

**Description** Inlet protection consists of a filtering measure placed around an inlet or drain to trap sediment and prevent the sediment from entering the storm drain system. Additionally, it serves to prevent the silting-in of inlets, storm drainage systems, or receiving channels. Inlet protection may be composed of gravel and stone with a wire mesh filter, block and gravel, or sod. Manufactured products are also available that are designed to trap silt and sediment at the point of entry to a storm drain. Inserts can include bags, racks, baskets and other materials that hang down into a catch basin or inlet. Inserts are made from filter fabric, wire mesh, metal plates, various types of plastic products and combinations of these and other materials. Care should be taken not to cause flooding with diverted flow.

- Applications**
- Inlet protection is appropriate for small drainage areas (less than 1 ac.) where storm drains will be ready for use before the drainage area reaches final stabilization. Storm drain inlet protection is also used where:
    - ✓ A permanent storm drain structure is being constructed on site and there is danger of sediment silting it in before permanent site stabilization.
    - ✓ There is a threat of sediment silting in an inlet that is in place prior to permanent stabilization.
    - ✓ Ponding around the inlet structure could be a problem to traffic on site.
  - Block and gravel filters can be used where velocities are higher. They may be used with most types of inlets where overflow capability is needed and in areas of heavy flows (238 gal/min or greater).
  - Gravel and mesh filters can be used where flows are higher and in locations subject to disturbance by site traffic. This type of protection may be used with most inlets where overflow capability is needed and in areas of heavy flows (238 gal/min or greater).
  - Sod inlet filters are usually used where sediments in the stormwater runoff are low.
  - Gravel and mesh filters and block and gravel filters should not be used in the right of way unless there is sufficient space to avoid a traffic hazard.

- Limitations**
- |                              |                            |
|------------------------------|----------------------------|
| Drainage area – 1 ac.        | Maximum slope – 5%         |
| Minimum bedrock depth – 2 ft | Minimum water table – 2 ft |
| NRCS soil type - ABCD        | Freeze/thaw – good         |
| Drainage/flood control – no  |                            |
- Consider sandbags (BMP 43-Temporary Berms) in situations where anchoring is not possible (e.g., paved road surfaces).
  - Inlet protection is a high maintenance item compared with other more permanent measures.
  - These devices require additional upslope BMPs to be effective.

Targeted  
Pollutants  
Design  
Parameters

Sediment

Several different designs are in use and the configurations vary. The following design considerations apply to most of inlet protection. Some additional concerns apply to only one or two of the types.

**Drainage area:** Not to exceed 1 ac. Overland flow to the inlet should be no greater than 240 gal/min.

**Slope gradient:** The drainage area should be fairly flat, with slopes of 5% or less. With filter fabric designs, the area immediately surrounding the inlet should not exceed a slope of 1%.

**Sump:** Where possible, a block-and-gravel protection device should be provided with a sediment-trapping sump 12 to 20 in. deep as measured from the crest of the inlet. Side slopes should be 2:1. The recommended volume of excavation is 860 ft<sup>3</sup>/ac. of ground disturbed.

**Orientation:** To achieve maximum trapping efficiency in gravel-and-mesh or block-and-gravel traps; the longest dimension of the basin should be oriented toward the longest inflow area.

**Materials for excavated gravel inlet protection:**

- Hardware cloth or wire mesh with 2/5 to 3/5 in. openings
- Washed gravel 0.8 to 4 in. diameter

**Materials for block and gravel inlet protection:**

- Hardware cloth or wire mesh with 2/5 to 3/5 in. openings
- Filter fabric (see the fabric specifications for silt fence, BMP 36-Silt Fence)
- Concrete blocks 4 to 12 in. wide
- Washed gravel 0.8 to 4 in. diameter

**Inlet Inserts:**

Devices should be installed as per the manufacturer's instruction meeting the following criteria:

- Devices should be installed as a point protection or in series as a perimeter sediment control BMP prior to any site grading activity.
- Installation should not block flows from filtering into the inlet or catch basin.
- Fabrics or other materials should be sized to handle projected site runoff and sediment load flows. Filter fabric should not be used alone as inlet protection.
- Devices should be installed without protruding parts that could be a traffic, worker, or pedestrian hazard.
- Retrieval edges, cords, bars, chains or other mechanisms should be flagged or marked for retrieval under submerged conditions.

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Construction — ~~Gravel and mesh:~~

## Guidelines

- Remove any obstructions to excavating and grading. Excavate sump area, grade slopes, and properly dispose of soil.
- Secure the inlet grate to prevent seepage of sediment-laden water.
- Place wire mesh over the drop inlet so the wire extends a minimum of 1ft beyond each side of the inlet structure. Overlap the strips of mesh if more than one is necessary.
- Place filter fabric over the mesh, extending it at least 1 ft beyond the inlet opening on all sides. Ensure that weep holes in the inlet structure are protected by filter fabric and gravel.
- Place stone or gravel over the fabric/wire mesh to a depth of at least 20 in.

