Straw Bale Inlet Protection (SBIP)

Practice Description

Straw bale inlet protection is a sediment control barrier formed around a storm drain inlet by the use of standard straw bales. The purpose is to help minimize sediment entering storm drains during construction. This practice applies where use of the storm drain system is necessary during construction and where inlets have a drainage area of 1 acre or less and an approach slope of 1% or less.

Planning Considerations

Storm sewers that are made operational before their drainage area is stabilized can convey large amounts of sediment to natural drainageways. In case of extreme sediment loading, the storm sewer itself may clog and lose a major portion of its capacity. To avoid these problems, it is necessary to prevent sediment from entering the system at the inlets.

This practice is for drainage areas of less than 1 acre. Runoff from large disturbed areas should be routed through a sediment basin. This method is for areas where heavy flows are expected and where overflow capacity is necessary to prevent excessive ponding around the structure.

The best way to prevent sediment from entering the storm sewer system is to minimize erosion by leaving as much of the site undisturbed as possible and disturbing the site in small increments, if possible. After disturbance, stabilize the site as quickly as possible to prevent erosion and sediment delivery.

Design Criteria and Construction

Drainage Area

Drainage area should be less than 1 acre per inlet. The drainage area should be relatively flat (slopes no greater than 5 percent) where sheet or overland flows are typical. The method shall not apply to inlets receiving concentrated flows.

Capacity

The design storm for the inlet should be able to enter the inlet without bypass flow.

Bale Size

Bales should be either wire bound or string-tied with binding oriented around the sides rather than over and under the bales. Bales should be 14″ x 18″ x 36″. Straw wattles can also be used for this practice. A drawing representing straw wattle inlet protection is provided by the MDOT at the end of this practice (MDOT Drawing ECD-12).

Effective Life

Straw and hay bales have a relatively short period of usefulness and should not be used if the project duration is expected to exceed 3 months. Bale placement should result in the twine or cord being on the side and not the bottom of the bale.

Site Preparation

Determine exact location of underground utilities (see Appendix C: MS One-Call and 811 Color Coding available in the Appendices Volume).

Clear area of all debris that might hinder excavation and disposal of spoil.

Installation

Bales should be placed lengthwise in a single row surrounding the inlet with the ends of the adjacent bales pressed together.

If filter fabric is used, it should be entrenched and backfilled. A trench can be excavated around the inlet the width of the bale to a minimum depth of 4″. After the bales are staked, the bales should be backfilled with the excavated soil and compacted against the filter barrier.

Anchors

Two 36″ long (minimum), 2″ x 2″ hardwood stakes should be driven through each bale after the bales are properly entranced. Alternate anchors can be two pieces of No. 4 steel rebar, 36″ long (minimum).

Erosion Control

Stabilize disturbed areas in accordance with vegetation plan. If no vegetation plan exists, consider planting and mulching as part of installation and select planting information from either the *Permanent Seeding* or *Temporary Seeding Practice*. Select mulching information from the *Mulching Practice*.

Construction Verification

Check finished grades and dimensions of the straw bale inlet protection. Check materials for compliance with specifications.

