

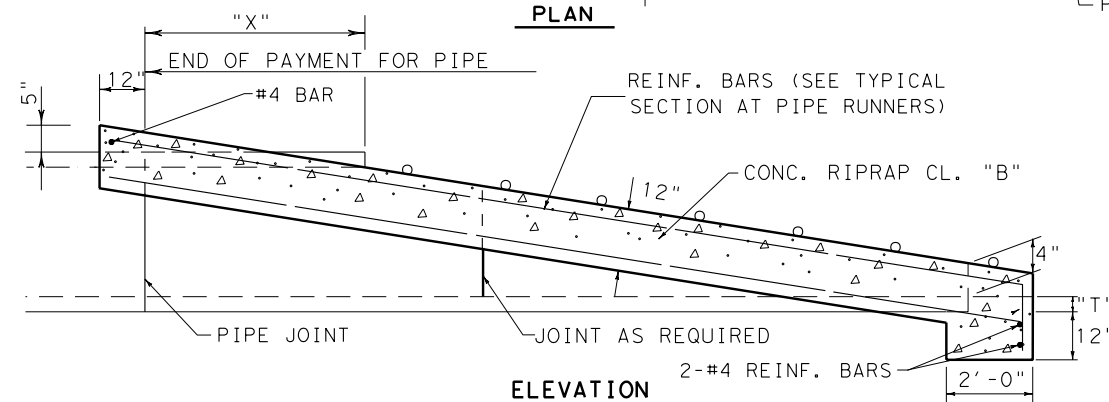
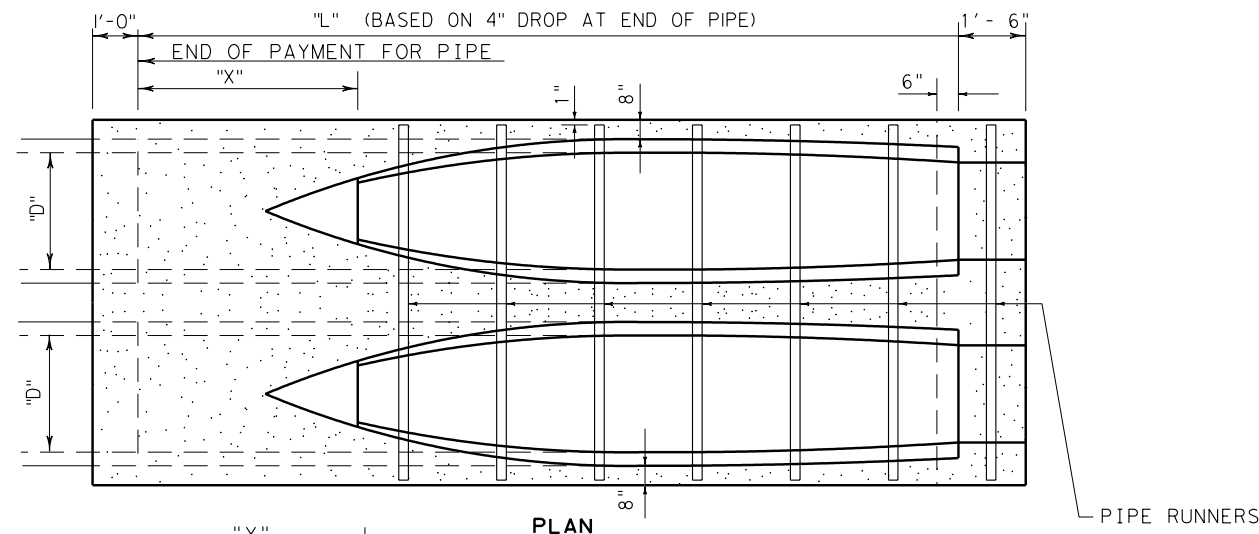
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http://www.dot.state.tx.us/ftw/spec/info/standard.htm set3.dgn

