



ILLINOIS URBAN MANUAL

**Field Manual for Inspection of
Erosion and Sediment Control
Best Management Practices**

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PUBLISHED OCTOBER 2013

PREFACE

This field manual is intended for use as a technical reference by developers, contractors, planners, engineers, government officials and others involved in inspection of soil erosion and sediment control best management practices on construction sites in Illinois. This field manual was written and reviewed by members of the Illinois Urban Manual Technical Review Committee (TRC) and Steering Committee (SC).

Practices found within the field manual are taken directly from the Illinois Urban Manual (IUM) which can be found at: www.aiswcd.org/IUM. Please consult the full manual for detailed standards as information contained within the field manual has been abridged.

The IUM is a dynamic document currently under revision coordinated and owned by the Association of Illinois Soil & Water Conservation Districts (AISWCD) with funding in large part provided by the Illinois Environmental Protection Agency



association of Illinois
**SOIL &
WATER**
conservation districts



**Illinois
Environmental
Protection Agency**

(IEPA) through
Section 319 of the
Clean Water Act.

The initiative to update the IUM is a cooperative effort. The TRC and the SC are actively tasked with the revision of the manual. The SC is comprised of the following public agencies representing the entire State of Illinois: **AISWCD, IEPA, Soil & Water Conservation Districts (SWCDs), Illinois Department of Agriculture-Bureau of Land & Water Resources (IDA-BLWR), Illinois Department of Transportation (IDOT), United States Army Corp of Engineers Chicago District (USACE), and United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS)**. The TRC is comprised of the above mentioned public agencies in addition to the following public and private professionals: Illinois Department of Natural Resources-Office of Water Resources (IDNR-OWR), environmental consultants and engineers.

INTRODUCTION

Planning Principles

Planning principles are the overall guidelines that need to be considered to select, implement and maintain erosion and sediment control best management practices (BMPs).

Erosion and sedimentation are natural geologic processes that human activities often accelerate. Erosion occurs through the action of water or wind. There are three major processes that must be understood to effectively control or limit soil erosion and sedimentation on construction sites. These are detachment, transport, and deposition.

Three types of erosion are as follows:

- Raindrop erosion: Erosion resulting from the direct impact of falling drops of rain on soil particles. This impact dislodges soil particles and splashes them into the air. The dislodged soil particles can then be easily transported by the flow of surface runoff.
- Sheet Erosion: The removal of a layer of exposed surface soil by the action of raindrop splash and runoff. The water moves in broad sheets over the land and is not confined in small depressions.
- Rill and Gully Erosion: Occurs after runoff flows concentrate into rivulets, cutting several inches deep into the soil surface. These grooves are called rills. Gullies may develop from rills if not repaired or in other areas where a concentrated flow of water moves over the soil.

Many of the BMPs included in the field manual will individually address one or more types of erosion. Of these, most will impact the detachment or movement of sediment or provide storage methods.

This manual categorizes BMPs into the following:

- **Erosion Control**
- **Sediment Control**
- **Miscellaneous**

The most important, and most often neglected, task is to provide effective soil stabilization by employing **erosion control** measures throughout the duration of a construction project. Soil stabilization is based on a simple premise: if water cannot detach the soil, it cannot be transported (i.e., erosion does not occur). The easiest, most economical, and environmentally sound way to prevent detachment is by keeping a good vegetative cover in place. One way this can be done is by minimizing soil disturbance. It also can be accomplished via other techniques such as mulching or use of erosion control blanket.

Planning Principles (continued)

Once the soil is detached, flowing water transports the soil to downslope positions. **Sediment control** measures are needed to filter, trap or otherwise remove eroded sediments before they can leave the construction site.

Additionally, sediment control measures can provide runoff control which is needed to deal with concentrated runoff. Concentrated runoff is a common occurrence on large sites containing existing drainageways and is made more severe by grading activities that removes water absorbent topsoil and compacts underlying soils. If concentrated runoff occurs, it will further erode the soil and carry it into streams, lakes, or road ditches. The basic principles behind runoff control measures are to provide stabilized channels for runoff water and to divert concentrated runoff from exposed, erodible soils.

In implementing the erosion and sediment control BMPs described in the field manual, it is important to understand them in the context of an overall construction site plan. Selection and design of BMPs must involve more than just choosing a practice from a list and installing it on a site. It also involves a planning process which considers areas for protection, the problem to be avoided, or remediated, and also factors in the characteristics of a site.

Effective site planning and design will result in minimal impacts to water quality, natural hydrologic characteristics and sensitive landscape features. Site design and the application of sound planning principles are critical factors in achieving effective soil erosion and sediment control.

Regulations & Requirements

What the law requires: Water Quality Regulations

The United States Army Corps of Engineers (USACE) and United States Environmental Protection Agency (USEPA) are the two federal agencies that regulate water quality. Both agencies have authority under the Clean Water Act (CWA) of 1977.

Specifically, the USACE has authority under Section 404 of the CWA of 1977. Additionally, the USACE has authority under Section 10: Rivers & Harbors Act of 1899 (RHA). Under the RHA, the USACE regulates “all work or structures” placed in or affecting the navigational waters of the United States (U.S.). One is required to obtain a permit from the USACE for marinas, bulkheads, bank stabilization, shoreline protection,

Regulations & Requirements (continued)

piers, pipelines, dredging, discharging or other work in navigational waters of the U.S.

The CWA of 1977 and subsequent amendments established a system of water quality standards, discharge limitations and permits. In Illinois, the USEPA has delegated responsibility for Section 401 and 402 to Illinois EPA. Prior to the issuance of a Section 404 permit, one must obtain Section 401 certification.

Section 401: Water Quality Certification

One must receive the Section 401 certification before applying for a federal permit for any work, which may result in a discharge to waters of the U.S., to ensure that actions are in accordance with Illinois' water quality standards.

Section 402: National Pollutant Discharge Elimination System (NPDES)

The General NPDES Permit No ILR10 for Storm Water Discharges from Construction Sites along with all required forms can be found on Illinois EPA's Phase II Stormwater website: <http://www.epa.state.il.us/water/permits/storm-water/>

In addition, in designated urbanized areas, there are regulations requiring permit applications for storm water discharges for municipal separate storm sewer systems (MS4s). MS4 communities are required to obtain permit coverage, develop a storm water management program and submit an annual report.

Section 404: Dredge or Fill Permitting

A permit program administered by the USACE that regulates the discharge of dredged or fill material into waters of the U.S., including wetlands and other special aquatic sites under the CWA. Section 404 permits and Section 401 Illinois EPA Water Quality Certification are linked together through the 404 permit application process.

Local Ordinances

In addition to Federal and State requirements, it is important to contact your local county or municipality to check local regulations. Local ordinances may require water quality and quantity issues to be addressed during the land development process.

Site Inspection

Inspections are an important, required element of an erosion and sediment control plan to ensure that a site meets the

Site Inspection (continued)

various water quality requirements of local, state and federal water quality regulations. The purpose of inspection is to verify that erosion and sediment control plans are being properly implemented and are adequate to prevent potential problems before they occur.

Qualified inspection personnel are those who are knowledgeable in the principles and practices of erosion and sediment control measures. **Inspectors should refer to the appropriate regulations for guidance on inspector qualifications and inspection requirements.**

As an inspector, it is important to note that:

- Erosion control is the first line of defense, and soil surface protection from raindrop impact is the most effective means of erosion control.
- Sediment control is the second line of defense, and runoff velocity reduction is the most effective means of controlling sediment.
- Erosion and sediment controls, and maintenance of these controls, must work together for maximum control.
- Day to day evaluation of erosion and sediment control methods and maintenance onsite can ensure compliance.

During an inspection, disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants (soil, oil, paints, chemicals, litter, etc.) entering the drainage system. Erosion and sediment control measures shall be observed to ensure they are operating correctly and being maintained according to specifications. Discharge locations or points shall be inspected to ascertain whether control measures are effective in preventing impacts to onsite and offsite areas as well as receiving waters. Deficiencies found during an inspection shall be corrected as soon as practicable after such inspection.

In addition, it is important to document each inspection. At a minimum, a report summarizing the scope of the inspection, name and qualifications of the inspector, date, site observations and actions taken to address concerns shall be made and maintained onsite.

Actions shall be taken to correct the concerns. All corrective measures shall be maintained throughout the duration of construction activity or until the site has been permanently stabilized.

PRACTICE SELECTION GUIDE

PRACTICE	Page #	Sheet Erosion	Rill & Gully Erosion	Streambank Erosion	Stream Channel Erosion	Sediment Control
Culvert Inlet Protection	28					2
Dewatering	31					3
Ditch Check - Manufactured	35		2			2
Erosion Control Blanket	7	2			1	2
Turf Reinforcement Mat	25	2	3	3	3	2
Inlet Protection-Paved Areas	42					2
Mulching	10	2				2
Polyacrylamide (PAM) for Temporary Soil Stabilization	13	3				3
Polyacrylamide (PAM) for Turbidity Reduction	45	3				3
Rock Check Dam	50		2			2
Rock Outlet Protection	16		2	2	2	1
Silt Fence	58	3				3
Stabilized Construction Entrance	20	1				2
Sump Pit	61					2
Temporary Concrete Washout Facility	64					2
Temporary Seeding	23	3	2	2	1	2

1: Slight Impact 2: Moderate Impact 3: Significant Impact

EROSION CONTROL PRACTICES



EROSION CONTROL BLANKET

Code 830



Credit: Ero-Tex

DEFINITION

A temporary protective blanket of degradable materials; such as straw, wood, coconut, jute or blend of these materials bound into a mat, usually with a plastic or degradable mesh or netting on one or both sides.

PURPOSE

To protect the soil surface from raindrop impact and overland flow during the establishment of vegetation, and to reduce soil moisture loss due to evaporation.

CONDITIONS WHERE PRACTICE APPLIES

Applies on exposed slopes and newly seeded areas. These blankets are used on slopes that are 1.5:1 or flatter. The most common application is on slopes and flat areas where turf will need to be established. For swales, channels and slopes steeper than 1.5:1 please refer to practice standard 831 TURF REINFORCEMENT MAT. A designer should determine blanket type.

CRITERIA

Blanket type should be selected by slope steepness, shear stress, degradation of the blanket, and the duration of time that the blanket will be protecting the soil solely without vegetation. Erosion control blankets shall be installed after the seed bed preparation, fertilizing, or liming (adjusting the soil pH) and seeding is completed. Refer to practice standards 965 TEMPORARY SEEDING and 880 PERMANENT SEEDING.

EROSION CONTROL BLANKET

(continued)



CRITERIA (continued)

The blanket shall be in firm contact with the soil. All rocks or soil clods 1.5 inches or larger must be removed prior to installation. It shall be anchored per the manufacturer's recommendation with the proper number and spacing of wire staples. The staples/pins shall be the proper width and length to meet the manufacturer's recommendations.

On slopes and in flow channels, the blanket shall be unrolled upstream to downstream parallel to the direction of flow. The upstream end of each blanket shall be anchored in a minimum 6-inch deep anchor trench, backfilled, and compacted. These blankets, when laid side by side, shall overlap a minimum of 4 inches. When more than one blanket length is needed, the materials shall be shingled at a minimum of 4 inches over the downstream piece as shown in standard drawing EROSION CONTROL BLANKET IL-530. All edges shall be stapled as per manufacturer's recommendation or at least as stringent as that stated in standard drawing IUM-530.

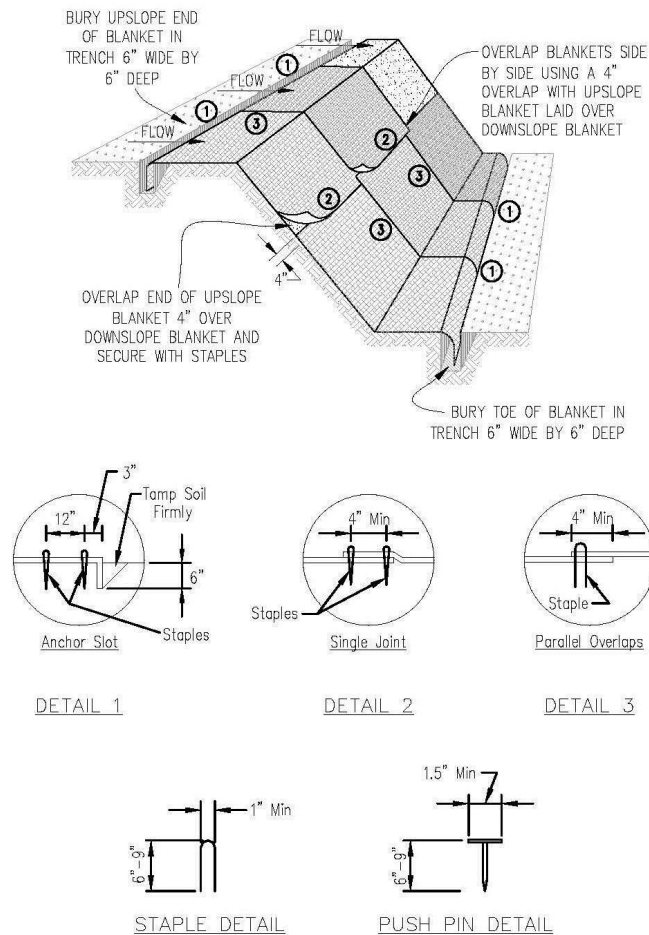
OPERATION & MAINTENANCE

When inspecting Erosion Control Blankets, check for damage due to water running under the blanket, tenting of the blanket, or if the blankets have been displaced by wind. Also, inspect locations in the flow channels where the blanket terminates and transitions into another BMP (such as riprap) for erosion under the blanket. Any areas where water seeped under the blanket, more staples may be needed per given area or more frequent anchoring trenches installed with better compaction. If significant erosion has occurred under the blanket, grading and reseeding may also be necessary. Any blankets that have been displaced will need to be reinstalled and re-stapled. This may indicate that the wrong type of blanket was chosen or improper final site grading was performed. One may need to revisit the site characteristics and then select a different type of Erosion Control Blanket or choose a different practice.