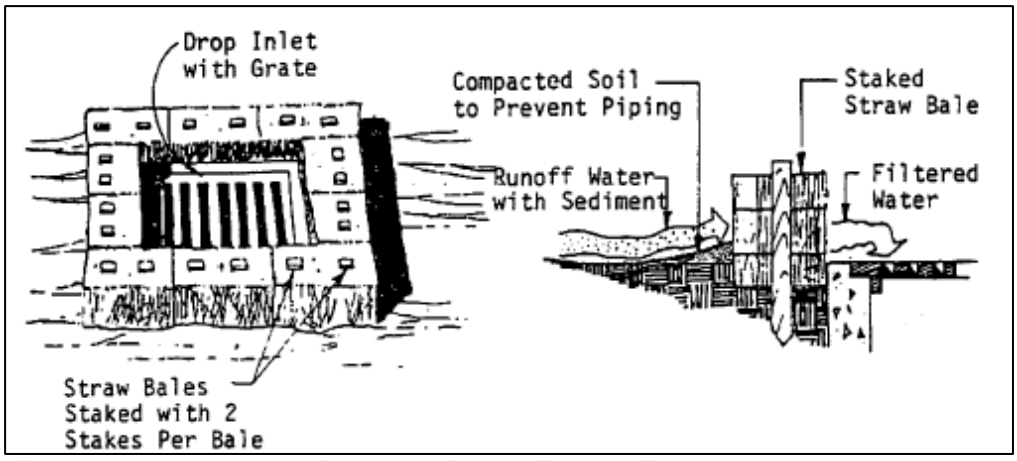

Figure SBIP- 1 Straw Bale Drop Inlet Sediment Filter

Common Problems

Consult with registered design professional if the following occurs:

Variations in topography on site indicate sediment trap will not function as intended; changes in plan may be needed.

Design specifications for materials cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

Maintenance

Inspect straw bale barriers after each storm event and remove sediment deposits promptly after it has accumulated to ½ of the original capacity, taking care not to undermine the entrenched bales.

Inspect periodically for deterioration or damage from construction activities. Repair damaged barrier immediately.

After the contributing drainage area has been stabilized, remove all straw bales and sediment, bring the disturbed area to grade, and stabilize it with vegetation or other materials shown in the design plan.

Straw bales may be recycled as mulch.

References

BMPs from Volume 1

Chapter 4

Sediment Basin (SBN) 4-298

MDOT Drawing ECD-10

Inlet Protection Typical Application and Details 4-253

MDOT Drawing ECD-12

Inlet Protection Details of Wattles 4-254

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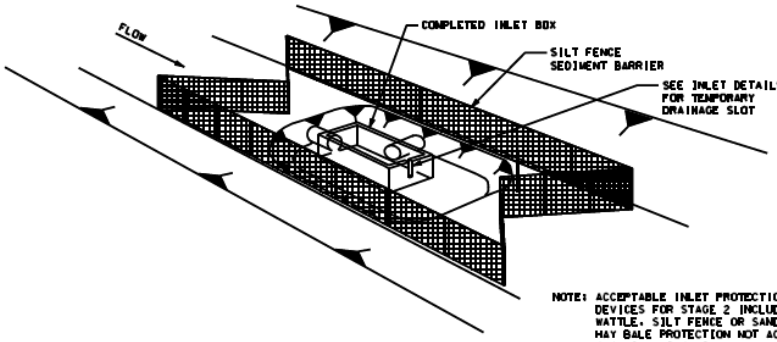
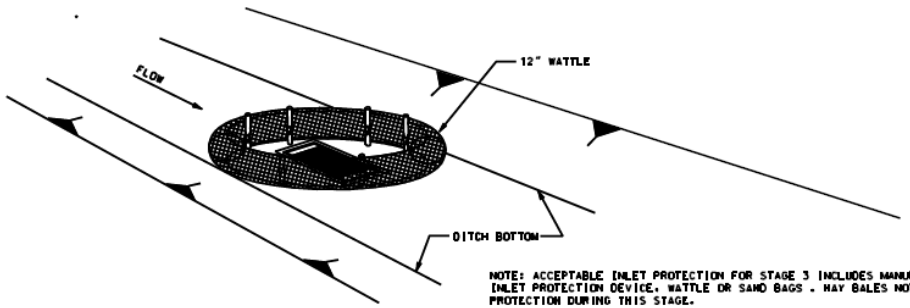


NOTE: ACCEPTABLE INLET PROTECTION DEVICES FOR STAGE 2 INCLUDE WATTLE, SILT FENCE OR SAND BAGS. HAY BALE PROTECTION NOT ACCEPTABLE DURING THIS PHASE.

