FEDERAL PROJECT	STATE PROJECT	PARISH	SHEET NO.

90° CROSSING

DIAM. (D) In.	SHELL* THICK. (T) In.	H Ft.-In.	NO OF PIPES	S Ft.-In.	L Ft.-In.	M Ft.-In.	CONCRETE TOEWALL: CONCRETE Cu. Yds.	CONCRETE TOEWALL: STEEL lbs.	FLEXIBLE△ REVETMENT Sq. Yds.	SACK ϕ TOEWALL Sq. Yds.
24	3.0	1-0	1		2-0	6-6	0.35	20	3	2
			2	1-3	2-0	10-3	0.53	31	5	3
			3	1-3	2-0	14-0	0.71	41	6	4
			4	1-3	2-0	17-9	0.89	51	8	5
			5	1-3	2-0	21-6	1.07	61	10	6
			6	1-3	2-0	25-3	1.25	71	11	7
30	3.5	1-3	1		2-6	8-1	0.46	29	4	3
			2	1-3	2-6	12-5	0.68	40	7	4
			3	1-3	2-6	16-9	0.89	52	9	5
			4	1-3	2-6	21-1	1.11	63	12	7
			5	1-3	2-6	25-5	1.32	74	14	8
			6	1-3	2-6	29-9	1.54	86	17	9
36	4.0	1-6	1		3-0	9-8	0.59	34	6	4
			2	1-3	3-0	14-7	0.84	46	10	5
			3	1-3	3-0	19-6	1.09	59	13	7
			4	1-3	3-0	24-5	1.34	71	16	8
			5	1-3	3-0	29-4	1.59	84	20	10
			6	1-3	3-0	34-3	1.84	96	23	11
42	4.5	1-9	1		3-6	11-3	0.73	38	9	4
			2	1-5	3-6	16-11	1.03	52	13	6
			3	1-5	3-6	22-7	1.33	66	18	8
			4	1-5	3-6	28-3	1.63	80	22	10
			5	1-5	3-6	33-11	1.93	95	26	12
			6	1-5	3-6	39-7	2.24	109	31	13
48	5.0	2-0	1		4-0	12-10	0.88	53	11	5
			2	1-7	4-0	19-3	1.23	70	17	7
			3	1-7	4-0	25-8	1.59	86	23	10
			4	1-7	4-0	32-1	1.94	103	29	12
			5	1-7	4-0	38-6	2.30	119	34	14
			6	1-7	4-0	44-11	2.65	136	40	16

75° CROSSING

DIAM. (D) In.	SHELL* THICK. (T) In.	H Ft.-In.	NO OF PIPES	S Ft.-In.	L Ft.-In.	M Ft.-In.	CONCRETE TOEWALL: CONCRETE Cu. Yds.	CONCRETE TOEWALL: STEEL lbs.	FLEXIBLE△ REVETMENT Sq. Yds.	SACK ϕ TOEWALL Sq. Yds.
24	3.0	1-0	1		2-1	6-9	0.36	25	3	2
			2	1-4	2-1	10-8	0.55	35	5	3
			3	1-4	2-1	14-7	0.74	46	6	4
			4	1-4	2-1	18-6	0.93	56	8	6
			5	1-4	2-1	22-5	1.11	67	10	7
			6	1-4	2-1	26-4	1.30	77	12	8
30	3.5	1-3	1		2-7	8-4	0.47	30	5	3
			2	1-4	2-7	12-11	0.70	41	7	4
			3	1-4	2-7	17-5	0.93	53	10	6
			4	1-4	2-7	21-11	1.15	65	12	7
			5	1-4	2-7	26-6	1.38	76	15	8
			6	1-4	2-7	31-0	1.60	88	17	10
36	4.0	1-6	1		3-1	10-0	0.61	34	7	4
			2	1-4	3-1	15-1	0.87	47	10	5
			3	1-4	3-1	20-3	1.13	60	14	7
			4	1-4	3-1	25-4	1.39	73	17	8
			5	1-4	3-1	30-6	1.66	86	20	10
			6	1-4	3-1	35-7	1.92	99	24	12
42	4.5	1-9	1		3-7	11-7	0.75	44	9	5
			2	1-6	3-7	17-6	1.06	59	14	6
			3	1-6	3-7	23-4	1.37	73	18	8
			4	1-6	3-7	29-3	1.69	87	23	10
			5	1-6	3-7	35-2	2.01	102	27	12
			6	1-6	3-7	41-1	2.32	117	32	14
48	5.0	2-0	1		4-2	13-4	0.91	55	12	6
			2	1-8	4-2	20-0	1.28	72	18	8
			3	1-8	4-2	26-8	1.65	89	24	10
			4	1-8	4-2	33-4	2.02	106	30	12
			5	1-8	4-2	40-0	2.39	123	36	15
			6	1-8	4-2	46-8	2.76	140	41	17