EROSION CONTROL BLANKET (continued)

(EC)

STANDARD DRAWING 530



NOTES

1. Staples shall be placed in a diamond pattern at 2 per square yard for stitched blankets. Non-stitched shall use 4 staples per square yard of material. As such, stitched blankets require 200 staples and non-stitched blankets require 400 staples per 100 square yards of material.
2. Staple or push pin lengths shall be selected based on soil type and conditions (minimum staple length is 6").
3. Erosion control material shall be placed in contact with the soil over a prepared seedbed.
4. All anchor slots shall be stapled at approximately 12" intervals.

MULCHING FOR SEEDING & SOIL STABILIZATION

Code 875



Credit: Kane-DuPage SWCD

DEFINITION

The application of mulch materials over seeded areas or for soil stabilization.

PURPOSE

To prevent erosion and surface compaction or crusting by protecting the soil surface from raindrop impact and reducing the velocity of overland flow.

To foster the growth of vegetation by conserving available moisture and providing insulation against extreme heat and cold.

CONDITIONS WHERE PRACTICE APPLIES

1. Areas that have been seeded to provide permanent vegetation.
2. Areas that have been seeded to provide temporary erosion control.
3. Areas requiring soil stabilization.
4. Areas using a light duty mulch with slopes of 4:1 (H:V) or flatter; and areas using a high performance mulch with slopes of 2:1 to 4:1.

This practice does not apply to tree and shrub planting areas. Follow the requirements of practice standard TREE AND SHRUB PLANTING 985 for mulching in these areas.

This practice does not apply to areas where concentrated flows are present; follow the requirements set forth in other practice standards, such as EROSION CONTROL BLANKET: TURF REINFORCEMENT MAT (TRM) 831 OR SODDING 925.

MULCHING FOR SEEDING & SOIL STABILIZATION

(continued)



CONDITIONS WHERE PRACTICE APPLIES (continued)

For slopes greater than 2:1 (H:V), follow the requirements of practice standard EROSION CONTROL BLANKET 830, EROSION CONTROL BLANKET: TURF REINFORCEMENT MAT (TRM) 831, SOIL BIOENGINEERING 926, OR SURFACE ROUGHENING 953.

CRITERIA

When used over seeded areas, mulching Methods 1, 2 and 3 shall be performed within 24 hours of the application of seed. Seed shall be applied in accordance with practice standards PERMANENT VEGETATION 880 or TEMPORARY SEEDING 965.

Areas to receive mulch shall be prepared in accordance with construction specification 6 SEEDING, SPRIGGING AND MULCHING.

Mulch Materials- Straw mulch shall come from oats, wheat, rye or barley and be free of diseased plant residue, weed seeds, and harmful chemical residues. Hydraulic mulch shall consist of wood, straw, or paper—or a combination of the three. Chemical mulch binder shall be approved as safe for the surrounding ecosystem. Manufactured mulches shall be installed in accordance with manufacturer's specifications.

Method 1- This method shall consist of the application of straw mulch at a rate of 2 tons/acre. This method shall be used on relatively flat surfaces in areas protected from wind.

Method 2- This method shall consist of the application of stabilized straw mulch at a rate of 2 tons/acre. This method shall be used in areas of moderate slope, when the ground is not frozen. Mulch shall be stabilized using one of the following methods:

1. Anchoring by means of mechanical stabilizer, or crimper, with dull, flat parallel disks spaced approximately eight inches apart. Mulch material shall be tucked 2" to 3" into the soil surface. Anchoring operation shall operate as close to the contour as possible.
2. Stabilizing by the application of an overspray of hydraulic mulch after the application of straw mulch. The hydraulic mulch shall be applied by an approved hydraulic mulch equipment at a minimum rate of 900 lb. of mulch per acre.

MULCHING FOR SEEDING & SOIL STABILIZATION

(continued)



CRITERIA (continued)

The hydraulic mulch shall be mixed in accordance with manufacturer's recommendations. Hydraulic mulch shall not be applied when the ambient temperature is at or below freezing.

3. Anchoring by means of stabilizing the mulch with a chemical mulch binder applied with the straw or as an overspray.

Method 3- This method shall consist of machine application of hydraulic mulch using approved hydraulic mulch equipment. The mulch shall, at a minimum, be applied at a rate of 1 ton of mulch per acre and for high performance mulch, more material may be needed. The hydraulic mulch shall be mixed in accordance with manufacturer's recommendations.

Hydraulic mulch shall not be applied when the ambient temperature is at or below freezing. To achieve full and even coverage, the hydraulic mulch shall be applied from two opposing directions.

OPERATION & MAINTENANCE

Where erosion is observed or where mulch has been displaced, the seeding and mulch, as well as other damages, shall be repaired or replaced immediately. Inspections shall occur until seeded areas are firmly established or soil stabilization is no longer required.

Operations by equipment on or near the site shall not damage the intended purpose of the mulch. Any damage shall be repaired or replaced immediately.

**POLYACRYLAMIDE (PAM) FOR TEMPORARY
SOIL STABILIZATION**
Code 893



Credit: IUM Technical Review Committee

DEFINITION

The land application of a water soluble anionic or nonionic Polyacrylamide (PAM) as a temporary agent to bind soil particles and reduce erosion.

PURPOSE

To temporarily stabilize disturbed soils and reduce erosion from wind and water during construction activities.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where timely establishment of vegetation or other temporary or permanent stabilization practices may not be feasible or practical, or to enhance or augment other stabilization practices. PAM application may be beneficial to or during:

- rough grading
- cut/fill areas
- temporary stockpiles
- temporary or permanent seeding
- staging areas
- any disturbed soils

CRITERIA

Only anionic or nonionic PAM shall be used for stormwater treatment. No cationic PAM formulations shall be used for stormwater treatment due to high toxicity to aquatic life.

Polyacrylamide use for erosion control shall be used in areas of sheet flow only. Polyacrylamide is not designed for

**POLYACRYLAMIDE (PAM) FOR TEMPORARY
SOIL STABILIZATION**
(continued)



CRITERIA (continued)

use as an erosion control best management practice in concentrated flow.

Slope steepness and length shall be taken into consideration when using PAM or discussed with manufacturer to ensure appropriate application and stabilization is achieved. Polyacrylamide shall not be applied on slopes steeper than 3:1 without additional erosion control measures such as an erosion control blanket or turf reinforcement matting or applied as an additive in a hydraulically applied mulch.

PAM shall not be applied to soils that are frozen or soils that have ice present at the surface.

When handling and mixing PAM, manufacturers' recommendations and criteria shall be followed. The method of PAM application chosen shall ensure a uniform coverage of active polymer over the areas to be stabilized. Polyacrylamide must be applied in solution.

Polyacrylamide application for soil stabilization shall be used for temporary purposes only (less than 4 months).

Application rates will vary based on manufacturer, but actual amount of polymer applied shall not exceed Material Safety Data Sheet (MSDS) or manufacturer's recommendations.

The PAM chosen to be used on site shall be tested with soils from the site where it is to be used prior to installation, to ensure successful application.

Polyacrylamides used for erosion control shall have a charge density of 8-35% by weight and have a molecular weight of 6 to 24 mg/mole.

The acrylamide used in the PAM shall also meet active monomer limits of $\leq 0.05\%$.

OPERATION & MAINTENANCE

Degradation of PAM occurs as a result of mechanical, chemical, and biological hydrolysis. The effectiveness of PAM,

**POLYACRYLAMIDE (PAM) FOR TEMPORARY
SOIL STABILIZATION**
(continued)



OPERATION & MAINTENANCE (continued)

for soil stabilization, will decrease over the course of time and the areas where PAM is used for soil stabilization should be inspected regularly for signs of erosion.

Polyacrylamide treated areas shall be monitored after each rain event to identify areas that may require reapplication.

Areas treated with PAM that are redisturbed shall be re-treated with PAM, as recommended by the manufacturer, or another equivalent soil stabilization practice.

All equipment used to apply PAM shall be thoroughly rinsed and kept clean to ensure effective application rates and prevent clogging, damage to equipment or mixing of inappropriate PAM formulations due to residual PAM.

Adjust PAM types used on-site as needed to ensure effective stabilization. No excess amounts of PAM should be disposed of directly to storm sewers or receiving waters.

ROCK OUTLET PROTECTION

Code 910



Credit: USDA-NRCS (Illinois)

DEFINITION

A section of rock protection placed at the outlet end of culverts, conduits, or channels.

PURPOSE

To prevent scour erosion at stormwater outlets, to protect the outlet structure, and to minimize the potential for downstream erosion by reducing the velocity and energy of concentrated stormwater flows. The practice also reduces the impacts of turbidity and sedimentation downstream.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the receiving channel or area. This applies to:

1. Culvert outlets of all types.
2. Pipe conduits from all sediment basins, dry and wet basin detention storm water ponds.
3. New channels constructed as outlets for culverts and conduits.
4. Where outflows from conduits or channels do not exceed 10 fps.

The design, of structurally lined aprons at the outlet of pipes and paved channel sections, applies to the immediate area or reach below the pipe or channel and does not apply to continuous rock linings of channels or streams.

The design of rock outlet protection depends entirely on the location. Pipe outlets at the top of cuts or on slopes steeper than 10 percent cannot be protected by rock aprons or riprap

ROCK OUTLET PROTECTION

(continued)



CONDITIONS WHERE PRACTICE APPLIES (continued)

sections due to reconcentration of flows and high velocities encountered after the flow leaves the apron.

CRITERIA

Tailwater depth - Depth of tailwater, immediately below the pipe outlet, must be determined for the design capacity of the pipe. Manning's Equation may be used to determine tailwater depth. If the tailwater depth is less than half the diameter of the outlet pipe and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition. Pipes which outlet onto a flat area with no defined channel will be assumed to have a Minimum Tailwater Condition.

Apron length - Apron length (L_a) shall be determined from Table 2 of this standard, located within the Illinois Urban Manual, according to the appropriate tailwater condition and velocity out of the conduits.

Apron width - When the pipe discharges directly into a well-defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

If the pipe discharges onto a flat area with no defined channels, the following criteria will be followed. Apron width will be 3 times the pipe diameter at the upstream location. The downstream width will be the pipe diameter plus the apron length for pipes with minimum tailwater conditions and the pipe diameter plus 0.4 times the apron length for pipes flowing under maximum tailwater conditions.

Bottom grade - The outlet protection apron shall be constructed with no slope (0.0% grade) along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

ROCK OUTLET PROTECTION

(continued)



CRITERIA (continued)

Alignment - Outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials - Outlet protection may be done using rock riprap, concrete block or gabions.

Thickness - The maximum thickness of the riprap layer shall be 1.5 times the maximum stone diameter for d50 of 15 inches or less; and 1.2 times the maximum stone size for d50 greater than 15 inches. Table 1 of this standard, located within the Illinois Urban Manual, lists some examples.

Stone quality - Stone for riprap shall consist of field stone or rough unhewn quarry stone. The stone shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual stones shall be at least 2.5.

The median size stone for riprap shall be determined from Tables 1 and 2 of this standard, located within the Illinois Urban Manual, for the material specified for the tailwater condition present. The placement of the riprap shall conform to construction specification 61 LOOSE ROCK RIPRAP.

Recycled concrete equivalent may be used provided it has a density of at least 150 pounds per cubic foot, and does not have any exposed steel or reinforcing bars.

Filter Fabric - In all cases, filter fabric shall be placed between the riprap and the underlying soil to protect soil movement into and through the riprap. The material must meet or exceed requirements specified in material specification 592 GEOTEXTILE Table 2 Class I.

OPERATION & MAINTENANCE

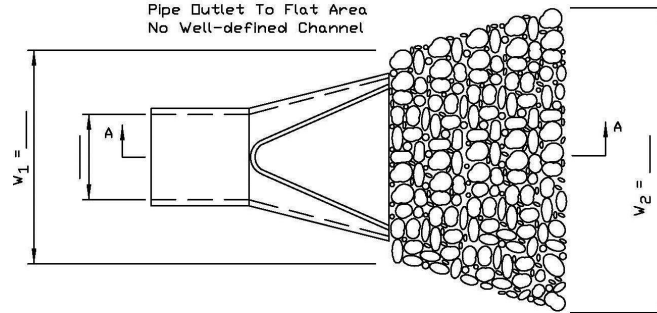
Inspect riprap outlet structures after heavy rains to see if any erosion around or below the riprap has taken place or if stones or geotextile fabric has been dislodged. Make all needed repairs immediately to prevent further erosion or sediment discharge.