### **Block and gravel:**

- open ends of the block should face outward, not upward, and the ends of adjacent blocks should abut. Lay one block on each side of the structure on its side to allow for dewatering of the pool.
- The block barrier should be at least 12 in. high and may be up to a Secure the inlet grate to prevent seepage of sediment-laden water.
- Place wire mesh over the drop inlet so the wire extends a minimum of 12 to 20 in. beyond each side of the inlet structure. Overlap the strips of mesh if more than one is necessary.
- Place filter fabric (optional) over the mesh and extend it at least 20 in. beyond the inlet structure.
- Place concrete blocks over the filter fabric in a single row lengthwise on their sides along the sides of the inlet. Excavate the foundation a minimum of 2 in. below the crest of the inlet. The bottom row of blocks should be against the edge of the structure for lateral support.
- The maximum of 24 in. high. It may be from 4 to 12 in. deep, depending on the size of block used.
- Prior to backfilling, place wire mesh over the outside vertical end of the blocks so that stone does not wash down the inlet.
- Place gravel against the wire mesh to the top of the blocks.

### **Swale, ditch line or yard inlet protection:**

- Excavate completely around inlet to a depth of 18 in. below notch elevation.
- Drive 2 x 4 post 1 ft into ground at four corners of inlet. Place nail strips between posts on ends of inlet. Assemble top portion of 2 x 4 frame using overlap joint shown. Top of frame (weir) should be 6 in. below edge of roadway adjacent to inlet.
- Stretch wire mesh tightly around frame and fasten securely. Ends should meet at post.
- Stretch filter cloth tightly over wire mesh, the cloth should extend from top of frame to 18 in. below inlet notch elevation. Fasten securely to frame. Ends should meet at post, be overlapped and folded, then fastened down.
- Backfill around inlet in compacted 6 in. layers until layer of earth is even with notch elevation on ends and top elevation on sides.
- If the inlet is not in a low point, construct a compacted earth dike in the ditch line below it. The top of the dike is to be at least 6 in. higher than

the top of frame (weir).

- This structure should be inspected frequently and the filter fabric replaced when clogged.

**Curb Inlet Protection:**

- Attach a continuous piece of wire mesh (30 in. minimum width by throat length plus 4 ft) to the 2 x 4 in. weir (measuring throat length plus 2 ft) as shown on the standard drawing.
- Place a piece of approved filter cloth (40-85 sieve) of the same dimensions as the wire mesh over the wire mesh and securely attach to the 2 in. of 4 in. weir.
- Securely nail the 2 x 4 in. weir to 9 in. long vertical spacers to be located between the weir and inlet face (maximum 6 ft apart).
- Place the assembly against the inlet throat and nail (minimum 2 ft) lengths of 2 x 4 in. to the top of the weir at spacer locations. These 2 x 4 in. anchors should extend across the inlet top and be held in place by gravel-filled bags or alternate weight.
- The assembly should be placed so that the end spacers are a minimum 1 ft beyond both ends of the throat opening.
- Form the wire mesh and filter cloth to the concrete gutter and against the face of curb on both sides of the inlet. Place clean 2 in. stone over the wire mesh and filter fabric in such a manner as to prevent water from entering the inlet under or around the filter cloth.
- This type of protection should be inspected frequently and the filter cloth and stone replaced when clogged with sediment.
- Assure that storm flow does not bypass inlet by installing temporary earth or asphalt dikes directing flow into inlet.

