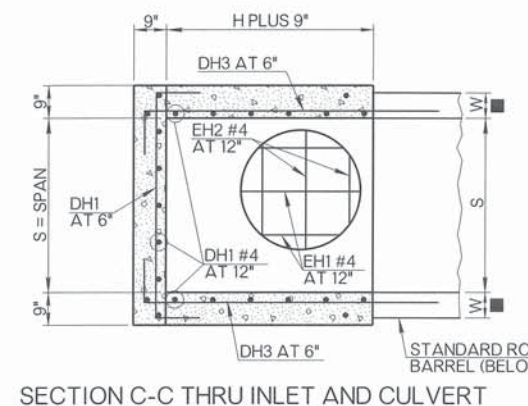
SECTION THRU CENTERLINE RCB CULVERT AND INLET



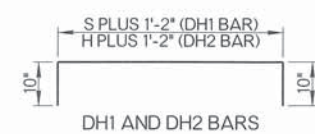
SECTION A - A THRU INLET



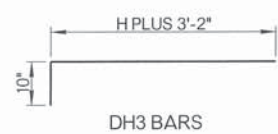
SECTION B-B THRU INLET



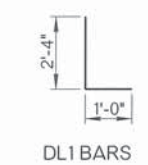
SECTION C-C THRU INLET AND CULVERT



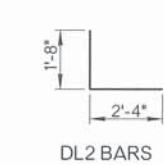
DH1 AND DH2 BARS



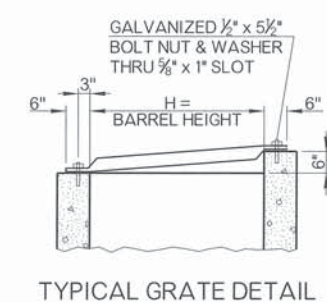
DH3 BARS



DL1 BARS



DL2 BARS



TYPICAL GRATE DETAIL

DIMENSIONS AND BAR LIST																										
DESIGN NO.	BARREL DIMENSIONS		STANDARD DEPTH	DH1 BARS (BENT)			DH2 BARS (BENT)			DH3 BARS (BENT)			DL1 #4 BARS (BENT)		DL2 #4 BARS (BENT)		DV1 #4 BARS		DV2 #4 BARS		DC #4 BARS		EH1 #4 BARS		EH2 #4 BARS	
	SPAN S	HEIGHT H		SIZE	NO.	LENGTH	SIZE	NO.	LENGTH	SIZE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
1	3'	2'	3'-6"	#4	12	5'-10"	#4	8	4'-10"	#4	16	6'-0"	16	3'-4"	6	4'-0"	16	3'-4"	6	2	4'-2"	5	5'-1"	4	4'-2"	
2	3'	3'	4'-6"	#4	14	5'-10"	#4	8	5'-10"	#4	20	7'-0"	18	3'-4"	6	4'-0"	18	4'-4"	6	2	4'-2"	5	6'-1"	5	4'-2"	
3	4'	2'	3'-6"	#4	12	6'-10"	#4	8	4'-10"	#4	16	6'-0"	17	3'-4"	7	4'-0"	17	3'-4"	7	2	5'-2"	6	5'-1"	4	5'-2"	
4	4'	3'	4'-6"	#5	14	6'-10"	#5	8	5'-10"	#5	20	7'-0"	19	3'-4"	7	4'-0"	19	4'-4"	7	2	5'-2"	6	6'-1"	5	5'-2"	
5	4'	4'	5'-6"	#5	16	6'-10"	#5	8	6'-10"	#5	24	8'-0"	21	3'-4"	7	4'-0"	21	5'-4"	7	2	5'-2"	6	7'-1"	6	5'-2"	
6	5'	2'	3'-6"	#5	12	7'-10"	#5	8	4'-10"	#5	16	6'-0"	18	3'-4"	8	4'-0"	18	3'-4"	8	2	6'-2"	7	5'-1"	4	6'-2"	
7	5'	3'	4'-6"	#5	14	7'-10"	#5	8	5'-10"	#5	20	7'-0"	20	3'-4"	8	4'-0"	20	4'-4"	8	2	6'-2"	7	6'-1"	5	6'-2"	
8	5'	4'	5'-6"	#5	16	7'-10"	#5	8	6'-10"	#5	24	8'-0"	22	3'-4"	8	4'-0"	22	5'-4"	8	2	6'-2"	7	7'-1"	6	6'-2"	
9	5'	5'	6'-6"	#5	18	7'-10"	#5	8	7'-10"	#5	28	9'-0"	24	3'-4"	8	4'-0"	24	6'-4"	8	2	6'-2"	7	8'-1"	7	6'-2"	
10	6'	3'	4'-6"	#5	14	8'-10"	#5	8	5'-10"	#5	20	7'-0"	21	3'-4"	9	4'-0"	21	4'-4"	9	2	7'-2"	8	6'-1"	5	7'-2"	
11	6'	4'	5'-6"	#5	16	8'-10"	#5	8	6'-10"	#5	24	8'-0"	23	3'-4"	9	4'-0"	23	5'-4"	9	2	7'-2"	8	7'-1"	6	7'-2"	
12	6'	5'	6'-6"	#5	18	8'-10"	#5	8	7'-10"	#5	28	9'-0"	25	3'-4"	9	4'-0"	25	6'-4"	9	2	7'-2"	8	8'-1"	7	7'-2"	
13	6'	6'	7'-6"	#5	20	8'-10"	#5	8	8'-10"	#5	32	10'-0"	27	3'-4"	9	4'-0"	27	7'-4"	9	2	7'-2"	8	9'-1"	8	7'-2"	

▲ REINFORCING FOR ADDITIONAL DEPTH
 FOR INLET DEPTHS GREATER THAN STANDARD DEPTH:
 - 2 ADDITIONAL DH1 BARS WILL BE REQUIRED FOR EVERY 6" OF ADDITIONAL DEPTH.
 - 2 ADDITIONAL DH2 BARS WILL BE REQUIRED FOR EVERY 6" OF ADDITIONAL DEPTH.
 - DV1 BARS WILL HAVE TO BE EXTENDED BY LENGTH EQUAL TO ADDITIONAL DEPTH OF INLET.
 - DV2 BARS WILL HAVE TO BE ADDED, WITH A LENGTH EQUAL TO ADDL. DEPTH PLUS 1'-8".

QUANTITIES (FOR INFORMATION PURPOSES ONLY)						
DESIGN NO.	CLASS AA CONCRETE		REINFORCING STEEL		PIPE GRATES	
	STANDARD DEPTH INLET	PER ADDITIONAL FT OF DEPTH	STANDARD DEPTH INLET	ADDITIONAL FOR EXTRA DEPTH INLETS	LENGTH OF PIPE	NUMBER OF GRATES
1	1.6 CY	0.37 CY	258 LBS	7 LBS+44 LBS/FT	3'-0 3/4"	2
2	2.2 CY	0.42 CY	328 LBS	7 LBS+48 LBS/FT	4'-0 1/2"	2
3	1.9 CY	0.42 CY	281 LBS	8 LBS+48 LBS/FT	3'-0 3/4"	3
4	2.6 CY	0.48 CY	460 LBS	8 LBS+71 LBS/FT	4'-0 1/2"	3
5	3.4 CY	0.53 CY	568 LBS	8 LBS+76 LBS/FT	5'-0 3/8"	3
6	2.1 CY	0.48 CY	389 LBS	9 LBS+71 LBS/FT	3'-0 3/4"	4
7	2.9 CY	0.53 CY	491 LBS	9 LBS+76 LBS/FT	4'-0 1/2"	4
8	3.7 CY	0.59 CY	603 LBS	9 LBS+82 LBS/FT	5'-0 3/8"	4
9	4.7 CY	0.64 CY	727 LBS	9 LBS+87 LBS/FT	6'-0 1/4"	4
10	3.2 CY	0.59 CY	522 LBS	10 LBS+82 LBS/FT	4'-0 1/2"	5
11	4.1 CY	0.64 CY	639 LBS	10 LBS+87 LBS/FT	5'-0 3/8"	5
12	5.1 CY	0.70 CY	766 LBS	10 LBS+93 LBS/FT	6'-0 1/4"	5
13	6.3 CY	0.75 CY	905 LBS	10 LBS+98 LBS/FT	7'-0 1/4"	5

- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - MAXIMUM DEPTH OF DROP INLETS SHALL BE THE HEIGHT OF THE RCB CULVERT PLUS 15'-0".
 - ALL REINFORCING STEEL SHALL HAVE A 2" MINIMUM CLEAR COVER UNLESS OTHERWISE SHOWN.
 - INLET TOP OPENING SHALL HAVE 3" x 7.58 LBS/FT. STD. WEIGHT STEEL, GALVANIZED, SCHEDULE 40, PIPE SAFETY GRATES INSTALLED PERPENDICULAR TO THE DIRECTION OF TRAFFIC AT 12" MAX. CENTERS. COST OF PIPE SAFETY GRATES AND ALL HARDWARE NEEDED FOR INSTALLATION SHALL BE INCLUDED IN THE PRICE BID FOR THE INLET.
 - PIPE GRATE ENDS SHALL BE HELD DOWN WITH 1/2" x 5/8" GALVANIZED BOLT, WASHER & NUT MEETING THE REQUIREMENTS OF ASTM A325. BOLT THREADS, 1 1/2", SHALL REMAIN EXPOSED FOR INSTALLING GRATE.
 - FOR 'T', 'U' AND 'W' DIMENSIONS, SEE BRIDGE STANDARD DRAWINGS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
611(G)	INLET CDI RCB DES. ●	EA
611(H)	ADDL. DEPTH IN INLET CDI RCB DES. ●	VF

● INLET DESIGN NUMBER SHALL BE SPECIFIED.

APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: 04/14/15
 ROADWAY DESIGN DIVISION STANDARD

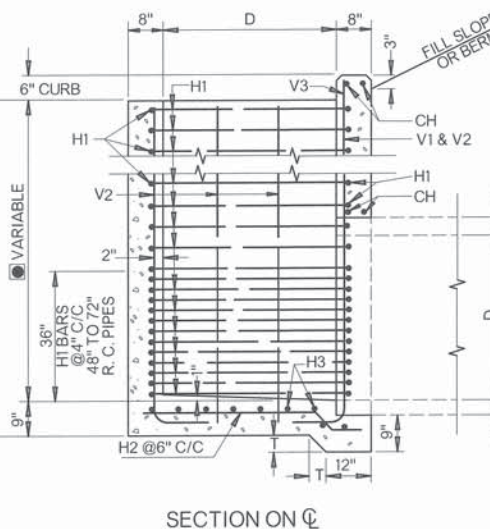
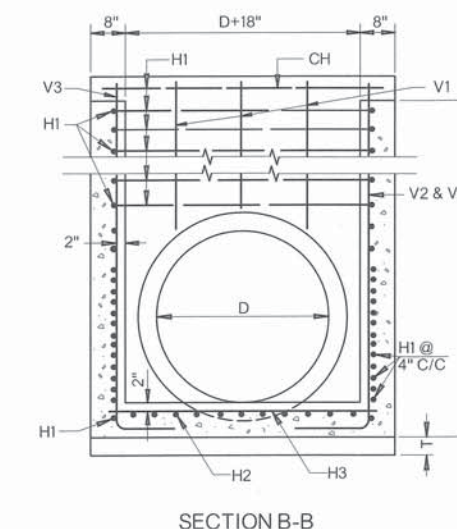
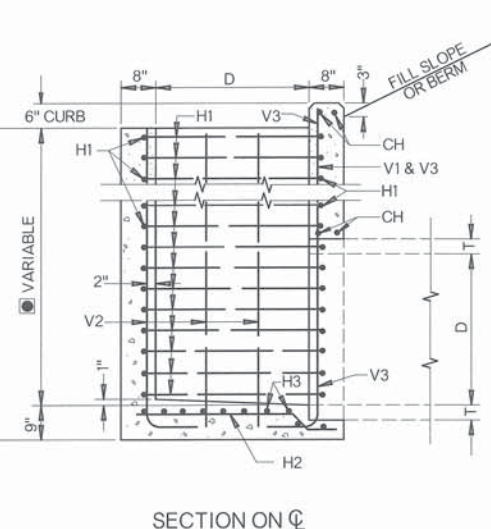
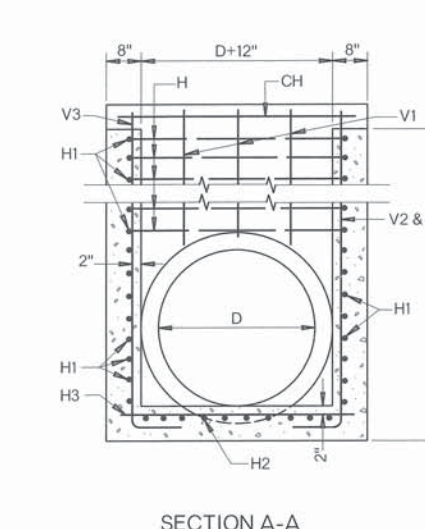
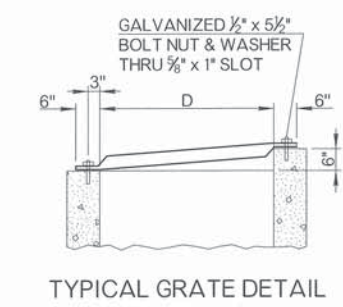
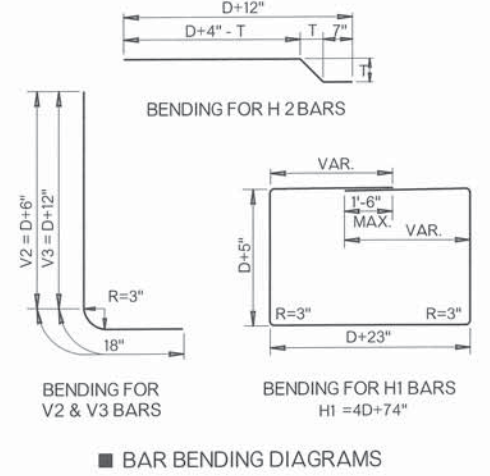
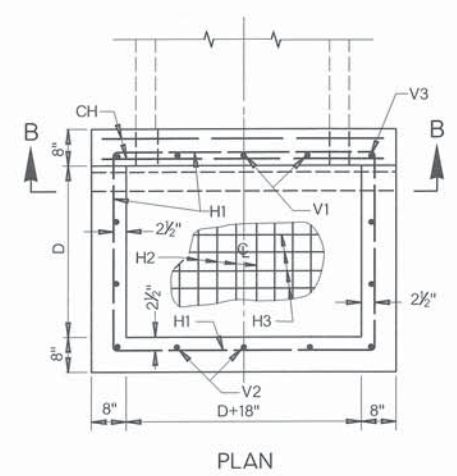
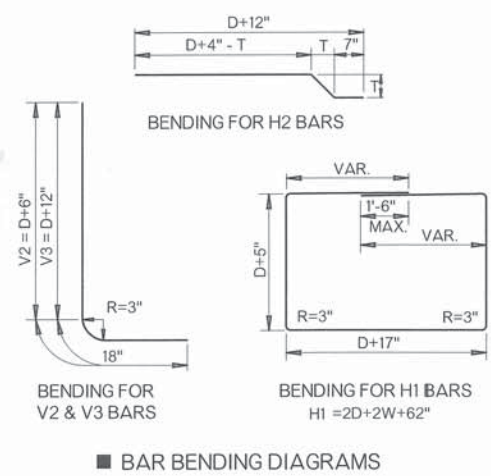
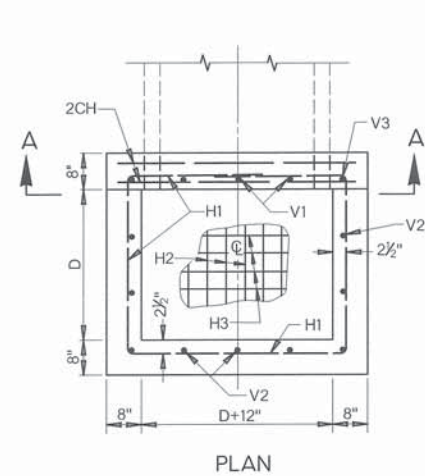
DOT CONCRETE DROP INLETS FOR R.C. BOXES (3' x 2' TO 6' x 6')

OKLAHOMA DEPARTMENT OF TRANSPORTATION
 2009 SPECIFICATIONS

CDIB-1	0
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R-32

OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	



- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - HORIZONTAL REINFORCING BARS SHALL BE PLACED AT 6" CENTERS EXCEPT AS SHOWN FOR 48" TO 72" R.C. PIPE. VERTICAL BARS ARE TIE BARS SPACED AS SHOWN.
 - MAXIMUM DEPTHS OF DROP INLET FOR 48" TO 72" PCP SHALL BE AS FOLLOWS:
 - 48" RCP - 18'-0"
 - 54" RCP - 16'-0"
 - 66" RCP - 12'-0"
 - 72" RCP - 10'-0"
 - TOTAL QUANTITIES AS SHOWN IN TABLE ARE COMPUTED TO TOP OF PIPE AND INCLUDE CURB. FOR DROP INLETS OF GREATER DEPTH, MULTIPLY THE FIGURE IN PER FOOT COLUMN BY THE HEIGHT FROM TOP OF PIPE TO TOP OF DROP INLET AND ADD THE RESULT TO THE QUANTITY IN THE PRECEDING COLUMN.
 - INLET TOP OPENING SHALL HAVE 3" x 7.58 LBS/FT. STD. WEIGHT STEEL PIPE, GALVANIZED, SCHEDULE 40, PIPE SAFETY GRATES INSTALLED PERPENDICULAR TO THE DIRECTION OF TRAFFIC AT 12" (MAXIMUM) CENTERS WITH THE COST OF PIPE SAFETY GRATES & ALL HARDWARE NEEDED FOR THE INSTALLATION TO BE INCLUDED IN THE PRICE BID FOR THE INLET.
 - PIPE GRATE ENDS SHALL BE HELD DOWN WITH 1/2" x 5 1/2" GALVANIZED BOLT, WASHER & NUT MEETING THE REQUIREMENTS OF ASTM A325. BOLT THREADS, 1 3/4", SHALL REMAIN EXPOSED FOR INSTALLING GRATE.
 - BAR BENDING DIAGRAMS AND DIMENSIONS FOR DESIGNS 1 THROUGH 10, AS SHOWN THIS SHEET, ARE FOR STANDARD DEPTH DROP INLETS.
 - ARCH PIPES MAY BE USED INSTEAD OF ROUND PIPES AT THE DISCRETION OF THE ENGINEER.

DROP INLET FOR 18" TO 42" REINF. CONCRETE PIPE
 ● DIMENSION FOR STD. HEIGHT DROP INLET TO BE (D+T+3")

DROP INLET FOR 48" TO 72" REINF. CONCRETE PIPE

DESIGN NUMBER	DIMENSIONS		REINFORCING STEEL										CLASS A CONCRETE		REINFORCING STEEL		PIPE GRATES			
	D DIAM. OF PIPE IN	AREA OF PIPE SQ.FT.	CH #4 BARS STRAIGHT NO.	H1 #4 BARS BENT NO.	H2 #4 BARS BENT NO.	H3 #4 BARS STRAIGHT NO.	V1 #4 BARS STRAIGHT NO.	V2 #4 BARS BENT NO.	V3 #4 BARS BENT NO.	TOTAL TO TOP OF PIPE INCLUDING CURB CY	PER FOOT OF ADDITIONAL HEIGHT CY/VF	TOTAL TO TOP OF PIPE INCLUDING CURB LBS	PER FOOT OF ADDITIONAL HEIGHT LBS/VF	NO. OF PIPE GRATES EA						
															THICKNESS OF WALL IN	EA	EA	EA	EA	EA
1	18"	1.77	2 1/2"	4	29"	5	134"	7	30"	7	26"	2	12"	6	42"	0.58	0.21	77	24	2
2	24"	3.14	3"	4	35"	6	158"	8	36"	8	32"	3	13"	6	48"	0.86	0.26	104	29	2
3	30"	4.91	3 1/2"	4	41"	7	182"	9	42"	9	38"	4	14"	7	54"	1.20	0.30	138	35	3
4	36"	7.07	4"	4	47"	8	206"	10	48"	10	44"	4	16"	8	60"	1.58	0.35	176	42	3
5	42"	9.62	4 1/2"	4	53"	9	230"	11	54"	11	50"	5	18"	10	66"	2.11	0.40	223	49	4
6	48"	12.57	5"	4	59"	15	254"	12	60"	12	56"	5	19"	10	72"	2.60	0.45	333	52	4
7	54"	15.90	5 1/2"	4	65"	16	278"	13	66"	13	62"	6	21"	10	78"	3.18	0.49	385	60	5
8	60"	19.63	6"	4	71"	17	302"	14	72"	14	68"	6	22"	11	84"	3.79	0.54	448	66	5
9	66"	13.76	6 1/2"	4	77"	18	326"	15	78"	15	74"	7	24"	12	90"	4.47	0.59	517	74	6
10	72"	28.27	7"	4	83"	19	350"	16	84"	16	80"	7	25"	14	96"	5.21	0.64	594	83	6

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
611 (G)	INLET CDI RCP DES. ●	EA
611 (H)	ADDL. DEPTH IN INLET CDI RCP DES. ●	VF

● DESIGN NUMBER SHALL BE SPECIFIED.

APPROVED BY ROADWAY ENGINEER: *Caleb A.* DATE: *01/11/15*

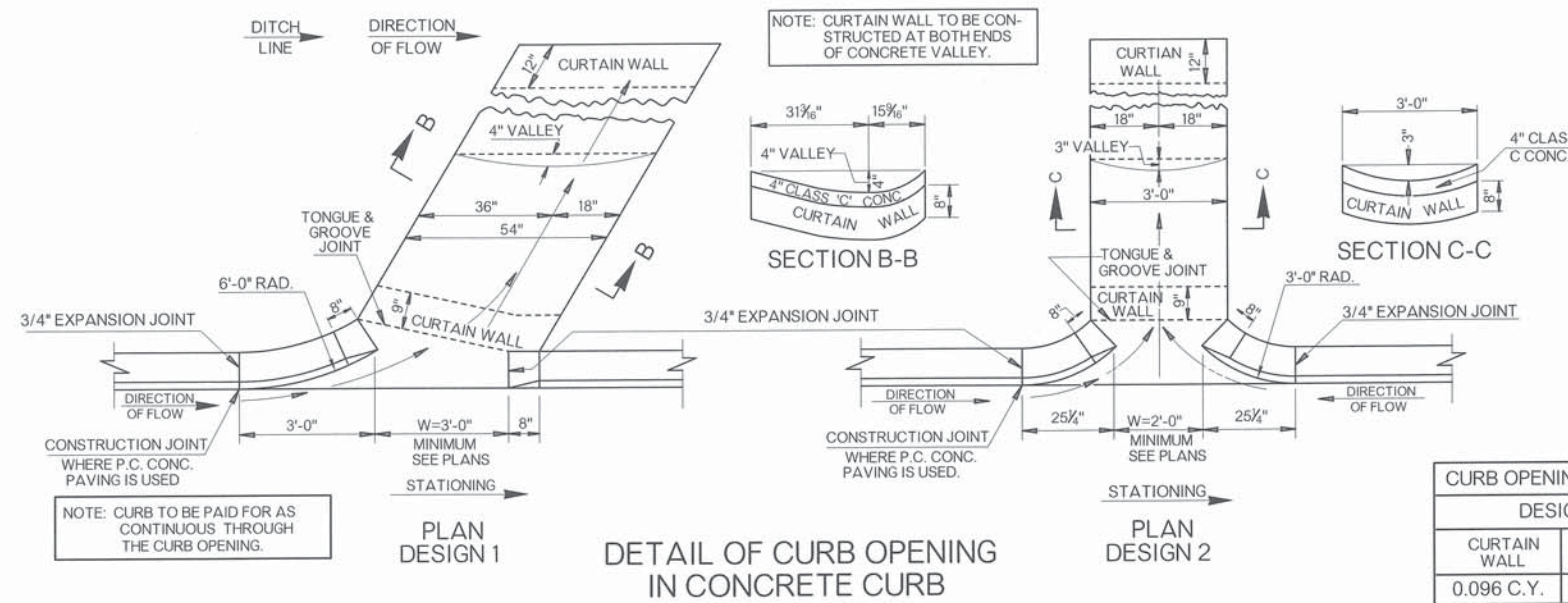
ROADWAY DESIGN DIVISION STANDARD

DOT CONCRETE DROP INLETS FOR 18" TO 72" R.C. PIPES

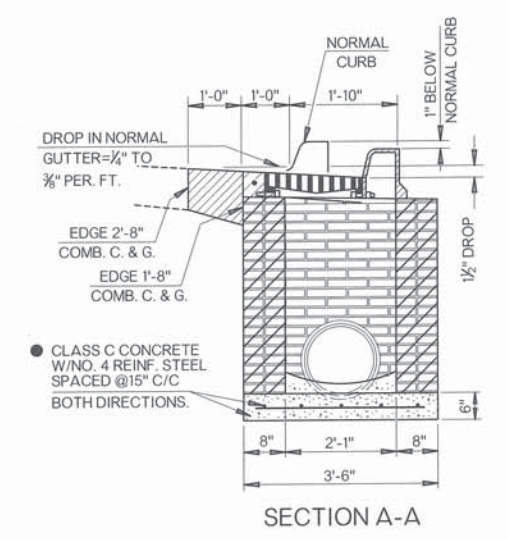
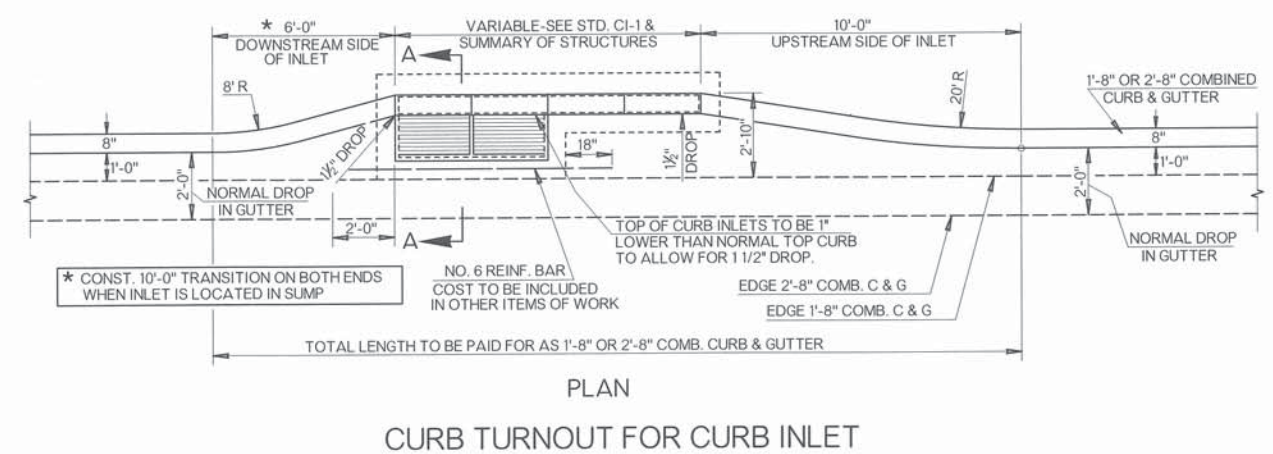
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

CDIP-1	1
	R-34

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



DESIGN 1		DESIGN 2	
CURTAIN WALL	PER FOOT OF FLUME	CURTAIN WALL	PER FOOT OF FLUME
0.096 C.Y.	0.048 C.Y.	0.074 C.Y.	0.037 C.Y.



- GENERAL NOTES
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - INLET STRUCTURES MAY BE SUPPLIED AS PRECAST UNITS IF PROPOSED PRECAST DESIGN IS SUBMITTED TO THE ENGINEER AND APPROVED FOR USE. SEE ROADWAY STANDARD CI-1.

ITEM NO.	ITEM	UNIT
509 (D)	CLASS C CONCRETE	CY

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 02/14/15.

ROADWAY DESIGN DIVISION STANDARD

DOT STORM SEWER CONSTRUCTION DETAILS

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

SSCD-3	1
R-38	

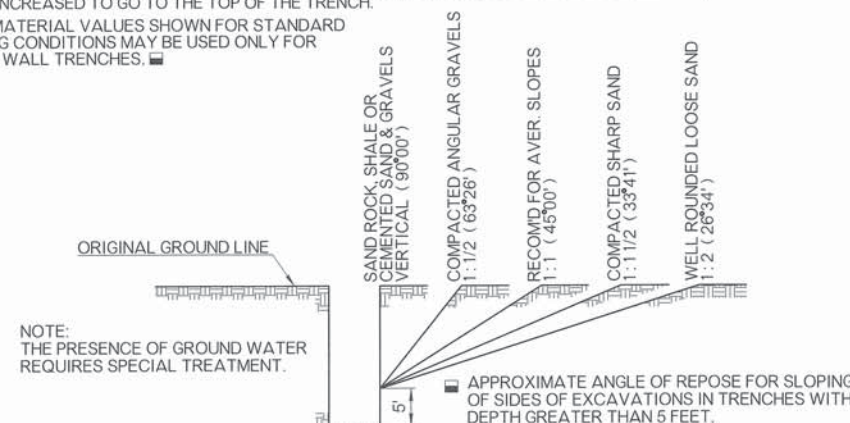
TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES

PIPE DIA. OR DESIGN EQUIV.	H	T	SINGLE PIPE STANDARD TRENCHING		DOUBLE PIPE STANDARD TRENCHING		TRIPLE PIPE STANDARD TRENCHING		SPECIAL TRENCHING SINGLE, DOUBLE & TRIPLE PIPE OPTIONS W+12"	
			W	STANDARD BEDDING MATERIAL CY/LF	W	STANDARD BEDDING MATERIAL CY/LF	W	STANDARD BEDDING MATERIAL CY/LF	ADD'L STANDARD BEDDING MATERIAL CY/LF	
18	3.25	0.208	3.17	0.274	5.67	0.468	8.17	0.663		0.120
24	3.83	0.25	4.00	0.386	7.00	0.629	10.00	0.873		0.142
30	4.42	0.292	4.58	0.474	8.33	0.811	12.08	1.146		0.163
36	5	0.333	6.17	0.751	10.67	1.193	15.17	1.636		0.185
42	5.58	0.375	6.75	0.870	12.00	1.429	17.25	1.989		0.207
48	6.17	0.417	7.33	0.996	13.33	1.688	19.33	2.379		0.228
54	6.75	0.458	7.92	1.126	14.67	1.960	21.42	2.794		0.250
60	7.33	0.5	8.50	1.262	16.00	2.251	23.50	3.230		0.271
66	8.08	0.542	9.08	1.408	17.33	2.565	25.58	3.688		0.299
72	8.67	0.583	9.67	1.564	18.67	2.903	27.67	4.167		0.321
78	9.25	0.625	10.25	1.731	20.00	3.265	29.75	4.667		0.343
84	9.83	0.667	10.83	1.908	21.33	3.653	31.83	5.179		0.364
90	10.42	0.708	11.42	2.096	22.67	4.067	33.92	5.713		0.386
96	11	0.75	12.00	2.296	24.00	4.507	36.00	6.277		0.407

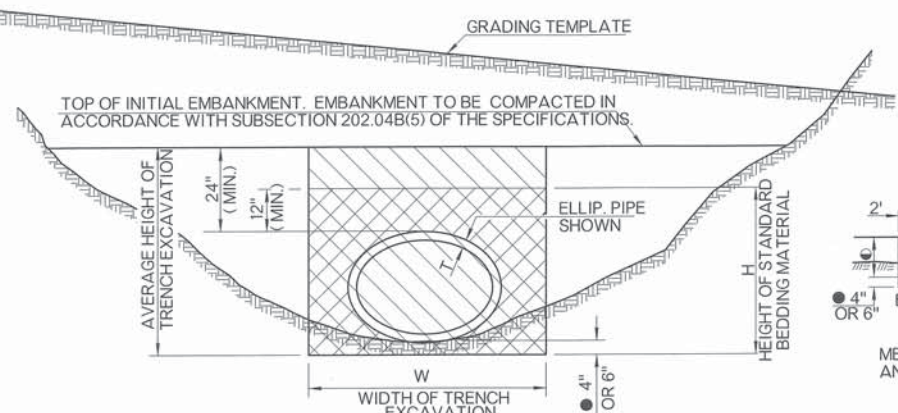
NOTE: QUANTITIES FOR 66" & 78" EQUIV. DIA. ARCH PIPE BASED ON METAL PIPE & ESTIMATED WALL THICKNESS.

FOR PIPES UNDER PAVEMENT, THE H DIMENSION AND THE STANDARD BEDDING MATERIAL QUANTITY, SHALL BE INCREASED TO GO TO THE TOP OF THE TRENCH.

BEDDING MATERIAL VALUES SHOWN FOR STANDARD TRENCHING CONDITIONS MAY BE USED ONLY FOR VERTICAL WALL TRENCHES.

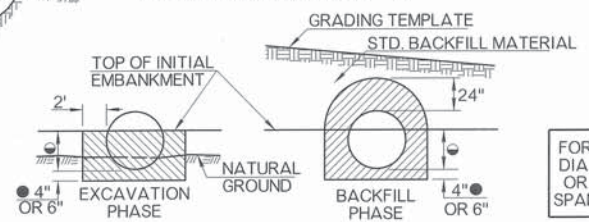


OPTIONAL TRENCHES WITH DEPTH GREATER THAN 5.0 FEET EXCAVATION AND BEDDING MATERIAL WILL BE MEASURED AND PAID FOR AS IF SHEETING & SHORING WAS USED. (SPECIAL TRENCHING=STD. WIDTH TRENCH+12")



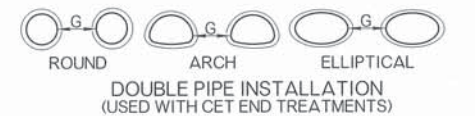
METHOD NO. 1
TRENCH EXCAVATION IN EMBANKMENT SECTIONS

EMBANKMENT HEIGHT PRIOR TO EXCAVATION
PIPE SIZES FROM 18" TO 42" = 30"
PIPE SIZES FROM 48" TO 84" = 2/3 DIAM.
PIPE SIZES LARGER THAN 84" = 60"

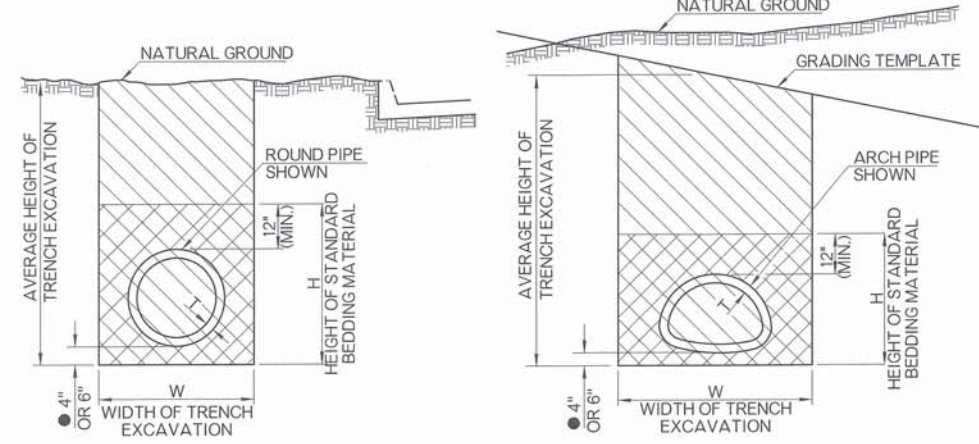


METHOD NO. 2
(OPTIONAL INSTALLATION FOR R. C. PIPE)

FOR DIA. OR SPAN	CONDUIT SHAPE			DIST.
	ROUND	ARCH	ELLIPTICAL	
UP TO 24"	UP TO 24"	UP TO 36"	UP TO 36"	G
25" TO 72"				D/2"
OVER 73"	37" TO 108"	37" TO 108"	OVER 108"	D/3"



LIMITS OF STANDARD BEDDING MATERIAL
QUANTITIES FOR BEDDING MATERIAL DO NOT INCLUDE THE SPACE WITHIN AND BOUNDED BY THE OUTER SURFACE OF THE PIPE CONDUIT.



TRENCH EXCAVATION IN CUT SECTIONS

TABLE OF EQUIVALENT PIPES

EQUIV. DIA.	REINF. CONC. ARCH PIPE	STEEL ARCH PIPE	ALUMINUM ARCH PIPE	REINF. CONC. ELLIPTICAL PIPE
18"	22" x 13"	21" x 15"	21" x 15"	14" x 23"
21"		24" x 18"	24" x 18"	
24"	28" x 18"	28" x 20"	28" x 20"	19" x 30"
27"				22" x 34"
30"	36" x 22"	35" x 24"	35" x 24"	24" x 38"
36"	43" x 26"	42" x 29"	42" x 29"	29" x 45"
42"	51" x 31"	49" x 33"	49" x 33"	34" x 53"
48"	58" x 36"	57" x 38"	57" x 38"	38" x 60"
54"	65" x 40"	64" x 43"	64" x 43"	43" x 68"
60"	73" x 45"	71" x 47"	71" x 47"	48" x 76"
66"		77" x 52"	77" x 52"	53" x 83"
72"	88" x 54"	83" x 57"	83" x 57"	58" x 91"
78"		87" x 63"	92" x 65"	63" x 98"
84"	102" x 62"	95" x 67"	95" x 67"	68" x 106"
90"	115" x 72"	103" x 71"	103" x 71"	72" x 113"
96"	122" x 77"	112" x 75"	112" x 75"	77" x 121"

▲ STRUCTURAL PLATE ARCH.

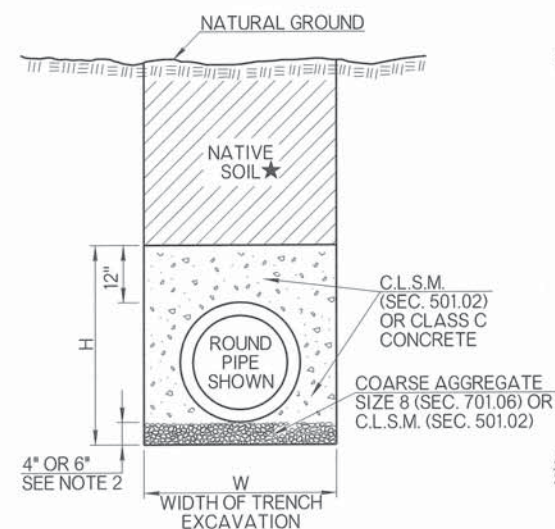
GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- TRENCH EXCAVATION AND BEDDING MATERIAL WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS OF SIDE DRAINS UNLESS OTHERWISE NOTED ON THE PLANS.
- FOR PIPE UNDERDRAIN INSTALLATIONS, SEE ROADWAY STANDARD PUD-3.
- SPECIAL TRENCHING CONDITIONS ARE THOSE AS DEFINED BY O.S.H.A. REGULATIONS, TITLE 29 CFR CHAPTER XVII, PART 1926.650, 1926.651 & 1926.652, SO DEFINED WILL APPLY UNTIL THEY ARE IN CONFLICT WITH CURRENT SPECIFICATIONS. FOR TRENCH DEPTHS OVER FIVE FEET, WHERE O.S.H.A. REGULATIONS FOR SPECIAL TRENCHING ARE APPLIED, QUANTITIES AND DIMENSIONS FOR SPECIAL TRENCHING WILL BE USED FOR COMPUTING QUANTITIES. SEE TABLE OF TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES.
- NORMAL BACKFILLING OPERATIONS SHALL FOLLOW BEDDING AND PIPE INSTALLATION AS CLOSELY AS PRACTICAL. IN NO CASE SHALL A PIPE INSTALLATION SUBJECT TO SUDDEN FLOW DEVELOPMENT BE LEFT WITHOUT SUFFICIENT BACKFILL TO RESTRAIN THE CONDUIT AND PREVENT JOINT SEPARATION AND/OR PIPING SCOUR. PHYSICALLY RESTRAINING THE CONDUIT MAY BE USED TO AUGMENT OR REPLACE THIS IMMEDIATE BACKFILL REQUIREMENT.
- ANY EXCESS EXCAVATION NOT USED FOR BACKFILL WILL BECOME THE PROPERTY OF THE CONTRACTOR AND DISPOSED OF, BY HIM, IN A MANNER APPROVED BY THE ENGINEER.
- STANDARD BEDDING QUANTITIES FOR ROUND PIPE ARE BASED ON AASHTO DESIGNATED CLASS III (WALL B) REINFORCED CONCRETE PIPE.
- WHEN REQUIRED, THE SIDES OF THE TRENCHES SHALL BE SHEETED AND SHORED OR OTHERWISE SUPPORTED WHEN THE TRENCH IS MORE THAN 5.0 FEET IN DEPTH. IN LIEU OF SHEETING, THE SIDES OF THE TRENCH ABOVE THE 5.0 FOOT LEVEL MAY BE SLOPED TO PRECLUDE COLLAPSE, SEE OPTIONAL TRENCHES DETAIL THIS SHEET.
- PROPER COMPACTION OF BACKFILL REQUIRES A VERTICAL WALLED TRENCH TO 24 INCHES ABOVE TOP OF PIPE, REGARDLESS OF EXCAVATION ABOVE THAT ELEVATION.
- EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
- ELLIPTICAL PIPE DIMENSIONS CONFORM TO AASHTO M 207, AS DESIGNATED RISE BY SPAN.
- FOR COMPUTING TRENCH EXCAVATION & STANDARD BEDDING QUANTITIES, THE LENGTH OF THE CULVERT SHALL INCLUDE END SECTION AND END TREATMENT LENGTHS.
- MULTIPLE PIPE INSTALLATIONS WILL REQUIRE A MINIMUM OF 12" BETWEEN PIPES FOR PROPER COMPACTION.

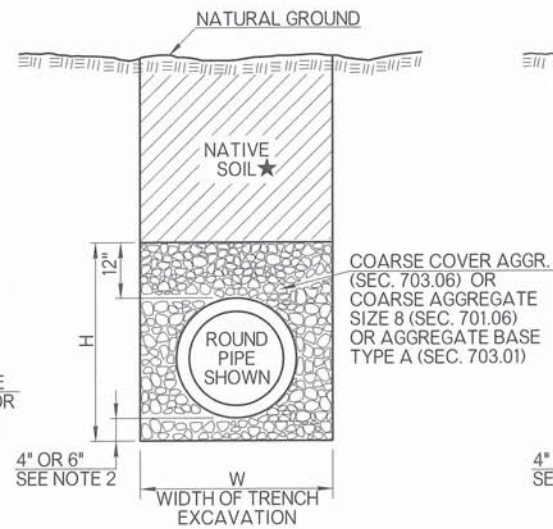
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY
613 (V)	TRENCH EXCAVATION	CY

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 02/10/15
ROADWAY DESIGN DIVISION STANDARD
DOT STANDARD PIPE INSTALLATION

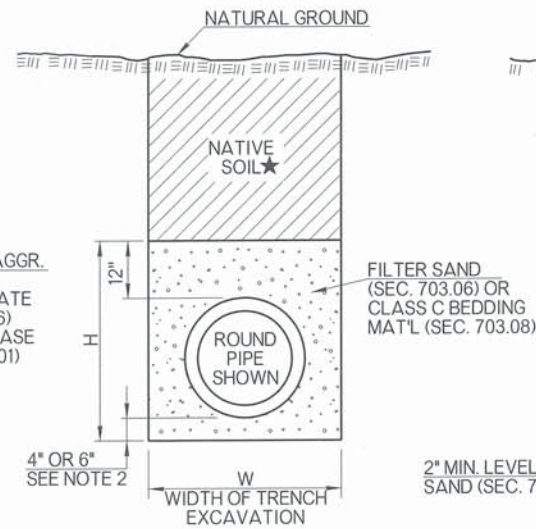
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



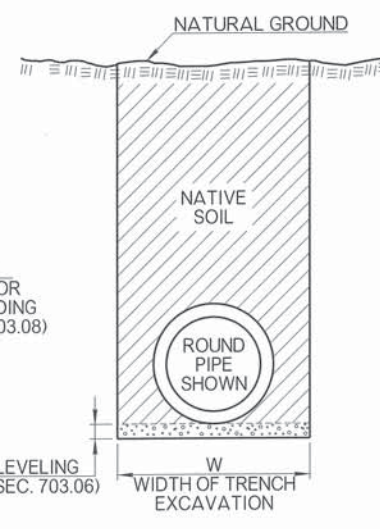
CLASS A BEDDING



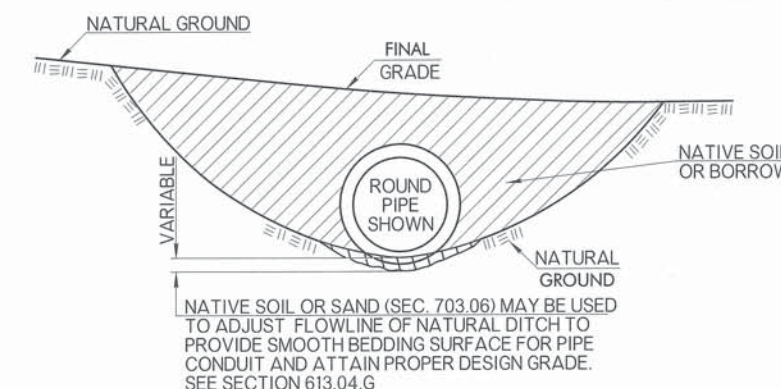
CLASS B BEDDING



CLASS C BEDDING



CLASS D BEDDING ALTERNATE 1



CLASS D BEDDING ALTERNATE 2

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
- NATIVE SOIL FOR BACKFILL, TO BE COMPACTED IN ACCORDANCE WITH SECTION 202.04 OF THE STANDARD SPECIFICATIONS.
- A BETTER CLASS OF BEDDING MAY BE SUBSTITUTED FOR THE NEXT LOWER CLASS. EXAMPLE: CLASS A STANDARD BEDDING CAN BE USED IN LIEU OF CLASS B STANDARD BEDDING.
- FOR TRENCH WIDTH (W), BEDDING HEIGHT (H), PIPE DATA, MULTIPLE PIPE SPACING & BEDDINGS DATA, SEE ROADWAY STANDARDS SPI-4 & FPI-3.
- DATA TABLE WILL DISPLAY 'NA' WHEN PIPE MATERIALS ARE NOT ALLOWED.
- STANDARD BEDDING CLASS D MATERIAL (S) (ALTERNATE 1) WILL BE CONSIDERED AS INCIDENTAL AND NOT BE PAID FOR SEPARATELY. COST FOR BORROW OR FILL MATERIAL, NEEDED FOR ALTERNATE 2, WILL BE INCLUDED IN THE PRICE OF THE PIPE.
- PIPE MATERIAL (S) / PRODUCT (S) NOT SHOWN IN THE PIPE BEDDING TABLE WILL BE EVALUATED AND APPROVED ON A CASE BY CASE BASIS.
- ALL TEMPORARY PIPES SHALL HAVE CLASS D BEDDING UNLESS OTHERWISE SHOWN IN THE PLANS.
- BEDDING MATERIAL TYPE B, C, AND D, SHALL BE PLACED IN 6" LAYERS AND COMPACTED TO THE SPECIFIED DENSITY USING HAND OPERATED EQUIPMENT ONLY.
- ★ WHEN PIPE INSTALLATION IS UNDER PAVING, IN LIEU OF BACKFILLING WITH NATIVE SOIL, PLACE BEDDING MATERIAL ALL THE WAY TO TOP OF TRENCH.
- THE USE OF AN ALTERNATE PIPE AND ITS CORRESPONDING BEDDING MATERIAL WILL BE ACCEPTABLE PROVIDED THE CRITERIA IN THE DESIGN TABLE IS MET
- POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.