60° CROSSING

DIAM. (D) In.	SHELL* THICK. (T) In.	H Ft.-In.	NO OF PIPES	S Ft.-In.	L Ft.-In.	M Ft.-In.	CONCRETE TOEWALL: CONCRETE Cu. Yds.	CONCRETE TOEWALL: STEEL lbs.	FLEXIBLE△ REVETMENT Sq. Yds.	SACK ϕ TOEWALL Sq. Yds.
24	3.0	1-0	1		2-4	7-7	0.40	27	3	2
			2	1-5	2-4	11-10	0.61	38	5	4
			3	1-5	2-4	16-2	0.82	49	7	5
			4	1-5	2-4	20-6	1.02	60	9	6
			5	1-5	2-4	24-9	1.23	71	11	8
			6	1-5	2-4	29-1	1.44	82	13	9
30	3.5	1-3	1		2-11	9-5	0.54	32	5	3
			2	1-5	2-11	14-4	0.78	44	8	5
			3	1-5	2-11	19-4	1.03	57	11	6
			4	1-5	2-11	24-4	1.28	69	14	8
			5	1-5	2-11	29-4	1.52	81	16	9
			6	1-5	2-11	34-3	1.77	94	19	11
36	4.0	1-6	1		3-6	11-3	0.69	37	8	4
			2	1-5	3-6	16-11	0.98	51	11	6
			3	1-5	3-6	22-6	1.26	64	15	8
			4	1-5	3-6	28-2	1.55	78	19	10
			5	1-5	3-6	33-10	1.84	92	23	11
			6	1-5	3-6	39-6	2.13	105	26	13
42	4.5	1-9	1		4-0	12-11	0.84	47	10	5
			2	1-8	4-0	19-6	1.19	63	15	7
			3	1-8	4-0	26-1	1.54	78	20	10
			4	1-8	4-0	32-8	1.89	94	25	12
			5	1-8	4-0	39-2	2.23	109	30	14
			6	1-8	4-0	45-9	2.58	125	36	16
48	5.0	2-0	1		4-7	14-9	1.01	58	13	6
			2	1-10	4-7	22-2	1.42	76	20	9
			3	1-10	4-7	29-7	1.83	95	26	11
			4	1-10	4-7	37-0	2.24	113	33	14
			5	1-10	4-7	44-5	2.65	132	39	17
			6	1-10	4-7	51-10	3.06	150	46	19