**Maintenance**

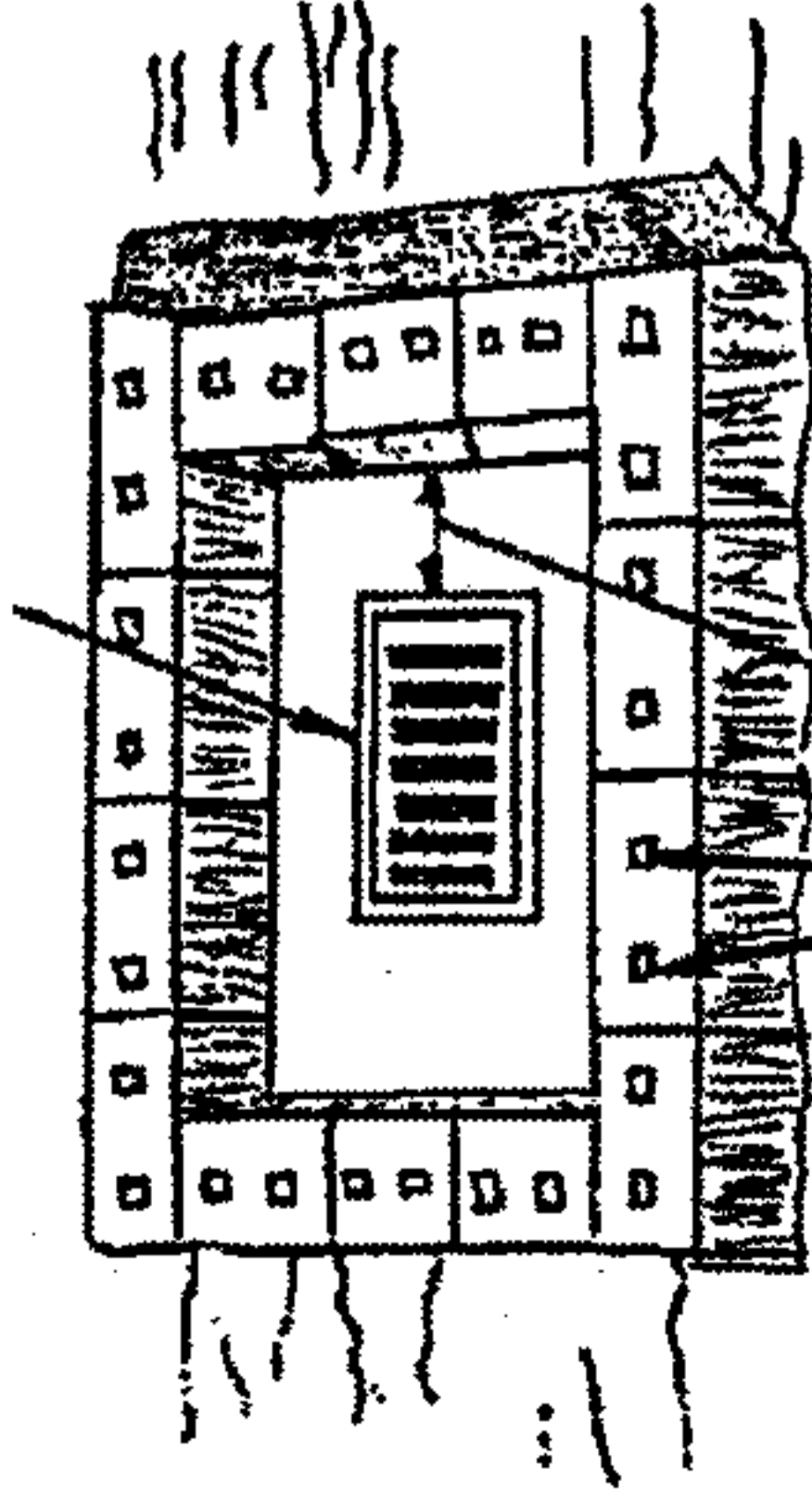
- Inspect regularly and after every storm. Make any repairs necessary to ensure the measure is in good working order.
- Remove accumulated sediment and restore the trap to its original dimensions when sediment has accumulated to half the design depth of the trap. All sediments removed should be disposed of properly.
- On gravel-and-mesh devices, clean (or remove and replace) the stone filter if it becomes clogged.
- Replacement of inlet inserts should be per manufacturer's instructions or when device no longer drains. At no time should devices be punctured or otherwise modified to bypass.
- Unless cleaned for reuse as a permanent site control or cleaned and left to biodegrade, all inlet inserts should be removed after construction is completed (or after permanent vegetation is established).
- Inlet protection should remain in place and operational up to 30 days after the drainage area is completely stabilized.