PIPE BEDDING CLASS/DESIGN TABLE							
TYPE OF PIPE	■ UNDER PAVING				OUTSIDE PAVING		
	CROSS DRAIN (NHS OR ADT > 6000 VPD)	CROSS DRAIN (OTHER)	STORM SEWER (NHS OR ADT > 6000 VPD)	STORM SEWER (OTHER)	CROSS DRAIN	SIDE DRAIN	STORM SEWER
REINFORCED CONCRETE PIPE	B	C	B	C	C	D	C
CORRUGATED GALV. STEEL PIPE (CGSP)	NA	B	NA	B	C	D	C
MILL PRECOATED CGSP	NA	B	NA	B	C	D	C
CORRUGATED GALV. STRUCT. PLATE	NA	B	NA	B	C	D	C
ALUMINIZED TYPE II CSP	NA	B	NA	B	C	D	C
CORRUGATED POLYETHYLENE / PVC	NA	A	NA	A	B	B	B
POLYVINYL CHLORIDE (SC 40/80 PVC)	NA	NA	NA	NA	NA	NA	NA
POLYPROPYLENE PIPE (PP) ▲	NA	B	NA	B	C	D	C

- WHEN THERE IS ANY POSSIBILITY OF THE PAVEMENT BEING WIDENED DURING THE LIFE OF THE DRAINAGE STRUCTURE, THE BEDDING SHALL MEET THE 'UNDER PAVING SECTION' CRITERIA FOR THE FULL EXTENT OF ANY ANTICIPATED EXPANSION TO THE FACILITY.
- ▲ BACKFILL WITH A MINIMUM OF TWO (2) FEET OF APPROVED BACKFILL MATERIAL.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY

APPROVED BY ROADWAY ENGINEER: *Caleb A.* DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

DOT STANDARD PIPE BEDDING

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

SPB-1	4
R-49	

STANDARD REVISIONS	
DESCRIPTION	DATE

FULL CIRCLE STEEL PIPE CULVERT											
PIPE DIAMETER FOR CORRUGATION PATTERN				MIN. COVER	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE						
					EQUIV. STANDARD GAGE						
2 2/3" x 1/2"	3" x 1"	5" x 1"	6" x 2"	TOP OF PIPE TO TOP OF SUBGRADE	16	14	12	10	8	7	5
18"				12"	61'	67'	86'	90'	94'		
21"				12"	53'	57'	74'	77'	81'		
24"				12"	46'	50'	65'	68'	71'		
27"				12"	41'	44'	57'	60'	63'		
30"				12"	37'	40'	52'	54'	56'		
36"				12"	30'	33'	43'	45'	47'		
	36"			12"	53'	66'	77'	89'	100'		
42"				12"	34'	44'	46'	47'	49'		
	42"			12"	45'	56'	64'	71'	78'		
48"				12"		41'	44'	45'	46'		
	48"			12"	39'	49'	56'	61'	66'		
		48"		12"	49'	52'	56'	61'	66'		
54"				12"		36'	43'	44'	45'		
	54"			12"	35'	44'	51'	55'	58'		
		54"		12"	47'	48'	52'	55'	58'		
60"				12"			42'	43'	43'		
	60"			12"	31'	39'	49'	51'	53'		
		60"		12"	43'	46'	49'	51'	53'		
			60"	12"			46'	68'	90'	96'	106'
66"				12"				42'	43'		
	66"			12"	29'	36'	47'	48'	50'		
		66"		12"	39'	45'	47'	48'	50'		
			66"	12"			42'	78'		82'	90'
72"				12"				42'	42'		
	72"			12"	26'	33'	45'	47'	48'		
		72"		12"	36'	44'	45'	47'	48'	73'	78'
			72"	12"				38'	57'	69'	
78"				12"					42'		
	78"			12"	24'	30'	44'	45'	46'		
		78"		12"	33'	42'	44'	45'	46'		
			78"	12"			35'	53'	63'	66'	70'
84"				12"					42'		
	84"			12"	22'	28'	42'	44'	45'		
		84"		12"	31'	39'	43'	44'	45'		
			84"	12"			33'	49'	59'	61'	64'
				12"			26'	39'	44'	44'	
				12"	29'	36'	43'	44'	44'		
				12"			31'	45'	55'	57'	60'
				12"			24'	36'	43'	44'	
				12"			34'	43'	43'	44'	
				12"			29'	43'	53'	54'	57'
				24"			34'	41'	43'		
				24"			32'	42'	43'	43'	
				24"			42'	42'	43'		
				24"			25'	38'	49'	50'	52'
				24"			31'	37'	41'		
				24"			40'	42'	42'		
				24"			29'	35'	39'		
				24"			38'	42'	42'		
				24"			23'	34'	45'	48'	49'

FULL CIRCLE ALUMINUM PIPE CULVERT											
PIPE DIAMETER FOR CORRUGATION PATTERN				MIN. COVER	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE						
					EQUIV. STANDARD GAGE						
2 2/3" x 1/2"	3" x 1"	6" x 1"		TOP OF PIPE TO TOP OF SUBGRADE	16	14	12	10	8		
18"				12"	36'	36'	63'				
24"				12"	27'	27'	47'	50'			
27"				12"	24'	24'	42'	44'			
30"				12"	22'	21'	37'	39'			
	30"			12"	40'	50'	68'				
36"				12"		18'	32'	33'			
	36"			12"	33'	41'	57'	85'			
		36"		12"	20'						
42"				12"			54'	57'			
	42"			12"			27'	35'	48'	73'	
48"				12"			47'	49'	51'		
	48"			12"	24'	30'	42'	63'	82'		
54"				12"			41'	44'	45'		
	54"			12"	21'	27'	37'	56'	73'		
		54"		12"			29'	42'	67'	66'	
60"				12"				39'	41'		
	60"			12"	19'	24'	33'	24'	66'		
		60"		12"		25'	37'	59'	58'		
66"				12"				36'	37'		
	66"			12"	14'	18'	26'	40'	51'		
		66"		12"			23'	33'	53'	52'	
			66"	12"			28'	27'	41'	54'	
				15"			19'	27'	36'	43'	
				15"			18'	25'	38'	50'	
				15"			17'	25'	32'	40'	
				18"			17'	23'	35'	47'	
				18"				23'	30'	37'	
				18"				21'	33'	43'	
				18"				21'	28'	34'	
				18"				20'	31'	40'	
				18"				19'	26'	32'	
				21"				18'	28'	37'	
				21"				18'	25'	29'	
				21"					27'	35'	
				24"					23'	28'	
				24"					16'	21'	26'
				24"						24'	32'
				24"						20'	25'

METAL PIPE ARCH - FILLS TO 10 FT. MAX.					
APPROX. EQUIV. ROUND PIPE	SIZE SPAN x RISE	2 2/3" x 1/2" CORRUGATION PATTERN			
		STEEL		ALUMINUM	
		MIN. GAGE	MIN. COVER	MIN. GAGE	MIN. COVER
15"	17" x 13"	16	12"	16	12"
18"	21" x 15"	16	12"	16	12"
21"	24" x 18"	16	12"	16	12"
24"	28" x 20"	16	12"	14	12"
30"	35" x 24"	14	12"	14	12"
36"	42" x 29"	14	12"	12	15"
42"	49" x 33"	14	12"	12	15"
48"	57" x 38"	12	12"	10	15"
54"	64" x 43"	12	12"	10	18"
60"	71" x 47"	10	12"	8	18"
66"	77" x 52"	8	12"	8	18"
72"	83" x 57"	8	12"	8	18"
3" x 1" & 5" x 1" CORRUGATION PATTERN					
36"	40" x 31"	14	12"		
42"	46" x 36"	14	12"		
48"	53" x 41"	14	12"		
54"	60" x 46"	14	12"	14	15"
60"	66" x 51"	14	12"	14	18"
66"	73" x 55"	14	12"	14	18"
72"	81" x 59"	14	12"	12	21"
78"	87" x 63"	14	12"	12	21"
84"	95" x 67"	12	12"	12	24"
90"	103" x 71"	12	18"	10	24"
96"	112" x 75"	12	18"	10	27"
102"	117" x 79"	12	18"		
108"	128" x 83"	10	24"		
114"	137" x 87"	10	24"		
120"	142" x 91"	10	24"		

WHEN INSTALLED UNDER PAVEMENT INCLUDING ALL P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS, A MINIMUM PIPE GAGE OF 16 MAY BE USED FOR INSTALLATION REQUIRING 30 INCH-EQUIVALENT ROUND CONDUITS (MAX.) AND LIMITED TO LOW VOLUME COUNTY OR OFF-SYSTEM ROADS, MINOR STREET RETURNS, DRIVEWAYS OR TEMPORARY DETOURS, AS APPROVED BY THE ENGINEER.

GENERAL NOTES


- METAL PIPE FILL HEIGHT DESIGNS ARE BASED ON A CLASS B BEDDING, NEGATIVE PROJECTION, HS-20 LIVE LOADING AND 120 LBS/C.F. SOIL WEIGHT. POLYPROPYLENE PIPE FILL HEIGHTS ARE BASED ON AASHTO M330 FOR POLYPROPYLENE, TYPE S, PIPE WITH OUTER CORRUGATED WALL AND SMOOTH INNER WALL.
- IN THE EVENT LOADS IN EXCESS OF HS-20 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF FOUR FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
- PROPER INSTALLATION PRACTICES MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARDS SPI-4, FPI-3 AND SPB-1. POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
- ANY PIPE DEFORMED PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE. SURFACE DISTRESS MUST BE REPAIRED TO THE SATISFACTION OF THE ENGINEER OR REPLACED AT THE CONTRACTOR'S EXPENSE.
- MAXIMUM FILL HEIGHTS ARE MEASURED TO TOP OF SUBGRADE (OR BOTTOM OF ASPHALT OR PC PAVEMENT) FOR METAL AND POLYPROPYLENE PIPES.

POLY-PROPYLENE PIPE DIAMETER	MAXIMUM FILL HEIGHT OVER CULVERT (FT.)			
	UNDER PAVEMENT		OUTSIDE PAVEMENT	
	95% COMPACT	90% COMPACT	Class C - 85% COMPACT	Class D - 85% COMPACT
18	25	18	16	13
24	22	16	14	12
30	23	17	13	12
36	22	16	11	11
42	22	15	11	11
48	21	15	11	10
60	23	16	11	10

REFER TO ROADWAY DESIGN STANDARD SPB-1 FOR MINIMUM FILL HEIGHT AND OTHER POLYPROPYLENE INSTALLATION DETAILS.

GAGE NUMBER	EQUIVALENT METAL THICKNESS AND GAGE	
	METAL THICKNESS (INCHES)	
	STEEL	ALUMINUM
16	0.064	0.060
14	0.079	0.075
12	0.109	0.105
10	0.138	0.135
8	0.168	0.164
7	0.188	----
5	0.218	----

- THE THICKNESS OF THE SHEET INCLUDES BOTH THE BASE STEEL AND THE COATING.
- THE THICKNESS SHOWN REFERS TO THE CLAD SHEET.

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 04/16/15
 ROADWAY DESIGN DIVISION STANDARD

FILL HEIGHT TABLES (METAL & POLYPROPYLENE PIPES)

REQUIRED PIPE CLASS FOR REINFORCED CONCRETE ROUND PIPE IN CUT SECTIONS													
PIPE DIAMETER	● MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE												
	1' TO 2'	2' THRU 10'	12'	14'	16'	18'	20'	25'	30'	35'	40'	45'	50'
12" 15" 18"	IV III III	II II	II II	II II	II II	II II	III II	III II	III II	III II	III II	III II	III II
24" 27" 30" 36"	III II II	II II	II III	III III	III IV	III IV	III IV	IV IV	IV IV	IV IV/V	IV IV/V	IV IV/V	IV IV/V
42" 48" 54" 60"	II II II	II II	III III	III III	III IV	IV IV	IV IV	IV IV	IV IV/V	IV/V IV/V	V V	IV/V IV/V	IV/V IV/V
66" 72" 78" 84"	II II II	II II	III III	III III	IV III	IV IV	IV IV	IV IV	IV/V IV/V	IV/V IV/V	V V	V V	V V
90" 96" 102" 108"	II II II	II II	II III	III III	III III	IV IV	IV IV	IV IV	IV/V IV/V	IV/V IV/V	V V	V V	V V

REQUIRED PIPE CLASS FOR REINFORCED CONCRETE ROUND PIPE IN FILL SECTIONS													
PIPE DIAMETER	● MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE												
	1' TO 2'	2' THRU 10'	12'	14'	16'	18'	20'	25'	30'	35'	40'	45'	50'
12" 15" 18"	IV III III	II II	III III	III III	IV IV	IV IV	IV IV	IV/V IV/V	V V	* *	* *	* *	* *
24" 27" 30" 36"	III II II	II II	III III	III III	IV IV	IV IV	IV IV	IV/V IV/V	V V	* *	* *	* *	* *
42" 48" 54" 60"	II II II	II II	III III	III III	IV III	IV IV	IV IV	IV/V IV/V	V V	* *	* *	* *	* *
66" 72" 78" 84"	II II II	II II	II III	III III	III III	IV IV	IV IV	IV/V IV/V	V V	V V	* *	* *	* *
90" 96" 102" 108"	II II II	II II	II III	III III	III III	IV IV	IV IV	IV/V IV/V	V V	V V	* *	* *	* *

* SPECIAL DESIGN PIPE. DESIGN METHOD TO CONFORM TO CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.

● FILL HEIGHT MEASURED FROM TOP OF PIPE TO TOP OF SUBGRADE.


REINFORCED CONCRETE ARCH/ELLIPTICAL PIPE					
▲ CLASS A - III ARCH CLASS HE - III HORIZONTAL ELLIPTICAL CLASS VE - IV VERTICAL ELLIPTICAL					
APPROXIMATE EQUIVALENT ROUND PIPE	ARCH SIZE SPAN x RISE	HORIZONTAL ELLIPTICAL SIZE RISE x SPAN	VERTICAL ELLIPTICAL SIZE RISE x SPAN	MINIMUM COVER	MAXIMUM COVER
15"	18" x 11"			12"	10'
18"	22" x 13"	14" x 23"	23" x 14"	12"	10'
24"	28" x 18"	19" x 30"	30" x 19"	12"	10'
30"	36" x 22"	24" x 38"	38" x 24"	12"	10'
36"	43" x 26"	29" x 45"	45" x 29"	12"	10'
42"	51" x 31"	34" x 53"	53" x 34"	12"	10'
48"	58" x 36"	38" x 60"	60" x 38"	12"	10'
54"	65" x 40"	43" x 68"	68" x 43"	12"	10'
60"	73" x 45"	48" x 76"	76" x 48"	12"	10'
66"		53" x 83"	83" x 53"	12"	10'
72"	88" x 54"	58" x 91"	91" x 58"	12"	10'
78"		63" x 98"	98" x 63"	12"	10'
84"	102" x 62"	68" x 106"	106" x 68"	12"	10'
90"	115" x 72"	72" x 113"	113" x 72"	12"	10'
96"	122" x 77"	77" x 121"	121" x 77"	12"	10'
102"		82" x 128"	128" x 82"	12"	10'
108"	138" x 87"	87" x 136"	136" x 87"	12"	10'
114"		92" x 143"	143" x 92"	12"	10'
120"		97" x 151"	151" x 97"	12"	10'

▲ DIMENSIONS LISTED FOR ARCH PIPE IN PAY ITEMS SHOW TRUNCATED INCHES.

GENERAL NOTES

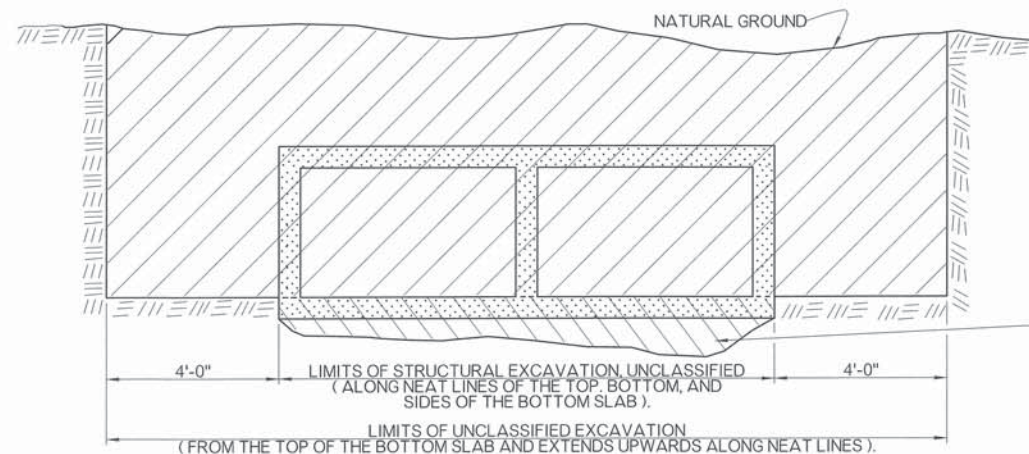
- FILL HEIGHT DESIGNS ARE BASED ON A CLASS B BEDDING, NEGATIVE PROJECTION, HS-20 LIVE LOADING, AND 120 LBS/C.F. SOIL WEIGHT.
- MINIMUM HEIGHT OF COVER FROM TOP OF PIPE TO TOP OF SUBGRADE FOR REINFORCED CONCRETE PIPE SHALL BE 12 INCHES.
- IN THE EVENT LOADS IN EXCESS OF HS-20 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF FOUR FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
- PROPER INSTALLATION PRACTICES MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARDS SPI-4, FPI-3 AND SPB-1.
- ANY PIPE CRACKED PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE. SURFACE DISTRESS MUST BE REPAIRED TO THE SATISFACTION OF THE ENGINEER, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
- PIPE DIMENSIONS LISTED IN TABLES CONFORM TO 2005 AASHTO DESIGNATIONS.
- CLASS IV/V REINFORCED CONCRETE PIPE SHALL MEET STRENGTH TEST REQUIREMENTS OF A MAXIMUM 2000 POUNDS FOR CLASS IV AND 3000 POUNDS FOR CLASS V PIPE - FORCE PER LINEAR FOOT PER FOOT OF DIAMETER TO PRODUCE A 0.01 INCH CRACK, CONFORMING TO TEST PROCEDURE REFERENCES IN AASHTO M 170.

APPROVED BY
ROADWAY ENGINEER: *Calvin A.* DATE: 04/16/15
ROADWAY DESIGN DIVISION STANDARD

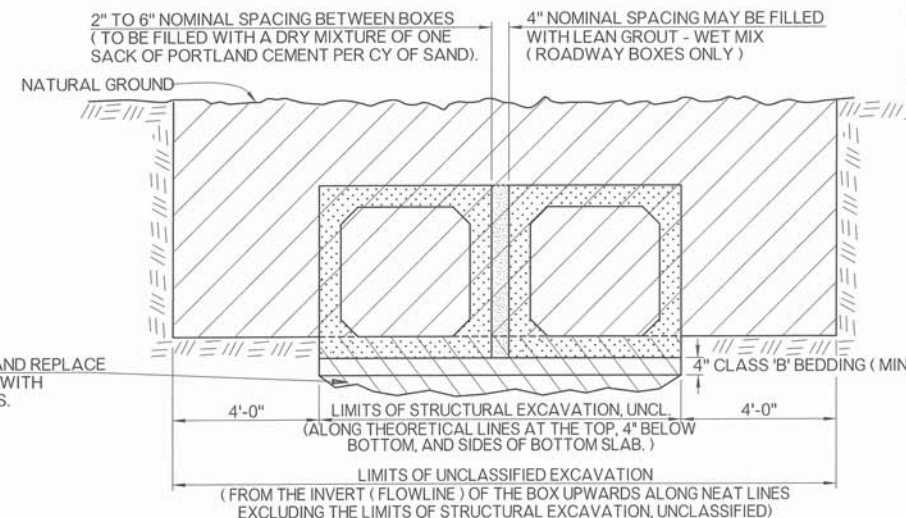


FILL HEIGHT TABLES
(CONCRETE PIPES)

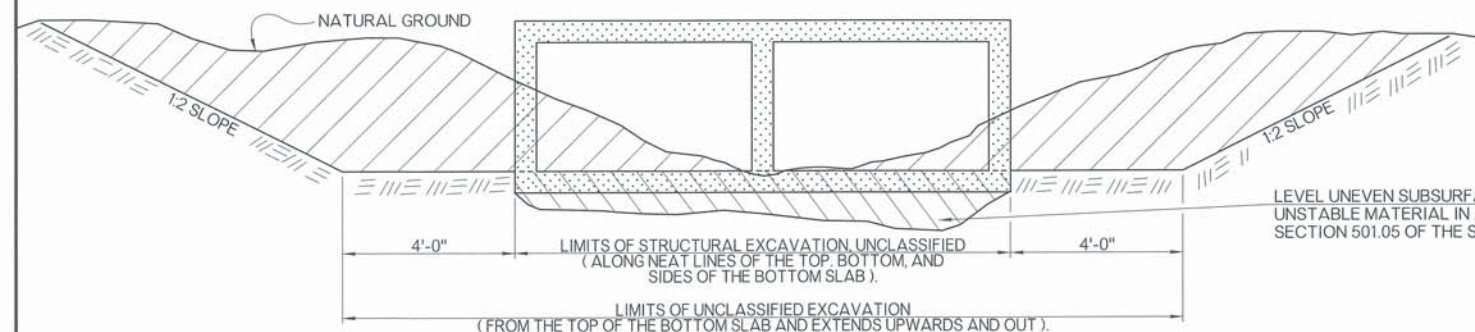
STANDARD REVISIONS	
DESCRIPTION	DATE



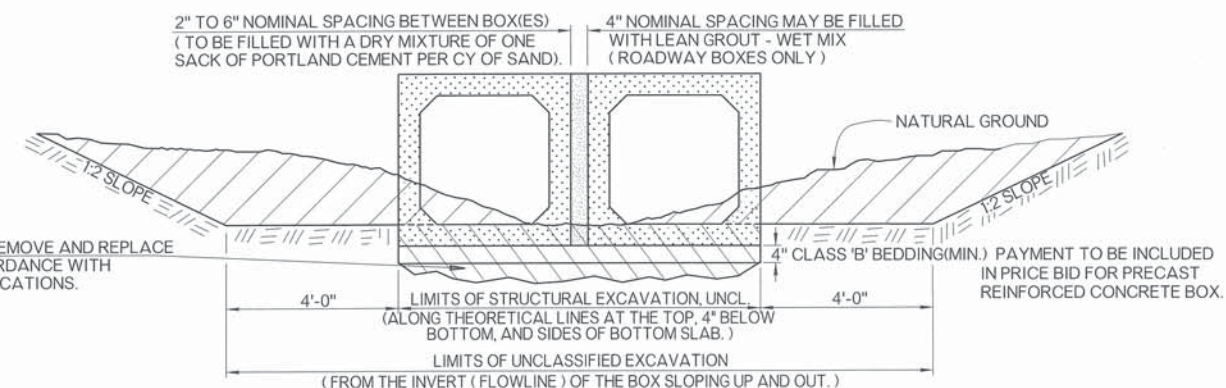
REQUIREMENTS FOR UNCLASSIFIED AND STRUCTURAL EXCAVATION OF RCB STORM SEWERS



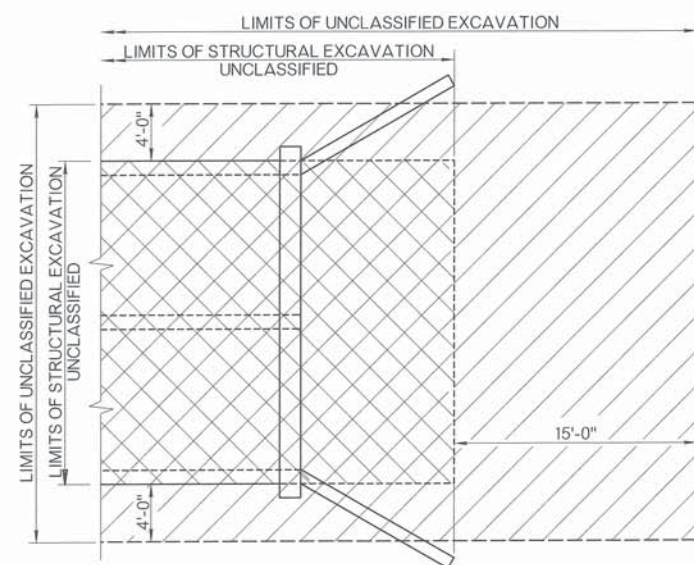
REQUIREMENTS FOR EXCAVATION OF PRECAST RCB STORM SEWERS



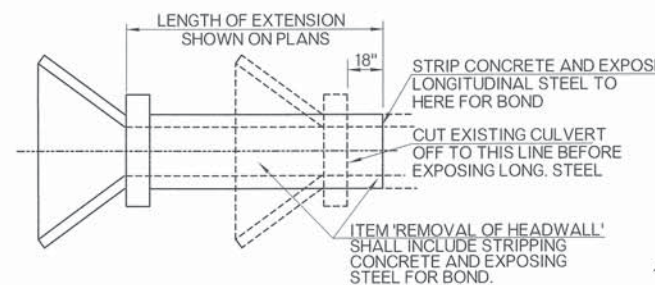
REQUIREMENTS FOR UNCLASSIFIED AND STRUCTURAL EXCAVATION OF RCB CULVERTS OF ROADWAY AND BRIDGE CLASSIFICATION



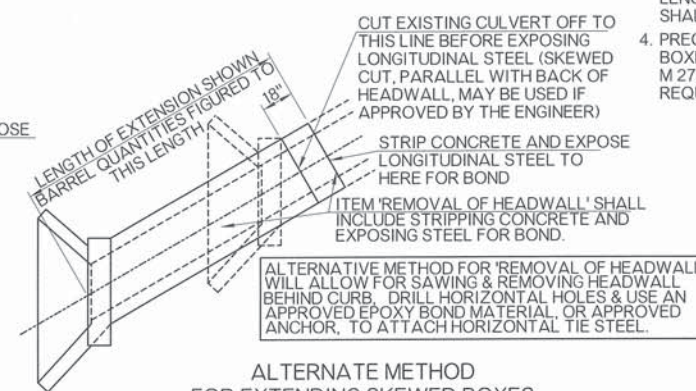
REQUIREMENTS FOR EXCAVATION OF PRECAST RCB CULVERTS OF ROADWAY AND BRIDGE CLASSIFICATION



PLAN VIEW



ALTERNATE METHOD FOR EXTENDING 90° BOXES



ALTERNATE METHOD FOR EXTENDING SKEWED BOXES

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. PAYMENT FOR CAST-IN-PLACE REINFORCED CONCRETE BOXES WILL BE IN CUBIC YARDS OF CLASS A OR CLASS AA CONCRETE AND POUNDS OF REINFORCING STEEL, IN ACCORDANCE WITH SECTION 509 AND 511 OF THE SPECIFICATIONS.
3. PAYMENT FOR PRECAST CONCRETE BOX CULVERTS WILL BE MADE BASED ON THE UNIT PRICE BID FOR ITEMS AND QUANTITIES OF A CAST-IN-PLACE BOX OF THE LENGTH REQUIRED AS DETERMINED BY FIELD MEASUREMENTS, AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 508 OF THE SPECIFICATIONS.
4. PRECAST CONCRETE BOX SECTIONS, USED IN LIEU OF CAST-IN-PLACE CONCRETE BOXES, SHALL MEET MINIMUM DESIGN REQUIREMENTS OF AASHTO M 259 OR M 273, AND ASTM C1433 OR C1577, AND JOINT FILLER SHALL MEET THE REQUIREMENTS OF SUBSECTION 726.01.B OF THE SPECIFICATIONS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
202 (A)	UNCLASSIFIED EXCAVATION	CY
501 (A)	STRUCTURAL EXCAVATION UNCLASSIFIED	CY
619 (B)	REMOVAL OF HEADWALL	EA

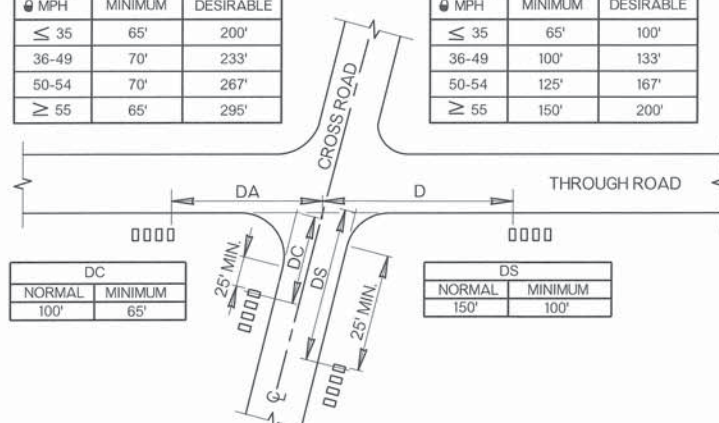
APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 04/16/15
 ROADWAY DESIGN DIVISION STANDARD
DOT STANDARD BOX INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	

● SPEED FACTOR MAY BE DESIGN SPEED, OBSERVED SPEED OR ASSIGNED SPEED BASED UPON PREDICTABLE GROWTH FACTORS OR PENDING IMPROVEMENTS.

THRU ROAD SPEED MPH	DA		THRU ROAD SPEED MPH	D	
	MINIMUM	DESIRABLE		MINIMUM	DESIRABLE
≤ 35	65'	200'	≤ 35	65'	100'
36-49	70'	233'	36-49	100'	133'
50-54	70'	267'	50-54	125'	167'
≥ 55	65'	295'	≥ 55	150'	200'

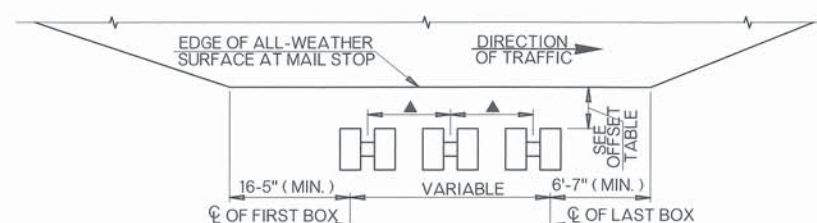
DC	DS	
	NORMAL	MINIMUM
100'	100'	100'
65'	65'	100'



SUGGESTED MINIMUM CLEARANCE DISTANCES TO NEAREST MAILBOX IN MAIL STOPS AT INTERSECTIONS

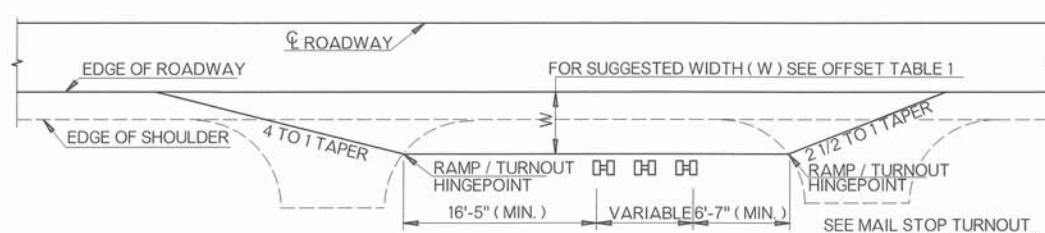
HIGHWAY TYPE AND TRAFFIC CONDITIONS	OFFSET TABLE			
	WIDTH OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX		DISTANCE ROADSIDE FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURNOUT OR USABLE SHOULDER	
	PREFERRED	MINIMUM	PREFERRED	MINIMUM
RURAL HIGHWAY ADT OVER 10,000 VPD	12'	8'	8' TO 12'	0
RURAL HIGHWAY ADT 1,500 TO 10,000 VPD	12'	8'	8' TO 12'	0
RURAL HIGHWAY ADT 400 TO 1,500 VPD	10'	8'	8' TO 12'	0
RURAL ROAD ADT UNDER 400 VPD	8'	6'	8' TO 12'	10"
RURAL ROAD ADT UNDER 50 VPD SPEED 40 MPH OR LESS	6'	2'	8' TO 12'	0
RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER	6'	0	8' TO 12'	10" ●
CURBED STREET	NOT APPLICABLE		8" TO 12" BEHIND FACE OF CURB	6" BEHIND FACE OF CURB

ADT-AVERAGE DAILY TRAFFIC, THROUGH ROAD ONLY
VPD-VEHICLES PER DAY
● IF TURNOUT IS PROVIDED, THIS MAY BE REDUCED TO ZERO.



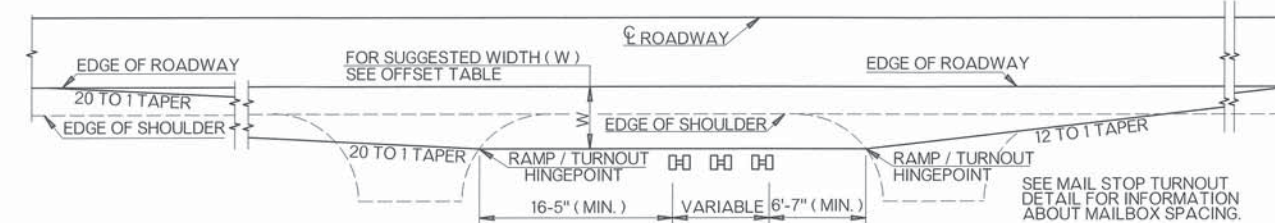
MAIL STOP TURNOUT DETAIL

▲ RECOMMENDED MINIMUM SPACING IS 3/4 OF THE DIMENSION FROM THE GROUND LINE TO THE BOTTOM OF THE MAILBOX



MAIL STOP LAYOUT

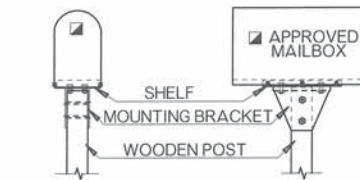
FOR ROADS CARRYING TRAFFIC AT 40 MPH OR LESS OR FOR LOCAL AND COLLECTOR ROADS



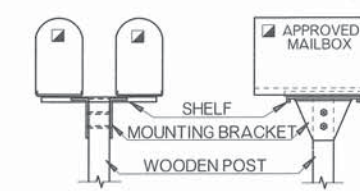
MAIL STOP LAYOUT

ROADS CARRYING TRAFFIC AT SPEED OVER 40 MPH

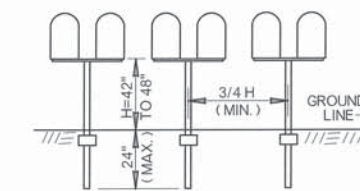
MAILBOX DESIGN TYPE	DIMENSIONS (NOM.)		
	LENGTH	WIDTH	HEIGHT
1	19"	6 1/2"	8 1/2"
1-A	21"	8"	10 1/2"
2	23 1/2"	11 1/2"	13 1/2"



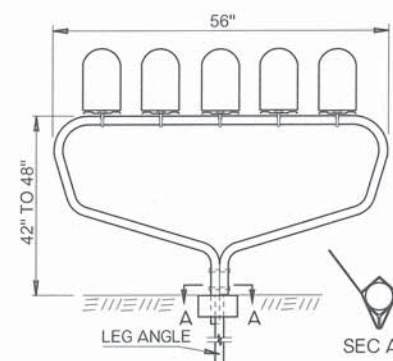
MAILBOX INSTALLATION - SINGLE WOODEN POST SUPPORT & BRACKET ASSEMBLY DETAILS



MAILBOX INSTALLATION - MULTIPLE (DOUBLE OR TWIN BOX)



POST SPACING DETAIL MULTIPLE BOX INSTALLATION SINGLE POST SERIES



MAILBOX INSTALLATION - MULTIPLE (MULTIPLE BOX SUPPORT DETAILS) MAXIMUM NUMBER OF MAILBOXES = 5

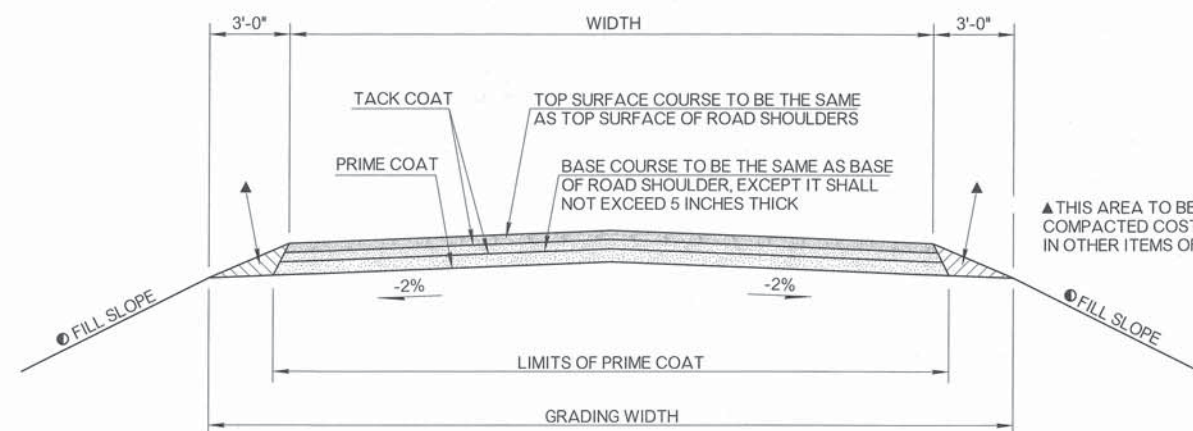
- GENERAL NOTES
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - MAILBOX INSTALLATION, SINGLE OR MULTIPLE TYPE, SHALL BE OF A DESIGN AND MATERIAL THAT HAS BEEN CRASH TESTED AND APPROVED. OTHER DESIGNS OR MAILBOX TYPES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
 - IF MAILBOX IS INSTALLED IN AN AREA WITH GUARDRAIL, MAILBOX AND/OR POST ASSEMBLY SHOULD BE BEHIND OR FLUSH WITH FACE OF RAIL.
 - PRODUCER AND CONTRACTOR SHALL AVOID PATENT INFRINGEMENT OF THE MAILBOX SUPPORT ASSEMBLY AND SHALL SAVE THE STATE HARMLESS IN THE USE OF ANY MAILBOX SUPPORT ASSEMBLY.
 - ALTERNATE WOODEN POST SUPPORT INSTALLATIONS MAY BE USED IN LIEU OF METAL PIPE SUPPORT UNITS IF WOODEN COMPONENTS CONFORM TO CURRENT SPECIFICATIONS.
 - PRICE OF EACH MAILBOX INSTALLATION, SINGLE OR MULTIPLE, INCLUDES PAYMENT FOR INSTALLATION OF THE POST SYSTEM, SUPPORT POST, ALL ATTACHMENT HARDWARE AND MOUNTING OF THE MAILBOX. PAYMENT FOR THE MAILBOX WILL BE PAID FOR BY THE EACH AND SEPARATELY FROM THE SUPPORT SYSTEM.
 - IF MAILBOX IS INSTALLED BEHIND CURB, ANY SIDEWALKS WILL REQUIRE A MINIMUM 3'-0" OF USABLE SPACE BEHIND THE MAILBOX.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
629 (A)	MAILBOX INSTALLATION - SINGLE	EA
629 (B)	MAILBOX INSTALLATION - MULTIPLE	EA
629 (C)	MAILBOX	EA
629 (D)	REMOVAL OF MAILBOX INSTALLATION	EA
629 (E)	REMOVE AND RESET MAILBOX	EA

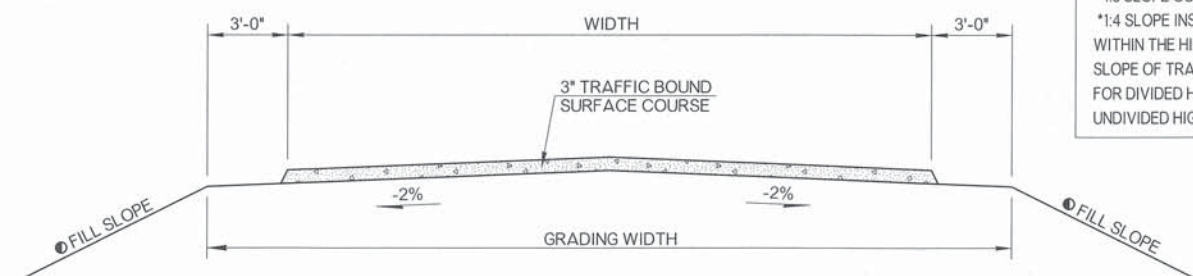
MAILBOX DESIGN TYPE(S) AND LOCATION(S) SHALL BE SPECIFIED IN THE PLANS.