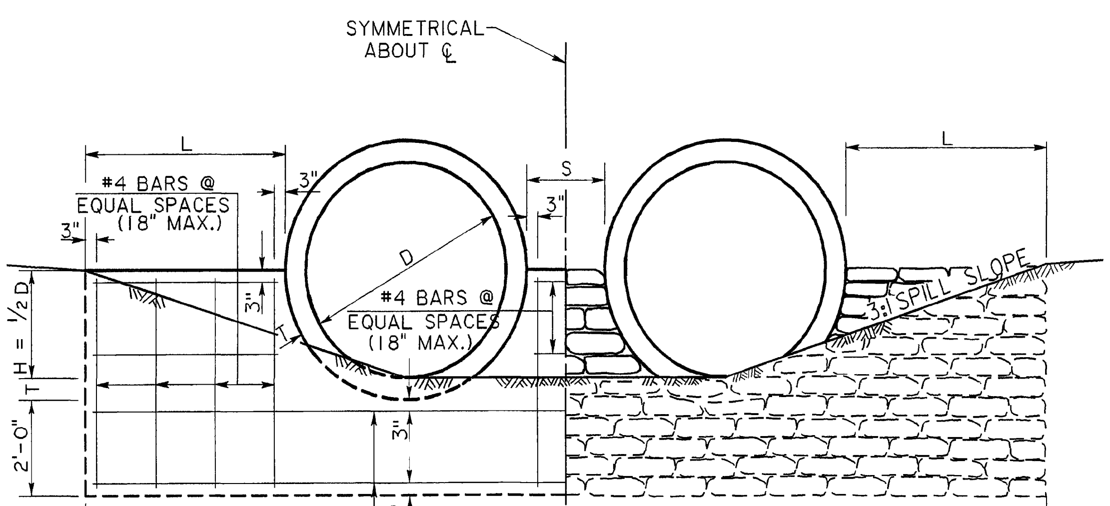
45° CROSSING

DIAM. (D) In.	SHELL* THICK. (T) In.	H Ft.-In.	NO OF PIPES	S Ft.-In.	L Ft.-In.	M Ft.-In.	CONCRETE TOEWALL: CONCRETE Cu. Yds.	CONCRETE TOEWALL: STEEL lbs.	FLEXIBLE△ REVETMENT Sq. Yds.	SACK ϕ TOEWALL Sq. Yds.
24	3.0	1-0	1		2-10	9-2	0.49	30	4	3
			2	1-9	2-10	14-6	0.74	43	6	5
			3	1-9	2-10	19-9	1.00	56	9	6
			4	1-9	2-10	25-1	1.25	69	11	8
			5	1-9	2-10	30-4	1.50	82	13	10
			6	1-9	2-10	35-8	1.76	95	16	11
30	3.5	1-3	1		3-6	11-4	0.65	36	6	4
			2	1-9	3-6	17-6	0.95	50	10	6
			3	1-9	3-6	23-7	1.25	65	13	8
			4	1-9	3-6	29-8	1.55	79	16	10
			5	1-9	3-6	35-10	1.86	93	20	12
			6	1-9	3-6	41-11	2.16	108	23	14
36	4.0	1-6	1		4-3	13-8	0.83	47	9	5
			2	1-9	4-3	20-7	1.18	63	14	8
			3	1-9	4-3	27-7	1.54	79	18	10
			4	1-9	4-3	34-6	1.90	95	23	12
			5	1-9	4-3	41-5	2.25	110	28	15
			6	1-9	4-3	48-4	2.60	126	32	17
42	4.5	1-9	1		4-11	15-10	1.02	53	12	6
			2	2-0	4-11	23-10	1.45	71	19	9
			3	2-0	4-11	31-10	1.87	89	25	12
			4	2-0	4-11	39-10	2.30	107	31	15
			5	2-0	4-11	47-11	2.73	125	37	18
			6	2-0	4-11	55-11	3.16	143	43	21
48	5.0	2-0	1		5-8	18-2	1.25	72	16	8
			2	2-3	5-8	27-3	1.75	97	24	11
			3	2-3	5-8	36-4	2.25	121	32	15
			4	2-3	5-8	45-5	2.75	145	40	18
			5	2-3	5-8	54-6	3.26	169	48	22
			6	2-3	5-8	63-7	3.76	193	57	25

