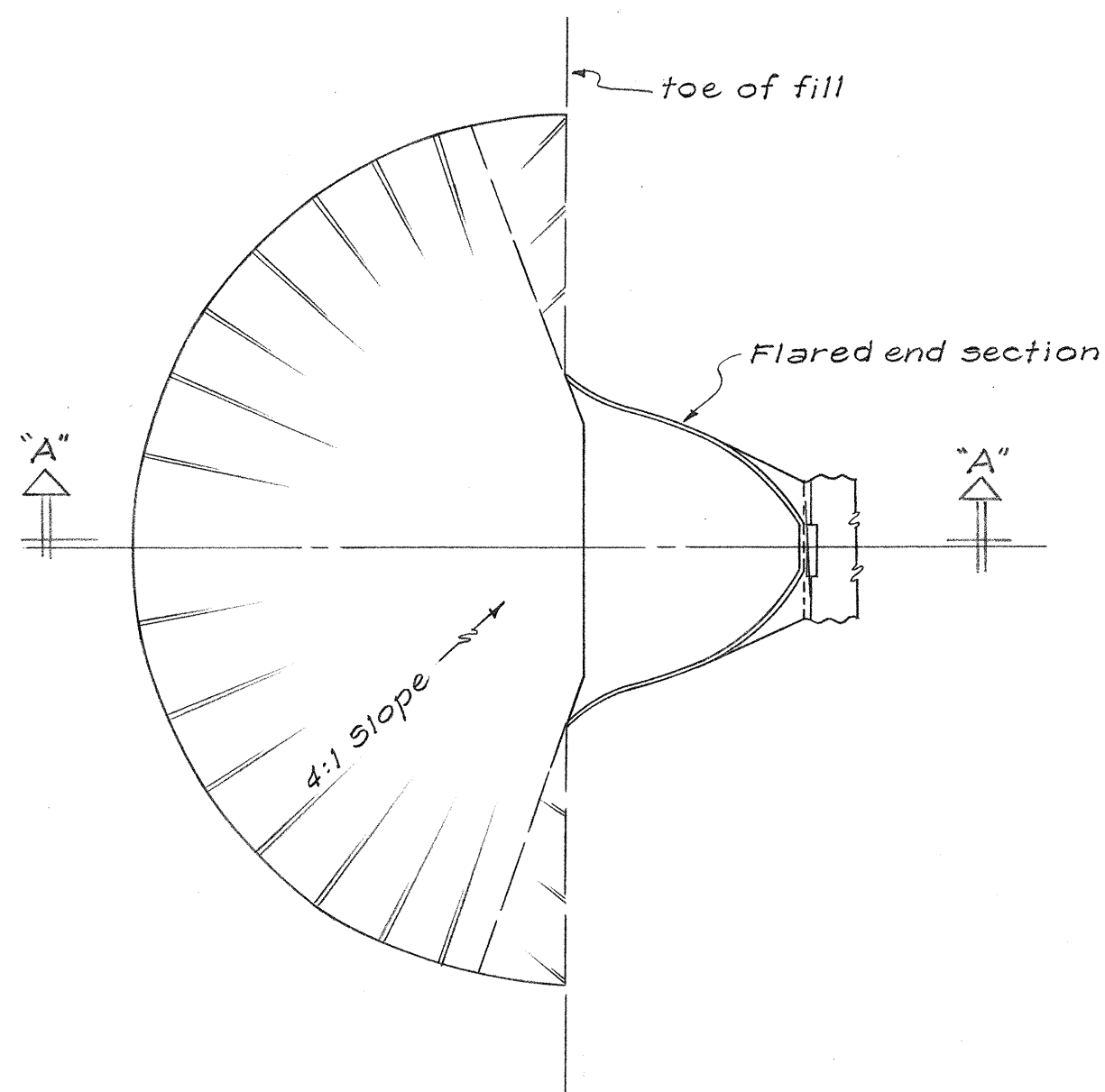
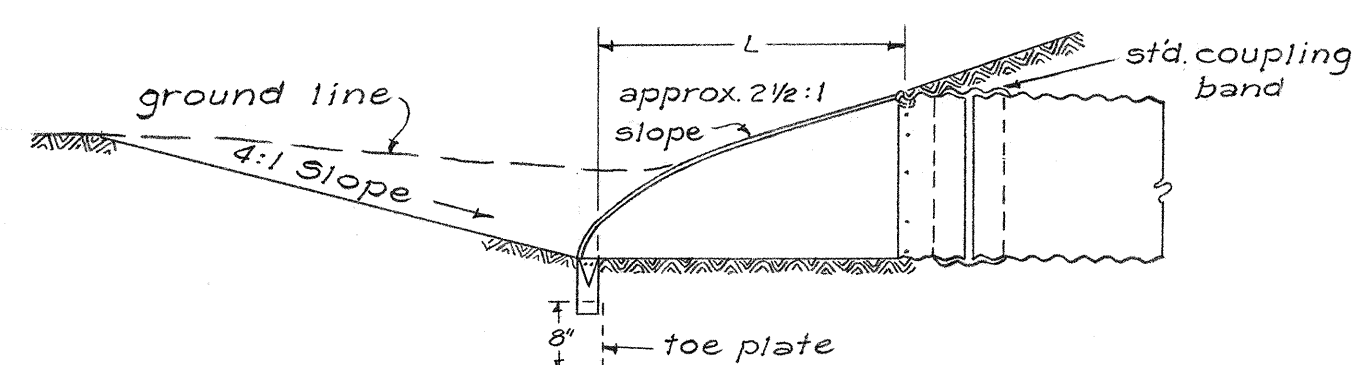


