



602 S. Main Street • Joplin, MO 64801 • Phone (417) 624-0820 • FAX (417) 625-4738

February 14, 2008

Ruth Wallace
Missouri Department of Natural Resources
Municipal Storm Water Program Coordinator
Water Pollution Control Branch
P O Box 176
Jefferson City, Missouri 65102

RECEIVED
2008 FEB 19 PM 12:52
WATER PROTECTION PROGRAM

Dear Ms. Wallace:

**REFERENCE: Joplin MS4 Storm Water Permit
MO-R 040041**

The City of Joplin's Phase II Storm Water Permit documentation for the calendar years 2008 to 2012 was sent *electronically* to your e-mail address (ruth.wallace@dnr.mo.gov) on February 14th. The *hard copies* are enclosed with this letter. If additional information is needed for this permit, please contact the following staff members.

David Hertzberg
DHertzbe@joplinmo.org
417-624-0820 Ext. 500

Daniel Johnson
DJohnso1@joplinmo.org
417-624-0820 Ext. 538

Mary Anne Phillips
MPhillip@joplinmo.org
417-624-0820 Ext. 501

Sincerely,

Mary Anne Phillips
Recycling Coordinator and
Storm Water Education Manager

Enclosures: Form M, Form K, 3 maps, 26 page Information on the Permittee narrative

Information on the Permittee:

Name of the Permittee: City of Joplin, Missouri

Type of Entity: City - Municipality

Total Area (acres): 23,040 acres

Mailing Address: 602 S. Main Street, Joplin MO 64801

Primary Contact: David Hertzberg, PE, Director of Public Works

Phone Number: 417-624-0820 Ext. 530

Secondary Contact: Daniel Johnson, EIT

Phone Number: 417-624-0820 Ext. 538

Information on the Municipal Separate Storm Sewer System:

MS4 System Location: Joplin, Missouri

Name of Organization: City of Joplin, Missouri

County(ies) Permittee Resides: Jasper County and Newton County

There are no major receiving waters within the permitted area.

The receiving waters are on the latest CWA's list of impaired waters: N/A

Received certification that their SWMP complies with the requirements of Part 3.1: N/A

Information on Adjacent Waterways:

The Permittee is within 100 feet of: Streams

The Permittee is within 100 feet of waters classified as major reservoirs:

None of the Permittee's area is defined as wetland.

The Permittee has received a CWA, Section 404 permit from the US Army Corps of Engineers: N/A

Stormwater from Joplin does not discharge to a sinkhole.

Information on Critical Areas:

There are threatened or endangered species in the area: See Page 2

The Permittee has met eligibility criteria for protection of threatened or endangered species.

There are critical habitats in the area: See Page 2

The Permittee has met eligibility criteria for protection of critical habitats.

There are historic properties in the area: See Page 2

The Permittee has met eligibility criteria for protection of historic properties.

Endangered Species:

County	Species	Status	Habitat
Jasper	Gray Bat (Myotis grisescens)	Endangered	Caves
Jasper	Arkansas Darter (Etheostoma cragini)	Candidate	Rivers
Jasper	Neosho Madtom (Noturus placidus)	Threatened	Rivers
Jasper	Ozark Cavefish	Threatened	Caves in the Boone and Burlington limestone formations of the Ozark Mountains
Newton	Gray Bat (Myotis grisescens)	Endangered	Caves
Newton	Arkansas Darter (Etheostoma cragini)	Candidate	Rivers
Newton	Ozark Cavefish	Threatened	Caves in the Boone and Burlington limestone formations of the Ozark Mountains

Historic Properties:

Name	Address	Owner	Year Added
Elks Club Lodge #501	318-320 W. 4 th St., Joplin	Private	1985
Fox Theater	415 S. Main St., Joplin	Private	1990
Joplin Carnegie Library	9 th and Wall Sts., Joplin	Local Government	1979
Joplin Union Depot	Broadway and Main St., Joplin	Private	1973
Newman Brothers Building	602-608 S. Main St., Joplin	Private	1990
Rains Brothers Building	906-908 S. Main St., Joplin	Private	1990
Scottish Rite Cathedral	505 Byers Ave., Joplin	Private	1990
St. Peter the Apostle Catholic Church and Rectory	812 Pearl St., Joplin	Private	1991

MCM #1: Public Education and Outreach on Stormwater Impacts

4.2.1.1 Permit Requirements

Joplin plans to continue a public education program by distributing educational materials to the community and conducting outreach activities. The focus of these efforts will be to educate the public with activities discussing the impact of stormwater discharges on water bodies and the steps the public can take to reduce pollutants in stormwater runoff.

4.2.1.2 Decision Process

Joplin’s stormwater public education and outreach program is in cooperation with other jurisdictions in the region. The target pollutants were identified and prioritized. The actions that impact the target pollutants were identified. The public education program was designed to impact the actions identified.

The following is a prioritized list of the leading pollutants, experienced in the permitted area, that are carried by stormwater runoff into water bodies. (1 = having most impact and 10 = having least impact)

6	Suspended Solids
2	Nutrients
8	Pesticides
5	Metals
3	Bacteria
1	Oxygen-Depleting Substances (BOD & other organics)
7	Oil and Grease
10	Salinity (Salt)
4	Priority Toxic Organic Chemicals (Household Hazardous Waste Pesticide/Herbicides)
9	Habitat Alterations
	Other

4.2.1.2.1 Inform Public on Steps

Joplin will continue to inform individuals and households in the community about the steps they can take to reduce stormwater pollution with the following programs:

	Year 1	Year 2	Year 3	Year 4	Year 5
Educational Materials:					
Post Information on Website & at Community Events	X	X	X	X	X
Distribute BMP information at Nature Center	X	X	X	X	X
Maintain a Library of Storm Water Educational Materials	X	X	X	X	X
Distribute Brochures:					
Lawn and Garden Activities	X	X	X	X	X
Water Conservation via Rain Barrel Workshops	X	X	X	X	X
Hazardous Waste Disposal	X	X	X	X	X
Trash Management	X	X	X	X	X
Septic System Controls	X	X	X	X	X
Illicit Discharges	X	X	X	X	X
Other Sanitary Sewer Overflows	X	X	X	X	X

	Year 1	Year 2	Year 3	Year 4	Year 5
Public Awareness:					
Erect Tributary Signage	X	X	X	X	X
Post Storm Water Quality Signs in Public Buildings	X	X	X	X	X
Issue Press Release Regarding Local Storm Water Issues	X	X	X	X	X
Show Storm Water Info on Local TV Station	X	X	X	X	X
Present at Speakers Bureau			X		
Publish Articles in Local Newspaper	X	X	X	X	X
Make Public Service Announcements Available to Local TV Station	X	X	X	X	X
Present Storm Water Program in Local Schools	X	X	X	X	X

4.2.1.2.2 How to Become Involved

Joplin will continue to inform individuals and groups on how to become involved in the stormwater program by providing those instructions in all materials distributed to the public. This is described in more detail in 4.2.2 Public Involvement/Participation.

4.2.1.2.3 Target Audiences

During the development of the education program, Joplin identified the sources of stormwater pollutants that needed to be reduced to improve overall water quality. The target audiences were selected because changing their behavior would have a significant stormwater quality impact on the target pollutants. The target audiences for the public education program are:

1. Citizens (Homeowners)
2. Restaurant Owners and Operators
3. Car Wash Owners and Operators
4. Service Station and Oil/Lube Business Owners and Operators
5. Lawn Service Companies
6. Developers and Home Builders
7. Business Owners
8. Children
9. Seniors
10. Elected Officials
11. City Staff
12. Recreational Facility (new Nature Center) and (new) City Trails
13. Booth at Annual Home Builders Association *Home Show*

4.2.1.2.4 Target Pollutant Sources

The target pollutant sources having a major impact on stormwater quality were identified. The following is a list of these sources:

The following is a list of potential sources of pollutants that are experienced in the permitted area. (1 = Major impact, 2 = Minor impact, 3 = Not an impact)

- | | |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Construction activities (sediment, construction chemicals and debris, solid and sanitary wastes)
Over application of fertilizer, herbicides, pesticides |
| 2 | Improper disposal of paint and household hazardous chemicals |
| 3 | Pet waste contamination |
| 2 | Improper disposal of waste oil, grease, and gasoline disposal |
| 2 | Trash, debris, and illegal dumping |
| 3 | Detergents washed into drains |
| 3 | Snow removal (salt, sand and snow disposal) |
| 2 | Sanitary sewer overflows |
| 3 | Infiltration from cracked sanitary sewers |
| 3 | Failing septic systems |
| 3 | Sewer service connections to storm drainage system |
| 3 | Foundation drains connected to storm drainage system |
| 3 | Downspouts connected to storm drainage system |
| 3 | Lake or water body used for motor boating |
| 2 | Spills from roadway accidents or fires |
| 2 | Connected impervious areas covering large acreages (such as malls, institutions with large parking areas) |
| 2 | Stream bank erosion |
| 3 | Waste transfer station |
| 3 | Other |

4.2.1.2.5 Outreach Strategy & Partnerships

Joplin's outreach strategy is to continue a variety of methods to reach a number of different target audiences multiple times. To change behavior, repetition is important. The mechanisms are described in 4.2.1.2.1 of this permit application.

The strategy is to continue the partnership with other governmental and non-governmental entities to execute the public outreach strategy. The idea is to share information and resources so duplication does not occur. The following entities will be assisting with the effort:

1. Other Communities
2. County Extension
3. EPA
4. Local Community Groups
5. Other: Missouri Southern State University, Local Schools, the Tri-State Water Resource Coalition, and Shoal Creek Watershed Partnership

The number of people targeted to be reached by the public education and outreach strategy is 15,000 per year.

4.2.1.2.6 Person Responsible

The person responsible for overall management and implementation of the permittee's stormwater public education and outreach program is the **PUBLIC WORKS DIRECTOR**. Others will be involved in the execution of each of the individual activities in the programs, but most of the activities will be delegated through the Publics Works Department.

4.2.1.2.7 Measurable Goals Selection

Joplin selected the measurable goals for each of the BMPs after reviewing EPA & ASCE research on the effectiveness of certain BMPs. The BMPs selected were chosen because of the evidence that they will have a positive impact the target pollutants identified as a concern for Joplin. The public education and outreach BMPs were also selected because many have been effective methods of communicating with the public for our community. The implementation of BMPs selected will determine the success of the measure on water quality.

MCM #2: Public Involvement and Participation

4.2.2.1 Permit Requirements

Joplin will comply with State and Local public notice requirements when implementing the public involvement and participation program.

4.2.2.2 Decision Process

The following is the documentation for Joplin's decision process and rationale statement for the development of a stormwater public involvement and participation program. It documents the overall program and the individual BMPs, measurable goals, and responsible party for the program.

4.2.2.2.1 Involving the Public in Developing the Submittal

Joplin has involved the public in the development and submittal of the application and stormwater management program as follows:

1. Held Stakeholder Meetings
2. Held a Public Hearing
3. Posted Public Meeting Announcements

4.2.2.2.2 Involving the Public in Program Implementation

Joplin plans to actively involve the public in the development and implementation of the stormwater program through a number of different methods selected because they are existing effective methods used by Joplin or because of EPA guidance documents that list these BMPs as effective public involvement methods.

4.2.2.2.3 Target Audiences to Involve in Program

The target audiences for the permittee's public involvement program are:

1. Citizens (Homeowners)
2. Mass Media
3. Local Elected Officials
4. Local Government Agencies
5. Business Leaders
6. Contractors, Home Builders, and Developers
7. Teachers
8. Seniors
9. Civic Organizations
10. Tri-State Water Resource Coalition
11. Shoal Creek Watershed Partnership

Were supposed to have done this in the first cycle.

4.2.2.2.4 Public Involvement Activities

Joplin plans will involve the public through the activities described below:

	Year 1	Year 2	Year 3	Year 4	Year 5
Hold Stakeholder Meetings	X	X	X	X	X
Establish Community Hotline	X	X	X	X	X
Hold Public Meetings	X	X	X	X	X
Develop Storm Water Stenciling Program	X	X	X	X	X

4.2.2.2.5 Person Responsible

The person responsible for the overall management and implementation of the permittee's stormwater public involvement/participation program is the **PUBLIC WORKS DIRECTOR**. Others will be involved in the execution of each of the individual activities in the programs, but most of the activities will be delegated through the Publics Works Department.