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 02/11/15
ROADWAY DESIGN DIVISION STANDARD
DOT MAILBOX INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

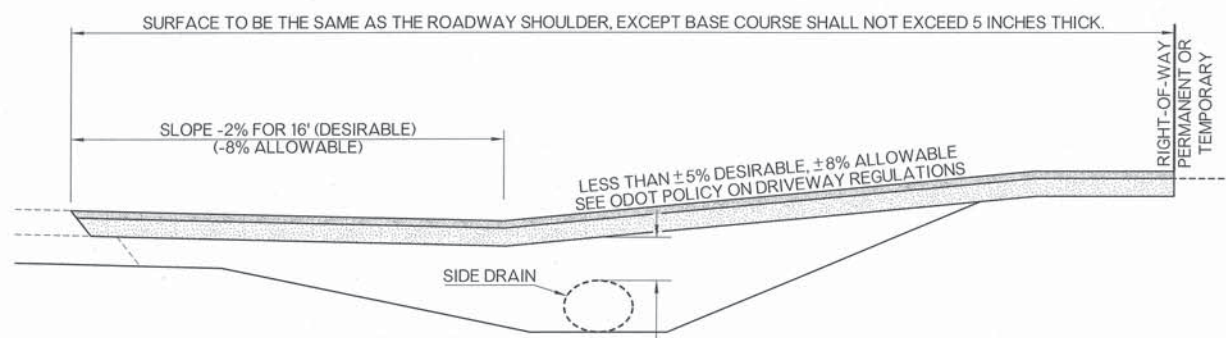


TYPICAL SECTION OF ASPHALT RETURN/DRIVE

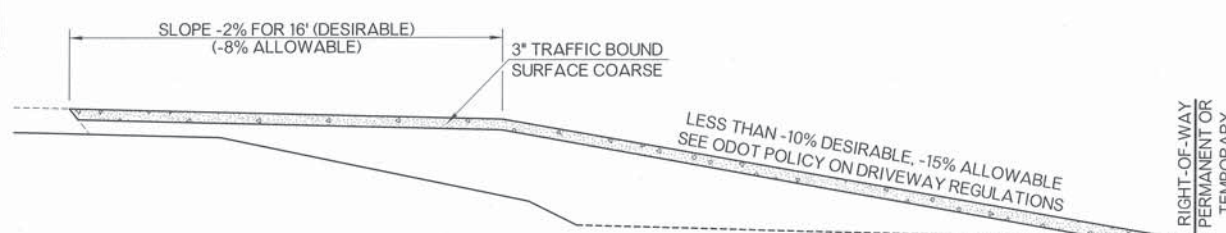


TYPICAL SECTION OF T.B.S.C. RETURN/DRIVE

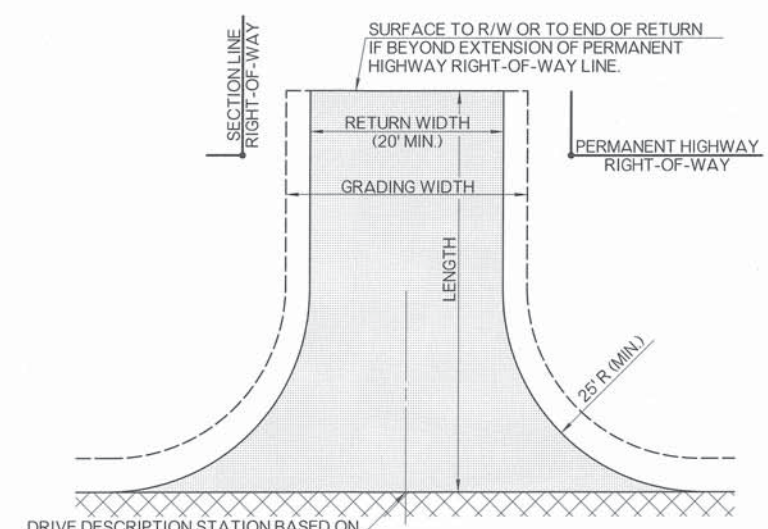
FILL SLOPE NOTES:
 FILL SLOPE AS SHOWN IN TYPICAL SECTIONS SHALL NOT EXCEED:
 *1:3 SLOPE OUTSIDE HIGHWAY CLEARZONE
 *1:4 SLOPE INSIDE HIGHWAY CLEARZONE
 WITHIN THE HIGHWAY CLEARZONE, ADJUST SLOPE OF TRAFFIC APPROACH END TO 1:10 FOR DIVIDED HIGHWAYS AND 1:6 FOR UNDIVIDED HIGHWAYS.



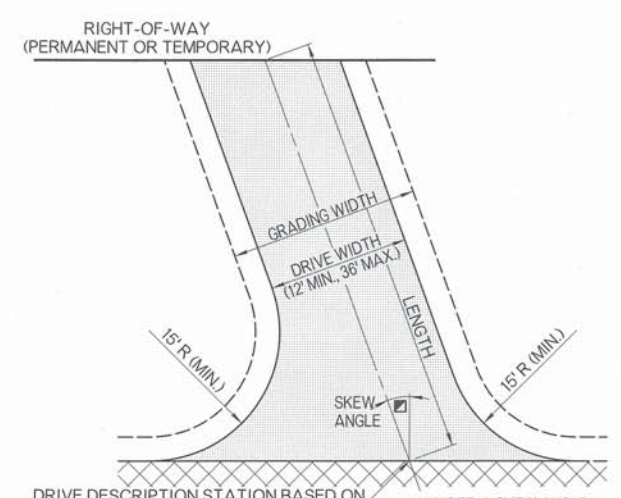
PROFILE OF TYPICAL ASPHALT RETURN/DRIVE ON ROADWAY CUT SECTION



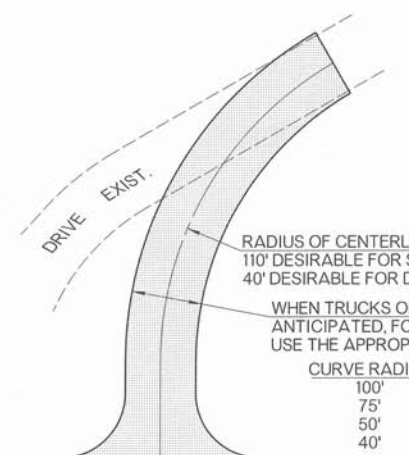
PROFILE OF TYPICAL T.B.S.C. RETURN/DRIVE ON ROADWAY FILL SECTION



PLAN TYPICAL SECTION LINE RETURN



PLAN TYPICAL DRIVE ON SKEW



SECTION LINE OR DRIVE WITH CURVED ALIGNMENT

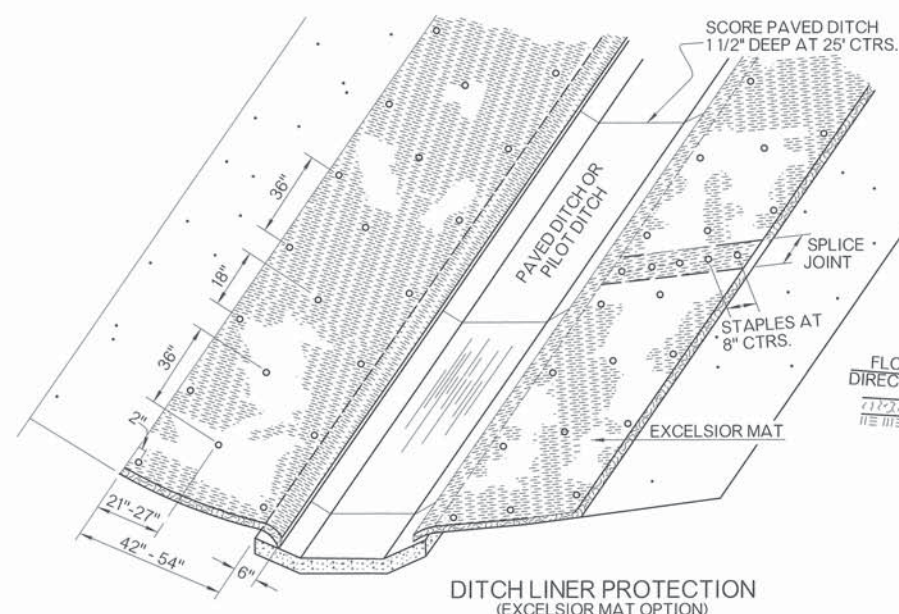
PROPOSED DRIVES AND RETURNS SHALL MATCH EXISTING EXCEPT WHEN SKEW ANGLE EXCEEDS 20 DEGREES; IT IS THEN DESIRED TO SHIFT THE LOCATION AND CONSTRUCT USING CURVED ALIGNMENT

USEFUL ABBREVIATIONS FOR PLAN SHEETS:

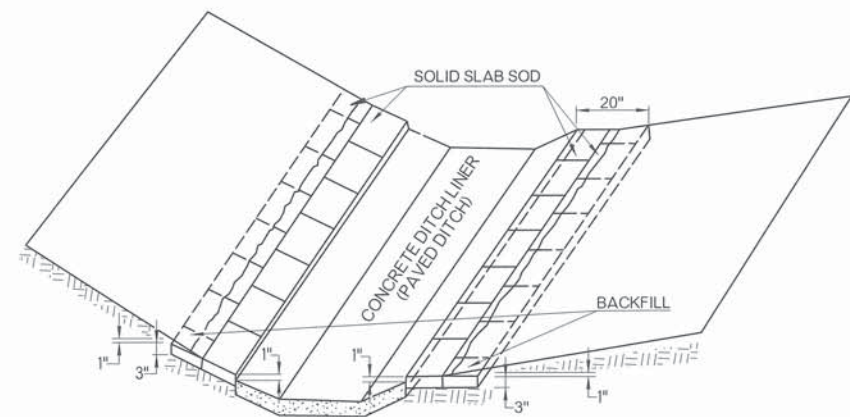
ASPH	.....	ASPHALT
T.B.S.C.	.....	TRAFFIC BOUND SURFACE COARSE
CONC.	.....	CONCRETE
SEC. RET.	.....	SECTION LINE RETURN
FIELD ENT.	.....	FIELD ENTRANCE
PVT. DRIVE	.....	PRIVATE DRIVE
COMM. DRIVE	.....	COMMERCIAL DRIVE
W/S.D.	.....	WITH SIDE DRAIN
AS DIKE	.....	AS DIKE ACROSS DITCH

APPROVED BY ROADWAY ENGINEER: *Callaf.A* DATE: 04/16/15
 ROADWAY DESIGN DIVISION STANDARD
DOT RURAL DRIVEWAY INSTALLATION

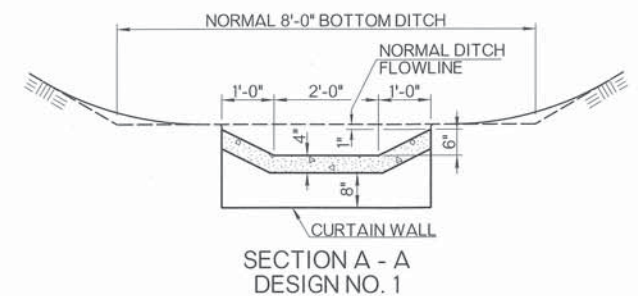
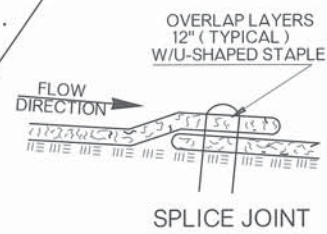
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



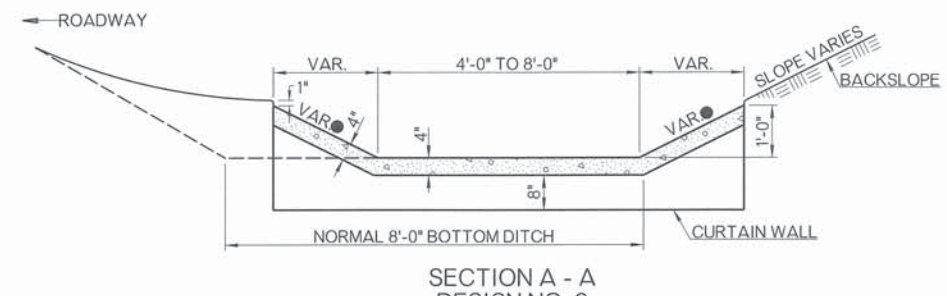
DITCH LINER PROTECTION
(EXCELSIOR MAT OPTION)



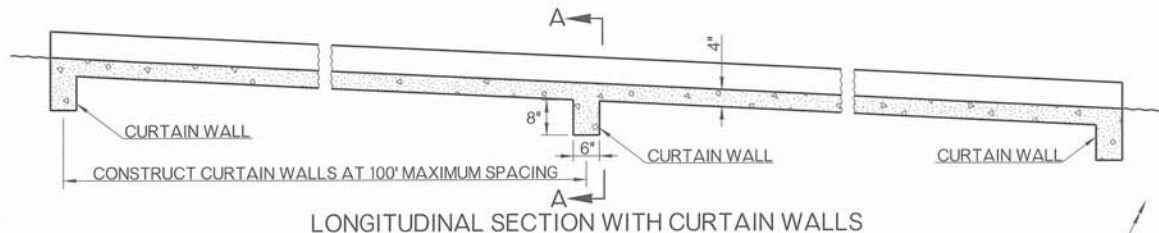
DITCH LINER PROTECTION
(SOLID SLAB SOD OPTION)



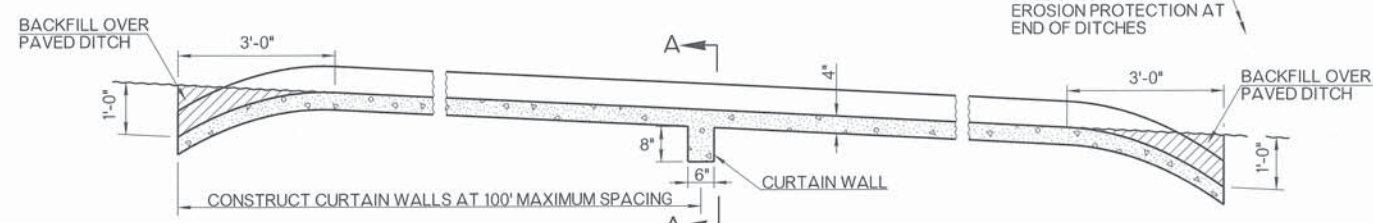
SECTION A - A
DESIGN NO. 1



SECTION A - A
DESIGN NO. 2



LONGITUDINAL SECTION WITH CURTAIN WALLS



OPTIONAL LONGITUDINAL SECTION WITH BURIED ENDS
(BURIED ENDS SHALL NOT BE USED ADJACENT TO DRAINAGE STRUCTURES)

DESIGN NO. 1 - A PAVED PILOT DITCH TO BE PLACED 6" BELOW THE NORMAL FLOWLINE AND IN THE CENTER OF A STANDARD DITCH

DESIGN NO. 2 - A DITCH THAT IS PAVED AND HAVING THE SAME FLOWLINE AS A STANDARD UNPAVED DITCH

QUANTITIES OF CLASS C CONCRETE PER LF OF PAVED DITCH											
QUANTITIES IN CUBIC YARDS											
DESIGN NO. 1						DESIGN NO. 2					
BOTTOM WIDTH	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	
K 1	.0522	.0645	.0769	.0892	.1016	.1274	.1397	.1521	.1644	.1768	DES. DES. DES. 2A 2B 2C
K 2	.0586	.0709	.0832	.0955	.1078	.1790	.1913	.2036	.2159	.2282	
● VARIABLE AS SHOWN ON PLANS						K 1	.1045	.1168	.1292	.1415	.1539
DESIGN 2A = 1:3 SLOPES						K 2	.1357	.1480	.1603	.1726	.1850
DESIGN 2B = 1:2 SLOPES						K 1	.0923	.1048	.1172	.1295	.1479
DESIGN 2C = 1:1 SLOPES						K 2	.1105	.1228	.1352	.1476	.1600
TOTAL CLASS C CONC. = (LENGTH OF PAVED DITCH) (K1) + (NO. OF CURT. WALLS) (K2)											
K1=CU. YDS. OF CONCRETE PER LINEAR FOOT											
K2=CU. YDS. OF CONCRETE PER CURTAIN WALL											

- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - ALL COST OF ADDITIONAL BORROW OR EXCAVATION, REQUIRED FOR INSTALLING PAVED DITCH, SHALL BE INCLUDED IN PRICE BID FOR CLASS C CONCRETE.
 - THE DITCH SHALL BE WATERED, AND COMPACTED, BEFORE PLACING CLASS C CONCRETE.
 - DITCH LINER PROTECTION MAY BE EITHER EXCELSIOR MAT, OR SOLID SLAB SOD, AND SHALL BE MEASURED BY THE LINEAR FOOT OF DITCH (PAVED DITCH), IN PLACE.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
509 (D)	CLASS C CONCRETE	CY
229	DITCH LINER PROTECTION	LF

APPROVED BY ROADWAY ENGINEER: *Calvin H.* DATE: 02/16/15

ROADWAY DESIGN DIVISION STANDARD

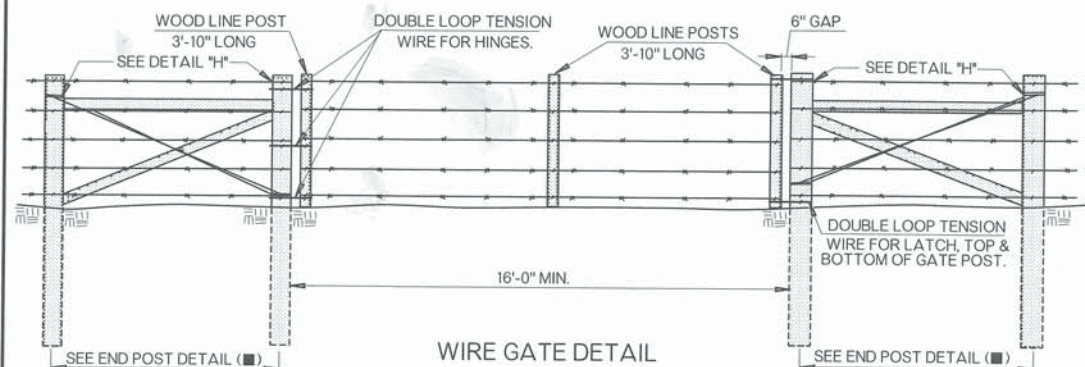
DOT

PAVED DITCHES AND FLUMES

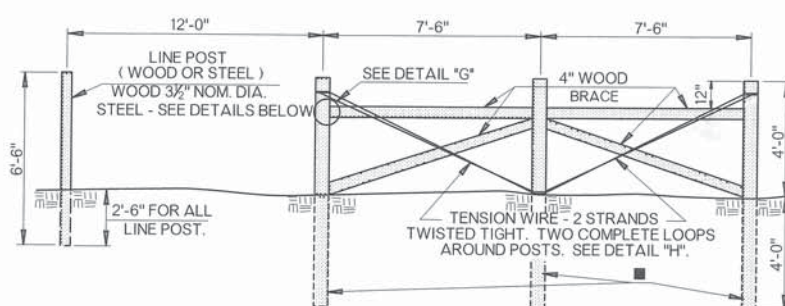
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

DC-3	2
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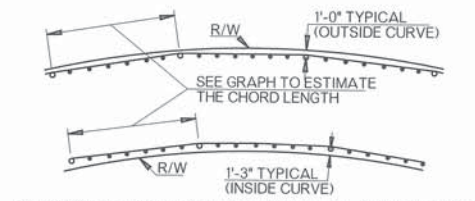
R-64



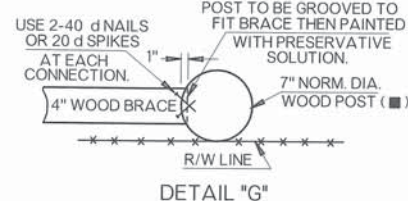
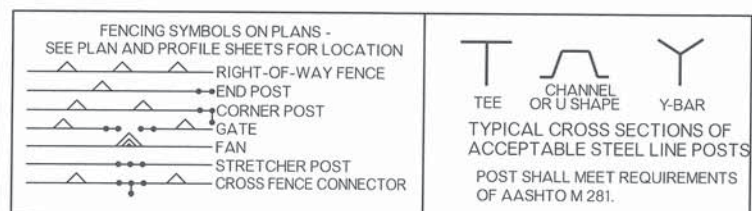
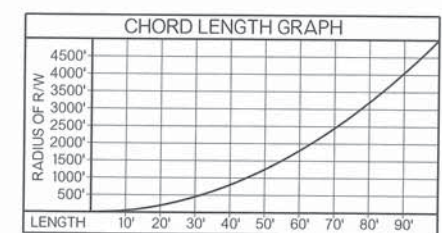
WIRE GATE DETAIL
LOCATION OF GATES TO BE DETERMINED BY THE ENGINEER. OTHER TYPES OF GATES MAY BE SUBSTITUTED FOR THE WIRE GATE, SUCH AS PREFABRICATED PIPE TUBING TYPES OR RANCH STYLE METAL PANEL TYPE, IF APPROVED BY THE ENGINEER. COST OF WIRE GATE SHALL BE INCLUDED IN THE PRICE BID FOR FENCE.



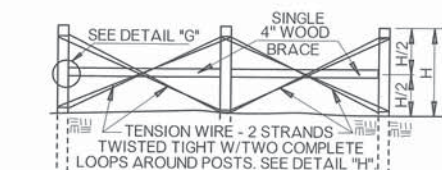
CORNER & STRETCHER POSTS DETAIL
USE STRETCHER DETAILS AT ALL CORNERS, BENDS IN R/W, ON HILL TOPS, IN VALLEYS OR DEEP DEPRESSIONS, AND AT 500' MAXIMUM SPACING.



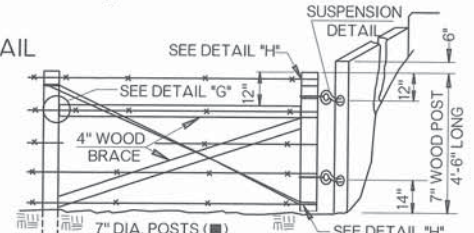
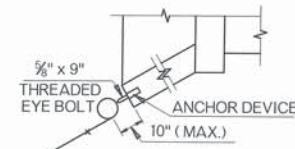
TYPICAL PLACEMENT FOR FENCE ALONG CURVES (WHEN R/W RADIUS IS LESS THAN 5000')



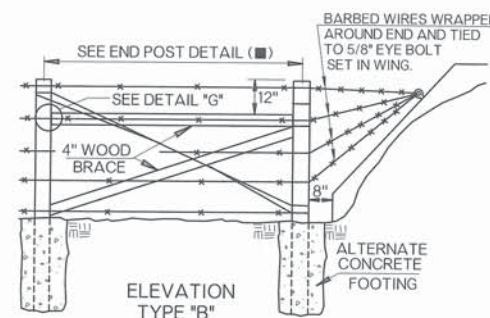
DETAIL 'G'
IF 3/2" DIA. x 8'-0" LONG GALV. STEEL (SCH. 40) PIPE IS USED AS ALTERNATIVE POST (■), THEN 2" DIA. GALV. STEEL PIPES (SCH. 40) WILL BE USED AS BRACING AND ATTACHED USING STANDARD CHAIN LINK FENCE HARDWARE MEETING THE REQUIREMENTS OF AASHTO M 181 & ASTM A53. SEE CHAINLINK DETAILS ON ROADWAY STANDARD RWF3-2.



CORNER & STRETCHER POSTS DETAIL ALTERNATIVE

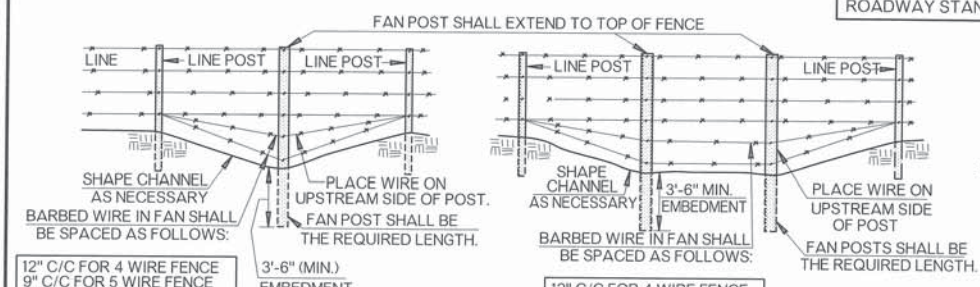


ELEVATION TYPE 'A'

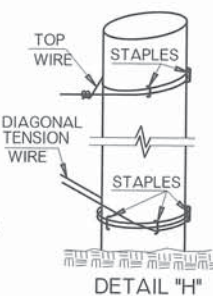


ELEVATION TYPE 'B'

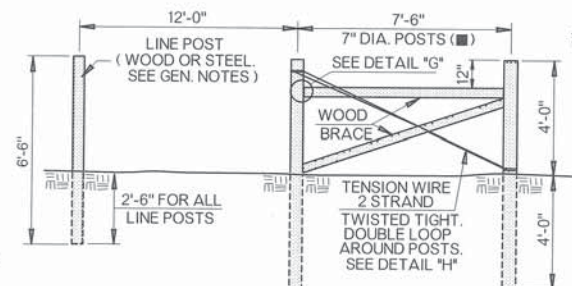
CONNECTIONS AT CULVERTS



TYPICAL FAN DETAILS
(FOR SMALL DRAINS AND IRREGULAR TERRAIN)

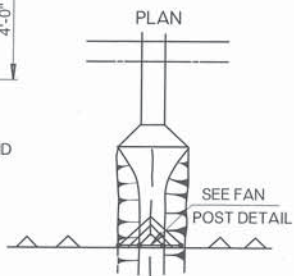


DETAIL 'H'



END POST DETAIL

USE FOR CROSS FENCE CONNECTIONS.
NOTE: ALL WIRES SHALL MAKE TWO COMPLETE WRAPS AROUND END POST, THEN AROUND THEMSELVES TWO TURNS. USE EXTRA STAPLES ON END POSTS. SEE DETAIL 'H'.



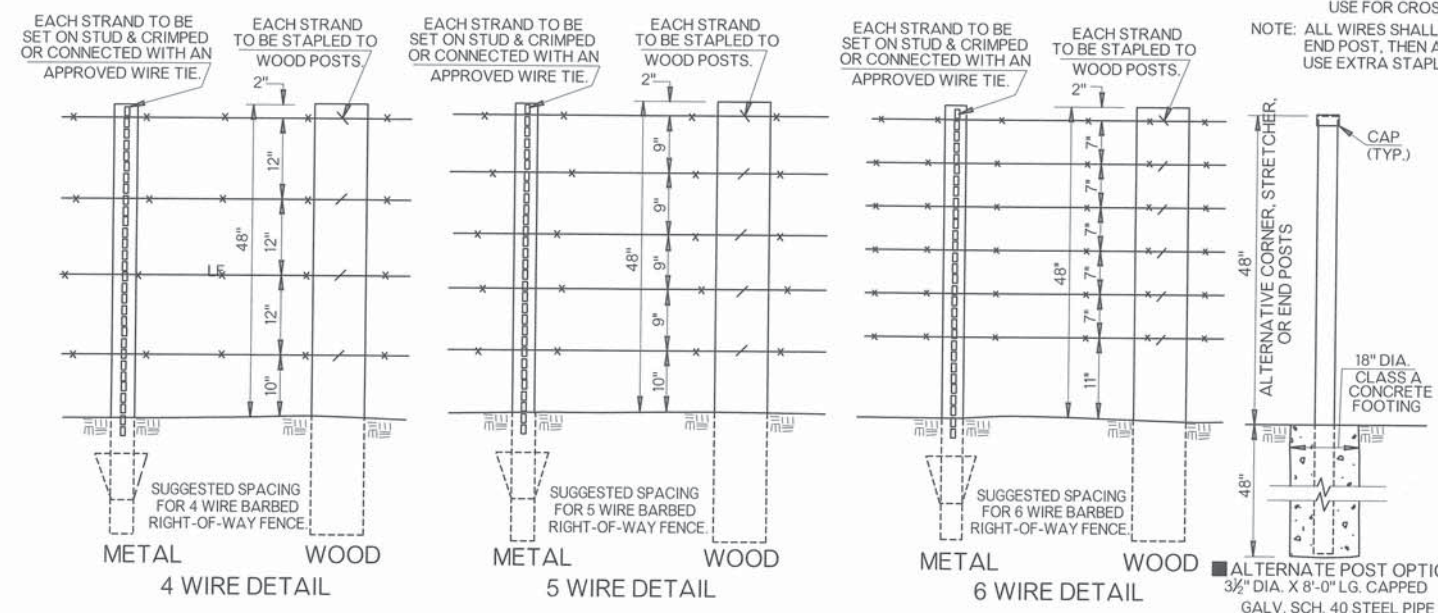
PLAN

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- FENCE, IN GENERAL, SHALL BE ON OUTSIDE OF POSTS AWAY FROM CENTERLINE OF HIGHWAY AND CONSTRUCTED ON THE PERMANENT RIGHT-OF-WAY (EXCEPTIONS ARE CORNERS AND CURVES).
- HINGES AND LOOP LATCH ON WIRE GATES SHALL BE FABRICATED FROM TENSION WIRE. THE HINGES (3 PER POST) SHALL BE FORMED OF DOUBLE LOOPS ON THE GATE POST. THE LOOP HINGES AROUND THE WIRE GATE POST SHALL BE FORMED LOOSE FOR EASE OF MOVEMENT. THE TOP 2 (TOP AND BOTTOM) LOOP STRETCHER POSTS TO BE USED IN GENERAL AT HILL TOPS AND AT BOTTOM OF VALLEYS AND AT A MAXIMUM OF 500 FEET APART.
- ALL MISCELLANEOUS HARDWARE SHALL BE FURNISHED GALVANIZED OR ALUMINUM COATED. ALL ALTERNATIVE METAL PIPE POSTS SHALL BE CAPPED.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
624 (C)	FENCE-STYLE SWF (● BARBED WIRE)	LF
624 (C)	FENCE-STYLE SWF (● SMOOTH WIRE)	LF
624 (C)	FENCE-STYLE SWF (● BARBLESS WIRE)	LF

● NUMBER OF STRANDS

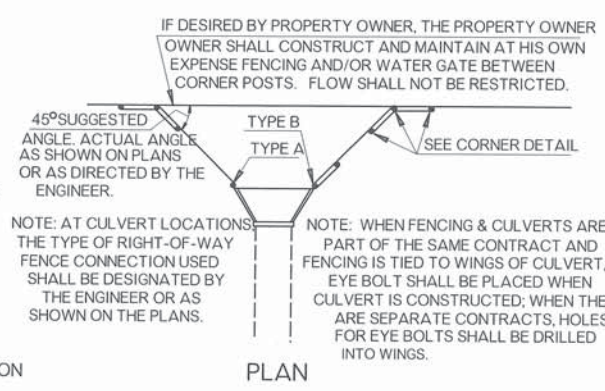


METAL 4 WIRE DETAIL

METAL 5 WIRE DETAIL

METAL 6 WIRE DETAIL

ALTERNATE POST OPTION
3/2" DIA. X 8'-0" LG. CAPPED
GALV. SCH. 40 STEEL PIPE



PLAN

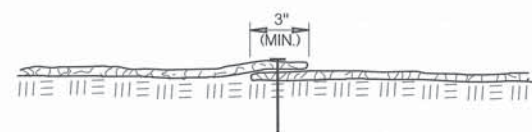
NOTE: AT CULVERT LOCATIONS THE TYPE OF RIGHT-OF-WAY FENCE CONNECTION USED SHALL BE DESIGNATED BY THE ENGINEER OR AS SHOWN ON THE PLANS.

NOTE: WHEN FENCING & CULVERTS ARE PART OF THE SAME CONTRACT AND FENCING IS TIED TO WINGS OF CULVERT, EYE BOLT SHALL BE PLACED WHEN CULVERT IS CONSTRUCTED; WHEN THEY ARE SEPARATE CONTRACTS, HOLES FOR EYE BOLTS SHALL BE DRILLED INTO WINGS.

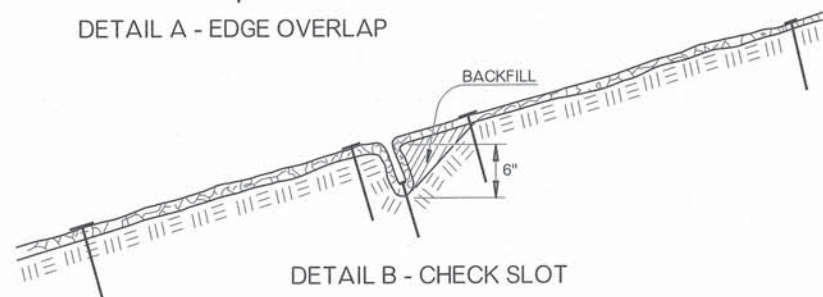
APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 02/11/15
ROADWAY DESIGN DIVISION STANDARD

DOT RIGHT-OF-WAY FENCE STYLE SWF (STRAND WIRE FENCE)

OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	

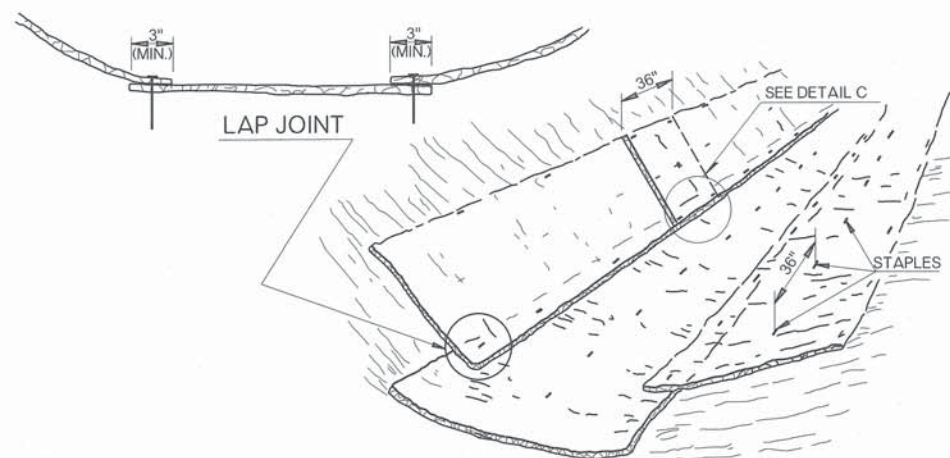


DETAIL A - EDGE OVERLAP



DETAIL B - CHECK SLOT

ALL SURFACES TO BE PROTECTED WITH NYLON EROSION CONTROL MAT, PRIOR TO PLACEMENT OF MAT, SHALL BE GRADED, SHAPED AND FINISHED SO THAT THE SURFACES ARE STABLE, FIRM AND FREE OF ROCKS OR OBSTRUCTIONS WHICH WOULD PREVENT THE MAT FROM LYING IN DIRECT CONTACT WITH THE SOIL SURFACE.



DETAIL OF DITCH PLACEMENT

DITCHES:

THREE WIDTHS OF MAT WILL BE REQUIRED FOR THE STANDARD DITCH PLACEMENT. THE CENTER WIDTH PLACED FIRST, THEN THE TWO SIDE WIDTHS. LAP JOINTS OF 3" SHALL BE USED.

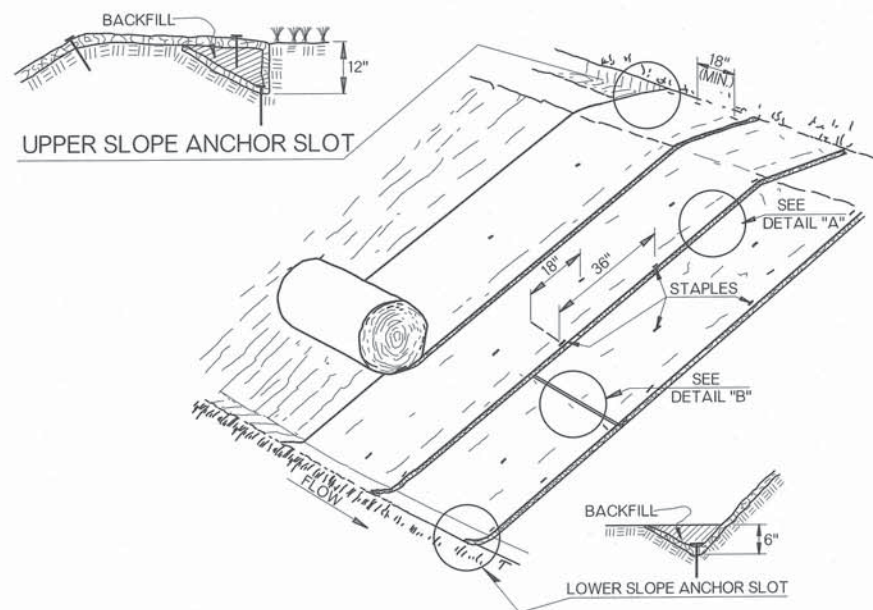
AT THE TERMINAL ENDS OF THE DITCH, THE MAT SHALL BE BURIED AT LEAST 12" VERTICALLY IN AN ANCHOR SLOT DUG INTO THE SOIL. THE MAT SHALL BE SECURED IN THE ANCHOR SLOT BY FASTENERS PRIOR TO BACKFILLING THE SLOT. THE BACKFILLED SOIL SHALL BE FIRMLY COMPACTED IN THE ANCHOR SLOT.

ON DITCHES WITH GRADES EXCEEDING 6 PERCENT, A 6" DEEP CHECK SLOT SHALL BE INSTALLED EVERY 25 FEET AND THE MAT SECURED IN THE CHECK SLOTS BY FASTENERS.

WHEN SEEDING DITCHES ONLY, MATS ARE INSTALLED AND APPROVED DURING THE NORMAL 'OUT OF PLANTING SEASON'. COMMON BERMUDA GRASS SEED AT THE RATE OF 6 LBS. PER ACRE SHALL BE UNIFORMLY SEEDED ON THE EXPOSED AREAS OF SOIL BENEATH THE MAT.

DURING THE 'PLANTING SEASON', THE SPECIFIED PLANT MATERIAL (SODDING, SPRIGGING OR SEEDING) SHALL BE COMPLETED PRIOR TO PLACING THE MAT IN THE DITCH.

WHEN SEEDING IS REQUIRED IN DITCHES, IT SHALL BE APPLIED BY SEEDING METHOD 'A', AS SPECIFIED IN SECTION 232.04.B OR HAND BROADCASTING.



DETAIL OF SLOPE PLACEMENT

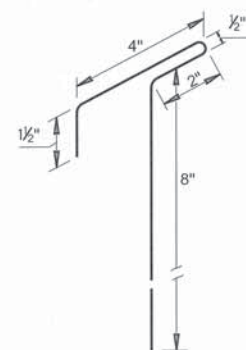
SLOPES:

WHEN PLACING MAT ON SLOPES, THE TOP END SHALL BE BURIED AT LEAST 12" VERTICALLY IN AN UPPER ANCHOR SLOT AND THE BOTTOM END SHALL BE BURIED AT LEAST 6" IN THE LOWER ANCHOR SLOT. THE MAT SHALL BE SECURED IN THE ANCHOR SLOTS BY STAPLES, PRIOR TO BACKFILLING THE SLOT. THE BACKFILL SOIL SHALL BE FIRMLY COMPACTED IN THE ANCHOR SLOTS.

LOWER ANCHOR SLOTS WILL NOT BE USED WHEN THE DITCH IS LINED WITH CONCRETE OR OTHER TYPE MATERIALS.

THE MAT SHALL BE INSTALLED IN A MANNER THAT WILL ALLOW THE DOWNGRADE EDGE TO OVERLAP THE PREVIOUSLY LAID STRIP. LAP JOINTS OF 3" SHALL BE USED.

ON SLOPES EXCEEDING 50 FEET IN SLOPE LENGTH, 6" DEEP CHECK SLOT SHALL BE INSTALLED EVERY 35 FEET AND THE MAT SECURED IN THE CHECK SLOTS BY STAPLES.



'T' STAPLE DETAIL

FASTENERS:

T SHAPED STAPLES. STAPLES SHALL BE MADE FROM A CONTINUOUS SINGLE STRAND OF NO. 8 GAUGE (0.162) WIRE. THE 'T' SHALL BE 4" ACROSS WITH ONE END BENT DOWNWARD 1/2" TO PREVENT TURNING. THE STAPLE SHALL BE 8" LONG. SEE STANDARD DETAIL.

WHEN TIGHT SOIL IS ENCOUNTERED, A 7" x 3/16" GUTTER SPIKE WITH A 1/2" TIN CAP (ROOFING TINS) AS A WASHER, MAY BE USED. THE TINS MAY NEED TO BE SLIGHTLY PRE-PUNCHED.

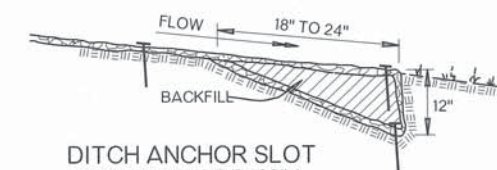


DETAIL C - END OF ROLL OVERLAP

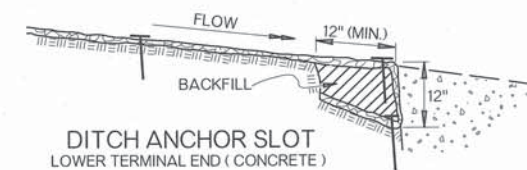
END OF ROLL. THE ENDS OF THE ROLL OF MAT SHALL OVERLAP 3 FEET WITH THE UP SLOPE END ON TOP.

STAPLING. THE NORMAL SPACING FOR STAPLING SHALL BE 3 FEET ALONG THE EDGE LAP JOINT AND DOWN THE CENTER OF EACH WIDTH OF MAT. THE CENTER STAPLES SHOULD BE OFFSET 18" FROM EDGE STAPLES.

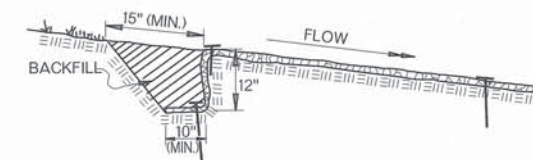
THE MAT SHALL BE STAPLED ACROSS THE WIDTH, IN ANCHOR SLOTS, IN CHECK SLOTS AND END OVERLAPS ON 18" CENTERS.



DITCH ANCHOR SLOT LOWER TERMINAL END (SOIL)



DITCH ANCHOR SLOT LOWER TERMINAL END (CONCRETE)



DITCH ANCHOR SLOT UPPER TERMINAL END (SOIL)

CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER MAINTENANCE OF THE AREA UNTIL THE ENTIRE PROJECT HAS BEEN COMPLETED. TYPICAL MAINTENANCE SHALL INCLUDE REFILLING OF WASHED OUT AREAS, RESEEDING AND REPLACING MAT.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
228	NYLON EROSION CONTROL MAT	SY

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 04/16/15

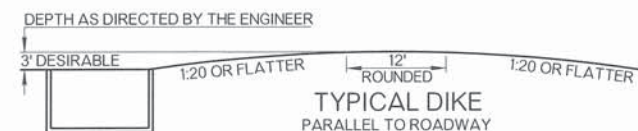
ROADWAY DESIGN DIVISION STANDARD

DOT EROSION CONTROL MAT (NYLON)

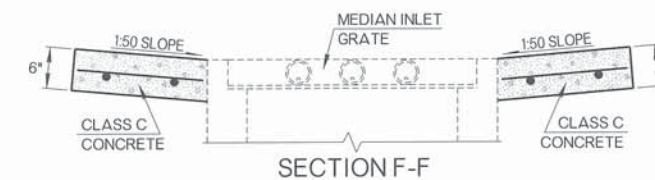
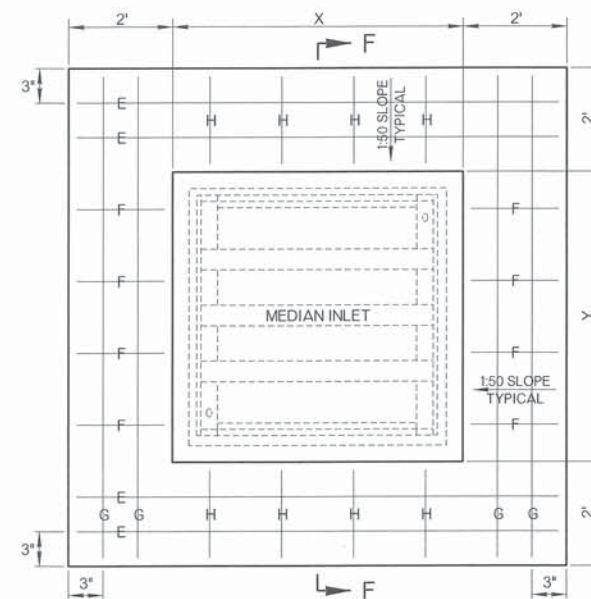
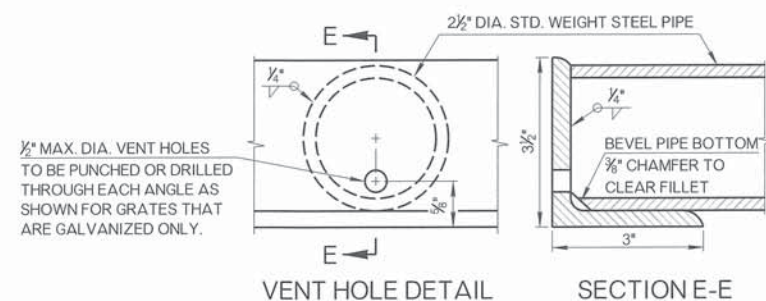
OKLAHOMA DEPARTMENT OF TRANSPORTATION 2009 SPECIFICATIONS

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OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	



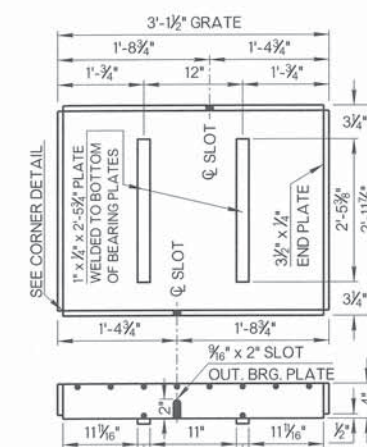
NOTE: WHEN A DIKE IS REQUIRED, IT SHALL BE CONSTRUCTED SLOPING UP FROM THE INLET ON A 1:20 SLOPE TO A DESIRABLE HEIGHT OF 3 FEET. IN NO CASE SHALL THE DIKE TOP BE HIGHER THAN 6" BELOW THE FINISHED GRADE OF THE INNER EDGE OF SURFACING AS SHOWN ON THE PLAN AND PROFILE SHEET.