Compacted  
soil to prevent  
piping

Drop inlet with grate

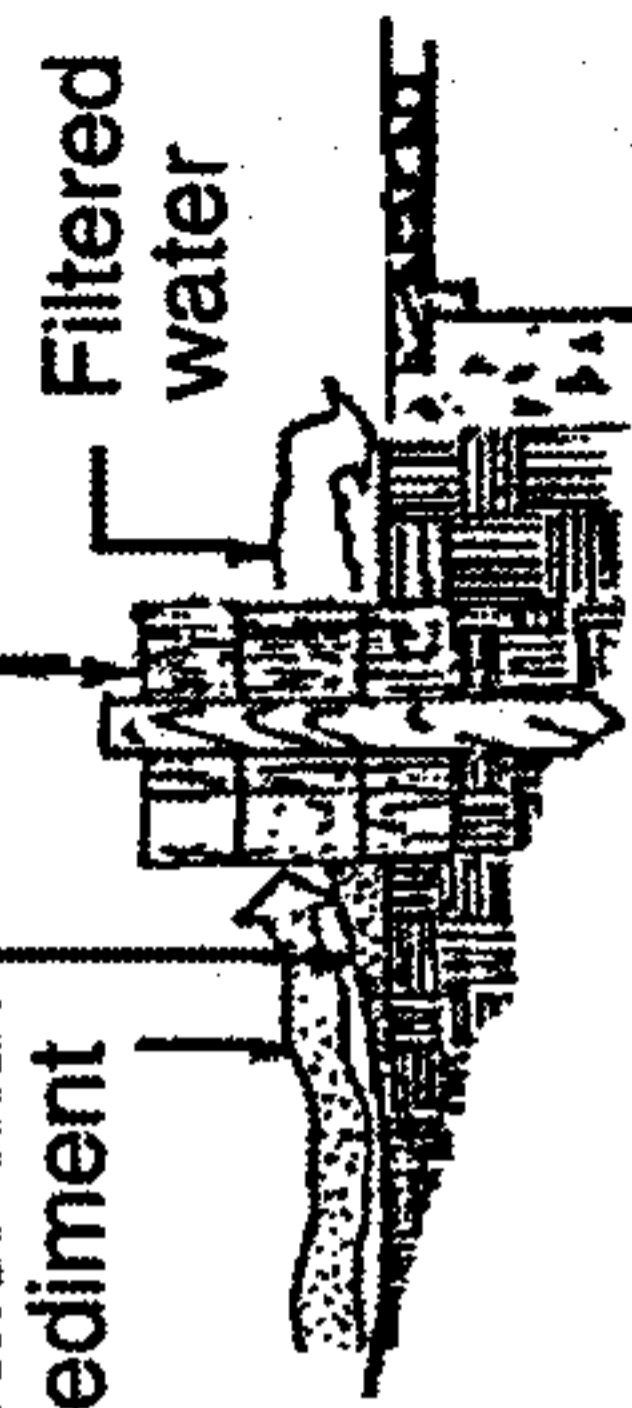
Runoff  
water with  
