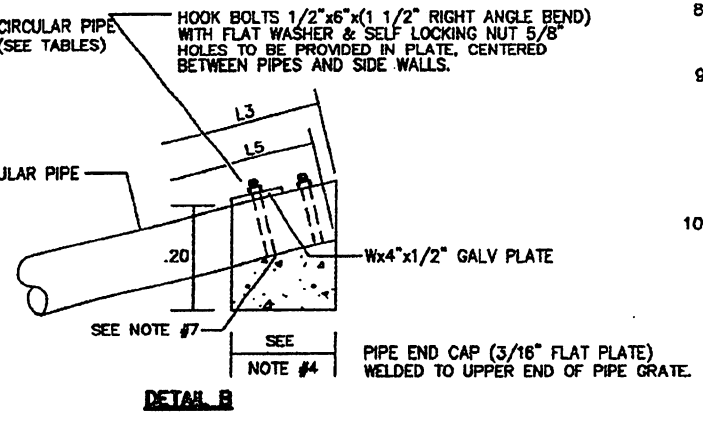
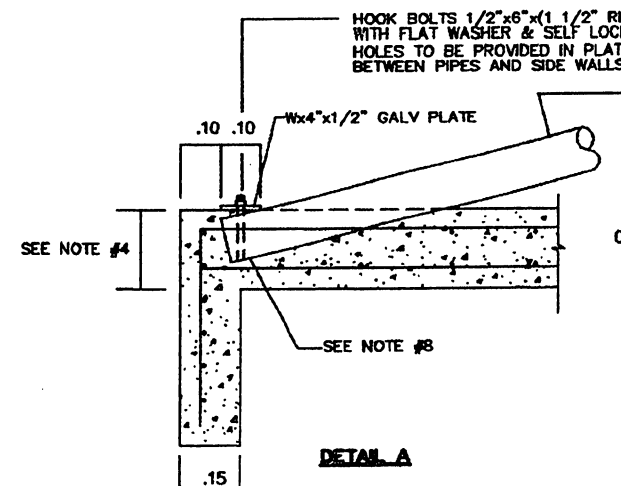
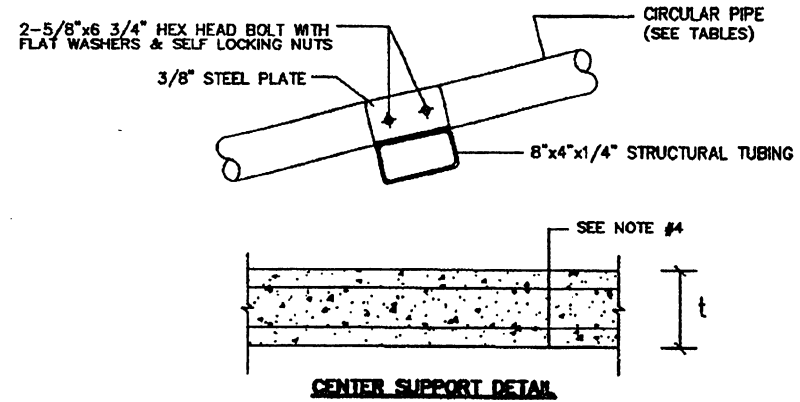
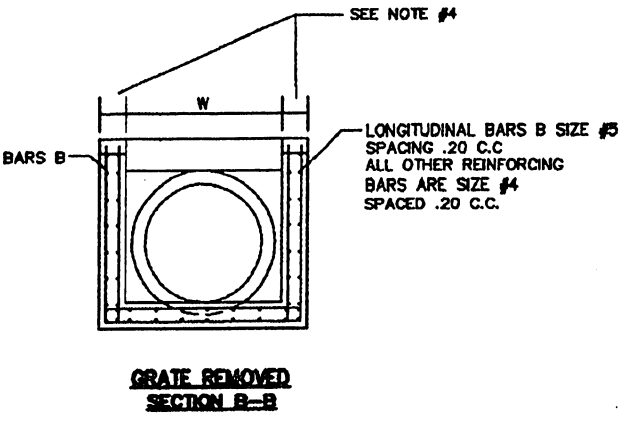
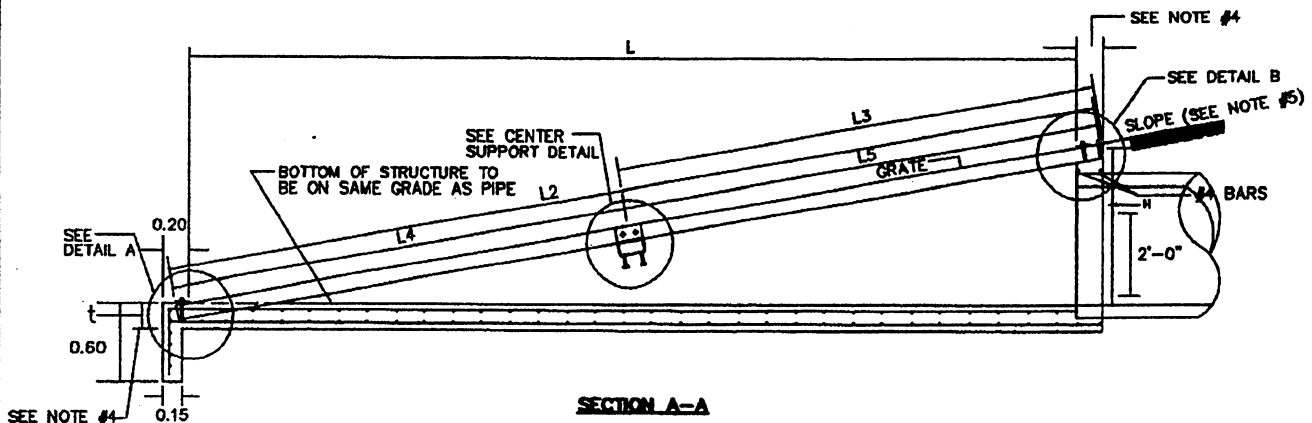