4.2.2.2.6 Goal Selected

Joplin selected the measurable goals for each of the BMPs after reviewing EPA & ASCE research on the effectiveness of certain BMPs. The BMPs selected were chosen because of the evidence that they will have a positive impact the target pollutants identified as a concern for Joplin. Some of the public involvement methods selected were also chosen because they have been used effectively by Joplin in the past. The implementation of BMPs selected will determine the success of the measure on water quality.

MCM #3: Illicit Discharge Detection and Elimination

4.2.3.1 Permit Requirement.

4.2.3.1.1 Overview

Joplin will expand the program to detect and eliminate illicit discharges (as defined in 10 CSR 20-6.200) in our small MS4.

4.2.3.1.2 Map

Joplin has developed a storm sewer system map, showing the location of all outfalls and the names and location of all waters in the State that receive discharges from those outfalls. The map will be improved with more detailed data including all inlets and the connecting pipes with sizes as well as the streams they drain to.

The map will be continuously improved using:

	Year 1	Year 2	Year 3	Year 4	Year 5
Storm Sewer Mapping	X	X	X	X	X
Public Complaints	X	X	X	X	X
Aerial Mapping	X	X	X	X	X
GIS Mapping	X	X	X	X	X

4.2.3.1.3 Enforcement

Joplin will effectively prohibit non-stormwater discharges into the stormwater system of Joplin's stormwater system via the following ordinances and regulations. Each ordinance/regulation is enforceable by Joplin with appropriate procedures and consequential actions.

4.2.3.1.4 Methods to Detect

Joplin will implement a plan using the following methods to detect and address non-stormwater discharges, including illegal dumping to the stormwater system:

	Year 1	Year 2	Year 3	Year 4	Year 5
Visual Inspection	X	X	X	X	X
Document and Investigate Complaints	X	X	X	X	X

4.2.3.1.5 Informing the Public

Joplin will inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste using the following methods:

	Year 1	Year 2	Year 3	Year 4	Year 5
Educational Programs:					
Procedural Training for City Staff	X	X	X	X	X
Distribute Literature	X	X	X	X	X
Post Signs	X	X	X	X	X
Recycling Program for Household Hazardous Waste	X	X	X	X	X

	Year 1	Year 2	Year 3	Year 4	Year 5
Volunteer Programs:					
Storm Drain Stenciling	X	X	X	X	X
Household Hazardous Waste Collection	X	X	X	X	X
Illegal Dumping Hotline	X	X	X	X	X

4.2.3.1.6 Insignificant Contributors

Joplin has not identified any of the following categories of non-stormwater discharges or flows (i.e. illicit discharges) as significant contributors of pollutants to their small MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined in 10 CSR 20-6.200), uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, springs, water from crawl space pumps, footing drains, lawn watering, flows from riparian habitats and wetlands, and street wash water (discharges or flows from fire fighting activities are excluded from the effective prohibition against non-stormwater and will only be addressed where they are identified as significant sources of pollutants to waters of the State.)

4.2.3.1.7 Occasional Incidental Non-Stormwater Discharges

Joplin's illicit discharge ordinance does not include a list of other similar occasional incidental non-stormwater discharges (e.g. non-commercial or charity car washes, etc.) to be addressed as illicit discharges because they are not reasonably significant sources of pollutants to the MS4. Should these occasional or incidental non-stormwater discharges be identified in the future, those entities responsible for discharging will be prohibited or conditions placed on them so as to minimize their discharge of pollutants.

4.2.3.2 Decision Process

Joplin has documented their decision process for the development of a stormwater illicit discharge detection and elimination program. Joplin's rationale statement addresses their overall illicit discharge detection and elimination program and the individual BMPs, measurable goals, and responsible persons for their program.

4.2.3.2.1 Sources for Mapping

Joplin will develop a storm sewer map showing the location of all outfalls and the names and location of all receiving waters. Joplin used the following sources to compile the maps:

1. Storm Sewer Mapping
2. Public Complaints
3. Aerial Mapping
4. USGS Mapping

Once the map is established, Joplin will use proposed building and street plans to locate new outfalls and update the maps.

4.2.3.2.2 Regulatory Mechanism

Joplin will use the following mechanism to effectively prohibit illicit discharges to the MS4:

1. City Ordinance
2. Inspection

This mechanism was selected because ordinances are commonly used by Joplin to establish laws and set forth the enforcement mechanisms. The ordinance establishes legal authority: to regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) of stormwater discharges by any use; to prohibit illicit connections and discharges to the MS4; and to establish legal authority to carry out all inspections, surveillance and monitoring procedures necessary to ensure compliance.

Joplin will develop and implement the following mechanisms to effectively prohibit illicit discharges to the MS4 on the respective schedule:

	Year 1	Year 2	Year 3	Year 4	Year 5
City Ordinance	X	X	X	X	X
Inspection	X	X	X	X	X

4.2.3.2.3 Enforcement

Joplin will set forth in the ordinance enforcement procedures intended to remove the source of the illicit discharge detected.

Joplin will ensure implementation of the mechanisms described in 4.2.3.2.2 above with the following enforcement actions:

	Year 1	Year 2	Year 3	Year 4	Year 5
Civil Penalties	X	X	X	X	X

4.2.3.2.4 Detection

Joplin will detect and address illicit discharges to the MS4, including discharges from illegal dumping and spills. Joplin's program will address on-site sewage disposal systems that flow into the MS4.

4.2.3.2.4.1 Identify Priority Areas

Joplin will use the system maps identified in 4.2.3.1.2 above and other data to identify priority areas with likelihood of illicit connections.

4.2.3.2.4.2 Trace the Source

N/A

4.2.3.2.4.3 Removal

Joplin will follow the ordinance adopted and the enforcement mechanisms detailed in the ordinance including those legal actions described in 4.2.3.1.3 above to enforce the removal of an identified illicit connection.

4.2.3.2.4.4 Program Evaluation

The success of the described program will be evaluated annually by analyzing the number of illicit connections discovered and eliminated.

4.2.3.2.5 Public Information

Joplin will inform public employees, business and the general public of hazards associated with illegal discharges and improper disposal of waste through the following methods:

	Year 1	Year 2	Year 3	Year 4	Year 5
Educational Programs:					
Procedural Training for City Staff	X	X	X	X	X
Distribute Literature	X	X	X	X	X
Post Signs	X	X	X	X	X
Recycling Program for Household Hazardous Waste	X	X	X	X	X

	Year 1	Year 2	Year 3	Year 4	Year 5
Volunteer Programs:					
Storm Drain Stenciling	X	X	X	X	X
Household Hazardous Waste Collection	X	X	X	X	X
Illegal Dumping Hotline	X	X	X	X	X

Where applicable the information distributed through these means will coordinate with the information distributed in the Public Education minimum control measure (e.g., consistent/coordinated messages in literature).

4.2.3.2.6 Responsible Party

The **PUBLIC WORKS DIRECTOR** will be responsible for overall management and implementation of Joplin's stormwater illicit discharge detection and elimination program. Others will be involved in the execution of each of the individual activities in the programs, but most of the activities will be delegated through the Publics Works Department.

4.2.3.2.7 Measurable Goals

Joplin will evaluate the success of the program based on:

The number of illicit connections found and eliminated.

Joplin selected the measurable goals for each of the BMPs after reviewing EPA & ASCE research on the effectiveness of certain BMPs. The BMPs selected were chosen because of the evidence that they will have a positive impact the target pollutants identified as a concern for Joplin. Some of the methods to detect and eliminate illicit discharges were also chosen because they have been used effectively by Joplin in

the past. The implementation of BMPs selected will determine the success of the measure on water quality.

MCM #4: Construction Site Stormwater Runoff Control

4.2.4.1 Permit Requirements

Joplin has developed, is implementing, and enforces a program to reduce pollutants in any stormwater runoff from construction activities that result in disturbance of greater than or equal to one acre. Joplin's plan also reduces pollutants in stormwater runoff from construction activities that disturb an area less than one acre if the site is part of a larger common plan of development or sale.

4.2.4.1.1 Regulatory Mechanism

Joplin has passed an ordinance with the required erosion and sediment controls, as well as sanctions to ensure compliance.

4.2.4.1.2 Best Management Practices (BMPs)

Joplin has required construction site operators to implement the appropriate erosion and sediment control Best Management Practices (BMPs). Joplin's Erosion and Sediment Control Manual includes the construction specifications and design standards for commercial/development projects as well as residential construction.

4.2.4.1.3 Wastes to Be Controlled

Joplin will require construction site operators to control wastes that may cause adverse impacts to water quality such as:

1. Discarded Building Materials
2. Concrete Truck Washout
3. Sediment
4. Litter or Trash
5. Sanitary Waste

4.2.4.1.4 Site Plan Review

Joplin has implemented procedures in their ordinance for site plan review, which incorporates consideration of potential water quality impacts.

4.2.4.1.5 Receipt & Consideration of Public Comment

Joplin will not implement procedures in their ordinance for receipt and consideration of information submitted by the public.

4.2.4.1.6 Site Inspection

Joplin has implemented procedures in their ordinance for site inspection and enforcement of erosion and sediment control measures.

4.2.4.2 Decision process

The following is the rationale statement for the development of Joplin's overall construction site stormwater runoff control program. It documents the individual BMPs, measurable goals, and responsible party for their program.

4.2.4.2.1 Regulatory Mechanism

Joplin has drafted an ordinance that requires the use of erosion and sediment controls on construction sites. The ordinance outlines the requirements for designers and contractors before, during and after the construction activities. The ordinance provides enforcement measures for those designers and contractors who do not follow the ordinance.

Other mechanisms are available to anyone involved in design and construction of erosion and sediment control activities. Those mechanisms include:

	Year 1	Year 2	Year 3	Year 4	Year 5
Design Methodologies	X	X	X	X	X
BMP Fact Sheets	X	X	X	X	X
Sample Plans	X	X	X	X	X
Construction Specifications	X	X	X	X	X
Standard Details	X	X	X	X	X
Ordinance	X	X	X	X	X
Staff Training	X	X	X	X	X

4.2.4.2.2 Enforcement

Joplin has ensured compliance with the developed ordinance by including an enforcement section in the ordinance detailing the sanctions and enforcement mechanisms. Joplin will use the following sanctions:

1. Non-Monetary Penalties
2. Fines
3. Permit Denial for Non-Compliance

4.2.4.2.3 Implementation of Proper Controls

Joplin has required construction site operators to control wastes that may have adverse impacts on water quality including:

	Year 1	Year 2	Year 3	Year 4	Year 5
Implementation of Proper Erosion and Sediment Controls	X	X	X	X	X

4.2.4.2.4 Pre-Construction Site Plan Review

Joplin has implemented procedures for site plan review, including the review of pre-construction plans, which look at the potential water quality impacts. Joplin will implement procedures and rationale for those sites that do not require site plan review. The estimated percentage of sites that will have a pre-construction site plan review is 100%.

	Year 1	Year 2	Year 3	Year 4	Year 5
Review of Construction Plans	X	X	X	X	X

4.2.4.2.5 Public Input on Submittals

Joplin will not implement procedures for receipt and consideration of information submitted by the public.

4.2.4.2.6 Site Inspection & Enforcement

Joplin has implemented procedures for site inspection and enforcement of control measures.

	Year 1	Year 2	Year 3	Year 4	Year 5
Site Inspection and Enforcement	X	X	X	X	X

4.2.4.2.7 Person Responsible

The person responsible for overall management and implementation of the permittee's stormwater public education and outreach program is the **PUBLIC WORKS DIRECTOR**. Others will be involved in the execution of each of the individual activities in the programs, but most of the activities will be delegated through the Publics Works Department.

4.2.4.2.8 Measurable Goals

Joplin selected the measurable goals for each of the BMPs after reviewing EPA & ASCE research on the effectiveness of certain BMPs. The BMPs selected were chosen because of the evidence that they will have a positive impact on the target pollutants identified for Joplin. The implementation of BMPs selected will determine the success of the measure on water quality.

Read like the first plan

4.2.5.2.2

Joplin will implement regulatory procedures that will be specifically tailored for the community, minimize water quality impacts, and attempt to maintain pre-development runoff conditions.