OPTION ONE DIMENSIONS AND QUANTITIES

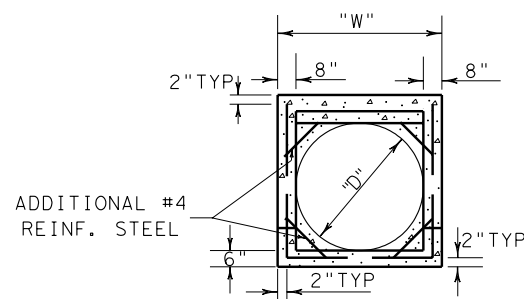
D	SLOPE	T	L	X	2 PIPES		3 PIPES		MULTIPLE PIPES, N=# OF PIPES	
					W	RIPRAP	W	RIPRAP	W (INCHES)	RIPRAP (CY)
18"	6:1	2 1/2"	9'-9"	3'-9"	5'-11"	2.17 CY	8'-7"	3.09 CY	32 (N)+7	0.322+0.922 (N)
18"	8:1	2 1/2"	13'-4"	5'-0"	5'-11"	2.61 CY	8'-7"	3.71 CY	32 (N)+7	0.401+1.104 (N)
21"	6:1	2 3/4"	11'-4 1/2"	3'-10 1/2"	6'-7"	2.54 CY	9'-7 1/2"	3.65 CY	36.5 (N)+6	0.306+1.115 (N)
21"	8:1	2 3/4"	15'-6"	5'-2"	6'-7"	3.07 CY	9'-7 1/2"	4.41 CY	36.5 (N)+6	0.384+1.344 (N)
24"	6:1	3"	13'-0"	4'-0"	7'-3"	2.93 CY	10'-8"	4.25 CY	41 (N)+5	0.280+1.324 (N)
24"	8:1	3"	17'-8"	5'-4"	7'-3"	3.56 CY	10'-8"	5.17 CY	41 (N)+5	0.353+1.604 (N)
27"	6:1	3 1/4"	14'-7 1/2"	4'-1 1/2"	7'-11"	3.34 CY	11'-8 1/2"	4.89 CY	45.5 (N)+4	0.245+1.549 (N)
27"	8:1	3 1/4"	19'-10"	5'-6"	7'-11"	4.08 CY	11'-8 1/2"	5.97 CY	45.5 (N)+4	0.310+1.886 (N)
30"	6:1	3 1/2"	16'-3"	4'-3"	8'-7"	3.78 CY	12'-9"	5.57 CY	50 (N)+3	0.199+1.790 (N)
30"	8:1	3 1/2"	22'-0"	5'-8"	8'-7"	4.63 CY	12'-9"	6.82 CY	50 (N)+3	0.252+2.188 (N)

NOTE: CONCRETE QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.



