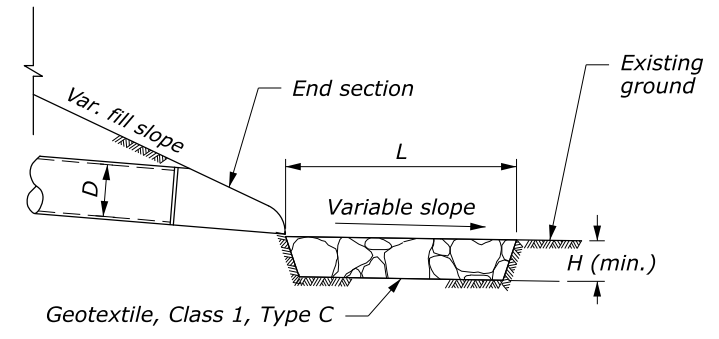
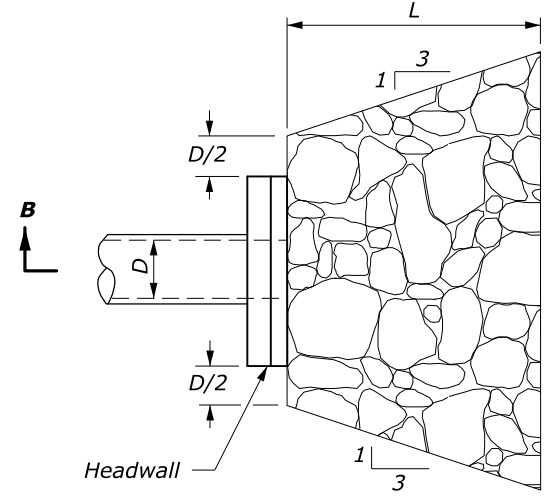