What kind? 1-5

	Year 1	Year 2	Year 3	Year 4	Year 5
Ordinance	X	X	X	X	X
Inspection and Maintenance of Long-Term Controls	X	X	X	X	X
Zoning Ordinances	X	X	X	X	X
Storm Water Master Plans	X	X	X	X	X
Comprehensive Plans	X	X	X	X	X
Publication of BMPs	X	X	X	X	X

4.2.5.2.3 Non-Structural Best Management Practices (BMPs)

4.2.5.2.3.1 Policies & Ordinances

Joplin will implement policies and ordinances that will help minimize water quality impacts.

Not Adequate!

	Year 1	Year 2	Year 3	Year 4	Year 5
Maintain and/or Increase Open Space	X	X	X	X	X
Minimize Impervious Surfaces	X	X	X	X	X
Minimize Disturbance of Soils and Vegetation	X	X	X	X	X

4.2.5.2.3.2 Infill Development

Should be applicable

N/A

4.2.5.2.3.3 Education

Not reflected above goals

Joplin will implement education programs for developers and the public about project designs that minimize water quality impacts.

Very opp. colbe

4.2.5.2.3.4 Other Non-Structural Measures

N/A

4.2.5.2.4 Structural BMPs

4.2.5.2.4.1 Structural BMPs

Joplin will implement the following structural BMPs:

Need better design & dispersed micro practices to small storm events

*No + quantity
should have*

	Year 1	Year 2	Year 3	Year 4	Year 5
Detention/Retention	X	X	X	X	X
Filtration Practices	X	X	X	X	X

4.2.5.2.5 Regulatory Mechanism

Joplin will implement an ordinance or other regulatory mechanism to address post-construction runoff from new developments and redevelopments. These mechanisms will help to not only recommend proper practices, but will help enforce the proper use of the practices under certain circumstances. They include:

	Year 1	Year 2	Year 3	Year 4	Year 5
Ordinance	X	X	X	X	X
Inspection and Maintenance of Long-Term Controls	X	X	X	X	X
Zoning Ordinances	X	X	X	X	X
Storm Water Master Plans	X	X	X	X	X
Comprehensive Plans	X	X	X	X	X
Publication of BMPs	X	X	X	X	X

Joplin will ensure compliance with the developed ordinance by way of sanctions and enforcement mechanisms. Joplin will implement the following sanctions in their ordinance:

1. Non-Monetary Penalties
2. Fines
3. Permit Denial for Non-Compliance

4.2.5.2.6 Long-Term Operation & Maintenance

Joplin will implement options to help ensure the long-term operation and maintenance of their selected BMPs. These options will help ensure that future O&M responsibilities are clearly identified.

4.2.5.2.7 Responsible Party

The person responsible for overall management and implementation of the permittee's stormwater public education and outreach program is the **PUBLIC WORKS DIRECTOR**. Others will be involved in the execution of each of the individual activities in the programs, but most of the activities will be delegated through the Publics Works Department.

4.2.5.2.8 Measurable Goals

Joplin selected the measurable goals for each of the BMPs after reviewing EPA & ASCE research on the effectiveness of certain BMPs. The BMPs selected were chosen because of the evidence that they will have a positive impact on the target pollutants identified as a concern for Joplin. The implementation of BMPs selected will determine the success of the measure on water quality.

*ASCE.
aren't
more they
focused
on
erosion
sediment
control
construction
sites?*

MCM #6: Pollution Prevention/Good Housekeeping for Municipal Operations

4.2.6.1 Permit Requirement.

4.2.6.1.1 Overview

Joplin will develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

4.2.6.1.2 Training

Using training materials that are available from EPA, State and other organizations, Joplin's program will include employee training to prevent and reduce stormwater pollution from activities.

4.2.6.2 Decision Process

Joplin has documented their decision process for the development of a pollution prevention/good housekeeping program for municipal operations. Joplin's rational statement addresses both their overall pollution prevention/good housekeeping program and the individual BMP's, measurable goals, and responsible persons for the program. The rational statement is as follows:

4.2.6.2.1 Pollution Prevention & Good Housekeeping Measures

Joplin will implement pollution prevention and good housekeeping measures in the following City activities:

	Year 1	Year 2	Year 3	Year 4	Year 5
Catch Basin Cleaning	X	X	X	X	X
Street Sweeping	X	X	X	X	X
Recycling Program	X	X	X	X	X
Maintenance Schedule	X	X	X	X	X
Maintenance Activities	X	X	X	X	X
Long-Term Inspection Procedures	X	X	X	X	X
Minimize Pesticides Used	X	X	X	X	X
Employee Training	X	X	X	X	X

The following is a list of industrial facilities owned and/or operated by Joplin that are subject to EPA's Multi-Sector General Permit (MSGP) or individual NPDES permits for discharges of stormwater associated with industrial activity that ultimately discharge to Joplin's MS4. Where available, the permit number has been included.

N/A

4.2.6.2.2 Employee Training

Joplin will formalize and implement an employee-training program in the following areas so as to prevent and reduce stormwater pollution from the following activities:

	Year 1	Year 2	Year 3	Year 4	Year 5
Park and Open Space Maintenance	X	X	X	X	X
Fleet and Building Maintenance	X	X	X	X	X
New Construction and Land Disturbances	X	X	X	X	X
Storm Water System Maintenance	X	X	X	X	X
Snow Removal Operations	X	X	X	X	X

These activities will be coordinated with the outreach programs developed for the public information and illicit discharge minimum control measures so that a consistent message is presented throughout Joplin's program.

4.2.6.2.3 Activities

Joplin's program will address the following areas:

4.2.6.2.3.1

The following activities will be formalized and implemented to reduce the floatables and other pollutants in the MS4:

	Year 1	Year 2	Year 3	Year 4	Year 5
Maintenance Schedule	X	X	X	X	X
Maintenance Activities	X	X	X	X	X
Long-Term Inspection Procedures	X	X	X	X	X

4.2.6.2.3.2 Pollutant Locations

Joplin would like to reduce or eliminate the discharged pollutants from the following locations:

1. Streets
2. Roads
3. Municipal Parking Lots
4. Maintenance and Storage Yards
5. Fleet or Maintenance Shops with Outdoor Storage Areas
6. Salt/Sand Storage Locations

The following controls and/or programs will be implemented to reduce or eliminate the discharge of pollutants from facilities owned by Joplin:

	Year 1	Year 2	Year 3	Year 4	Year 5
Catch Basin Cleaning	X	X	X	X	X
Street Sweeping	X	X	X	X	X
Recycling Program	X	X	X	X	X
Minimize Pesticides Used	X	X	X	X	X
Employee Training	X	X	X	X	X

4.2.6.2.3.3 Pollutant Removal

Joplin will implement training procedures for the removal of dredge spoil, accumulated sediments, floatables, and other debris.

4.2.6.2.3.4 Flood Management

Joplin will review their current regulations concerning flood management to ensure they allow for:

1. Assessment and implementation of solutions that address impacts to water quality for new projects and;
2. Review of existing projects for inclusion of water quality aspects.

4.2.6.2.4 Responsible Party

The **PUBLIC WORKS DIRECTOR** will be responsible for overall management and implementation of the pollution prevention and good housekeeping program for Joplin. Others will be involved in the execution of each of the individual activities in the programs, but most of the activities will be delegated through the Publics Works Department.

This should be a post-construction item.

Planning needs to be involved

4.2.3.2.5 Program Evaluation

this tells us nothing

Joplin will evaluate the success of the pollution prevention/good housekeeping minimum control measure by tracking the progress of each measure against the implementation schedule. Each one of the measures described in this permit was chosen based on its implementability by Joplin staff and impact on water quality.



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM, WATER POLLUTION BRANCH
STORMWATER ANNUAL REPORT – MS4s
 (MUNICIPAL SEPARATE STORM SEWER SYSTEMS)

RECEIVED

2000 MAY 27 PM 1:09

PO BOX 176
 JEFFERSON CITY, MO 65102

SS
 KP

MAKE ENOUGH COPIES OF FORM FOR EACH REPORTING YEAR. Or go to <http://www.dnr.mo.gov/bac/forms/index.html>

****Each section MUST be completed. Please print or type.****

WATER PROTECTION PROGRAM

A. PERMITTEE INFORMATION

PERMITTEE (AGENCY NAME) City of Joplin	CHECK BOX IF THIS IS A NEW NAME <input type="checkbox"/>
MAILING ADDRESS 602 S. Main Street	CHECK BOX IF THIS IS A NEW ADDRESS <input type="checkbox"/>
CITY, STATE AND ZIP CODE Joplin MO 64801	CHECK BOX IF THIS IS A NEW CITY, STATE, ZIP <input type="checkbox"/>
FACILITY PHONE NUMBER 417-624-0820	CHECK BOX IF THIS IS A NEW NUMBER <input type="checkbox"/>
PERMIT CERTIFICATION NO. MO-R 040041	

HAVE ANY AREAS BEEN ADDED TO OR LOST FROM THE MS4 DUE TO ANNEXATION OR OTHER LEGAL MEANS?

YES NO IF YES, INCLUDE UPDATED MAP

B. REPORTING PERIOD

(CHECK ONE) REPORT IS DUE BY APRIL 10 OF THE FOLLOWING YEAR

- Mar. 10, 2003 to Dec. 31, 2003 -or-
- Jan. 1, 2004 to Dec. 31, 2004
- Jan. 1, 2005 to Dec. 31, 2005
- Jan. 1, 2006 to Dec. 31, 2006
- Jan. 1, 2007 to Dec. 31, 2007

C. PROGRAM AREAS (ATTACHMENT)

As an attachment to this form, address each of the following items for **each** of the six program areas (public education, public participation/involvement, illicit discharge detection and elimination, construction, post-construction, and good housekeeping for municipal operations.) The status of each program area must be addressed, even if the program area was completed and fully implemented in a previous reporting year.

If another entity does not have its own permit but is instead covered under your permit, the Annual Report information under Section C of this form must also be provided for each such entity.

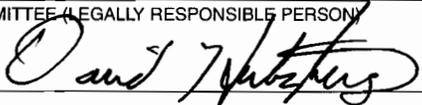
(Depending on the size of the municipality and the complexity of the programs, the attachments for this section will likely comprise one to five pages per program area.)

1. Implementation status.
 - a. General summary
 - b. Program elements changed or refined since previous report or permit application.
Include a summary of any changes made in accordance with Section 4.4 of the permit that have already been submitted to the department, and any additions made in accordance with Section 4.4 of the permit.
 - c. Status of Measurable Goals
Provide:
 - i. *The completion date for any measurable goals completed during the reporting period.*
 - ii. *An explanation for any measurable goals scheduled for completion during the reporting period that were not completed. (Any modified goals/deadline should be listed in Item 5, below.)*
2. Overall compliance with permit conditions.
 - a. Assessment of the appropriateness of the identified Best Management Practices (BMPs).
Factors to consider in determining appropriateness include, but are not limited to, effectiveness for local population, pollution sources, receiving water concerns, and integration with local management procedures.

