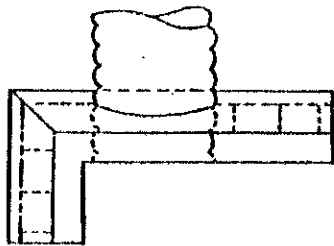


ENDWALLS



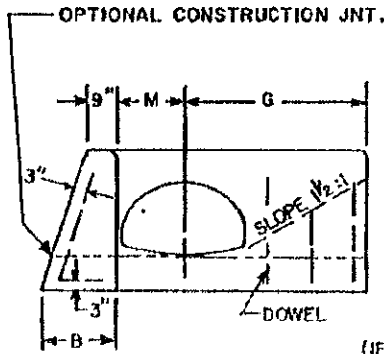
PLAN

GENERAL NOTES:

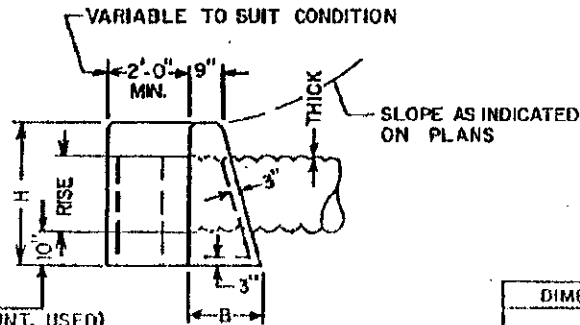
ALL CORNERS TO BE CHAMFERED 1".
 THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-#6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM 3" COVER AND A LENGTH 6" LESS THAN ENDWALL.

IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR "X" (DOWELS) SHALL BE IN THE BASE AS SHOWN ON PLANS. SPACING TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.

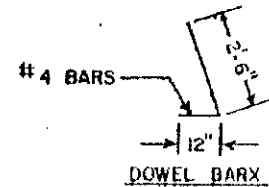
WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS BASE SEPARATELY, THE TOP OF THE BASE SHALL BE LEFT ROUGH.
 FORMS WILL BE USED IN CONSTRUCTION OF BOTTOM SLAB.
 CLASS "AA" CONCRETE SHALL BE USED.



ELEVATION



END ELEVATION



DOWEL BAR

FOOTING
 (IF CONST. JNT. USED)

QUANTITIES BASED ON 2'-0"

REINFORCING QUANTITIES									
SPAN	18"	22"	25"	29"	36"	43"	50"	65"	72"
BARS X									X
QTY.	5	5	5	6	6	7	7	8	8
LBS.	12	12	12	14	14	16	16	19	19

COMMON DIMENSIONS USING C.M. ARCH PIPE							TOTAL CONC.
SPAN	RISE	THICK	H	B	G	M	CU. YD.
18"	11"	.064	2'-7"	1'-4"	2'-5"	1'-0"	0.604
22"	13"	.064	2'-9"	1'-5"	2'-9"	1'-2"	0.712
25"	16"	.064	3'-0"	1'-6"	3'-3"	1'-4"	0.877
29"	18"	.079	3'-2"	1'-7"	3'-7"	1'-6"	1.015
36"	22"	.079	3'-6"	1'-9"	4'-3"	1'-9"	1.306
43"	27"	.079	3'-11"	2'-0"	5'-1"	2'-1"	1.796
50"	31"	.109	4'-3"	2'-2"	5'-9"	2'-4"	2.206
58"	36"	.109	4'-8"	2'-4"	6'-7"	2'-8"	2.794
65"	40"	.138	5'-0"	2'-6"	7'-4"	3'-0"	3.387
72"	44"	.138	5'-4"	2'-8"	8'-0"	3'-3"	3.995

APPROVED: DATE May 6, 1930

REVISIONS		
NO.	DATE	DESCRIPTION

STANDARD CONCRETE "L" ENDWALL FOR SINGLE PIPE CULVERTS
 18" THRU 72" ARCH PIPE
 CITY OF GREENVILLE, N.C.—ENGINEERING DEPT.

