

Targeted Constituents

● Significant Benefit		◐ Partial Benefit		○ Low or Unknown Benefit	
● Sediment	○ Heavy Metals	◐ Floatable Materials	○ Oxygen Demanding Substances		
○ Nutrients	○ Toxic Materials	○ Oil & Grease	○ Bacteria & Viruses	◐ Construction Wastes	

Description

Temporary inlet protection is necessary to prevent sediment from entering and clogging the storm drainage system. Inlet protection can be installed at grate inlets, curb inlets, culverts or other drainage features by using a means of filtration through which stormwater runoff must pass. This practice will significantly reduce sediment and will help control floatable waste materials and other construction wastes.

Suitable Applications

- Every storm drain inlet, catch basin, curb inlet, culvert or similar drainage structure that receives sediment-laden runoff must be protected by a combination of upstream erosion control and temporary inlet protection as needed.
- Where disturbed tributary areas have not yet been permanently stabilized, and where ponding water will not endanger highways, street traffic, houses or other buildings, parks, or other facilities.
- Small drainage areas, typically less than 0.5 acres, which have impervious surfaces that do not permit the construction of a sediment trap or sediment basin.

Approach

Temporary inlet protection can be accomplished by either using premanufactured proprietary devices or by constructing a device on site. Self constructed devices generally consists of a means of filtering (geotextile fabric, aggregate, straw bale) which is securely anchored and supported against the weight of ponded water by some type of support (wood posts, concrete blocks, wire mesh, the inlet structure itself). This can be accomplished in many different ways; the following details are included in this BMP and may be modified to meet site requirements.

Figure ES-24-1	Silt Fence	(also see ES-14, Silt Fence)
Figure ES-24-2	Straw Bale Barrier	(also see ES-15, Straw Bale Barrier)
Figure ES-24-3	Block and Gravel	(with filter fabric and gravel)
Figure ES-24-4	Sandbag Barrier	(also see ES-16, Sandbag Barrier)
Figure ES-24-5	Wire Mesh and Gravel	(also see ES-17 for rock filter berm)
Figure ES-24-6	Excavated Impoundment	(with wire mesh and gravel)
Figure ES-24-7	Proprietary device	(filter bag)
Figure ES-24-8	Proprietary device	(curb inlet protection)

Temporary inlet protection is appropriate for small areas of less than 1 acre, generally flat with less than 5% slope. Temporary inlet protection for paved or impervious areas should generally have smaller areas of less than half an acre. Inlet protection structures which pond water onto streets, parking lots or driveways should be designed to have

some method for allowing excess water from large storms to bypass or overflow. The means of filtering (which is generally clean aggregate or filter fabric) should be inspected regularly to see if sediments and silt are clogging the material. Replace clogged aggregate with new clean aggregate regularly. Clean, repair or replace filter fabric regularly to ensure adequate functioning. Usually straw bale barriers are not an effective means of capturing large amounts of sediment. Straw bales decompose rapidly and develop holes and cracks from routine stormwater flows, so that they must be maintained much more frequently than other types of temporary inlet protection.

Stormwater runoff may bypass protected inlets on slopes. A berm or other type of wall can be used to capture some of the flow. Inlets which are downstream, particularly sump inlets, should be designed with an overflow as a means for handling large storms.

BMP selection is site specific. Care should be taken in deciding which BMP will work most effectively in each situation. A BMP that works effectively in one situation may not be appropriate in another.

Installation***Silt Fence***

Place wooden stakes (minimum size 2" x 2", but typically built with 2" x 4" posts) around the perimeter of the inlet driven approximately 18" into the ground. Maximum spacing is typically 3 feet apart for unreinforced silt fence, and stakes are typically 42 inches long. Excavate a trench approximately 6 inches wide and 6 inches deep around the outside perimeter of the stakes. Place edge of filter fabric (typically in rolls of 30" or 36" width) in the bottom of trench. Attach filter fabric to wooden stakes and to the wood support rails, typically using heavy-duty wire staples (1" length) or nails with a large diameter head. Backfill trench with compacted soil all the way around. Drive additional stakes through trench as needed to further stabilize silt fence.

Straw Bale Barrier

Excavate a trench at least 4 inches deep around the outside perimeter of the storm drainage inlet. Tightly place straw bales into trench to form an effective barrier to sediment. Drive two stakes per straw bale at an angle, so that the straw bale is forced closer to the previously installed straw bales. Fill any holes or cracks with chinked straw. Backfill trench with compacted soil all the way around.