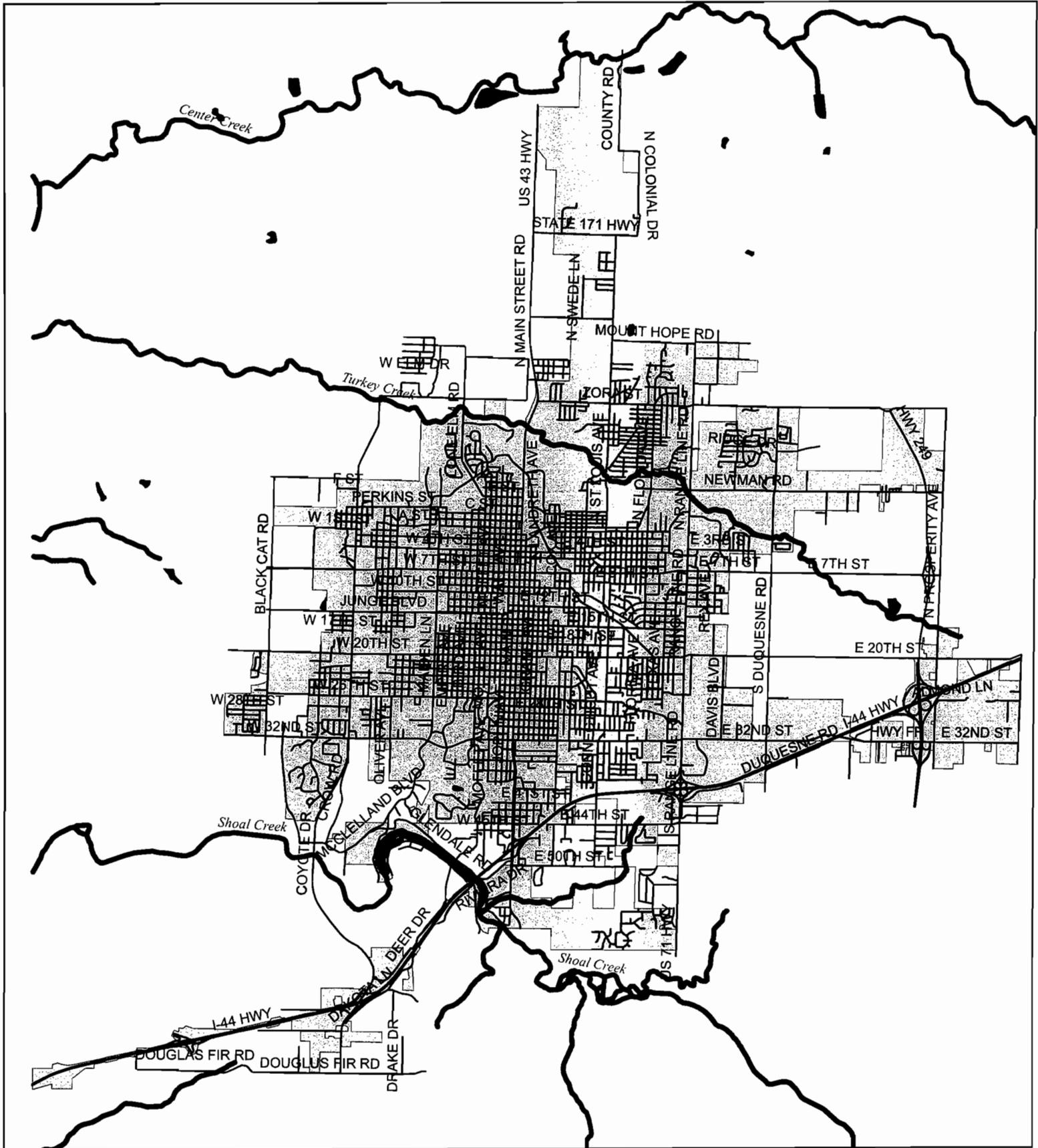
- b. Progress towards achieving the statutory goal of reducing the discharge of pollutants to the Maximum Extent Practicable (MEP).
Include a general discussion on your assessment of the overall program effectiveness at protecting water quality.
- 3. Results of information collected and analyzed, if any, during the reporting period, including any monitoring data used to assess the success of the program at reducing the discharge of pollutants to the MEP.
Discharge monitoring is not a requirement under the permit. However, if you did collect any monitoring data for stormwater discharges within your jurisdiction, or if any program element included data collection of some sort, you submit a short summary of the information and any analysis completed. Examples of data sources include survey/polling results, miles of riverbank cleaned up, number of hits on a Web site before and after a public education campaign, etc. (Data recorded under Item 1.c, Measurable Goals, does not need to be repeated here.)
- 4. Brief summary of stormwater activities you plan to undertake during the next reporting cycle (including an implementation schedule).
Provide a short summary based on your existing Missouri State Operating Permit Stormwater Management Program implementation schedule. If any changes are planned from the original descriptions provided in the application or previous reports, they should be summarized in Item 5.
- 5. Proposed changes to the program area.
 - a. Changes to BMPs
 - b. Changes to Measurable Goals*Provide a summary of proposed changes or additions to information previously submitted in reports or the permit application. Significant changes that involve replacing or deleting an ineffective or unfeasible BMP may require program review as outlined in Section 4.4 of the permit.*
- 6. Statement, if not included in previous reports or application, that you are relying on another government entity to satisfy some of your permit obligations (if applicable).
Another entity may be relied on to perform requirements of your MS4 permit. However, as the permittee, you remain liable for compliance with the terms of the permit if the requirements are not fulfilled. You must complete this annual report for the geographic areas covered under your permit, for ALL program areas, even if one or more program elements is being performed by another entity. (However, if YOU are performing a program element for ANOTHER permittee, you do not need to include that activity in this report.)
- 7. A summary of the number and nature of inspections and formal enforcement actions performed.
Site-specific information may also be included, but is not required. (Information recorded under Item 1.c Measurable Goals, does not need to be repeated here.)

D. CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

SIGNATURE OF PERMITTEE (LEGALLY RESPONSIBLE PERSON) 	DATE SIGNED 5/23/08
NAME (PRINTED) David K. Hertzberg, PE	TITLE Dir. of Public Works

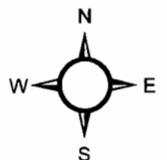
Joplin Permanent Streams



Legend

-  Joplin Streets
-  Rivers
-  Water Bodies
-  Joplin City Limits

Form M Item 12



1 inch equals 8,000 feet

2007 STORM WATER ANNUAL REPORT – MS4s
PROGRAM AREAS ATTACHMENT
City of Joplin

*How many?
Effective new?*

MCM #1 - PUBLIC EDUCATION

1. Implementation Status

a. **General Summary** --- City of Joplin staff informs individuals and households in the community about the steps they can take to reduce storm water pollution by mailing out the "Recycling and Waste Disposal Guide" to every household within the city limits of Joplin. This guide is also disseminated throughout the community all year, every year.

Another brochure titled, "Recommended Methods (Best Management Practices) for Storm Water Protection and Water Pollution Prevention" is disseminated throughout the community all year and is mailed to all individuals that receive a new business license.

Proper lawn and garden activity literature is disseminated throughout the community all year, every year.

City staff attends meetings with contractors, home builders, and Jasper and Newton County elected officials on a routine basis. City staff receives updates on proper waste recycling and disposal methods. All of these brochures and meetings address issues such as hazardous waste disposal, lawn and garden activities, trash management, and all six control methods.

Council Bill No. 2007-263 amended the Joplin City Code of Ordinances by adding Appendix 29-F concerning Erosion and Sediment Control Regulations.

b. No elements changed or were refined concerning the six BMPs.

c. **Status of Measurable Goals**

i. All goals were met. Dates are listed in the attached report.

ii. N/A

2. Overall compliance with permit conditions

a. All of the BMPs targeted were appropriate for the Joplin region in year 2007.

b. All of the target pollutant sources with a major or minor impact were addressed.

3. Reduction of pollutant discharge is not tested for any MCM category.

4. Next Reporting Cycle activities will not change as outlined in 2008-2012 permit application.

5. No changes to the BMPs or measurable goals are planned for year 2008.

6. N/A

7. N/A

?
Thinking not
Should be a new plan.

MCM #2 - PUBLIC INVOLVEMENT

1. Implementation Status

a. **General Summary** --- Existing City Code provides for public meetings and hearings involving ordinances and resolutions. Related public meetings such as the Tri-State Water Coalition are "piggy backed" with storm water BMPs. City staff keeps the local media informed about storm water issues, as well as all water issues.

- b. No changes were made to the program elements.
 - c. **Status of Measurable Goals**
 - i. All measurable goals were met. Dates are listed in the attached report.
 - ii. N/A
- ? Should have a schedule*
2. **Overall compliance with permit conditions.**
 - a. All of the BMPs targeted were appropriate for the Joplin region in year 2007.
 - b. All of the target audiences and activities and target pollutant sources with a major or minor impact were addressed.
 3. Reduction of pollutant discharge is not tested for any MCM category.
 4. Next Reporting Cycle activities will not change as outlined in the 2008-2012 permit application.
 5. No changes to the BMPs or measurable goals are planned for year 2008.
 6. N/A
 7. N/A
- don't agree program is skimpy*
still needs to be a goal
they should

MCM #3 – ILLICIT DISCHARGE

1. **Implementation Status**
 - a. **General Summary** --- Existing City Codes Section 54-35 through 54-63 and the entire chapter 118 Utilities-Sewer and Sewage Disposal provides for detection, enforcement, inspection, and elimination of illicit discharges and general water pollution.
 - b. No changes were made to the program elements.
 - c. **Status of Measurable Goals**
 - i. All measurable goals were met. Dates are listed in the attached report.
 - ii. N/A
2. **Overall compliance with permit conditions.**
 - a. All of the BMPs targeted were appropriate for the Joplin region in year 2007.
 - b. All of the target audiences and activities and target pollutant sources with a major or minor impact were addressed.
3. Reduction of pollutant discharge is not tested for any MCM category.
4. Next Reporting Cycle activities will not change as outlined in the 2008-2012 permit application. The mapping of "outflows" will be added, but this does not "change" the permit application.
5. No changes to the BMPs or measurable goals are planned for year 2008.
6. N/A
7. City staff in the Waste Water Treatment Plant, Solid Waste Department, Sewer Maintenance, Street, and Health Departments are occasionally alerted to suspected instances of accidental discharges. The businesses or home owners were instructed to make repairs or alternative discharge methods.

MCM #4 – CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

1. Implementation Status

a. **General Summary** --- Through permits, plans and inspections, construction site BMPs are being monitored. Public education and input for soil and erosion control BMPs has been ongoing. A workshop was conducted and filmed in 2006. These free films are still available to anyone.

b. The soil and erosion control ordinance element changed.

c. Status of Measurable Goals

i. All measurable goals will be met in year 2008.

ii. It became necessary to have the ordinance take effect in year 2007 instead of year 2005, due to staffing, research, and proper Planning and Zoning Commission and City Council procedures.

2. Overall compliance with permit conditions.

a. All of the BMPs targeted were appropriate for the Joplin region in year 2007.

b. All of the target audiences and activities and target pollutant sources with a major or minor impact were addressed.

3. Reduction of pollutant discharge is not tested for any MCM category.

4. The new "Plans Reviewer" city staff position will enable the City to oversee construction activities more efficiently.

5. No changes are being proposed for 2008 to the BMPs or to measurable goals.

6. N/A

7. No formal enforcement actions were performed.

MCM #5 – POST-CONSTRUCTION STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

1. Implementation Status

a. **General Summary** --- Existing City Code (specifically Council Bill 2003-140 and 2003-160), Current Zoning Codes, Ordinances, and Storm Water Master Plans, and Comprehensive Plans address this topic.

b. Program elements have not changed.

c. Status of Measurable Goals

i. Maintaining and/or increasing Open Space is addressed in the current zoning codes via a reduction in the parking space requirements and increase in lot size. Soil and Vegetation Disturbance is also addressed in the current zoning codes, EPA and DNR permits, and the City's new soil and erosion control ordinance.

ii. N/A

2. Overall compliance with permit conditions.

a. All of the BMPs targeted were appropriate for the Joplin region in year 2007.

b. All of the target audiences and activities and target pollutant sources with a major or minor impact were addressed.

3. Reduction of pollutant discharge is not tested for any MCM category.

4. Next Reporting Cycle activities include an update in the City's "Comprehensive Storm Water Master Plan" and revising storm water management regulations. Public Meetings will be conducted.

5. No changes to the BMPs or measurable goals are planned for year 2008.
6. N/A
7. N/A

MCM #6 – POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

1. Implementation Status

a. General Summary --- City staff cleans out catch basins and performs street sweeping on a routine basis. City staff has proper disposal and recycling services available for chemicals, motor oil, etc. City staff receives training by attending various meetings, conferences, workshops, etc. A professional kit was purchased in 2007.

b. Program elements have not changed.

c. Status of Measurable Goals

i. N/A

ii. N/A

2. Overall compliance with permit conditions.

a. All of the BMPs targeted were appropriate for the Joplin region in year 2007.

b. All of the target audiences and activities and target pollutant sources with a major or minor impact were addressed.