ROCK OUTLET PROTECTION (continued)

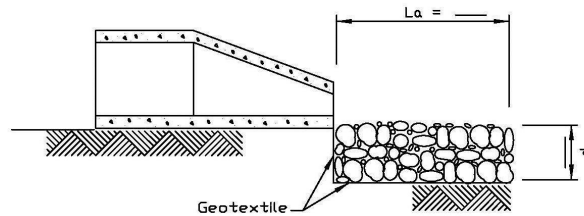
EC

STANDARD DRAWING 610: Pipe Outlet to Flat Area

Pipe Outlet To Flat Area
No Well-defined Channel



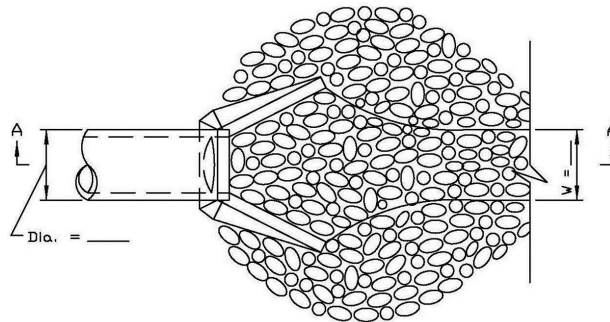
PLAN



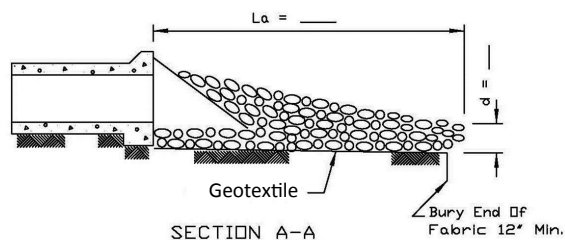
SECTION A-A

STANDARD DRAWING 611: Pipe Outlet to Channel

Pipe Outlet To Well-Defined Channel



PLAN



SECTION A-A

STABILIZED CONSTRUCTION ENTRANCE

Code 930



Credit: USDA-NRCS (Illinois)

DEFINITION

A stabilized pad of aggregate underlain with filter fabric located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

PURPOSE

To reduce or eliminate the tracking of sediment onto public right-of-ways or streets.

CONDITIONS WHERE PRACTICE APPLIES

A stabilized construction entrance shall be used at all points of construction ingress and egress.

CRITERIA

Stabilized construction entrance shall meet the following requirements:

Aggregate size: IDOT coarse aggregate gradations: CA-1, CA-2, CA-3 or CA-4

Thickness: 6 inches or more

Stone placement: The stone for the entrance shall be placed according to construction specification 25 ROCKFILL. Placement will be by Method 1 and compaction will be class III.

Width: 14 feet minimum but not less than the full width of ingress or egress points.

Length: As required, but not less than 70 feet, except on a single residence lot where a 30 feet minimum shall apply.

STABILIZED CONSTRUCTION ENTRANCE

(continued)



CRITERIA (continued)

Filter fabric shall be used under the aggregate to minimize the migration of stone into the underlying soil by heavy vehicle loads. The filter fabric shall meet the requirements of materials specification 592 GEOTEXTILE Table 2 Class I.

All surface water following or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.

Washing- If conditions on the site are such that the vehicles traveling over the gravel do not remove the majority of the mud, then the tires of the vehicles must be washed before entering a public road. Wash water must be carried away from the entrance to a sediment trapping facility such as practice standard TEMPORARY SEDIMENT TRAP 960. A wash rack may be used to make washing more convenient and effective.

Location – The washing station should be located to provide for maximum utility by all construction vehicles.

Timing – The graveled access shall be installed as soon as practical after the start of site disturbance.

Removal – The entrance shall remain in place and be maintained until the disturbed area is stabilized by permanent best management practices.

OPERATION & MAINTENANCE

The entrance shall be maintained in a condition that will prevent tracking of sediment onto public right-of-ways or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped or washed onto public right-of-ways must be removed immediately. Periodic inspection and needed maintenance shall be provided after each rain.

EC

Existing Ground

Existing Pavement

Wash Rack (Optional)

Coarse Aggregate

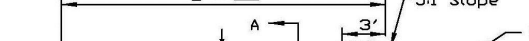
14' Min

10' Min

10' Min

Positive Drainage To Sediment Trapping Device.

Must Extend Full Width Of Ingress And Egress Operation.



A side elevation diagram of a roadway construction detail. The diagram shows a cross-section of a road with various layers and features. Key elements include:

- Existing Ground:** The base level on the left side of the diagram.
- Filter Fabric:** A layer of material (represented by a cross-hatch pattern) placed over the existing ground.
- Min 6":** A vertical dimension indicating the minimum thickness of the filter fabric layer.
- Aggregate Base:** A layer of material (represented by a stippled pattern) above the filter fabric.
- Aggregate Surface:** A layer of material (represented by a dotted pattern) above the aggregate base.
- 5:1 Slope:** A sloped section of the aggregate surface, indicated by a dashed line and the text "5:1 Slope".
- 3':** A horizontal dimension indicating the width of the sloped section.
- Mountable Berm (Optional):** A raised section of the road surface, indicated by a dashed line and the text "Mountable Berm (Optional)".
- Existing Pavement:** The road surface on the right side of the diagram.
- Dimensions:** A horizontal dimension $L =$ is shown at the top, and a vertical dimension A is shown on the right side.

SIDE ELEVATION

SECTION A-A

SECTION B-B

TEMPORARY SEEDING

Code 965

EC



Credit: Winnebago County SWCD

DEFINITION

Planting rapid-growing annual grasses or small grains, to provide initial, temporary cover for erosion control on disturbed areas.

PURPOSE

To temporarily stabilize denuded areas that will not be brought to final grade or on which construction will temporarily cease.

CONDITIONS WHERE PRACTICE APPLIES

To all cleared, unvegetated, or sparsely vegetated soil surfaces where vegetative cover is needed for less than 1 year. Applications of this practice include diversions, dams, temporary sediment basins, temporary road banks, topsoil stockpiles and any other exposed areas of a construction site.

CRITERIA

Plant Selection- Select plants appropriate to the season and site conditions from the associated table, for this standard, located within the Illinois Urban Manual.

Site Preparation- Prior to seeding, install necessary erosion control and sediment control practices, if possible. Remove large rocks or other debris that may interfere with seedbed preparation or seeding operations.

Seedbed Preparation:

1. Fertilizer: In advance of utilizing fertilizer, please consult local regulations for specific requirements regarding application of nutrients. A soil test may be helpful in

TEMPORARY SEEDING

(continued)



CRITERIA (continued)

determining site specific fertilizer needs. In lieu of site specific recommendations, apply 500 pounds per acre of 10-10-10 fertilizer or equivalent. Incorporate lime, if needed, and fertilizer into the top 2-4 inches of soil. If the seeding period is less than 30 days, fertilizer will not be required.

2. Prepare a seedbed of loose soil to a depth of 3 to 4 inches. If recent tillage or grading operations have resulted in a loose surface, additional tillage or roughening may not be required except to break up large clods. If rainfall caused the surface to become sealed or crusted, loosen it just prior to seeding by disking, raking, harrowing, or other suitable methods. Groove or furrow slopes steeper than 3:1 on the contour before seeding.

Seeding: Seed shall be evenly applied with a cyclone seeder, drill, cultipacker seeder or hydroseeder. Small grains shall be planted no more than one inch deep. Grasses shall be planted no more than 1/2 inch deep.

Follow broadcast seedings by cultipacking, dragging a harrow or raking.

Mulching- Seedings made during optimum spring and summer seeding dates, with favorable soil and site conditions, will not require mulch. When temporary protection is needed see practice standard MULCHING 875.

OPERATION & MAINTENANCE

Reseed areas where seedling emergence is poor, or where erosion occurs, as soon as possible. Protect from vehicular and foot traffic. Control weeds by mowing.

Table 1: Temporary Seeding, Species, Rates & Dates

Species	Lbs./Acre	Lbs./1000 ft. 2	Seeding Dates
Oats	90	2	Early spring-July 1
Cereal Rye	90	2	Early spring-Sept. 30
Wheat	90	2	Early spring-Sept. 30
Perennial Ryegrass	25	0.6	Early spring-Sept. 30

TURF REINFORCEMENT MAT (TRM)

Code 831



Credit: ERO-TEX

DEFINITION

Protective reinforced materials formed into a non-degradable mat.

PURPOSE

To reinforce vegetation against medium to high flow conditions, ice, wave action, and to protect the soil surface from rain drop impact.

CONDITIONS WHERE PRACTICE APPLIES

Area of concentrated flow where natural vegetation alone will not sustain expected flow conditions or provide sufficient long term erosion protection. Areas where shorelines are susceptible to ice and wave action or hard armoring is inappropriate due to landscape features such as mowing.

CRITERIA

The Turf Reinforcement Mat (TRM) shall be selected based on shear stress, steepness of slope, and expected flow velocities.

The TRM shall be placed the same day as seed placement.

Degradable staples shall not be used in area where turf establishment will not happen quickly.

The TRM shall be in firm contact with the soil. All rocks or soil clods 1.5 inches or larger must be removed prior to installation. The TRM shall be anchored per manufacturer recommendations and using the proper number and spacing of staples. The staples/pins shall be the proper width and

TURF REINFORCEMENT MAT

(continued)



CRITERIA (continued)

length to meet the manufacturer's recommendations and IUM Standard Drawing IUM 531 EROSION CONTROL BLANKET: TURF REINFORCEMENT MAT and IUM Material Specification 805 EROSION CONTROL BLANKET.

Soil filled TRMs shall have an appropriate erosion control blanket installed over the top to hold the soil in place.

In concentrated flow channels the TRMs shall be unrolled upstream to downstream, parallel to the direction of flow. The upstream edge of the TRM shall be toed into an anchor trench a minimum of 6" wide by 6" deep. All overlaps shall be a minimum of 4".

Staple check slots are recommended at 40' intervals using a double row of staples staggered 4" apart and 4" on center over the width of the channel.

OPERATION & MAINTENANCE

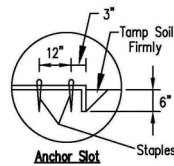
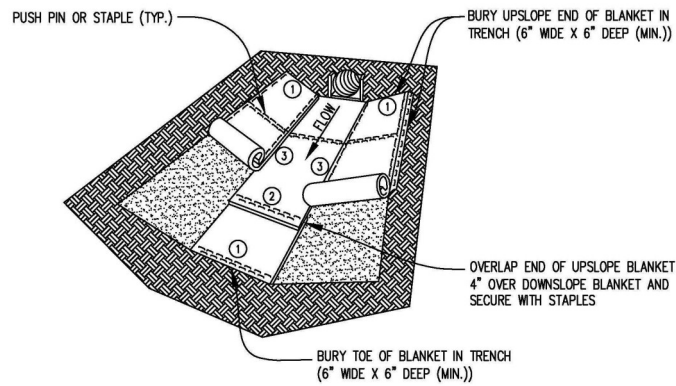
When mowing, mower decks shall remain raised all season until TRM has either dropped down into the soil or incorporated into the root structure.

Inspect all TRMs periodically during establishment. Repair or replace any areas that may be failing. If the TRM has failed due to high flow, more substantial TRMs or hard armament may be needed.

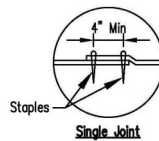
TURF REINFORCEMENT MAT (continued)

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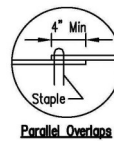
STANDARD DRAWING 531: Turf Reinforcement Mat



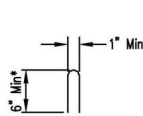
DETAIL 1



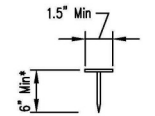
DETAIL 2



DETAIL 3



STAPLE DETAIL



PUSH PIN DETAIL

NOTES

1. For sandy soil conditions, staple or push pin shall be a minimum of 8".

SEDIMENT CONTROL PRACTICES



CULVERT INLET PROTECTION

Code 808



Credit: Kendall County SWCD

DEFINITION

A temporary sediment filter located at the inlet to storm sewer culverts.

PURPOSE

To prevent sediment from entering, accumulating in and being transferred by a culvert and associated drainage system prior to permanent stabilization of a disturbed project area.

CONDITIONS WHERE PRACTICE APPLIES

Where a culvert and associated drainage system are to be made operational prior to the stabilization of the disturbed drainage area.

CRITERIA

All culvert inlet protection shall be constructed in a manner that will facilitate cleanout and disposal of trapped sediment and minimizes interference with construction activities.

All culvert inlet protection shall be constructed in such a manner that any resultant ponding of stormwater will not cause inconvenience or damage to adjacent areas or structures.

Stone Culvert Inlet Protection

Stone culvert inlet protection has a maximum expected useful life of 18 months.

The maximum area draining to this practice shall be 3 acres.

CULVERT INLET PROTECTION

(continued)



CRITERIA (continued)

For drainage areas larger than 3 acres, install a temporary sediment trap meeting the requirements of practice standard TEMPORARY SEDIMENT TRAP 960.

The stone culvert inlet protection is a small stone berm in a horseshoe shape around the culvert inlet. The upstream half of the stone berm shall consist of coarse aggregate meeting IDOT CA-1, CA-2, CA-3 or CA-4 gradation and the downstream half of the stone berm shall consist of riprap meeting IDOT RR-3 or RR-4 gradation. In addition, any riprap that is used for permanent protection on the culvert inlet embankment shall meet IDOT Quality Designation A.

Filter fabric shall be used under the aggregate. The filter fabric shall meet the requirements of materials specification 592 GEOTEXTILE Table 2 Class I.

The downstream toe of the stone berm shall be no closer than 24 inches from the culvert opening in order to provide an acceptable emergency outlet for flows from larger storm events.

Maximum height of the stone berm shall be 3 feet.

Side slopes of the stone berm section shall not exceed 2:1 horizontal to vertical.

The stone berm shall be tied into the culvert embankment a minimum of 1 foot above the design elevation of the stone berm.

OPERATION & MAINTENANCE

The structure shall be inspected after every runoff producing rain and repairs made as needed.

If aggregate is used, it shall be replaced or cleaned when inspection reveals that clogged voids are causing ponding problems.

Sediment shall be removed and the impoundment restored to its original dimensions when sediment has accumulated to one-half the height of the fence or stone berm.