SLOPED REINFORCED CONCRETE PIPE

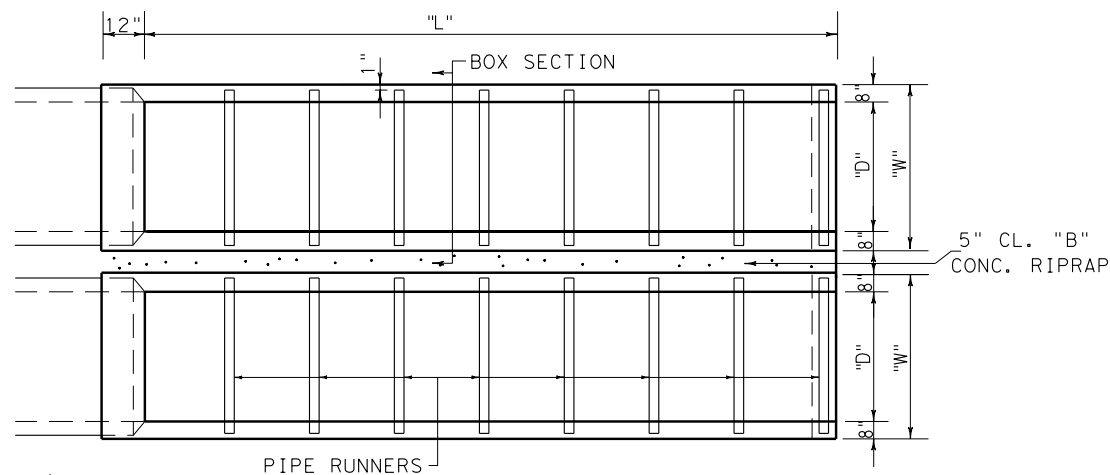
OPTION ONE



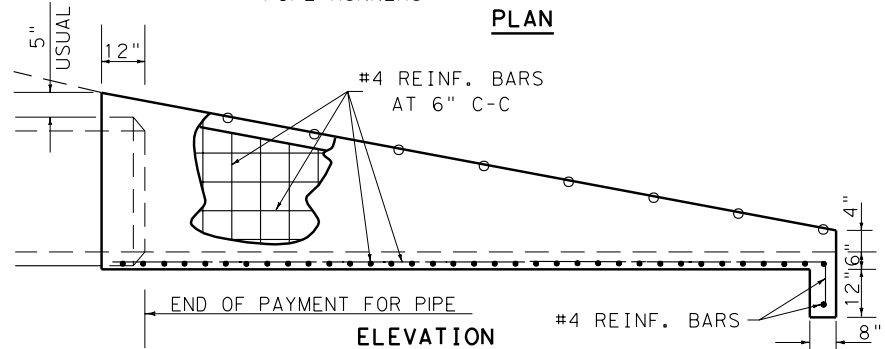
SECTION

D	SLOPE	L	W	CL A CONC (CY)	5" CL B CONC (CY)
18"	6:1	9'-9"	2'-10"	1.29 (N)	0.00
18"	8:1	13'-4"	2'-10"	1.70 (N)	0.00
21"	6:1	11'-4 1/2"	3'-1"	1.62 (N)	0.00
21"	8:1	15'-6"	3'-1"	2.14 (N)	0.00
24"	6:1	13'-0"	3'-4"	1.99 (N)	0.00
24"	8:1	17'-8"	3'-4"	2.63 (N)	0.00
27"	6:1	14'-7 1/2"	3'-7"	2.40 (N)	0.05 (N-1)
27"	8:1	19'-10"	3'-7"	3.17 (N)	0.07 (N-1)
30"	6:1	16'-3"	3'-10"	2.84 (N)	0.09 (N-1)
30"	8:1	22'-0"	3'-10"	3.75 (N)	0.12 (N-1)

NOTE: "N" = # OF CULVERT PIPES. CONCRETE QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.