3. Reduction of pollutant discharge is not tested for any MCM category.

4. Next Reporting Cycle activities will include city staff education through a professionally purchased training kit.

5. No changes to the BMPs or measurable goals are planned for year 2008

6. N/A

7. N/A

Completed Activity Summary

MCM 1 Public Education

Educational Materials

Maintain a Library of Stormwater Educational Materials

1

Cost/effort to complete (\$'s/hours) _ 2500/104

Date started _

Description of location _ Public Works Offices at City Hall, 602 South Main Street, Joplin, MO 64801 4th Floor

Description of materials displayed/maintained _ BMP manuals, organic gardening practices, household hazardous waste satellite collection facility information, soil erosion and sediment controls concerning construction projects, Joplin Phase II permit, videos of workshops, etc.

Estimated Cost/effort to complete (\$'s/hours) _ /

Post Information on Website

1

Cost/effort to complete (\$'s/hours) _ 150.00/3

Date posted _

Description of content _ Recommended methods for storm water protection and water pollution prevention; Household Hazardous Waste disposal

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ Best Management Practices information keeps chemicals and soil out of the storm drains and water bodies

Number of website hits (optional) _

Web address _ www.joplinmo.org

2

Cost/effort to complete (\$'s/hours) _ /

Date posted _

Description of content _

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _

Number of website hits (optional) _

Web address _

Public Awareness

Distribute Promotional Items to Community

1

Amount distributed _

Cost/effort to complete (\$'s/hours) _ /

Date distributed _

Description of items distributed _

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _

Issue Press Release Regarding Local Stormwater Issues

1

Cost/effort to complete (\$'s/hours) _ 150/6

Date issued _

Description of release _ Storm Water education is mentioned in press releases concerning wood chip giveaway; Earth Day activities; America Recycles Day activities; HHW facility reminders; annual leaf pick up; and compost bin giveaways -- however, the local newspaper does not always print the information. The City's "Citizen" newsletter is mailed quarterly. The January issue ran an article regarding leaf pick up program; April issue ran an article regarding compost bins and proper disposal of appliances, tires, electronics, etc.; July issue regarding stormwater system complete with map; November issue regarding leaf pick up and gardening tips.

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ Wood chips prevent soil erosion and the need for chemicals; compost can be used instead of chemicals; HHW collection facility keeps chemicals from entering the waterbodies

Number of releases issued _ 6

Types of media recipients _ print, radio, tv, on-line newspapers

Post Stormwater Quality Signs in Public Buildings

1

Cost/effort to complete (\$'s/hours) _ 900/10

Date of posting _

Description of sign _ BMP poster at City Hall. Household Hazardous Waste Satellite Collection Facility signs. Airport sign shows how chemicals from lawns can wash into storm drains then into water bodies.

Duration of posting _

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ Teaches residents about proper use and disposal of chemicals such as insecticides, fertilizers, mercury, motor oil, paint, etc.

Location of sign _ City Hall - 602 S. Main and Recycling Center - 1310 West A Street and Joplin Regional Airport

Number of displays _ 2

Present at Speaker's Bureau

1

Cost/effort to complete (\$'s/hours) _ /

Date presented _

Description of presentation _

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _

Number in attendance _

Present Stormwater Program in Schools

1

Cost/effort to complete (\$'s/hours) _ 328/13

Date presented _ March 6, 2007

Description of presentation/materials covered _ General BMPs to College Heights Christian School and 6th Grade of North Middle School.

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ Keep trash and chemicals out of waterbodies.

Number in attendance _ 180

Publish Articles in Local Newspaper

1

Cost/effort to complete (\$'s/hours) _ 75.5/3

Date of publication _ Nov 26, 2007

Description of publication content _ The Joplin Globe newspaper ran a feature article concerning annual leaf pick up on Nov 26;

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ leaves can clog storm drains and be deposited into area water bodies;

Run Public Service Announcement on TV

1

Cost/effort to complete (\$'s/hours) _ /

Date of program _

Description of program content _

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _

Show Stormwater Information on Local TV Station

1

Cost/effort to complete (\$'s/hours) _ 150/4

Date of program _ March 1, 2007

Description of program content _ Mary Anne Phillips was a guest on the "Newsmaker Show" that aired on KOAM, KOZJ and KGCS television stations concerning generic BMPs

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ BMPs for Phase II and Soil & Erosion Control keeps soil out of water bodies.

***MCM* 2 Public Involvement**

Public Involvement

Develop Stormwater Stenciling Program

1

Cost/effort to complete (\$'s/hours) _ 500/5

Description of location of stenciling records _ Summer School activity taught students about BMPs. Five storm drains were stenciled around Kelsey Norman Elementary School. New stencils were purchased from Earthwater for \$229.00 and will be used on subsequent stenciling projects.

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of participants in program _ 25

Number of structures stenciled _ 5

Establish Community Hotline

1

Cost/effort to complete (\$'s/hours) _ 200/5

Date hotline established _

Describe location of hotline records _ Hotline number is printed in a generic Storm Water brochure that is distributed area wide and brochure is on web site

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of calls received _ 0

Number of calls responded _

Hold Public Meetings

1

Content of meeting _ Tri-State Water Coalition meetings are held monthly with an attendance of approx. 40. The City "piggy backs" on these meetings to disseminate general storm water BMPs.

Cost/effort to complete (\$'s/hours) _ /

Date of meeting _

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ Many in attendance at the Tri-State also are responsible for educating the public on water quality as well as quantity.

Number in attendance _ 480

MCM 3 Illicit Discharge

Detection

Visual Inspection

1

Cost/effort to complete (\$'s/hours) _ /

Describe location of visual inspection records _ All street, stormwater maintenance, waste water treatment plant, code enforcers, and health department employees have been trained to watch for illicit discharges in their daily work. It is a constant process. Violators are sited and forced to correct the problem through municipal court.

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of locations visually inspected _

Educational Programs

Distribute Literature

1

Amount distributed _ 2,000

Cost/effort to complete (\$'s/hours) _ /

Date distributed _

Description of brochure _ Educates the public and businesses on BMPs for all aspects and solutions of water pollution prevention and storm water management through annual Trash and Waste Guide and Generic Storm Water Brochure.

Estimated Cost/effort to complete (\$'s/hours) _ /

How it relates to stormwater _ general

Post Signs

1

Cost/effort to complete (\$'s/hours) _ 250/10

Dates of postings _ March 1

Description of signs _ BMPs

Duration of postings _ Feb. 29 to March 2 for HBA HOME SHOW and all year at Airport

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relates to stormwater _ talks about preventing trash from entering storm drains; proper chemical disposal; proper lawn maintenance, etc.

Location of signs _ Signs posted at annual Home Builders Association Home Show and all year at Joplin Regional Airport

Number of signs posted _ 1 each

Procedural Training for City Staff

1

Cost/effort to complete (\$'s/hours) _ 2,000/36

Dates of training sessions _ June 18, 2007

Description of location of training session records _ 3 staff members attended EPA Region 6 MS4 operators conference in Rogers, Arkansas; cost \$50 each plus staff time. Two staff members researched and purchased a training kit from Excal; Cost \$500 plus staff time.

Description of training sessions _

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _

Total number of staff in attendance _ 3

Total number of training sessions held _ 1

Recycling Program for Household Hazardous Waste

1

Cost/effort to complete (\$'s/hours) _ 5,000/36

Date of program _ January 1, 2007

Description of program _ The Recycling Center operates a Household Hazardous Waste Collection Facility all year. HHW is accepted for free from residents of McDonald, Jasper, Newton, Barton and Vernon Counties. This service is funded in part by Region M Solid Waste Management District and the City of Joplin.

Estimated Cost/effort to complete (\$'s/hours) _ /

Locations covered by program _ 1

Number of participants _ 100

Enforcement

Civil Penalties

1

Cost/effort to complete (\$'s/hours) _ /

Describe location of records _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of Actions _

Inspection

1

Cost/effort to complete (\$'s/hours) _ /

Describe location of inspection records _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of inspections performed _

Mapping

Storm Sewer Mapping

1

Cost/effort to complete (\$'s/hours) _ 4,800/160

Date of mapping _

Describe mapping technique _ Staff continually updates and perfectes map to provide a more useful tool within the geographical information system. In 2007, installed two new layers to the map showing detention ponds and maintenance mapping.

Estimated Cost/effort to complete (\$'s/hours) _ /

ID number of structure _

Type of structure _

2

Cost/effort to complete (\$'s/hours) _ 10,000/250

Date of mapping _

Describe mapping technique _ For 2006 the City used existing storm sewer GIS layers. In 2007 the city is working on updating and perfecting this map to provide a more useful tool within the geographical information system. This map will show the location of all outfalls and the name and location of all waters of the State that receive discharges from those outfalls.

Estimated Cost/effort to complete (\$'s/hours) _ /

ID number of structure _

Type of structure _

Volunteer Programs

Illegal Dumping Hotline

1

Cost/effort to complete (\$'s/hours) _ /

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by program _ 22,400

Number of construction sites covered by program _

Percent of construction sites > 1.0 acres covered by _
program

Construction Specifications

1

Cost/effort to complete (\$'s/hours) _ /

Date Std. Construction Specifications were adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by program _ 22,400

Number of construction sites covered by program _

Percent of construction sites > 1.0 acres covered by _
program

Design Methodologies

1

Cost/effort to complete (\$'s/hours) _ /

Date Design Methodologies was adopted _

Date hotline established _

Describe location of hotline records _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of calls received _

Number of calls responded _

Visual Inspections

1

Cost/effort to complete (\$'s/hours) _ /

Describe location of visual inspection records _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of visual inspections performed _

***MCM 4* Construction Site Stormwater Runoff Controls Construction Materials Implemented**

BMP Fact Sheets

1

Cost/effort to complete (\$'s/hours) _ /

Date BMP Fact Sheets were adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by program _ 22,400

Number of construction sites covered by program _

Percent of construction sites > 1.0 acres covered by _
program

Ordinance

1

Cost/effort to complete (\$'s/hours) _ /

Date of implementation _

Describe effort completed (draft/final/approved, etc.) _ City Council approved ordinance on April 16, 2007, with an effective date of June 1, 2007.

Description of ordinance content _ Designed to safeguard persons, protect property, prevent damage to the environment and promote the public welfare by guiding, regulating, and controlling the design, construction, use and maintenance of any development or other activity, which disturbs or breaks the topsoil or results in the movement of earth on land in City of Joplin. Includes definitions, permits, review and approval, erosion and sediment control plan, design requirements, inspection, enforcement and separability.

Estimated Cost/effort to complete (\$'s/hours) _ /

Sample Plans

1

Cost/effort to complete (\$'s/hours) _ /

Date Sample Plans were adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by program _ 22,400

Number of construction sites covered by program _

Percent of construction sites > 1.0 acres covered by _
program

Staff Training

1

Cost/effort to complete (\$'s/hours) _ /

Dates of training sessions _ June 18, 2007

Description of location of training session records _ EPA Region 6 MS4 Operators Conference in Rogers,
Arkansas

Description of training sessions _ Inspector Training

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _ Keep soil, trash, chemicals out of the storm drains
and water bodies.

Total number of staff in attendance _ 3

Total number of training sessions held _ 1

Standard Details

1

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by reviews _

Number of construction sites covered by reviews _

Percent of construction sites > 1.0 acres covered by _
reviews

Site Inspection and Enforcement

1

Cost/effort to complete (\$'s/hours) _ /

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by inspections/enforcement _

Number of construction sites covered by _
inspections/enforcement

Number of sites where enforcement action was required _

Percent of construction sites > 1.0 acres covered by _
inspections/enforcement

***MCM 5* Post-Construction Stormwater Runoff Controls Non-Structural BMPs**

Maintain and/or Increase Open Space

1

Cost/effort to complete (\$'s/hours) _ /

Cost/effort to complete (\$'s/hours) _ /

Date Std. Details were adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by program _ 22,400

Number of construction sites covered by program _

Percent of construction sites > 1.0 acres covered by
program _

Construction Site Procedures

Implementation of Proper Erosion and Sediment Controls

1

Cost/effort to complete (\$'s/hours) _ 3,000/100

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres covered by ESC procedures _ greater than .12 acres

Number of construction sites covered by ESC procedures _ all construction within city limits greater than .12 acres - many hours have been spent in the research and drafting of the erosion and sediment control ordinance and guidelines to take effect in 2007.