Removed sediment shall be deposited in a suitable area and

CULVERT INLET PROTECTION

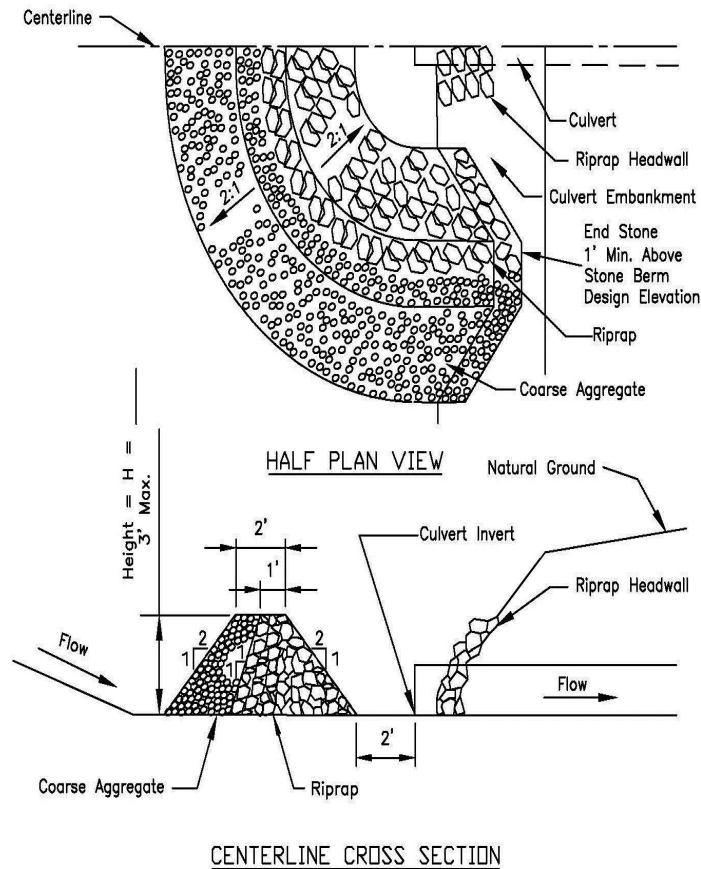
(continued)

CRITERIA (continued)

in such a manner that it will not erode and cause sedimentation problems.

Temporary structures shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

STANDARD DRAWING 508ST: Culvert Inlet Protection Stone



NOTES

1. The maximum drainage area to the culvert being protected is 3 acres.
2. Tie the storm berm into the culvert embankment a minimum of 1 foot above the design elevation of the stone berm.

DEWATERING

Code 813



Credit: ERO-TEX

DEFINITION

The removal of water from construction sites.

PURPOSE

1. To facilitate construction in areas with surface water or a high water table.
2. To prevent erosion and sediment transport.
3. To provide worksite safety.
4. To prevent pollution of groundwater or surface water.
5. To preserve downgradient natural resources and property.

CONDITIONS WHERE PRACTICE APPLIES

To any construction site (includes any onsite and offsite excavated areas), where the presence of water creates unsafe conditions, potential damage, or restricts construction operations.

Construction sites where water is present in any form, including intermittent runoff, streams, standing water, ground water, or other bodies of water.

CRITERIA

Dewatering shall consist of the removal of surface water and/or ground water by diverting and/or removing water from construction sites, within a watershed, as needed to perform the required construction in accordance with the specifications.

All outlets for dewatering discharges shall be stable and protected from erosion.

DEWATERING

(continued)

SC

CRITERIA (continued)

Diverting Surface Water- Cofferdams, channels, sumps, flumes, and temporary diversions shall be built and maintained, as needed.

Installation of cofferdams and sumps shall follow the requirements as outlined in practice standards COFFERDAM 803 and SUMP PIT 950.

Excess surface runoff shall be diverted from the construction area as outlined in the practice standards TEMPORARY DIVERSION 955, TEMPORARY SWALE 980, DIVERSION 815, AND DIVERSION DIKE 820.

A permanent stream or other concentrated flow shall be diverted away from the construction area as outlined in practice standard TEMPORARY STREAM DIVERSION 976.

Removing Water- Drains, sumps, pumps, casings, well points and all other items required to dewater the site shall be furnished, installed and maintained.

Well points and deep wells shall be placed in intervals along the construction area as necessary to depress the groundwater table during construction. Monitor wells shall be installed where measurement of the effectiveness of the pumping is required. Well point and deep well dewatering shall be terminated as soon as practical.

In poorly drained soil areas, or where well dewatering is not practical, pumping directly from the construction trenches shall be allowed.

Erosion and Sediment Control- All dewatering activities shall be done in a manner that does not negatively impact the water quality of the water table or cause erosion or transport sediment or other pollutants.

Sediment removal shall be provided using the following practices or combination of practices depending on the sediment, dewatering method, location and amount of dewatering.

Where sumps are used, they shall meet the requirements of

DEWATERING

(continued)



CRITERIA (continued)

SUMP PIT 950. In addition, where space is available, TEMPORARY SEDIMENT TRAP 960 shall be used to detain water and remove sediment from pumping and diversion operations. Where there is limited space, a PORTABLE SEDIMENT TANK 895 shall be used to retain sediment from dewatering operations. POLYACRYLAMIDE (PAM) FOR TURBIDITY REDUCTION AND SEDIMENT CONTROL 894 may also be used, as appropriate.

Where there is low, intermittent amounts of dewatering, pumps with filtration bags shall be used. Filtration bags shall be attached to pump discharges and surrounded with a secondary containment or on a stabilized, flat area. Filter bags shall not be placed, whole or partially, within aquatic areas (wetlands, streams, etc.)

The material for the filtration bag shall meet the requirements of material specification 592 GEOTEXTILE, Table 2, Class I with a minimum tensile strength of 200 lbs. The filtration bag shall be sized per manufacturer recommendations and based on the size of the pump. The largest size pump to be used with a filtration bag shall be 4-inch diameter.

Removal of Dewatering Facilities- The temporary dewatering areas shall be removed after they have served their purpose. The dewatering areas shall be graded and stabilized with appropriate erosion control practices. The dewatering sites after removal shall not create any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

OPERATION AND MAINTENANCE

The frequency of inspections shall depend on the dewatering method, amount of discharge, potential damage, and quality of the receiving bodies of water. The frequency of inspections and specific tasks shall be identified:

1. Inspections shall be conducted to ensure proper operation and compliance with any permits or water quality standards.

DEWATERING

(continued)

SC

OPERATION AND MAINTENANCE (continued)

2. Accumulated sediment shall be removed from the flow area and temporary diversions shall be repaired, as required.
3. Outlet areas shall be checked and repairs shall be made in a timely manner, as needed.
4. Pump outlets shall be inspected for erosion, and sumps shall be inspected for accumulated sediment.
5. Dewatering bags shall be removed and replaced when half full of sediment or when the pump discharge has reduced to an impractical rate.
6. If the receiving area is showing any signs of cloudy water, erosion or sediment accumulation, discharges shall be stopped immediately once safety and property damage concerns have been addressed.
7. Sediment shall be disposed in accordance with all applicable laws and regulations.

DITCH CHECK (MANUFACTURED)

Code 814



Credit: ERO-TEX

DEFINITION

A pre-fabricated temporary dam or flow thru device installed across a swale or road ditch to reduce the velocity of water.

PURPOSE

To reduce the velocity of concentrated storm water flows thereby reducing erosion of the swale or road ditch, trap sediment, promote settling of suspended solids behind the check, reduce scour and channel erosion, and promote infiltration when suitable soils are present.

CONDITIONS WHERE PRACTICE APPLIES

Where grading activity occurs in areas of concentrated flows, with slopes less than 8% and flow velocities less than 8 cfs, and a temporary measure is needed to control erosion of the channel until permanent stabilization practices can be implemented.

Manufactured ditch checks should be applied to ditches that cannot receive a permanent non-erodible lining.

CRITERIA

The minimum height of manufactured ditch checks shall be 10 inches for synthetic porous runoff control structures and permeable ditch checks and shall not exceed a maximum height of 15 inches for other manufactured products.

Manufactured ditch checks such as rolled erosion control products must be trenched in 3 inches and staked through the

DITCH CHECK (MANUFACTURED)

(continued)

SC

CRITERIA (continued)

outer mesh material at a 45 degree angle in the direction of flow. Staking this product as directed will prevent the ditch check from riding up the stakes during high flows. If rolled erosion control products are spliced, a minimum overlap equal to the diameter of the product shall be used.

Urethane foam geotextile ditch checks must be pinned from the middle out toward the edge of the fabric. The upstream ends of the urethane foam apron must be keyed into the soil to prevent under cutting of the check.

Plastic permeable ditch checks and synthetic porous runoff control structure ditch checks must have either a biodegradable erosion control blanket or permanent erosion control blanket underneath them. The blanket must be toed into the soil and pinned to prevent undercutting of the check. Each of these ditch check types has a particular anchor pin system that must be followed to ensure stability of the panel from flows and proper connection of panel sections.

A manufactured ditch check shall be selected to manage flows from a 10 year storm event or selected to match the ditch lining design year flow.

All manufactured ditch checks must be installed to ensure the center of the structure is at least 6 inches lower than outside edges of check to allow water to flow over the middle of the ditch check and not around the edges. Each manufactured ditch check shall have a central section/portion forming a horizontal weir and inclined portions which extend from the weir up the embankment and the backslope. Some manufacturers have criteria for number of panels or sections up slope based upon side slope ratios.

The control structures must be placed perpendicular to the direction of water flow. There must be firm contact between the bottom of the check and soil or base material, such as an erosion control blanket.

The anchoring systems specified for each type of manufactured ditch check must be able to endure flow rates

DITCH CHECK (MANUFACTURED)

(continued)



CRITERIA (continued)

designed for the application including freeze thaw cycles.

Manufactured ditch checks must be spaced such that the top of the downstream check shall be at the same elevation as the bottom of the upstream check, or as specified in manufacturer's specifications.

Manufactured ditch checks, similar to other ditch check types, must be placed such that ponding water will not result in nuisance conditions to adjacent areas.

The manufacturer's specifications and recommendations shall be followed when selecting the appropriate manufactured ditch check.

OPERATION & MAINTENANCE

Sediment shall be removed from the upstream side of the ditch check when sediment has reached one-half the height of the ditch check. Inspect any fabric for tears or dislodging after sediment is removed and repair or replace immediately. Additional requirements may apply per manufacturer specifications or permit requirements.

Products shall be maintained in same condition as when installed. Rolled erosion control ditch checks must be replaced whenever tears, splits, unraveling or compressed straw or excelsior is apparent.

Any fabric used as a base or apron underneath the plastic permeable or synthetic porous runoff control structure ditch checks that is torn or dislodged must be replaced or repaired.

Remove debris (litter, corn stalks) when observed.

Water or sediment going around the ditch check indicates incorrect installation or that maintenance is required. The flow of water over the center of the ditch check or through the device must be reestablished. The manufactured ditch check may need lengthening up the side slope, sediment removed from the pores, or the flow velocities are too great for the type of ditch check.

DITCH CHECK (MANUFACTURED)

(continued)

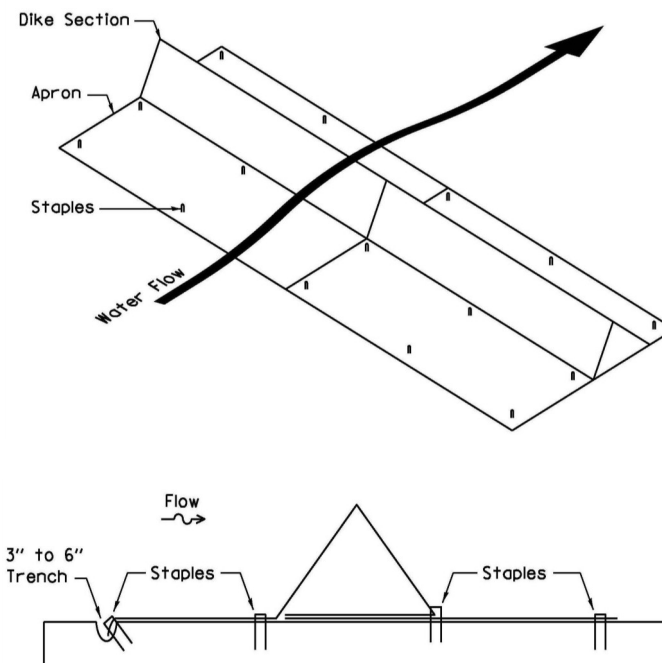
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OPERATION & MAINTENANCE (continued)

Manufactured ditch checks are not designed to be part of the permanent storm water system. Their material components are not conducive to being incorporated into soils once they have reached their useful life.

Remove manufactured ditch checks once all upslope areas are stabilized and swale or ditch stabilization is complete. The biodegradable form of plastic permeable ditch checks can be left in place on top of the permanent stabilization such as blankets to provide velocity reductions provided they are not a hazard to mowing operations. Vegetated ditch checks may remain in place within the ditch or swale if permanent vegetation is desired, such as in the case of establishing a vegetated swale.