sediment

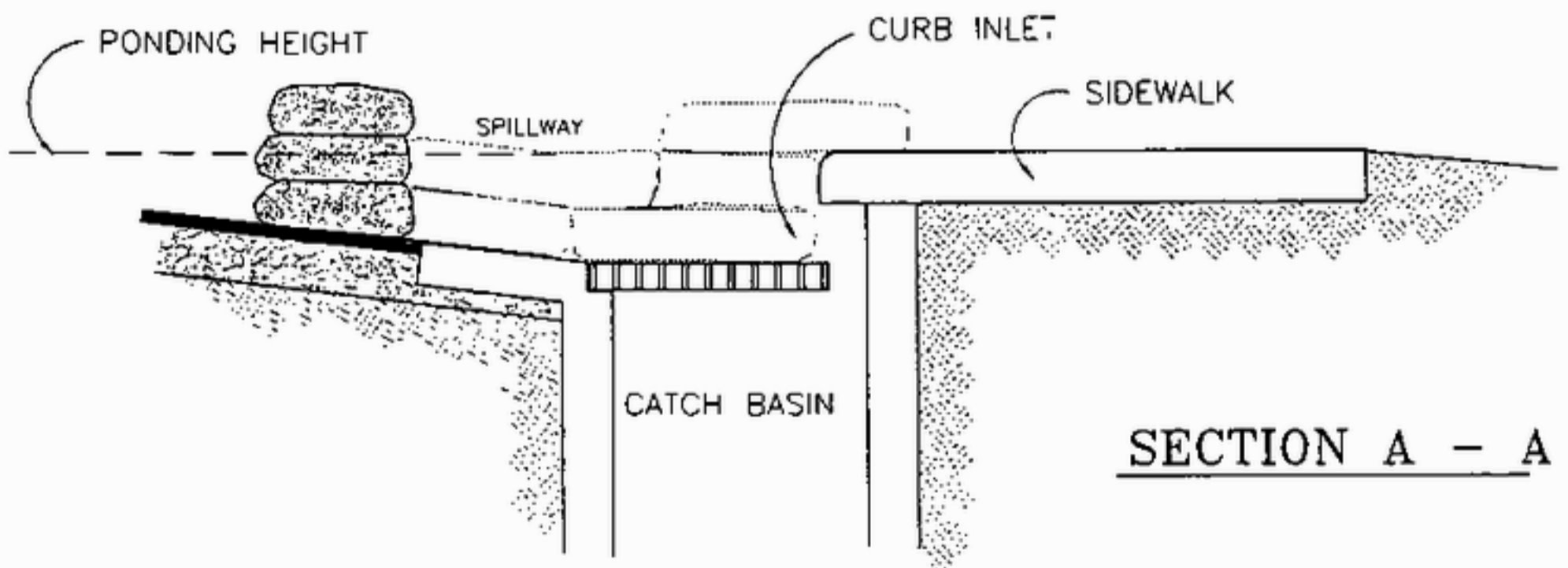
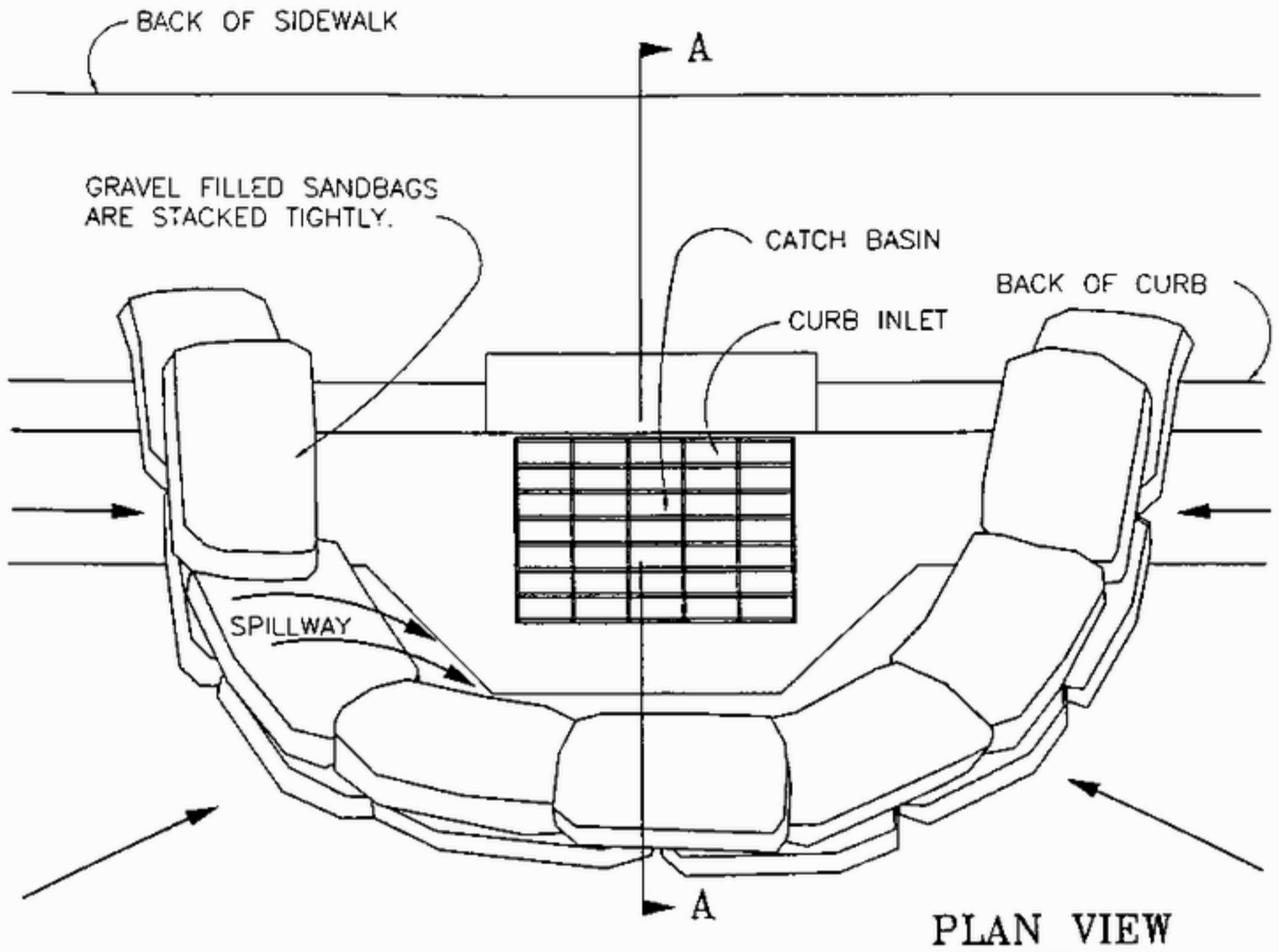
Staked  
straw bale  
Filtered  
water