Block and Gravel

Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward and not upward. Ends of adjacent blocks should abut. The height of barrier can be varied by stacking combinations of blocks that are typically 6 or 8 inches high. Blocks which are stacked should be anchored against movement. Place geotextile filter fabric over the outside vertical face of the concrete blocks. If more than one strip is necessary, overlap the strips by at least 1 foot. Place clean stone against the geotextile filter fabric up to the top of the concrete blocks. Use ½" to ¾" gravel is selected, although other sizes of gravel will perform adequately to protect and weight filter fabric.

Sandbag Barrier

In general, sandbags are appropriate for gently sloping streets where ponded water will not endanger the public or cause property damage. Use sandbags made of geotextile fabric (not burlap) and fill with uniform material such as ½" rock or ¼" pea gravel.

Place one or two layers of overlapping sandbags, and pack them tightly together. A gap

of one sandbag on the top row can serve as an overflow spillway from unexpected large storms. Install geotextile filter fabric and aggregate to filter sediment from stormwater. Small pipes (2" diameter or smaller) can be placed through the sandbag barrier if covered by filter fabric. Verify that sandbag barrier is sturdy and adequate to contain ponded water.

Wire Mesh and Gravel

Place hardware cloth or wire mesh over the inlet so that the wire extends a minimum of 1 foot beyond each side of inlet structure. Use hardware cloth or comparable wire mesh with openings from ¼" to ½" size. If more than one strip of mesh is necessary, overlap the strips. As an option, place filter fabric over wire mesh to ensure that sediment and loose fines do not enter the protected inlet. Place clean gravel which is ½" to ¾" size over the wire mesh. The depth of the gravel should be at least 12 inches over the entire inlet opening and extend at least 18 inches beyond the inlet opening in every direction.

Excavated Impoundment

An excavated impoundment can be used in areas where a manhole or inlet has been installed in the ground but possibly has not yet been backfilled. It can function as a sediment trap with a storage capacity of 67 cubic yards per acre of tributary area. Small holes can be drilled into the inlet structure and then later grouted when the temporary inlet protection is no longer needed. Filtering is accomplished by the appropriate size of clean gravel, geotextile filter fabric, or other means.

Proprietary Devices

Pre-manufactured devices are compatible with most styles of catch basins. It is important to follow the manufacturer's installation instructions so the device will operate effectively. Proprietary devices such as Gutter Gator, Gutter Buddy, FiltR Fence, Suntree Curb Inlet Protector, etc... are used on curb inlets and cause sediment to be filtered or settled out of suspension before the water enters the storm drain. Devices such as StormSok, Curb Sack, FLeXstorm, Siltsack, etc... work with grated inlets and consist of a sack within the storm drain that collects sediment from the stormwater. With all these devices, regular inspection, maintenance and cleaning are required to keep the device functioning properly and to prevent flooding.