Percent of construction sites > 1.0 acres covered by ESC _ 100%
procedures

Review of Construction Plans

1

Cost/effort to complete (\$'s/hours) _ /

Date enabling ordinance was adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres impacted by this approach _

Number of construction sites utilizing this approach _

Minimize Disturbance of Soils and Vegetation

1

Cost/effort to complete (\$'s/hours) _ /

Date enabling ordinance was adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres impacted by this approach _

Number of construction sites utilizing this approach _

Minimize Impervious Surfaces

1

Cost/effort to complete (\$'s/hours) _ /

Date enabling ordinance was adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres impacted by this approach _

Number of construction sites utilizing this approach _

Regulatory Procedures

Comprehensive Plans

1

Cost/effort to complete (\$'s/hours) _ /

Date of implementation _

Description of comprehensive plan content _

Estimated Cost/effort to complete (\$'s/hours) _ /

Inspection and Maintenance of Long-Term Controls

1

Cost/effort to complete (\$'s/hours) _ /

Description of location of inspection records _

Description of location of maintenance records _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of inspection activities performed _

Number of maintenance activities performed _

Ordinance

1

Cost/effort to complete (\$'s/hours) _ /

Date of implementation _

Describe effort completed (draft/final/approved, etc.) _

Description of ordinance content _

Estimated Cost/effort to complete (\$'s/hours) _ /

Publication of Long-Term Control BMPs

1

Cost/effort to complete (\$'s/hours) _ /

Date of implementation _ January 1, 2006

Estimated Cost/effort to complete (\$'s/hours) _ /

Name and description of publication content _ City of Joplin Zoning Codes

Zoning Ordinance

1

Cost/effort to complete (\$'s/hours) _ /

Date of implementation _

Describe effort completed (draft/final/approved, etc.) _

Description of ordinance content _

Estimated Cost/effort to complete (\$'s/hours) _ /

Structural BMPs

Detention/Retention Practices

1

Cost/effort to complete (\$'s/hours) _ /

Date enabling ordinance was adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres controlled by these practices _

Number of construction sites utilizing these practices _

Percent of construction sites > 1.0 acres utilizing these practices _

Filtration Practices

1

Cost/effort to complete (\$'s/hours) _ /

Date enabling ordinance was adopted _

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of acres controlled by these practices _

Number of construction sites utilizing these practices _

Percent of construction sites > 1.0 acres utilizing these practices _

**MCM 6 Pollution Prevention/Good Housekeeping
Program Measures**

Catch Basin Cleaning

1

Cost/effort to complete (\$'s/hours) _ 1,500/96.5

Describe location of catch basin cleaning records _ Catch Basins inside city limits in residential and commercial areas. Location list on file at Sewer Maintenance office, 1301 West 2nd Street, Public Works Center. Cost includes avg. salary of crew at \$15 x 332 hours. Hours and number of catch basins on spreadsheet also at PWC.

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of catch basins cleaned _ 76 catch basins cleaned

Employee Training

1

Cost/effort to complete (\$'s/hours) _ /

Dates of training sessions _

Description of location of training session records _

Description of training sessions _

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _

Total number of staff in attendance _

Total number of training sessions held _

Maintenance Schedule

1

Cost/effort to complete (\$'s/hours) _ /

Date maintenance schedule prepared _

Description of location of maintenance schedule records _

Estimated Cost/effort to complete (\$'s/hours) _ /

Minimize Pesticides Used

1

Cost/effort to complete (\$'s/hours) _ /

Date program was implemented _ April 4, 2006

Description of program _ ADAPCO Company (pest management vendor) held a training seminar for City staff and regional municipalities.

Estimated Cost/effort to complete (\$'s/hours) _ /

Identify method of ensuring use is minimized/checked _

Number of locations covered by program _ 1

Recycling Program

1

Cost/effort to complete (\$'s/hours) _ /

Date program was implemented _ January 1, 2006

Description of program _ The Recycling Coordinator distributes a recycling procedure fact sheet to employees. Waste generated by employees and operations (from flourescent bulbs, pallets, chemicals, lead acid batteries, tires, ink jet cartridges, etc. to cardboard) are recycled. Used motor oil is either sent away for recycling or used as fuel in an oil burner furnace at the Central Garage.

Estimated Cost/effort to complete (\$'s/hours) _ /

Locations covered with program _ The City has over 20 facilities ranging from the Airport, Library, City Hall and more

Number of participants _ The City has between 300 and 400 full-time, part-time, and seasonal employees.

Street Sweeping

1

Cost/effort to complete (\$'s/hours) _ 61,785/4,119

Describe location of street sweeping records _ Sweeping is conducted on residential and commercial streets that are maintained by the City. State Highways are swept by Missouri Department of Transportation and are not counted in this report. List of streets are on file at at the Public Works Center, 1301 West 2nd Street. Cost is based on 4,119 lane miles x \$15 avg. per hour = \$61,785

Estimated Cost/effort to complete (\$'s/hours) _ /

Number of lane miles swept _ 7,494

Training Programs

Fleet and Building Maintenance

1

Cost/effort to complete (\$'s/hours) _ /

Dates of training sessions _

Description of location of training session records _

Description of training sessions _

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _

Total number of staff in attendance _

Total number of training sessions held _

New Construction and Land Disturbances

1

Cost/effort to complete (\$'s/hours) _ /

Dates of training sessions _

Description of location of training session records _

Description of training sessions _

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _

Total number of staff in attendance _

Total number of training sessions held _

Park and Open Space Maintenance

1

Cost/effort to complete (\$'s/hours) _ /

Dates of training sessions _

Description of location of training session records _

Description of training sessions _

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _

Total number of staff in attendance _

Total number of training sessions held _

Snow Removal Operations

1

Cost/effort to complete (\$'s/hours) _ /

Dates of training sessions _

Description of location of training session records _

Description of training sessions _

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _

Total number of staff in attendance _

Total number of training sessions held _

Stormwater System Maintenance

1

Cost/effort to complete (\$'s/hours) _ /

Dates of training sessions _

Description of location of training session records _

Description of training sessions _

Estimated Cost/effort to complete (\$'s/hours) _ /

How they relate to stormwater _

Total number of staff in attendance _

Total number of training sessions held _

MCM #5: Post-Construction Stormwater Management in New Development and Redevelopment

4.2.5.1 Permit Requirement

4.2.5.1.1 Overview

How so?

Joplin has developed, is implementing, and enforces a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale.

4.2.5.1.2 Strategies

How so?

Joplin has developed and implemented strategies, which will include a combination of structural and/or non-structural Best Management Practices (BMPs) appropriate for the community.

4.2.5.1.3 Ordinance

How so?

Joplin uses an ordinance and other regulatory mechanisms to address post-construction runoff from new development and redevelopment projects to the extent allowable under State or Local law.

4.2.5.1.4 Long-Term Operation & Maintenance

Which one? quantity or quality?

Joplin will continue to ensure adequate long-term operation and maintenance of BMPs.

4.2.5.2 Decision Process

The following is the rationale statement for the development of a post-construction stormwater management program. It documents the BMPs, measurable goals, and responsible party for the program.

4.2.5.2.1 Priority Areas

Joplin will implement regulatory procedures to address stormwater runoff from new development and redevelopment projects. There are no areas identified as a priority for regulatory procedures.

this is problematic

Joplin

EROSION AND SEDIMENT CONTROL ORDINANCE

Section I. Introduction/ Purpose

During the construction process, soil is vulnerable to erosion by wind and water. Eroded soil endangers natural resources by reducing water quality, and causing the siltation of aquatic habitat for fish and other desirable species. Eroded soil also necessitates repair of sewers and ditches, and the dredging of lakes. In addition, clearing and grading during construction causes the loss of native vegetation necessary for terrestrial and aquatic habitat, and to provide a healthy living environment for citizens of the City of Joplin. ←

necessary for

As a result, the purpose of this ordinance is to safeguard persons, protect property, prevent damage to the environment and promote the public welfare by guiding, regulating, and controlling the design, construction, use and maintenance of any development or other activity which disturbs or breaks the topsoil or results in the movement of earth on land in City of Joplin.

Section II. Definitions

adequate erosion & sediment control ←

Inspector An individual who has received training and is employed by the City of Joplin to inspect erosion and sediment control practices.

Clearing Any activity which removes the vegetative surface cover.

Drainage Way Any channel that conveys surface runoff throughout the site.

Erosion Control Measures that prevent erosion.

Erosion and Sediment Control Plan A plan or set of plans prepared by or under the direction of a licensed professional engineer indicating the specific measures and sequencing to be used controlling sediment and erosion on a development site both before, during and after construction.

consider CPESC certified ?

Grading Excavation or fill of material, including the resulting conditions thereof.

Perimeter Control A barrier that prevents sediment from leaving a site either by filtering sediment-laden runoff, or diverting it to a sediment trap or basin.

Phasing Clearing a parcel of land in distinct phases, with the stabilization of each phase before the clearing of the next.

Sediment Control Measures that prevent eroded sediment from leaving the site.

Site	A parcel of land, or a contiguous combination thereof, where grading work is performed as a single unified operation.
Site Development Permit	A permit issued by the municipality for which the construction or alteration of ground improvements and structures for the control of erosion, runoff and grading. ←
Stabilization	The use of practices that prevent exposed soil from eroding. <i>(including street-piles)</i> →
Start of Construction	The first land-disturbing activity associated with a development, including land preparation such as clearing, grading and filling; installation of streets and walkways; excavation for basements, footings, piers or foundations; erection of temporary forms; and installation of accessory buildings such as garages.
Watercourse	Any body of water, including, but not limited to lakes, ponds, rivers, streams, and bodies of water delineated by the City of Joplin. <i>natural or man-made</i> ? state fed?
Waterway	A channel that directs surface runoff to a watercourse, or to the public storm drain. ←

Section III. Permits

1. No person shall be granted a site development permit for land-disturbing activity which would require the uncovering of 5,000 or more square feet without the approval of an Erosion and Sediment Control Plan by City of Joplin. 7.1
acre
- for projects w/ large ...

— No person shall be granted a site development permit without a

2. No site development permit is required for the following activities: ~~the approval of~~
state fed. permit
~~developing a~~
~~subp~~
~~med. site~~

 - a. Any emergency activity which is immediately necessary for the protection of life, property or natural resources.
 - b. Existing nursery and agricultural operations conducted as a permitted main or accessory use.
what about non-agricultural nurseries? these can be significant ←
some
3. Each application shall bear the name(s) and address(es) of the owner or developer of the site, and of any consulting firm retained by the applicant together with the name of the applicants principal contact at such firm.
4. Each application shall include a statement that any land clearing, construction, or development involving the movement of earth shall be in accordance with the Erosion and Sediment Control Plan, and that an Inspector shall be allowed on site on all days where construction or grading activity takes place.
5. Persons constructing a single structure on a lot zoned R1 or R2 may choose an
shall designate a responsible person

Erosion and Sediment Control Plan from the City of Joplin's Single Family Residential Design Booklet. This plan does not need to be prepared under the direct supervision of a licensed professional engineer.

What are those?

Section IV. Review and Approval

1. City of Joplin will review each application for a site development permit to determine its conformance with the provisions of this local regulation. Within thirty (30) days after receiving an application, the City of Joplin shall, in writing either:
 - a. approve the permit application;
 - b. approve the permit application subject to such reasonable conditions as may be necessary to secure substantially the objectives of this regulation, and issue the permit subject to these conditions; or
 - c. disapprove the permit application, indicating the deficiencies and the procedure for submitting a revised application and/or submission.
2. Failure of the City of Joplin to act on original or revised applications within thirty (30) days of receipt shall authorize the applicant to proceed in accordance with the plans as filed unless such time is extended by agreement between the applicant and City of Joplin. Pending preparation and approval of a revised plan, development activities shall be allowed to proceed in accordance with conditions established by City of Joplin.

However, the applicant must still comply with state & federal requirements.

Section V. Erosion and Sediment Control Plan

1. The Erosion and Sediment Control Plan shall include:
 - a. A sequence of construction of the development site, including stripping and clearing, rough grading, construction of utilities, infrastructure, buildings, final grading and landscaping. Sequencing shall identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas, and the sequence of clearing, installation of temporary erosion and sediment measures, and establishment of permanent vegetation.
 - b. All erosion and sediment control measures necessary to meet the objectives of this local regulation throughout all phases of construction and permanently, after completion of development of the site. Depending upon the complexity of the project, the drafting of intermediate plans may be required at the close of each season.
 - c. Seeding mixtures and rates, types of sod, method of seedbed preparation, expected seeding dates, type and rate of lime and fertilizer application, and

kind and quantity of mulching for both temporary and permanent vegetative control measures.

d. Provisions for maintenance of control facilities.