Bales 12-24"  
from inlet

Straw bales  
staked with 2  
stakes per bale





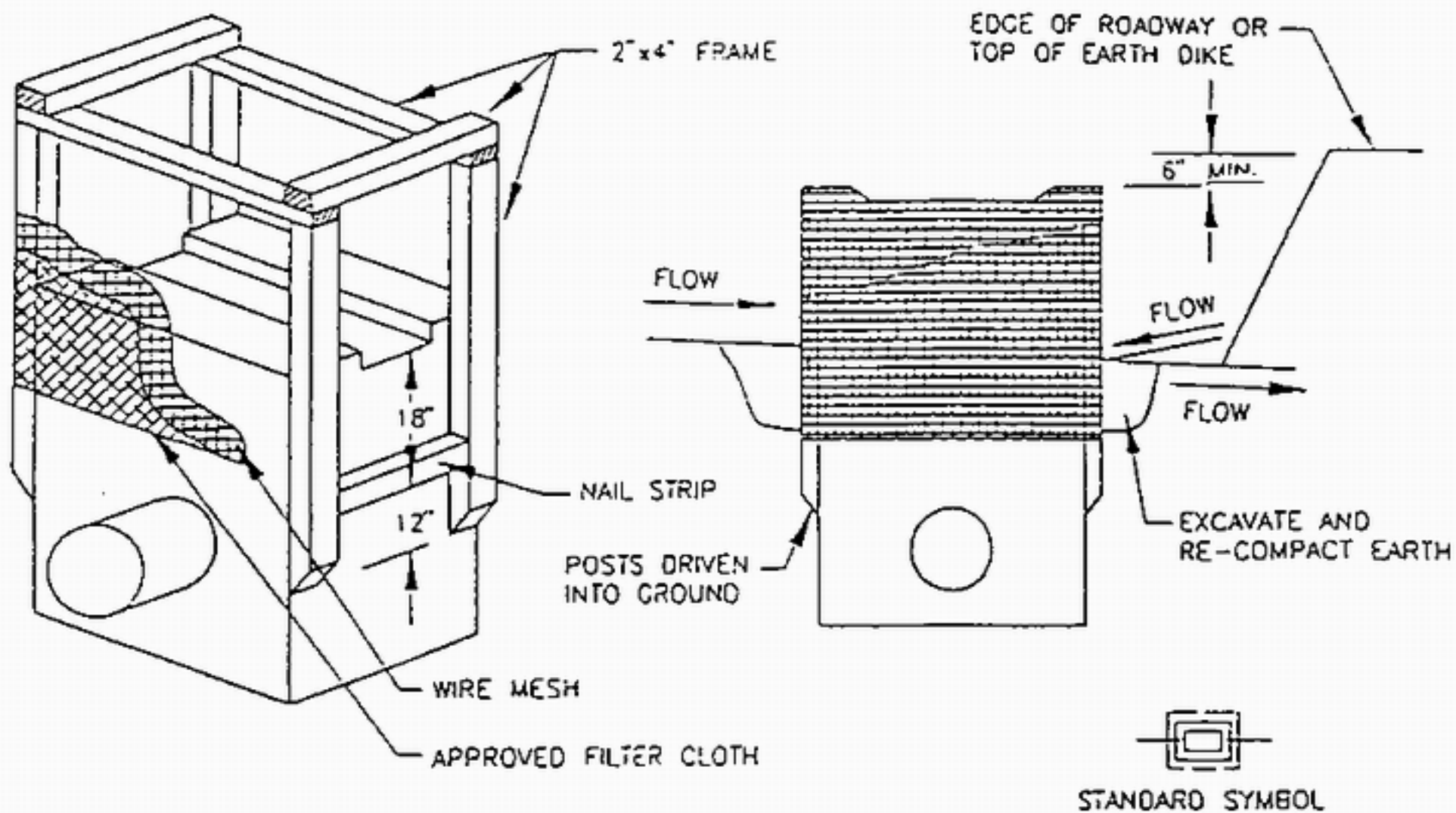
NOTES:

1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.

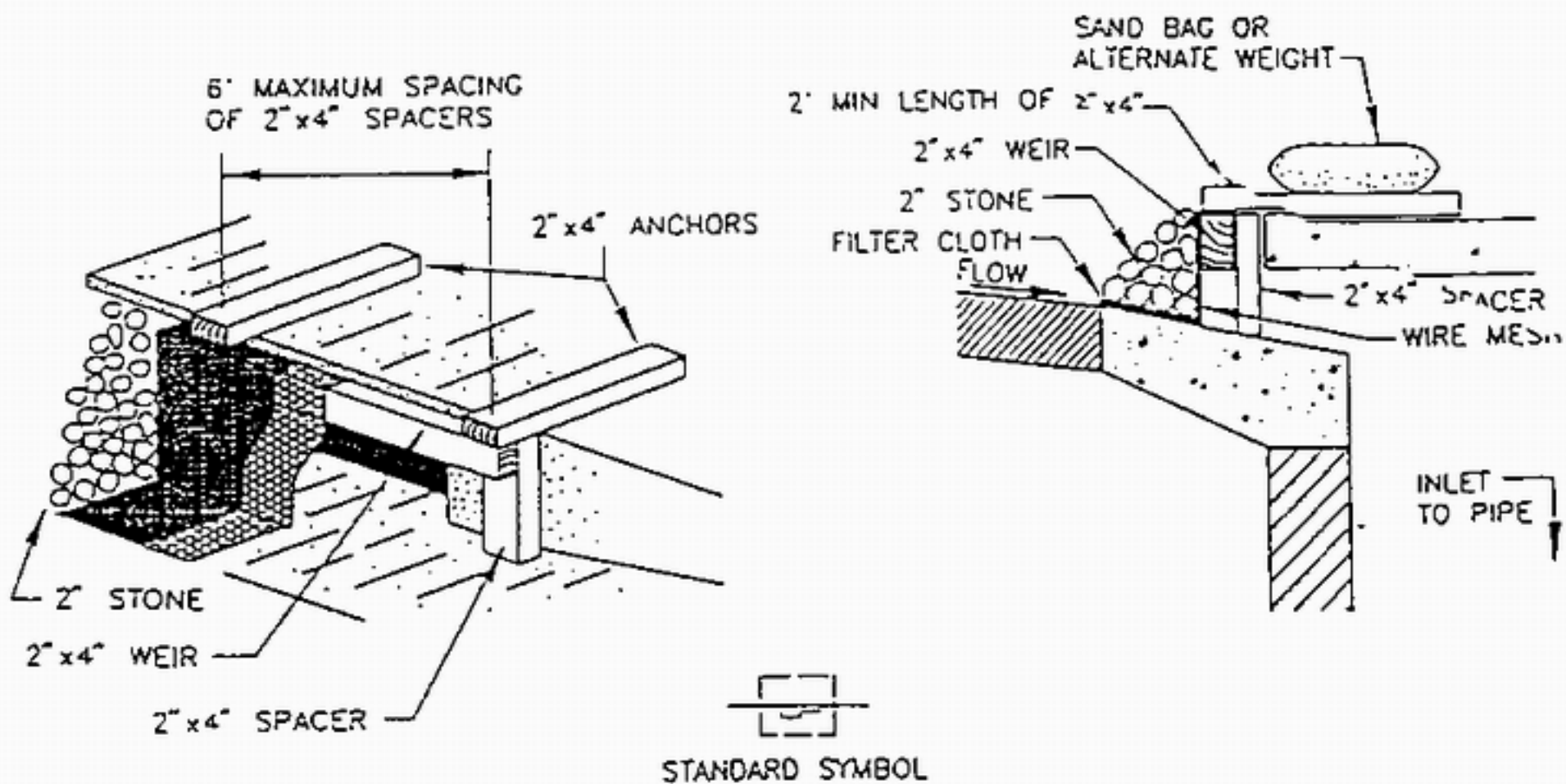
2. SANDBAGS, OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY.