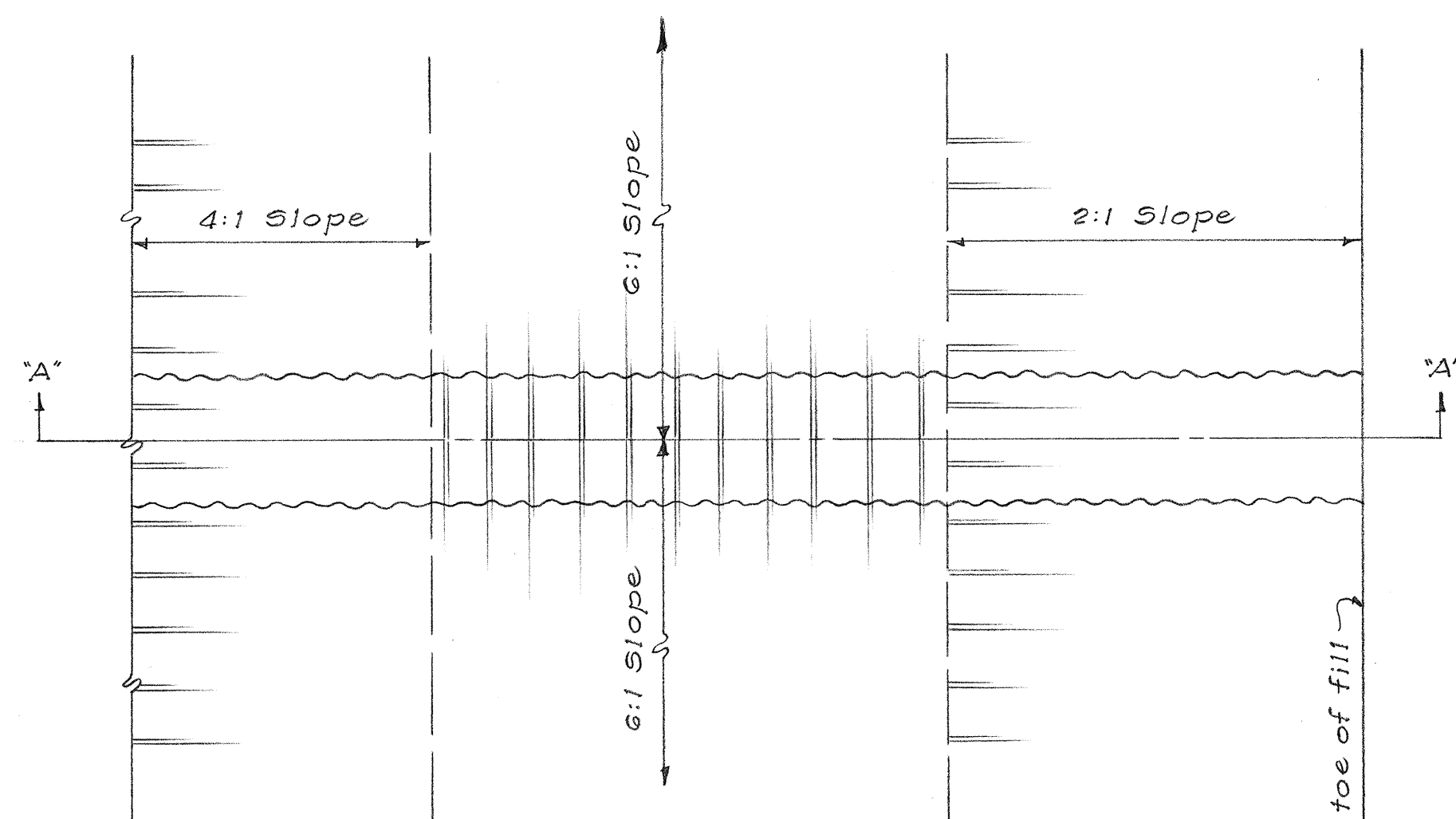


PLAN

INLET END OF PIPE CULVERT
(NOT TO SCALE)

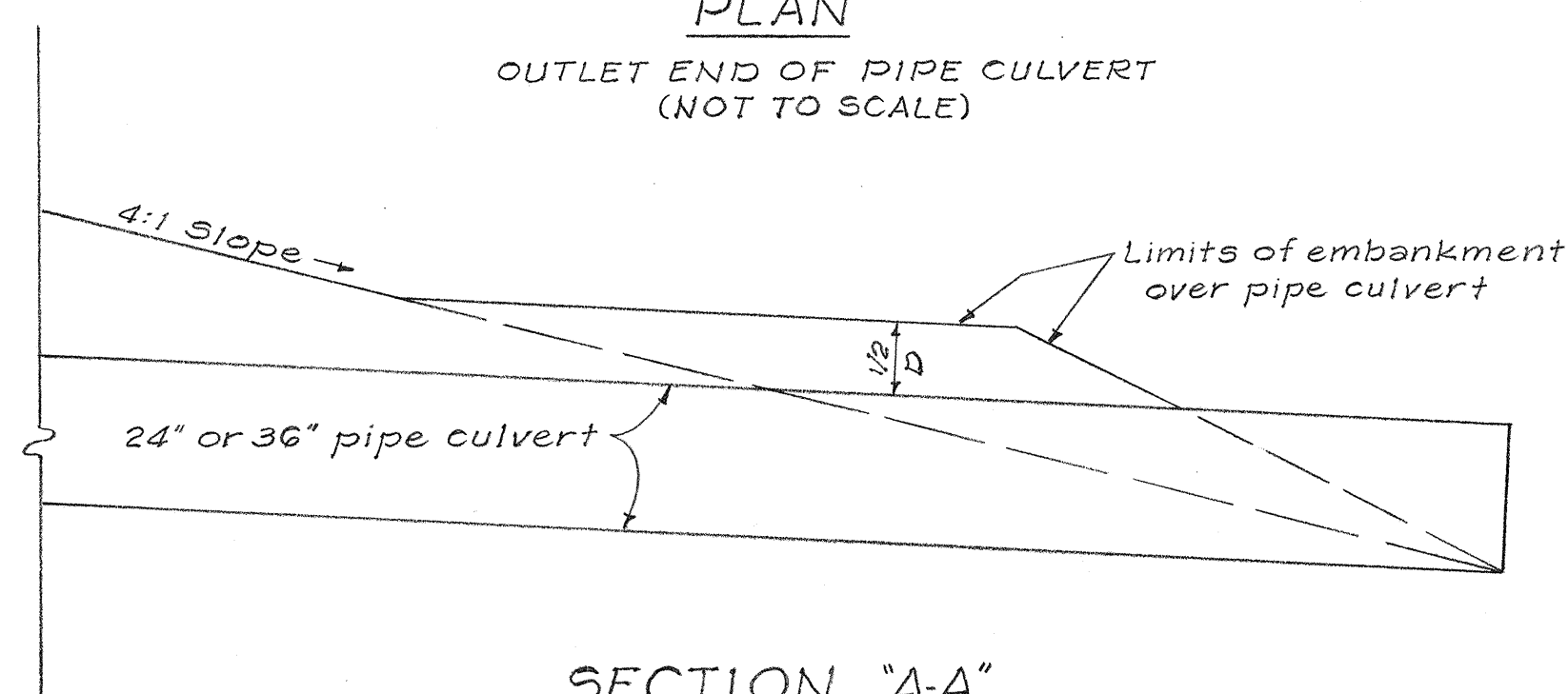


SECTION "A-A"
(NOT TO SCALE)



