Installation Excavate subgrade below design elevation to allow for thickness of filter and riprap. Install riprap to minimum thickness of 1.5 times maximum stone diameter. Final structure should be to lines and elevations shown in plans.

NOTE: Over-excavation to allow for riprap and filter increases the amount of spoil considerably (reference Practice 6.31, *Riprap-lined Channels*).

Construct apron on zero grade. If there is no well-defined channel, cross section may be level or slightly depressed in the middle (Figure 6.41b). In a well-defined channel, extend riprap and filter to the top of the bank or as shown on plans (Figure 6.41c). Blend riprap smoothly to the surrounding land.

Apron should be straight and properly aligned with the receiving stream. If a curve is necessary to fit site conditions, curve the apron near the upstream end.

Compact any fill used in the subgrade to the density of the surrounding undisturbed material. Subgrade should be smooth enough to protect fabric from tearing.

Install a continuous section of extra-strength filter fabric on smooth, compacted foundation.

Protect filter fabric from tearing while placing riprap with machinery. Repair any damage immediately by removing riprap and installing another section of filter fabric. Upstream section of fabric should overlap downstream section a minimum of 1 ft.

Make sure top of riprap apron is level with receiving stream or slightly below it. Riprap should not restrict the channel or produce an overfall.

Immediately following installation, stabilize all disturbed areas with vegetation as shown in plans.

Figure 6.41b Pipe outlet to flat area with no well-defined channel.

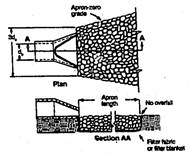
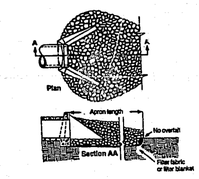


Figure 6.41c Pipe outlet to well-defined channel.



Note: In both figures, the thickness of riprap is as shown in plans (minimum thickness is 1.5 times maximum stone diameter).

LEVEL SPREADER

Level Spreader (not to scale)

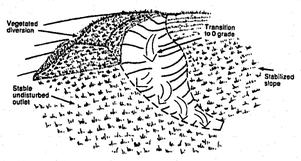


Figure 6.40a Level spreader is designed to disperse small volumes of concentrated flow across stable slopes.

Grade—The grade of the last 20 feet of the diversion channel should provide a smooth transition from channel grade to level at the spreader. The grade of the spreader should be 0%.

Spreader lip—Construct the level lip on undisturbed soil to uniform height and zero grade over the length of the spreader. Protect it with an erosion-resistant material, such as fiberglass matting, to prevent erosion and allow vegetation to become established.

Outlet area—The outlet disposal area must be generally smooth and well-vegetated with a maximum slope of 10%.

Vegetate all disturbed areas.

Construction Specifications

1. The matting should be a minimum of 4 ft wide extending 6 inches over the lip and buried 6 inches deep in a vertical trench on the lower edge. The upper edge should butt against uncut sod and be securely held in place with closely spaced heavy duty wire staples at least 12 inches long.

2. Ensure that the spreader lip is level for uniform spreading of storm runoff.

3. Construct the level spreader on undisturbed soil (not on fill).

4. Construct a 20-ft transition section from the diversion channel to blend smoothly to the width and depth of the spreader.

Cross Section

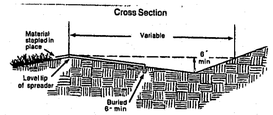


Figure 6.40b Detail of level spreader cross section.

5. Disperse runoff from the spreader across a properly stabilized slope not to exceed 10%. Make sure the slope is sufficiently smooth to keep flow from concentrating.

6. Immediately after its construction, appropriately seed and mulch the entire disturbed area of the spreader.

Maintenance Inspect level spreaders after every rainfall until vegetation is established, and promptly make needed repairs. After the area has been stabilized, make periodic inspections and keep vegetation in a healthy, vigorous condition.

Table 6.40a Minimum Dimensions for Level Spreader

Design Flow cfs	Entrance Width	Depth	End Width	Length
	——minimum dimension in feet——			
0-10	10	0.5	3	10
10-20	15	0.5	3	20
20-30	24	0.7	3	30

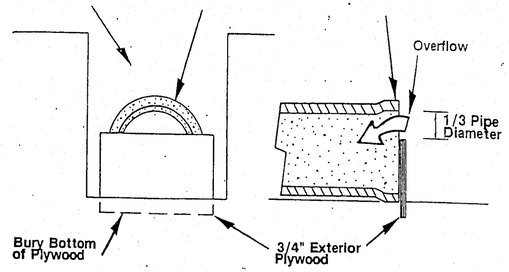


Figure 1: Illustration of Plywood Inlet Protection for Storm Drain Under Construction.

