

## 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 could significantly reduce sediment, floatable waste materials and other construction wastes.

## Selection Criteria

Any 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. Inlet protection is also needed where disturbed areas have not yet been permanently stabilized.

Temporary inlet protection generally consists of a means of filtering (geotextile fabric, aggregate, socks) which is securely anchored and supported against the weight of ponded water by some type of support (wood posts, wire mesh, etc.). This can be accomplished in many different ways; the following details are included in this BMP and may be modified to meet site requirements.

- Block and gravel (with filter fabric and gravel)
- Sandbag Barrier
- Wire Mesh and Gravel (with rock filter berm)
- Excavated Impoundment (with wire mesh and fabric)
- Geotextile filter bag (premanufactured geotextile product)

For safety reasons, 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 filtering media used should be inspected regularly to see if sediments and silt are clogging the media. Clean, repair, or replace any clogged media regularly. Repair or replace silt fence fabric regularly to ensure adequate functioning. 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. Downstream inlets, particularly sump inlets, should be designed with an overflow as a means for handling large storms events.

## Design Considerations

### **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. See Figure 1 below.

### **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. See Figure 2 below.

### **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. See Figure 3 below.

### **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. See Figure 4 below.

### **Geotextile Filter Bag**

Install premanufactured product (such as Siltsack® according to manufacturer's recommendations. A geotextile filter bag is intended for use in grate inlet structures that drain small areas less than 0.5 acres in size. Due to the potential for clogging, a geotextile filter bag should not be used as the primary device for controlling sediment and erosion. Regular inspection, maintenance and cleaning are required. When using these products, traffic safety considerations such as cones and traffic control barriers may be necessary. See Figure 5 below.

## Maintenance

Inspect all inlet protection devices at least weekly and after every rainfall event. During extended rainfall events, inspect inlet protection devices at least once every 24 hours. Replace clogged aggregate or silt fence 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.

Photo 1

Unprotected Curb Inlet



Photos 2 - 4

Well Protected Curb and Drain Inlet

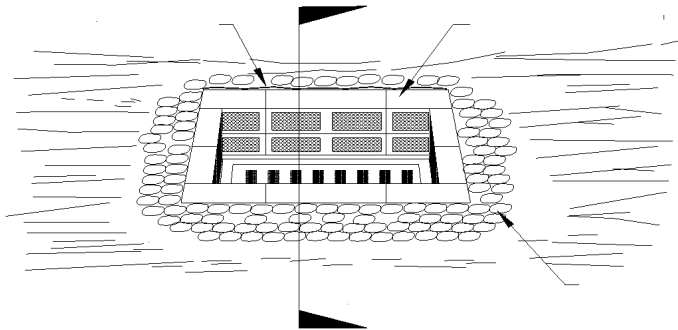




Photos 5 - 6  
Well Protected Curb Inlet

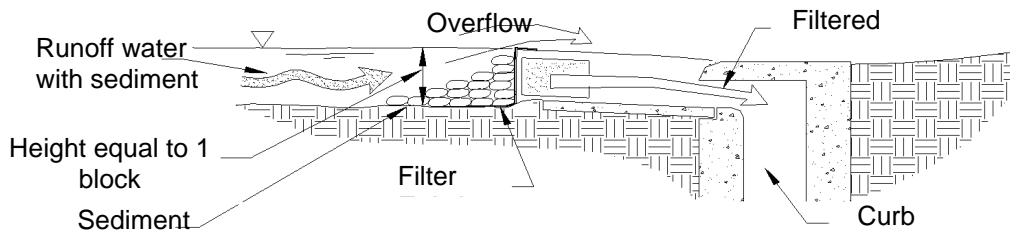
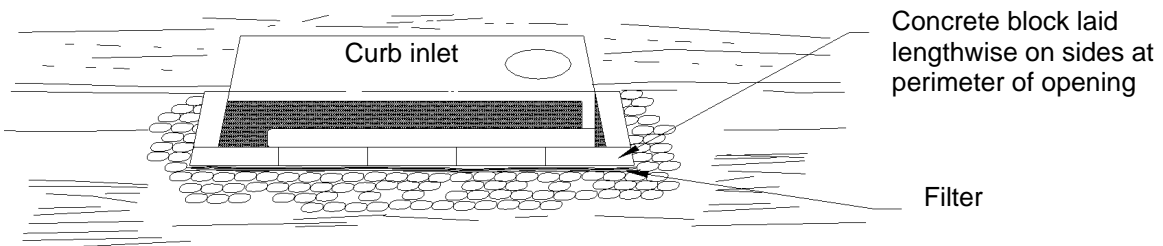
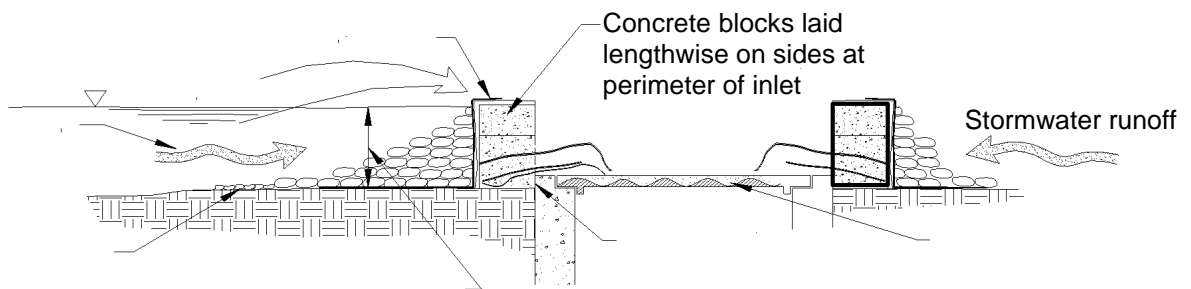