Maintenance

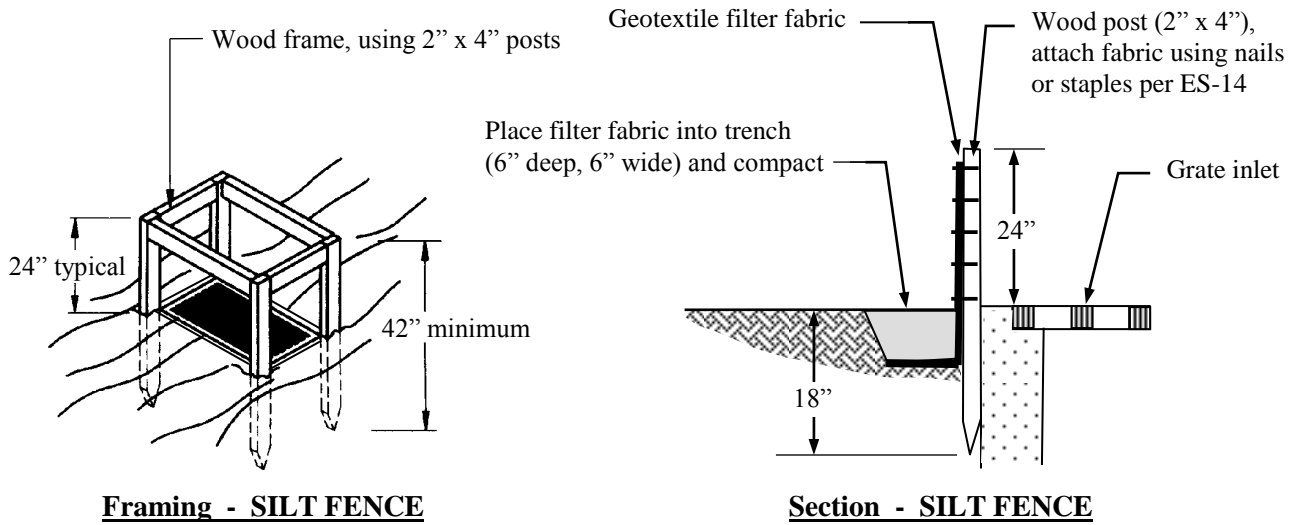
- Inspect all inlet protection devices at least twice weekly (72 hours or more between each inspection) and after every significant rainfall event (1/2" or more rainfall). During extended rainfall events, inspect inlet protection devices at least once every 24 hours. Replace clogged aggregate or filter fabric immediately. Look for damage caused by large flows. Inspect downstream inlets, pipes, and other infrastructure downstream after severe storms to check for bypassed material.
- Remove sediment from temporary inlet protection methods when sediment reaches 2 or 3 inches deep. More frequent sediment removal is required from paved areas such as streets or parking lots.
- Remove all inlet protection devices within thirty days after the site is stabilized, or when the inlet protection is no longer needed. Bring the disturbed area to final grade and appropriately stabilize all bare areas around the inlet with vegetation. Clean storm drainage system of sediment and debris prior to final inspection.

Limitations

Some forms of temporary inlet protection may encroach onto access roads, streets, parking lots, driveways or highway traffic; modify designs to allow for emergency overflow or bypass for large storms which may endanger traffic or cause property

damage. Sediment removal may be ineffective in high-flow conditions or if stormwater runoff contains large amounts of sediment. For drainage areas larger than half an acre, stormwater runoff should be routed to a sediment trap or sediment basin designed for larger flows.

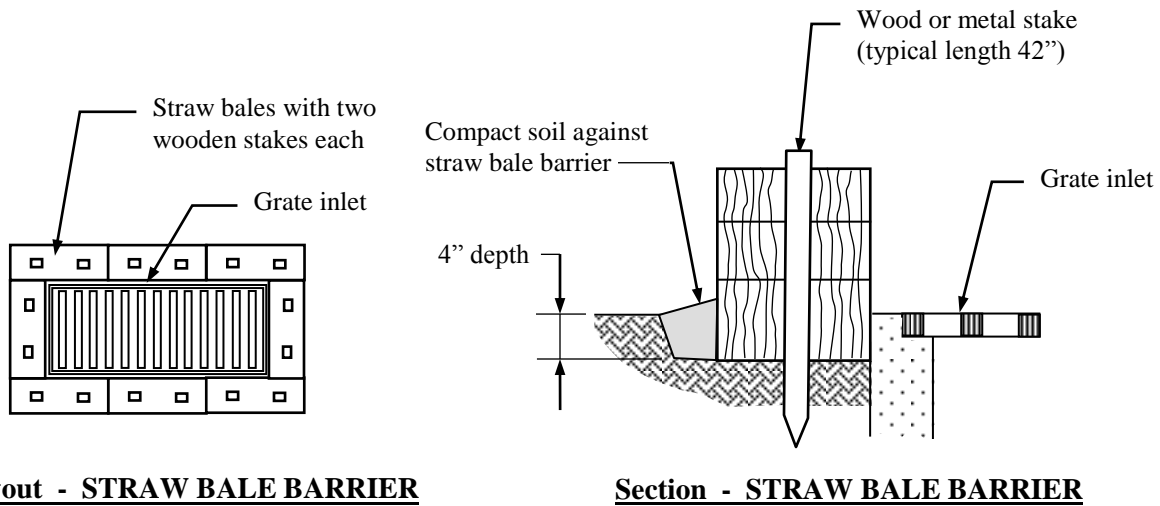
References **8, 25, 30, 33, 34, 35, 43, 54, 135, 136, 141, 144, 162, 167, 179**
(see BMP Manual Chapter 10 for list)



**Figure ES-24-1
Inlet Protection – Silt Fence**

Notes:

1. See ES-14, Silt Fence, for materials and specifications of silt fence.
2. See ES-15, Straw Bale Barrier, for materials and specifications of straw bale barriers. Straw bale barriers are not effective for silt and clay sediments.