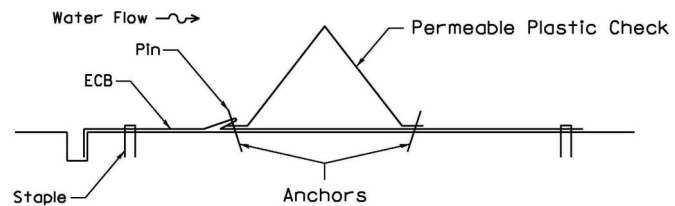
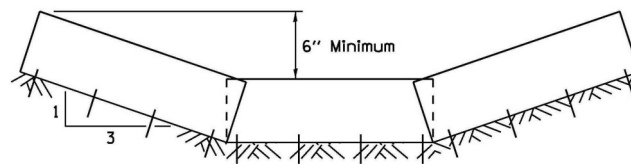
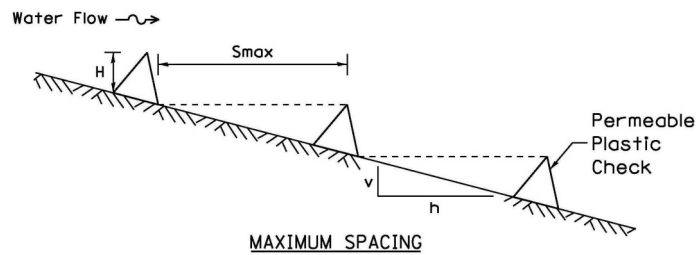
STANDARD DRAWING 514UF: Urethane Foam Geotextiles



DITCH CHECK (MANUFACTURED) (continued)

SC

STANDARD DRAWING 514PC: Plastic Permeable Checks

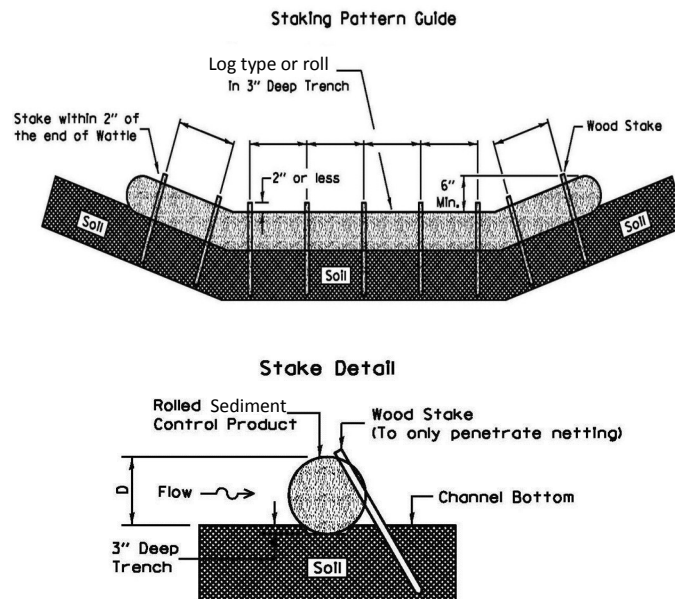


DITCH CHECK (MANUFACTURED)

(continued)



STANDARD DRAWING 514RC: Rolled Sediment Control Products



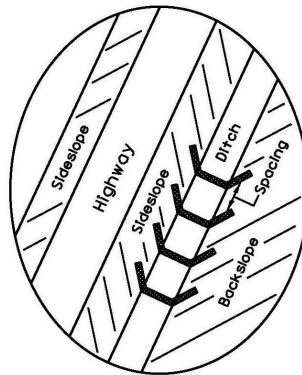
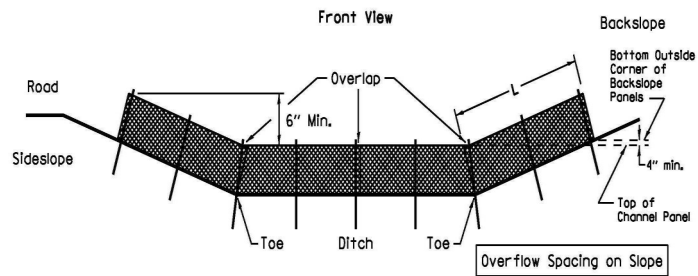
NOTES

1. Overlap minimum is the diameter of the roll.
2. Stake spacing shall be a maximum of no more than 3' between stakes.
3. Ends shall be turned at least 6" upslope.
4. Recommended stakes are 1 1/8" wide x 1 1/8" thick x 24" long.
5. Stakes shall not extend above the log type or roll more than 2".
6. Spacing: The toe of the upstream ditch check shall create a horizontal line with the downstream ditch check.

DITCH CHECK (MANUFACTURED) (continued)

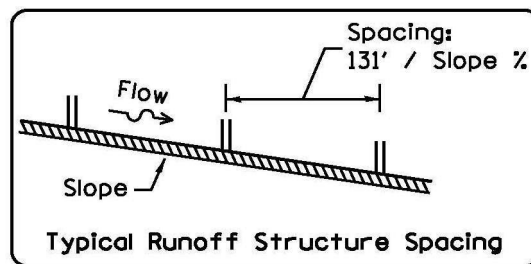
SC

STANDARD DRAWING 514SC: Synthetic Porous Runoff Control Structures



Minimum Installation Length up Slopes

Slope	Panels
2:1	1
2.5:1	1.5
3:1	2
3.5:1	2
4:1	2
5:1	2.5
6:1	2.5



INLET PROTECTION-PAVED AREAS

Code 861



Credit: ERO-TEX

DEFINITION

A temporary sediment control barrier formed around or in a storm drain inlet in paved areas.

PURPOSE

To help prevent sediment from entering storm drains during construction.

CONDITIONS WHERE PRACTICE APPLIES

Various inlet protection practices are used where storm drain inlets are to be made operational during construction operations and before permanent stabilization of the disturbed drainage area. The methods of inlet protection are effective for areas that are paved and areas under construction. Sheet flow or concentrated flows are permitted with these methods. These methods of inlet protection are not applicable for direct discharges from pumps unless the pump discharges are treated prior to discharging to the inlets.

CRITERIA

The primary sediment to be trapped shall be identified and the appropriate filter requirements specified per manufacturers' recommendations.

When flow rates are critical to the functioning of a site, the selection of the inlet protection device shall include the specified flow rate and the selection of the filter made in conjunction with the specifications for trapping sediment.

Inlet protection using geotextile fabric only (specifically, a piece of fabric cut and placed under the lid) shall not be allowed.

INLET PROTECTION—PAVED AREAS

(continued)

SC

CRITERIA (continued)

Drop-in inlet protection devices shall include an overflow which prevents stormwater from flooding paved areas.

OPERATION & MAINTENANCE

Each inlet protection practice or device shall be inspected after every runoff event. Accumulated sediment shall be removed per manufacturer's directions but not less than when the capacity for sediment storage has been reduced by half. Sediment that has been removed shall be placed such that it will not reenter the storm drain system.

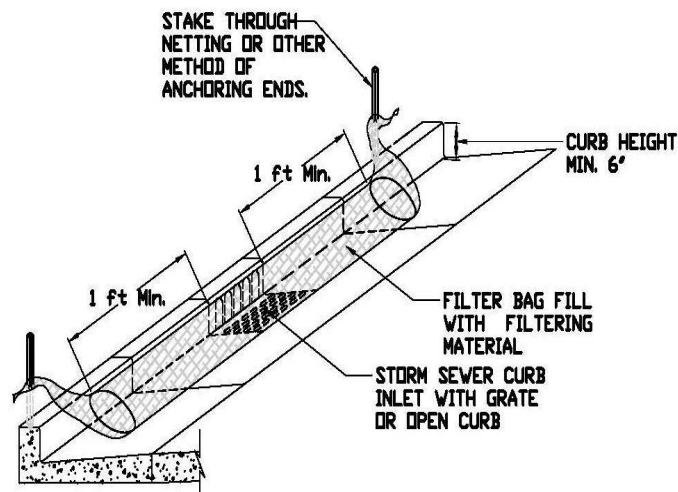
Repairs or replacement of inlet protection devices shall be made immediately.

For devices to be kept in place in the winter season, areas shall be cleared of any sediment accumulation and prepared or protected for snow removal operations.

Inlet protection practices shall be removed upon job completion.

STANDARD DRAWING 561C: Inlet Protection Paved Areas

Curb Protection

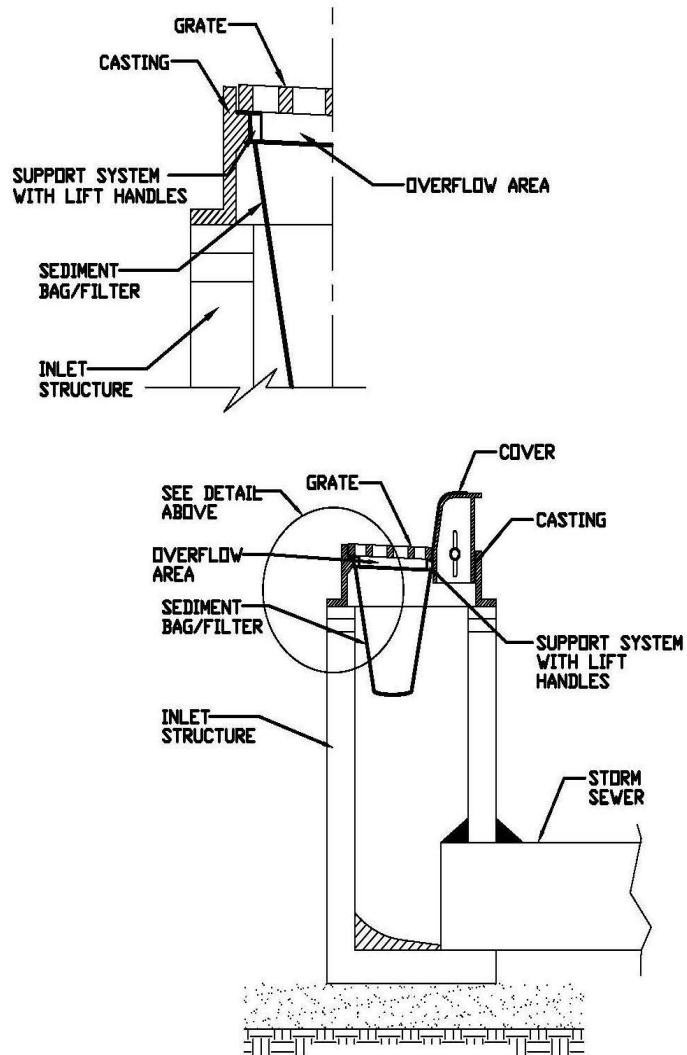


INLET PROTECTION—PAVED AREAS

(continued)

SC

STANDARD DRAWING 561D: Inlet Protection Paved Areas
Drop-In Protection



POLYACRYLAMIDE (PAM) FOR TURBIDITY REDUCTION AND SEDIMENT CONTROL



Code 894



Credit: Jonathon Koepke, CPESC

DEFINITION

The application of a granular and/or semi-hydrated block of water soluble Anionic or Nonionic Polyacrylamide (PAM) to flocculate fine clays and silts in stormwater and enhance sediment removal.

PURPOSE

To prevent sediment and turbid stormwater from entering into drainageways, storm sewers and receiving waters.

CONDITIONS WHERE PRACTICE APPLIES

Where turbid stormwater associated with the suspension of fine soil particles needs to be clarified and sediment captured prior to discharge. Examples of applicable activities may include the following:

- dewatering
- pipe discharges
- channelized or concentrated flow paths
- storm sewer conveyance and collection systems
- temporary diversions
- bypass channels

CRITERIA

Only anionic or nonionic PAM shall be used for stormwater treatment. No cationic PAM formulations shall be used for stormwater treatment due to high toxicity to aquatic life.

Polyacrylamide shall not be used in an effort to flocculate large sediment particulates such as sands and any PAM

**POLYACRYLAMIDE (PAM) FOR TUBIDITY REDUCTION
AND SEDIMENT CONTROL**
(continued)

SC

CRITERIA (continued)

treatment system used shall be designed to protect the PAM from heavy sediment loads and larger sized sediment particulates.

When handling and mixing PAM, Manufacturers' recommendations and criteria shall be followed.

Polyacrylamides for stormwater clarification are soil specific. PAM shall be tested with on-site soil and water samples to determine which formulation performs most effectively.

Polyacrylamide must mix completely within the water column for sufficient flocculation of sediment to occur. Mixing time of the polymer shall be calculated to determine where flocculated sediment will form (usually occurs within one to three minutes of mixing time).

All flocculated sediment formed during the mixing process shall be trapped before the water is discharged from the site (See IUM technical standards for TEMPORARY SEDIMENT TRAP 960 and TEMPORARY SEDIMENT BASIN 957). Capture and removal of sediment shall take place within the limits of disturbance and prior to discharge of stormwater off-site. This may include the combined usage of other sediment control best management practices in order to effectively remove sediment from stormwater discharge.

Polyacrylamides used for sediment control and turbidity reduction shall have a charge density of 8-35% by weight and have a molecular weight of 6 to 24 mg/mole.

The acrylamide used in the PAM shall have active monomer limits of $\leq 0.05\%$ by weight.

OPERATION & MAINTENANCE

PAM treatment system shall be inspected daily or weekly depending on the design of the system used and after rainfall events. Inspections shall be conducted to ensure the effectiveness of the treatment system and to assess the need for maintenance and clean out of the sediment capturing device(s). Monitor runoff, the treatment system, and the

**POLYACRYLAMIDE (PAM) FOR TURBIDITY REDUCTION AND
SEDIMENT CONTROL** (continued) **SC**

OPERATION & MAINTENANCE (continued)

clarity of stormwater discharge to ensure effectiveness and direct maintenance as necessary.

Polyacrylamide shall be reapplied or additional PAM formulations shall be added as necessary to achieve proper flocculation of sediments.

Adjust PAM formulations and products as needed if soil variability is encountered during treatment.

Replace semi-hydrated PAM blocks as necessary to achieve effective flocculation of sediments.

Keep all unapplied PAM dry and protected from weather prior to use.

Maintain sediment screens, filters, traps, and other sediment containment devices used with these systems as necessary.