Figure 1  
Inlet Protection - Block & Gravel



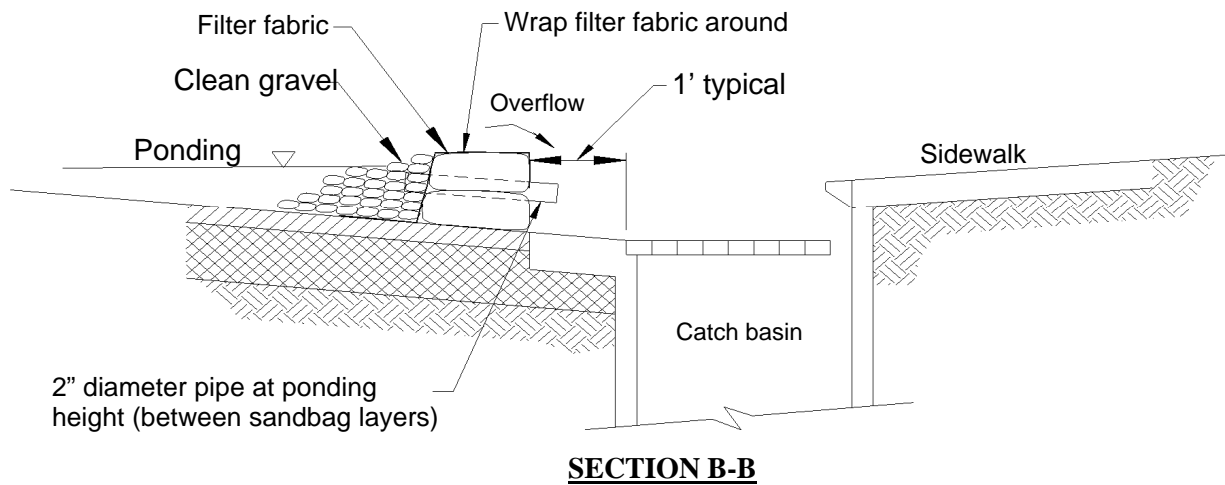
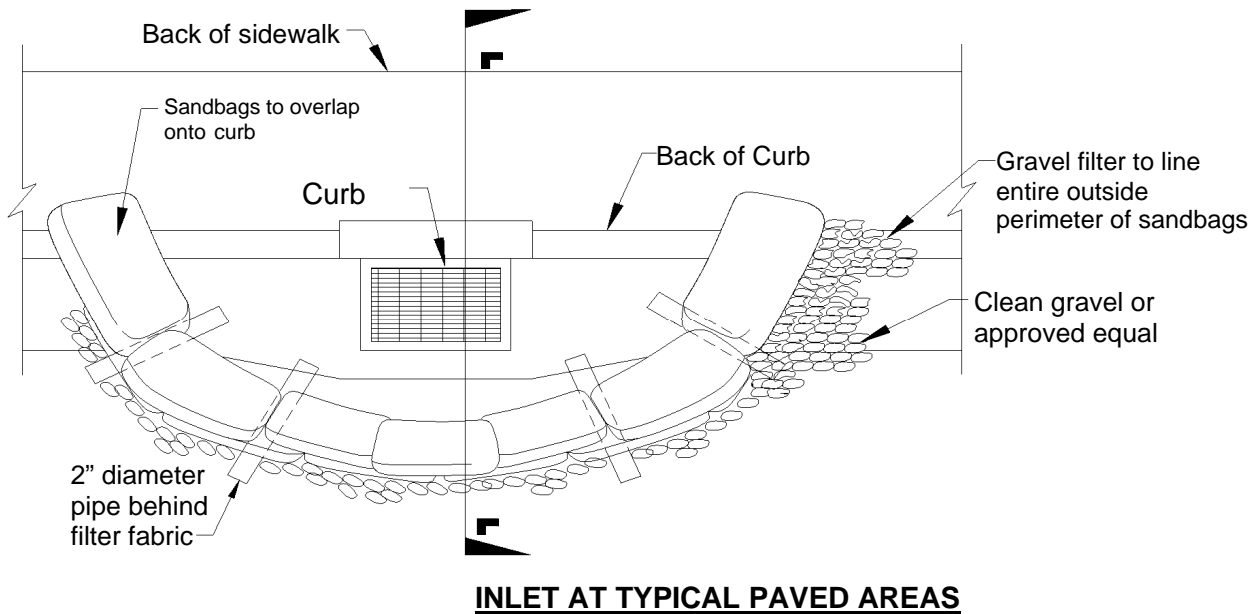
Notes:

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 WITH CURB**

Figure 2  
Inlet Protection - Sandbag Barrier



**Notes:**

1. Use clean aggregate ( $\frac{1}{2}$ " -  $\frac{3}{4}$ " ) such as TDOT #4 or #5 or washed #57.
2. Periodically replace old gravel with new clean gravel. Old gravel may be used as backfill material.
3. Use geotextile filter fabric for stormwater with high content of silt and clay (as shown in Section B-B).

Figure 3  
Inlet Protection - Wire Mesh & Gravel

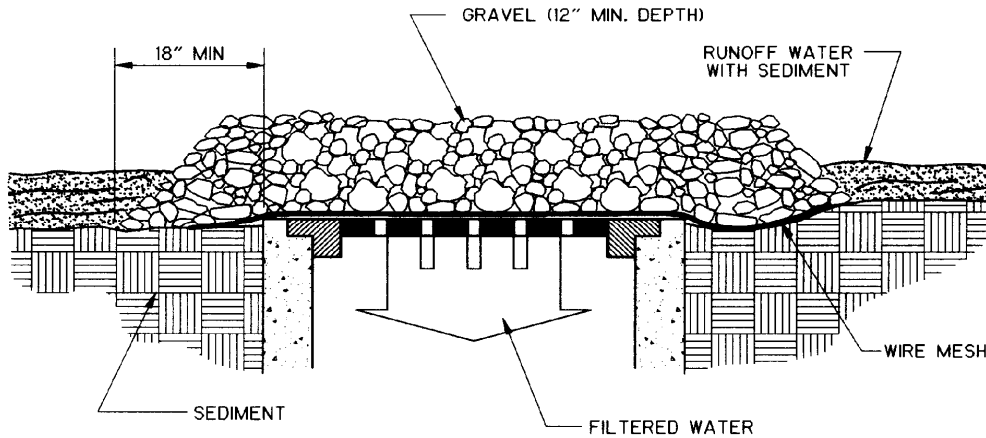


Figure 4  
Inlet Protection - Excavated Impoundment

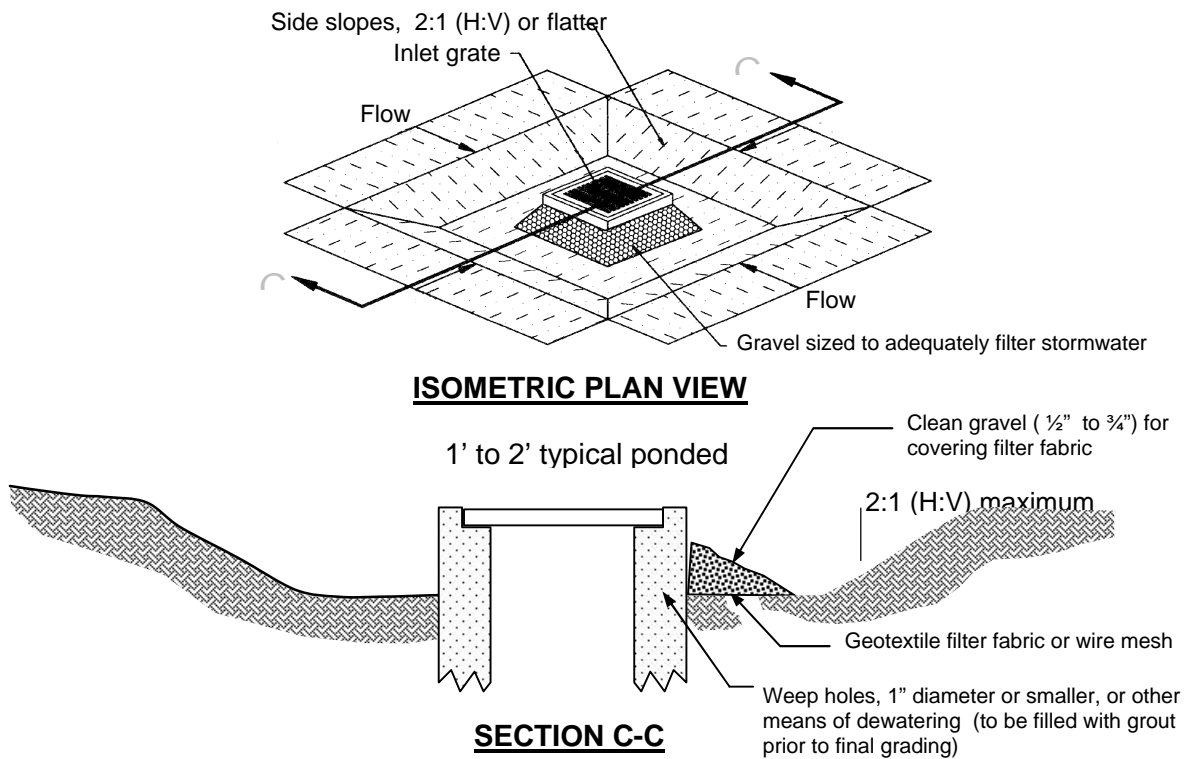
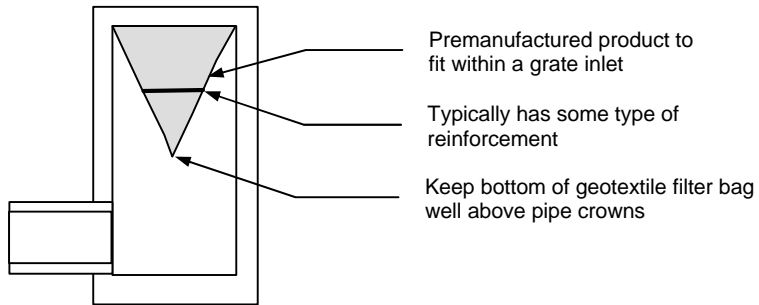


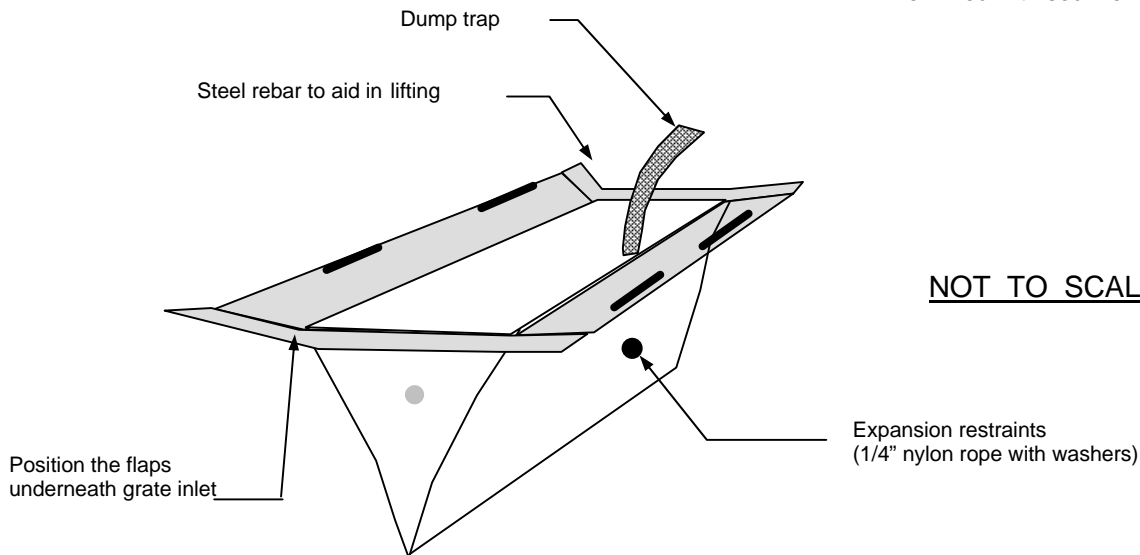


Figure 5  
Inlet Protection – Geotextile Filter Bag



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. Do not install geotextile filter bag at locations that may cause flooding in streets or adjacent properties.
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

**ISOMETRIC PLAN VIEW**

## References

USEPA (U.S. Environmental Protection Agency). 1992. *Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices*. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

Knoxville (City of). October 2007. Knoxville Stormwater Engineering Division. City of Knoxville BMP Manual. [http://www.ci.knoxville.tn.us/engineering/bmp\\_manual/](http://www.ci.knoxville.tn.us/engineering/bmp_manual/)