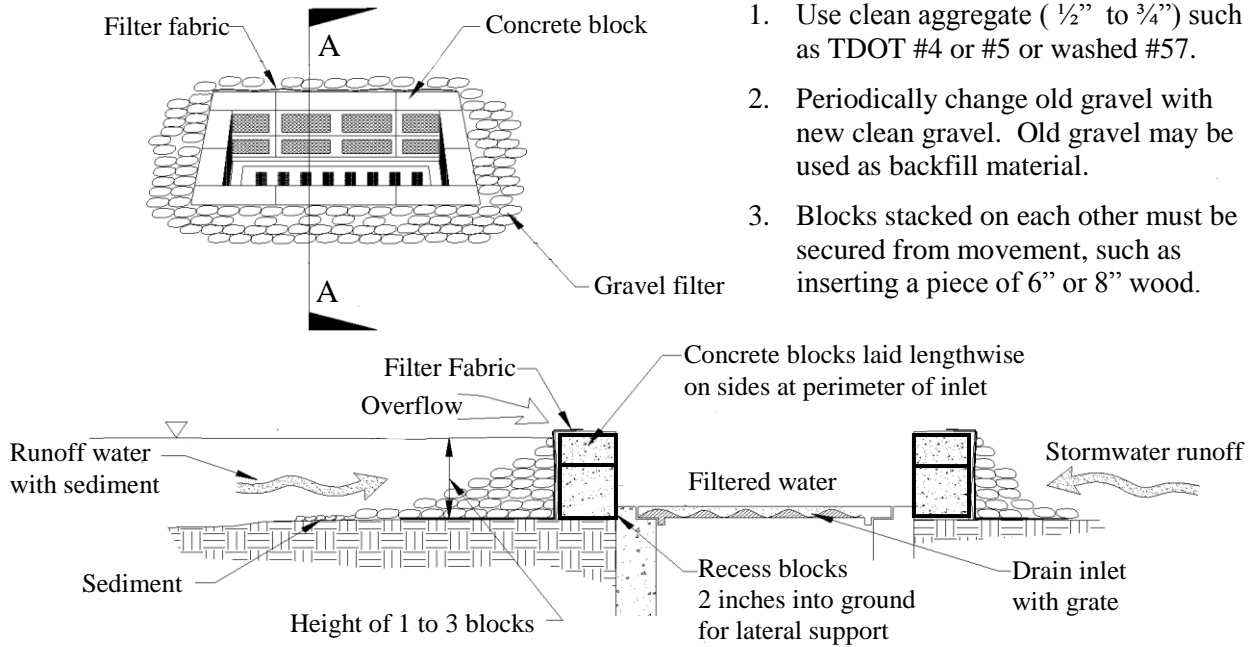


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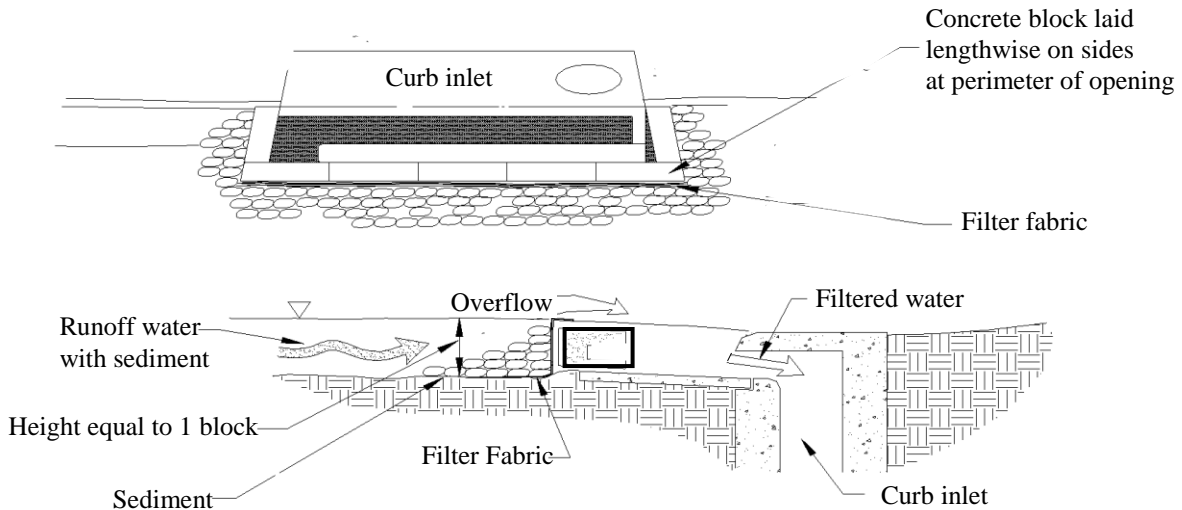
**Figure ES-24-2
Inlet Protection – Straw Bale Barrier**