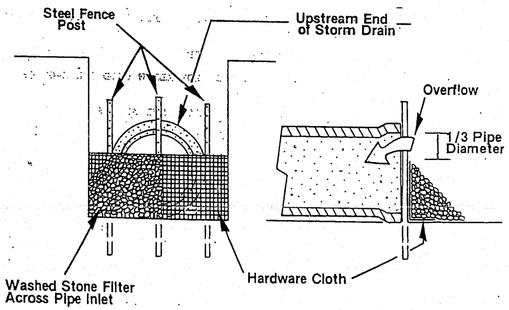


Figure 2: Illustration of Stone Filter Inlet Protection for Storm Drain Under Construction.

Drop Inlet Protection (Temporary)

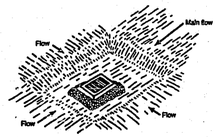
Excavated Installation Clear area of all debris. Remove and stockpile or spread soil so that it will not block flow or wash back into the excavation.

Excavate basin to the depth, side slopes, and dimensions shown in plans.

Shape basin to fit site conditions with longest dimension oriented toward the largest inflow (Figure 6.50b).

NOTE: This practice may be used to improve the effectiveness and reliability of other sediment traps and barriers such as fabric, or block and gravel inlet protection.

Figure 6.50b Perspective of excavated drop inlet protection.



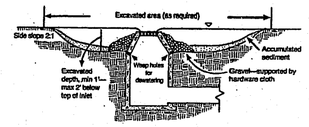


Figure 6.50c Cross section of excavated drop inlet protection.

Install weep holes in drop inlet to drain pool slowly. Cover holes with wire screen (hardware cloth) and gravel to hold sediment in place (Figure 6.50c). Gravel to be 1/2- to 3/4-inch washed aggregate (NCDOT #57 or #5), 1 ft thick, minimum.

Excavate minimum depth 1 ft and the maximum depth at 2 ft as measured from the crest of the inlet structure.

Maintain side slopes around the excavation no steeper than 2:1.

When necessary, spoil may be placed to form a dike on the downslope side of the excavation to prevent bypass flow.

Stabilize all disturbed areas, except the excavated pool bottom, in accordance with vegetation plan.

Fabric Drop Inlet Protection

Installation Set top of fabric at least 6 inches below downslope ground elevation to prevent runoff from bypassing the inlet. If necessary, build a temporary dike on the low side of the inlet. Dike should be compacted to 6 inches higher than fabric (Figure 6.51b).

Cut fabric from a single roll to eliminate joints.

Space support posts evenly against the perimeter of the inlet a maximum distance of 3 ft apart. Drive them securely into the ground approximately 18 inches. Overflow must fall directly into the inlet and not on unprotected soil.

Build a supporting frame of 2 x 4-inch lumber as shown in Figure 6.51c, maximum height 1.5 ft above the drop inlet crest. The frame adds stability and serves as a weir to control storm overflow into the drop inlet.

Alternatively, use wire fence (14 gauge minimum, with a maximum mesh spacing of 6 inches) to support fabric. Stretch fence with top level to provide uniform overflow. Extend wire 6 inches below ground.

Place bottom 12 inches of fabric in trench adjacent to the drop inlet.

Backfill and compact with roll or crushed stone.

Fasten fabric securely to the posts and frame or support fence, if used. Overlap joints to the next post.

A combination of excavated sediment pool and a low fabric height prevents bypass flow and provides sediment storage capacity.

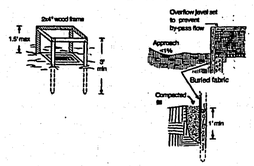


Figure 6.51c Recommended installation of fabric with supporting frame around stormwater inlet.

Temporary Diversions

■ **Stabilization:** ridge must be stabilized with vegetation if in place longer than 30 working days. Channel must be stable for design flow.

Installation

Site Preparation Mark diversion location and remove trees, brush, stumps, and other objectionable material.

Set grade and alignment to fit site needs and topography. Maintain constant or gradually increasing grade. Realign or elevate ridge as needed to avoid reverse grade. Deviation from the plan may require prior approval.

Construction Construct diversion to dimensions and grades shown in plan (Figure 6.20b).

Build ridge higher than design and compact with wheels of construction equipment. Compacted ridge must be at or above design grade at all points. Channel must be constructed on design grade.

Leave sufficient area along diversion to permit cleanout and regrading.

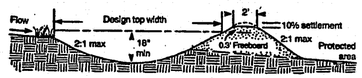


Figure 6.20b Temporary diversion cross section.

Outlets Stabilize outlets during installation of diversion.

Where temporary diversions are constructed above steep slopes, install temporary slope drains for outlets (reference Practice 6.32, *Temporary Slope Drains*).

Flow containing sediment must be diverted to a sediment trap.

Stabilization Vegetate ridge immediately after construction unless diversion will be in place less than 30 working days.

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 272 RICHARD ALAN PATON SEAL
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