PLAN

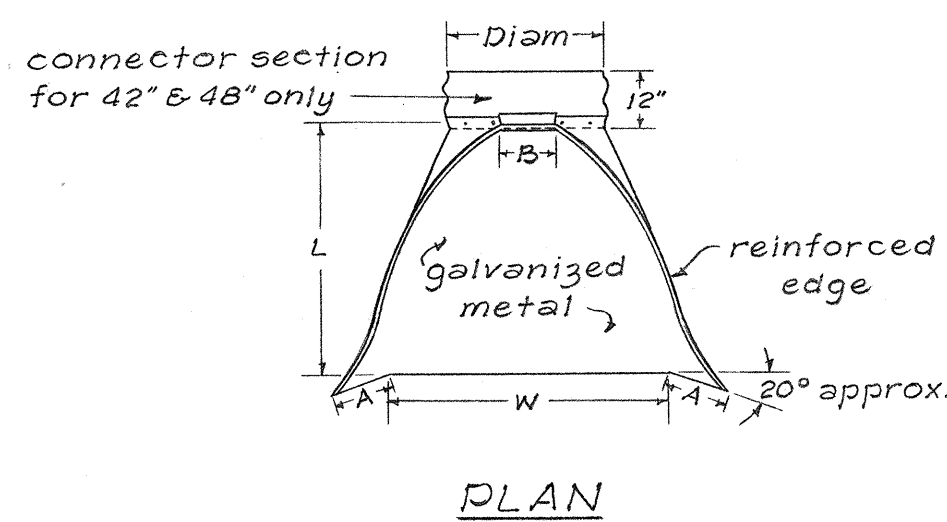
OUTLET END OF PIPE CULVERT
(NOT TO SCALE)



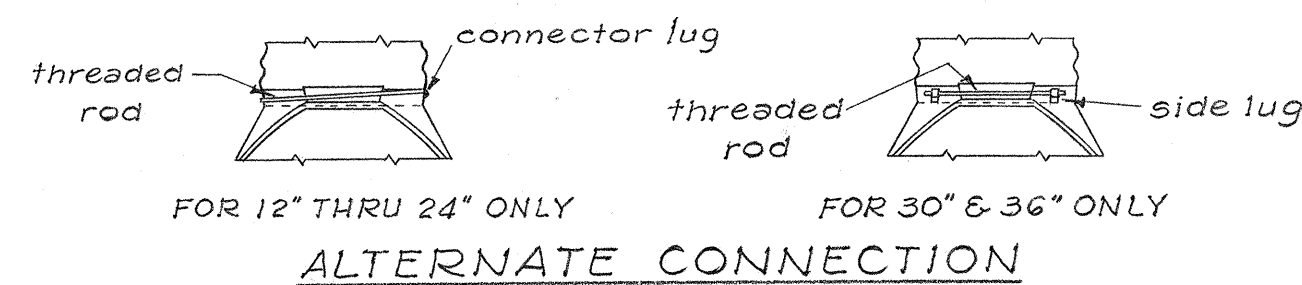
SECTION "A-A"
(NOT TO SCALE)

SUMMARY OF DRAINAGE STRUCTURES												
LOCATION	DITCH & CHANNEL EXCAVATION	STRUCTURE EXC.	CLASS B CONCRETE	REINFORCING STEEL	BED COURSE MATERIAL FOR CULVERT	24" CORR. CLASS II	36" CORR. CLASS IV	24" CORR. METAL PIPE (10GA)	36" CORR. METAL PIPE (10GA)	24" FLARED END SECTION	36" FLARED END SECTION	
	C.Y.	C.Y.	C.Y.	LB.	C.Y.	L.F.	L.F.	L.F.	L.F.	E.A.	E.A.	
Sta. 31+27		101	(2.74)	(60)	20		(108)		108			1
Sta. 54+50	1	108	(2.74)	(60)	21		(108)		108			1
Sta. 62+00	1	108	(2.74)	(60)	20		(108)		108			1
Sta. 74+00	47	115	(2.74)	(60)	16		(76)		86			1
Sta. 85+00		108	(2.74)	(60)	20		(120)		120			1
Sta. 99+50	85	115	(2.76)	(84)	11	(66)		76		2		
Sta. 109+50	1	108	(2.74)	(60)	20		(94)		94			1
Sta. 119+50		108	(2.74)	(60)	21		(106)		106			1
Sta. 131+50	30	108	(2.74)	(60)	20		(106)		106			1
Sta. 141+50		130	(2.74)	(60)	25		(128)		128			1
Sta. 150+00	13	108	(2.74)	(60)	17		(96)		96			1
Sta. 160+60	59	108	(2.74)	(60)	18		(88)		88			1
Sta. 168+50	36	108	(2.74)	(60)	21		(104)		104			1
Sta. 177+00	9	117	(2.74)	(60)	23		(122)		122			1
Sta. 184+50	15	117	(2.76)	(84)	12	(72)		72		2		
Sta. 188+35	158	117	(1.98)	(42)	11	(70)		70		1		
Sta. 189+50	4	117	(2.76)	(84)	12	(72)		72		2		
Sta. 192+00		121	(2.74)	(60)	24		(120)		120			1
Sta. 197+50		108	(2.74)	(60)	19		(96)		96			1
TOTAL	459	1,065	(50.76)	(1,194)	357	(280)	(1578)	284	1,524	7	15	

NOTE: () indicates alternate bid item.