STD. NO.	REV.
30 01	

GENERAL NOTES:

ALL CORNERS TO BE CHAMFERED 1".

THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-#6 BARS "Y" IN TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MIN. OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL.

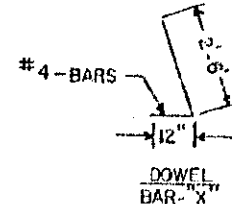
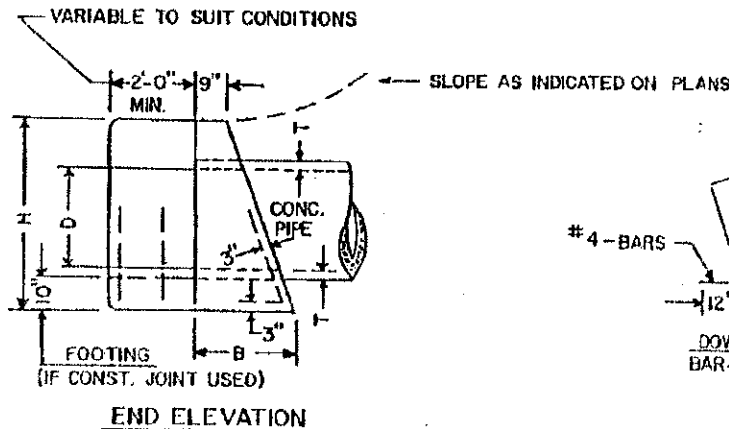
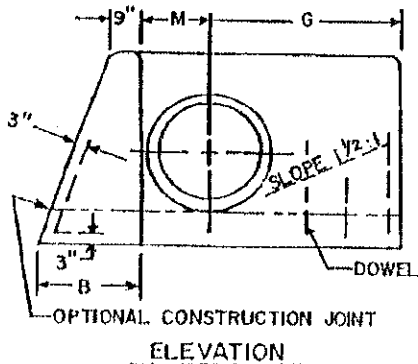
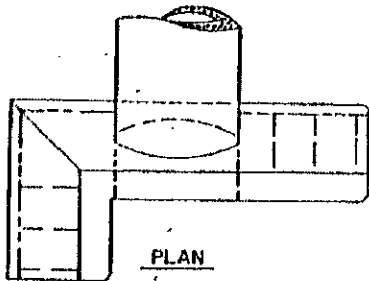
IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR "X" (DOWELS) SHALL BE PLACED IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS TO BE ON APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.

IF THE CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POUR SLAB SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.

FORMS ARE TO BE USED FOR THE CONSTRUCTION OF BASE SLAB.

WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT ARE USED ONLY IN COMPUTATIONS OF ENDWALL QUANTITIES.

CLASS "AA" CONCRETE SHALL BE USED.



		REINFORCING QUANTITIES									
DIA.		15"	18"	24"	30"	36"	42" CM	42" RC	48" CM	48" RC	
BARS	X	X	X	X	X	X	Y	X	Y	X	Y
QTY.		5	5	6	6	7	7	2	7	2	8
LBS.		12	12	14	14	16	47	49	52	2	8

COMMON DIMENSIONS							COMMON DIMENSIONS					COMMON DIMENSIONS	
D	H	B	G	M	T	CU. YD.	H	B	G	M	CU. YD.		
15"	3'-4"	1'-8"	2'-9"	1'-0"	1 7/8"	0.960	3'-0"	1'-6"	2'-6"	0'-11"	0.770		
18"	3'-7"	1'-10"	3'-2"	1'-2"	2"	1.193	3'-3"	1'-8"	2'-11"	1'-0"	0.964		
24"	4'-2"	2'-1"	4'-0"	1'-5"	2 1/2"	1.711	3'-9"	1'-11"	3'-8"	1'-3"	1.385		
30"	4'-9"	2'-5"	4'-7"	1'-9"	2 3/4"	2.394	4'-3"	2'-2"	4'-5"	1'-6"	1.908		
36"	5'-3"	2'-8"	5'-6"	2'-0"	3"	3.169	4'-9"	2'-5"	5'-2"	1'-9"	2.544		
42"	5'-10"	2'-11"	6'-4"	2'-4"	3 1/2"	4.139	5'-3"	3'-3"	5'-11"	2'-0"	3.301		
48"	6'-5"	3'-3"	7'-2"	2'-8"	4"	5.422	5'-9"	2'-11"	6'-6"	2'-3"	4.193		

REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED: DATE May 8, 1980

STANDARD CONCRETE "L" ENDWALL FOR SINGLE PIPE CULVERTS
15" THRU 48" PIPE
CITY OF GREENVILLE, N.C. — ENGINEERING DEPT.

STD. NO.	REV
30.02	

GENERAL NOTES:

All corners are to be chamfered 1".

The Contractor will be required to place 2-6 bars "Y" in the top of all endwalls for pipe culverts 42" and over with a minimum of 3" cover and a length of 6" less than endwall.

Forms are to be used for construction of bottom slab.

Wall thickness (T) shown is not to be interpreted to mean the thickness acceptable, but is used only in computing endwall quantities.

If contractor elects to use construction joint at bottom of pipe and pours base separately, the top of the base shall be left rough.

When contractor elects to use construction joint at bottom of pipe, bar "X" (dowels) shall be placed in the base as shown on plans, spacing of bars to be approximately 12" centers unless engineers direct otherwise.

When skew angle of pipe is over 45°, use G-1 dimension for 45° plus 6" for each 5° over 45°, G2 dimension will be the new dimension divided by the cosine of the angle of pipe skew.

Class "AA" concrete shall be used.

All pipes will meet NCDOT-Division of Highways specifications for load bearing capacities.

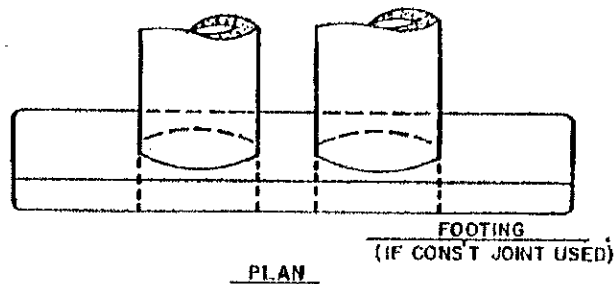
REVISIONS

NO.	DATE	DESCRIPTION

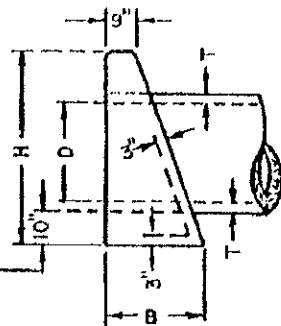
APPROVED: DATE May 8, 1980

CITY OF GREENVILLE, N.C.—ENGINEERING DEPT.

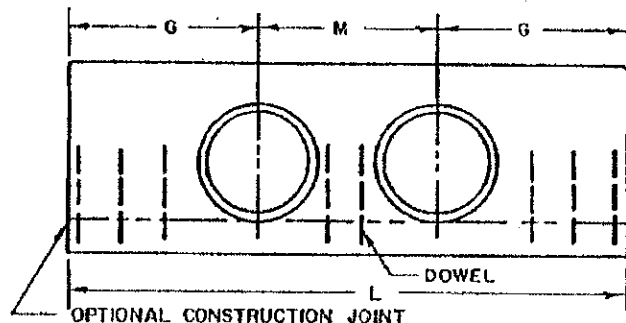
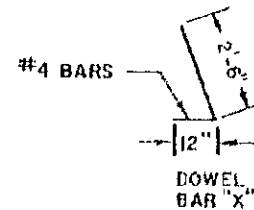
STD. NO.	REV.
30.03	