APRON REINFORCING STEEL LOCATION & LENGTHS
(#4 BARS - EQUALLY SPACED @ 18" MAXIMUM)*

DIAMETER	E - BARS	F - BARS	G - BARS	H - BARS	X	Y	APRON REINF. STEEL ^o	APRON CLASS C CONCRETE ^o
IN	(NO.) FT. - IN.	(NO.) FT. - IN.	(NO.) FT. - IN.	(NO.) FT. - IN.	FT. - IN.	FT. - IN.	LB.	C. Y.
18 & 24	(4) 7 - 2 1/2	(8) 1 - 9	(4) 7 - 4 1/2	(8) 1 - 9	3 - 7 1/2	3 - 5 1/2	57	0.41
30	(4) 7 - 10	(8) 1 - 9	(4) 7 - 4 1/2	(8) 1 - 9	3 - 7 1/2	4 - 1	59	0.43
36	(4) 8 - 5	(9) 1 - 9	(4) 8 - 5	(9) 1 - 9	4 - 8	4 - 8	66	0.49

*MINIMUM 1/2" COVER OVER STEEL *QUANTITIES ARE FOR ONE APRON



DETAIL ALTERNATE STIFFENER
TYPE 1 GRATE

■ 1/2" DIA. x 3 1/2" STD. HEX BOLT W/ NUT (2 TOTAL)
CROSS BARS - 3/8" DIA. x 2'-11 1/2" (10 TOTAL)
END PLATES - 3 1/2" x 1/4" x 2'-11 1/2" (2 TOTAL)
BEARING PLATES - 4" x 1/4" x 3'-1" (16 TOTAL)

SMD BAR LIST

BAR	SIZE	NO.	SHAPE	LENGTH	SPACE
TYPE 1 - 18" OR 24" RCP OR CGSP					
A	#4	5	BENT	11'-10"	6" C/C
B	#4	15	BENT	2'-11 1/2"	9" C/C
C	#5	7	STR.	3'-1 1/2"	6" C/C
D	#5	6	STR.	3'-3 1/2"	6" C/C
TYPE 2 - 18" OR 24" RCP OR CGSP					
A	#4	6	BENT	11'-10"	6" C/C
B	#4	16	BENT	3'-6 1/2"	9" C/C
C	#5	7	STR.	3'-1 1/2"	6" C/C
D	#5	6	STR.	3'-3 1/2"	6" C/C
TYPE 2A - 18", 24" OR 30" RCP OR CGSP					
A	#4	7	BENT	12'-11 1/2"	6" C/C
B	#4	18	BENT	4'-1"	9" C/C
C	#5	7	STR.	3'-3 1/2"	6" C/C
D	#5	7	STR.	3'-7"	6" C/C
TYPE 2B - 18", 24", 30" OR 36" RCP OR CGSP					
A	#4	8	BENT	16'-2"	6" C/C
B	#4	20	BENT	4'-7"	9" C/C
C	#5	7	STR.	4'-4"	6" C/C
D	#5	8	STR.	4'-4"	6" C/C

GRATES - OVERALL DIMENSIONS
TYPE 1 GRATE: 3'-1/2" x 2'-11 1/2"
TYPE 2 GRATE: 3'-1/2" x 2'-11 1/2"
TYPE 2A GRATE: 3'-1/2" x 3'-6 1/2"
TYPE 2B GRATE: 4'-1/2" x 4'-1/2"
W = 8 1/2" FOR TYPE 2
W = 9" FOR TYPE 2A & 2B
PIPE GRATE MATERIAL
2 1/2" I.D. STD. WEIGHT STEEL PIPE

ESTIMATED SMD QUANTITIES

DESIGNATED PIPE SIZE IN INLET	TYPE OF GRATE	1 PIPE CLASS A CONC.			2 PIPES CLASS A CONC.		REINF. STEEL	
		CY	LB.	CY	LB.	CY	LB.	
18" RCP	1 OR 2	0.75	0.67	115	0.23	27		
24" RCP	1 OR 2	0.85	0.76	129	0.23	27		
30" RCP	2A	1.06	0.96	160	0.25	29		
36" RCP	2B	1.52	1.38	211	0.31	35		

ADD'L SMD DEPTH PER VERT. FT.

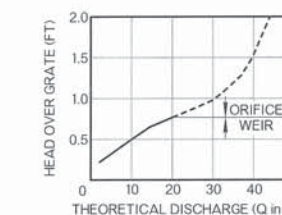
GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- VENT HOLES AND DRAIN HOLES FOR HOT DIP GALVANIZATION SHALL BE DRILLED OR PUNCHED IN GRATE AS SHOWN.
- BICYCLE AND PEDESTRIAN SAFE GRATES, SIMILAR TO TYPE 1 GRATES, MAY BE SUBSTITUTED FOR TYPE 2A AND 2B GRATES, IF THEY MEET THE MINIMUM EQUIVALENT HYDRAULIC AND STRUCTURAL REQUIREMENTS AND PROPOSED DESIGNS ARE APPROVED BY THE ENGINEER. GRATES SIMILAR TO TYPE 1 GRATES, USED AS ALTERNATIVES TO TYPE 2A AND 2B GRATES, SHALL BE DESIGNATED TYPES 1A AND 1B GRATES. COST FOR TYPE 1A AND 1B GRATES SHALL BE INCLUDED IN THE PRICE BID FOR THE RESPECTIVE INLET.
- EXPOSED ROUNDED EDGING. ALL EXPOSED SURFACES SHALL BE FINISHED IN ACCORDANCE WITH SECTION 509.
- COST OF APRON MATERIALS (INCLUDING REINFORCING STEEL), LABOR, AND INSTALLATION SHALL BE INCLUDED IN THE PRICE BID FOR SMD INLET.

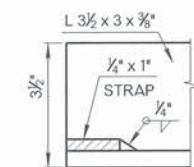
BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
611 (G)	INLET (SMD-TYPE 1)	EA
611 (G)	INLET (SMD-TYPE 2)	EA
611 (G)	INLET (SMD-TYPE 2A)	EA
611 (G)	INLET (SMD-TYPE 2B)	EA

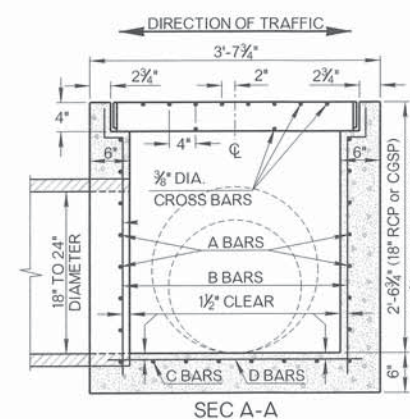
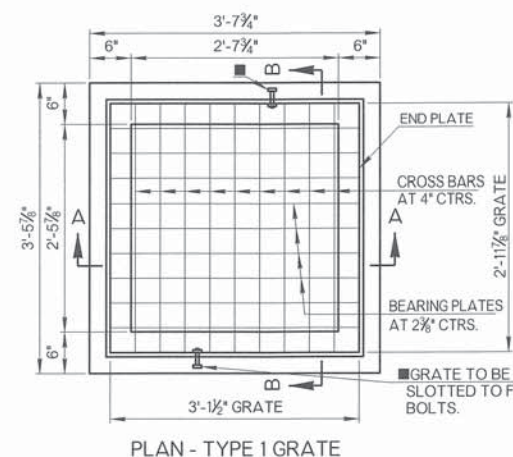
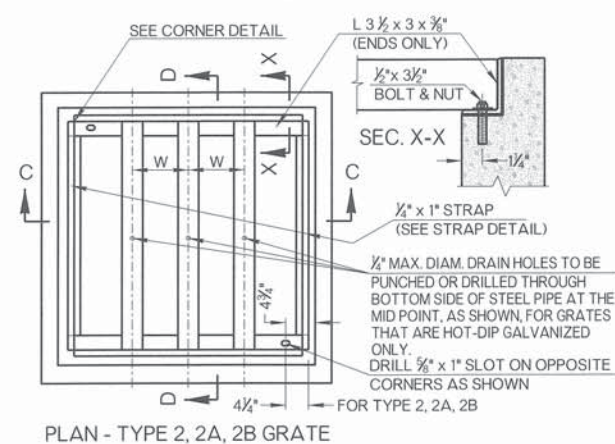
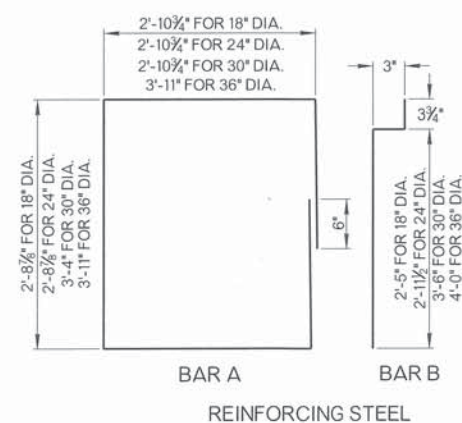
NOTE: COST OF INLET GRATE SHALL BE INCLUDED IN THE PRICE BID FOR THE INLET. COST OF ALL CLASS A CONCRETE AND REINFORCING STEEL NECESSARY FOR ADDITIONAL DEPTH SHALL BE INCLUDED IN THE PRICE BID FOR THE INLET. INLET ADDITIONAL DEPTH DATA SHALL BE NOTED ON THE PLANS.



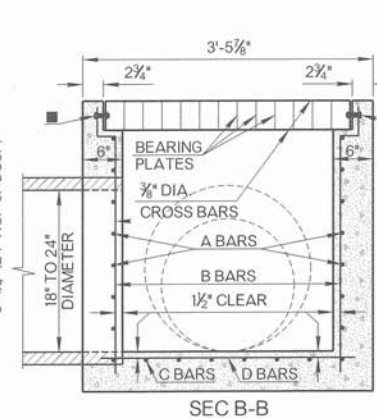
NOTE: TO ALLOW FOR CLOGGING 60% THEORETICAL DISCHARGE IS THE RECOMMENDED FACTOR TO USE IN AREAS SUBJECT TO FLOODING.



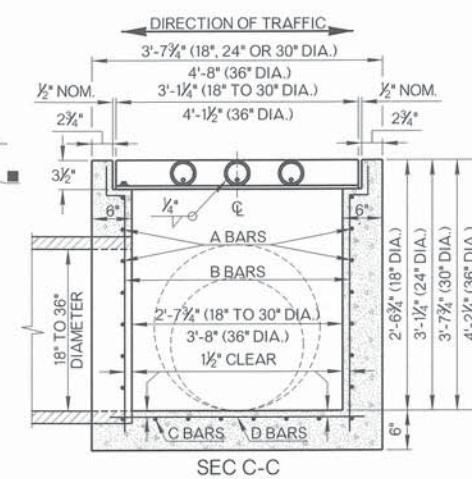
STRAP DETAIL



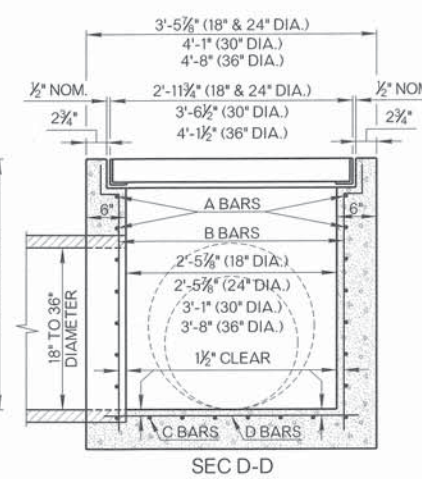
SMD INLET WITH TYPE 1 GRATE



SEC B-B



SMD INLET WITH TYPE 2, 2A & 2B GRATE



SEC D-D

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 02/10/15
ROADWAY DESIGN DIVISION STANDARD

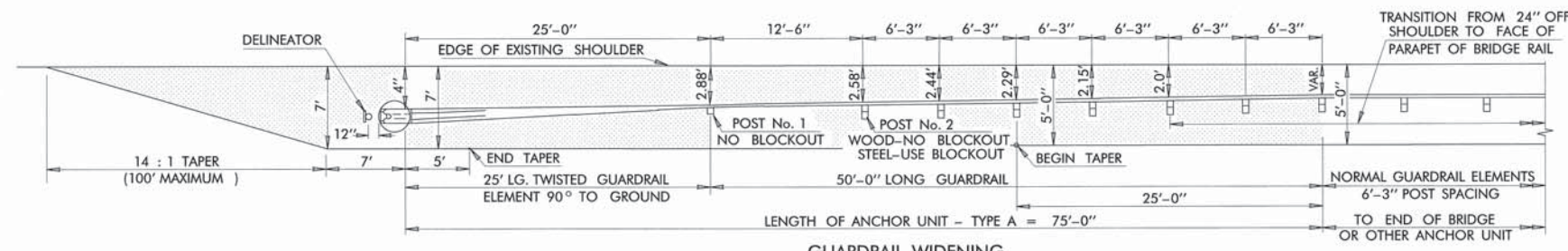


STANDARD MEDIAN DRAINS
(18" TO 36" PIPES)

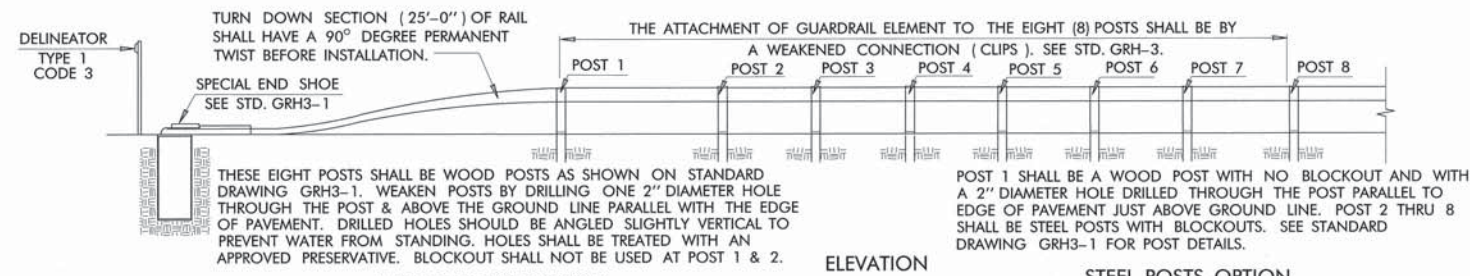
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

SMD-3	1
	R-36

DESCRIPTION	REVISIONS	DATE



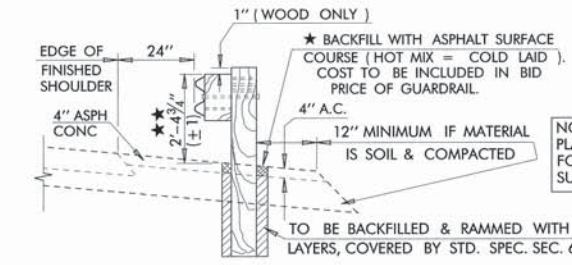
GUARDRAIL WIDENING



WOOD POSTS OPTION

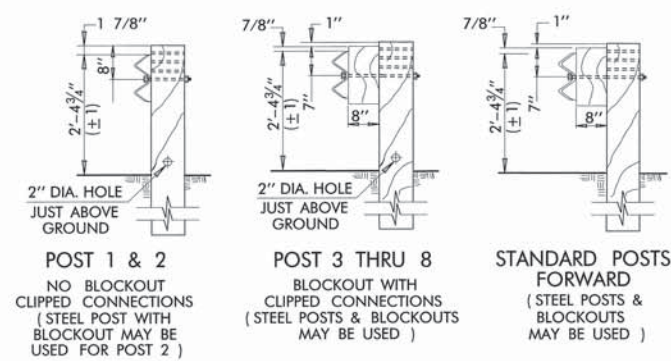
ANCHOR UNIT - TYPE A

STEEL POSTS OPTION



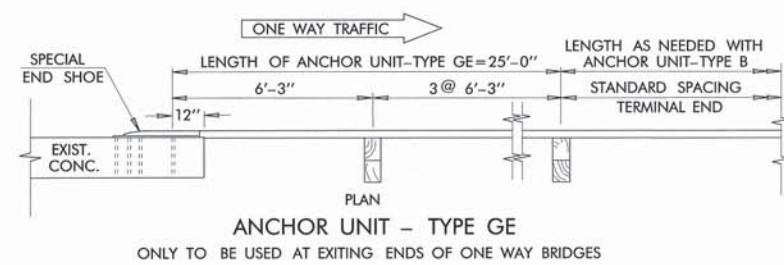
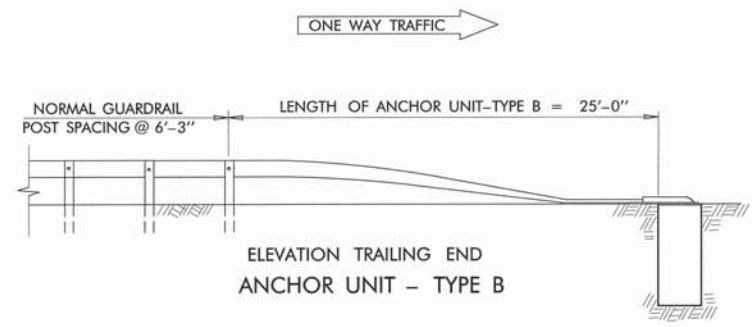
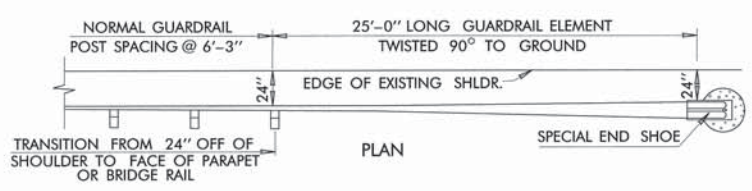
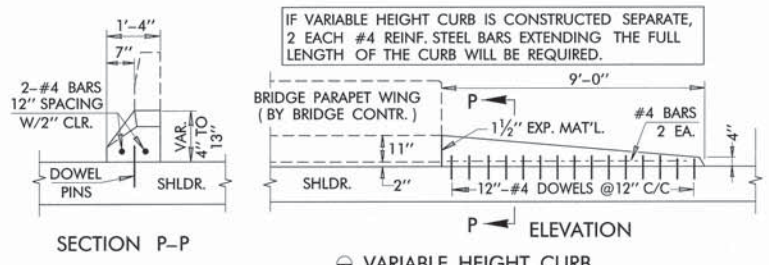
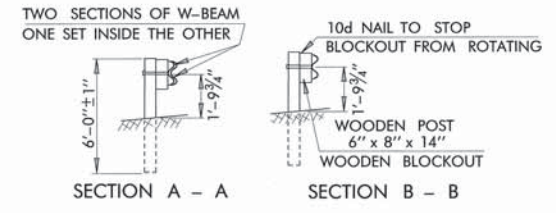
DETAIL OF GUARDRAIL POST IN SHOULDER BASE WIDENING

- ★ SEE 2009 STD. SPECIFICATIONS-SEC. 411, ASPH SURFACE COURSE (HOT MIX-COLD LAID)
- ★ MEASURE DIRECTLY BELOW RAIL, GUARDRAIL TO BE INSTALLED THIS DIMENSION. WHEN INSTALLING GUARDRAIL IN AN AREA WITH NO SHOULDER WIDENING THE RAIL HEIGHT SHALL BE MEASURED AS FOLLOWS: FOR NEGATIVE GRADE SHOULDERS, MEASURE TO A LINE FROM THE SHOULDER ON THE SAME SLOPE AS THE SHOULDER. FOR POSITIVE GRADE & LEVEL SHLDRS, MEASURE FROM A LINE LEVEL WITH THE EDGE OF SHOULDER.



WOOD POST DETAIL
RECTANGULAR POSTS SHOWN
SEE MAINTENANCE STD. DRAWING GRH3-1

ANCHOR UNIT - TYPE A - APPROACH END



ANCHOR UNIT - TYPE GE

ONLY TO BE USED AT EXITING ENDS OF ONE WAY BRIDGES

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ENGLISH STANDARD SPECIFICATIONS.
- THE BRIDGE CONTRACTOR SHALL PROVIDE HOLES FOR THE CONNECTION OF W-BEAM TERMINAL CONNECTOR (SPECIAL END SHOE) TO BRIDGE RAIL AND SLOPED FACE PARAPET. RETROFIT CONNECTIONS FOR GUARDRAIL (SPECIAL END SHOE) SHALL BE FIELD DRILLED BY THE SURFACING CONTRACTOR.
- GUARDRAIL COMPONENTS SHALL MEET NCHRP-350, THE APPLICABLE STANDARDS OF "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE" PREPARED AND APPROVED BY THE AASHTO-ARTBA-AGC JOINT COMMITTEE, TECHNICAL BULLETIN NO. 268 B.
- POST SPACING AND FACE OF RAIL ALIGNMENT REMAINS THE SAME.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623.06(F)	GUARDRAIL ANCHOR UNIT (TYPE ▲)	EA.

▲ TYPE OF GUARDRAIL ANCHOR UNIT TO BE SPECIFIED.



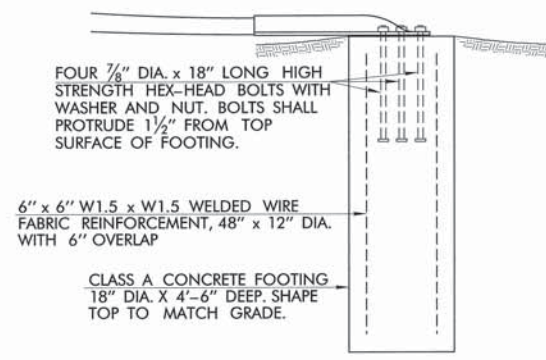
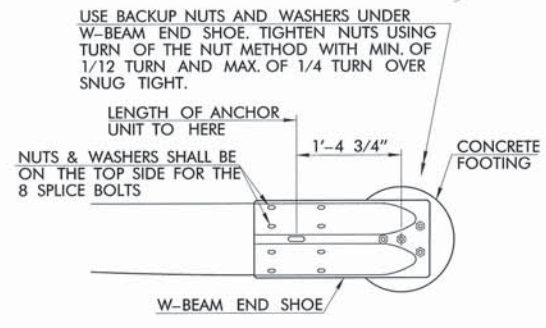
APPROVED BY TRAFFIC ENGINEER: *Daniel Smith* DATE: 4/9/12

TRAFFIC MAINTENANCE STANDARD
GUARDRAIL ANCHOR UNITS
(1 OF 2)
(27 3/4" SYSTEM)

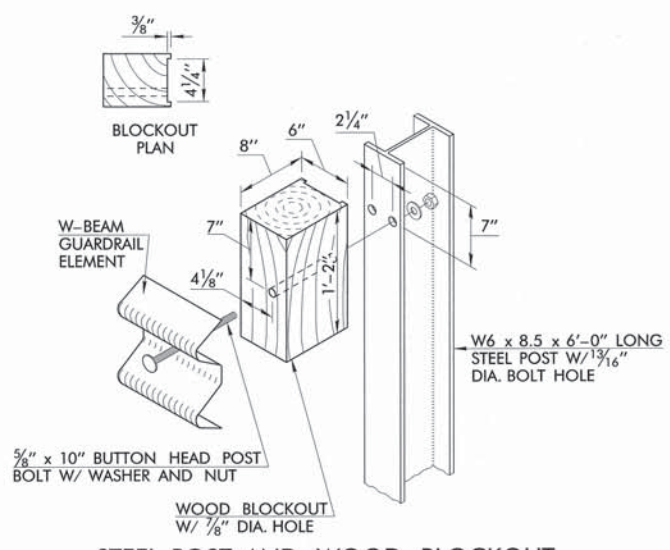
2009 SPECIFICATIONS

GRAU1-1	00
M-025	

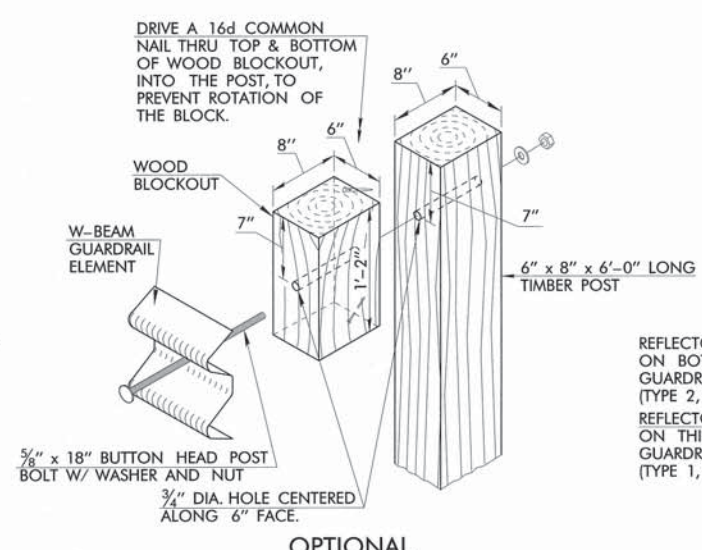
DESCRIPTION	REVISIONS	DATE



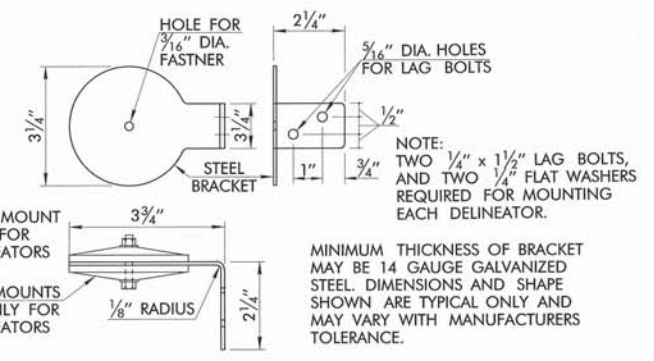
GROUND ANCHOR FOOTING DETAIL



STEEL POST AND WOOD BLOCKOUT



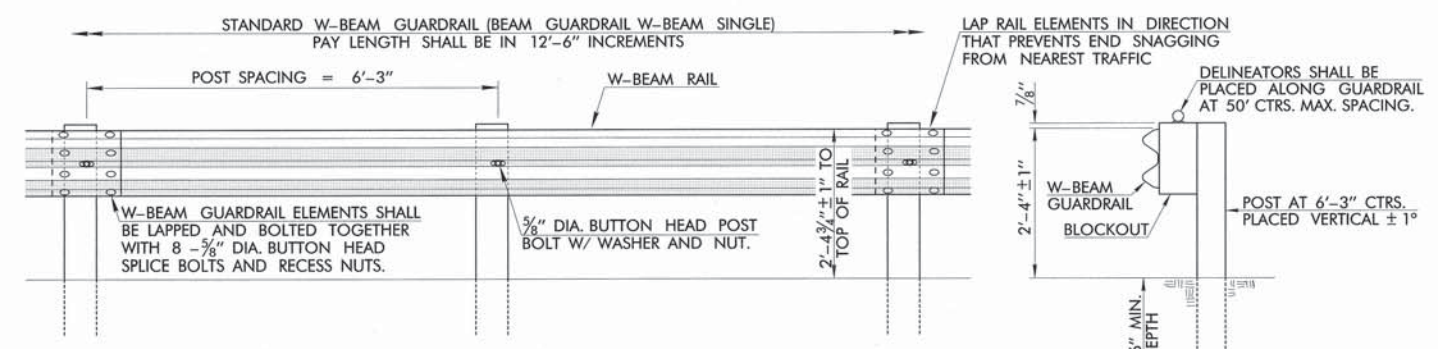
OPTIONAL WOOD POST AND WOOD BLOCKOUT



TYPICAL BRACKET FOR MOUNTING 3 1/4\"/>

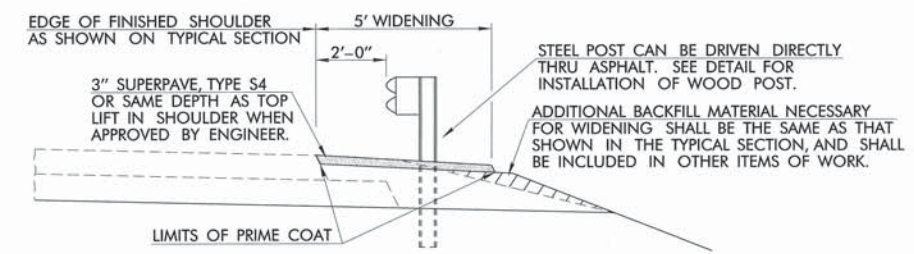
OPTIONAL TYPE POSTS OR BLOCKOUTS FOR STANDARD GUARDRAIL

THE CONTRACTOR MAY, AT HIS OPTION, SELECT AND USE ONE OF THE TYPE POSTS AND BLOCKOUTS SHOWN ABOVE, OR AN APPROVED ALTERNATE. THIS POST & BLOCKOUT CHOICE MUST BE USED ON THE ENTIRE PROJECT. ALTERNATE POST (INCLUDING SPECIAL SHAPES) MAY BE USED UPON THE APPROVAL OF THE ENGINEER. ALTERNATE BLOCKOUTS (SUCH AS RECYCLED MATERIAL, RUBBER, PLASTIC AND COMPOSITE PRODUCTS) MAY BE USED IF PRODUCT HAS BEEN EVALUATED AND APPROVED BY ODOT.

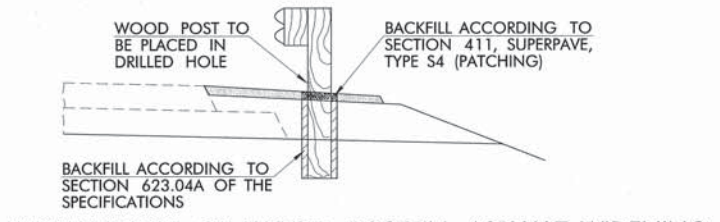


STANDARD W-BEAM GUARDRAIL ELEVATION

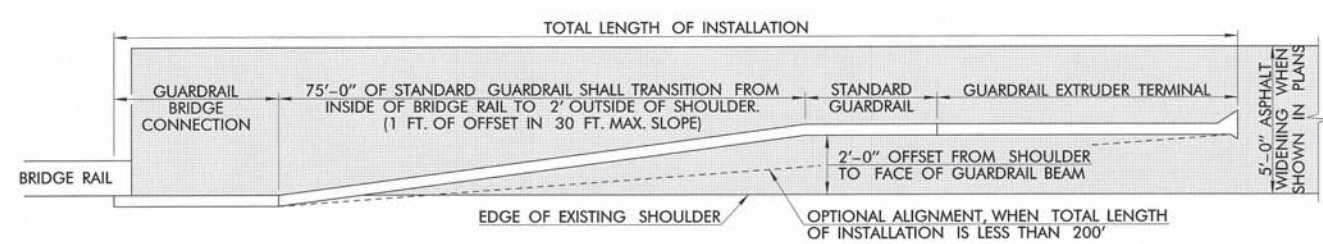
STANDARD W-BEAM GUARDRAIL SECTION



DETAIL OF SHOULDER WIDENING FOR STANDARD GUARDRAIL



INSTALLATION OF WOOD POST IN ASPHALT WIDENING



TYPICAL GUARDRAIL INSTALLATION AT BRIDGE

- GENERAL NOTES**
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. STANDARD GUARDRAIL WITH 6'-3\"/>
 3. WOOD POSTS AND BLOCKOUTS SHALL BE STRESS GRADE 1200F.
 4. ALL STANDARD GUARDRAIL AND GUARDRAIL EXTRUDER TERMINALS SHALL BE OFFSET SO THAT RAIL FACE IS TWO FEET OUTSIDE THE SHOULDER. FOR TRANSITION FROM BRIDGE RAIL TO TWO FOOT OFFSET, BEGINNING AT THE GUARDRAIL BRIDGE CONNECTION, TRANSITION THE STANDARD GUARDRAIL, AT A 30:1 TAPER, UNTIL THE RAIL REACHES THE OFFSET DISTANCE.
 5. ALL GUARDRAIL, METAL POSTS, PLATES AND HARDWARE SHALL BE GALVANIZED AFTER FABRICATION.
 6. ANY FIELD CUTS OR HOLES DRILLED IN GALVANIZED MATERIALS SHALL BE COATED WITH A ZINC OXIDE PAINT. SEE SECTION 730 OF THE SPECIFICATIONS.
 7. GUARDRAIL DELINEATORS (TYPE 2, CODE 1) WILL BE REQUIRED FOR ALL TWO-LANE ROADWAYS. ALL OTHER ROADWAYS WILL REQUIRE GUARDRAIL DELINEATORS (TYPE 1, CODE 1).

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623 (A)	BEAM GUARDRAIL W-BEAM SINGLE	L.F.
853	GUARDRAIL DELINEATORS (TYPE 1, CODE 1)	EA.
853	GUARDRAIL DELINEATORS (TYPE 2, CODE 1)	EA.

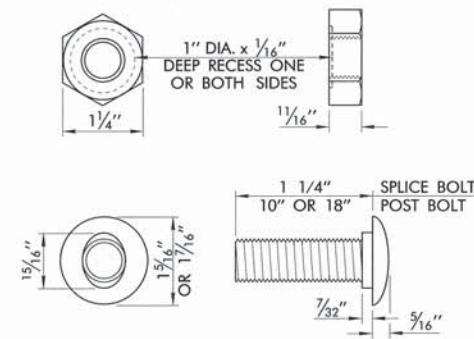
NOTE: PAYITEM GUARDRAIL ANCHOR UNIT TYPE B INCLUDES ALL LABOR AND MATERIALS TO INSTALL 25'-0\"/>



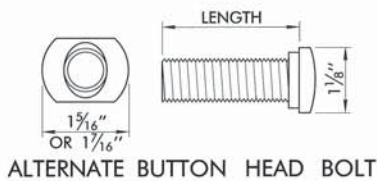
APPROVED BY TRAFFIC ENGINEER: *Daryl Smaly* DATE: 4/9/12
TRAFFIC MAINTENANCE STANDARD

GUARDRAIL AND HARDWARE
(1 OF 3)
(27 3/4\"/>

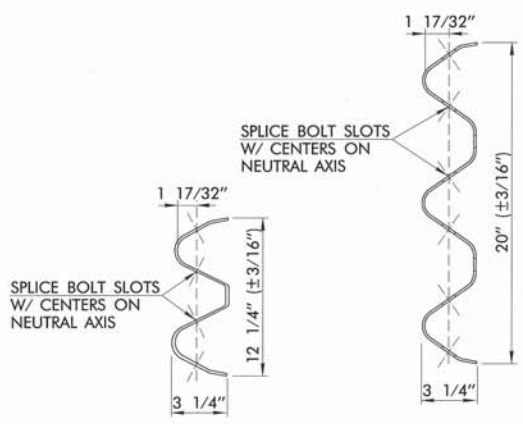
DESCRIPTION	REVISIONS	DATE



5/8" DIA. BUTTON HEAD BOLT & RECESS NUT

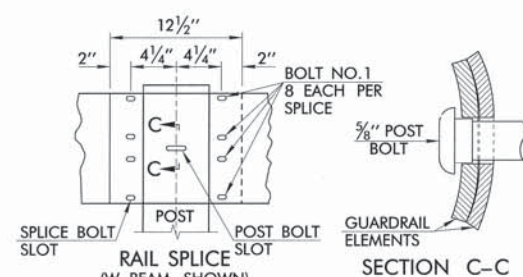


ALTERNATE BUTTON HEAD BOLT



W-BEAM GUARDRAIL SECTION

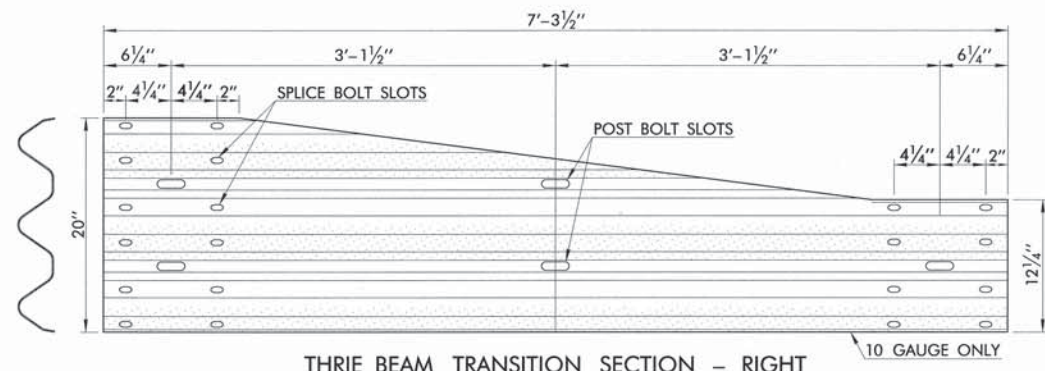
THRIE BEAM GUARDRAIL SECTION



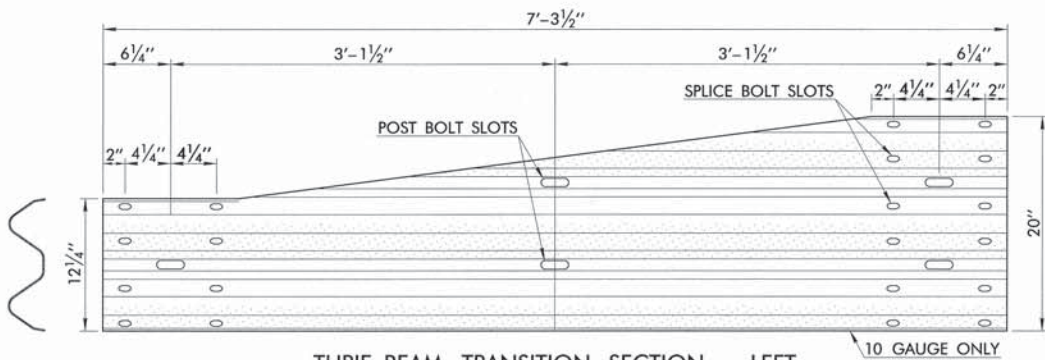
RAIL SPLICE (W-BEAM SHOWN) SECTION C-C

GUARDRAIL SHALL BE LAPPED IN THE DIRECTION OF NEAREST TRAFFIC AT ALL LOCATIONS WHERE SPLICES OCCUR (EXCEPT AT NARROW OR ONE LANE BRIDGE APPROACHES, WHERE LAPS SHALL BE TOWARD THE BRIDGE ON BOTH SIDES OF THE APPROACH ROADWAY).

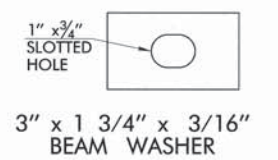
RAIL SPLICE



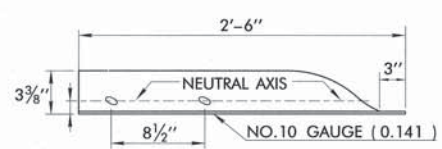
THRIE BEAM TRANSITION SECTION - RIGHT (THRIE BEAM TO W-BEAM CONNECTION)



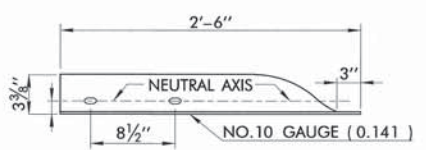
THRIE BEAM TRANSITION SECTION - LEFT (THRIE BEAM TO W-BEAM CONNECTION)



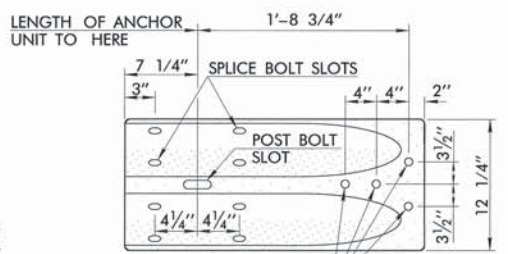
3" x 1 3/4" x 3/16" BEAM WASHER



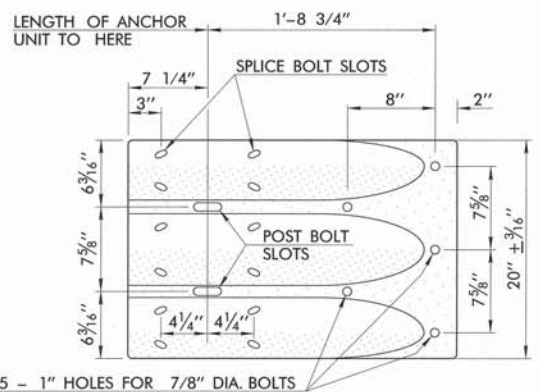
NO. 10 GAUGE (0.141)



NO. 10 GAUGE (0.141)

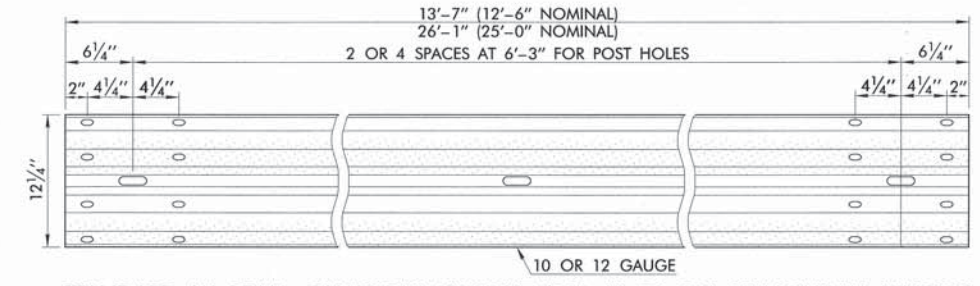


W-BEAM TERMINAL CONNECTION (END SHOE)

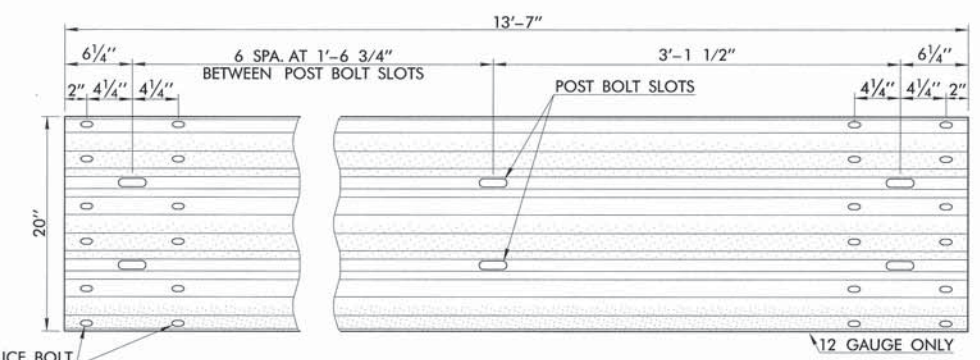


THRIE BEAM TERMINAL CONNECTION 10 GAUGE ONLY (END SHOE)

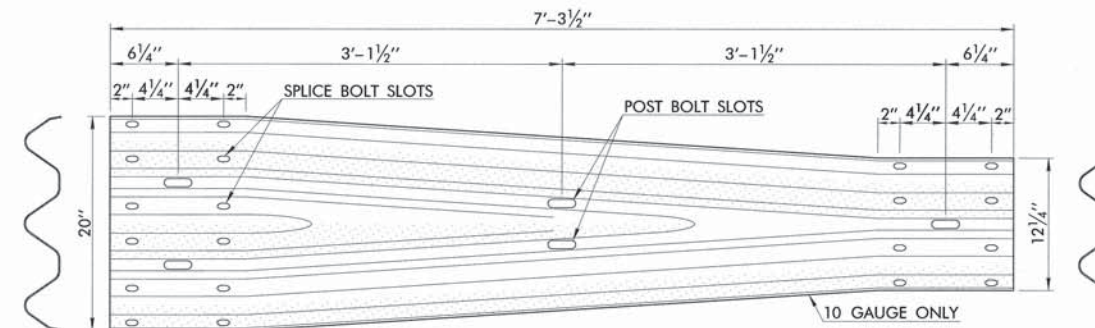
5 - 1" HOLES FOR 7/8" DIA. BOLTS WITH NUTS AND STEEL WASHERS.