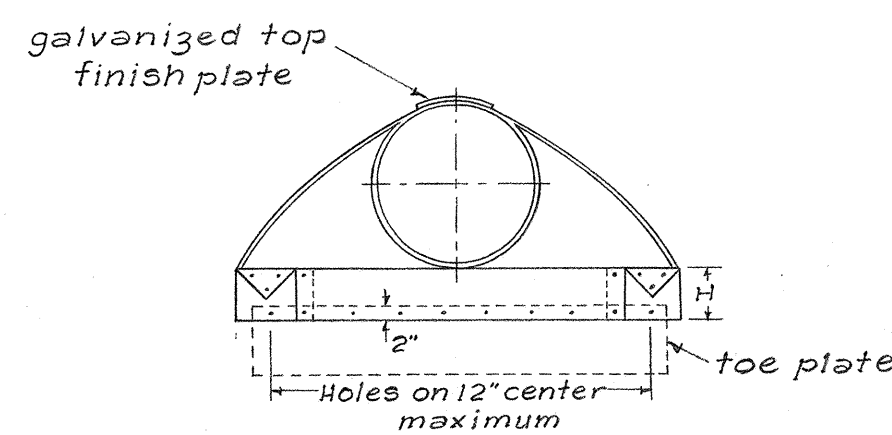
PLAN



ALTERNATE CONNECTION

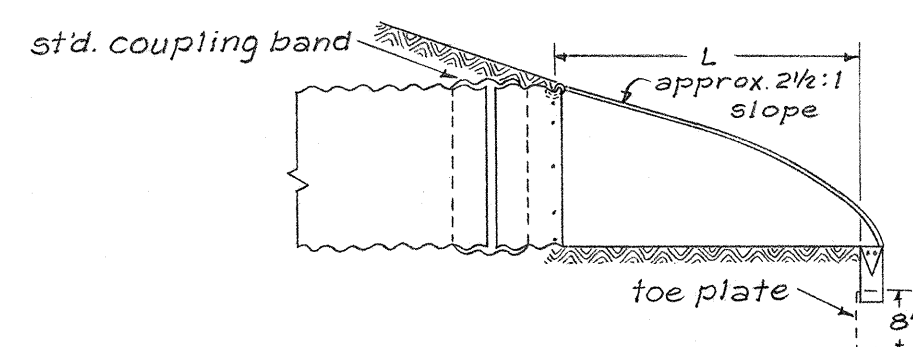
NOTES:

Toe plate where needed to be punched to match holes in skirt lip.
3/8" galvanized bolts to be furnished. Length of toe plate is W+10" for 12" to 36" diam. pipe and W+22" for 36" to 48" diam. pipe.
Skirt section for 12" to 24" diam. pipe to be made in one piece.
Skirt section for 30" to 48" diam. pipe may be made from two sheets joined by riveting or bolting on center line.
Connector section, corner plate and toe plate to be same gage as skirt and each to be galvanized.



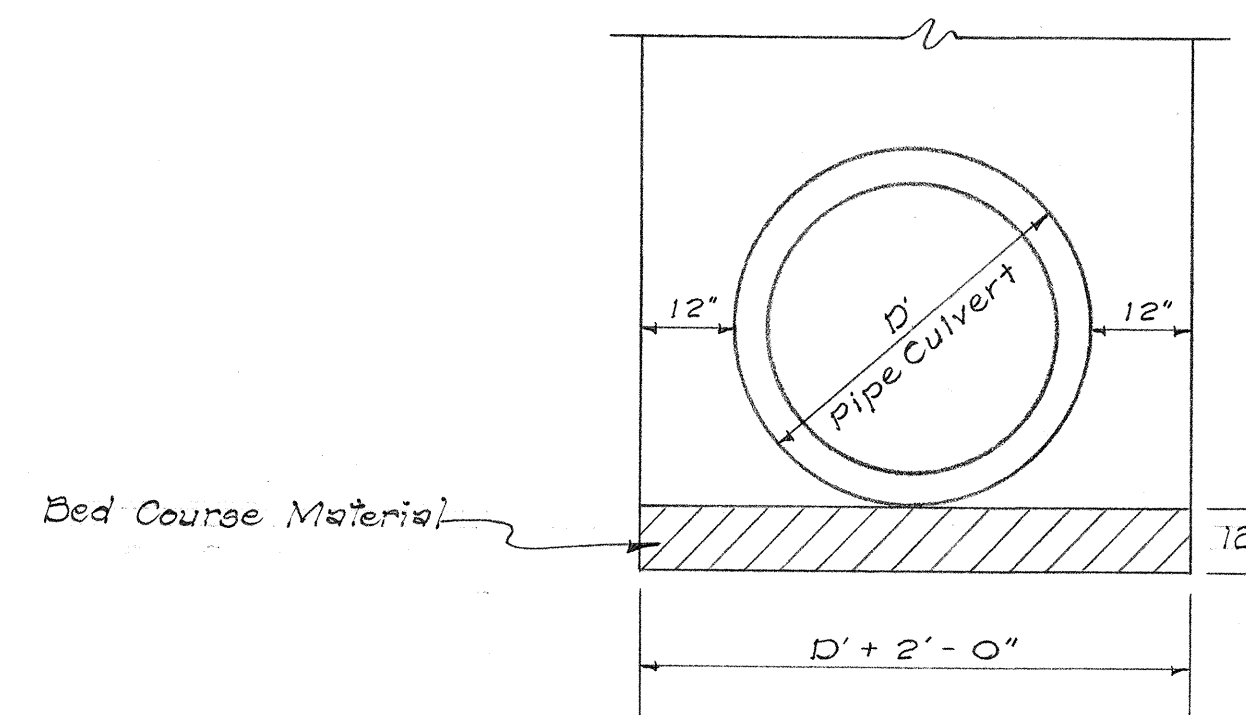
ELEVATION

FLARED END SECTION
For 12-in. to 48-in. Metal Pipe Culverts
(NOT TO SCALE)



TYPICAL CROSS SECTION

PIPE DIAM (IN)	GAGE	DIMENSIONS (IN)					
		A	B	H	L	W	
12	1G	4 3/4	6	6	21	24	
15	1G	6	8	6	26	30	
18	1G	7	9	6	31	36	
24	14	9 1/2	12	6	42	48	
30	14	12	15	7 1/2	52 1/2	60	
36	12	14	18	9	63	72	
42	12	16	21	10 1/2	73 1/2	84	
48	12	18	27	12	84	90	



DETAIL OF BED COURSE
MATERIAL
(NOT TO SCALE)

