

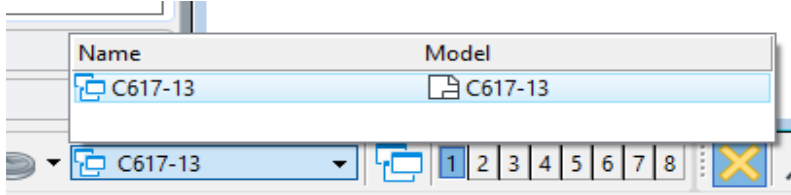
Notes to the Designer

Updated January 2024

Placed Riprap at Culvert Outlets

General Information

- Printing should be done from the **[Sheet]** View model



- **Maximum slope.** Riprap aprons shown in this drawing can be used for culvert outlets with slopes up to 10%. For steeper applications, use alternate protective aprons, such as revet mattresses.

Applicable SCRs

- None

Typical Pay Item Used

- 25101-2200 Placed riprap, method 2, class 2 [CUYD (m3)] and/or
- 25101-2300 Placed riprap, method 2, class 3 [CUYD (m3)] and/or
- 25101-2400 Placed riprap, method 2, class 4 [CUYD (m3)] and/or

- 60201-0?00 [12-inch to 48-inch] pipe culvert [LNFT (m)]
- 60210-0?00 End section for [12-inch to 48-inch] pipe culvert [EACH]

- Geotextile quantity is shown for information only

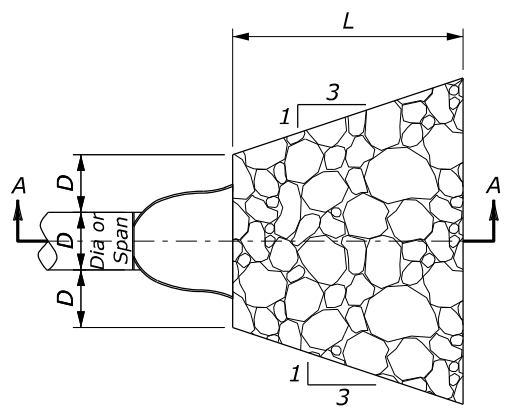
Updates

- **August 2014**
 - Updated for FP-14
- **August 2020**
 - Updated geotextile reference
- **September 2021**
 - Updated for OpenRoads Designer
- **January 2024**
 - Updated border

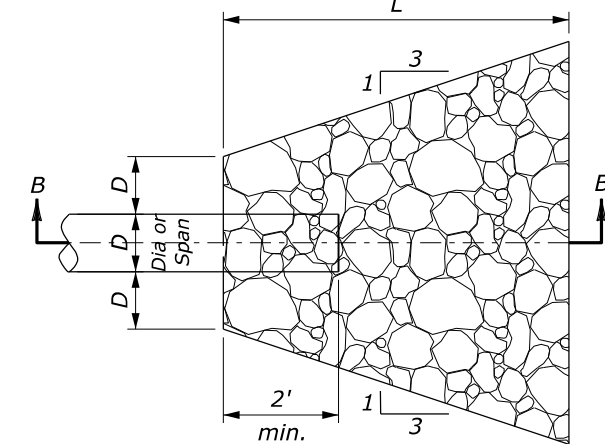
OUTLET WITHOUT DITCH
PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES

	CULVERT SIZE D (inches)	RIPRAP CLASS	LENGTH OF APRON L (feet)	DEPTH OF APRON H (feet)	ESTIMATED RIPRAP QUANTITY (CY)	ESTIMATED GEOTEXTILE QUANTITY (SY)
WITH END SECTION	12	2	4	1.5	1	5
	18	2	6	1.5	2.2	9
	24	2	8	1.5	3.9	14
	30	3	12.5	2	10.9	28
	36	3	16	2	15.6	37
	42	4	21	2.5	34.1	63
WITHOUT END SECTION	12	2	6	1.5	1.7	8
	18	2	8	1.5	3.2	12
	24	2	10	1.5	5.2	17
	30	3	14.5	2	13.3	33
	36	3	17	2	18.5	43
	42	4	23	2.5	38.7	70
48	4	26	2.5	49.8	87	

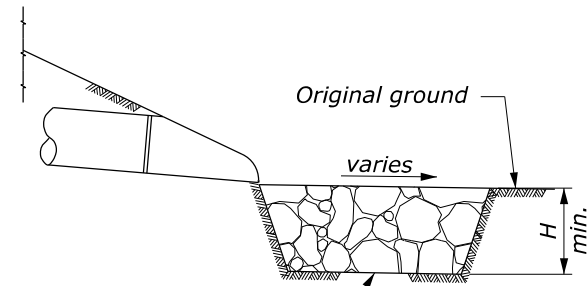
- NOTE:**
1. Use for slopes serving culverts with slopes of less than 10%.
 2. Furnish geotextile filter conforming to Subsection 714.01(a). See summary tables for class and type.
 3. Excavation for placement of riprap will not be measured for payment.