Notes:

1. Use clean aggregate (1/2" to 3/4") such as TDOT #4 or #5 or washed #57.
2. Periodically change old gravel with new clean gravel. Old gravel may be used as backfill material.
3. Blocks stacked on each other must be secured from movement, such as inserting a piece of 6" or 8" wood.



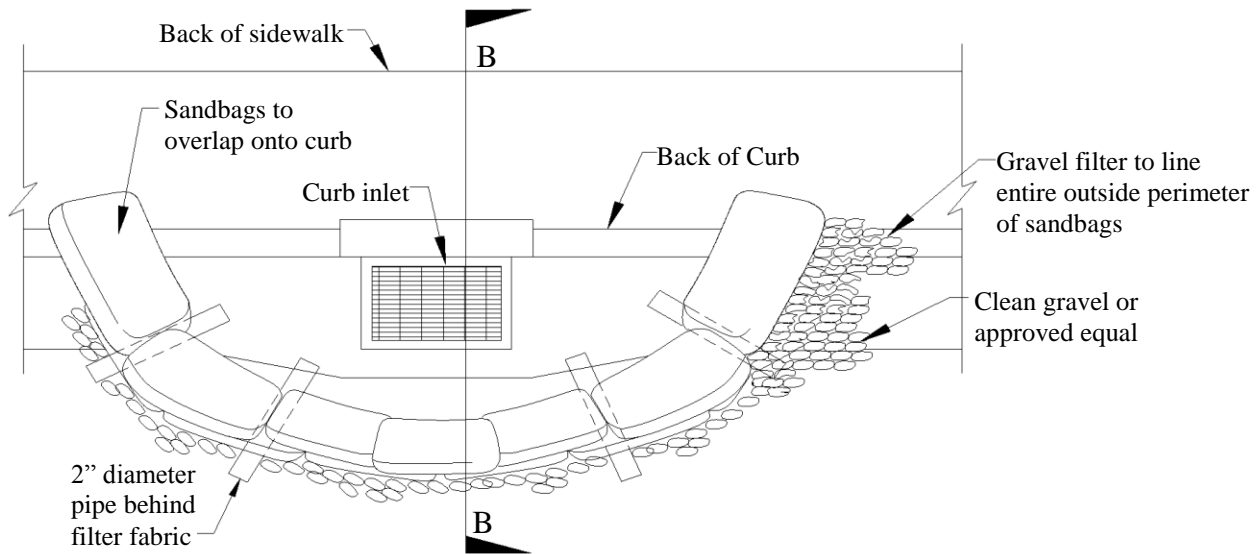
INLET WITHOUT CURB



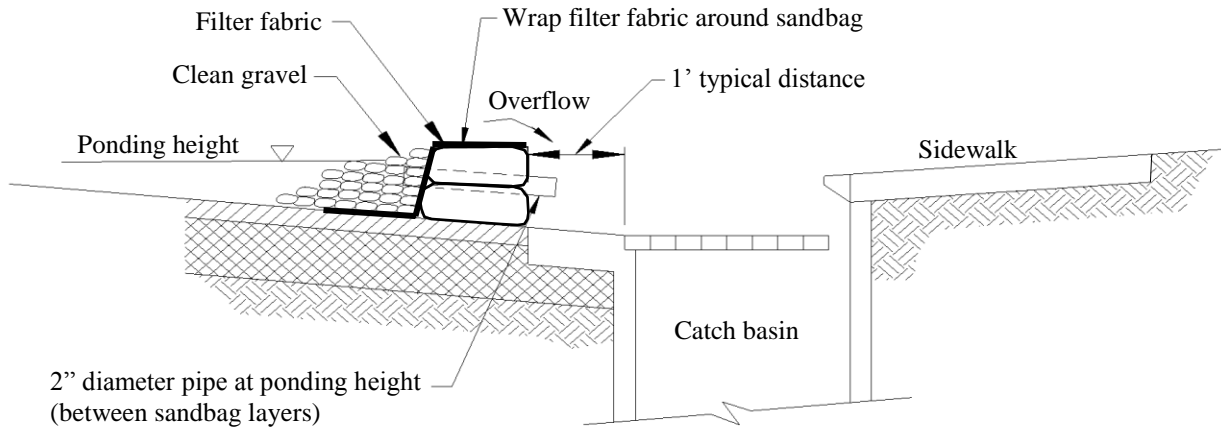
INLET WITH CURB

NOT TO SCALE

**Figure ES-24-3
Inlet Protection - Block and Gravel**



INLET AT TYPICAL PAVED AREAS



SECTION B-B

Notes:

1. See ES-16, Sandbag Barrier, for more information on sandbag materials and specifications.
2. Use clean aggregate (1/2" to 3/4") such as TDOT #4 or #5 or washed #57.
3. Periodically replace old gravel with new clean gravel. Old gravel may be used as backfill material.
4. Use geotextile filter fabric for stormwater with high content of silt and clay (as shown in Section B-B).

NOT TO SCALE

**Figure ES-24-4
Inlet Protection - Sandbag Barrier**

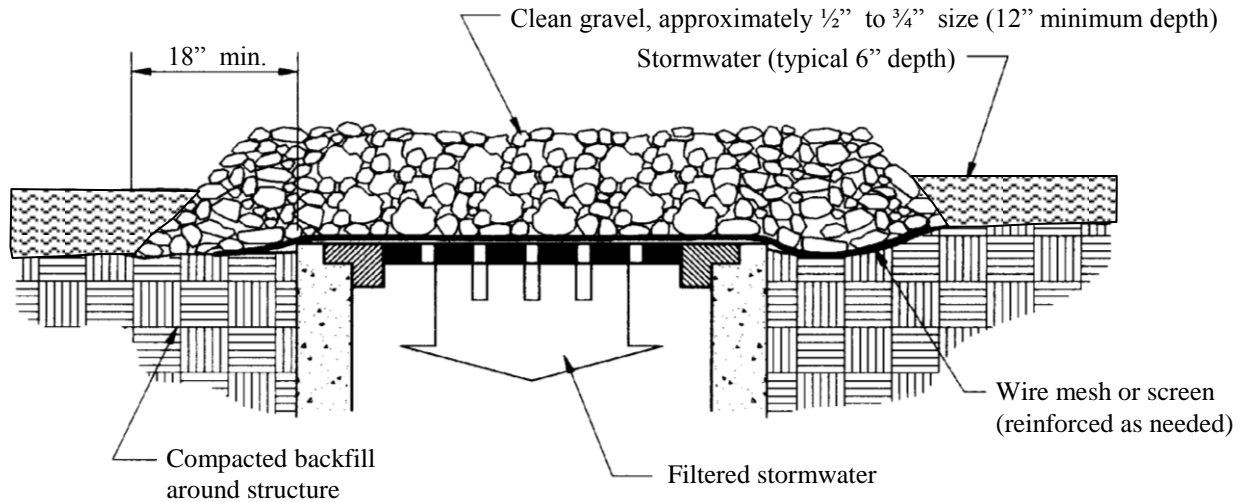
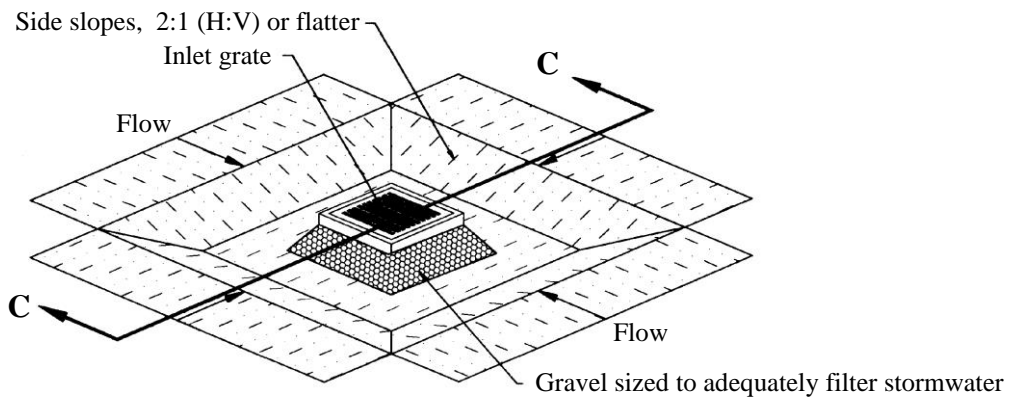
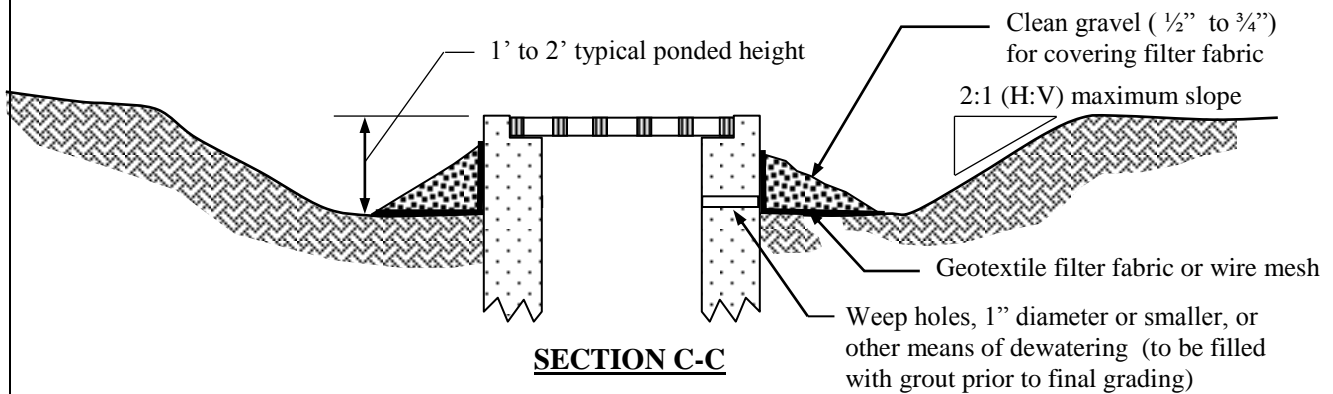