PLAN VIEW

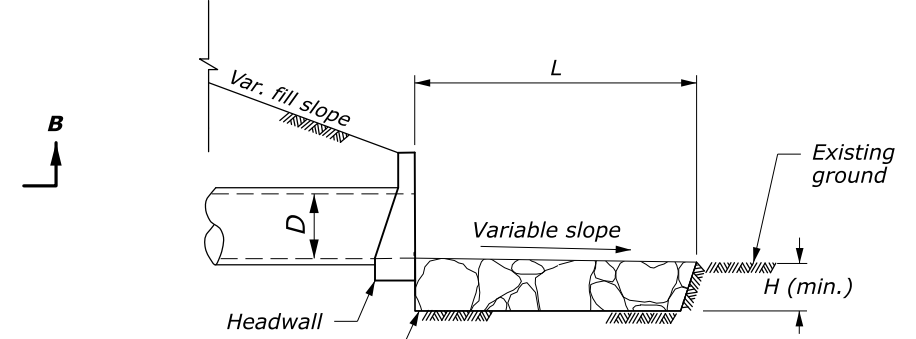


SECTION A-A

CULVERT WITH END SECTION



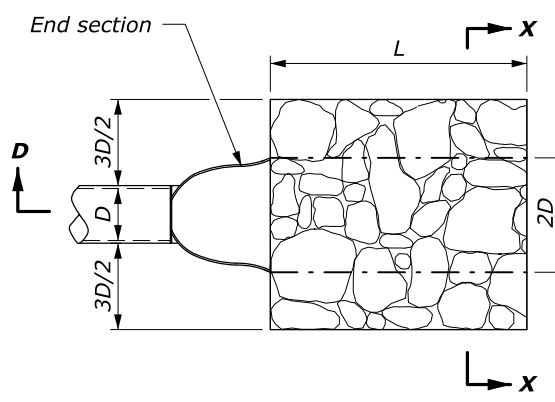
PLAN VIEW



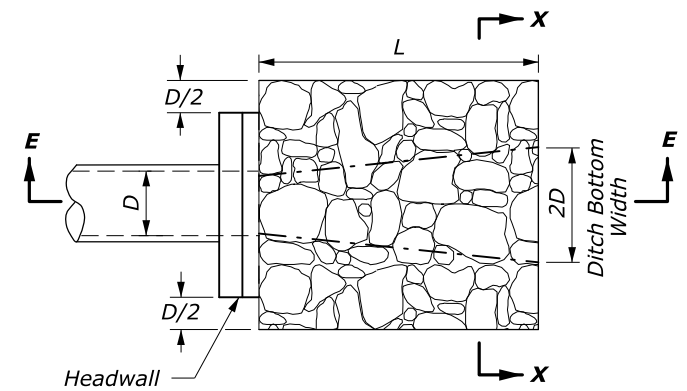
SECTION B-B

CULVERT WITH HEADWALL

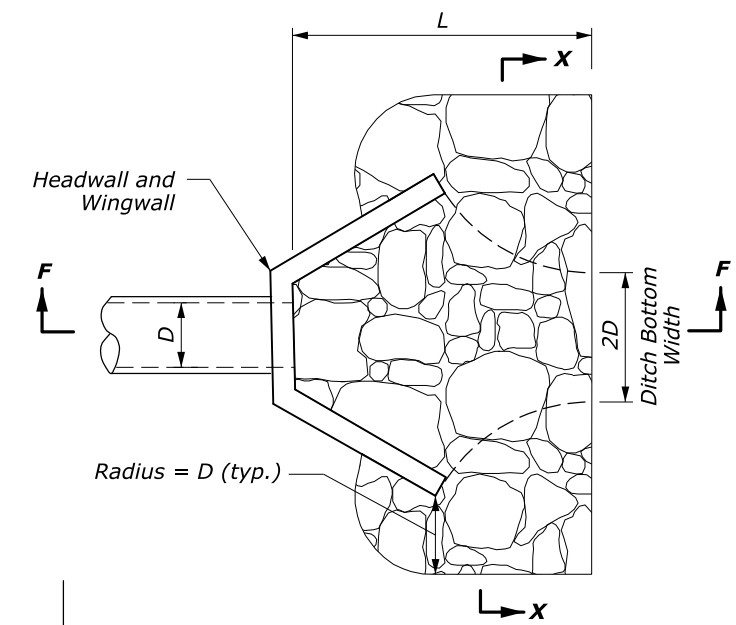
PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH



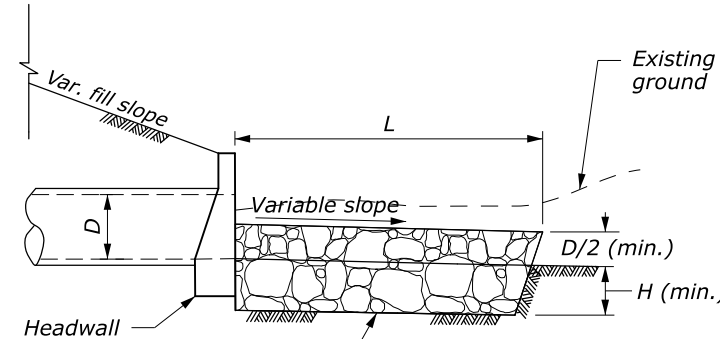
PLAN VIEW



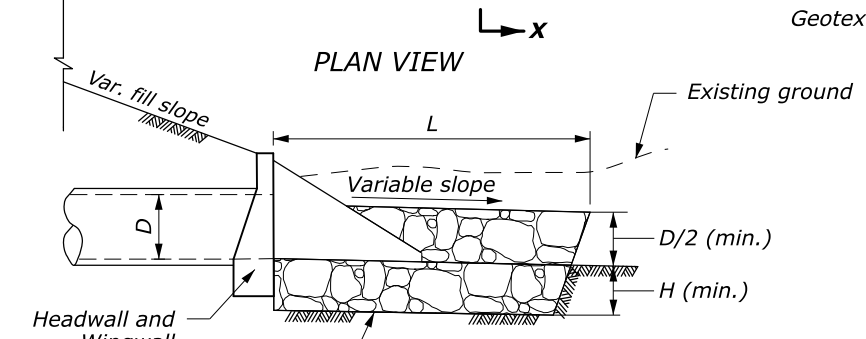
SECTION D-D
CULVERT WITH END SECTION



PLAN VIEW



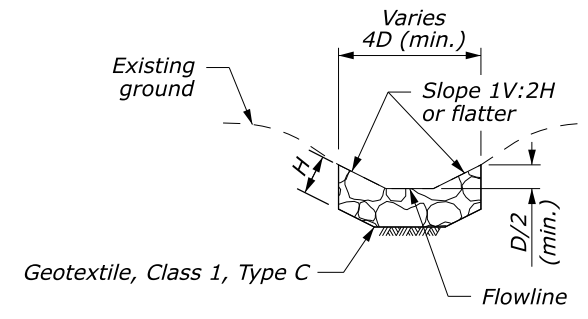
SECTION E-E
CULVERT WITH HEADWALL



SECTION F-F
CULVERT WITH HEADWALL AND WINGWALL

NOTES:

1. Use for aprons serving culverts with slopes of less than 10%.
2. For arch or elliptical pipes, use equivalent diameter for (D) dimension.
3. See Sheet 2 of 2 for dimensions and estimated quantities.



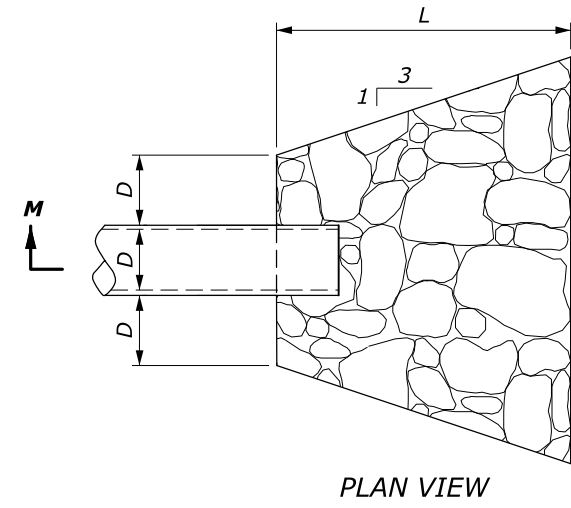
SECTION X-X

PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH

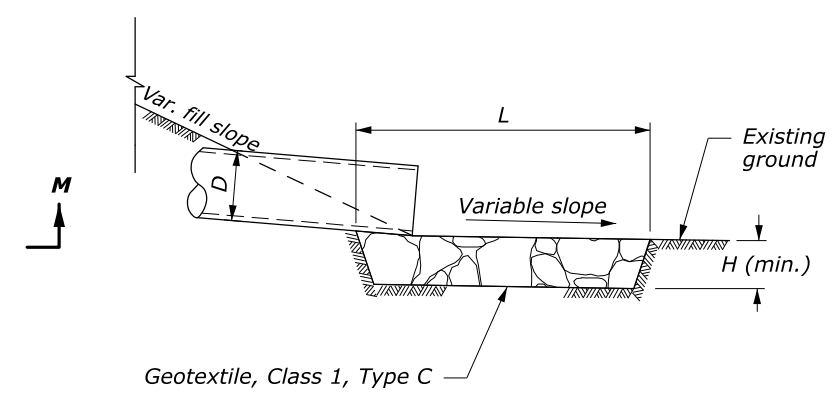
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
EFLHD DETAIL PLACED RIPRAP AT CULVERT OUTLETS Sheet 1 of 2	
DETAIL APPROVED FOR USE APPROVED: MAY 2017 REVISED: OCTOBER 2021	DETAIL E251-01

M:\Standards_and_Details\EFLHD_Detail Drawings\FP-14\1_ ORD_Version\Section-251_Riprap\Updates_Working_Docs\October2021\sr25101_detail-20211012.dgn (Sheet 1 of 2) 13 October 2021 11:56 AM