PIPE SIZE	4:1			6:1		
	CONCRETE CUL. MTS	REIN. STEEL	LBS.	CONCRETE CUL. MTS	REIN. STEEL	LBS.
18"	1.59	1.23	425	2.25	1.77	618
24"	2.44	1.90	628	3.55	2.74	917
30"	3.01	2.30	788	4.35	3.37	1157
36"	4.20	3.28	1059	6.01	4.65	1556
42"	8.05	6.29	1369	11.59	8.99	1997
48"	10.29	8.03	1847	14.84	11.60	2514
54"	12.80	9.99	2105	18.47	14.32	3084
60"	14.36	11.22	2391	20.82	16.16	3517

**NOTES:**

1. ALL CONCRETE SHALL BE 5,000 PSI.
2. REINFORCING STEEL SHALL HAVE A MINIMUM .038 COVER.
3. ALL PIPE FOR GRATE, STRUCTURAL TUBING, AND RELATED HARDWARE TO BE GALVANIZED AS PER AASHTO M-111.
4. t = 8" FOR 18" TO 36" PIPES  
t = 12" FOR 42" TO 60" PIPES
5. SLOPE AS SPECIFIED ON TYPICAL SECTIONS.
6. STRUCTURAL TUBING TO BE EXTENDED TO WITHIN 2" OF OUTSIDE FACE OF SIDEWALLS.
7. NOTCHES FOR PIPE TO BE FORMED IN CONCRETE SO THAT PIPE WILL FIT SNUG BUT CAN BE REMOVED.
8. IN SUCH CASES WHEN THE PIPE IS NOT PERPENDICULAR TO THE HEADWALL AND IF SLOPES ARE FLATTER THAN 6:1, THE CONTRACTOR SHALL MODIFY THE DIMENSIONS AS REQUIRED AND SUCH ADJUSTMENTS MUST BE APPROVED BY THE ENGINEER.
9. IF HEADWALL IS PAID AS HEADWALL TYPE C, THEN EXCAVATION, BACKFILL, CONCRETE, REINFORCEMENT STEEL, STEEL FOR GRATE AND INCIDENTALS SHALL BE A SUBSIDIARY OBLIGATION. IF PAID BY CONCRETE AND REINFORCEMENT STEEL, THEN EXCAVATION AND BACKFILL SHALL BE A SUBSIDIARY OBLIGATION AND STEEL NECESSARY FOR THE GRATE AND INCIDENTALS SHALL BE PAID AS REINFORCEMENT STEEL. IF PAID AS PORTLAND CEMENT CONCRETE FOR DRAINAGE STRUCTURES, THEN EXCAVATION, BACKFILL, REINFORCEMENT STEEL AND STEEL NECESSARY FOR GRATE AND INCIDENTALS SHALL BE A SUBSIDIARY OBLIGATION.
10. ALL GRAY CAST IRON PRODUCTS USED IN THE "DR" SERIES OF THE STANDARD DRAWINGS MUST BE FROM APPROVED MANUFACTURERS AND THE APPROVED PRODUCTS IDENTIFIED BY PRODUCT NUMBER OR CATALOG NUMBER LISTED IN THE APPROVED LIST OF MANUFACTURERS AND PRODUCTS CONTAINED IN THE FIRST PAGE OF THE "DR" SERIES.