PLAN



END ELEVATION



ELEVATION

DOWELS IN ENDWALL WITH REINFORCED CONC. PIPE

L O C.	PIPE DIA.	SINGLE PIPE						DOUBLE PIPE											
		15"	18"	24"	30"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"				
BARS		x	x	x	x	x	x	y	x	y	x	x	x	x	x	y	x	y	
G	QTY.	2	2	3	3	4	4	5			2	2	3	3	4	4	5		
M	QTY.	-	-	-	-	-	2	-	2		1	1	2	2	2	2	2	3	2
G	QTY.	2	2	3	3	4	4	5			2	2	3	3	4	4	5		
TOT.	LBS.	9	9	14	14	19	65	65			12	12	19	19	23	77	92		

SEE NOTE

DOWELS IN ENDWALL WITH CORRUGATED METAL PIPE

L O C.	PIPE DIA.	SINGLE PIPE						DOUBLE PIPE											
		15"	18"	24"	30"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"				
BARS		x	x	x	x	x	y	x	y	x	x	x	x	x	y	x	y		
G	QTY.	2	2	3	3	4	4	5			2	2	3	3	4	4	5		
M	QTY.	-	-	-	-	-	2	-	2		1	1	1	2	2	2	2	2	2
G	QTY.	2	2	3	3	4	4	5			2	2	3	3	4	4	5		
TOT.	LBS.	9	9	14	14	19	53	62			12	12	16	19	23	73	85		

SEE NOTES

DIMENSIONS AND CONCRETE QUANTITIES

CONCRETE PIPE										CORRUGATED METAL PIPE									
D	COMMON DIMS.				SINGLE PIPE		DOUBLE PIPE		H	COMMON DIMS.				SINGLE PIPE		DOUBLE PIPE			
	H.	B	G	T	L	CU.YD.	M	L		CU.YD.	H	B	G	L	CU.YD.	M	L	CU.YD.	
15"	3'-4"	1'-8"	2'-9"	1 7/8"	5'-6"	0.734	2'-2"	7'-8"	0.970	3'-0"	1'-6"	2'-6"	5'-0"	0.573	1'-11"	6'-11"	0.780		
18"	3'-7"	1'-10"	3'-2"	2"	6'-4"	0.958	2'-7"	8'-11"	1.274	3'-3"	1'-8"	2'-11"	5'-10"	0.767	2'-3"	8'-1"	1.014		
24"	4'-2"	2'-1"	4'-0"	2 1/2"	8'-0"	1.506	3'-5"	11'-5"	2.010	3'-9"	1'-11"	3'-8"	7'-4"	1.200	3'-0"	10'-4"	1.597		
30"	4'-9"	2'-5"	4'-7"	2 3/4"	9'-2"	2.145	4'-3"	13'-5"	2.920	4'-3"	2'-2"	4'-5"	8'-10"	1.757	3'-9"	12'-7"	2.340		
36"	5'-3"	2'-8"	5'-6"	3"	11'-0"	3.040	5'-0"	16'-0"	4.086	4'-9"	2'-5"	5'-2"	10'-4"	2.456	4'-6"	14'-10"	3.288		
42"	5'-10"	2'-11"	6'-4"	3 1/2"	12'-8"	4.120	5'-10"	18'-6"	5.534	5'-3"	2'-8"	5'-11"	11'-10"	3.310	5'-3"	17'-1"	4.434		
48"	6'-5"	3'-3"	7'-2"	4"	14'-4"	5.535	6'-6"	21'-0"	7.427	5'-9"	2'-11"	6'-8"	13'-4"	4.337	6'-0"	19'-4"	5.812		