Figure ES-24-5
Inlet Protection - Wire Mesh and Gravel

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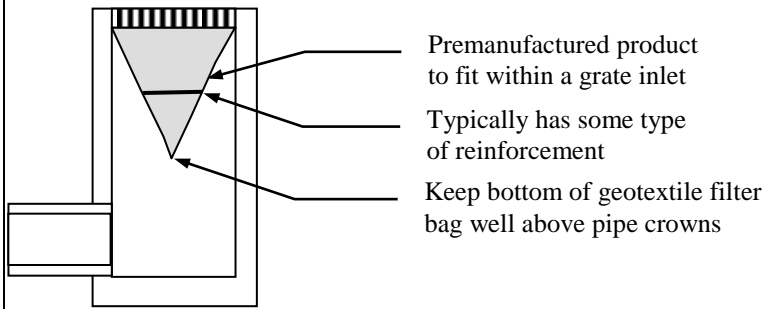


ISOMETRIC PLAN VIEW



SECTION C-C

Figure ES-24-6
Inlet Protection - Excavated Impoundment

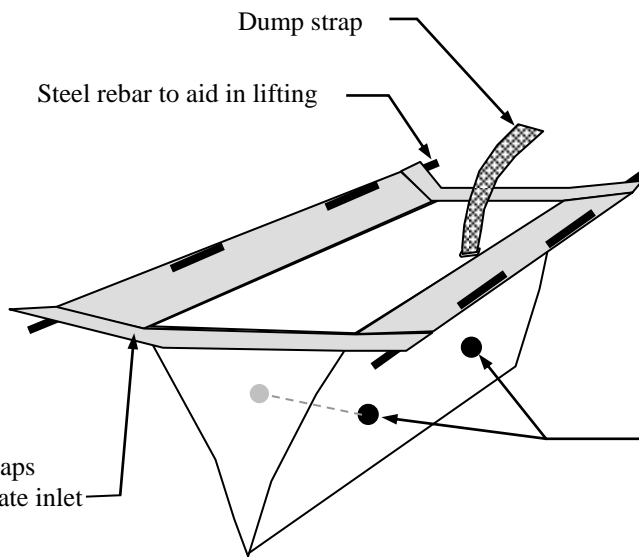


Premanufactured product to fit within a grate inlet
 Typically has some type of reinforcement
 Keep bottom of geotextile filter bag well above pipe crowns