STAGE 2

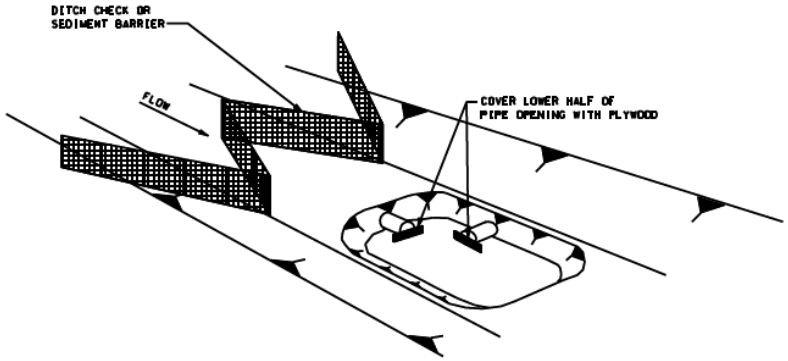
INLET/JUNCTION BOX CONSTRUCTED BUT NOT BACKFILLED



NOTE: ACCEPTABLE INLET PROTECTION FOR STAGE 3 INCLUDES MANUFACTURED INLET PROTECTION DEVICE, WATTLE OR SAND BAGS . HAY BALES NOT ACCEPTABLE PROTECTION DURING THIS STAGE.

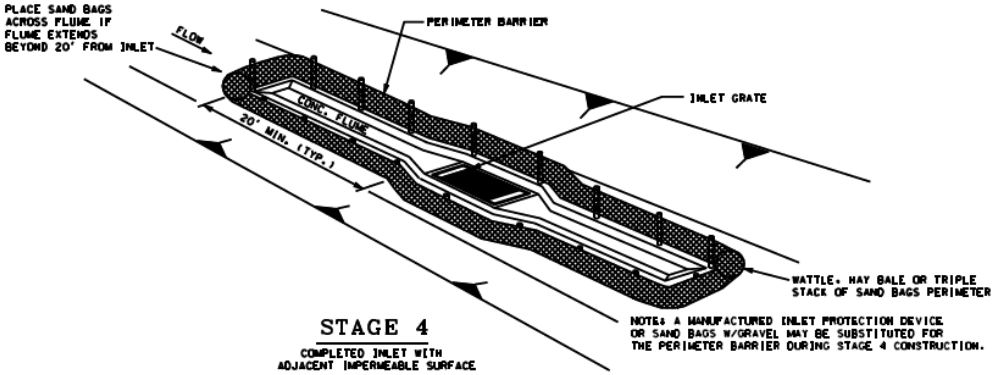
STAGE 3

INLET CONSTRUCTED AND BACKFILLED



STAGE 1

INLET/JUNCTION BOX LOCATION EXCAVATED



NOTE: A MANUFACTURED INLET PROTECTION DEVICE OR SAND BAGS W/GRAVEL MAY BE SUBSTITUTED FOR THE PERIMETER BARRIER DURING STAGE 4 CONSTRUCTION.

STAGE 4

COMPLETED INLET WITH ADJACENT IMPERMEABLE SURFACE

DITCH INLET CONSTRUCTION STAGES

NOTES:
1. FOUNDATION BACKFILL SHOULD BE PLACED IN STAGE 1 IMMEDIATELY AFTER PIPE INSTALLATION. INLET CONSTRUCTION SHOULD COMMENCE AS SOON AS POSSIBLE AND BE CONTINUOUS THROUGH COMPLETION.
2. CONFIGURATIONS MAY BE ADJUSTED WITH APPROVAL OF THE ENGINEER FOR TRAVELWAY SAFETY, WATER FLOW, SOIL OR INSTALLATION CHALLENGES.
3. DURING STAGE 1 AND STAGE 2, SILT FENCE MAY BE REQUIRED UPSLOPE OF THE INLET EXCAVATION AS DIRECTED BY THE ENGINEER.
4. IF SILT FENCING IS INSTALLED AROUND THE INLET EXCAVATION IT SHOULD BE PLACED IN A CONFIGURATION THAT WILL ALLOW INLET CONSTRUCTION.