3. LEAVE ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.

4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.



SWALE INLET PROTECTION DETAIL



CURB INLET PROTECTION DETAIL

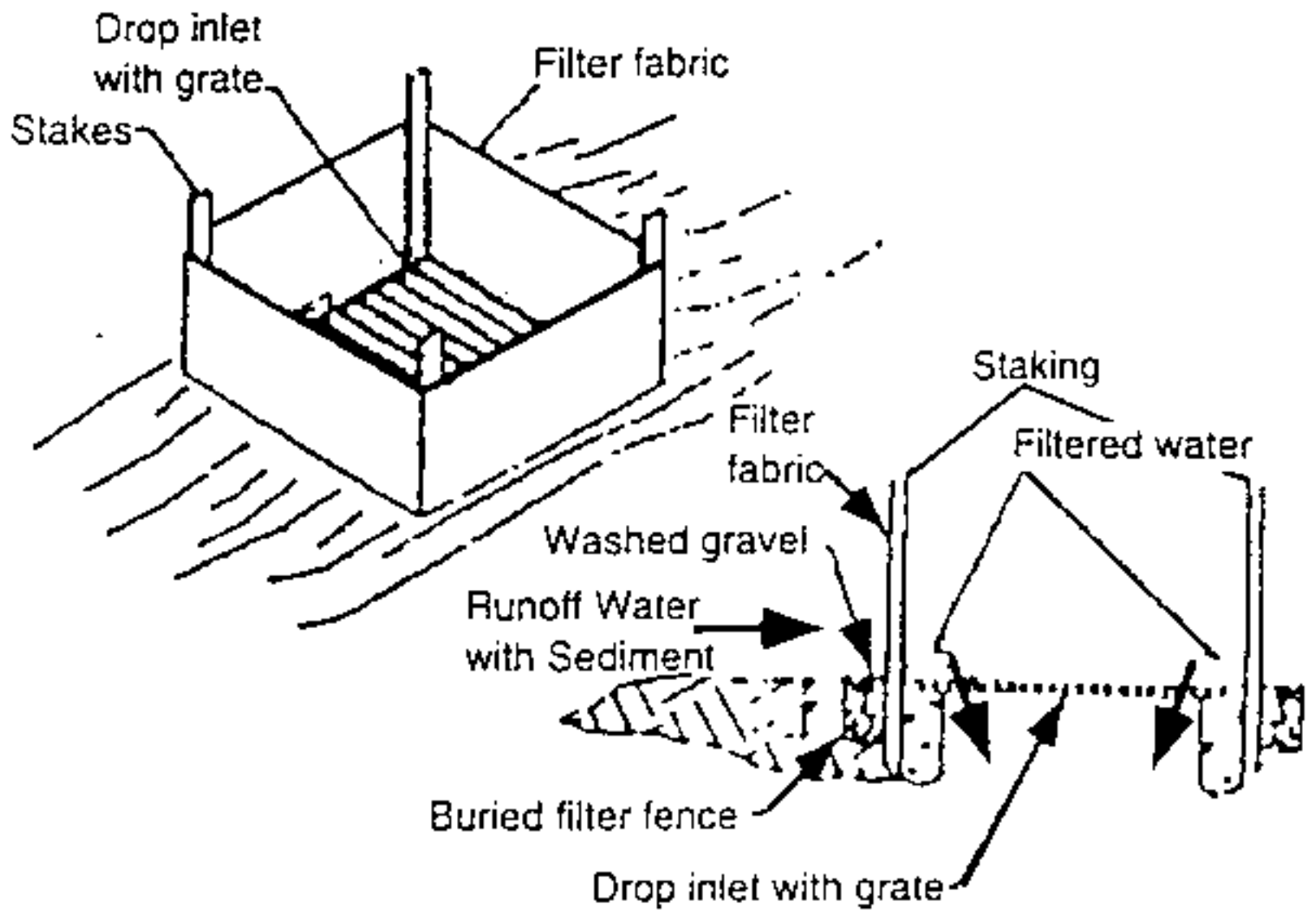
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