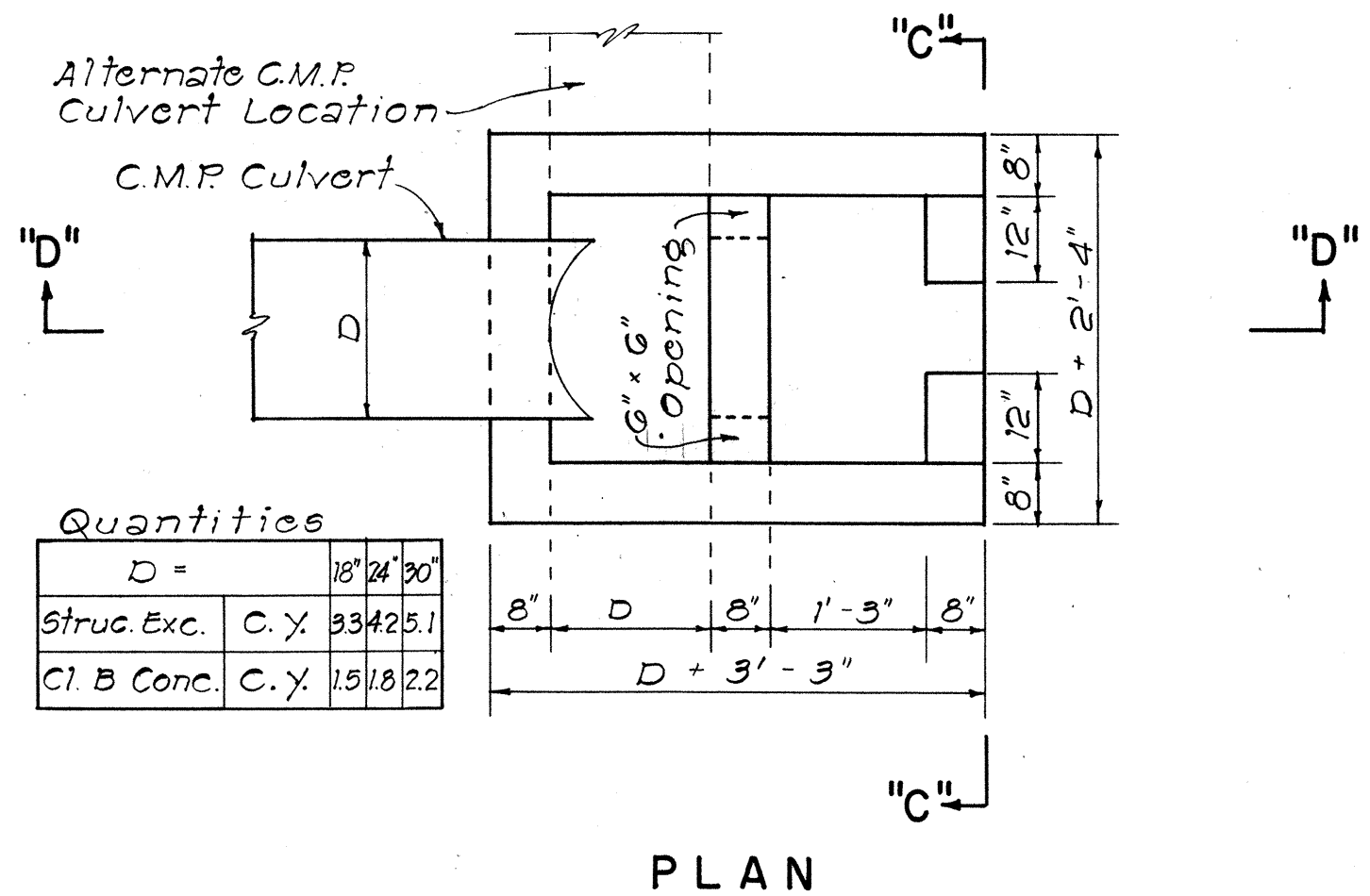
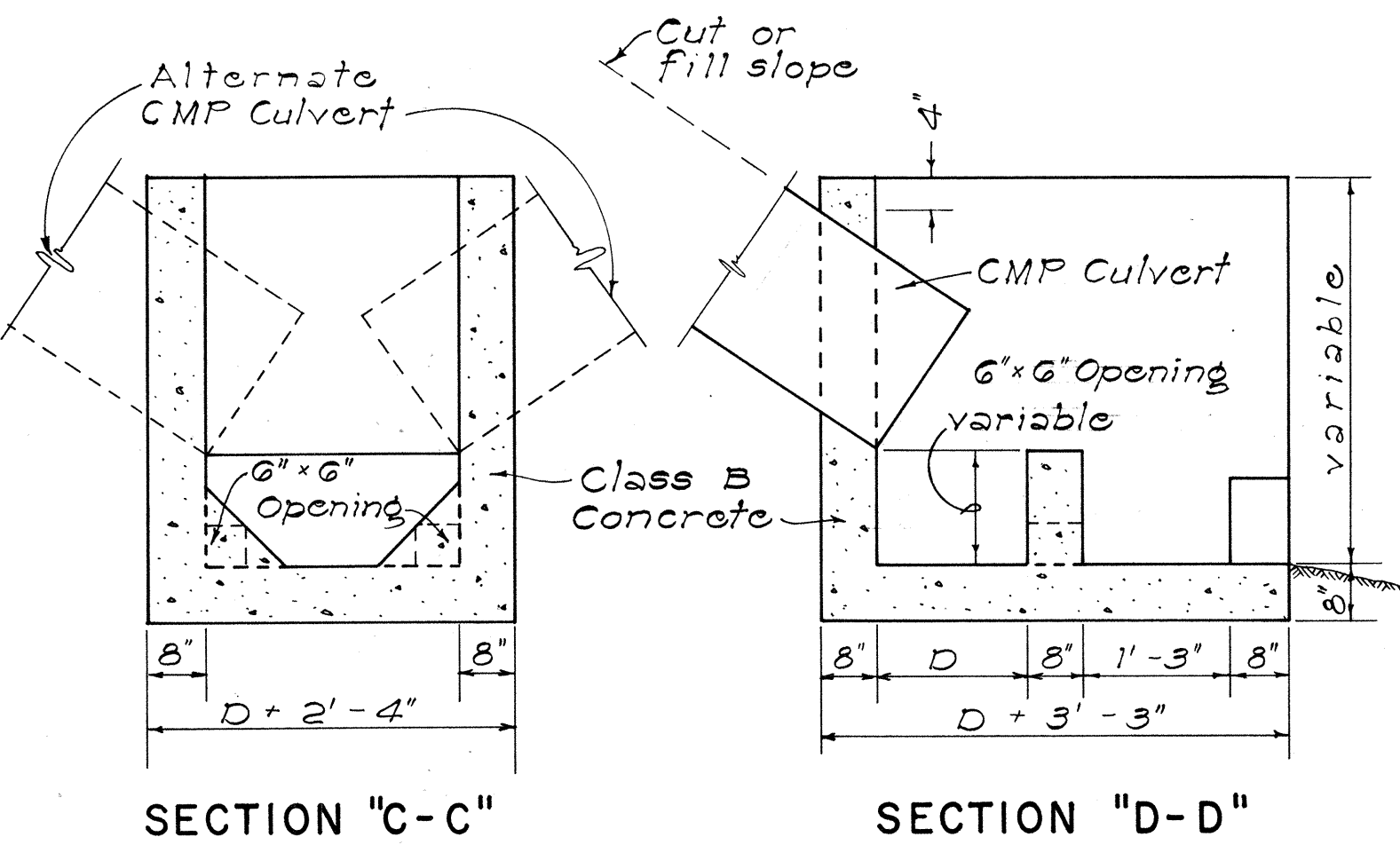
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATE OF HAWAII