BY	REVISION	DATE

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
INLET PROTECTION
TYPICAL APPLICATIONS AND DETAILS

WORKING NUMBER: ECD-10
SHEET NUMBER:

FILENAME: EROSION CONTROL\ECD-10.DGN
DESIGN TEAM: CHECKED: DATE:

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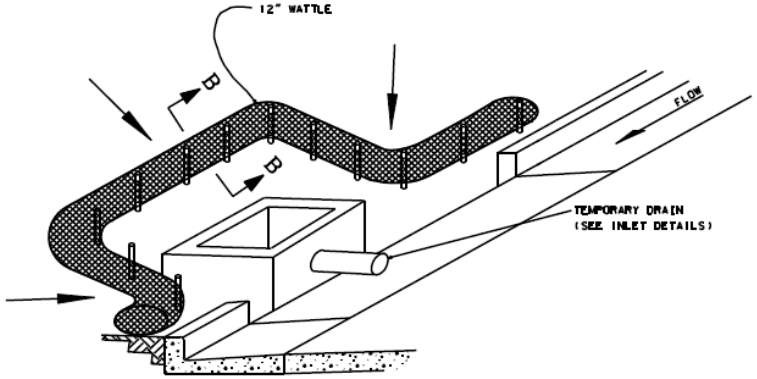
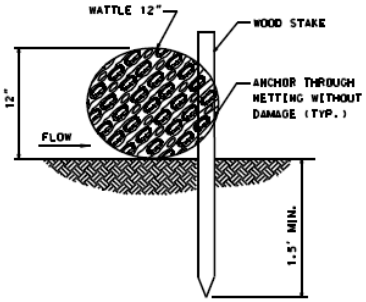
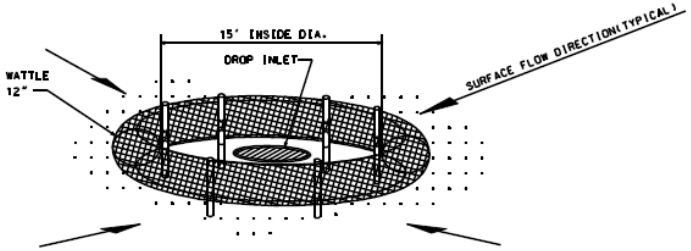
NOTE:
SILT FENCE OR SAND BAGS MAY ALSO BE USED FOR THIS APPLICATION.
HAY BALES NOT ACCEPTABLE DURING THIS STAGE.



CURB INLET PROTECTION (STAGE 2)
SINGLE OR DOUBLE WING INLET

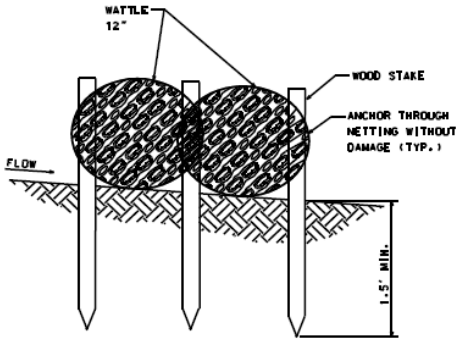


SECTION B-B



DROP INLET PROTECTION

NOTES:
1. ANCHORING STAKES SHALL BE SIZED, SPACED, AND BE OF A MATERIAL THAT EFFECTIVELY SECURES THE WATTLE. STAKE SPACING SHALL BE A MAXIMUM OF THREE FEET.
2. OVERLAP ENDS OF WATTLES PER MANUFACTURERS RECOMMENDATIONS (1'MIN.,3'MAX.).
3. TRENCHING OF WATTLES MAY BE NECESSARY IF PIPING BECOMES EVIDENT.



SECTION A-A

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
INLET PROTECTION DETAILS
OF WATTLES

WORKING NUMBER
ECD-12
SHEET NUMBER

FILENAME: EROSION CONTROL-ECD-12.DGN
DESIGN TEAM CHECKED DATE