TOOTHMAN-ORTON ENGINEERING COMPANY  
BOISE, IDAHO McCALL, IDAHO

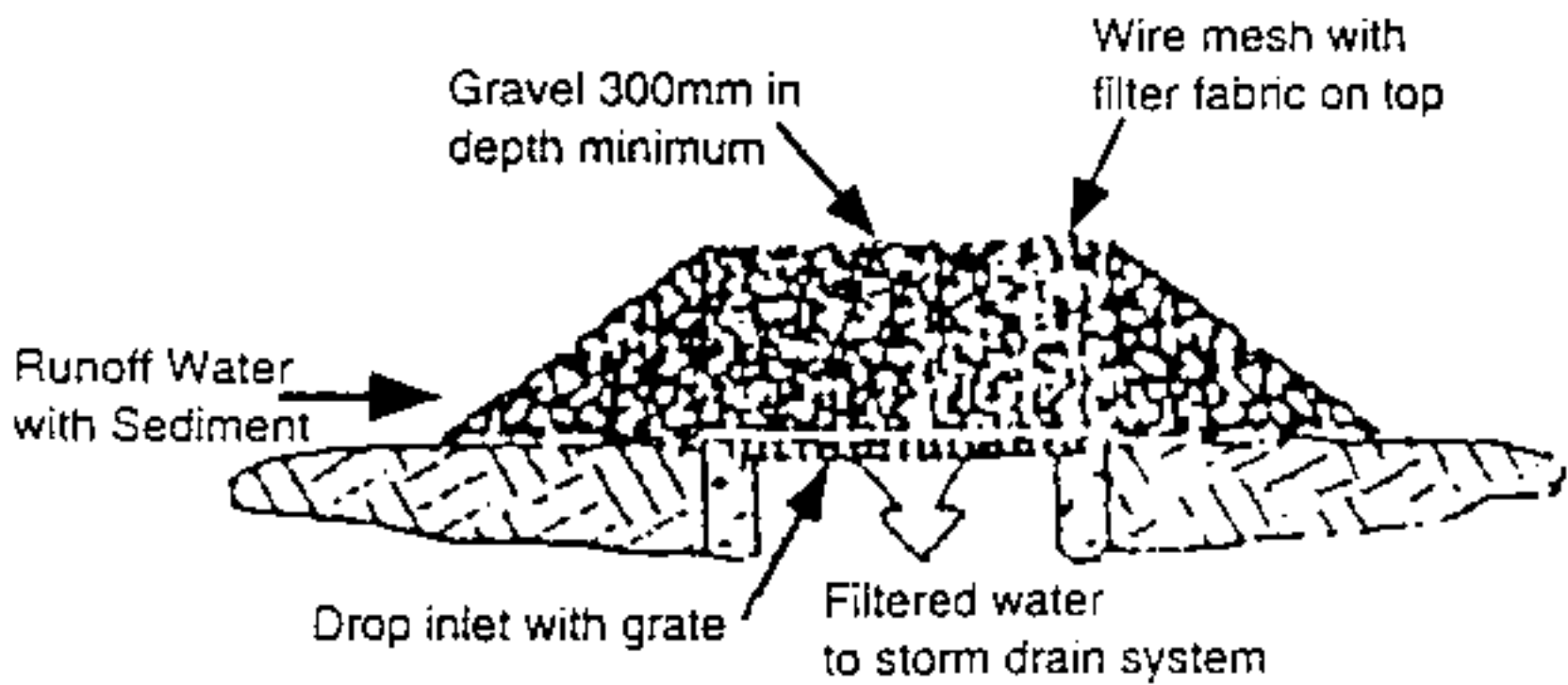
INLET PROTECTION  
DETAIL

STANDARD  
DRAWING

IPD-1



## FILTER FABRIC FENCE INLET FILTER



## GRAVEL AND WIRE MESH FILTER SECTION