PIPE CULVERT DETAILS

KAIMU-PAHOA ROAD
Project 5-0130 (12)

Scale: As Noted Date: March 1968

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	3-0130(12)	1970	13	53



DETAILS OF CONC. DROP BOX AT OUTLET OF CULVERT PIPE
NOT TO SCALE

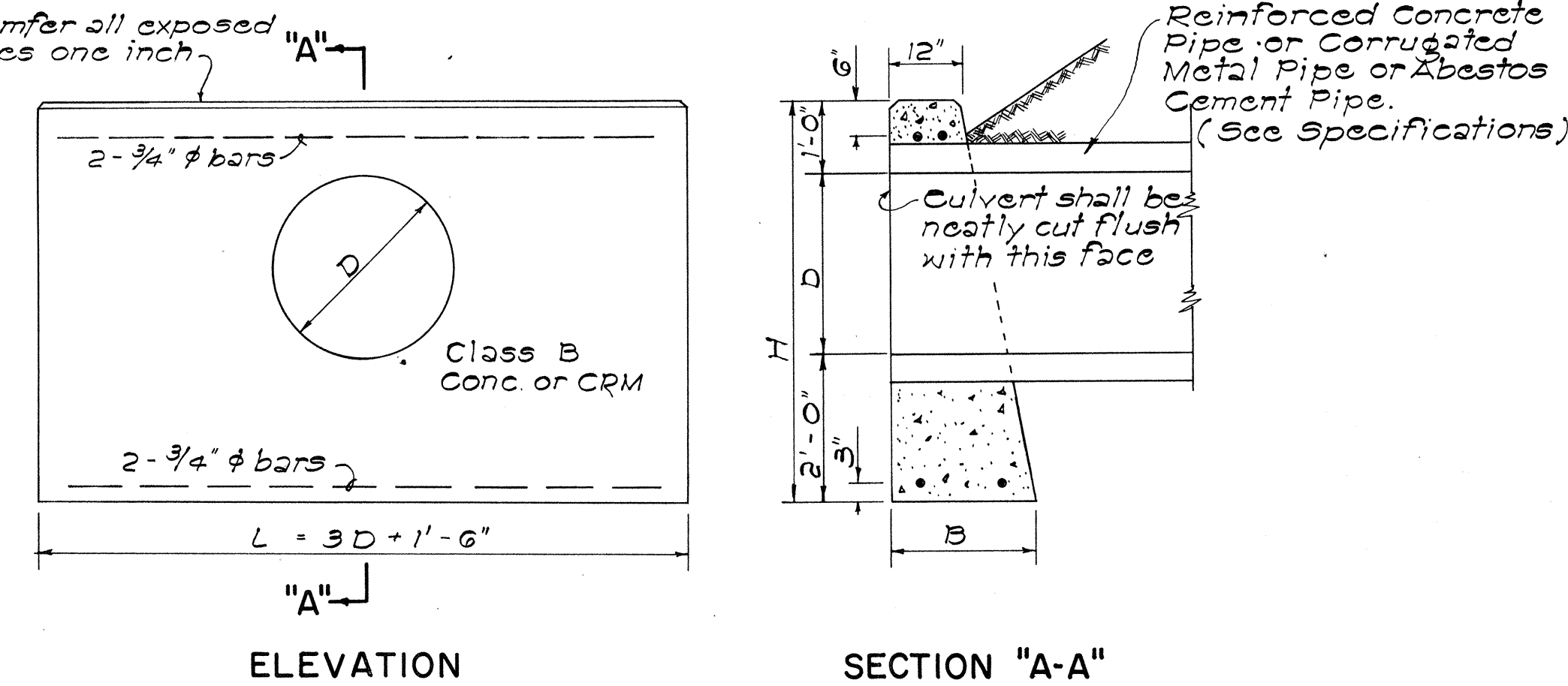
APPROVAL RECOMMENDED:
HYDRAULIC DESIGN ENGINEER 12-17-69
DATE

APPROVED:
ASSISTANT CHIEF, ENGINEERING 12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
DROP INTAKE; HEADWALL & CONCRETE PROTECTION