2. Modifications to the plan

a. Major amendments of the erosion and sediment control plan shall be submitted to the City of Joplin and shall be processed and approved, or disapproved, in the same manner as the original plans.

b. Field modifications of a minor nature may be authorized by City of Joplin by verbal authorization to the permittee.

~~But must~~ However, the permittee must comply w/ state require to submit written change to the City

Section VI. Design Requirements

1. Grading, erosion control practices, sediment control practices, and waterway crossings shall meet the design criteria set forth in the most recent version of the City of Joplin's Erosion and Sediment Control Guidelines, and shall be adequate to prevent transportation of sediment from the site to the satisfaction of the City of Joplin

2. Phasing shall be required on all sites disturbing greater than five acres, with the size of each phase to be established at plan review and as approved by the City of Joplin. Sedimentation control shall be established before work on each phase, or for the complete site in the first phase.

3. Clearing, except that necessary to establish sediment control devices, shall not begin until all sediment control devices have been installed and have been stabilized.

4. Cut and fill slopes shall be no greater than 4:1, except as approved by the City of Joplin to meet other community or environmental objectives.

5. Erosion Control requirements shall include the following:

a. Should continuous work on-site be suspended for a period of greater than 14 days, soil must be stabilized within the following 7 days.

b. If vegetative erosion control methods, such as seeding, have not become established within 30 days, the City of Joplin may require that the site be reseeded, or that a non-vegetative option be employed.

c. On steep slopes or in drainage ways, special techniques that meet the design criteria outlined in the City of Joplin shall be used to ensure stabilization.

3

2

guide?

- d. Soil stockpiles must be stabilized or covered at the end of each work day. Stabilization shall be by either tarping or installing silt fencing around the entire pile.
- e. Techniques shall be employed to prevent the blowing of dust or sediment from the site.
- f. Techniques that divert upland runoff past disturbed slopes shall be employed.

6. Sediment Controls

- a. Sediment controls shall be provided in the form of settling basins or sediment traps or tanks, and perimeter controls.
- b. Adjacent properties shall be protected by the use of a vegetated buffer strip, in combination with perimeter controls.

7. Waterways and Watercourses

- a. When a wet watercourse must be crossed regularly during construction, a temporary stream crossing shall be provided, and an approval obtained from the City of Joplin and all other necessary local, state and federal interests. *good!*
- b. When in-channel work is conducted, the channel shall be stabilized before, during and after work.
- c. All on-site stormwater conveyance channels shall be designed according to the criteria outlined in the City of Joplin Stormwater Management Regulations. *- Design criteria? or guidance?* ←
- d. Stabilization adequate to prevent erosion must be provided at the outlets of all pipes, flumes and paved channels.

8. Construction Site Access

- a. A stabilized construction entrance road shall be provided at all sites.
- b. Other measures may be required at the discretion the City of Joplin in order to ensure that sediment is not tracked onto public streets by construction vehicles, or washed into storm drains.
- c. Public streets adjacent to the site access shall be scraped and swept daily by the contractor to the Inspector's satisfaction.

Section VII. Inspection

The City of Joplin shall make inspections as hereinafter required and shall either approve that portion of the work completed or shall notify the permittee wherein the work fails to comply with the erosion and sediment control plan as approved.

*7
Need memo
attached*

Section VIII. Enforcement

1. Stop-Work Order; Revocation of Permit: In the event that any person holding a site development permit pursuant to this ordinance violates the terms of the permit, or implements site development in such a manner as to materially adversely affect the health, welfare, or safety or persons residing or working in the neighborhood or development site so as to be materially detrimental to the public welfare or injurious to property or improvements in the neighborhood, the City of Joplin may suspend or revoke the site development permit.

2. Violation of the provisions of this article or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with granting of variances) shall constitute a misdemeanor. Any person who violates this article or fails to comply with any of its requirements shall, upon conviction thereof, be punished in accordance with the City Code. Each day such violation continues shall be considered a separate offense. Nothing herein contained shall prevent the city or other appropriate authority from taking such other lawful action as is necessary to prevent or remedy any violation.

Section IX. Separability

The provisions and sections of this ordinance shall be deemed to be separable, and the invalidity of any portion of this ordinance shall not affect the validity of the remainder.

Title:

4.6.4.3.2 Land Disturbance / Storm Water BMP Plan (GPs)

Applicability:

This section outlines the standard procedure for reviewing the Storm Water Best Management Plan or Storm Water Pollution Prevention Plan as outlined in the MOR100, MOR100A, and MOR109 series Missouri State Operating Permits.

Content:

Soil sediment that erodes from a construction activity is a large contributor to water pollution. Poor storm water management from construction sites can cause a decline in water quality by introducing pollutants such as nutrients, suspended solids, organic carbon, bacteria, hydrocarbons, trace metals, pesticides, chlorides, thermal impacts and trash and debris and can accelerate the declination of the re-charge area. It can also cause the degradation of stream channels.

Sediment loading rates from construction sites are typically 10 to 20 times greater than preconstruction rates (North Carolina Department of Environment, Health and Natural Resources, 1993). Over a short period of time, construction sites can contribute more sediment to receiving streams than was previously deposited over several decades.

In an effort to prevent sediment from entering water bodies, careful consideration of erosion control measures must be taken. Some ways to prevent erosion without using equipment are limiting areas of disturbance, preserving existing vegetation and stabilizing the area as soon as possible after grading. Temporary erosion control measures such as silt fences, hay bales, filter sox, slope drains, sediment basins etc. may be considered based on topography and construction activities.

A Storm Water Pollution Prevention Plan (SWPPP) shall be developed and implemented for construction sites and activities where a cumulative total of one (1) or more acres over the life of the project will be disturbed or is part of a larger common plan of development or sale which will disturb a cumulative total of one or more acres over the life of the project.

The SWPPP shall be developed by the applicant or applicant's representative in accordance with the concepts and methods described in the following documents:

- a. **Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices**, (Document number EPA 832-R-92-005) published by the United States Environmental Protection Agency (USEPA) in 1992. **This manual is available at The USEPA internet site:**
http://www.epa.gov/npdes/pubs/chap02_conguide.pdf

- b. ***Protecting Water Quality: A field guide to erosion, sediment and storm water best management practices for development sites in Missouri***, published by the Missouri Department of Natural Resources in November 1995.

The development of the SWPPP is not limited to the use of these guidance materials. The plan is to be developed prior to the permit application submittal and should be included with the permit application for all projects greater than 40 acres in size or in areas where sink holes, mine tailings, stream crossings or other sensitive areas will be affected.

The SWPPP shall include a description of potential sources, which are likely to add pollutants to storm water discharges, or which may result in non-storm water discharges from the construction site. The SWPPP shall include a description of the erosion control practices, including a time schedule, to be implemented during construction to minimize erosion on disturbed areas of a construction site. A copy of the SWPPP shall be kept on site or at a minimum be made available to inspectors by close of business on the day of inspection. A template for use in the development of a SWPPP can be found in Appendix A. The SWPPP shall:

- 1) Identify the facility.
- 2) Identify all outfalls.
- 3) Identify all pollutant sources, storm water and non-storm water. Pollution can include nutrients, suspended solids, organic carbon, bacteria, hydrocarbons, trace metals, pesticides, chlorides, thermal impacts and trash and debris.
- 4) Contain a physical description of the best management practices (BMP's) both temporary and permanent. This should include how off site vehicle tracking will be addressed.
- 5) Explain site and physical conditions that must be addressed for effective use of the BMP's
- 6) Describe BMP installation/construction procedures, including typical drawings.
- 7) Describe operation and maintenance procedures for the BMP's chosen. Include a schedule for maintenance.
- 8) State whether the BMP is temporary or permanent.
- 9) Describe or show where, in relation to other site features, the BMP's are to be located.
- 10) Detail when the BMP will be installed in relation to each phase of the land disturbance procedures to complete the project and what site conditions must be met before the removal of the BMP's if the BMP's are not permanent. Include a time schedule for this implementation.
- 11) State temporary stabilization details should areas be left undisturbed for more than 14 days.
- 12) State bench marks to be referenced for proper installation, as well as operation and maintenance of drainage course changes. Work in defined drainages or watercourses and their associated wetlands may require a permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the federal Clean Water Act.
- 13) Discuss solid and hazardous waste management including trash containers.
- 14) Discuss proper sanitation methods (i.e. portable toilets).
- 15) Explain how the storage of construction materials will be kept away from drainage areas.
- 16) Describe the outlet control devices to be used.
- 17) The SWPPP shall require a sedimentation basin for each drainage area with 10 or more acres disturbed at one time. The sediment basin shall be sized to contain 0.5 inch of sediment from the drainage area and be able to contain a 2-year, 24-hour storm. The sediment shall be

cleaned out of the basin and otherwise maintained as needed until the drainage area is stabilized. This requirement does not apply to flows from areas where such flows are properly diverted around both the disturbed areas and the sediment basin. Discharges from the basin shall not cause scouring of the banks or bottom of the receiving stream.

Where use of a sediment basin of this size is impractical, the SWPPP shall evaluate and specify other similarly effective BMPs to be employed to control erosion and sediment delivery. The SWPPP shall require the basin be maintained until final stabilization of the area served by the basin.

The SWPPP shall require both temporary and permanent sedimentation basins to have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

- 18) The SWPPP shall be amended when appropriate. Field implementation shall match narrative and illustrated depictions.
- 19) The SWPPP shall contain a site inspection form and inspection log for use during weekly inspections or during storm water events. Inspections shall be performed once every 7 days or within 24 hours after a storm event of greater than 0.5 inches. Qualified personnel shall perform inspections and authorized persons shall sign reports. The site inspection shall include: date, name and qualifications of inspector, weather information, location of sediment/pollutant discharge, BMP's requiring maintenance, BMP's that have failed, BMPs that are needed, corrective action required including changes/updates to SWPPP and schedule/date. Copies of inspection reports shall be maintained for three years from the date permit coverage expires.
- 20) The SWPPP shall indicate the portions of the project for which each operator has control over day-to day activities.
- 21) Contractors shall be notified of the provision of the SWPPP and a copy shall be provided to all contractors or sub-contractors involved with pre-stabilization activities. A provision must be included to notify all applicable contractors of changes made to the SWPPP.
- 22) The owner as well as all relevant contractors and sub-contractors shall sign the SWPPP.

In addition to the narrative portion of the SWPPP, a site map shall be included. The site map shall be a maximum of 1" = 200 feet. Applicable topographic lines shall be shown. The site map shall include:

- (1) Drainage patterns and slopes anticipated before and after major grading activities are completed.
- (2) Generally, each sheet shall be oriented so that the north arrow points toward the top or toward the left side of the sheet.
- (3) Boundary lines for land disturbance activities.
- (4) Existing and planned streets, buildings, lots, utilities, geographic features, buffer strips and waterways.
- (5) All outfalls should be labeled.
- (6) All BMP's both temporary and permanent.
- (7) All sedimentation basins.

(8) The map shall include a legend, which describes all symbols used. Whenever symbols fail to satisfactorily convey the requisite information, notes shall be used.

Permit writers and inspectors shall insure that the review of all SWPPP's find them to be in accordance with this guidance. If SWPPP's are found lacking, they shall be returned to the applicant with an explanation of the deficiencies.