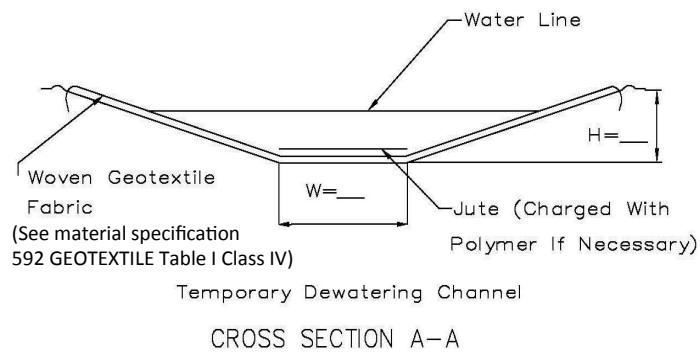
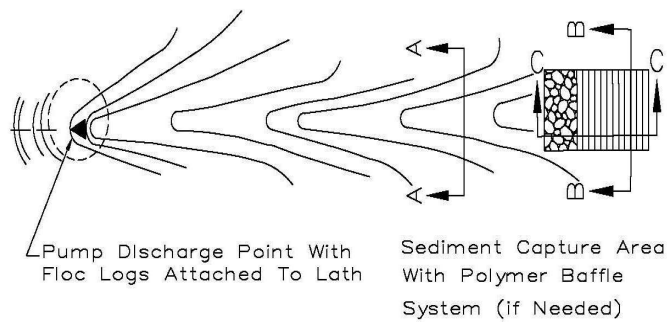
Sediment shall be removed from the capturing system and the impoundment restored to its original dimensions when sediment has accumulated to one-half the height of the containment area.

Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems.

Temporary PAM treatment systems shall be removed when they have served their useful purpose, but not before the upslope area and source of sediment or turbidity has been permanently stabilized.

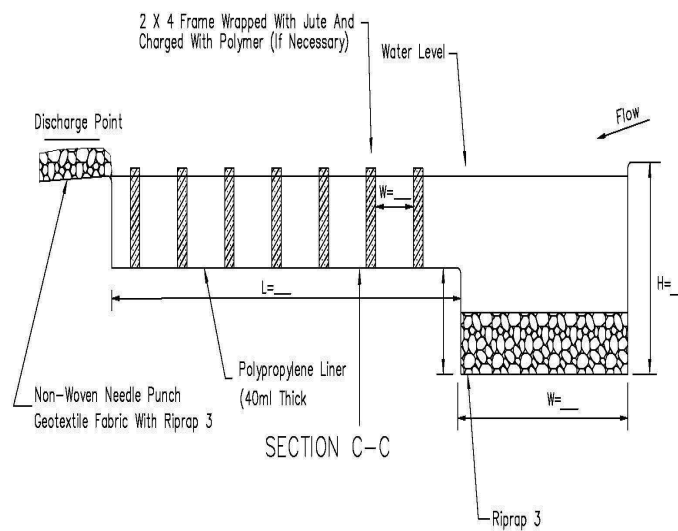
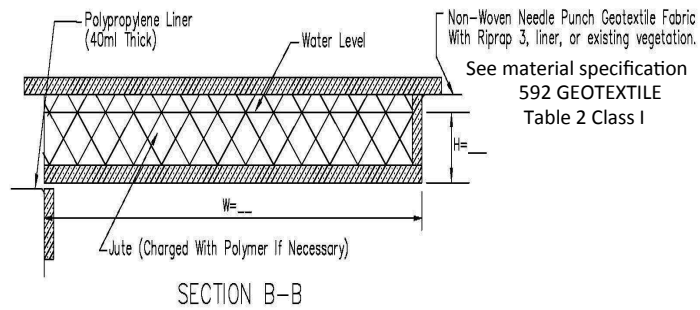
**POLYACRYLAMIDE (PAM) FOR TUBIDITY REDUCTION AND
SEDIMENT CONTROL** (SC)
(continued)

STANDARD DRAWING 594A: Temporary Mixing Swale with
Optional Baffle Pit



**POLYACRYLAMIDE (PAM) FOR TUBIDITY REDUCTION AND
SEDIMENT CONTROL** (continued) **SC**

STANDARD DRAWING 594B: Temporary Mixing Swale with
Optional Baffle Pit



ROCK CHECK DAM

Code 905



Credit: McHenry-Lake SWCD

DEFINITION

A small rock dam construction across a grassed swale, road ditch or temporary swale.

PURPOSE

To reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the swale or ditch, trap sediment generated from adjacent areas or the ditch itself and to increase infiltration when suitable soils are present.

CONDITIONS WHERE PRACTICE APPLIES

This practice, utilizing a combination of rock sizes, is limited to use in small grassed swales or open channels that drain 10 acres or less. It shall not be used in a perennial stream where protection of the flowing stream is the objective.

Some specific applications include:

1. Temporary ditches or swales that, because of their short time of service, cannot receive a non-erodible lining but still need protection to reduce erosion.
2. Permanent ditches or swales that cannot receive a permanent non-erodible lining for an extended period of time.
3. Either temporary or permanent ditches or swales that need protection during the establishment of grass linings.
4. An aid in the sediment trapping strategy for an active construction site. This practice is not a substitute for major perimeter trapping measures.

CRITERIA

The drainage area of a ditch or swale being protected shall not exceed 2 acres when rock meeting IDOT CA-1, CA-2, CA-3

ROCK CHECK DAM

(continued)



CRITERIA (continued)

or CA-4 gradation is used alone and shall not exceed 10 acres when rock meeting IDOT RR-3 or RR-4 gradation and Quality Designation A is added on the downstream side of the dam.

The maximum height of the rock check dam shall be 3.0 feet. The top of the rock check dam shall be a minimum of 1.0 feet below the top of the ditch or swale.

The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the rock at the center of the downstream dam.

The rock check dams shall be placed such that the resultant ponding will not cause inconvenience or damage to adjacent areas or structures.

Filter fabric shall be used under the aggregate. The filter fabric shall meet the requirements of materials specification 592 GEOTEXTILE Table 2 Class I.

The center of the rock check dam shall be at least 6 inches lower than the sides. Hand or mechanical placement will be necessary to achieve complete coverage of the ditch or swale and to assure that the center of the dam is lower than the sides. Rock shall be placed in according to construction specification 25 ROCKFILL using Method 1 placement and Class III compaction.

OPERATION & MAINTENANCE

If any erosion has taken place around or below the rock check dam or if rocks have been dislodged, repairs shall be made to prevent further damage. Sediment shall be removed once it has accumulated to one-half the height of the rock check dam. The center of the rock check dam shall also be inspected to insure that the center of the dam is lower than the sides.

Unless incorporated into a permanent stormwater management control, rock check dams must be removed when their useful life has been completed. In temporary ditches and swales, rock check dams should be removed and the ditch filled in when they are no longer needed. In permanent structures, rock check dams should be removed when a permanent lining can be installed. In the case of grass-

ROCK CHECK DAM

(continued)

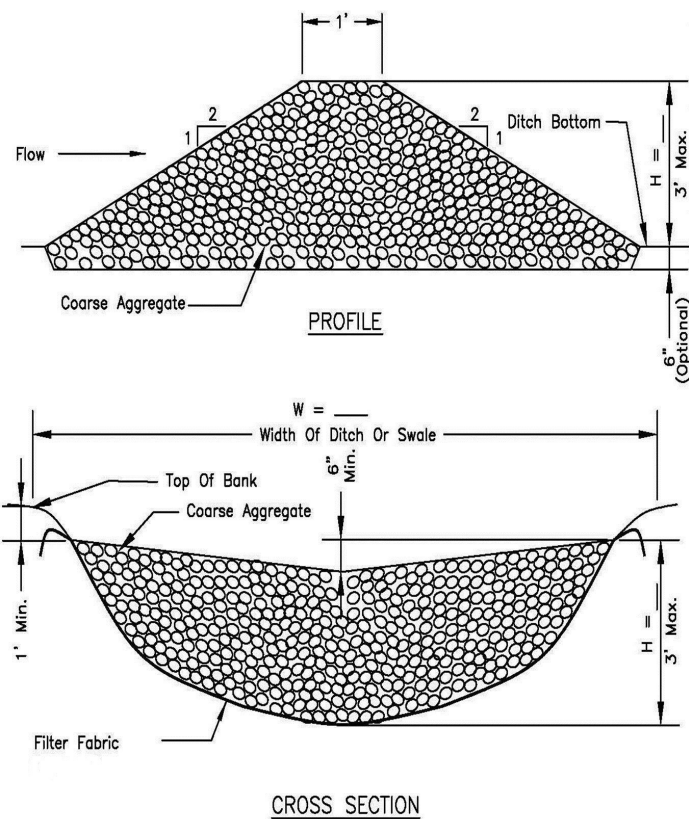


OPERATION & MAINTENANCE (continued)

lined ditches, rock check dams should be removed when the grass has matured sufficiently to protect the ditch or swale. The area beneath the rock check dams should be stabilized immediately after they are removed.

For rock check dams that are made a part of a permanent stormwater management control, maintenance should continue. If sediment trapping is to be a continuing function of the rock check dam, the sediment shall be removed when it has accumulated to one-half the depth of the rock check dam.

STANDARD DRAWING 605CA: Rock Check Dam Coarse Aggregate



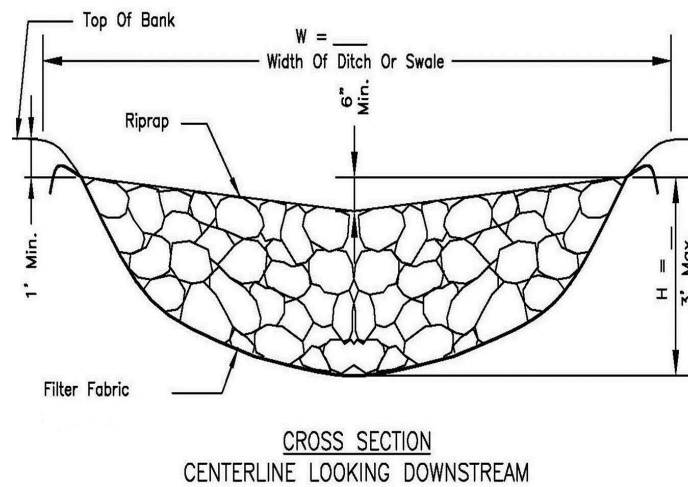
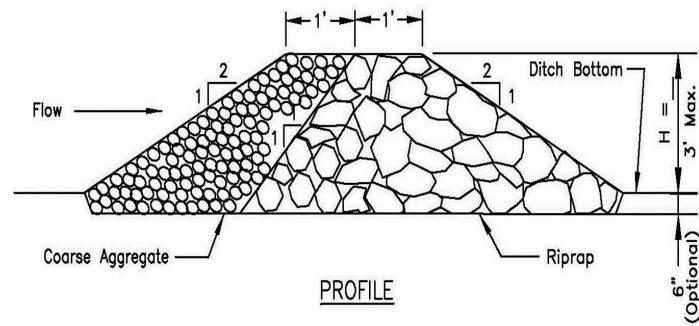
NOTES

1. Drainage area to each dam shall be less than 2 acres.
2. For added stability, the base of the dam may be keyed 6 inches into the soil.

ROCK CHECK DAM (continued)

RC

STANDARD DRAWING 605R: Rock Check Dam Riprap



NOTES

1. Maximum drainage area to each dam is 10 acres.
2. For added stability, the base of the dam may be keyed 6 inches into the soil.

SILT FENCE

Code 920



Credit: ERO-TEX

DEFINITION

A temporary barrier of entrenched geotextile fabric stretched across and attached to supporting posts used to intercept sediment laden runoff from small drainage areas of disturbed soil.

PURPOSE

To cause deposition of transported sediment load from sheet flows leaving disturbed areas.

CONDITIONS WHERE PRACTICE APPLIES

1. Where runoff occurs causing sheet erosion.
2. Downslope areas for perimeter protection from sheet flow.
3. Where adjacent areas are to be protected from silt laden runoff.
4. Where effectiveness is required for one construction season or 6 months, whichever is less.

CRITERIA

The maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of fence.

Silt Fence should not be placed in areas of concentrated flows, such as streams or ditches.

When one row of fence is used, or it is the last in a series, the area below the fence must be undisturbed or stabilized.

Silt fence fabric shall be selected using material specification

SILT FENCE
(continued)



CRITERIA (continued)

592 GEOTEXTILE Table 1 Classes I-IV; the user of the manual shall select the geotextile fabric that best suits the design and site conditions.

The maximum allowable slope distances contributing runoff to a silt fence are listed in the following table:

Slope (%)	Maximum Spacing along Slope (ft.)
25	50
20	75
15	125
10	175
Flatter than 10	200

Fence posts shall be a minimum of 48 inches long. Wood posts shall be of sound quality wood with a nominal cross sectional area of 1.5 x 1.5 inches. Steel posts shall be standard T and U sections weighing not less than 1.33 pounds per linear foot or other steel posts having equivalent strength and bending resistance. The maximum spacing shall be 5 feet. When wire or other forms of approved backing are used, the maximum spacing may be increased to 10 feet. The posts shall be driven a minimum of 18 inches into the ground or as approved by the engineer. Spacing may need to be adjusted so the posts are located in low areas where water may pond. Additional posts may be required at low areas.

Wire fence shall be a minimum 14-gauge wire with a maximum 6-inch mesh opening. The geotextile fabric shall be furnished in a continuous roll cut to the length of the wire fence needed to avoid splices.

When splices are necessary, the fabric shall be spliced at a support post and posts twisted together per drawing IUM-620BW so silt-laden water cannot escape around or beneath the fence.

The height of a silt fence shall be a minimum of 24 inches above the original ground surface. The silt fence shall be

SILT FENCE
(continued)

SC

CRITERIA (continued)

entrenched to a minimum depth of 6 inches, with an additional 6 inches extending along the bottom of the trench in the upslope direction. The 6 inch extension of fabric along the bottom may need to be cut where two fences are spliced per the above mentioned method.

The posts shall be installed, trench backfilled, and the soil compacted over the fabric to 95%. The wire mesh does not get buried and compacted in the anchor trench; it stops at ground level.