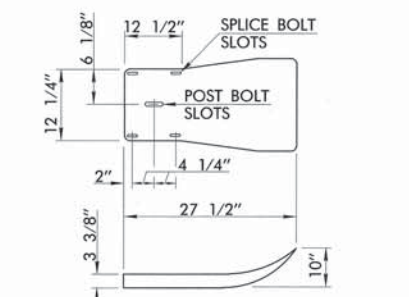
STANDARD W-BEAM GUARDRAIL ELEMENT (12'-6" OR 25'-0" NOMINAL LENGTH)



THRIE BEAM GUARDRAIL ELEMENT FOR BRIDGE CONNECTION



THRIE BEAM TRANSITION SECTION (6'-3" NOMINAL LENGTH) (THRIE BEAM TO W-BEAM CONNECTION)



W-BEAM END SECTION (FLARED)

- GENERAL NOTES**
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. ALL GUARDRAIL BEAMS, END SHOES, AND END SECTIONS ON THIS STANDARD DRAWING SHALL BE IN ACCORDANCE WITH AASHTO M 180.
 3. ALL SPLICE BOLT SLOTS SHALL BE 29/32" WIDE x 1 1/8" LONG.
 4. ALL POST BOLT SLOTS SHALL BE 3/4" WIDE x 2 1/2" LONG.



APPROVED BY TRAFFIC ENGINEER: *David Gandy* DATE: 4/9/12

TRAFFIC MAINTENANCE STANDARD

GUARDRAIL AND HARDWARE (2 OF 3) (27 3/4" SYSTEM)

2009 SPECIFICATIONS

GRH2-1	00
M-028	

ALL GENERAL NOTES SHOWN BELOW SHALL APPLY TO ALL OF THE STANDARD DRAWINGS IN TCS SERIES

DESCRIPTION	REVISIONS	DATE
MODIFIED NOTES		3/15/2011

CONTRACTOR

ON CONSTRUCTION PROJECTS IT WILL BE THE CONTRACTORS RESPONSIBILITY TO INSTALL THE NECESSARY TRAFFIC CONTROL BEFORE CONSTRUCTION BEGINS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL DEVICES TO ASSURE A HIGH DEGREE OF BOTH DAY AND NIGHT VISIBILITY, WHICH WILL INCLUDE ANY WASHING, REPLACEMENT AND/OR REPOSITIONING WHERE DEEMED NECESSARY BY THE ENGINEER.

THE CONTRACTOR SHALL REPAIR OR REPLACE ANY NEW OR EXISTING PERMANENT STATE OWNED SIGNS WHICH ARE DAMAGED DUE TO HIS NEGLIGENCE OR CARELESS HANDLING DURING THE CONSTRUCTION OF THIS PROJECT. THIS SHALL BE DONE AT THE CONTRACTORS EXPENSE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TEMPORARY TRAFFIC CONTROL WORK ZONE AND EXISTING PAVEMENT MARKINGS ON ALL ROADWAYS OPEN TO TRAFFIC WITHIN THE PROJECT. SUFFICIENT QUANTITIES HAVE BEEN PROVIDED FOR MAINTAINING PAVEMENT MARKINGS FOR PRESCRIBED DETOUR ROUTES WHEN DEEMED NECESSARY BY THE ENGINEER.

SIGN MATERIALS

ALL SIGN BLANK MATERIALS SHALL BE THE OPTION OF THE CONTRACTOR BUT SHALL BE OF SUCH MATERIAL THAT WILL RETAIN A SATISFACTORY APPEARANCE THROUGHOUT THE LIFE OF THE PROJECT.

ALL SIGNS, LIGHTS, FLAGS, ETC. SHALL CONFORM IN SIZE, SHAPE, COLOR, LEGENDS AND APPLICATIONS TO THE STANDARDS SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND/OR OKLAHOMA STATE STANDARD DRAWINGS FOR SIGNS. STANDARD DRAWINGS ARE AVAILABLE FROM THE DEPARTMENT OF TRANSPORTATION. INTERPRETATIONS THAT MAY BE NECESSARY SHALL BE REFERRED TO THE ENGINEER.

SIGN SHEETING

REFLECTORIZATION OF TRAFFIC CONTROL DEVICES SHALL BE BY MEANS OF WIDE ANGLE, FLAT TOP REFLECTIVE SHEETING MEETING THE REQUIREMENTS OF 2009, OKLAHOMA STANDARD SPECIFICATIONS.

SIGN INSTALLATION

ALL SIGNS SHALL BE SECURELY PLACED OR WEIGHTED TO PREVENT BLOWING OVER. ROCKS, BROKEN CONCRETE OR OTHER SUCH OBJECTS SHALL NOT BE CONSIDERED AN ACCEPTABLE SUBSTITUTE FOR SAND BAGS WHEN USED TO OBTAIN ADDED STABILITY FOR MOVABLE SIGNS AND BARRICADES.

SPACING OF SIGNING, ON THE PLANS OR TCS STANDARDS, SHOULD BE NO LESS THAN THE DISTANCES SHOWN. THE DISTANCE BETWEEN SIGNS SHOULD BE INCREASED ON HIGH SPEED OR MORE HEAVILY TRAVELED HIGHWAYS, OR WHERE SIGHT DISTANCE IS RESTRICTED.

IN ALL CONSTRUCTION ZONES, THE 48 INCH X 48 INCH WARNING SIGNS SHALL HAVE ATTACHED THERETO FLORESCENT FLAGS AND TYPE "A" WARNING LIGHTS. THIS SHALL ALSO APPLY WHEN SIGNS ARE USED ON BOTH SIDES OF THE ROADWAY. ADDITIONAL FLASHING LIGHTS MAY BE REQUIRED WHEN SO DESIRED BY THE ENGINEER.

ALL DIAMOND SHAPED CONSTRUCTION WARNING SIGNS ON EXPRESSWAYS OR FREEWAYS SHALL BE 48 INCH X 48 INCH, WITH THE APPROPRIATE ADVISORY SIGN WHERE REQUIRED UNLESS OTHERWISE NOTED IN THE PLANS.

DUE TO THE TEMPORARY NATURE OF CONSTRUCTION, SIGNS WHICH ARE 33 S.F. AND OVER WILL HAVE NO REINFORCING STEEL IN THEIR FOOTINGS.

ALL SIGNS AND SIGN ASSEMBLIES WITH A TOTAL SURFACE AREA OF 10 S.F. OR MORE SHALL BE INSTALLED ON TWO (2) POSTS. THE EXCEPTION BEING SINGLE ROUTE MARKER ASSEMBLIES.

SIGNS MOUNTED ON BARRICADES SHALL BE MOUNTED AS HIGH AS NECESSARY TO BE VISIBLE.

BARRICADES

ONE (1) WING BARRICADE SHALL BE SET ON EACH SIDE OF THE ROADWAY IN ADVANCE OF THE FIRST ADVANCE WARNING SIGN. THE EXCEPTIONS ARE MINOR CROSS STREETS AND SECTION LINE ROADS WHICH INTERSECT THE WORK AREA.

WING BARRICADES SHALL BE INSTALLED ON TWO (2) BREAKAWAY POSTS.

WORK DURATION

THE FIVE CATEGORIES OF WORK DURATION AND THEIR TIME AT A LOCATION SHALL BE: A) LONG-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN 3 DAYS. B) INTERMEDIATE-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN ONE DAYLIGHT PERIOD UP TO 3 DAYS, OR NIGHTTIME WORKLASTING MORE THAN 1 HOUR. C) SHORT-TERM STATIONARY IS DAYTIME WORK THAT OCCUPIES A LOCATION FOR MORE THAN 1 HOUR WITHIN A SINGLE DAYLIGHT PERIOD. D) SHORT DURATION IS WORK THAT OCCUPIES A LOCATION UP TO 1 HOUR. E) MOBILE IS WORK THAT MOVES INTERMITTENTLY OR CONTINUOUSLY.

LIGHTING

TYPE "A" WARNING LIGHTS SHALL BE USED ON BARRICADES (AS REQUIRED) AND WARNING SIGNS.

TYPE "C" WARNING LIGHTS MAY BE USED ON VERTICAL PANELS (OPTIONAL).

CONSTRUCTION NOTES

SHOULD THE REQUIRED WORK ON ANY PROJECT, INCLUDING ANY TRAFFIC CONTROL, OVERLAP OR OTHERWISE INTERFERE WITH THE ON-GOING WORK OR TRAFFIC CONTROL OF ANOTHER PROJECT, IT SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE CONTRACTORS TO COORDINATE THEIR WORK ACTIVITIES TO FACILITATE THE SAFE MOVEMENT OF TRAFFIC THROUGHOUT OR AROUND THEIR COLLECTIVE WORK AREAS. ANY SUCH RECOMMENDED CHANGES SHALL BE SUBMITTED IN WRITING TO EACH PROJECT RESIDENT ENGINEER FOR REVIEW AND APPROVAL.

ALL TRAFFIC CONTROL DEVICES NOT REQUIRED FOR THE SAFE CONDUCT OF TRAFFIC THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE SHALL BE PROMPTLY REMOVED, COMPLETELY COVERED, TURNED AWAY FROM TRAFFIC OR OTHERWISE TAKEN OUT OF SERVICE. DEVICES SHALL NOT BE STORED ALONG THE ROADWAY WITHIN 15 FEET (15') OF AN OPEN DRIVING LANE, EITHER BEFORE OR AFTER THEY ARE TO BE USED UNLESS PROTECTED BY GUARDRAIL, BRIDGE RAIL, AND/OR BARRIERS INSTALLED FOR OTHER PURPOSES. THESE DEVICES SHALL BE REMOVED FROM THE TEMPORARY TRAFFIC CONTROL ZONE WHEN THE ENGINEER DETERMINES THEY ARE NO LONGER NEEDED. WHERE THERE IS INSUFFICIENT RIGHT-OF-WAY TO PROVIDE FOR THIS 15 FEET (15') SETBACK, THE CONTRACTOR SHALL DETERMINE ALTERNATE LOCATIONS AND REQUEST THE ENGINEERS APPROVAL TO USE THEM.

TRAFFIC CONTROL DEVICES, WARNING DEVICES, AND BARRIERS SHALL BE KEPT IN CORRECT POSITION, PROPERLY DIRECTED, CLEARLY VISIBLE AND CLEAN AT ALL TIMES. DAMAGED, DEFACED OR DIRTY DEVICES OR BARRICADES SHALL IMMEDIATELY BE REPAIRED, REPLACED OR CLEANED BY THE CONTRACTOR AND APPROVED FOR USE BY THE ENGINEER.

NO EQUIPMENT OR VEHICLES BELONGING TO THE CONTRACTOR, HIS SUB-CONTRACTORS OR EMPLOYEES SHALL BE PARKED OR STOPPED WITHIN 30 FEET (30') OF A LANE CARRYING TRAFFIC, AT ANY TIME, UNLESS REQUIRED BY ONGOING WORK OPERATIONS.

ALL DETOURS AND DIVERSIONS SHOULD BE IN PLACE, WITH SIGNING, STRIPING AND CHANNELIZING DEVICES, AS SHOWN IN THE PLANS OR STANDARD DRAWINGS, BEFORE THEY ARE OPENED TO TRAFFIC.

WHEN IT BECOMES NECESSARY TO CLOSE THE ROAD TO THROUGH TRAFFIC, NO LESS THAN SEVEN DAYS PRIOR TO THE CLOSURE, THE CONTRACTOR SHALL NOTIFY THE FOLLOWING INDIVIDUALS OR AGENCIES DESCRIBING THE AFFECTED ROAD AND THE APPROXIMATE DURATION OF THE CLOSURE. THOSE TO BE NOTIFIED INCLUDE BUT ARE NOT LIMITED TO 1) LOCAL LAW ENFORCEMENT OFFICIALS, 2) LOCAL FIRE OFFICIALS, 3) AMBULANCE SERVICES, 4) LOCAL SCHOOL SUPERINTENDENT, 5) UNITED STATES POSTAL SERVICE, AND 6) CITY OR COUNTY ROAD SUPERINTENDENT.

ALL TEMPORARY TRAFFIC CONTROL DEVICES, AND THEIR CONDITIONS THROUGHOUT THE LIFE OF THE CONSTRUCTION PROJECT, SHALL MEET O.D.O.T.'S LATEST "QUALITY STANDARDS FOR TEMPORARY TRAFFIC CONTROL DEVICES". THE O.D.O.T. RESIDENT ENGINEER WILL MAKE FINAL DECISION OF ALL TEMPORARY TRAFFIC CONTROL DEVICES BASED ON THE O.D.O.T. GUIDELINES.

NO GENDER BIAS SIGNS ARE ALLOWED.

ARROW DISPLAY

USE OF AN ARROW DISPLAY, IN THE ARROW OR CHEVRON MODE, SHALL BE LIMITED TO STATIONARY OR MOVING LANE CLOSURES.

AN ARROW DISPLAY, IN THE CAUTION MODE, SHALL BE USED ONLY FOR SHOULDER WORK, BLOCKING THE SHOULDER, ROADSIDE WORK NEAR THE SHOULDER, OR FOR MOBILE OPERATIONS (I.E. STRIPING).

AN ARROW DISPLAY IN THE ARROW OR CHEVRON MODE, SHALL NOT BE USED ON A TWO-LANE, TWO-WAY ROADWAY FOR TEMPORARY ONE-LANE OPERATION.

AN ARROW DISPLAY SHALL NOT BE USED ON A MULTI-LANE ROADWAY TO LATERALLY SHIFT TRAFFIC.

CHANNELIZING DEVICES

IN THOSE AREAS WHERE DRIVERS ARE ASKED TO MAKE A DECISION OR MUST BE GUIDED THROUGH A PRECISE MOVEMENT, BY USE OF CHANNELIZING DEVICES, IT IS ESPECIALLY IMPORTANT TO PROVIDE A CLEARLY DEFINED PATH. EXAMPLES OF THIS COULD BE IN DELINEATING A TEMPORARY GORE OR TURNING RADIUS. IN SUCH AREAS THE SPACING OF CHANNELIZING DEVICES MAY BE REDUCED TO 10 FEET FOR SPEEDS OF 40 M.P.H. OR LESS, AND 20 FEET FOR SPEEDS GREATER THAN 40 M.P.H.

WHEN CHANNELIZING DEVICES ARE USED TO DIRECT TRAFFIC ACROSS EXISTING LANE LINES OR EDGE LINES, THE SPACING BETWEEN CHANNELIZING DEVICES SHALL BE REDUCED 50%. SPACING SHOULD ALSO BE REDUCED WHEN CHANNELIZING DEVICES ARE PLACED ON CURVES, HILLS, OR NEXT TO POTENTIAL HAZARDS.

ALL TRAFFIC CONTROL CHANNELIZING DEVICES SHALL MEET MUTCD COLOR REQUIREMENTS.

FLAGGERS

FLAGGERS MUST BE CLEARLY VISIBLE TO APPROACHING TRAFFIC FOR A DISTANCE SUFFICIENT TO PERMIT PROPER RESPONSE BY MOTORISTS TO THE FLAGGING INSTRUCTIONS, AND TO PERMIT TRAFFIC TO REDUCE SPEED OR STOP BEFORE ENTERING THE TEMPORARY TRAFFIC CONTROL ZONE. FLAGGERS SHALL BE POSITIONED TO MAINTAIN MAXIMUM COLOR CONTRAST BETWEEN THE FLAGGER'S REFLECTIVE CLOTHING AND EQUIPMENT AND THE WORK AREA BACKGROUND.

DURING HOURS OF DARKNESS, FLAGGER STATIONS SHALL BE ILLUMINATED SUCH THAT THE FLAGGER WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC. LIGHTS TO BE USED FOR ILLUMINATING THE STATION SHALL BE APPROVED BY THE ENGINEER. REFLECTORIZED PADDLES AND REFLECTORIZED VESTS, SHIRTS OR JACKETS SHALL BE USED FOR NIGHTTIME FLAGGING.

UNLESS OTHERWISE SPECIFIED IN THE PLANS, THE COST OF FLAGGING OPERATIONS SHALL BE INCLUDED IN OTHER ITEMS OF WORK.

MINIMUM STANDARDS FOR TRAFFIC CONTROL DEVICES

- (1) WARNING LIGHTS (TYPE A FLASHERS AND TYPE C STEADY BURN)
 - (A) NOT LESS THAN NINETY (90) PERCENT OF THE TOTAL NUMBER OF LIGHTS BEING USED AT ANY ONE TIME SHALL BE FULLY OPERATIONAL
 - (B) NOT MORE THAN THREE (3) LIGHTS ADJACENT TO ONE ANOTHER SHALL BE FAILING.
- (2) ARROW DISPLAY
 - (A) WHEN IN ARROW MODE, NO MORE THAN TWO (2) LAMPS IN THE STEM AND ZERO (0) LAMPS IN THE HEAD SHALL BE FAILING. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
 - (B) WHEN IN CAUTION MODE (CORNERS), A MINIMUM OF FOUR (4) LAMPS SHALL BE OPERATIONAL. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
 - (C) ANY LAMP WHICH IS LIGHTED BUT IMPROPERLY ALIGNED SHALL NOT BE CONSIDERED OPERATIONAL.
- (3) CHANGEABLE MESSAGE SIGNS
 - (A) NOT LESS THAN NINETY (90) PERCENT OF THE PIXELS SHALL BE FUNCTIONAL IN EACH CHARACTER MODULE.
 - (B) NO SANDBAG BALLASTING OVER 3 FEET IN HEIGHT.
- (4) PAVEMENT MARKING TAPE
 - (A) NOT MORE THAN TEN (10) PERCENT OF ALL TAPE, PAINT, MESSAGE OR SYMBOL SHALL BE MISSING
 - (B) NOT MORE THAN TWO (2) CONSECUTIVE DASHED LINES SHALL BE MISSING.
 - (C) NOT MORE THAN FIFTY (50) CONTINUOUS FEET OF A SOLID LINE SHALL BE MISSING.
- (5) CONSTRUCTION ZONE PAVEMENT MARKERS
 - (A) NOT MORE THAN TEN (10) PERCENT OF THE TOTAL NUMBER OF MARKERS SHALL BE MISSING.
 - (B) NOT MORE THAN THREE (3) CONSECUTIVE MARKERS SHALL BE MISSING.

STRIPING

WHENEVER THE WORK CAUSES THE OBLITERATION OF PAVEMENT MARKINGS, EITHER TEMPORARY OR PERMANENT MARKINGS SHALL BE IN PLACE PRIOR TO OPENING THE ROADWAY TO TRAFFIC. CENTERLINE PAVEMENT MARKINGS SHALL BE PROVIDED AT ALL TIMES FOR ROADWAYS OPEN TO TRAFFIC.

THE APPLICATION SURFACES FOR PAVEMENT MARKINGS SHALL BE FREE OF DUST, DIRT, MOISTURE OR OTHER FOREIGN MATTER WHICH WOULD INTERFERE WITH ADHESION. INSTALLATION OF ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

ALL TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IMMEDIATELY AHEAD OF THE PERMANENT STRIPING OPERATIONS OR RE-STRIPING FOR FOLLOWING CONSTRUCTION PHASES.

WHEN REMOVABLE PAVEMENT MARKINGS TAPE IS TO BE INSTALLED ON NEW CONCRETE PAVEMENT, THE CURING COMPOUND SHALL BE REMOVED PRIOR TO INSTALLATION.

IF REMOVABLE PAVEMENT MARKING TAPE IS INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND FAILS DURING THE FIRST SIX MONTHS OF SERVICE, IT SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. REPLACEMENT SHALL BE ACCOMPLISHED IN A TIMELY MANNER UPON BEING NOTIFIED, BY THE ENGINEER, OF SUCH FAILURE.

PILOT CAR

WHEN LANE CLOSURES ARE REQUIRED ON TWO-LANE /TWO-WAY ROADWAYS, THE CONTRACTOR MAY, AT HIS OPTION, UTILIZE A PILOT CAR. IF THE CONTRACTOR ELECTS TO USE A PILOT CAR, CHANNELIZING DEVICES ALONG THE CENTERLINE WILL NOT BE REQUIRED. THE PILOT CAR OPERATOR SHALL BE IN RADIO CONTACT WITH PERSONNEL IN THE TEMPORARY TRAFFIC CONTROL ZONE. MAXIMUM SPEED OF THE PILOT CAR THROUGH THE WORK AREA SHALL BE 25 M.P.H. FULL COMPENSATION FOR FURNISHING AND OPERATING THE PILOT CAR, (INCLUDING DRIVER, RADIOS, AND ANY OTHER EQUIPMENT OR LABOR REQUIRED) SHALL BE CONSIDERED AS INCLUDED IN THE COST OF OTHER ITEMS OF WORK.

MISCELLANEOUS

TRAFFIC CONDITIONS MAY NECESSITATE CHANGES IN THE USE AND/OR QUANTITIES OF THE TRAFFIC CONTROL DEVICES AS SHOWN IN THE PLANS OR IN THE STANDARDS. ANY SUCH CHANGES ARE SUBJECT TO APPROVAL BY THE ENGINEER.

ALL CHANNELIZING DEVICES PROVIDED ON THIS PROJECT SHALL BE IN GOOD CONDITION AND SHALL BE APPROVED FOR USE ON THIS PROJECT BY THE ENGINEER.

THE REGULATORY SPEED LIMITS THROUGH THE WORK ZONE MAY BE ADJUSTED AT THE DISCRETION OF THE ENGINEER WITH THE DOCUMENTED APPROVAL OF THE DIVISION ENGINEER IN ACCORDANCE WITH TITLE 47 OF THE OKLAHOMA MOTOR VEHICLE LAWS.

THE TERMINATION AREA EXTENDS FROM THE DOWNSTREAM END OF THE WORK AREA TO THE TEMPORARY TRAFFIC CONTROL DEVICE SUCH AS "END ROAD WORK" SIGNS. IF POSTED, A SPEED SIGN, OR OTHER SIGNS MAY BE USED TO INFORM ROAD USERS THAT THEY CAN RESUME NORMAL OPERATIONS.

THE CONSTRUCTION SIGNING AND BARRICADE CONTRACTOR SHOULD AFFIX THEIR COMPANY NAME AND/OR LOGO INCONSPICUOUSLY ON EACH TRAFFIC CONTROL DEVICE.



APPROVED BY TRAFFIC ENGINEER: *Shelby Gray* DATE: 3/21/11

TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL CONSTRUCTION NOTES

2009 SPECIFICATIONS

TCS1-1	01
T-501	

DESCRIPTION	REVISIONS	DATE
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TAPER LENGTH CRITERIA FOR WORK ZONES

SPEED LIMIT M.P.H.	"L" FORMULA	"L" TAPER LENGTH (MINIMUM) (FT)			NUMBER OF CHANNELIZING DEVICES REQUIRED (MINIMUM)			SPACING CHANNELIZING DEVICES (MAXIMUM)		MAXIMUM HORIZONTAL ALIGNMENT THRU DETOUR (DEGREE) (S=0)	SPEED LIMIT M.P.H.
		10' OFFSET	11' OFFSET	12' OFFSET	10' OFFSET	11' OFFSET	12' OFFSET	① THRU TAPER SECTION (FT.)	② THRU TANGENT SECTION (FT.)		
20	$L = \frac{W \times S^2}{60}$	70	75	80	5	5	5	20	40	—	20
25		105	115	125	6	6	6	25	50	—	25
30		150	165	180	6	7	7	30	60	15	30
35		205	225	245	7	8	8	35	70	11	35
40	$L = W \times S$	265	295	320	8	9	9	40	80	8	40
45		450	495	540	11	12	13	45	90	6	45
50		500	550	600	11	12	13	50	100	5	50
55		550	605	660	12	14	15	50	100	4	55
60		600	660	720	13	15	16	50	100	3	60
65		650	715	780	14	16	17	50	100	2.5	65
70		700	770	840	15	17	18	50	100	2	70
75		750	825	900	16	18	19	50	100	1.8	75

NOTES:

① RECOMMENDED SIGNING TO BE USED THRU LANE TAPER IS (1) CW1-8 ON EVERY OTHER DRUM.

② RECOMMENDED SIGNING TO BE USED THRU TANGENT LANES IS (1) R4-7A(R) OR (1) R4-7A(L) (AS APPLIES) ON EVERY OTHER DRUM.

L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = POSTED SPEED OR OFF-PEAK 85 PERCENTILE SPEED IN MPH

TYPE OF TAPER
UPSTREAM TAPERS
MERGING TAPER
SHIFTING TAPER
SHOULDER TAPER
TWO-WAY TRAFFIC TAPER

TAPER LENGTH
L MINIMUM
1/2 L MINIMUM
1/3 L MINIMUM
100 FEET MAXIMUM
100 FEET PER LANE (USE IS OPTIONAL)

FLARE RATES FOR CONCRETE MEDIAN BARRIER IN TEMPORARY TRAFFIC CONTROL ZONES

SPEED *	FLARE RATE (MINIMUM)
40 M.P.H.	9 TO 1
45 M.P.H.	10 TO 1
50 M.P.H.	11 TO 1
55 M.P.H.	12 TO 1
60 M.P.H.	13 TO 1
65 M.P.H.	14 TO 1
70 M.P.H.	15 TO 1
75 M.P.H.	16 TO 1

* POSTED SPEED LIMIT PRIOR TO CONSTRUCTION

PAVEMENT MARKINGS THROUGH TEMPORARY TRAFFIC CONTROL ZONE

		DRIVING SURFACE	FLEX TAB MARKERS	TAPE (REMOVABLE)	TAPE (NON-REMOVABLE)	PAINT	CONSTRUCTION ZONE PAVEMENT MARKERS
ASPHALT	EXISTING PAVEMENT TO BE REMOVED OR OVERLAYED IN THE NEXT PHASE		X	X	X	X	X
	EXISTING PAVEMENT TO BE LEFT IN PLACE THRU THE NEXT PHASE		X	X			X
	INTERMEDIATE LIFT		X	X	X	X	X
	MILLED SURFACE		X	X	X	X	X
	FINAL LIFT		X	X			
CONCRETE	EXISTING PAVEMENT TO BE REMOVED OR OVERLAYED IN THE NEXT PHASE		X	X	X	X	X
	EXISTING PAVEMENT TO BE LEFT IN PLACE THRU THE NEXT PHASE		X	X			X
	FINAL SURFACE		X	X		X	X

NOTE: USE OF NON-REMOVABLE TAPE (FOILBACK) SHALL BE LIMITED TO THOSE CONDITIONS SHOWN IN THE TABLE.

RECOMMENDED CLEAR ZONE DISTANCE (FT) (CONSTRUCTION WORK ZONES)

DESIGN SPEED	DESIGN ADT	FILL SLOPES			CUT SLOPES		
		6:1 OR FLATTER	5:1 OR 4:1	3:1	3:1	4:1 OR 5:1	6:1 OR FLATTER
40 MPH OR LESS	UNDER 750	4	4	SEE NOTE 3	4	4	4
	750-1500	5	6		5	5	5
	1500-6000	6	7		6	6	6
	OVER 6000	7	8		7	7	7
45-50 MPH	UNDER 750	5	6		4	4	5
	750-1500	7	8		5	6	7
	1500-6000	8	10		6	7	8
	OVER 6000	10	12		7	9	10
55 MPH	UNDER 750	6	7		4	5	5
	750-1500	8	10		5	7	8
	1500-6000	10	12		7	8	10
	OVER 6000	11	13		8	10	11
60 MPH	UNDER 750	8	10	5	6	7	
	750-1500	10	13	6	8	10	
	1500-6000	13	16 *	7	9	12	
	OVER 6000	15	18 *	10	12	13	
65-70 MPH	UNDER 750	9	10	5	7	7	
	750-1500	12	14	6	9	10	
	1500-6000	14	17 *	8	11	13	
	OVER 6000	15	19 *	11	13	14	

NOTES:
* THE CLEAR ZONE MAY BE LIMITED TO 15 FEET FOR PRACTICALITY AND TO PROVIDE A CONSISTENT ROADWAY TEMPLATE.

(1) ALL DISTANCES ARE MEASURED FROM EDGE OF THE TRAVEL LANE.

(2) FOR CLEAR ZONES, THE "DESIGN ADT" WILL BE THE TOTAL ADT ON TWO-WAY ROADWAYS AND DIRECTIONAL ADT ON ONE-WAY ROADWAYS (E.G., RAMPS AND ONE ROADWAY OF A DIVIDED HIGHWAY).

(3) FILL SLOPES WHICH ARE 3:1 OR STEEPER ARE CRITICAL AND MAY REQUIRE A BARRIER. THEREFORE THERE IS NOT A CLEAR ZONE APPLICATION.

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED * (MPH)	LENGTH (FEET)
20 M.P.H.	115
25 M.P.H.	155
30 M.P.H.	200
35 M.P.H.	250
40 M.P.H.	305
45 M.P.H.	360
50 M.P.H.	425
55 M.P.H.	495
60 M.P.H.	570
65 M.P.H.	645
70 M.P.H.	730
75 M.P.H.	820

* POSTED SPEED, OFF-PEAK 85th PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED.

CROSSOVER CRITERIA FOR WORK ZONES

WIDTH OF MEDIAN (W) (FT)	LATERAL SHIFT - (P) (FT)	LENGTH OF CROSSOVER - LC * (FT)											
		V.	30 M.P.H.	35 M.P.H.	40 M.P.H.	45 M.P.H.	50 M.P.H.	55 M.P.H.	60 M.P.H.	65 M.P.H.	70 M.P.H.	75 M.P.H.	
		D.	15°	11°	8°	6°	5°	4°	3°	2.5°	2°	1.8°	
20	32	R.	382	521	716	955	1146	1433	1910	2292	2865	3183	
30	42		219	256	301	348	382	427	493	541	605	637	
40	52		250	293	344	398	437	489	565	619	692	730	
50	62		277	325	382	443	485	543	628	688	770	812	
60	72		301	354	417	483	529	593	685	751	841	886	
70	82		324	381	448	519	570	638	738	809	905	955	
80	92		344	405	478	554	608	681	787	863	966	1,018	
90	102		363	428	505	586	643	720	833	914	1,023	1,078	
100	112		381	450	531	616	676	758	877	962	1,076	1,135	
110	122		398	470	555	644	708	793	918	1,007	1,127	1,189	
120	132		414	489	578	672	738	827	958	1,050	1,176	1,240	
			429	508	601	698	767	860	995	1,092	1,223	1,290	

* CROSSOVER = REVERSE CURVE CONNECTION TYING TWO (2) PARALLEL ROADWAYS.

RECOMMENDED DISTANCE BETWEEN SIGNS (MIN.)

ROAD TYPE	A (FT)	B (FT)	C (FT)
URBAN (LOW SPEED)	100	100	100
URBAN (HIGH SPEED)	350	350	350
RURAL	500	500	500
EXPRESSWAY / FREEWAY	1,000	1,500	2,640

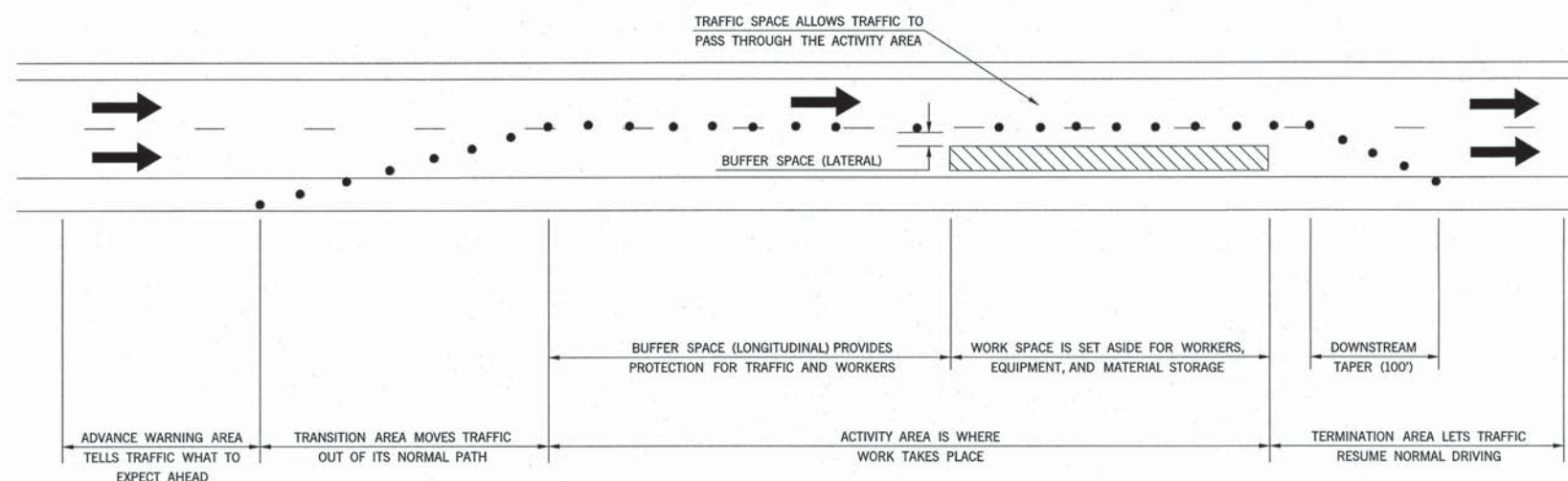


APPROVED BY
TRAFFIC ENGINEER: *David Smith* DATE: 6/23/10

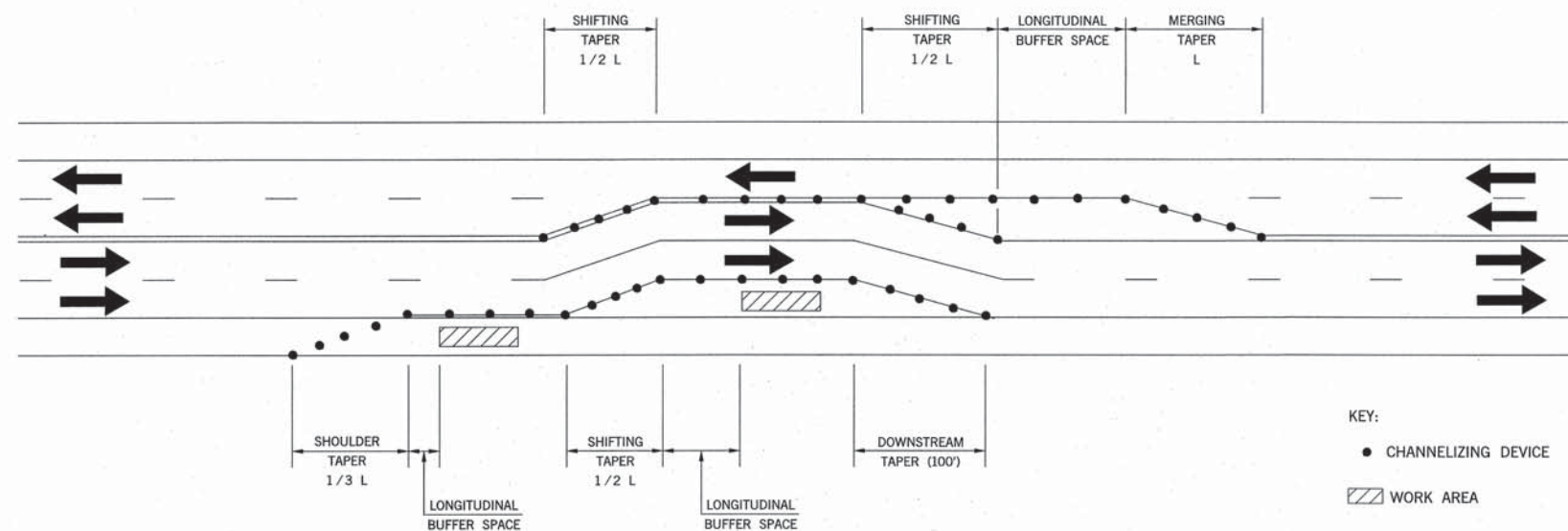
TRAFFIC STANDARD TRAFFIC CONTROL STANDARD TRAFFIC CONTROL TABLES AND CHARTS

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DESCRIPTION	REVISIONS	DATE
CHANGED TRANSITION NOTATION		5/31/2011



COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL ZONE



TAPERS AND BUFFER SPACE

TEMPORARY TRAFFIC CONTROL ELEMENTS



APPROVED BY TRAFFIC ENGINEER: *[Signature]* DATE: 5/31/2011

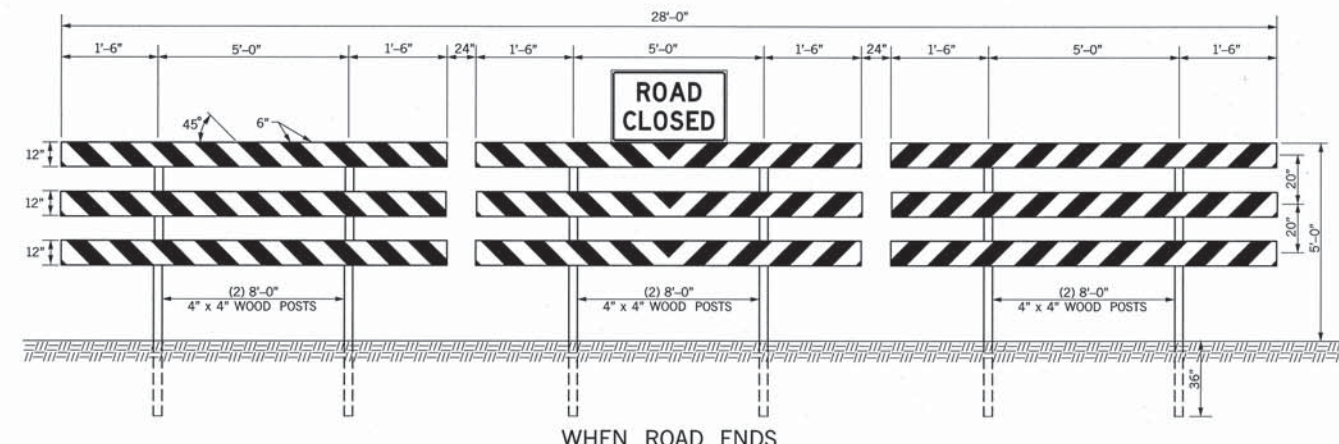
TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TEMPORARY TRAFFIC CONTROL ELEMENTS

2009 SPECIFICATIONS

TCS3-1	01
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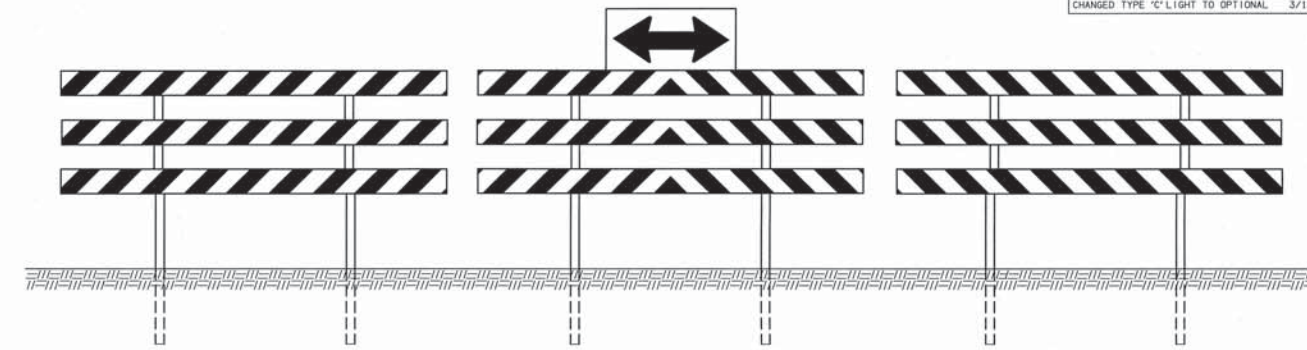
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DESCRIPTION	REVISIONS	DATE
CHANGED TYPE 'C' LIGHT TO OPTIONAL		3/16/2011



WHEN ROAD ENDS

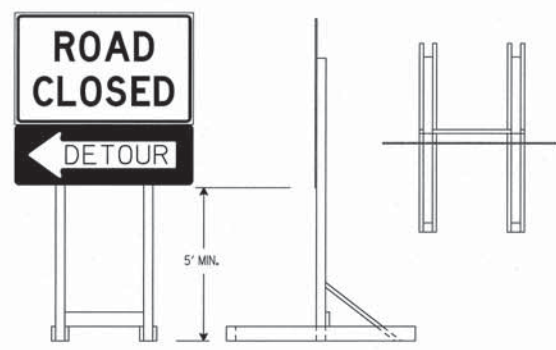
PERMANENT TYPE III(A/B) BARRICADE
(DIMENSIONS ARE TYPICAL FOR BOTH BARRICADES)



FOR T-INTERSECTIONS

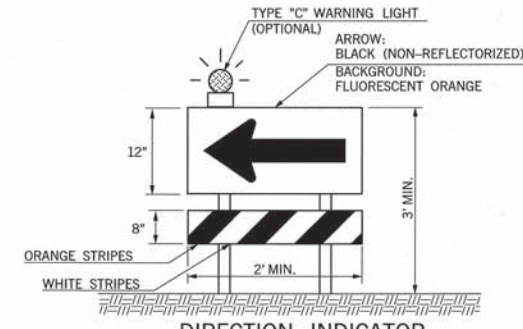
NOTES: A PERMANENT BARRICADE TYPE III(A) SHALL CONSIST OF NINE (9) PANELS AND SIX (6) POSTS.
TYPICAL INSTALLATION AS SHOWN IS FOR AN ABSOLUTE CLOSURE.
BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.

PERMANENT BARRICADE TYPE III(B) WILL BE IDENTICAL TO TYPE III(A) WITH NINE (9) ADDITIONAL REFLECTORIZED 3/4"x12" LUMBER PANELS ATTACHED TO THE BACK SIDE OF THE BARRICADE.
COLOR: BACKGROUND - WHITE (REFLECTORIZED)
DIAGONAL STRIPES - RED (REFLECTORIZED)

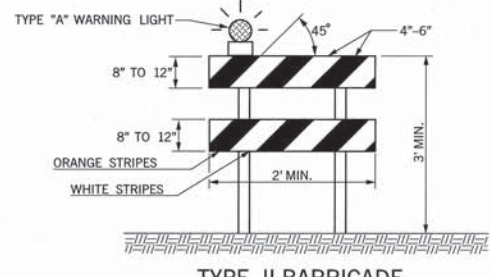


Skid-Mounted Sign Support with plywood sign

LONG INTERMEDIATE TERM STATIONARY PORTABLE SIGN SUPPORTS
5 Foot Mounting Height (SKID MOUNTED)
(SHALL BE PLACED BEHIND TYPE III BARRICADE)



DIRECTION INDICATOR BARRICADE



TYPE II BARRICADE

NOTES: FOR WOODEN BARRICADES NOMINAL LUMBER DIMENSIONS WILL BE SATISFACTORY.
FOR RAILS LESS THAN 3 FEET LONG, 4 INCH WIDE STRIPES SHALL BE USED.
TYPE III BARRICADES SHALL BE CONSTRUCTED USING A MINIMUM OF TWO (2) POSTS.
FOR WOODEN BARRICADES, PANEL THICKNESS SHALL NOT EXCEED ONE-HALF INCH (1/2").
BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.
PROJECTS WITH WORK LIMITS OF 2.0 MILES OR MORE IN LENGTH WILL REQUIRE THE G20-1A SIGN. THE SIGN (G20-1A) WILL BE REQUIRED ON ONE SIDE OF A 2-LANE ROADWAY AND BOTH SIDES OF A DIVIDED HIGHWAY.
ALL BARRICADE STRIPES SHALL BE RETROREFLECTIVE.
COLOR: BACKGROUND - WHITE (REFLECTORIZED)
DIAGONAL STRIPES - FLUORESCENT ORANGE (REFLECTORIZED)

IF BARRICADES ARE USED TO CHANNELIZE PEDESTRIANS, THERE SHALL BE CONTINUOUS DETECTABLE BOTTOM AND TOP RAILS WITH NO GAPS BETWEEN INDIVIDUAL BARRICADES TO BE DETECTABLE TO USERS OF LONG CANES. THE BOTTOM OF THE BOTTOM RAIL SHALL BE NO HIGHER THAN 6 INCHES ABOVE THE GROUND SURFACE. THE TOP OF THE TOP RAIL SHALL BE NO LOWER THAN 36 INCHES ABOVE THE GROUND SURFACE.

SIGNS MOUNTED ON TYPE III BARRICADES SHOULD NOT COVER MORE THAN 50 PERCENT OF THE TOP TWO RAILS OR 33 PERCENT OF THE TOTAL AREA OF THE THREE RAILS

SIGNS MOUNTED ON BARRICADES, OR OTHER PORTABLE SUPPORTS, SHALL BE NO LESS THAN 1' ABOVE THE TRAVELED WAY.

SANDBAGS MAY BE PLACED ON LOWER PARTS OF THE FRAME OR THE STAYS OF BARRICADES TO PROVIDE THE REQUIRED BALLAST.