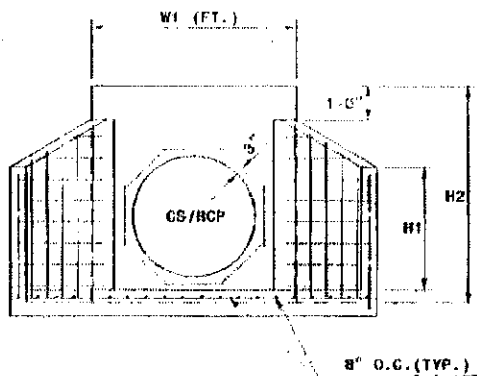
REVISIONS

NO.	DATE	DESCRIPTION

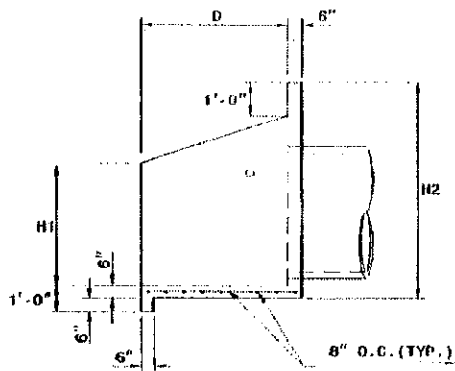
APPROVED: DATE May 8, 1980

STANDARD CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
15" THRU 48" PIPE - 90° SKEW
CITY OF GREENVILLE, N.C. - ENGINEERING DEPT.

STD. NO.	REV.
30.04	



ELEVATION

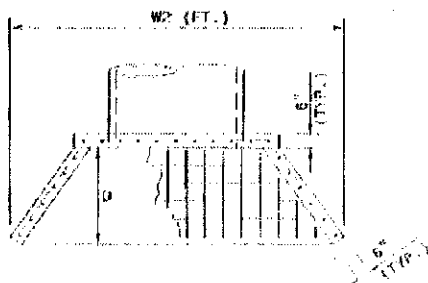


SIDE

NOTES:

- * USE 4000 PSI CONCRETE.
- * PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A105 WITH 2" MIN. CLEARANCE.
- * PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
- * PIPE TO BE GROUTED INTO HEADWALL AT JOB SITE BY CONTRACTOR
- * ALL ELEMENTS PRECAST TO MEET ASTM C913.
- * WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
- * CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".

NOTE: THE MINIMUM BAR SIZE SHALL BE #5 BARS AT 8" CTS. THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED.



PLAN

ENDWALL DIMENSIONS

FT.	MINIMUM	NIN. /MAX.	MIN. /MAX.	NIN. /MAX.	MIN. /MAX.	NIN. /MAX.
PIPE DIA.	BAR SIZE	H1 (FT.)	H2 (FT.)	D (FT.)	W1	W2
1.0	#5 @ 8"	1.25/2.00	2.00/3.75	1.25/1.75	3.00/3.75	5.50/6.00
1.25	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	6.50/6.75
1.50	#5 @ 8"	1.25/2.00	3.00/4.25	1.50/2.50	3.50/3.75	6.50/6.75
2.0	#5 @ 8"	1.50/2.50	4.00/4.75	1.75/2.50	4.00/4.25	7.50/8.25
2.5	#5 @ 8"	2.50/3.50	4.00/6.00	2.00/3.00	4.50/5.50	10.00/11.50
3.0	#5 @ 8"	3.00/3.50	5.00/6.00	2.75/3.50	5.25/5.75	11.50/11.75
3.5	#5 @ 8"	3.25/4.50	6.00/6.75	3.25/3.50	6.00/6.75	12.00/13.25
4.0	#5 @ 8"	3.50/4.50	6.50/7.00	3.25/3.50	6.50/6.75	13.00/13.25
4.5	#5 @ 8"	4.00/5.00	6.50/8.50	3.25/4.00	7.00/9.25	13.50/15.75
5.0	#5 @ 8"	4.50/5.00	7.00/8.50	3.25/4.00	7.25/9.25	13.75/15.75
5.5	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.25/9.25	14.00/15.75
6.0	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.75/9.25	14.75/16.75

PRECAST CONCRETE ENDWALL
 FOR SINGLE 12" THRU 72" PIPE - 90° SKEW

PRECAST CONCRETE ENDWALL
 FOR SINGLE 12" THRU 72" PIPE - 90° SKEW