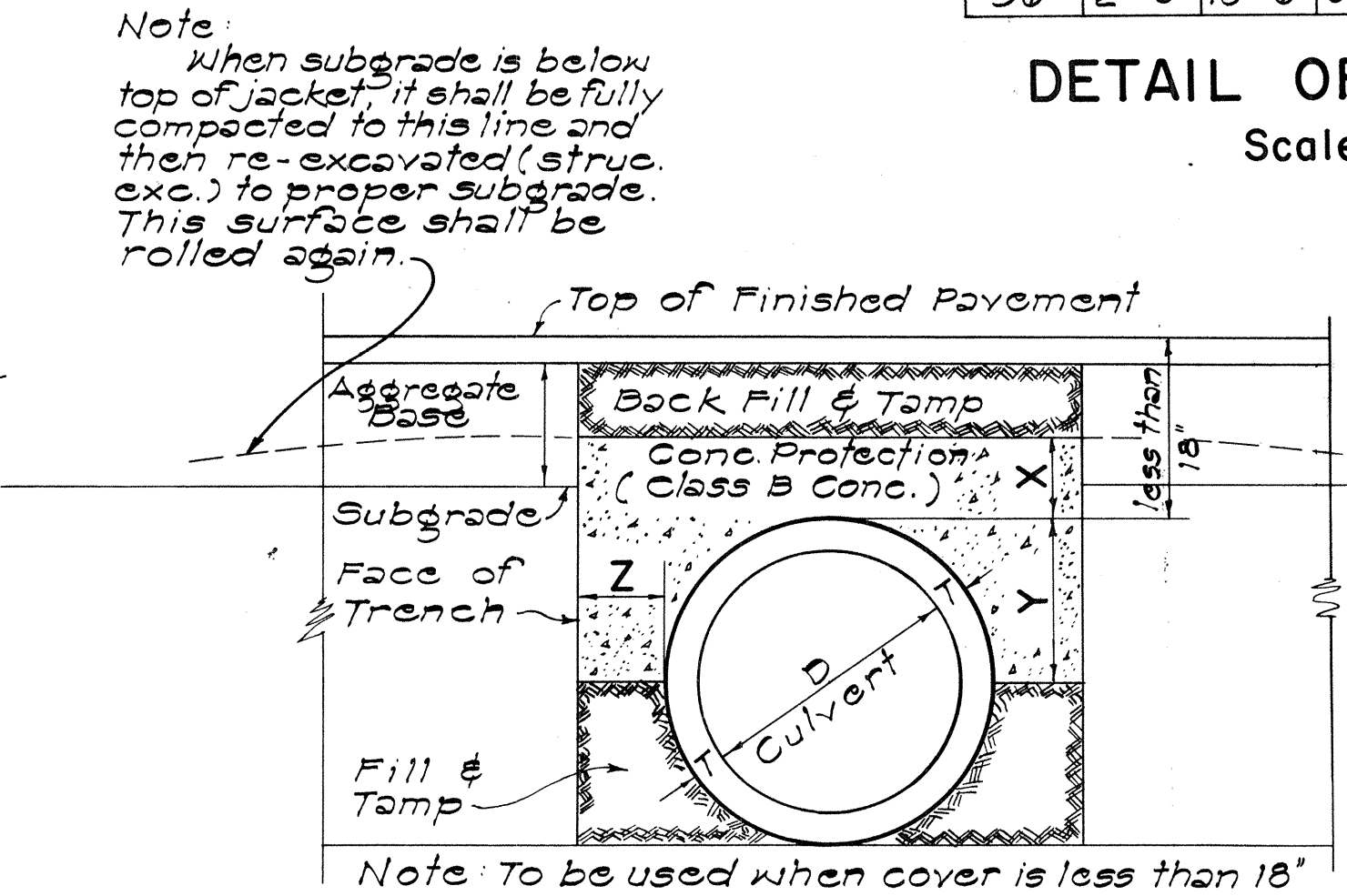
Scale: As Noted Date: Aug. 1967
SHEET NO. / OF / SHEETS DH 10



DATA FOR CONC. HEADWALL				CL. B CONC. FOR R.C.P.		CL. B CONC. FOR C.M.P.		Steel For One Headwall	
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Size	Length	Lbs.
18"	1'-6"	6'-0"	4'-6"	1.12	1.17	4	3/4"	5'-6"	33
24"	1'-6"	7'-6"	5'-0"	1.52	1.60	4	3/4"	7'-0"	42
30"	2'-0"	9'-0"	5'-6"	2.36	2.49	4	3/4"	8'-6"	51
36"	2'-0"	10'-6"	6'-0"	2.94	3.13	4	3/4"	10'-0"	60
42"	2'-6"	12'-0"	6'-6"	4.19	4.47	4	3/4"	11'-6"	69
48"	2'-6"	13'-6"	7'-0"	5.01	5.36	4	3/4"	13'-0"	78

DATA - MASONRY HEADWALL				CRM FOR R.C.P.		CRM FOR C.M.P.	
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Size
18"	1'-0"	6'-0"	4'-6"	1.24	1.29	4	3/4"
24"	2'-0"	7'-6"	5'-0"	1.83	1.92	4	3/4"
30"	2'-3"	9'-0"	5'-6"	2.56	2.70	4	3/4"
36"	2'-6"	10'-6"	6'-0"	3.45	3.66	4	3/4"

DETAIL OF HEADWALL
Scale: 1/2" = 1'-0"