The silt fence may also be entrenched by static slicing. Static slicing consists of the insertion of a narrow custom-shaped blade approximately 8 inches into the ground, while simultaneously pulling the silt fence fabric into the opening created as the blade is pulled through the ground. The blade imparts no vibration or oscillatory motion. The tip of the blade is designed to slightly disrupt the soil upward, preventing horizontal compaction of the soil and creating optimum soil conditions for mechanical compaction. Compact (2 passes typically) using a tire on the tractor. Post-setting and driving, followed with tying or stapling the fabric to the post, finalizes the installation.

The filter fabric and wire support, if used, must be securely fastened to the upslope side of the posts using heavy duty wire staples at least one inch long or in accordance with manufacturer's recommendations. The fabric shall be attached to the wire support to prevent sagging of the fabric.

If the silt fence must cross contours, with the exception of the ends of the fence, gravel check dams placed perpendicular to the back of the fence shall be used to minimize concentrated flow and erosion along the back of the fence. The gravel check dams shall be approximately 1 foot high at the back of the fence and be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence. The gravel check dams shall consist of appropriately sized and specified rock for the fence line grade and contributing drainage area. The gravel check dams shall be located every 10 feet along the fence where the

SILT FENCE
(continued)

SC

CRITERIA (continued)

fence must cross contours. J-hooks shall be used at the ends of runs longer than 200 feet and at intervals as deemed necessary by the designer and according to site conditions.

Silt fence shall be used prior to the establishment of erosion controls and installed prior to the clearing of existing vegetation and grading work. When deemed necessary additional rows of silt fence shall be spaced according to site conditions and in keeping with maximum acreage requirements discussed in the table above.

OPERATION & MAINTENANCE

Silt fence shall be removed once upslope areas have been permanently stabilized.

Silt fence shall be inspected no less frequently than every week during construction. Should the fabric decompose or become ineffective prior to the end of the expected usable life and the fence still is necessary, the fabric or the entire system shall be replaced promptly.

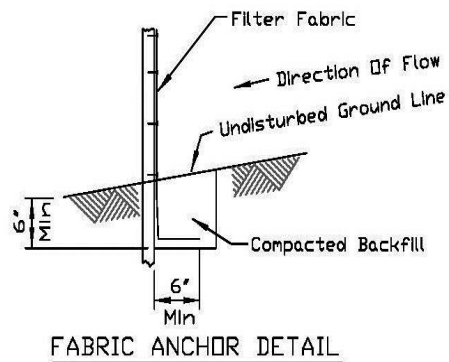
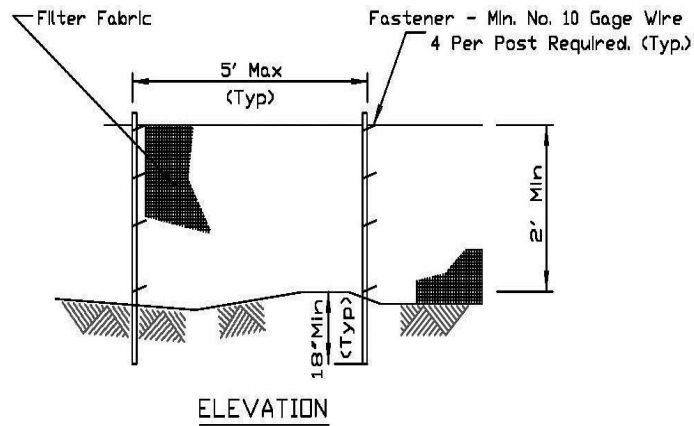
Sediment deposits must be removed when the level of deposition reaches approximately one-half the height of the silt fence.

Any sediment deposits remaining in place after the silt fence is no longer required shall be dressed to conform to the existing grade, a seedbed prepared and the site vegetated.

SILT FENCE (continued)

SC

STANDARD DRAWING 620A: Silt Fence Plan



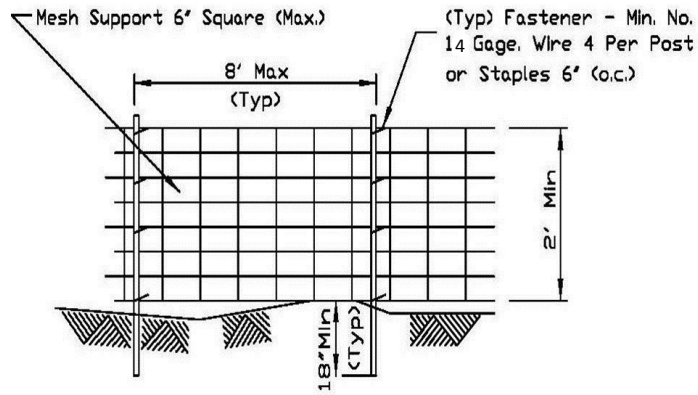
NOTES

1. Filter fabric shall meet the requirements of material specification 592 Geotextile Table 1, Classes I-IV; the user of the manual shall select the geotextile fabric that best suits the design and site conditions.
2. Fence posts shall be either standard steel post or wood post with a minimum cross-sectional area of 3.0 square inches.

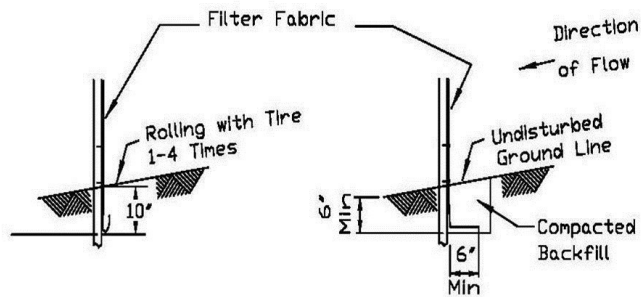
SILT FENCE
(continued)

SC

STANDARD DRAWING 620A(W): Silt Fence with Wire
Support Plan



ELEVATION



FABRIC ANCHOR DETAIL

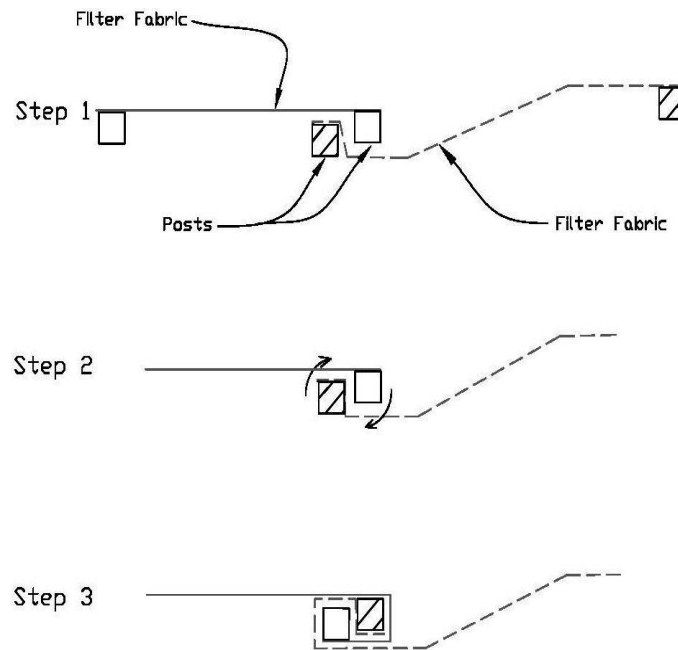
STATIC SLICE INSTALLATION

TRENCH INSTALLATION

SILT FENCE (continued)

SC

STANDARD DRAWING 620B(W): SPLICING TWO FENCES



ATTACHING TWO SILT FENCES

NOTES

1. Place the end post of the second fence inside the end post of the first fence.
2. Rotate both posts at least 180 degrees in a clockwise direction to create a tight seal with the fabric material.
3. Cut the fabric near the bottom of the stakes to accommodate the 6" flap.
4. Drive both posts a minimum of 18 inches into the ground and bury the flap.
5. Compact backfill (particularly at splices) completely to prevent stormwater piping.

SUMP PIT

Code 950

SC



Credit: Christopher B. Burke Engineering, Ltd.

DEFINITION

A temporary pit which is constructed to trap and filter water for pumping into a suitable discharge area.

PURPOSE

To remove excessive water from excavations in a manner that improves the quality of the water being pumped.

CONDITIONS WHERE PRACTICE APPLIES

Sump pits are constructed when water collects during the excavation phase of construction. This practice is particularly useful in urban areas during excavation for building foundations.

CRITERIA

A perforated vertical standpipe is placed in the center of the pit to collect filtered water. The standpipe will be a perforated 12 to 24-inch diameter corrugated metal or PVC pipe. Water is then pumped from the center of the pipe to a suitable discharge area. The pit will be filled with coarse aggregate meeting the requirements of IDOT standards for gradations of CA-2, CA-3 or CA-4.

CONSIDERATIONS

Discharge of water pumped from the standpipe should be to a suitable practice such as practice standard PORTABLE SEDIMENT TANK 895, TEMPORARY SEDIMENT TRAP 960, TEMPORARY SEDIMENT BASIN 957, DEWATERING 813, POLYACRYLAMIDE (PAM) FOR TEMPORARY SOIL STABILIZATION 893 or a stabilized area.

SUMP PIT
(continued)

SC

CONSIDERATIONS (continued)

If water from the sump pit will be pumped directly to a storm drainage system, filter fabric will be wrapped around the standpipe to ensure clean water discharge.

The fabric, if used, shall meet the requirements as shown in material specification 592 GEOTEXTILE Table I, Class IV.

It is recommended that 1/4 to 1/2 inch hardware cloth wire be wrapped around and secured to the standpipe prior to attaching the filter fabric. This will increase the rate of water seepage into the standpipe.

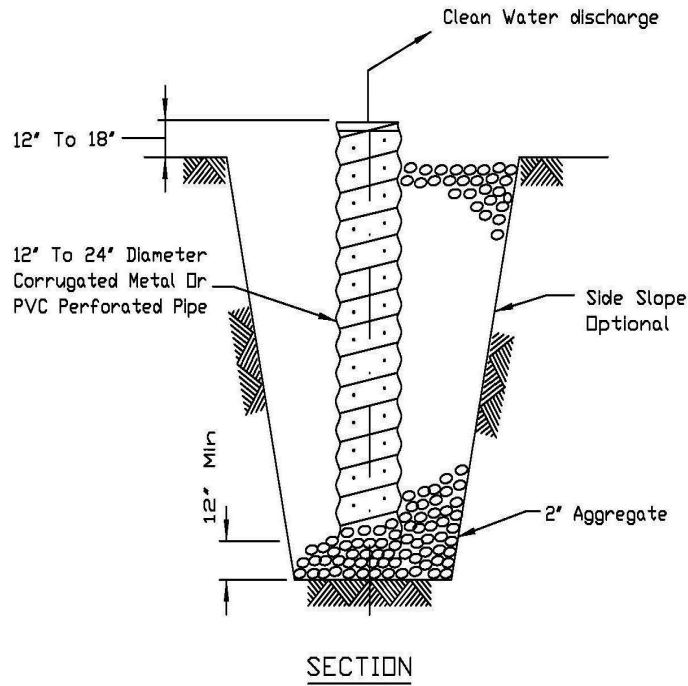
OPERATION & MAINTENANCE

The sump pit may have to be replaced if the pit and filter fabric plugs with sediment.

SUMP PIT
(continued)

SC

STANDARD DRAWING 650: Sump Pit Plan



NOTES

1. Pit dimensions are optional.
2. The standpipe will be constructed by perforating a 12"-24" diameter corrugated metal or PVC pipe.
3. A base of 2" aggregate will be placed in the pit to a minimum depth of 12". After installing the standpipe, the pit surrounding the standpipe will then be backfilled with 2" aggregate.
4. The standpipe will extend 12"-18" above the lip of the pit.
5. If discharge will be pumped directly to a storm drainage system, the standpipe will be wrapped with filter fabric before installation.
6. If desired, 1/4"-1/2" hardware cloth may be placed around the standpipe prior to attaching the filter fabric. This will increase the rate of water seepage into the pipe.

MISCELLANEOUS PRACTICES

MSC

TEMPORARY CONCRETE WASHOUT FACILITY

Code 954

MSC



Credit: IUM Technical Review Committee

DEFINITION

A device used to manage liquid and solid wastes from concrete usage on construction sites.

PURPOSE

To control concrete wastes to prevent both on-site and off-site pollution.

CONDITIONS WHERE PRACTICE APPLIES

On any construction site where concrete is used.

CRITERIA

The following steps shall be taken to effectively control concrete wastes.

1. Perform washout of concrete mixer trucks in designated areas only.
2. Each facility shall have appropriate signage to inform concrete equipment operators of the proper washout locations.
3. Each facility shall be located in an area protected from possible damage from construction traffic and have a stabilized access to prevent tracking onto streets.
4. Washout facilities shall be located on level ground and a minimum of 50 ft. from storm drain inlets and all open drainage facilities. For smaller sites where the distance criteria may not be practical, washout facilities shall be

TEMPORARY CONCRETE WASHOUT FACILITY

(continued)

MSC

CRITERIA (continued)

- located as far from drainage facilities as possible and additional inspections shall be conducted to ensure no illicit discharges have occurred.
5. Temporary concrete washout facilities shall be supplied in sufficient quantity and size to manage all liquid and solid wastes generated by washout operations.
 6. Washout water from low volume facilities shall be allowed to evaporate and not be discharged into the environment.
 7. Washout water from high volume facilities shall be removed with a vacuum truck and taken back to the batch plant. Washout water shall not be discharged into the environment.
 8. Solidified concrete waste from washout facilities shall be considered Clean Construction or Demolition Debris (CCDD) as per the Illinois Environmental Protection Act (415 ILCS 5) and disposed of in accordance to the Act.
 9. Each facility shall be inspected daily to ensure the container is not leaking or nearing two-thirds capacity of either solids, liquids or a combination of both.