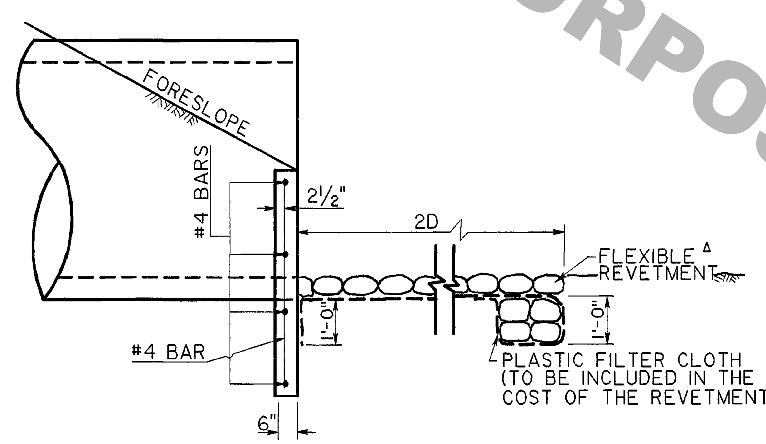
*REFERS TO CLASS III PIPE, WALL B.

△ STONE ALTERNATE TO BE 10" THICK. SEE STD. SPECIFICATIONS, SECTION 712 FOR GRADATION OF STONE.

ϕ QUANTITY BASED ON SURFACE AREA OF TOEWALL FACE.

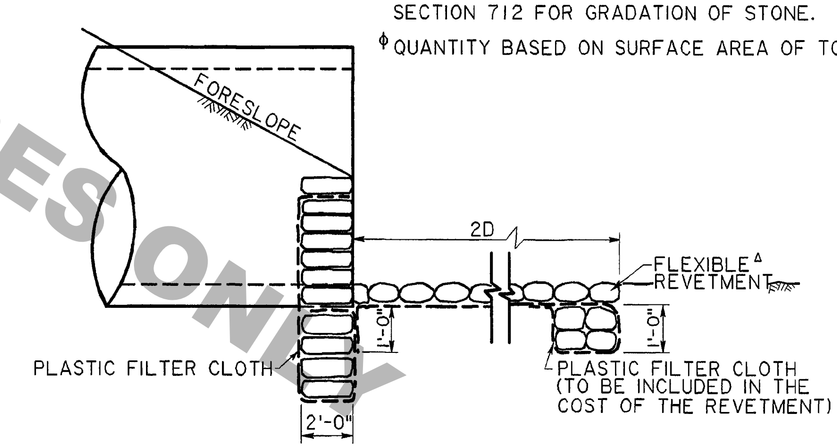


ELEVATION VIEW



PROFILE VIEW

SHOWING CONCRETE TOEWALL



PROFILE VIEW

SHOWING SACK REVETMENT TOEWALL

GENERAL NOTES:

1. CONSTRUCTION SPECIFICATIONS SHALL BE THE LATEST LA. D.O.T.D. STANDARD SPECIFICATIONS.
2. ALL CONCRETE TO BE CLASS A.
3. DIMENSIONS RELATING TO REINF. STEEL ARE TO BAR CENTERS.
4. REINFORCEMENT SHALL BE AS PER D.O.T.D. SPECS.
5. QUANTITIES GIVEN ARE FOR ONE TOEWALL.
6. TOEWALL REQUIRED ON UPSTREAM AND DOWNSTREAM END OF PIPES UNLESS OTHERWISE NOTED ON PLANS.
7. TOEWALL IS PARALLEL TO ROADWAY FOR ALL CROSSING ANGLES.

STATE OF LOUISIANA
WILLIAM M. RAY
REG. No. 24936
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

William M. Ray
6-28-01

DATE	DESCRIPTION	BY
	REVISIONS	

SPECIAL DETAIL NO. TW-90RCP1 SHEET 1 OF 1

SPECIAL DETAIL

TOE WALL FOR 24" THRU 48" RCP
ONE THRU SIX OPENINGS
CROSSING ANGLE: 90°, 75°, 60°, 45°

DATED MAY 20, 1999

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

DESIGNED LAB	DETAILED KAJ	DIR. spdetail/toewall
CHECKED MN	CHECKED SD	FILE tw-90rcp1.dgn

HYDRAULICS SECTION