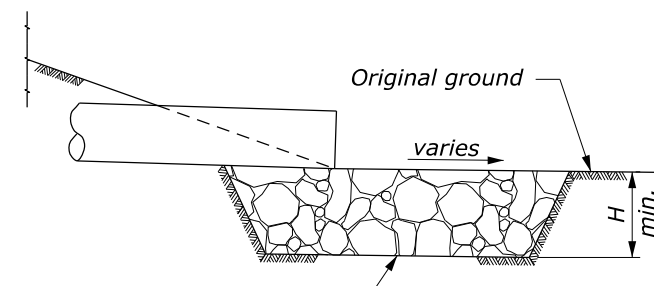
PLAN VIEW
CULVERT WITH STANDARD END SECTION



PLAN VIEW
CULVERT WITHOUT STANDARD END SECTION

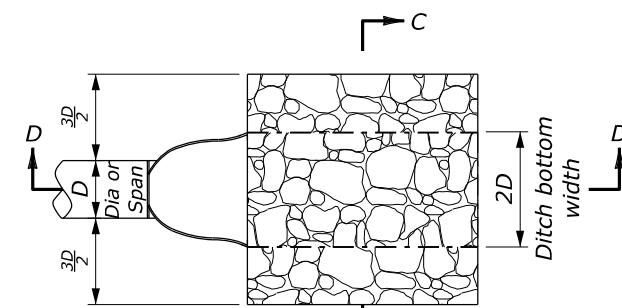


SECTION A-A

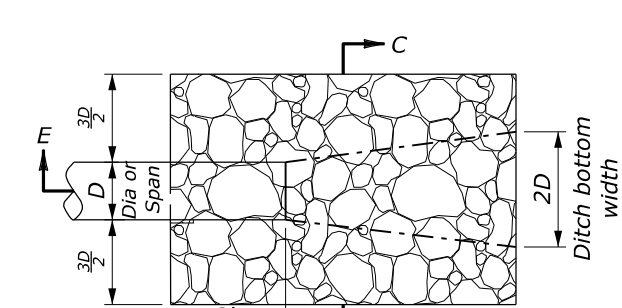


SECTION B-B

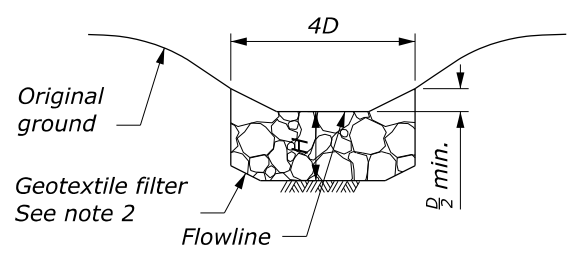
PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH



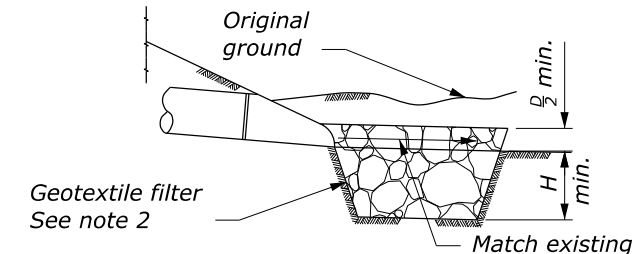
PLAN VIEW
CULVERT WITH STANDARD END SECTION



PLAN VIEW
CULVERT WITHOUT STANDARD END SECTION



SECTION C-C

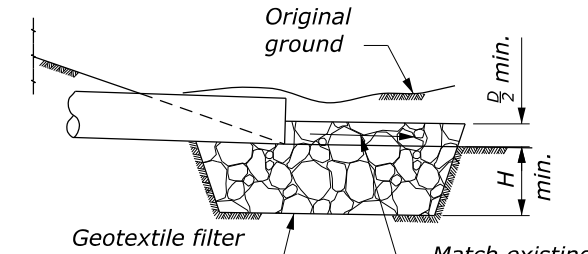


SECTION D-D

PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH

OUTLET WITH DITCH
PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES

	CULVERT SIZE D (inches)	RIPRAP CLASS	LENGTH OF APRON L (feet)	DEPTH OF APRON H (feet)	ESTIMATED RIPRAP QUANTITY (CY)	ESTIMATED GEOTEXTILE QUANTITY (SY)
WITH END SECTION	12	2	4	1.5	0.9	5
	18	2	6	1.5	2	8
	24	2	8	1.5	3.6	13
	30	3	12.5	2	9.3	24
	36	3	16	2	13.4	32
	42	4	21	2.5	27.3	53
WITHOUT END SECTION	12	2	6	1.5	1.4	6
	18	2	8	1.5	2.7	10
	24	2	10	1.5	4.5	15
	30	3	14.5	2	10.8	27
	36	3	17	2	15.2	36
	42	4	23	2.5	29.9	57
48	4	26	2.5	38.6	70	



SECTION E-E

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	CFLHD DETAIL C251-50
PLACED RIPRAP AT CULVERT OUTLETS	SPECIFICATION FP-14 APPROVED FOR USE 06/2024

K:\CADD_Coordinator\ORD Drawings\Details - 10:10 Version\International Seed\C251-50.dgn [Det C251-50] 25 January 2024 10:24 AM