Prefabricated Concrete Washout Facilities

1. Prefabricated facilities can be any water tight unit designed to contain concrete slurry and solids.
2. Prefabricated facilities shall be of sufficient volume and quantity to contain all the liquids and concrete waste generated by washout operations.

Temporary Concrete Washout Facilities "Above Grade"

1. Above grade washout facilities shall be constructed with a minimum length and minimum width of 3m (10ft) but of sufficient volume and quantity to contain all the liquids and concrete waste generated by washout operations.
2. The walls of the above grade facilities may be constructed of straw bales, barrier walls or earthen berms. If straw bales are used, they shall be entrenched 3" into the earth, butted tightly end to end and staked in place using 2"x2"x4' wooden stakes. If barrier walls are used, they shall be butted tightly end to end.
3. The facility shall be lined with a 30-mil polyethylene liner and secured using sand bags, 6" wire staples, or other

TEMPORARY CONCRETE WASHOUT FACILITY

(continued)

MSC

CRITERIA (continued)

anchors. The plastic lining material shall be free of holes and tears and must be impermeable.

Temporary Concrete Washout Facilities "Below Grade"

1. Below grade washout facilities shall be constructed with a minimum length and minimum width of 3m (10ft) but of sufficient volume and quantity to contain all the liquids and concrete waste generated by washout operations.
2. The soil base shall be prepared free of rocks or debris that may cause tears or holes in the plastic lining material.
3. The facility shall be lined with a 30-mil polyethylene liner and secured using sand bags, 6" wire staples or other anchors. The plastic lining material shall be free of holes and tears and must be impermeable.

Removal of Temporary Washout Facilities

1. When temporary concrete washout facilities are no longer required for the work, the facilities shall be removed from the site of the work.
2. Holes, depressions or other ground disturbances caused by removal of the temporary concrete washout facilities shall be restored to the satisfaction of the engineer.

OPERATION & MAINTENANCE

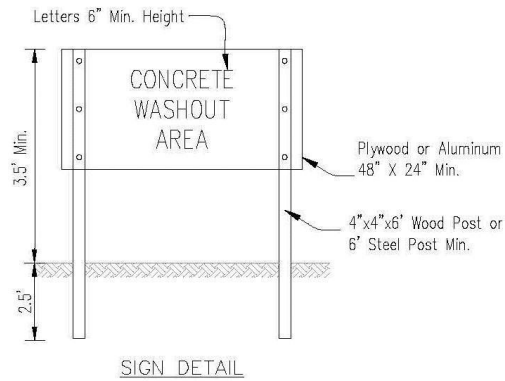
1. Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 100mm (4 in) for above grade facilities and 300mm (12 in) for below grade facilities. Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete or slurry and returning the facilities to a functional condition.
2. Existing facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is two-thirds full.
3. Temporary concrete washout facilities shall be inspected for damage (e.g. tears in plastic liner, missing sand bags, etc.). Damaged facilities shall be repaired promptly.

TEMPORARY CONCRETE WASHOUT FACILITY

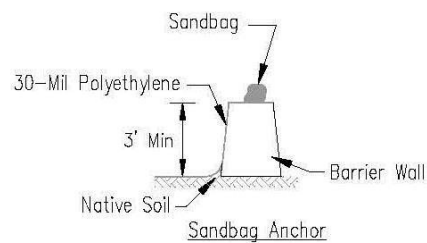
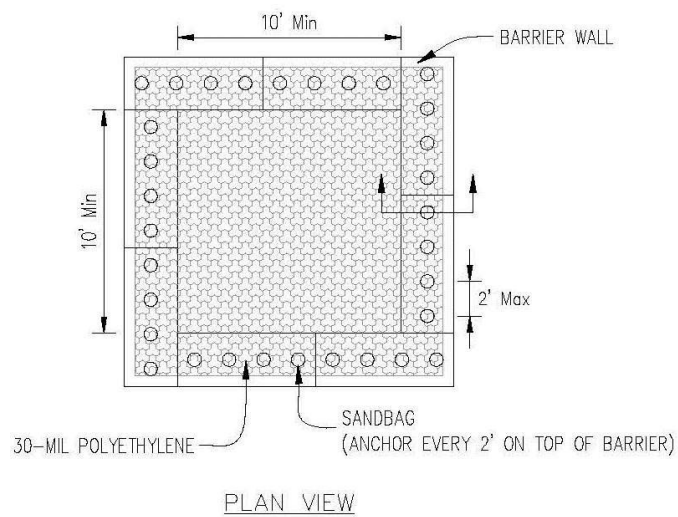
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MSC

STANDARD DRAWING 654: Temporary Concrete Washout Sign



STANDARD DRAWING 654BW: Temporary Concrete Washout Facility Barrier Wall



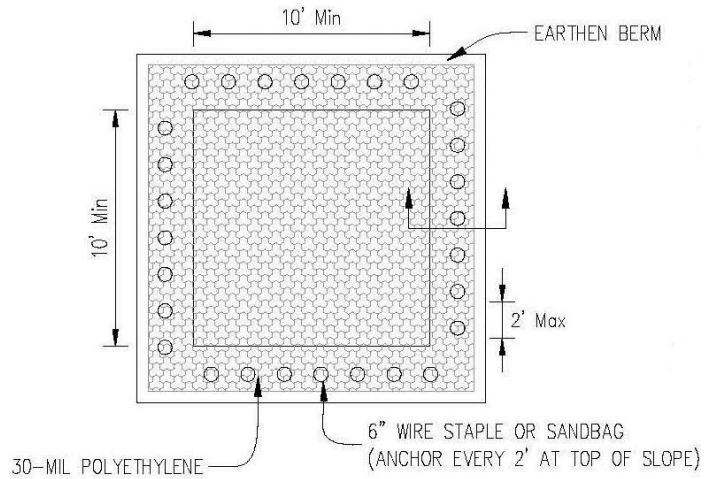
BARRIER WALL ANCHOR SECTION

TEMPORARY CONCRETE WASHOUT FACILITY

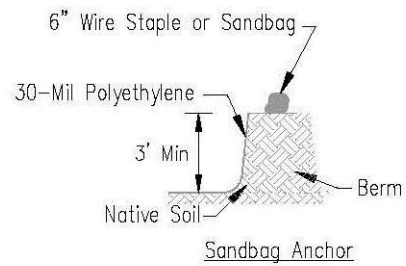
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MSC

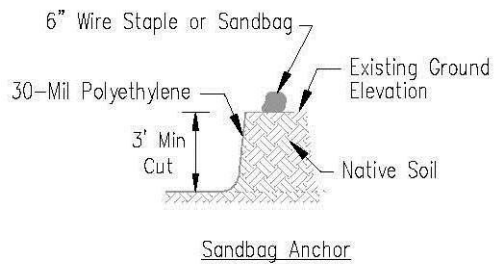
STANDARD DRAWING 654ET: Temporary Concrete Washout Facility Facility Earthen Type



PLAN VIEW



EARTHEN BERM ANCHOR SECTIONS



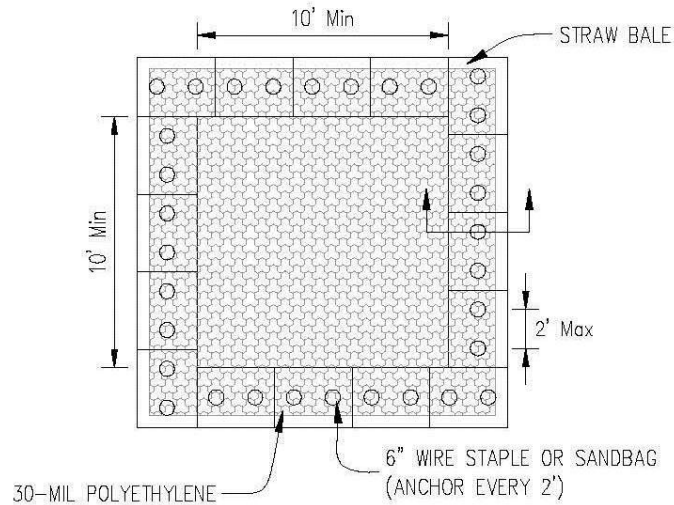
SUBGRADE ANCHOR SECTIONS

TEMPORARY CONCRETE WASHOUT FACILITY

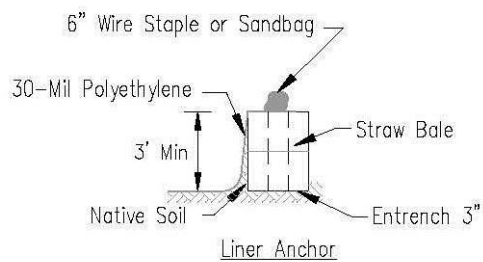
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MSC

STANDARD DRAWING 654ET: Temporary Concrete Washout Facility Facility Straw Bale



PLAN VIEW



STRAW BALE ANCHOR SECTIONS

NOTES

1. Each straw bale is to be staked in place using (2) 2"x 2"x 4' wooden stakes.

OTHER CONSIDERATIONS

The following construction site best management practices can be utilized onsite during construction to address additional resource concerns.

•**Stockpile Stabilization/Management**

During construction of the project, soil stockpiles should be stabilized or protected with sediment trapping measures such as practice standards SILT FENCE 920 or TEMPORARY SEEDING 965. Perimeter controls should be placed around the stockpile immediately; seeding of stockpiles should be completed within 7 days of formation if it is to remain dormant for longer than 30 days.

Locate stockpiles a minimum of 50' away from concentrated flows of stormwater, drainage courses, and inlets.

Stockpiles should not be constructed on impervious surfaces or located under trees.

For active stockpiles, perimeter controls such as silt fences should be maintained at all times, and adjusted as needed to accommodate the delivery and removal of materials from the stockpile. Perimeter control should be in place during down times such as evenings and weekends.

•**Portable Sediment Tank**

A portable sediment tank is a compartmented container through which sediment-laden water is pumped to trap and retain the sediment prior to pumping the water to drainageways, adjoining properties, and rights-of-way below the sediment tank site.

To be used on sites where excavations are too deep and space is limited, or where an excavation extends below the seasonal high water table causing a sump pump to be used.

The portable sediment tank should be constructed with at least three equal baffled compartments. The inlet and outlet pipe should be a minimum diameter of 3 inches. The minimum storage volume of the tank should be in cubic feet, calculated by multiplying 32 times the pump discharge in gallons per minutes (gpm).

The sediment tank should be located for ease of clean out and disposal of the trapped sediment.

OTHER CONSIDERATIONS

• **Portable Sediment Tank (continued)**

The tank should be cleaned out when one-third of the storage volume is filled with sediment. All sediment collected in the tank should be disposed of in an approved sediment trapping device or on the construction site as approved by the engineer or inspector.

• **Tree Protection and Tree & Forest Ecosystem Preservation**

To protect individual and contiguous stands of trees from damage during construction operations.

The Critical Root Zone (CRZ) is, at a minimum, one foot outside the perimeter of the leaf canopy of the tree to be protected. This area should be protected from damage during construction operations. All required protection measures should be installed prior to the commencement of any site development activity and should remain in place and in working, functional order until all site development activities have ceased or the surrounding area has been stabilized.

Construction fencing, wooden snow fence, or approved equivalent with a minimum height of 40 inches should be installed around the CRZ of all trees to be protected, prior to pruning. The fencing should be secured to ground-mounted metal or wood posts.

No construction activities, including the placement of topsoil, should be permitted within the CRZ. Locate roadways, storage areas, parking pads, etc. at least 25 ft. from the CRZ of an individual tree.

For roots impacted outside the CRZ, the roots should be properly pruned according to the Society of American Foresters, National Arborist Association and International Society of Arboriculture standard of using the appropriate pruning tool to make a clean cut.

In situations where it is not feasible to avoid impact in the CRZ such as when utilities or other development features necessitate underground movement of the soil, follow criteria in practice standard TREE PROTECTION—AUGERING 991.

ACKNOWLEDGEMENTS

A Special Thanks to those who created, compiled and edited the field manual including:

- ◆ Illinois Environmental Protection Agency
- ◆ Members of the Field Manual Task Order Group:
 - Megan Andrews, Field Manual Production Coordinator, Kendall County SWCD;
 - Kelly Thompson, Illinois Urban Manual Initiative Coordinator, AISWCD;
 - Rick McAndless, North Cook SWCD; Ed Weskerna, McHenry-Lake SWCD; Candice Jacobs, Kane-DuPage SWCD; Dennis Anthony, Winnebago County SWCD; and Stacy Helm, Jefferson County SWCD.
- ◆ Technical Reviewers:
 - Dan Salinger, ERO-TEX
 - Rich Nowack, Quigg Engineering

Thank you to the Illinois Department of Transportation (IDOT) for helping to shape the layout of the field manual.

Additionally, thank you to the following sources for their valuable information:

- ◆ Illinois Field Manual for Implementation and Inspection of Erosion and Sediment Control Plans: Urban Committee of the Association of Illinois Soil & Water Conservation Districts (AISWCD)
- ◆ Urban Soil Erosion and Sediment Control: USDA Natural Resources Conservation Service (NRCS) and AISWCD
- ◆ Conservation Strategies for Growing Communities: USDA-Iowa NRCS
- ◆ North Carolina Erosion & Sediment Control Planning & Design Manual; North Carolina Erosion and Sediment Control Field Manual; & North Carolina Erosion & Sediment Control Inspector's Guide: North Carolina Department of Environment and Natural Resources
- ◆ Field Manual for Erosion & Sediment Control in Georgia: Georgia Soil & Water Conservation Commission

This field manual has been approved by the Illinois Urban Manual Technical Review Committee and Steering Committee as well as the Illinois Environmental Protection Agency.

Mention of trade names or commercial products, if any, does not constitute endorsement.