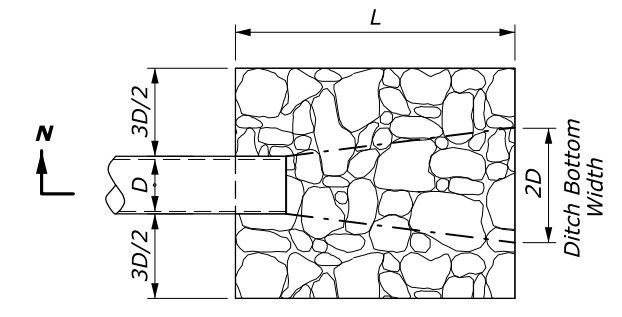


PLAN VIEW

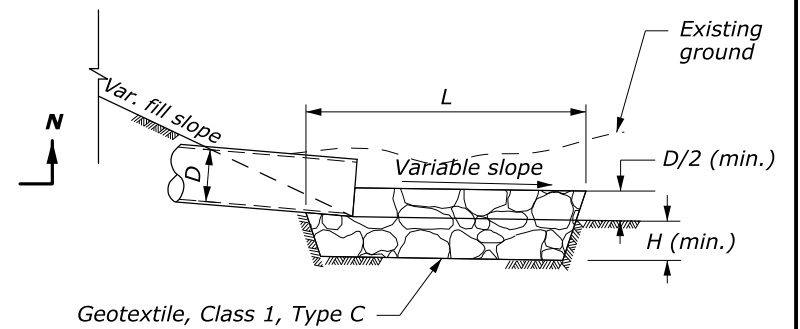


SECTION M-M

CULVERT OUTLET WITHOUT DITCH



PLAN VIEW



SECTION N-N

CULVERT OUTLET WITH DITCH

PROTECTIVE APRON AT CULVERT OUTLET WITH NO END TREATMENT

PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES

	CULVERT SIZE (D) INCHES	RIPRAP CLASS	LENGTH OF APRON (L) LNFT	DEPTH OF APRON (H) LNFT	OUTLET WITHOUT DITCH		OUTLET WITH DITCH	
					ESTIMATED RIPRAP QUANTITY CUYD	ESTIMATED GEOTEXTILE QUANTITY SQYD	ESTIMATED RIPRAP QUANTITY CUYD	ESTIMATED GEOTEXTILE QUANTITY SQYD
WITH END SECTION	12	2	4	1.5	1	5	0.9	4
	18	2	6	1.5	2.2	9	2	8
	24	2	8	1.5	3.9	13	3.6	12
	30	3	12.5	2	10.8	27	9.3	24
	36	3	15	2	15.6	37	13.3	32
	42	4	21	2.5	34	63	27.2	52
WITH HEADWALL	12	2	4	1.5	1.6	6	1.1	5
	18	2	6	1.5	3	10	2	8
	24	2	8	1.5	5.3	16	3.6	12
	30	3	12.5	2	15	32	9.3	24
	36	3	15	2	21.7	43	13.3	32
	42	4	21	2.5	47.6	73	27.2	52
WITH HEADWALL AND WINGWALL	12	2	4	1.5	1.6	6	1.1	6.3
	18	2	6	1.5	3	10	2.5	11.1
	24	2	8	1.5	5.3	16	4.5	17
	30	3	12.5	2	15	32	11.6	32
	36	3	15	2	21.7	43	16.7	42.6
	42	4	21	2.5	47.6	73	34.1	68.4
WITH NO END TREATMENT	12	2	6	1.5	1.7	7	1.3	6
	18	2	8	1.5	3.2	12	2.7	10
	24	2	10	1.5	5.2	17	4.4	15
	30	3	14.5	2	13.2	32	10.7	27
	36	3	17	2	18.5	42	15.1	36
	42	4	23	2.5	38.7	70	29.8	56
	48	4	26	2.5	49.8	86	38.5	70

NOTES:

1. Use for aprons serving culverts with slopes of less than 10%.
2. For arch or elliptical pipes, use equivalent diameter for (D) dimension.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
EFLHD DETAIL PLACED RIPRAP AT CULVERT OUTLETS Sheet 2 of 2	
DETAIL APPROVED FOR USE APPROVED: MAY 2017 REVISED: OCTOBER 2021	DETAIL E251-01