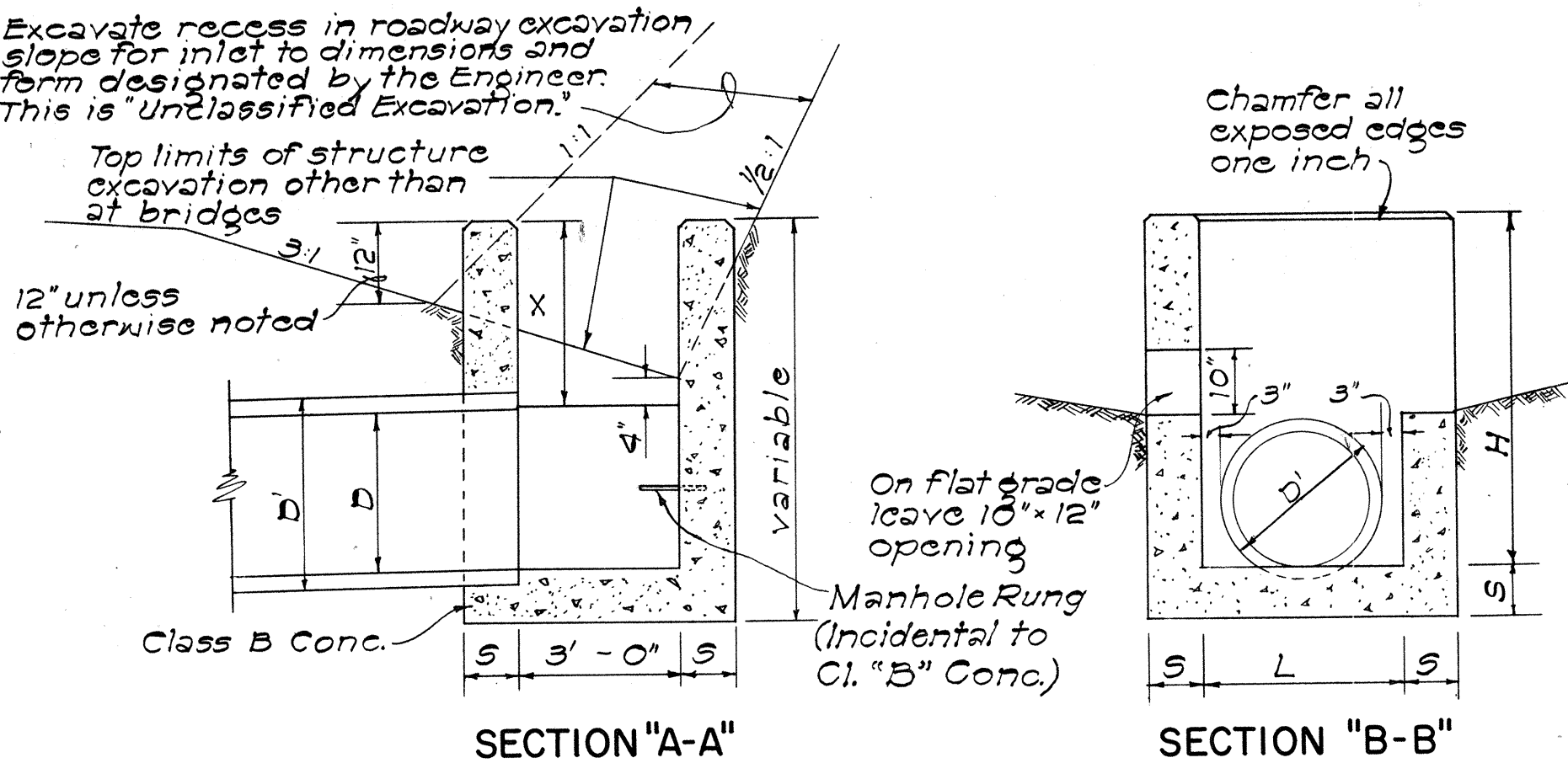
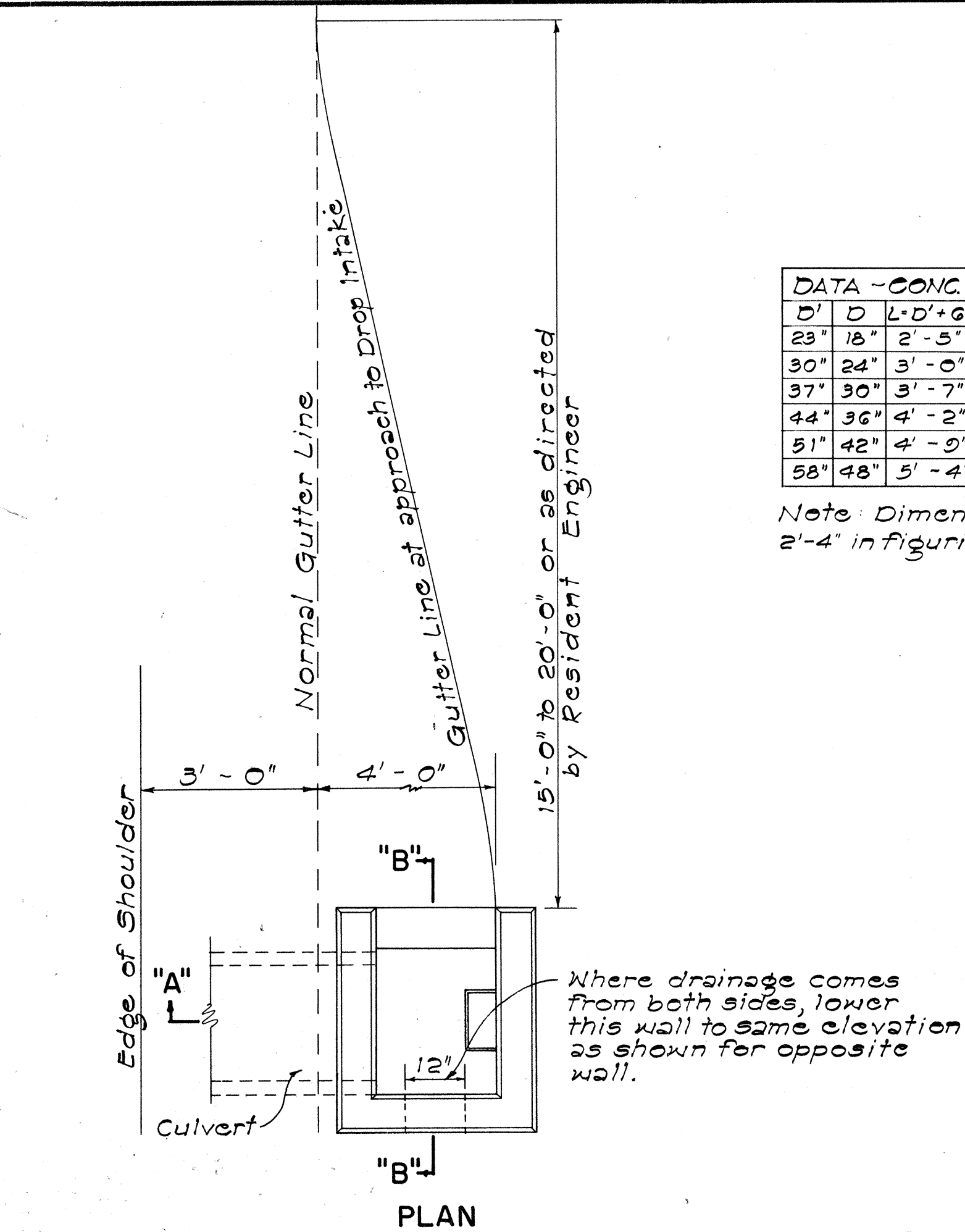


DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	D/2 + T	Z must be from pipe to face of trench
7" for 24" D		Minimum = X
8" for 30" D		
9" for 36" D		
10" for 42" D		
11" for 48" D		
12 for 54" D	Maximum pay quantity will be Z = 12"	

SECT. OF CULVERT WITH CONC. PROTECTION
Scale: 1" = 1'-0"

DATA - CONC. DROP INTAKE					Where Variable Equals	
D	L	D' + G	S	Cu. Yds.	Variable	Equals
23"	18"	2'-5"	8"	1.41	4'	-0"
30"	24"	3'-0"	8"	1.72	5'	-0"
37"	30"	3'-7"	9"	2.32	5'	-6"
44"	36"	4'-2"	9"	2.73	6'	-0"
51"	42"	4'-9"	10"	3.54	6'	-6"
58"	48"	5'-4"	10"	4.01	7'	-0"

Note: Dimension "X" is assumed as 2'-4" in figuring the above quantities.



DETAIL OF CONCRETE DROP INTAKE
Scale: 1/2" = 1'-0"

GENERAL NOTES

- Culvert shall enter and leave Drop Intake from any position and in the direction indicated by the plans or ordered by the Engineer.
- D' shall be the maximum outside dimension of the culvert at the Drop Intake wall.
- Manhole Rungs (16" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (12 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Manhole Rungs may be placed at any location as ordered by the Engineer.

DATE	
DESIGNED BY	
CHECKED BY	
NO.	