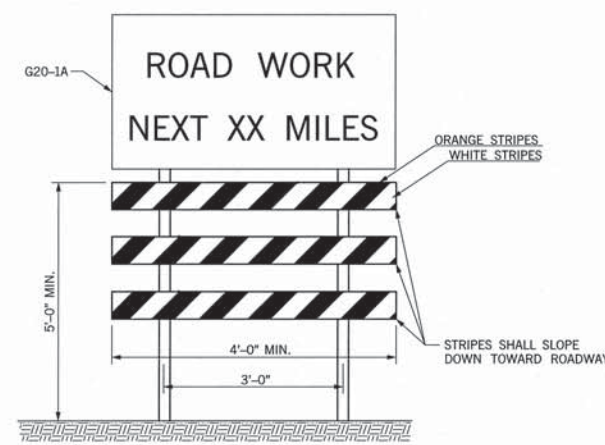
BALLAST SHALL NOT BE PLACED ON TOP OF ANY STRIPED RAIL. BARRICADES SHALL NOT BE BALLASTED BY NONDEFORMABLE OBJECTS SUCH AS ROCKS OR CHUNKS OF CONCRETE. BALLAST SHALL NOT EXTEND INTO THE ACCESSIBLE PASSAGE WIDTH OF 60".

DIRECTION INDICATOR BARRICADE SHALL CONSIST OF A ONE-DIRECTION LARGE ARROW (W1-6) SIGN MOUNTED ABOVE A DIAGONAL STRIPED, HORIZONTALLY ALIGNED, RETROREFLECTIVE RAIL.

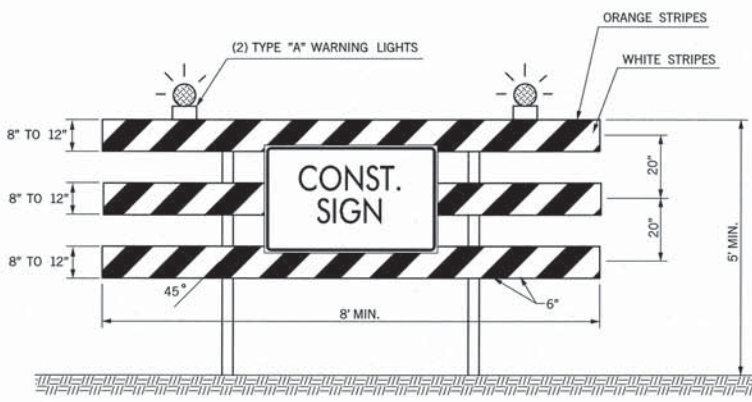
WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, THE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

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

WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD BE POSITIONED TO SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

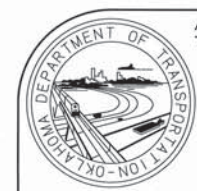


WING BARRICADE



TYPE III BARRICADE

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD
880(C)	CONSTRUCTION BARRICADES	SD
880(E)	WARNING LIGHTS	SD



APPROVED BY TRAFFIC ENGINEER: *[Signature]* DATE: 3/21/11

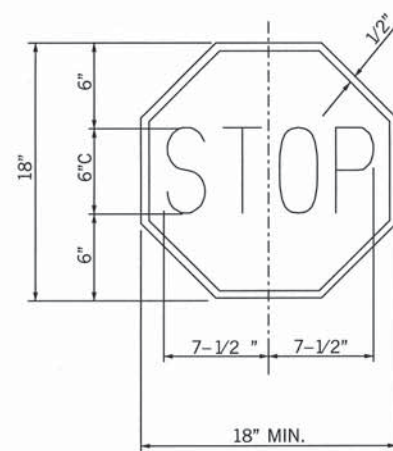
TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL DEVICES

2009 SPECIFICATIONS

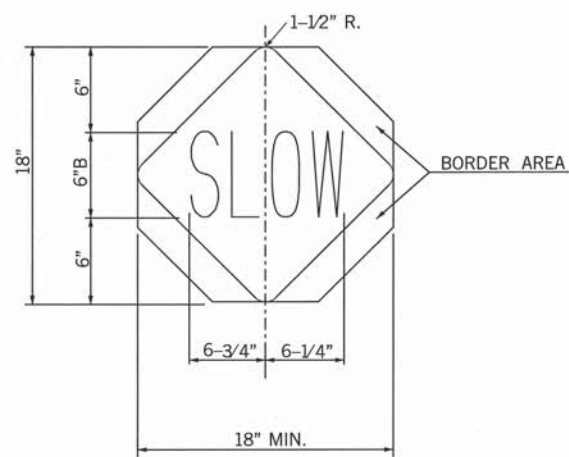
TCS4-1	01
	T-504

\$\$\$date\$\$\$

DESCRIPTION	REVISIONS	DATE

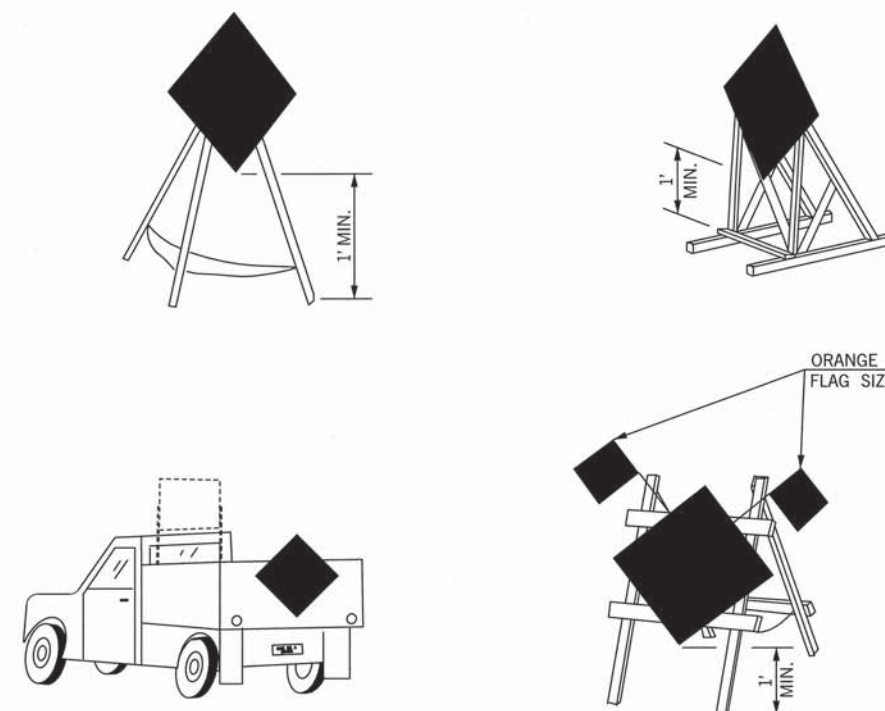


STOP:
 LEGEND AND BORDER: WHITE (REFLECTORIZED)
 BACKGROUND: RED (REFLECTORIZED)



SLOW:
 LEGEND AND BORDER AREA: BLACK (NON-REFLECTORIZED)
 BACKGROUND: ORANGE (REFLECTORIZED)

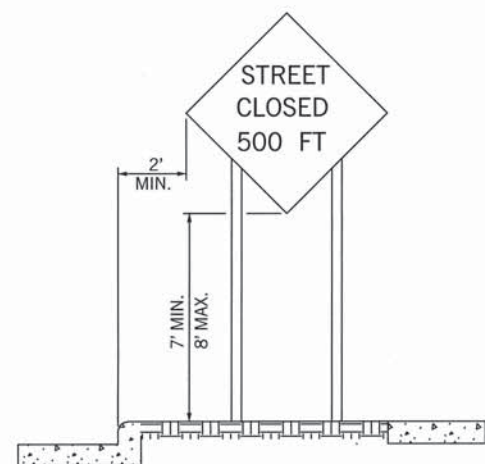
STOP-SLOW PADDLE



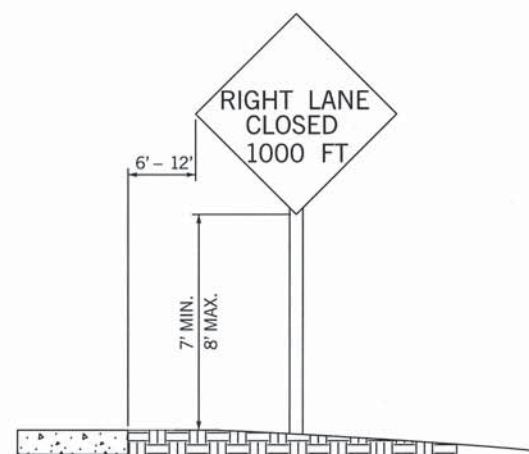
ORANGE FLAGS (OPTIONAL)
 FLAG SIZE 16" x 16" (MIN.)

NOTE:
 THE BOTTOM OF SIGNS MOUNTED
 ON BARRICADES OR TEMPORARY
 SUPPORTS SHALL NOT BE LESS THAN
 1 FOOT ABOVE THE TRAVELED WAY.

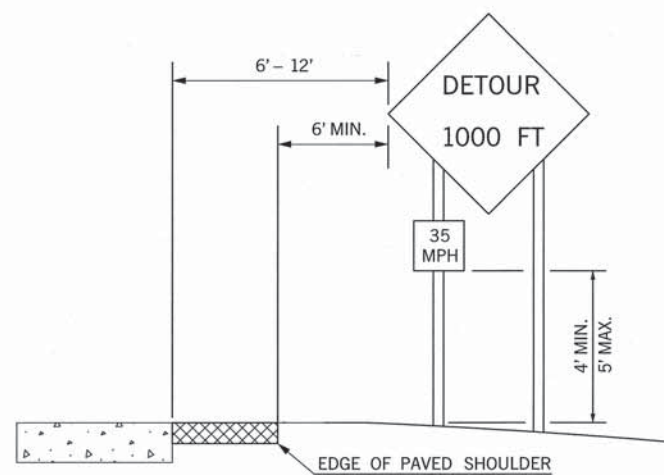
**PORTABLE AND TEMPORARY MOUNTINGS
 METHODS OF MOUNTING SIGNS OTHER THAN ON POSTS**



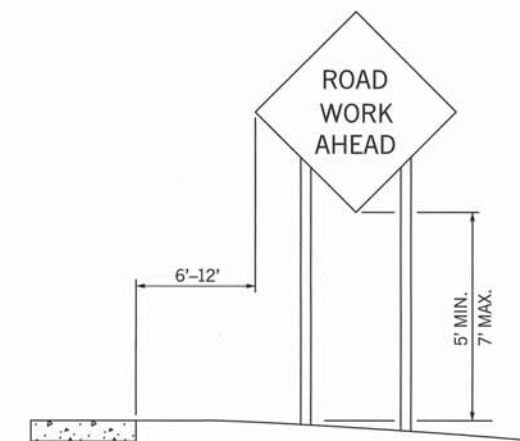
**URBAN DISTRICT
 (WITH CURB)**



**URBAN DISTRICT
 (WITHOUT CURB)**



**RURAL DISTRICT WITH
 ADVISORY SPEED PLATE**



RURAL DISTRICT

HEIGHT AND LATERAL LOCATIONS OF SIGNS – TYPICAL INSTALLATIONS

TRFFC36 M:\2009_Standards_TC\505.dgn 8:24:30 AM 6/23/2010 R:\TBAF_PLOT\teroy.pen R:\TBAF_PLOT\bw.ctb



APPROVED BY
 TRAFFIC ENGINEER: *David J. Smith* DATE: 6/23/10

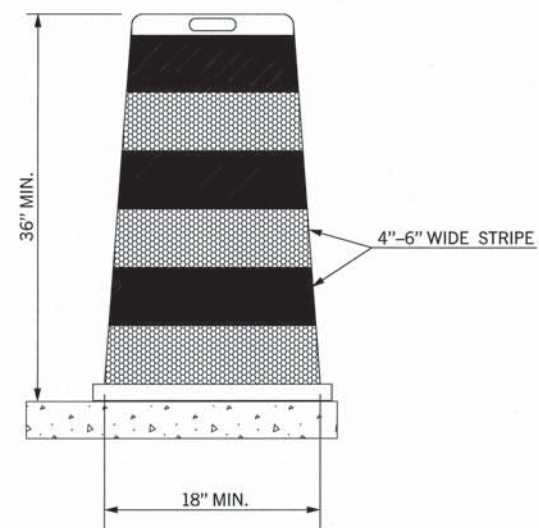
TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
 TYPICAL SIGN INSTALLATION

2009 SPECIFICATIONS

TCSS-1 00
 T-505

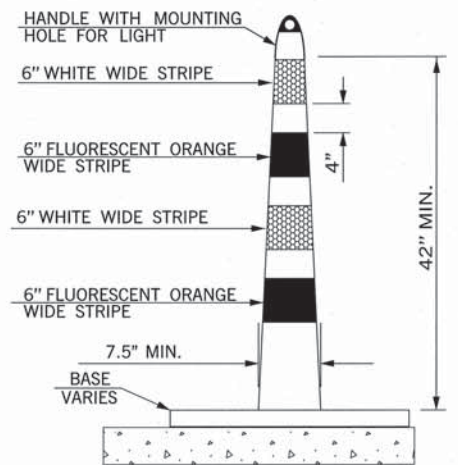
DESCRIPTION	REVISIONS	DATE
ADD NOTE TO VERTICAL PANEL		07/19/10
CHANGED TYPE "C" LIGHT TO OPTIONAL		3/15/2011



DRUM

NOTES:

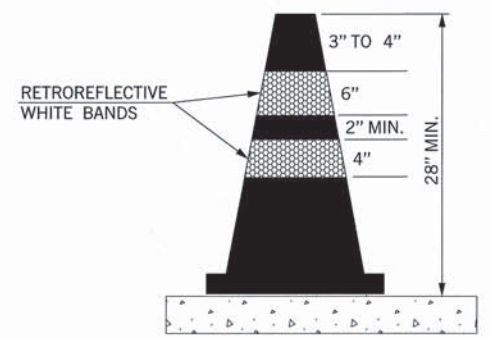
METAL DRUMS SHALL NOT BE USED.
 EACH DRUM SHALL HAVE A MINIMUM OF TWO (2) FLUORESCENT ORANGE STRIPES ALTERNATING WITH A MINIMUM OF TWO (2) WHITE STRIPES. THESE STRIPES SHALL CONSIST OF RETROREFLECTIVE SHEETING.
 BALLAST SHALL NOT BE PLACED ON TOP OF A DRUM.
 DRUMS SHALL NOT BE USED TO DELINEATE AN EDGE DROP OFF IF THEY MUST BE PLACED IN THE DROP OFF AREA BELOW THE LEVEL OF THE DRIVING SURFACE.



CHANNELIZER CONE

NOTES:

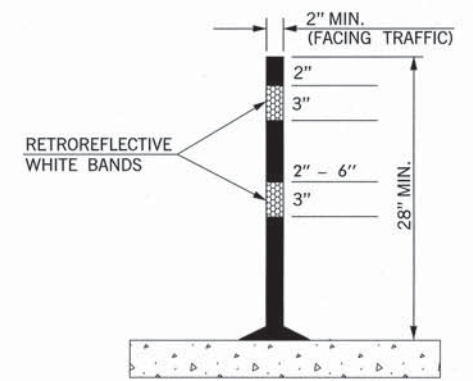
CHANNELIZER CONES USED ON HIGH SPEED ROADWAYS, ON ALL HIGHWAYS DURING NIGHTTIME, OR WHENEVER MORE CONSPICUOUS GUIDANCE IS NEEDED SHALL BE A MINIMUM OF 42 INCHES HIGH.
 EACH CHANNELIZER CONES SHALL HAVE A MINIMUM OF TWO (2) FLUORESCENT ORANGE STRIPES ALTERNATING WITH A MINIMUM OF TWO (2) WHITE STRIPES. THESE STRIPES SHALL CONSIST OF RETROREFLECTIVE SHEETING.
 BASE SHALL WEIGH 30 LBS. OR MORE.



CONE

NOTES:

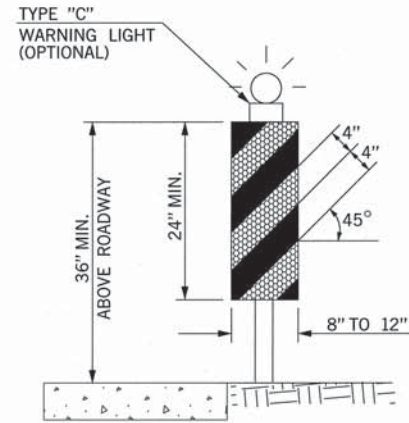
CONES USED ON HIGH SPEED ROADWAYS, ON ALL HIGHWAYS DURING NIGHTTIME, OR WHENEVER MORE CONSPICUOUS GUIDANCE IS NEEDED SHALL BE A MINIMUM OF 28 INCHES HIGH.
 CONES SHALL BE PREDOMINANTLY ORANGE, WITH WHITE RETROREFLECTIVE SHEETING.



TUBE CHANNELIZER

NOTES:

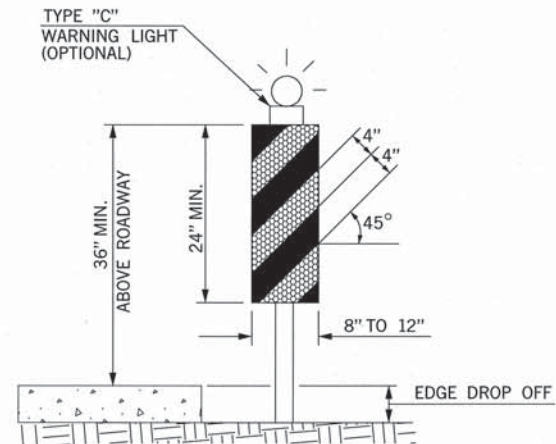
TUBE CHANNELIZERS USED ON HIGH SPEED ROADWAYS, ON ALL HIGHWAYS DURING NIGHTTIME, OR WHENEVER MORE CONSPICUOUS GUIDANCE IS NEEDED SHALL BE A MINIMUM OF 28 INCHES HIGH.
 TUBE CHANNELIZERS SHALL BE PREDOMINANTLY ORANGE, WITH WHITE RETROREFLECTIVE SHEETING.



**VERTICAL PANEL
W/O DROP OFF**

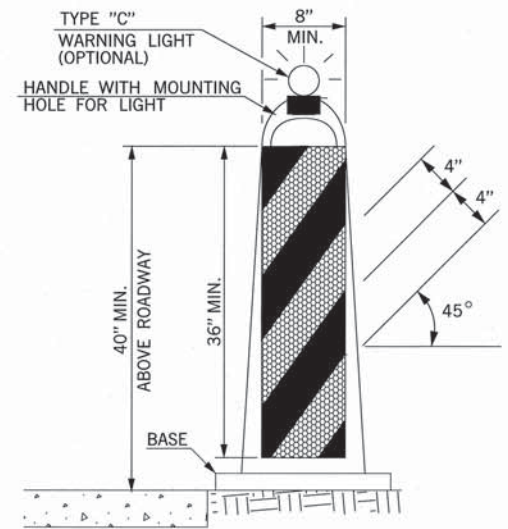
NOTES:

PANEL STRIPE WIDTHS SHALL BE 6 INCHES EXCEPT WHERE PANEL LENGTHS ARE LESS THAN 36 INCHES, THEN 4 INCH WIDE STRIPES MAY BE USED.
 MARKINGS FOR VERTICAL PANELS SHALL BE ALTERNATING FLUORESCENT ORANGE AND WHITE RETROREFLECTORIZED STRIPES (SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS).
 SHALL HAVE A MINIMUM OF TWO (2) FULL FLUORESCENT ORANGE STRIPES.



**VERTICAL PANEL
W/DROP OFF**

ON UNDIVIDED HIGHWAYS, VERTICAL PANELS SHALL HAVE A MINIMUM OF 192 SQUARE INCHES OF RETROREFLECTIVE SHEETING ON EACH PANEL (FRONT AND BACK). WHEN USED ON HIGH SPEED ROADWAYS, VERTICAL PANELS SHALL HAVE MINIMUM OF 270 SQUARE INCHES OF RETROREFLECTIVE SHEETING ON EACH PANEL (FRONT AND BACK). THIS SHALL CONSTITUTE ONE (1) COMPLETE VERTICAL PANEL.
 ON DIVIDED HIGHWAYS A VERTICAL PANEL MAY HAVE SHEETING ON ONLY ONE SIDE.



STACKABLE VERTICAL PANEL

NOTES:

(1) VERTICAL PANEL SIGNS SHALL BE MOUNTED BACK TO BACK WHEN USED FOR TWO-WAY TRAFFIC.
 (2) BASE SHALL BE NO LARGER THAN 28" LONG BY 20" WIDE, AND 2" THICK.
 (3) BASE SHALL WEIGHT 30 LBS. OR MORE.
 (4) THESE DEVICES SHALL BE CONSTRUCTED OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING VEHICLES ON IMPACT.

KEY:

- FLUORESCENT ORANGE (REFLECTORIZED)
- WHITE (REFLECTORIZED)

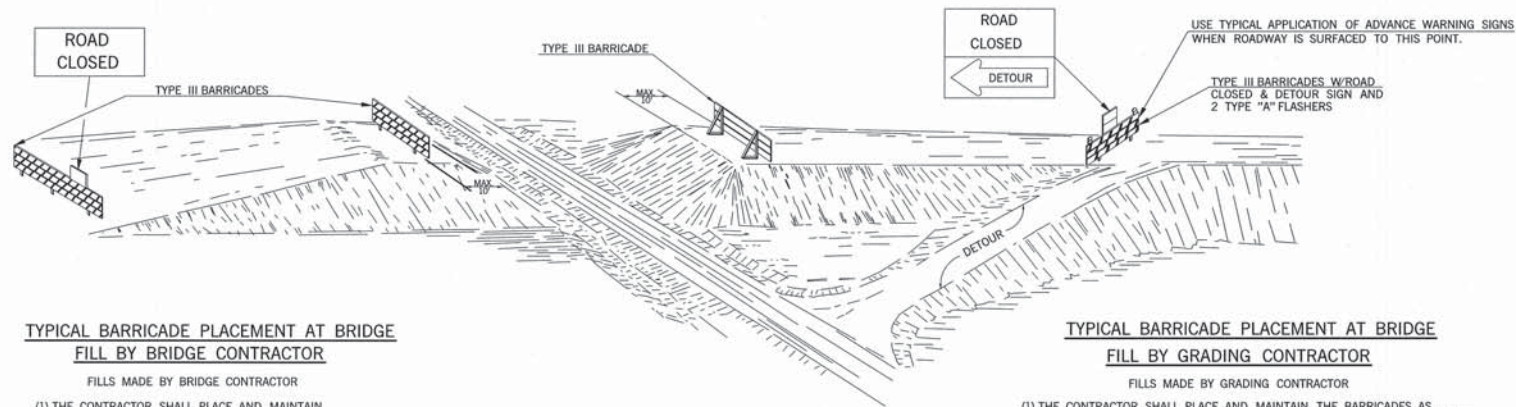
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(D)	VERTICAL PANEL	SD
880(E)	WARNING LIGHTS	SD
880(F)	DRUMS	SD
880(G)	TUBE CHANNELIZERS	SD
880(H)	CONES	SD
880(I)	CHANNELIZER CONES	SD



APPROVED BY
 TRAFFIC ENGINEER: *[Signature]* DATE: 3/21/11

TRAFFIC STANDARD
 CONTROL STANDARD
 CHANNELIZING DEVICES

\$\$\$date\$\$\$

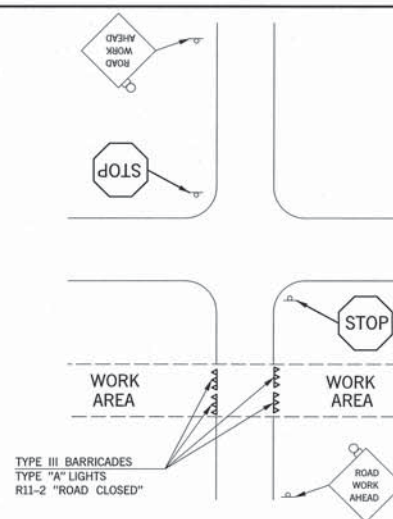


TYPICAL BARRICADE PLACEMENT AT BRIDGE FILL BY BRIDGE CONTRACTOR

- FILLS MADE BY BRIDGE CONTRACTOR
- (1) THE CONTRACTOR SHALL PLACE AND MAINTAIN THE BARRICADES AS SHOWN UNTIL THEY ARE NO LONGER NEEDED.
 - (2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.
 - (3) THE ENGINEER SHALL NOTIFY THE GRADING CONTRACTOR TO FURNISH AND ERECT HIS BARRICADES "IMMEDIATELY" AFTER THE BRIDGE CONTRACTOR REMOVES HIS BARRICADES. THE GRADING CONTRACTOR SHALL MAINTAIN HIS BARRICADES UNTIL FINAL INSPECTION OR UNTIL THEY ARE NO LONGER NEEDED.
 - (4) BARRICADES AT BRIDGE FILL SHALL BE IN PLACE AND MAINTAINED AT ALL TIMES UNTIL OPENED TO TRAFFIC. HOWEVER, BARRICADES MAY BE REMOVED OR ADJUSTED, AS NEEDED, TO ALLOW ACCESS TO THE WORK AREA.

TYPICAL BARRICADE PLACEMENT AT BRIDGE FILL BY GRADING CONTRACTOR

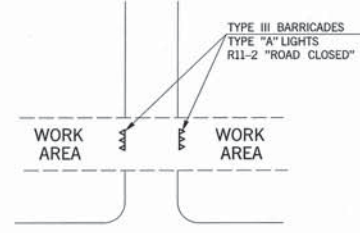
- FILLS MADE BY GRADING CONTRACTOR
- (1) THE CONTRACTOR SHALL PLACE AND MAINTAIN THE BARRICADES AS SHOWN UNTIL FINAL INSPECTION OR UNTIL THEY ARE NO LONGER NEEDED.
 - (2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.
 - (3) IF THE BRIDGE WORK ORDER IS ISSUED PRIOR TO COMPLETION OF THE GRADING CONTRACT, THE BRIDGE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE GRADING CONTRACTOR TO ASSUME RESPONSIBILITY FOR PROTECTION OF THE BRIDGE WORK AREA. THIS WILL INCLUDE FURNISHING, INSTALLING, AND MAINTAINING ALL BARRICADES AND SIGNS NECESSARY TO PROVIDE THAT PROTECTION UNTIL THE BRIDGE IS COMPLETED AND THE FINAL INSPECTION IS COMPLETED.
 - (4) IF THE BRIDGE WORK ORDER HAS NOT BEEN ISSUED PRIOR TO THE FINAL INSPECTION OF THE GRADING, THEN THE GRADING CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE OKLAHOMA DEPARTMENT OF TRANSPORTATION FOR STATE FORCES TO SUPPLY, INSTALL AND MAINTAIN ANY NECESSARY TRAFFIC CONTROL DEVICES NEEDED TO PROTECT THE WORK AREA. THESE STATE OWNED DEVICES SHALL REMAIN IN PLACE UNTIL SUCH TIME THAT THE BRIDGE WORK ORDER IS ISSUED. AT THAT TIME THE BRIDGE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR TRAFFIC CONTROL AND REPLACE THE STATE OWNED DEVICES WITH HIS OWN.
 - (5) SUFFICIENT NUMBER OF TYPE II BARRICADES WITH SIGNS SHALL BE USED TO COMPLETELY CLOSE THE WORK AREA TO THROUGH TRAFFIC.
 - (6) BARRICADES AT BRIDGE FILL SHALL BE IN PLACE AND MAINTAINED AT ALL TIMES UNTIL OPENED TO TRAFFIC. HOWEVER, BARRICADES MAY BE REMOVED OR ADJUSTED, AS NEEDED, TO ALLOW ACCESS TO THE WORK AREA.



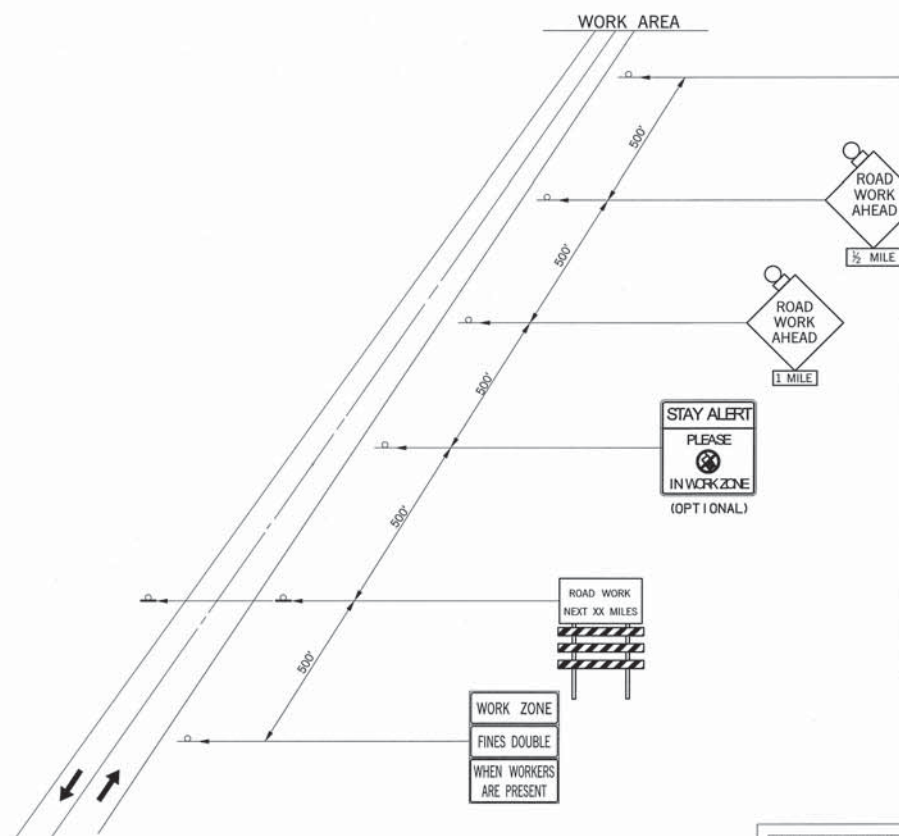
TYPICAL SIGN PLACEMENT FOR INTERSECTING ROADS AND STREETS

DESCRIPTION	REVISIONS	DATE
MODIFIED NOTE		3/15/2011
ADD "NO CELL PHONE" USAGE IN WORK ZONE DISTANCE SIGN TO WARNING SIGNS		4/2/2013

- NOTES:
- (1) SIGNS SHOWN FOR ONE DIRECTION OF TRAVEL ONLY.
 - (2) FLASHING WARNING LIGHTS SHALL BE USED TO CALL ATTENTION TO THE EARLY WARNING SIGNS.
 - (3) WARNING LIGHTS SHOULD BE USED TO MARK CHANNELIZING DEVICES AT NIGHT AS NEEDED.
 - (4) PLACEMENT OF TYPE III BARRICADES SHALL BE APPROVED BY THE ENGINEER.
 - (5) TYPE II BARRICADES, DRUMS AND/OR VERTICAL PANELS MAY BE SUBSTITUTED FOR TYPE III BARRICADES TO AVOID OBSTRUCTING THE MOTORISTS VIEW.
 - (6) IF TWO OR MORE DRIVEWAYS ARE IN CLOSE PROXIMITY, THE BARRICADES BETWEEN THE DRIVEWAYS MAY BE OMITTED AT THE DISCRETION OF THE ENGINEER.
 - (7) THE "ROAD WORK AHEAD" SIGN, WHICH SERVES AS A GENERAL WARNING OF OBSTRUCTIONS OR RESTRICTIONS, SHALL BE LOCATED ON ALL INTERSECTING ROADS AND STREETS.



TYPICAL SIGN PLACEMENT FOR PRIVATE DRIVE OR RESIDENCE



TYPICAL APPLICATION ADVANCE WARNING SIGNS ON 2-LANE HIGHWAY

TYPICAL CONSTRUCTION WARNING SIGNS WITH MESSAGES OTHER THAN DETAILED ON STANDARD DRAWINGS SHALL BE CONSTRUCTED USING THE LARGEST POSSIBLE LETTER SIZE. SIGN SIZE AND COLOR SHALL BE THE SAME AS OTHER CONSTRUCTION WARNING SIGNS USED FOR SIMILAR CONDITIONS.

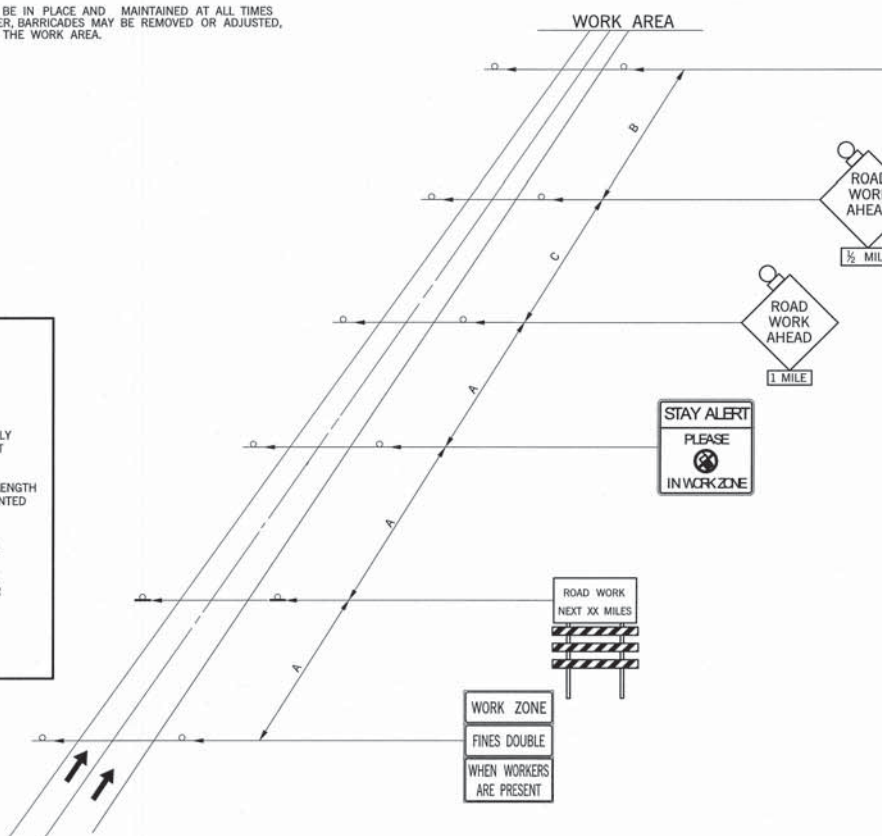
FINES DOUBLE IN WORK ZONE SIGNS ARE TO BE USED ONLY ON STATE OR FEDERAL HIGHWAYS WHERE THE SPEED LIMIT IS REDUCED OR AS DIRECTED BY THE ENGINEER.

PROJECTS WITH WORK LIMITS OF 1.0 MILES OR MORE IN LENGTH WILL REQUIRE THE Q20-1A SIGN. THE SIGN SHALL BE MOUNTED AS SHOWN ON TCS4-1 (LATEST REVISION).

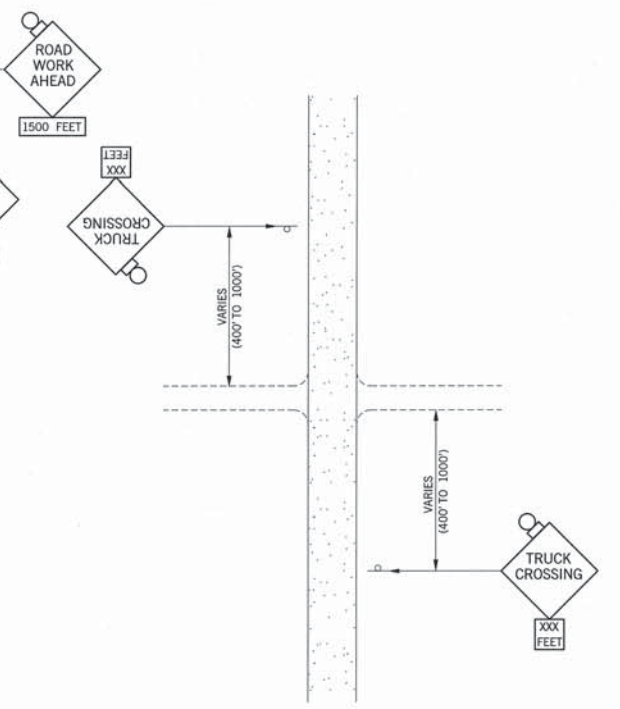
WARNING SIGNS SHOWN ARE "ADVANCE" WARNING SIGNS AND ARE REQUIRED ON ALL STATE HIGHWAYS. ADDITIONAL WARNING SIGNS MAY BE REQUIRED WITHIN THE PROJECT LIMITS TO WARN DRIVERS OF SPECIFIC HAZARDS. ADVANCE "WARNING SIGNS" MAY CHANGE AS CONDITIONS CHANGE OR AS DIRECTED BY THE ENGINEER.

PROJECT WORK OF 1.0 MILE OR MORE IN LENGTH WILL REQUIRE SIGNS CS-14 AND R2-1 TO BE PLACED EVERY 1/2 MILE THROUGH WORK ZONE.

ROAD TYPE	DISTANCE BETWEEN SIGNS SHALL BE A (MIN.)		
	A (FT)	B (FT)	C (FT)
URBAN (LOW SPEED)	100	100	100
URBAN (HIGH SPEED)	350	350	350
RURAL	500	500	500
EXPRESSWAY /FREEWAY	1,000	1,500	2,640



TYPICAL APPLICATION ADVANCE WARNING SIGNS ON A DIVIDED HIGHWAY



TYPICAL APPLICATION ADVANCE SIGNING WHERE TRUCKS ARE CROSSING



APPROVED BY TRAFFIC ENGINEER: *David S. ...* DATE: 4/18/2013

TRAFFIC STANDARD TRAFFIC CONTROL STANDARD PLACEMENT OF ADVANCE WARNING SIGNS

2009 SPECIFICATIONS

TCS7-1	02
	T-507

\$\$\$date\$\$\$



STOP

R1-1 30 x 30 5.18 SF
R1-1E 36 x 36 7.46 SF
R1-1F 48 x 48 13.26 SF

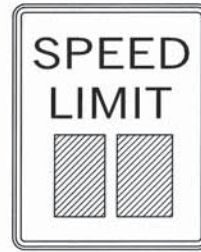
COLOR:
LEGEND AND BORDER:
WHITE (REFLECTORIZED)
BACKGROUND:
RED (TRANSPARENT REFLECTORIZED)



YIELD

R1-2 36 x 36 x 36 3.90 SF
R1-2E 48 x 48 x 48 6.93 SF
R1-2F 60 x 60 x 60 10.83 SF

COLOR:
LEGEND AND BORDER:
RED (TRANSPARENT REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



SPEED LIMIT

R2-1(SPEED) 24 x 30 5.00 SF
R2-1E() 36 x 48 12.00 SF
R2-1F() 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



NO RIGHT TURN

R3-1 24 x 24 4.00 SF
R3-1E 36 x 36 9.00 SF
R3-1F 48 x 48 16.00 SF

COLOR:
ARROW AND BORDER:
BLACK (NON-REFLECTORIZED)
CIRCLE AND DIAGONAL:
RED (TRANSPARENT REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



NO LEFT TURN

R3-2 24 x 24 4.00 SF
R3-2E 36 x 36 9.00 SF
R3-2F 48 x 48 16.00 SF

COLOR:
ARROW AND BORDER:
BLACK (NON-REFLECTORIZED)
CIRCLE AND DIAGONAL:
RED (TRANSPARENT REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

DESCRIPTION	REVISIONS	DATE



KEEP RIGHT SIGN

R4-7 24 x 30 5.00 SF
R4-7E 36 x 48 12.00 SF
R4-7F 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



KEEP LEFT SIGN

R4-8 24 x 30 5.00 SF
R4-8E 36 x 48 12.00 SF
R4-8F 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



KEEP RIGHT

R4-7a(R) 24 x 30 5.00 SF
R4-7a(R)E 36 x 48 12.00 SF
R4-7a(R)F 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



KEEP LEFT

R4-7a(L) 24 x 30 5.00 SF
R4-7a(L)E 36 x 48 12.00 SF
R4-7a(L)F 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



DO NOT ENTER

R5-1 30 x 30 6.25 SF
R5-1E 36 x 36 9.00 SF
R5-1F 48 x 48 16.00 SF

COLOR:
SYMBOL: :
RED (TRANSPARENT REFLECTORIZED)
LEGEND AND BACKGROUND: :
WHITE (REFLECTORIZED)



ONE WAY

R6-1(L) 36 x 12 3.00 SF
R6-1E(L) 54 x 18 6.75 SF
R6-1F(L) 54 x 18 6.75 SF

COLOR:
ARROW AND BORDER:
WHITE (NON-REFLECTORIZED)
LEGEND AND BACKGROUND:
BLACK (REFLECTORIZED)



ONE WAY

R6-1(R) 36 x 12 3.00 SF
R6-1E(R) 54 x 18 6.75 SF
R6-1F(R) 54 x 18 6.75 SF

COLOR:
ARROW AND BORDER:
WHITE (NON-REFLECTORIZED)
LEGEND AND BACKGROUND:
BLACK (REFLECTORIZED)



STOP HERE ON RED

R10-6 24 x 36 6.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

NOTES:
WORD SIGNS MAY BE USED IF SYMBOL SIGNS ARE NOT AVAILABLE EITHER IN "STANDARD HIGHWAY SIGNS MANUAL" OR IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) (CURRENT EDITION).

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD



APPROVED BY TRAFFIC ENGINEER: *[Signature]* DATE: 6/23/10

TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS8-1 00
T-508



ROAD CLOSED

R11-2 48 x 30 10.00 SF

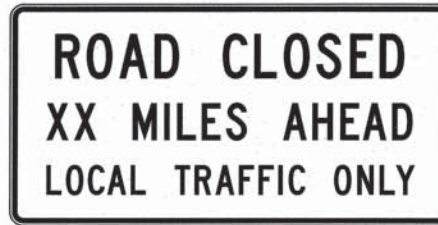
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



LANE CLOSED

R11-2(LANE) 48 x 30 10.00 SF

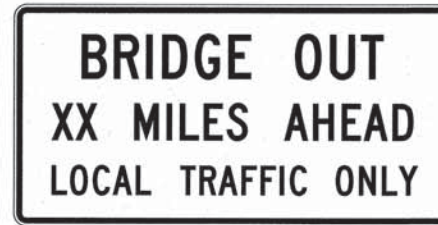
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



ROAD CLOSED XX MILES AHEAD

R11-3a 60 x 30 12.50 SF

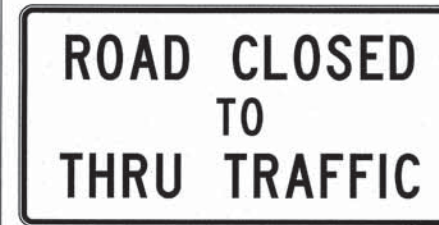
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



BRIDGE OUT XX MILES AHEAD

R11-3b 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



ROAD CLOSED TO THRU TRAFFIC

R11-4 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



DETOUR SIGN

M4-8 24 x 12 2.00 SF
M4-8E 30 x 15 3.13 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-9(R) 30 x 24 5.00 SF
M4-9(R)E 48 x 36 12.00 SF
M4-9(R)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-9(L) 30 x 24 5.00 SF
M4-9(L)E 48 x 36 12.00 SF
M4-9(L)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-9(V) 30 x 24 5.00 SF
M4-9(V)E 48 x 36 12.00 SF
M4-9(V)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-10(R) 48 x 18 6.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-10(L) 48 x 18 6.00 SF

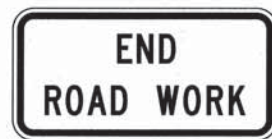
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



ROAD WORK NEXT XX MILES SIGN

G20-1A 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



END ROAD WORK SIGN

G20-2A 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



PILOT CAR FOLLOW ME SIGN

G20-4 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

NOTES:
WORD SIGNS MAY BE USED IF SYMBOL SIGNS ARE NOT AVAILABLE EITHER IN "STANDARD HIGHWAY SIGNS MANUAL" OR IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) (CURRENT EDITION).

ALL DIAMOND SHAPE CONSTRUCTION WARNING SIGNS SHALL BE 48 INCHES X 48 INCHES UNLESS OTHERWISE NOTED IN THE PLANS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD



APPROVED BY
TRAFFIC ENGINEER: *David Gandy* DATE: 3/21/11

TRAFFIC STANDARD
TRAFFIC CONTROL STANARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS9-1 01
T-509

TRFPC36 M:\2009 Standards TC\1510.dgn 8:27:40 AM 6/23/2010 R:\TRAF PLOT\eroy.pen R:\TRAF PLOT\bw.cb



TURN LEFT

W1-1(L) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



TURN RIGHT

W1-1(R) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



CURVE LEFT

W1-2(L) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



CURVE RIGHT

W1-2(R) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



LEFT REVERSE TURN

W1-3(L) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



RIGHT REVERSE TURN

W1-3(R) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



LEFT REVERSE CURVE

W1-4(L) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



RIGHT REVERSE CURVE

W1-4(R) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



LEFT REVERSE CURVE

W1-4B(L) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



RIGHT REVERSE CURVE

W1-4B(R) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



LEFT REVERSE CURVE

W1-4C(L) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



RIGHT REVERSE CURVE

W1-4C(R) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



ARROW

W1-6 48 x 24 8.00 SF
W1-6E 60 x 30 12.50 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DOUBLE ARROW

W1-7 48 x 24 8.00 SF
W1-7E 60 x 30 12.50 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

DESCRIPTION	REVISIONS	DATE

NOTES:
WORD SIGNS MAY BE USED IF SYMBOL SIGNS ARE NOT AVAILABLE EITHER IN "STANDARD HIGHWAY SIGNS MANUAL" OR IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) (CURRENT EDITION).