PLAN



ELEVATION

SLOPED CLASS "A" CONCRETE BOX

OPTION TWO

PARALLEL DRAINAGE APPLICATION

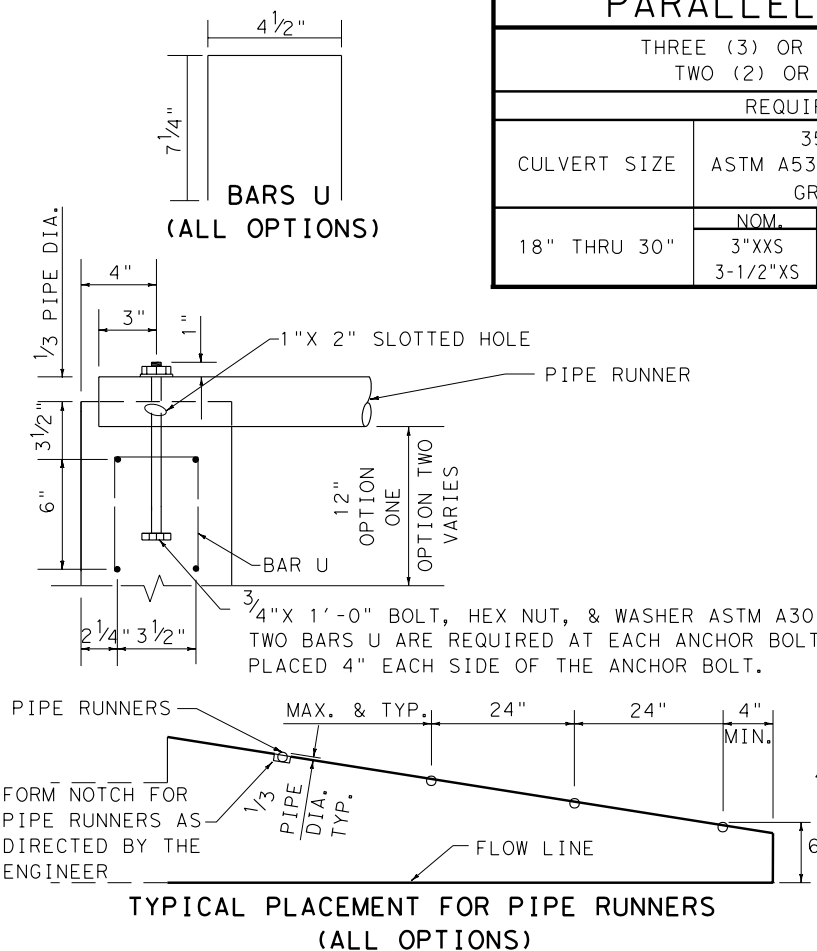
THREE (3) OR MORE 18" THRU 24" PIPES REQUIRE PIPE RUNNERS. TWO (2) OR MORE 30" R.C. PIPES REQUIRE PIPE RUNNERS.

REQUIRED PIPE SIZES FOR GIVEN PIPE YIELD

CULVERT SIZE	35 KSI ASTM A53, TY E & S GR. B			42 KSI ASTM A500 GR. B			52 KSI API 5LX52		
	NOM.	OD	ID	NOM.	OD	ID	NOM.	OD	ID
18" THRU 30"	3"XS 3-1/2"XS	3.500 4.000	2.300 3.364	3"XS 3-1/2"STD	3.500 4.000	2.900 3.548	3" STD.	3.500	3.068

GENERAL NOTES:

- ALL MITERED PIPE SECTIONS, REINFORCING STEEL BOLTS, NUTS, WASHERS, CONCRETE AND PIPE RUNNERS ARE CONSIDERED PARTS OF THE SAFETY END TREATMENT FOR PAYMENT.
- ALL REBARS ARE #4. UNLESS NOTED ALL REBARS SHALL HAVE 1-1/2" MINIMUM COVER.
- DESIGN: SAFETY PIPE RUNNERS ARE DESIGNED FOR A TRAVERSING LOAD OF 10,000 POUNDS AT YIELD AS RECOMMENDED BY RESEARCH REPORT 280-2F, SAFETY TREATMENT OF ROADSIDE PARALLEL DRAINAGE STRUCTURES, TEXAS TRANSPORTATION INSTITUTE, JUNE 1981.
- PIPE RUNNERS MAY BE SIMPLE SPAN OR CONTINUOUS ACROSS MULTIPLE PIPES. ADEQUATE SUPPORT AND ANCHORAGE FOR PIPE RUNNERS SHALL BE PROVIDED AS SHOWN ON THIS SHEET AND AS DIRECTED BY THE ENGINEER.



TYPICAL PLACEMENT FOR PIPE RUNNERS (ALL OPTIONS)

TYPE II SAFETY END TREATMENT - PARALLEL DRAINAGE - 18" TO 30" MULTIPLE PIPES SET (3) (FW)

ORIGINAL DRAWING - APRIL 1987
REVISED - NOV. 1991 - M. J. N.
REVISED - FEB. 1994 - E. R. F.

DRAWN	CHECKED	TRACED	CHECKED	FEDERAL DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
				6	TEXAS		
DRAWN	CHECKED	TRACED	CHECKED	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.
DRAWN	CHECKED	TRACED	CHECKED	JOB NO.	SHEET NO.		

LEVELS DISPLAYED
6
1