PIPE SIZE	H	L	W	PIPE GRATE					
				PIPE O.D.	NO. BARS	SPACING	L3	L4	L5
18"	2'-4 1/2"	8'-8"	2'-0"	3 1/2"	1	10'-9 1/2"	NO CENTER REQUIRED		
24"	2'-11"	11'-8"	3'-0"	4"	2	13'-0 1/4"	NO CENTER REQUIRED		
30"	3'-5 1/2"	15'-10"	3'-0"	4"	2	15'-3"	NO CENTER REQUIRED		
36"	4'-0"	18'-0"	4'-0"	4 1/2"	3	17'-8"	NO CENTER REQUIRED		
42"	4'-6 1/2"	18'-2"	4'-0"	4 1/2"	3	19'-8 3/4"	NO CENTER REQUIRED		
48"	5'-1"	20'-4"	5'-0"	4 1/2"	3	22'-2 3/4"	10'-5 1/4"	11'-10 1/2"	10'-4 1/4"
54"	5'-7 1/2"	22'-8"	6'-0"	4 1/2"	4	24'-5 5/8"	12'-8 1/8"	11'-10 1/2"	12'-7 1/8"
60"	6'-2"	24'-8"	6'-0"	4 1/2"	4	28'-8 1/2"	14'-11"	11'-10 1/2"	14'-10"

PIPE SIZE	H	L	W	PIPE GRATE					
				PIPE O.D.	NO. BARS	SPACING	L3	L4	L5
18"	2'-4 1/2"	14'-3"	2'-0"	4"	1	15'-3 1/4"	NO CENTER REQUIRED		
24"	2'-11"	17'-8"	3'-0"	4 1/2"	2	18'-9"	NO CENTER REQUIRED		
30"	3'-5 1/2"	20'-9"	3'-0"	4 1/2"	2	22'-0"	4'-8 1/8"	17'-4 1/2"	4'-7 1/2"
36"	4'-0"	24'-0"	4'-0"	4 1/2"	3	25'-3 1/2"	7'-11 5/8"	17'-4 1/2"	7'-11"
42"	4'-6"	27'-3"	4'-0"	4 1/2"	3	28'-11"	11'-7 1/4"	17'-4 1/2"	11'-8 1/2"
48"	5'-1"	30'-8"	5'-0"	4 1/2"	3	32'-2 5/8"	14'-10 3/4"	17'-4 1/2"	14'-10 1/8"
54"	5'-7 1/2"	33'-9"	6'-0"	4 1/2"	4	35'-8"	18'-2 1/4"	17'-4 1/2"	18'-1 1/2"
60"	6'-2"	37'-0"	6'-0"	4 1/2"	4	38'-9 1/2"	18'-3 1/2"	18'-4 3/4"	18'-4 3/4"

EFFECTIVE DATE: DECEMBER 1998

COMMONWEALTH OF PUERTO RICO  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC WORKS  
HIGHWAY AND TRANSPORTATION AUTHORITY

**DRAINAGE TRANSVERSABLE HEADWALL TYPE C WITH LOAD-CARRYING GRATE**

RECOMMENDED BY: [Signature]  
DESIGN AREA DIRECTOR  
DATE: 12-1-98  
APPROVED BY: [Signature]  
EXECUTIVE DIRECTOR  
DATE: 8-21-98  
APPROVED BY: [Signature]  
DIV. ADM. FHWA-PR DIVISION  
DATE: 12-7-98

DATE	REVISION	BY
10-1988	ADD NOTE 10	I.V.

STD. DWG. DR 22 OF 40