ALL DIAMOND SHAPE CONSTRUCTION WARNING SIGNS SHALL BE 48 INCHES X 48 INCHES UNLESS OTHERWISE NOTED IN THE PLANS.

* SUPPLEMENTAL SIGNS SHALL ONLY BE USED IN CONJUNCTION WITH DIAMOND SHAPE CONSTRUCTION WARNING SIGNS. THE SIZE OF SUPPLEMENTAL SIGNS SHALL BE APPROPRIATE FOR USE WITH A 48 INCH X 48 INCH WARNING SIGN UNLESS OTHERWISE NOTED IN THE PLANS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD



APPROVED BY
TRAFFIC ENGINEER: *David J. Smith* DATE: 6/23/10

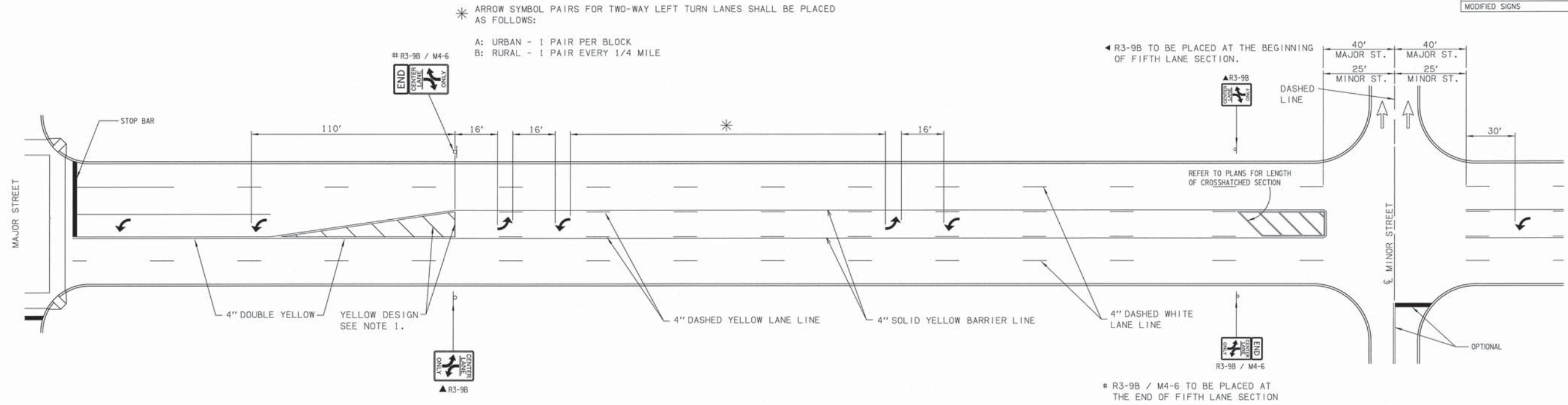
TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS10-1	00
T-510	

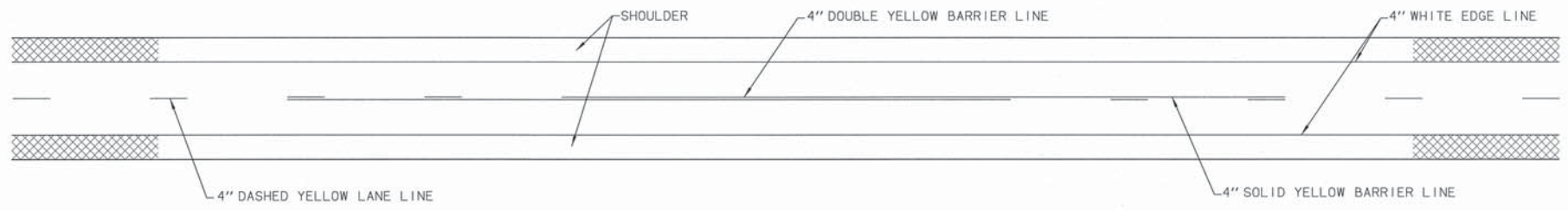
DESCRIPTION	REVISIONS	DATE
ADDED GENERAL NOTE L		7/08/2011
MODIFIED SIGNS		4/10/2012



FIFTH LANE PAVEMENT MARKING DETAIL (URBAN)

GENERAL NOTE

- 1. WIDTH OF DIAGONALS ARE AS FOLLOWS:
 > 45 MPH - 12" WIDE
 < 45 MPH - 8" WIDE



TWO LANE RURAL ROADWAY PAVEMENT MARKINGS

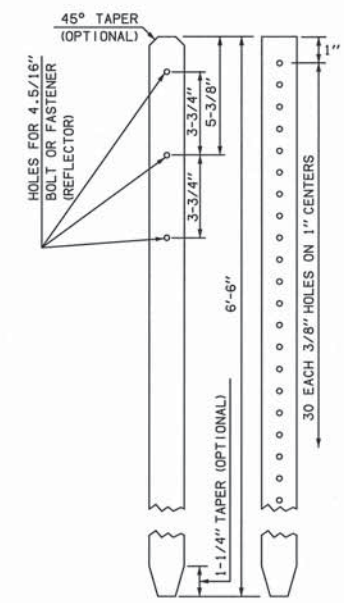
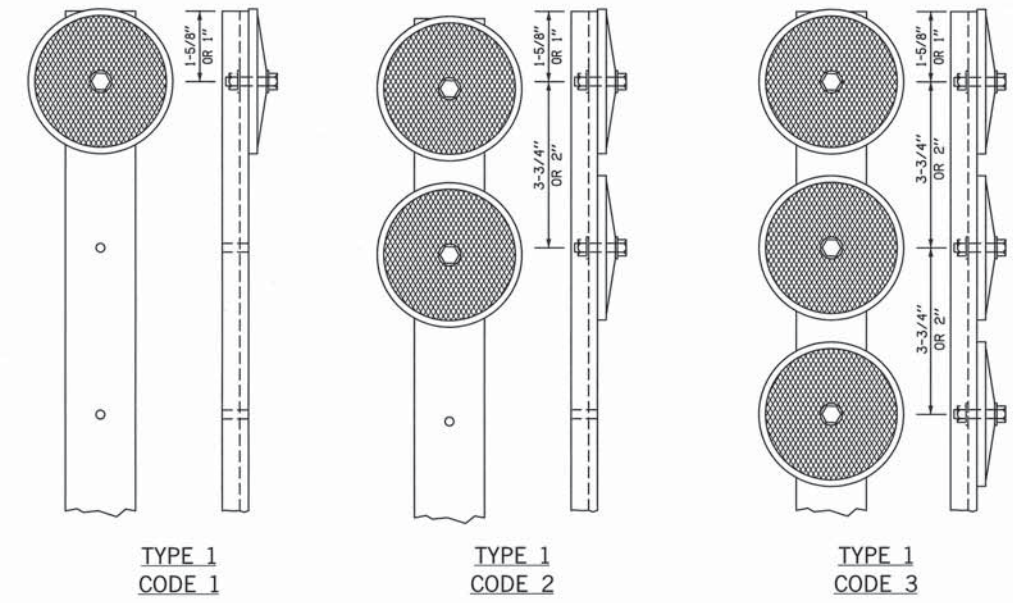
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
854(A)	TRAFFIC STRIPE (PAINT) (4" WIDE)	LF
854(B)	TRAFFIC STRIPE (PAINT) (ARROW, WORDS, OR SYMBOLS)	EA
855(A)	TRAFFIC STRIPE (PLASTIC) (4" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (6" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (8" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (24" WIDE)	LF
855(B)	TRAFFIC STRIPE (PLASTIC) (ARROW)	EA
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (4" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (6" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (8" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (24" WIDE)	LF
856(B)	TRAFFIC STRIPE (MULTI-POLYMER) (SYMBOLS, WORDS, ETC)	EA



APPROVED BY TRAFFIC ENGINEER: *[Signature]* DATE: 4/9/12

TRAFFIC STANDARD
 PAVEMENT MARKING
 (FIFTH LANE AND TWO LANE RURAL)

DESCRIPTION	REVISIONS	DATE

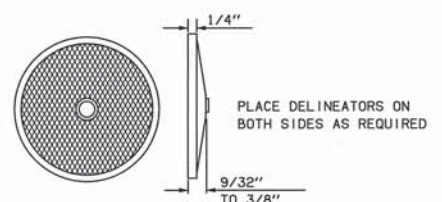
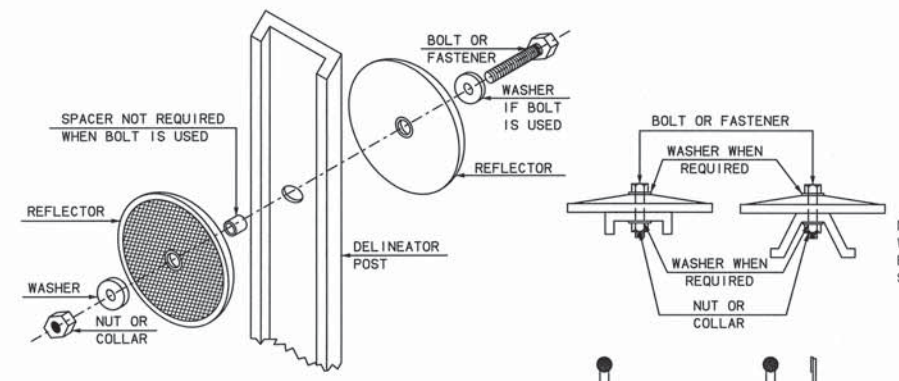


TYPE 2 DELINEATORS SHALL BE THE SAME AS SHOWN ABOVE EXCEPT THAT REFLECTORS ARE MOUNTED ON BOTH SIDES OF THE POST. COLOR OF THE REFLECTORS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST REVISION.

MATERIALS SPECIFICATIONS

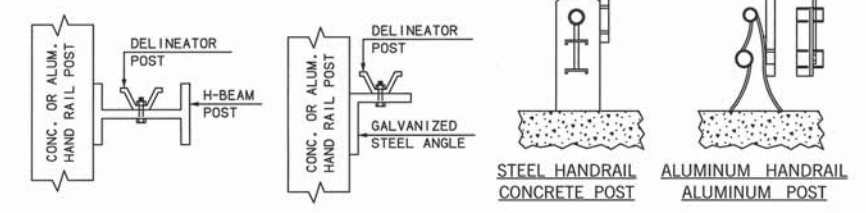
THE WEIGHT OF EACH POST BEFORE GALVANIZING & PUNCHING SHALL BE 1.12 lbs/ft. THE WEIGHT TOLERANCE SHALL BE ±3-1/2%.

NOTE 1:
FASTENING DEVICES MAY BE ALUMINUM BOLTS, NUTS, AND WASHERS OR ALUMINUM OR STEEL FASTENERS UTILIZING A SWEDGED COLLAR OR ALUMINUM OR STEEL BLIND OR PULL RIVETS OF THE SELF PLUGGING TYPE (PULL PIN, CLIPPED FLUSH, REMAINS IN RIVET WHEN FINISHED). ALL NUTS SHALL BE SELF LOCKING.

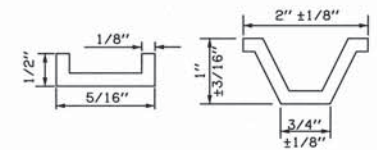


CENTER MOUNT REFLECTOR

NOTE 3:
WHEN BOLTS AND NUTS ARE USED FOR DELINEATOR ASSEMBLIES, THE BOLT ENDS ARE TO BE SUFFICIENTLY DEFORMED TO RESIST VANDALISM. SEE NOTE 1 FOR FASTENING DEVICES.



NOTE 2:
FOR ATTACHING DELINEATOR POSTS TO GALVANIZED STEEL ANGLES, USE 5/16" X 3/4" GALVANIZED STEEL BOLTS. FOR ATTACHING DELINEATORS POST OR GALVANIZED STEEL ANGLES TO ALUMINUM OR "H" BEAM HANDRAIL POST, USE 5/16" X 1" GALVANIZED STEEL BOLTS. FOR ATTACHING GALVANIZED STEEL ANGLES TO CONCRETE POSTS, USE TWO 5/16" X 2" GALVANIZED STEEL EXPANSION SLEEVES AND WASHERS FOR EACH BOLT.



ALTERNATE POST SECTIONS

THE CONTRACTOR MAY USE EITHER TYPE OF POST, BUT ONLY ONE TYPE SHALL BE USED THROUGHOUT THE PROJECT. THE CONTRACTOR SHALL FURNISH THE CORRECT SIZE FASTENING DEVICES AND NECESSARY SPACERS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
853	DELINEATORS	EA



APPROVED BY
TRAFFIC ENGINEER: *David J. Smith* DATE: 8/3/2010

TRAFFIC STANDARD
STANDARD DELINEATOR UNITS

2009 SPECIFICATIONS

DU2-1	00
T-110	

DESCRIPTION	REVISIONS	DATE



STOP

R1-1 30 x 30 5.18 SF
 R1-1E 36 x 36 7.46 SF
 R1-1F 48 x 48 13.26 SF

COLOR:
 LEGEND AND BORDER:
 WHITE (REFLECTORIZED)
 BACKGROUND:
 RED (TRANSPARENT REFLECTORIZED)



YIELD

R1-2 36 x 36 x 36 3.90 SF
 R1-2E 48 x 48 x 48 6.93 SF
 R1-2F 60 x 60 x 60 10.83 SF

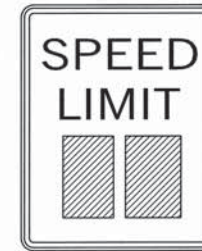
COLOR:
 LEGEND AND BORDER:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



ALL-WAY

R1-3P 18 x 6 0.75 SF
 R1-3PE 30 x 12 2.50 SF

COLOR:
 LEGEND AND BORDER:
 WHITE (REFLECTORIZED)
 BACKGROUND:
 RED (TRANSPARENT REFLECTORIZED)



SPEED LIMIT

R2-1(1) ^{SPEED} 24 x 30 5.00 SF
 R2-1E() 36 x 48 12.00 SF
 R2-1F() 48 x 60 20.00 SF

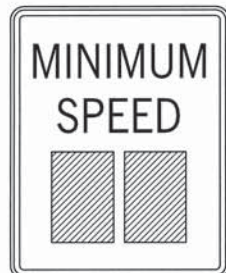
COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



TRUCK SPEED LIMIT

R2-2P(1) ^{SPEED} 24 x 24 4.00 SF
 R2-2PE() 36 x 36 9.00 SF
 R2-2PF() 48 x 48 16.00 SF

COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



MINIMUM SPEED LIMIT

R2-4P(1) ^{SPEED} 24 x 30 5.00 SF
 R2-4PE() 36 x 48 12.00 SF
 R2-4PF() 48 x 60 20.00 SF

COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



NO RIGHT TURN

R3-1 24 x 24 4.00 SF
 R3-1E 36 x 36 9.00 SF
 R3-1F 48 x 48 16.00 SF

COLOR:
 ARROW AND BORDER:
 BLACK (NON-REFLECTORIZED)
 CIRCLE AND DIAGONAL:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



NO LEFT TURN

R3-2 24 x 24 4.00 SF
 R3-2E 36 x 36 9.00 SF
 R3-2F 48 x 48 16.00 SF

COLOR:
 ARROW AND BORDER:
 BLACK (NON-REFLECTORIZED)
 CIRCLE AND DIAGONAL:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



NO TURN

R3-3 24 x 24 4.00 SF
 R3-3E 36 x 36 9.00 SF
 R3-3F 48 x 48 16.00 SF

COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



NO U TURN

R3-4 24 x 24 4.00 SF
 R3-4E 36 x 36 9.00 SF
 R3-4F 48 x 48 16.00 SF

COLOR:
 ARROW AND BORDER:
 BLACK (NON-REFLECTORIZED)
 CIRCLE AND DIAGONAL:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



LEFT TURN ONLY

R3-5(L) 30 x 36 7.50 SF

COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



RIGHT TURN ONLY

R3-5(R) 30 x 36 7.50 SF

COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



LANE-LEFT

R3-6(L) 30 x 36 7.50 SF

COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



LANE-RIGHT

R3-6(R) 30 x 36 7.50 SF

COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
850(A)	SHEET ALUMINUM SIGNS	SF



APPROVED BY
 TRAFFIC ENGINEER: *David G. Smith* DATE: 8/3/2010

TRAFFIC STANDARD
 REGULATORY SIGN DETAILS
 (R-SERIES)

2009 SPECIFICATIONS

RSD1-1 00
 T-114

DESCRIPTION	REVISIONS	DATE



LEFT LANE MUST TURN LEFT
R3-7(L) 30 x 30 6.25 SF
R3-7(L)E 36 x 36 9.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



RIGHT LANE MUST TURN RIGHT
R3-7(R) 30 x 30 6.25 SF
R3-7(R)E 36 x 36 9.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



LANE-LEFT ONLY
R3-8(L) 30 x 30 6.25 SF
R3-8(L)E 36 x 36 9.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



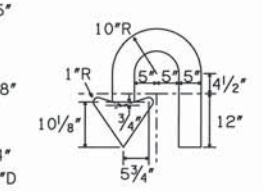
LANE-RIGHT ONLY
R3-8(R) 30 x 30 6.25 SF
R3-8(R)E 36 x 36 9.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



LANE-U-TURN ONLY
R3-8(U) 36 x 48 12.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



LANE RIGHT OR LEFT ONLY
R3-9a 30 x 36 7.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



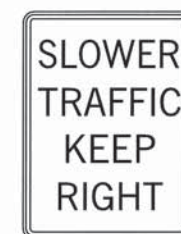
CENTER LANE TURN LEFT ONLY
R3-9B 24 x 36 6.00 SF
R3-9B(E) 36 x 48 12.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



DO NOT PASS
R4-1 24 x 30 5.00 SF
R4-1E 36 x 48 12.00 SF
R4-1F 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



SLOW TRAFFIC KEEP RIGHT
R4-3 24 x 30 5.00 SF
R4-3E 36 x 48 12.00 SF
R4-3F 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



KEEP RIGHT SIGN
R4-7 24 x 30 5.00 SF
R4-7E 36 x 48 12.00 SF
R4-7F 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



KEEP RIGHT
R4-7a 24 x 30 5.00 SF
R4-7aE 36 x 48 12.00 SF
R4-7aF 48 x 60 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



DO NOT ENTER
R5-1 30 x 30 6.25 SF
R5-1E 36 x 36 9.00 SF
R5-1F 48 x 48 16.00 SF

COLOR:
SYMBOL: :
RED (TRANSPARENT REFLECTORIZED)
LEGEND AND BACKGROUND: :
WHITE (REFLECTORIZED)



WRONG WAY
R5-1a 36 x 24 6.00 SF
R5-1aE 36 x 24 6.00 SF
R5-1aF 42 x 30 8.75 SF

COLOR:
LEGEND AND BORDER:
WHITE (REFLECTORIZED)
BACKGROUND:
RED (TRANSPARENT REFLECTORIZED)



NO TRUCKS
R5-2 24 x 24 4.00 SF
R5-2E 30 x 30 6.25 SF
R5-2F 36 x 36 9.00 SF

COLOR:
LEGEND AND BORDER:
WHITE (REFLECTORIZED)
BACKGROUND:
RED (TRANSPARENT REFLECTORIZED)



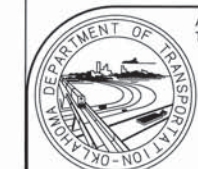
ONE WAY
R6-1(L) 36 x 12 3.00 SF
R6-1E(L) 54 x 18 6.75 SF

COLOR:
ARROW AND BORDER:
WHITE (REFLECTORIZED)
LEGEND AND BACKGROUND:
BLACK (NON-REFLECTORIZED)



ONE WAY
R6-1(R) 36 x 12 3.00 SF
R6-1E(R) 54 x 18 6.75 SF

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
850(A)	SHEET ALUMINUM SIGNS	SF

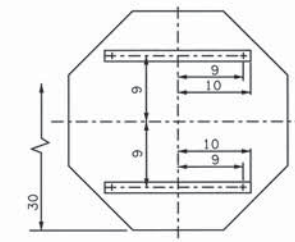


APPROVED BY
TRAFFIC ENGINEER: *David G. Smith* DATE: 8/31/2010

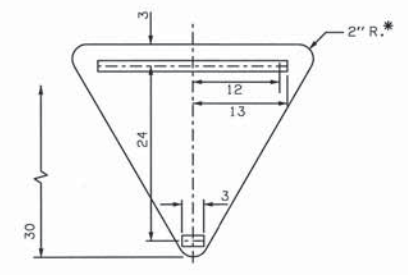
TRAFFIC STANDARD
REGULATORY SIGN DETAILS
(R-SERIES)

2009 SPECIFICATIONS

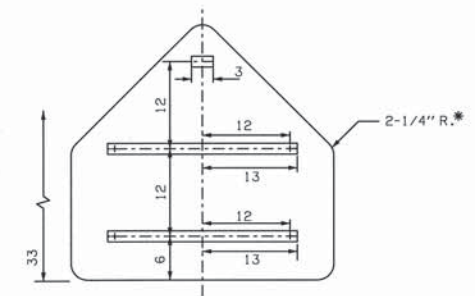
DESCRIPTION	REVISIONS	DATE



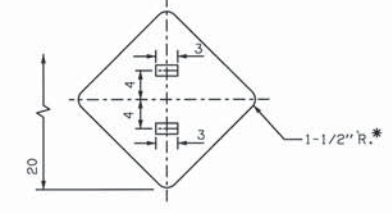
B-30(O)
 (1) 2" SQUARE TUBE POST
 (1) 2" PIPE POST



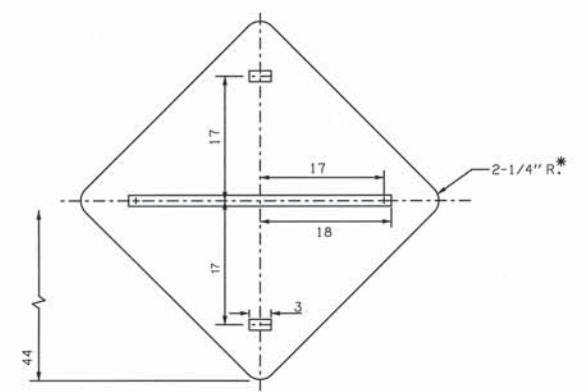
B-36(T)
 (1) 2" SQUARE TUBE POST
 (1) 2" PIPE POST



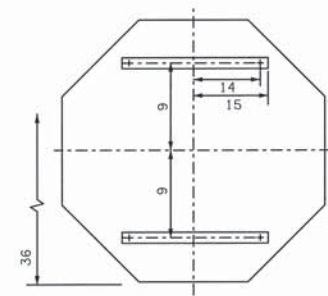
B-36(P)
 (1) 2" SQUARE TUBE POST
 (1) 2" PIPE POST



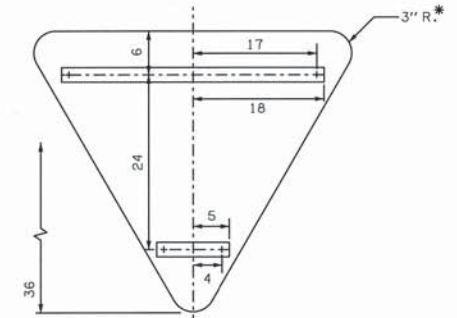
B-18(D)
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



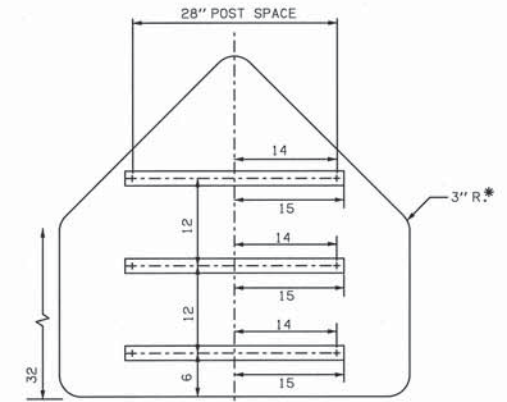
B-36(D)
 (1) 2" SQUARE TUBE POST
 (1) 2-1/2" PIPE POST



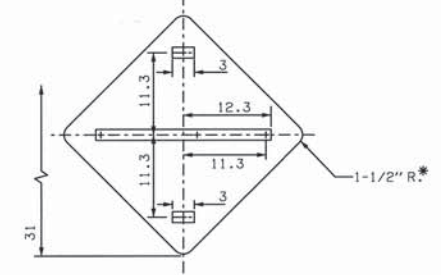
B-36(O)
 (1) 2" SQUARE TUBE POST
 (1) 2-1/2" PIPE POST



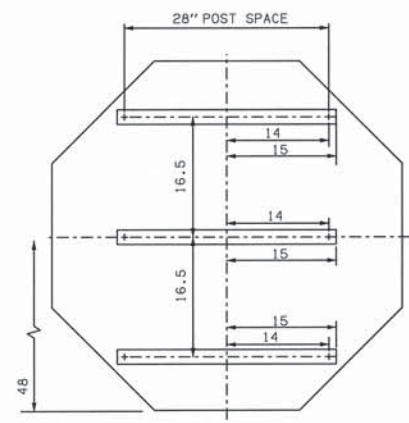
B-48(T)
 (2) 2" SQUARE TUBE POSTS
 (1) 2-1/2" PIPE POST



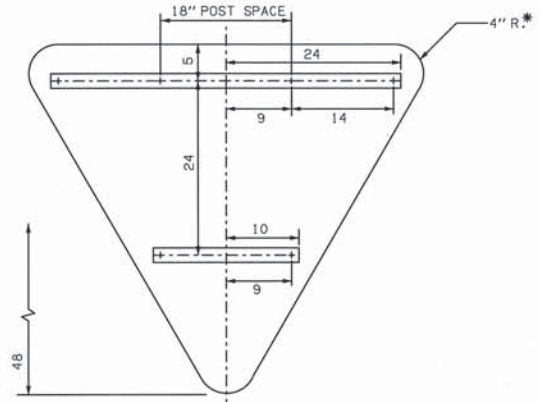
B-48(P)
 (2) 2" SQUARE TUBE POSTS
 (2) 2" PIPE POSTS



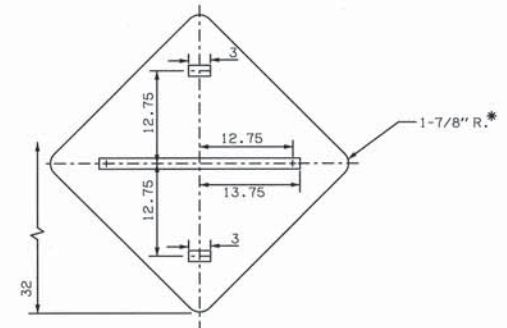
B-24(D)
 (1) 2" SQUARE TUBE POST
 (1) 2" PIPE POST



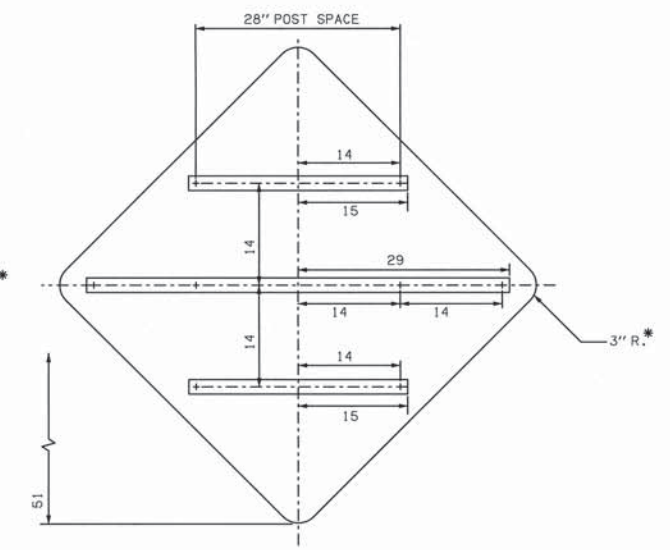
B-48(O)
 (2) 2" SQUARE TUBE POSTS
 (2) 2-1/2" PIPE POSTS



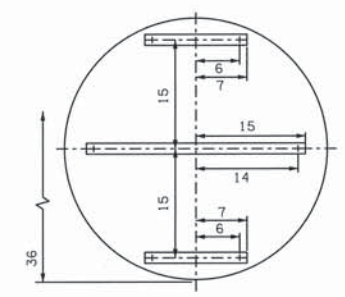
B-60(T)
 (2) 2" SQUARE TUBE POSTS
 (2) 2" PIPE POSTS



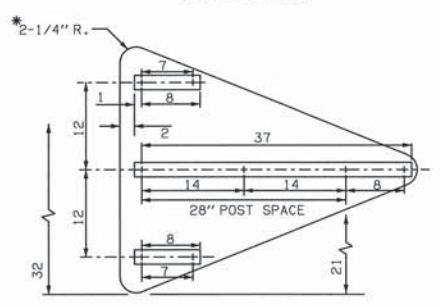
B-30(D)
 (1) 2" SQUARE TUBE POST
 (1) 2" PIPE POST



B-48(D)
 (2) 2" SQUARE TUBE POSTS
 (2) 2-1/2" PIPE POSTS



B-36(R)
 (1) 2" SQUARE TUBE POST
 (1) 2-1/2" PIPE POST



B-4836(T)
 (2) 2" SQUARE TUBE POSTS
 (2) 2" PIPE POSTS

CONSTRUCTION NOTES:

- ALL FLAT SHEET SIGNS SHALL USE GALVANIZED STEEL POSTS.
- THICKNESS OF MATERIALS FOR FLAT SHEET SIGNS SHALL BE AS FOLLOWS, DETERMINED BY THE LONGEST DIMENSION OF THE SIGN UNLESS OTHERWISE SPECIFIED.

ALUMINUM ALLOY 6061-T6 OR 5052-H38	GALVANIZED STEEL
0.063" FOR SIGNS THROUGH 24"	16 GAUGE FOR SIGNS THROUGH 24"
0.080" FOR SIGNS 25" THROUGH 35"	14 GAUGE FOR SIGNS 25" THROUGH 35"
0.100" FOR SIGNS 36" AND LARGER	12 GAUGE FOR SIGNS 36" AND LARGER
- SIGN BRACKETS SHALL BE GALVANIZED STEEL OR ALUMINUM. HOLES FOR MOUNTING BRACKETS TO SIGN SHALL BE 5/16" D. HOLES FOR MOUNTING SIGN AND BRACKETS TO POST SHALL BE 3/8" D. HOLES SHALL BE PUNCHED BEFORE GALVANIZING. SIZE OF BRACKETS SHALL BE AS FOLLOWS: SIGNS THROUGH 36" SHALL USE A GALVANIZED STEEL OR ALUMINUM CHANNEL 1-1/2" X 1/2" X 1/8". SIGNS LARGER THAN 36" SHALL USE A GALVANIZED STEEL OR ALUMINUM CHANNEL 2" X 1/2" X 1/8". ALUMINUM SIGN BRACKETS SHALL BE ALLOY 6061-T6, 6062-T6 OR 6063-T6.
- ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED STEEL OR CADMIUM PLATED. ALL BOLT ENDS SHALL BE SUFFICIENTLY BRADDED AFTER INSTALLATION TO MINIMIZE REMOVAL BY VANDALISM.
- ALL POSTS SHALL EXTEND 2" ABOVE THE TOP SIGN BRACKET, BUT NOT ABOVE THE TOP OF THE SIGN.
- CORNER RADIUS FOR ALL FLAT SHEET SIGNS SHALL BE AS SHOWN.
- ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.



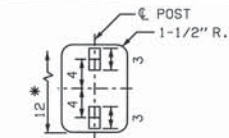
APPROVED BY
 TRAFFIC ENGINEER: *David Gray* DATE: 8/3/2010
 TRAFFIC STANDARD

SIGN BLANK AND BRACKET DETAILS

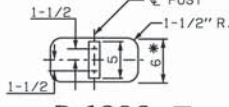
2009 SPECIFICATIONS

SBS1-1	00
T-130	

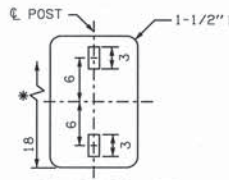
DESCRIPTION	REVISIONS	DATE



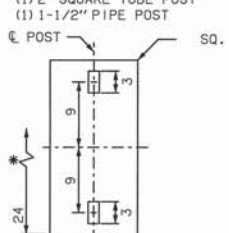
B-0912
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



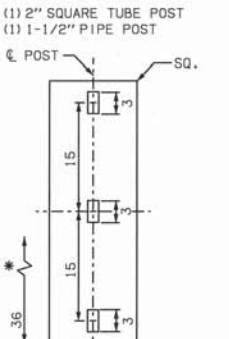
B-1206



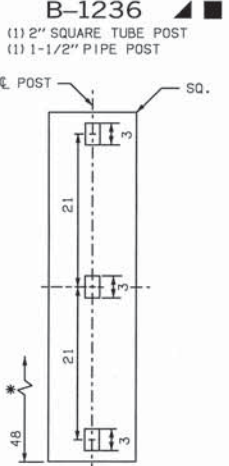
B-1218
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



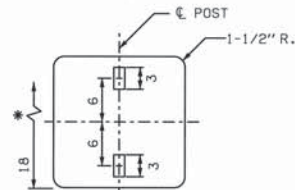
B-1224
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



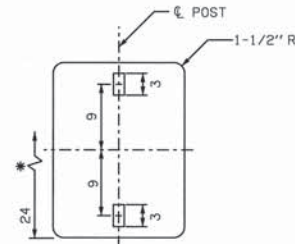
B-1236
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



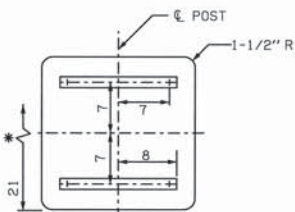
B-1248
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



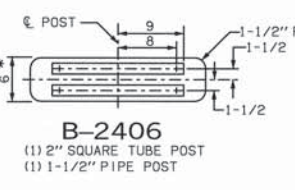
B-18(S)
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



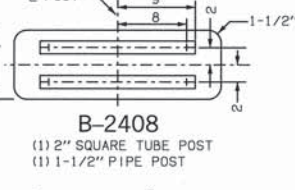
B-1824
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



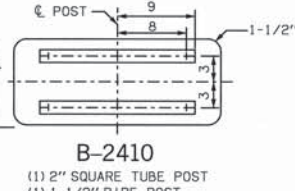
B-21(S)
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



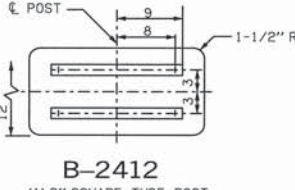
B-2406
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



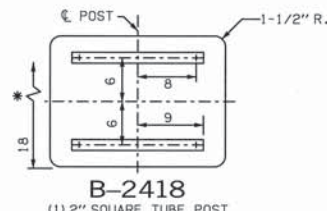
B-2408
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



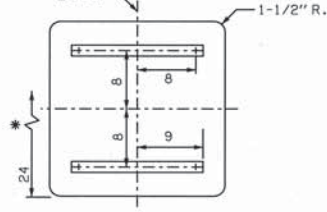
B-2410
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



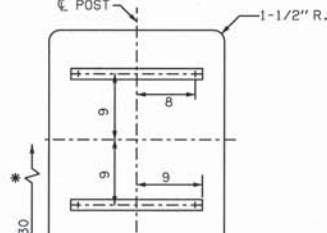
B-2412
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



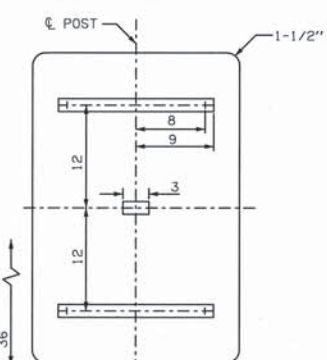
B-2418
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



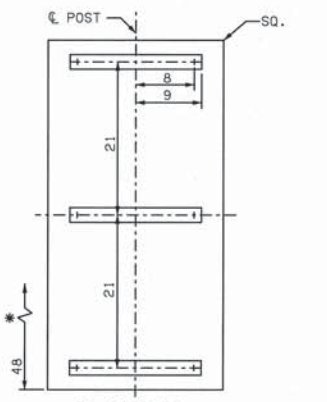
B-24(S)
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



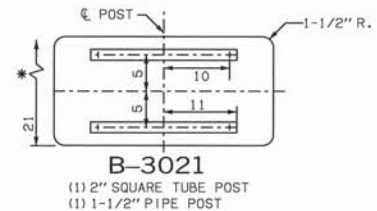
B-2430
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



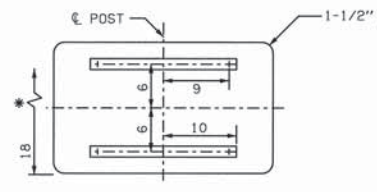
B-2436
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



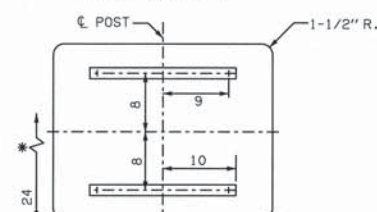
B-2448
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



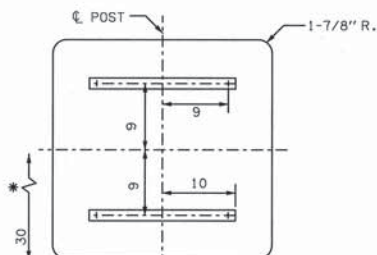
B-3021
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



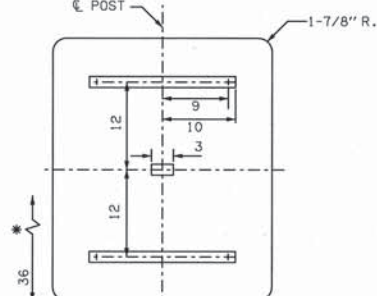
B-3018
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



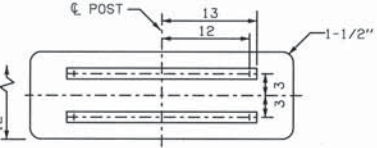
B-3024
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



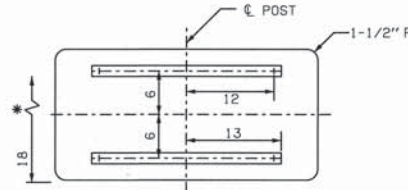
B-30(S)
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



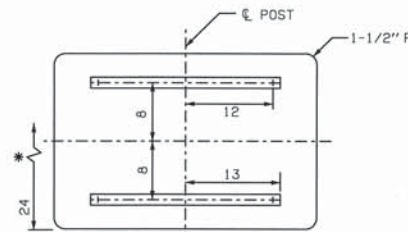
B-3036
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



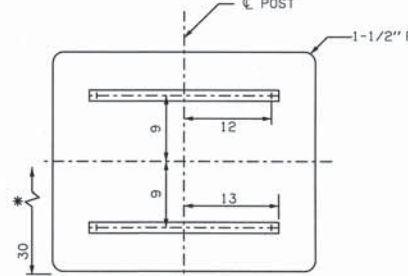
B-3612
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



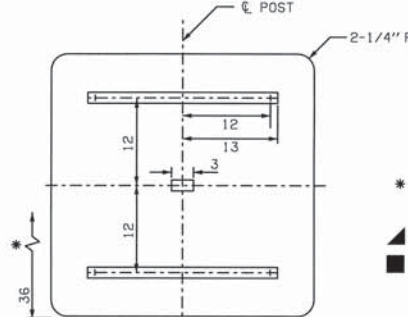
B-3618
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



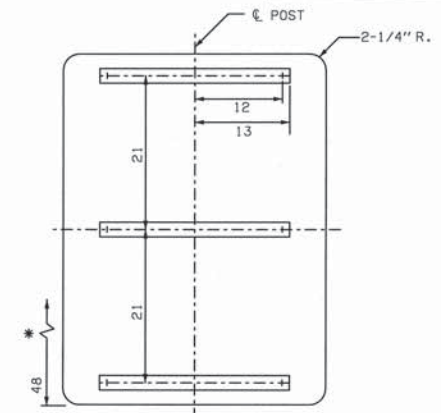
B-3624
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



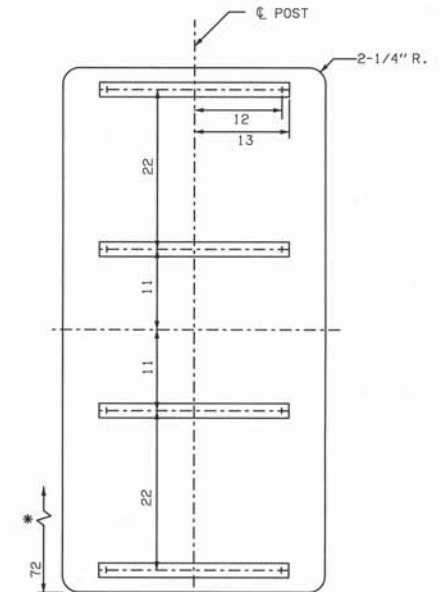
B-3630
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST



B-36(S)
 (1) 2" SQUARE TUBE POST
 (1) 1-1/2" PIPE POST

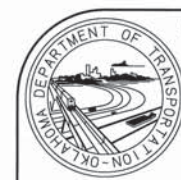


B-3648
 (2) 2" SQUARE TUBE POSTS
 (1) 3" PIPE POST



B-3672
 (1) 1-1/2" PIPE POST

NOTES:
 * ALL POSTS SHALL EXTEND 2" ABOVE THE TOP SIGN BRACKET, BUT NOT ABOVE THE TOP OF THE SIGN.
 ▲ SIGN BLANK THICKNESS SHALL BE .060" ALUMINUM OR 16 GAUGE STEEL.
 ■ VERTICAL SIGN BRACKET ONLY.
 ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.