PROFILE VIEW

Notes:

1. Install and maintain geotextile filter bag in accordance with manufacturer's recommendations. Product shown is the SiltSack® Sediment Control Device made by ACF Environmental.
2. Regular SiltSack® has a grab tensile strength of 300 lbs and puncture strength of 120 lbs. Fabric is woven polypropylene with double stitch.
3. Inspect geotextile filter bag after each rainfall event. Remove sediment as recommended by manufacturer.
4. Regular SiltSack® has a flow rate of 40 gpm per square foot of clean geotextile material. The flow rate will be much lower when filled with sediment.



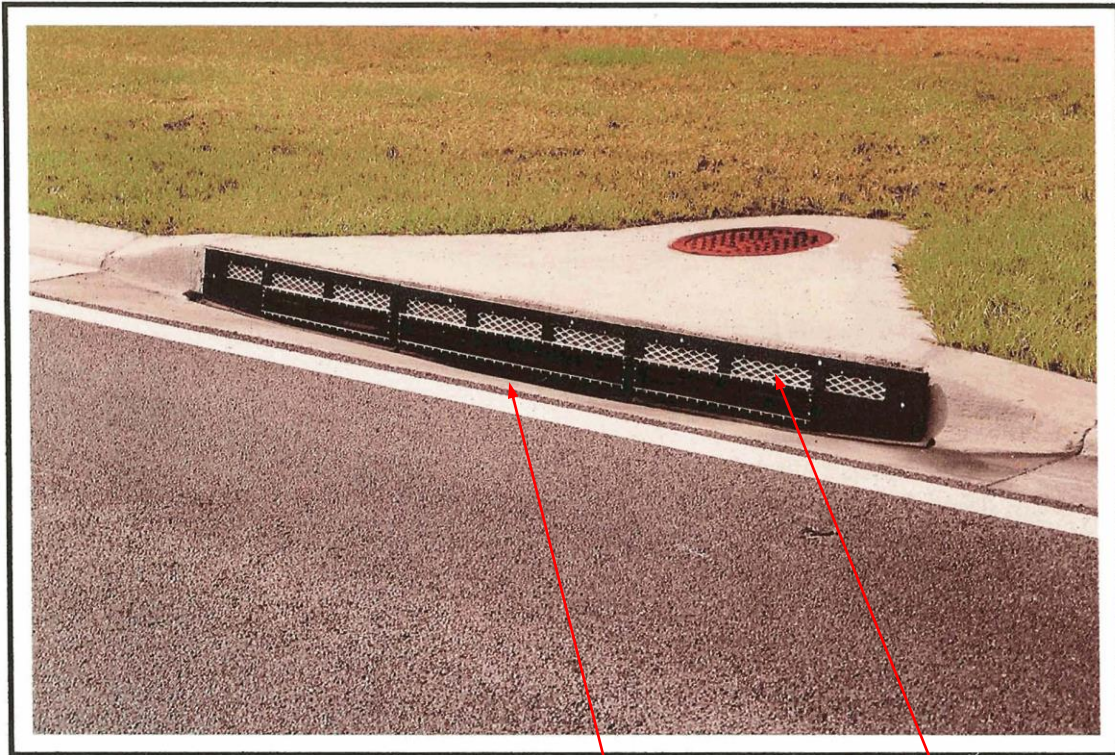
NOT TO SCALE

Position the flaps underneath grate inlet

Expansion restraints
 (1/4" nylon rope with washers)

ISOMETRIC PLAN VIEW

**Figure ES-24-7
 Inlet Protection – Proprietary Device (Filter Bag)**



Notes:

1. Install and maintain inlet protection in accordance with manufacturer’s recommendations. Product shown is the Curb Inlet Protector made by Suntree Technologies Inc.
2. Runoff passes through a filter screen to remove sediment. During high-flow events, excess water will bypass through a trash-screen.
3. Inspect after every significant rainfall event. Remove accumulated sediment to prevent flooding of the street or adjacent property.

Filter screen

Bypass with trash screen

**Figure ES-24-8
Inlet Protection – Proprietary Device (curb inlet protection)**