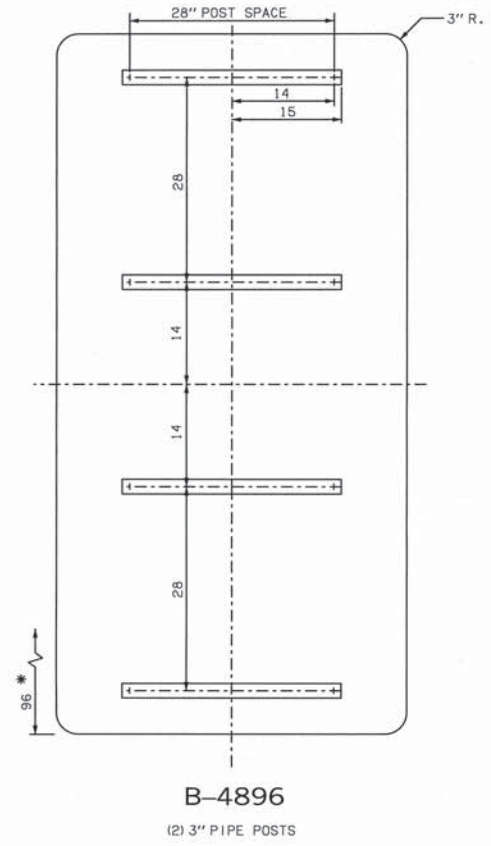
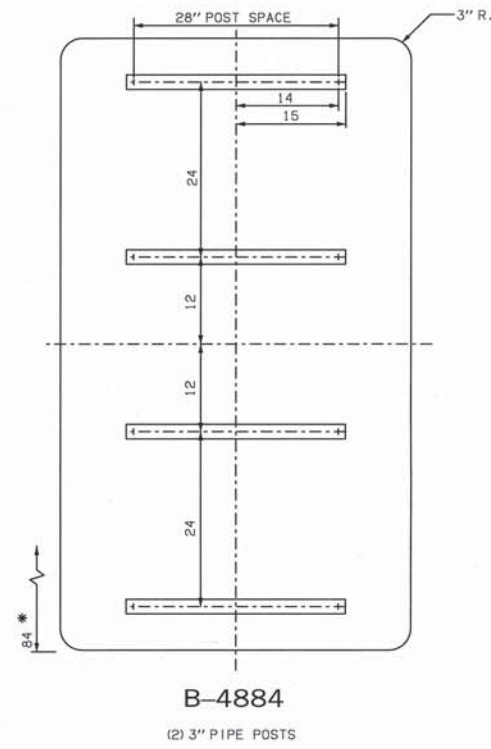
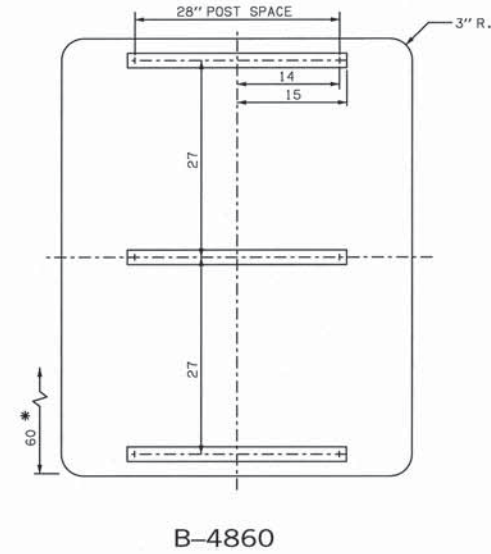
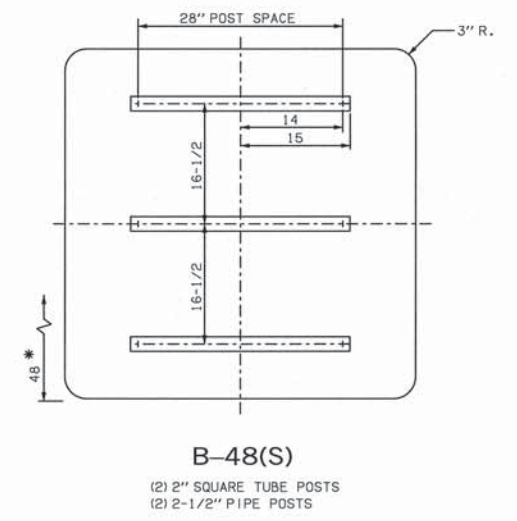
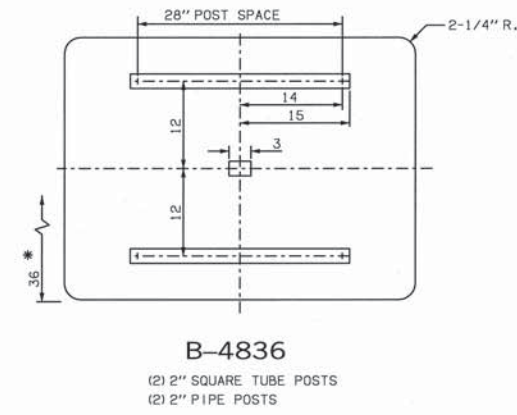
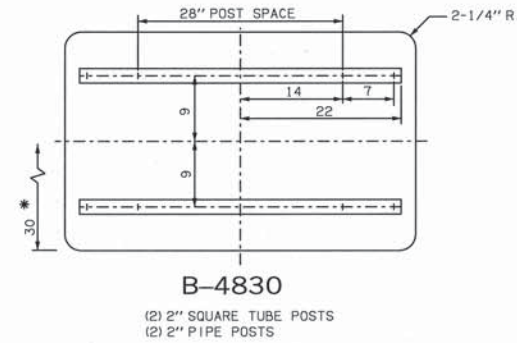
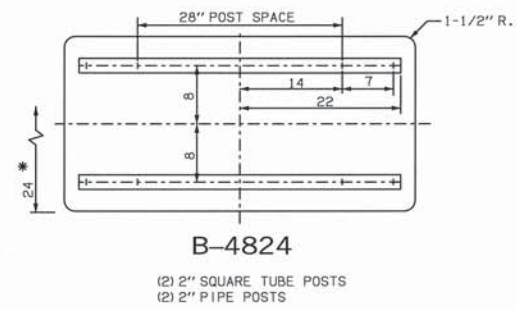
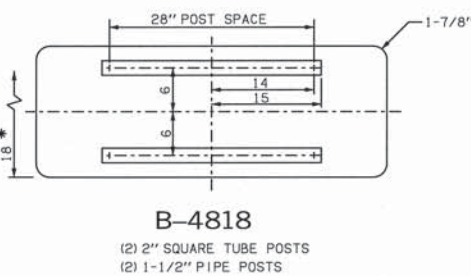
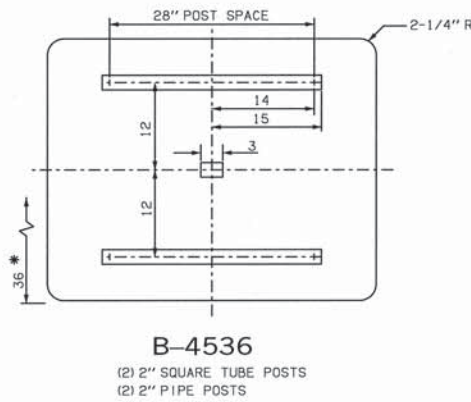
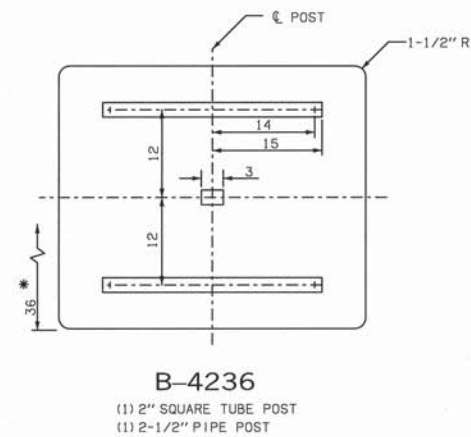
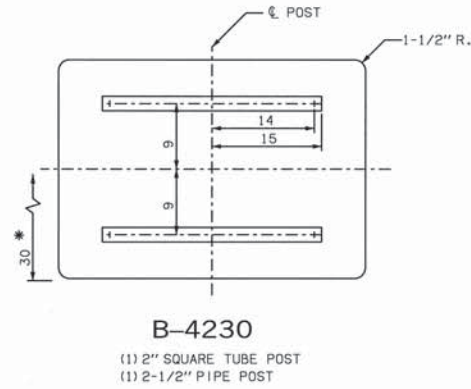
APPROVED BY
 TRAFFIC ENGINEER: *David Smith* DATE: 8/31/2010

TRAFFIC STANDARD

SIGN BLANK AND BRACKET DETAILS

2009 SPECIFICATIONS

SBS2-1	00
T-131	



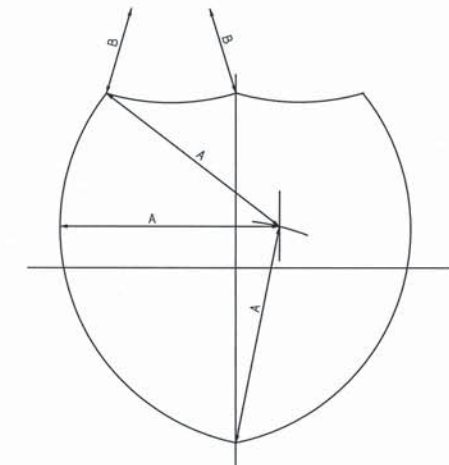
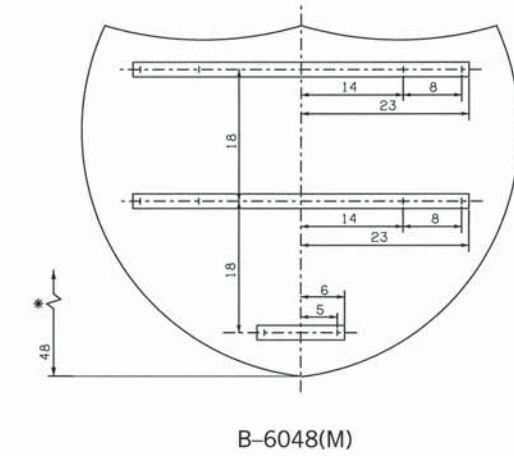
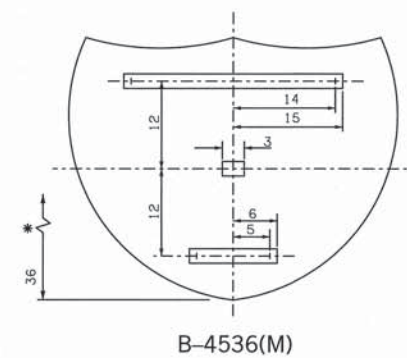
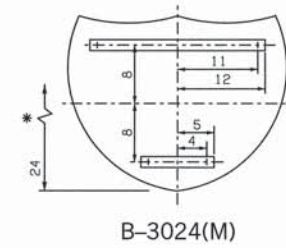
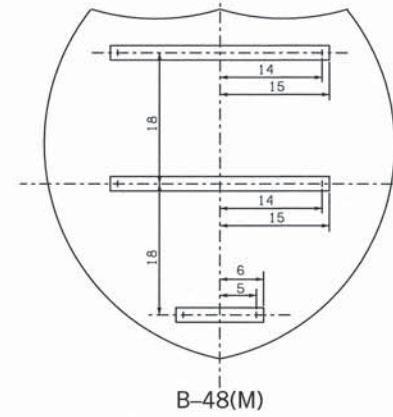
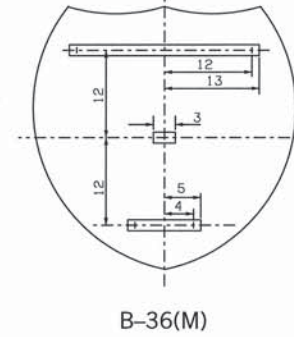
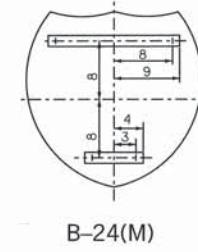
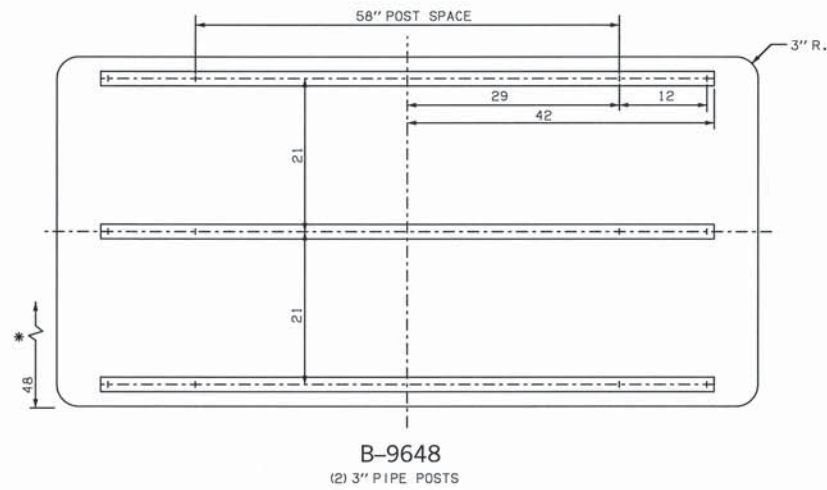
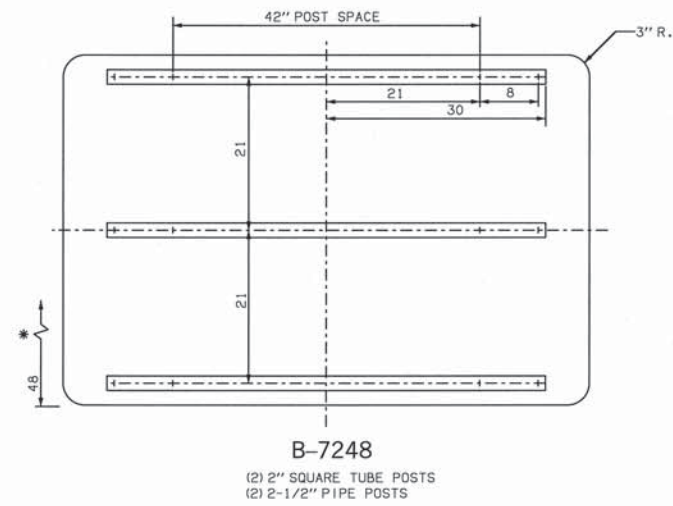
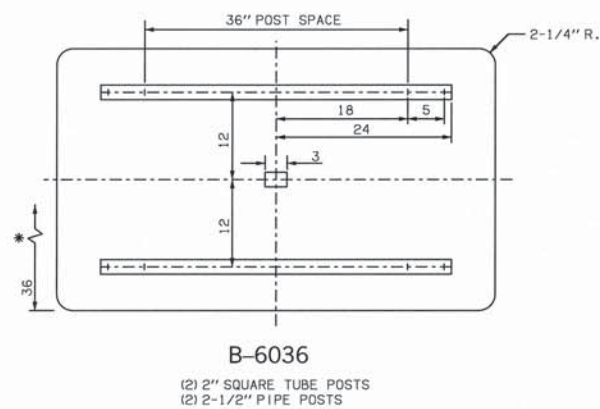
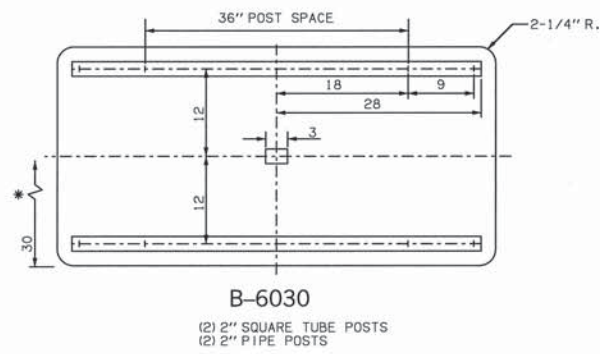
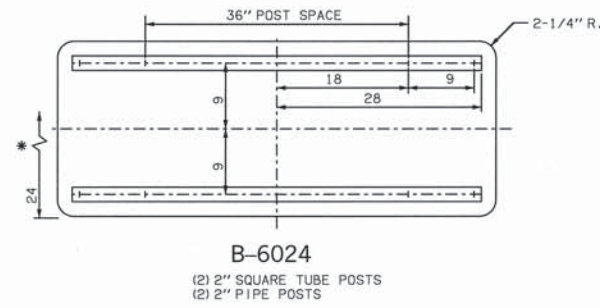
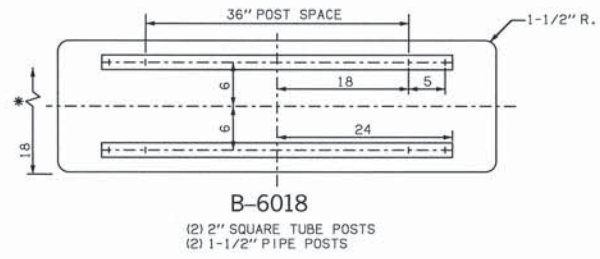
* ALL POSTS SHALL EXTEND 2" ABOVE THE TOP SIGN BRACKET, BUT NOT ABOVE THE TOP OF THE SIGN.
 ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.



APPROVED BY
 TRAFFIC ENGINEER: *David Smith* DATE: 8/31/2010
 TRAFFIC STANDARD

SIGN BLANK AND BRACKET DETAILS

DESCRIPTION	REVISIONS	DATE
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	A (In)	B (In)
24" X 24"	15	15
30" X 24"	17	24
36" X 36"	22-1/2	22-1/2
45" X 36"	25-1/2	36
48" X 48"	30	30
60" X 48"	34	48

NOTES:
BRACKET ARMS SHOWN ARE FOR SIGNS INDIVIDUALLY MOUNTED.
* ALL POSTS SHALL EXTEND 2" ABOVE THE TOP SIGN BRACKET, BUT NOT ABOVE THE TOP OF SIGN.
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.



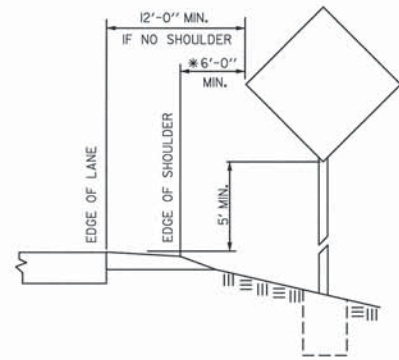
APPROVED BY
TRAFFIC ENGINEER: *David Gray* DATE: 8/3/2010

TRAFFIC STANDARD

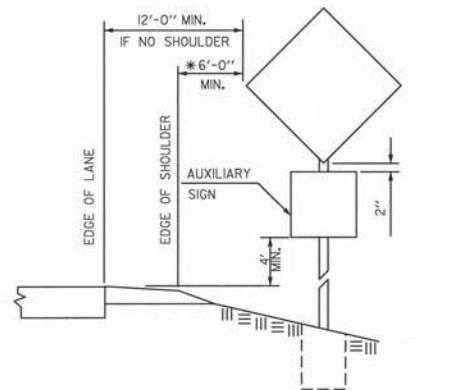
SIGN BLANK AND BRACKET DETAILS

2009 SPECIFICATIONS

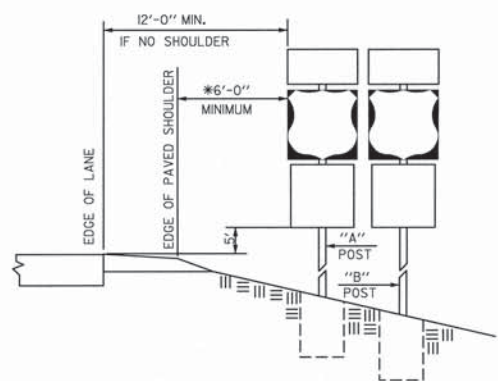
SBS4-1 00
T-133



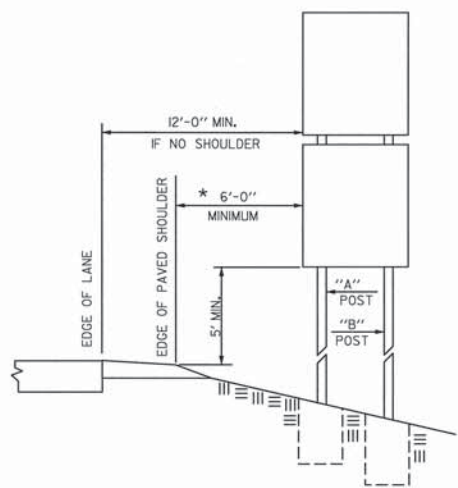
SINGLE POST (RURAL)



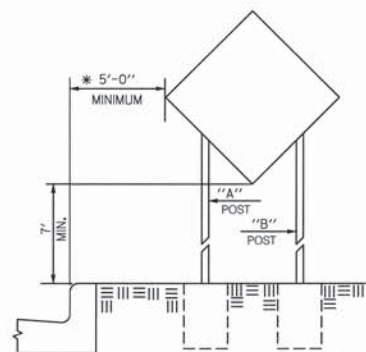
SINGLE POST WITH AUXILIARY SIGN (RURAL)



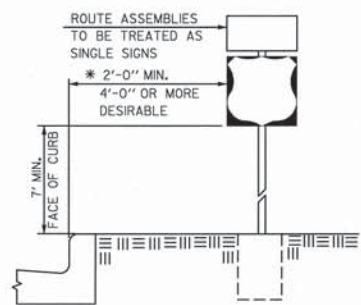
ROADSIDE ASSEMBLY (RURAL)



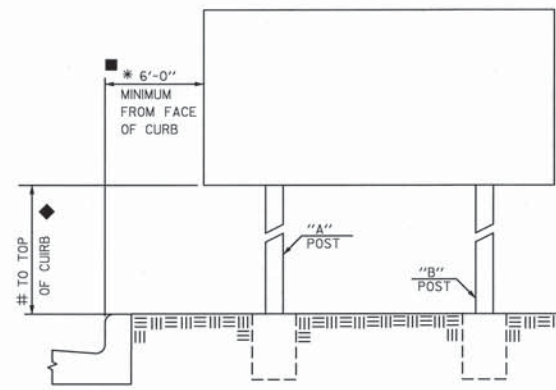
DOUBLE POST MAXIMUM & MINIMUM SPEED LIMIT SIGNS (RURAL)



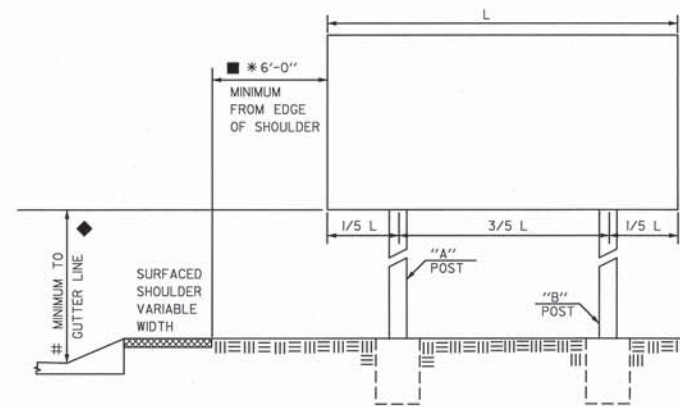
BUSINESS, COMMERCIAL OR RESIDENTIAL AREA



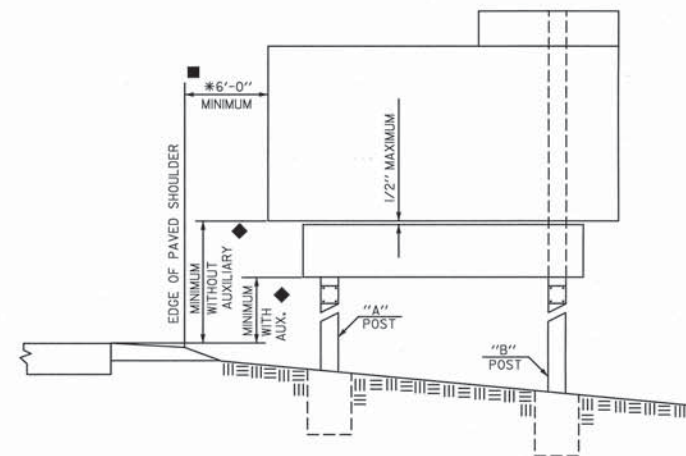
BUSINESS, COMMERCIAL OR RESIDENTIAL AREA



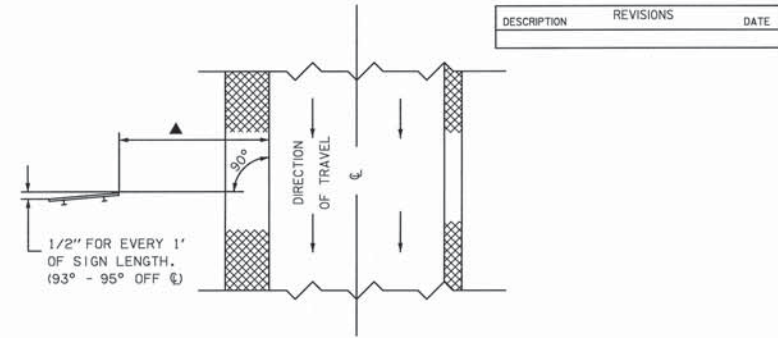
INFORMATION SIGN WITH NON-MOUNTABLE CURB



INFORMATION SIGN WITH MOUNTABLE CURB



FREWAY OR EXPRESSWAY SIGN (WITH OR WITHOUT AUXILIARY SIGN)



SIGN POSITIONING DETAIL

#1 SIGNS SHALL BE SO POSITIONED TO ELIMINATE OR MINIMIZE SPECULAR REFLECTION. DUE TO THE NUMEROUS VARIATIONS IN ROAD CURVES AND GRADES, THIS GENERAL RULE MAY NOT ALWAYS BE APPLICABLE, AND SIGNS SHALL BE POSITIONED AS DETERMINED BY THE ENGINEER.

#2 IF FURTHER CLARIFICATION OF VERTICAL AND LATERAL CLEARANCES IS REQUIRED, SEE THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (LATEST REVISION).

◆ WHEN LATERAL CLEARANCE OF STANDARD OR SPECIAL INFORMATION GUIDE SIGNS IS 30' OR GREATER (AS REQUIRED BY CLEAR ZONE) FROM THE EDGE LINE, THE MINIMUM VERTICAL CLEARANCE IS 7'. IF AN AUXILIARY SIGN IS MOUNTED BELOW A STANDARD OR SPECIAL INFORMATION GUIDE SIGN, THE RECOMMEND VERTICAL CLEARANCE FOR THE STANDARD OR SPECIAL INFORMATION GUIDE SIGN IS MINIMUM 8' AND THE AUXILIARY SIGN IS MINIMUM 5'.

* THE MINIMUM LATERAL CLEARANCE OF THE SIGN FROM THE EDGE OF SHOULDER OR FACE OF CURB SHALL BE AS SHOWN ON THIS STANDARD DRAWING UNLESS OTHERWISE SHOWN OR NOTED ON PLANS. WHEN SIGNS ARE NOTED TO BE PLACED 5' TO 9' FROM SHOULDER, THE TOLERANCE SHALL BE THE DISTANCE SHOWN +2'.

IN INSTANCES WHERE THE LATERAL CLEARANCE SHOWN CAUSES THE FOOTING TO BE LOCATED UNDESIRABLY, SUCH AS THE BOTTOM OF DITCHES, ETC., THE LOCATION MAY BE ADJUSTED OUTWARD FROM THE ROADWAY IF NECESSARY AT THE DISCRETION OF THE ENGINEER.

IN RURAL AREAS THERE SHALL BE A 12' MINIMUM FROM TRAVELWAY (EDGE LINE) TO THE EDGE OF THE SIGN IF NO SHOULDER EXISTS.

■ NORMALLY, ON FREEWAY AND EXPRESSWAY MAINLINE, STANDARD OR SPECIAL INFORMATION SIGNS SHALL BE LOCATED WITH A LATERAL CLEARANCE OF 10' FROM THE FACE OF NON-MOUNTABLE CURBS OR GUARD RAILS, 20' FROM EDGE OF SHOULDER. IN ALL CASES EXCEPT WHEN SIGN SUPPORTS ARE PROTECTED BY BARRIERS, SIGNS SHALL HAVE A LATERAL CLEARANCE OF 30' OR GREATER (AS REQUIRED BY CLEAR ZONE) FROM EDGE OF DRIVING LANE.

ALONG INTERCHANGE RAMP THE LATERAL CLEARANCE SHALL NORMALLY BE 10' OR GREATER (AS REQUIRED BY CLEAR ZONE).

▲ WHEN LATERAL CLEARANCE IS 30'-0" OR GREATER FROM EDGE OF PAVEMENT, THE SIGN IS TO BE APPROXIMATELY PERPENDICULAR TO ROADWAY.

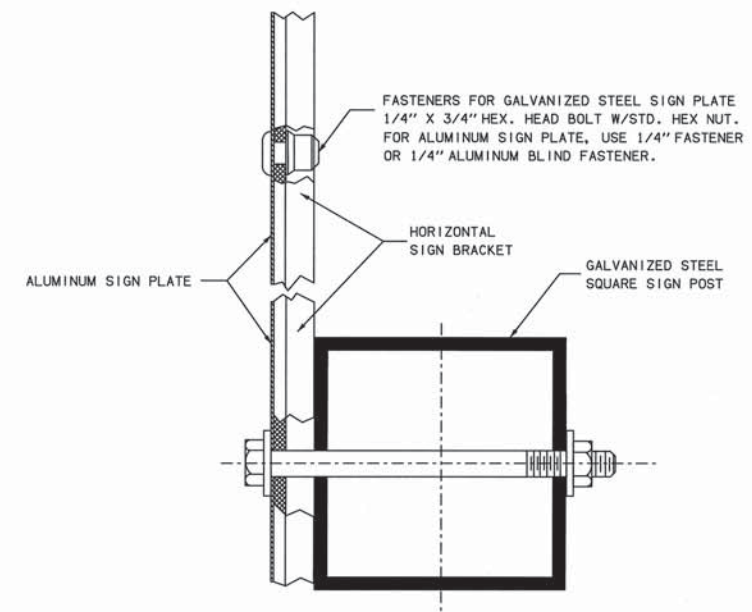


APPROVED BY TRAFFIC ENGINEER: *David Smith* DATE: 8/31/2010

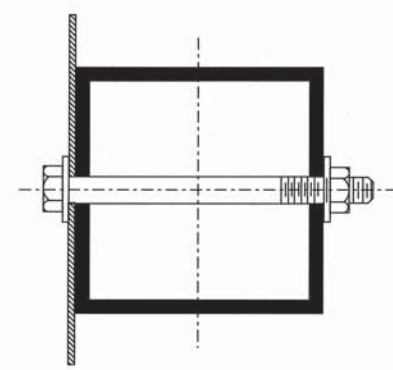
TRAFFIC STANDARD

TYPICAL INSTALLATIONS OF GROUND MOUNTED SIGNS

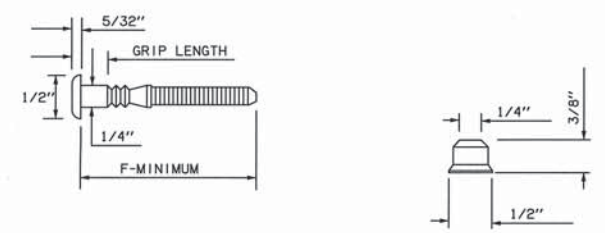
DESCRIPTION	REVISIONS	DATE



TOP VIEW

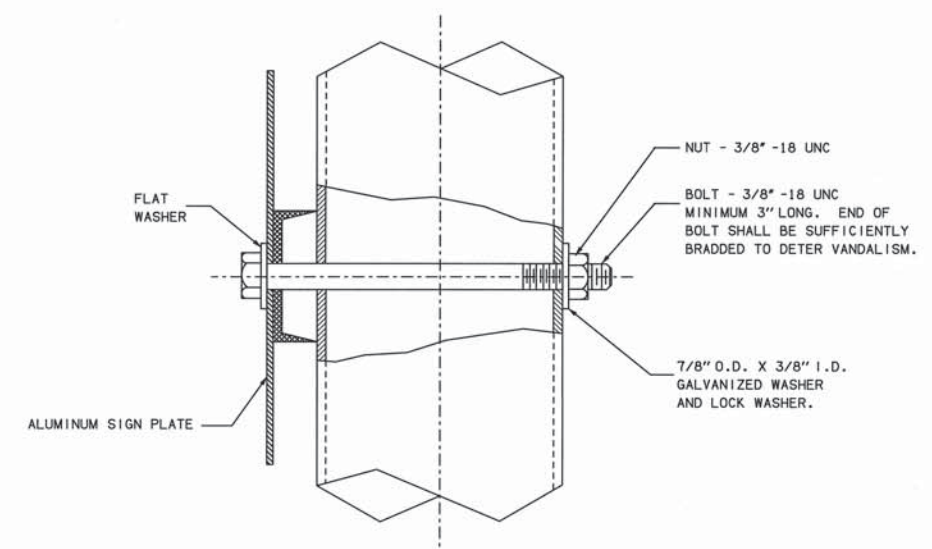


TOP VIEW



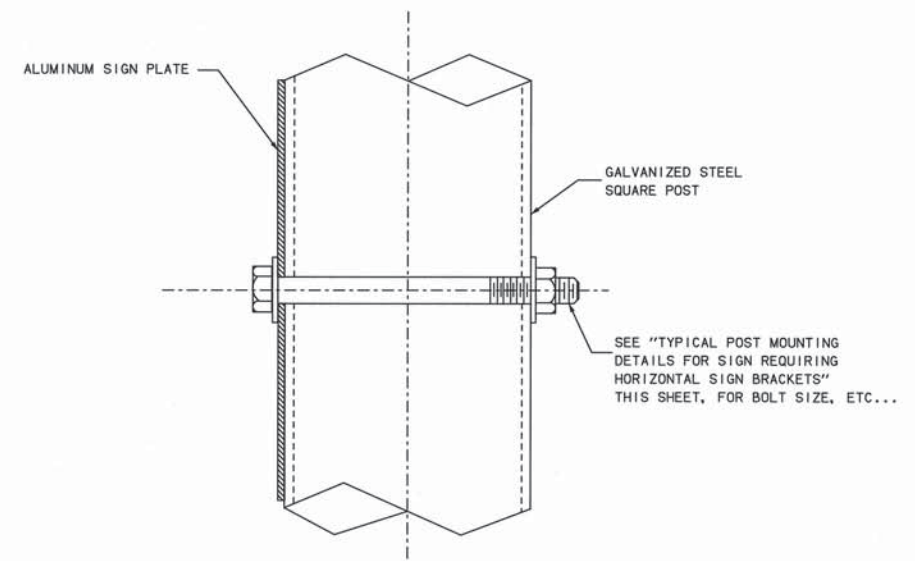
1/4" FASTENER AND 1/4" COLLAR (TYPICAL)

GRIP NO.	GRIP LENGTH (INCHES)	F-MIN.
2	0.094 - 0.156	1-7/16"
3	0.157 - 0.218	1-1/2"
4	0.219 - 0.281	1-9/16"
5	0.282 - 0.343	1-5/8"
6	0.344 - 0.406	1-11/16"
17	0.407 - 1.093	2-3/8"



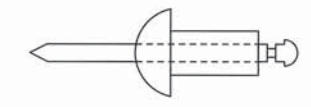
SIDE VIEW

TYPICAL POST MOUNTING DETAILS FOR SIGN REQUIRING HORIZONTAL SIGN BRACKETS



SIDE VIEW

TYPICAL POST MOUNTING DETAILS FOR SIGN 18" WIDE AND UNDER



ALUMINUM ALLOY BODY AND MANDREL. GRIP RANGE 1/16" TO 1/4".

1/4" BLIND FASTENERS

NOTE: ALL NUTS SHALL BE SELF-LOCKING.



APPROVED BY TRAFFIC ENGINEER: *David G. Smith* DATE: 8/31/2010

TRAFFIC STANDARD

SHEET SIGN ASSEMBLY DETAILS (SQUARE TUBE)

2009 SPECIFICATIONS

SSA1-1	00
T-139	

DESCRIPTION	REVISIONS	DATE
MODIFIED GENERAL NOTE 4.		7/08/2011
REISSUED		4/10/2012

WINDLOAD COORDINATES FOR SQUARE POST AT 90 MPH

SIGN CENTROID	ALLOWABLE SIGN AREA (FT ²) PER SINGLE POST *							
	FHWA APPROVED FOR: 2 POST PER SIGN				FHWA APPROVED FOR: 1 POST PER SIGN			
	1/2"x12ga perf.	1 3/4"x14ga perf.	1 3/4"x12ga perf.	2"x14ga perf.	2"x12ga perf.	2 1/4"x14ga perf.	2 1/4"x12ga perf.	2 1/2"x12ga perf.
16.5'	3.46	3.90	4.85	5.19	6.48	6.67	8.34	10.44
16'	3.57	4.02	5.00	5.36	6.68	6.88	8.60	10.76
15.5'	3.68	4.15	5.17	5.53	6.90	7.11	8.88	11.11
15'	3.81	4.29	5.34	5.71	7.13	7.34	9.17	11.48
14.5'	3.94	4.44	5.52	5.91	7.37	7.60	9.49	11.87
14'	4.08	4.59	5.72	6.12	7.64	7.87	9.83	12.30
13.5'	4.23	4.76	5.93	6.35	7.92	8.16	10.19	12.75
13'	4.39	4.95	6.16	6.59	8.22	8.47	10.59	13.24
12.5'	4.57	5.15	6.41	6.86	8.55	8.81	11.01	13.77
12'	4.76	5.36	6.67	7.14	8.91	9.18	11.47	14.35
11.5'	4.96	5.59	6.96	7.45	9.30	9.58	11.97	14.97
11'	5.19	5.85	7.28	7.79	9.72	10.01	12.51	15.65
10.5'	5.44	6.13	7.63	8.16	10.18	10.49	13.11	16.40
10'	5.71	6.43	8.01	8.57	10.69	11.01	13.76	17.22
9.5'	6.01	6.77	8.43	9.02	11.25	11.59	14.49	18.12
9'	6.34	7.15	8.90	9.52	11.88	12.24	15.29	19.13
8.5'	6.72	7.57	9.42	10.08	12.58	12.96	16.19	20.26
8'	7.14	8.04	10.01	10.71	13.36	13.77	17.20	21.52

* USE A MULTIPLIER OF 2 OR 3 FOR 2 & 3 POST INSTALLATIONS.

GENERAL NOTES

- POST TUBE SHALL MEET ASTM A1011 GRADE 50. POST TUBE GALVANIZED AS PER ASTM A653 GRADE 90.
- HEAVY DUTY ANCHOR TUBE SHALL MEET ASTM A500 GRADE B STRUCTURAL TUBE AND STEEL SHALL BE HOT DIP GALVANIZED PER ASTM A123.
- THE UPPER SIGN POST SHALL TELESCOPE INSIDE THE ANCHOR TUBE A MINIMUM OF 12". ANCHOR TUBE SHALL BE MINIMUM OF 30" WITH 3" MAXIMUM AS SHOWN IN DETAILS.
- THE CONCRETE FOOTING SHALL BE CLASS "C" CONCRETE OR AS DIRECTED BY THE ENGINEER. CONCRETE INCLUDED IN THE COST OF SQUARE TUBE POST.
- THE NON-REINFORCED CIRCULAR CONCRETE FOOTING, ANCHOR TUBE AND HARDWARE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE SQUARE TUBE POST.
- SEE STANDARD DRAWINGS SSA1-1, MSD5-1, MSD6-1, SBS1-1, SBS2-1, AND SBS3-1 (LATEST REVISION) FOR PROPER BRACKET PLACEMENT ON THE SIGN AND POST SPACING FOR TWO POST INSTALLATION.
- FOR VERTICAL AND LATERAL CLEARANCE, SEE STANDARD DRAWING GMS1-1, AND GMS2-1-(LATEST REVISION).
- SIGNS SHALL BE ATTACHED TO THE POSTS WITH BOLTS AS SHOWN ON STANDARD DRAWING SSA1-1-(LATEST REVISION).

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
851(C)	SQUARE TUBE POST	LF

APPROVED BY TRAFFIC ENGINEER: *Theresa Gray* DATE: 4/17/12

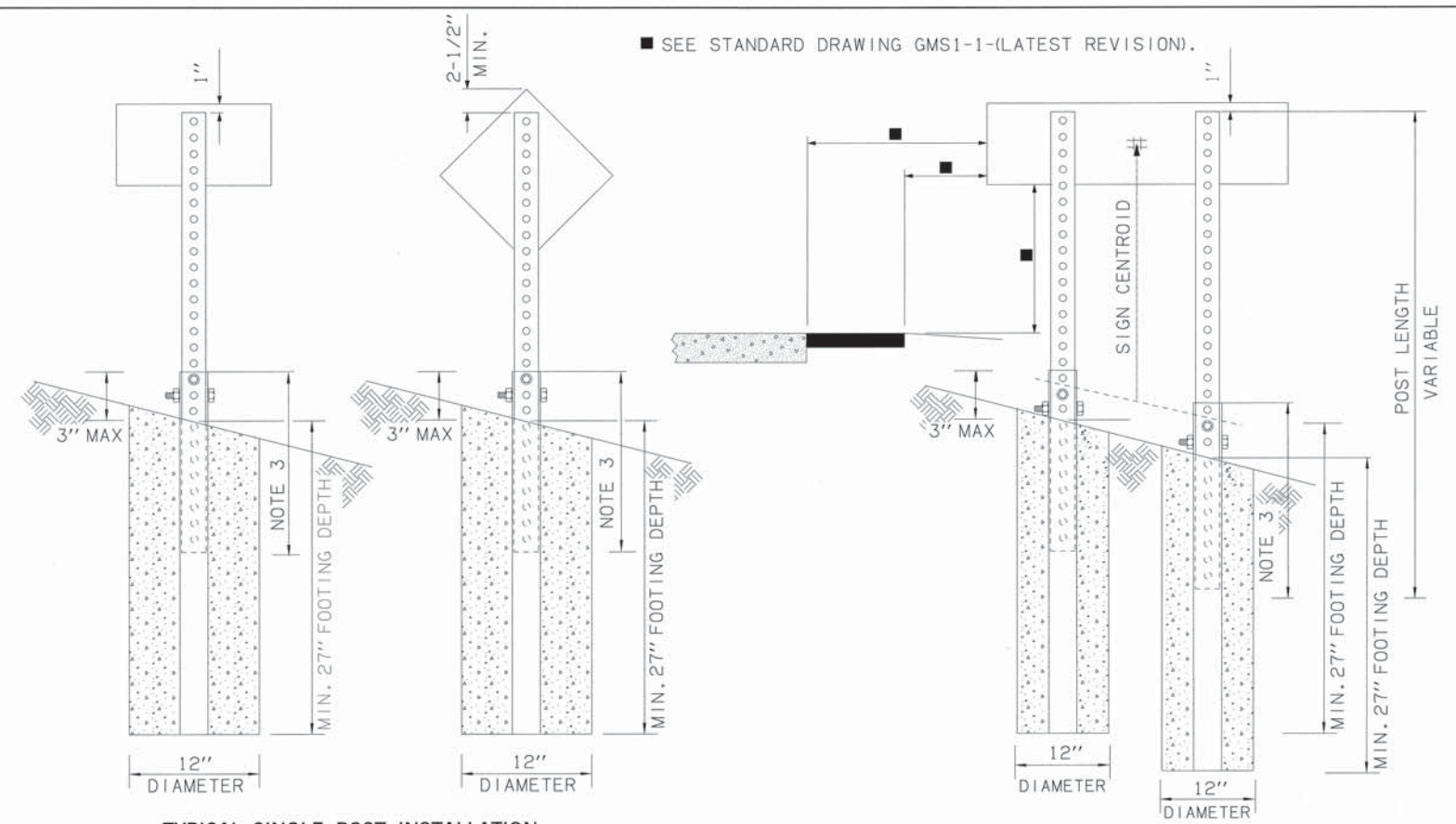


TRAFFIC STANDARD
SQUARE TUBE POST DETAILS

2009 SPECIFICATIONS

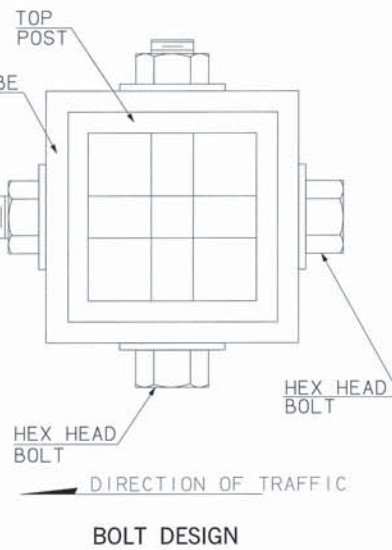
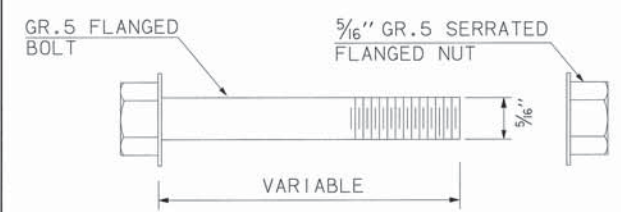
SSP1-1	02
T-138	

SEE STANDARD DRAWING GMS1-1-(LATEST REVISION).

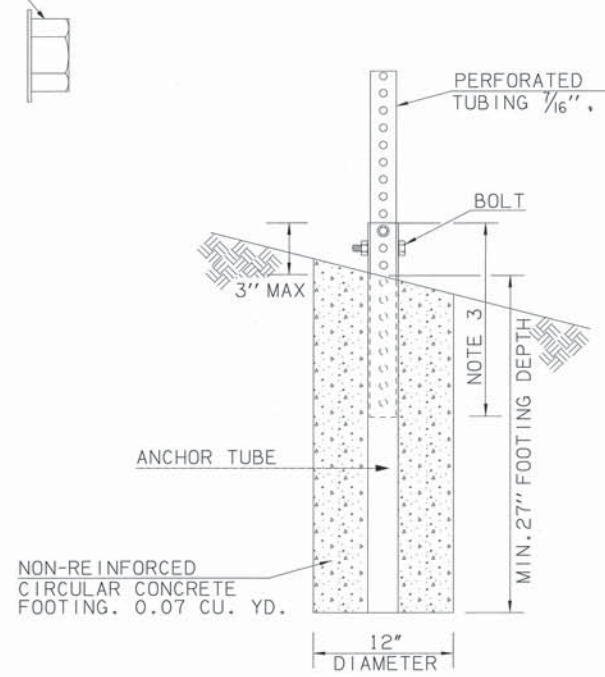


TYPICAL SINGLE POST INSTALLATION

TYPICAL DOUBLE POST INSTALLATION



BOLT DESIGN



ANCHOR TUBE DETAILS WITH CONCRETE FOOTING

NON-PERFORATED ANCHOR TUBE SHALL HAVE TWO (2) 1/16" DIAMETER HOLES SPACED 1" ON CENTER ALONG THE CENTERLINE OF EACH OF THE FOUR SIDES.



HEAVY DUTY ANCHOR TUBE

- DRAWING NOT TO SCALE -