Legal References:

Missouri State Operating Permit
MOR100, MOR100A, and MO-R109 series

Code of State Regulations
10 CSR 20-6.200 Storm Water Regulations
<http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf>

Clean Water Act Title III - Standards and Enforcement
(Sections 301-320)
http://www.epa.gov/region5/water/pdf/ecwa_t3.pdf

Other Links:

EPA Office of Compliance
Managing Your Environmental Responsibilities: A Planning Guide
for Construction and Development
<http://www.cicacenter.org/links>

EPA Storm Water Pollution Prevention Plan
http://www.epa.gov/npdes/pubs/chap02_conguide.pdf

EPA Example Storm Water Pollution Prevention Plan for a
Construction Activity
http://www.epa.gov/npdes/pubs/app_c_conguide.pdf

Protecting Water Quality. A field guide to erosion, sediment
and storm water best management practices for development sites
in Missouri and Kansas.
<http://www.dnr.mo.gov/env/wpp/wpcp-guide.htm>

2000 Maryland Stormwater Design Manual
http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/stormwater_design/index.asp

1994 Maryland Standards and Specifications for Soil Erosion and
Sediment Control
<http://www.goprincegeorgescounty.com/Government/AgencyIndex/DER/PRD/pdf/SWMfinal.pdf>

Key words:

Best Management Practices, Storm Water Pollution Prevention Plan

Page ID:

4.6.4.3.2 Land Disturbance Storm Water BMP Plan (GPs)

Revised by:

Tina A. White ESIII

Modification Date:

April 2006

Appendix A

Template for the narrative portion of the
SWPPP

STORM WATER POLLUTION PREVENTION PLAN
FOR SUBDIVISIONS

PART I GENERAL PROJECT INFORMATION

To be completed by Owner or Design Professional

PROJECT NAME: _____

PROPERTY OWNER'S NAME: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

PHONE #: _____ **FAX #:** _____

MOBILE #: _____ **PAGER #:** _____

DSEVELOPER'S NAME: _____

(If different from property owner)

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

PHONE #: _____ **FAX #:** _____

MOBILE #: _____ **PAGER #:** _____

GENERAL DESCRIPTION OF PROJECT:

LOCATION OF THE PROJECT:

Address: _____

Legal Description: _____

Receiving Stream: _____ Class: _____

Distance from project outfall to receiving water: _____ feet

Note: If outfall discharges to more than one receiving water body, attach information for each outfall. If discharge is to a sinkhole, list groundwater as receiving water, and submit a **Sinkhole Evaluation** report.

PART II PROJECT PLANNING & DESIGN

To be completed by ENGINEER

ENGINEER'S NAME: _____

COMPANY: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

PHONE #: _____ **FAX #:** _____

NOTE: ATTACH SEDIMENT & EROSION CONTROL PLAN (SECP)

TYPE OF SOIL DISTURBING ACTIVITIES PROPOSED

Soil disturbing activities for this subdivision will include the following:

(Check those which apply)

- clearing and grubbing of existing vegetation
- stripping of topsoil within the limits of construction
- stockpiling and re-spreading topsoil
- utility trench excavation and backfill
- preparing subgrade for streets and sidewalks
- backfilling curbs and sidewalks
- construction of sediment basins and stormwater detention basins
- disposal areas for excess excavated material
- borrow areas for fill material
- construction of compacted fill areas for residential building construction
- other (specify)

NOTE: Limits of land disturbance must be clearly shown on the sediment and erosion control plan

TOTAL SITE AREA: _____ ACRES

ESTIMATED AREA TO BE DISTURBED BY ALL PROPOSED CONSTRUCTION ACTIVITIES:

_____ ACRES

NOTE: Attach Missouri State Operating Permit

RUNOFF COEFFICIENT PRIOR TO DEVELOPMENT: _____

RUNOFF COEFFICIENT AFTER DEVELOPMENT: _____

IS A SECTION 404 PERMIT FOR THIS SITE FROM THE UNITED STATES ARMY CORPS OF ENGINEERS REQUIRED? _____ Yes _____ No

If yes, please attach.

ARE RECEIVING WATERS, STREAMS, LAKES, OR RESERVOIRS IDENTIFIED AS CRITICAL HABITAT FOR ENDANGERED SPECIES AS DETERMINED BY MISSOURI

DEPARTMENT OF CONSERVATION AND U.S. FISH AND WILDLIFE SERVICE?

_____ Yes _____ No

If yes, please attach letter from the Department of Conservation as to their recommendations.

SEDIMENT & EROSION CONTROLS TO BE USED

TEMPORARY CONTROLS

_____ Silt fence
_____ Straw/hay bale dike
_____ Silt containment berm _____
Sediment Basin
_____ Diversion berm or swale _____
Temporary gravel construction entrance
_____ Vegetative buffers _____
Other (specify) _____

TEMPORARY STABILIZATION

_____ Temporary seeding _____
Mulching
_____ Other (specify) _____

PERMANENT EROSION CONTROLS

_____ Diversion berm _____
Diversion swale
_____ Riprap/paved chute _____
Riprap outlet protection
_____ Riprap channel lining _____
Reinforced sod channel lining
_____ Sod channel lining _____
Concrete trickle channel
_____ Concrete channel lining _____
Vegetative buffers
_____ Other (specify) _____

PERMANENT STABILIZATION

_____ Seeding _____
Straw mulch _____
_____ Hydromulch _____
Pavement & other permanent surfacing _____
_____ Other (specify) _____

Note: Attach specifications and details for any of the items listed above, which are not shown on the attached Sediment & Erosion Control Plan.

GENERAL DESCRIPTION OF STORMWATER MANAGEMENT PLAN:

GENERAL SEQUENCY OF CONTSTUCTION: Describe the general sequence of construction. Note any critical construction sequences, time restrictions, etc. of which the contractor must be aware in planning his activities.

PART III CONSTRUCTION OF STREETS & UTILITIES

To be completed by GENERAL CONTRACTOR

GENERAL CONTRACTOR'S NAME: _____

ADDRESS; _____

CITY: _____ **STATE:** _____ **ZIP:** _____

PHONE #: _____ **FAX #:** _____

MOBILE #: _____ **PAGER #:** _____

The General Contractor must designate a **SEDIMENT CONTROL OFFICER** who has primary responsibility for ensuring compliance with the Stormwater Pollution Prevention Plan during construction.

NAME OF SEDIMENT & EROSION CONTROL OFFICER _____

PHONE #: _____ **FAX #:** _____

MOBILE #: _____ **PAGER #:** _____

SUBCONTRACTORS: Check items for which subcontractors are to be used and attach list of subcontractors.

- | | |
|--------------------------|------------------------------------|
| _____ Grading | _____ Sanitary Sewers |
| _____ Storm Sewers | _____ Concrete drainage structures |
| _____ Paving | _____ Curb & Gutter |
| _____ Concrete flatwork | _____ Sediment controls |
| _____ Seeding & Mulching | _____ Water |
| _____ Gas | _____ Electric |
| _____ Blasting | _____ Other: _____ |

List all additional subcontractors whose scope of work includes land disturbance activities

OTHER CONTRACTORS: List utility companies which will be doing work on the site with their own contractors:

Telephone: _____
Cable TV: _____
Other: _____

BLASTING: List all contractors who will perform blasting work or handle explosives. Attach insurance certificates for all contractors on the list.

SEQUENCE OF CONSTRUCTION: The General Contractor **MUST** complete the following sequence of construction before a Permit is issued.

ITEM

SUBCONTRACTOR

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

GENERAL SEDIMENT CONTROL PRACTICES

The contractor shall implement the following general sediment and erosion control practices in addition to specific measures required on the SECP.

- No more than 50% of the site or 10 acres, whichever is less, will be stripped of vegetation at any one time.
- Clearing, grubbing and stripping topsoil is not allowed within 25 feet of a stream bank and should be avoided within 50 feet of a stream bank.
- Work within watercourses and drainageways shall be completed as quickly as possible once the work has been initiated, and the disturbed area revegetated or protected from erosion as soon as possible. Work within watercourses may not commence until all equipment and material necessary to complete the work have been delivered to the site.
- Disturbed areas within 50 feet of a defined watercourse must be regraded, seeded, and mulched within 5 working days of the initial disturbance.
- If construction ceases in an area for more than 14 days that area must be seeded and mulched in accordance with the temporary seeding schedule.
- The maximum time period for disturbed areas to be without vegetative cover shall be minimized to the extend practical and in no case shall exceed 30 days.

MAINTENANCE/INSPECTION PROCEDURES

The following maintenance and inspection practices are required to maintain sediment and erosion controls:

- **All control measures will be inspected at least once per week and following any storm event of 0.5 inches or more.**
- All measures will be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours of report.
- Silt fences and straw bales will be inspected **weekly** for proper anchorage and leakage underneath. Silt fencing shall also be inspected for tears.
- Built-up sediment will be removed from silt barriers when it has reached 1/3 of the height of the barrier.

- Sediment basins will be inspected for depth of sediment on a **monthly** basis and built up sediment will be removed when 1/3 of the basin volume is filled.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth. The developer is responsible for maintaining planted areas until growth has reached 1" in height

MATERIALS INVENTORY: List below all materials which will be stored outside on the site during construction:

_____ Pipe fittings and joint compounds for underground utility piping

_____ Gravel and stone bedding material

_____ Concrete forming materials

_____ Other (specify)

Please list ALL sources of possible pollution.

Note: Fuels, oils, and other petroleum products; forming oils and compounds; fertilizers; pesticides; or any other hazardous or toxic compounds shall not be stored outside on the site unless specifically approved in this plan.

SPILL PREVENTION / MATERIAL MANAGEMENT PRACTICES

PETROLEUM PRODUCTS: All vehicles kept on the site will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled. Any asphalt substances used on-site will be applied according to the manufacturer's recommendations.

FUELING & SERVICING: No fueling, servicing, maintenance, or repair of equipment or machinery may be done within 50 feet of a stream, or within 100 feet of a classified stream, losing stream or sinkhole.

MUD TRACKING: A stabilized construction entrance has been designated on the plan. Only designated entrances can be used for construction access to the site. The General Contractor is responsible for keeping mud cleaned from adjoining streets on a daily basis if needed.

CONCRETE TRUCKS: Concrete trucks will be allowed to wash only in locations where discharge is directed to a sediment basin.

DISPOSAL OF OIL: No fuels, oils, lubricants, solvents, or other hazardous materials can be disposed of on the site. All hazardous material must be properly disposed of in accordance with State law.

TRASH / SOLID WASTE: The General Contractor is responsible for disposing of all solid waste from the site in accordance with State law. Dumpsters or other collection facilities must be provided as needed. Solid waste may not be buried on the site.

SANITARY WASTE: The General Contractor is responsible for providing sanitary facilities on the site. Sanitary waste may be disposed only in locations having a State permit.

OTHER DISCHARGES: Water for pressure testing sanitary sewers, flushing water lines, etc. may be discharged only in approved areas.

AIR EMISSIONS

BURNING: Any burning on the site requires a permit from the Missouri Department of Natural Resources. Call the _____ Regional Office at _____

DUST CONTROL: The Contractor is required by State law to control fugitive dust blown from the site. Dust can be minimized by stabilizing areas with mulch as soon as possible. Watering must be provided in unstabilized areas. Fugitive dust emissions are regulated by the Department of Natural Resources. Call the _____ Regional Office at _____ for guidance..

OTHER GOOD HOUSEKEEPING PRACTICES: In addition to the foregoing, the following good housekeeping practices will be followed during the construction of the project:

- An effort will be made to store only enough product to do the job.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Whenever possible, all of a product will be used up before disposing of the container
- Manufacturer's recommendations for proper use and disposal will be followed.
- The site superintendent shall inspect daily to ensure proper use, storage, and disposal of materials.
- Fertilizers will be applied only in the minimum amounts recommended by the manufacturer.
- All paint containers will be tightly sealed and stored when not required for use. Excess paint will not be dumped into the storm sewer system but will be properly disposed of according to manufacturer's instructions and State regulations.

HAZARDOUS PRODUCTS

- Products will be kept in original containers unless they are not resealable. If product is transferred to a new container, it must be properly marked and labeled.
- Original labels and material safety data will be retained.
- If surplus product must be disposed of, disposal must be done in accordance with State law.

SPILL CONTROLS

- The Sediment & Erosion Control Officer will be the spill prevention and cleanup coordinator.
- In addition to the good housekeeping practices and material management practices listed in the previous sections of this plan, the following practices will be followed for spill prevention and clean-up:
- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Material and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported immediately to the Local Emergency Planning Committee (LEPC) at 417-869-6040, regardless of the size of the spill. The permittee or his authorized representative is required to notify the MDNR Environmental

Emergency Response in accordance with 40CFR117 and CFR302 as soon as they have knowledge of the discharge of any hazardous substance or petroleum product in excess of the reportable quantity.

- The spill prevention plan will be adjusted to include measures to prevent this type of spill from re-occurring and how to clean up the spill if there is another one.

SAMPLING REQUIREMENTS

There are no sampling requirements required as a part of this plan. The Department may require sampling and reporting as a result of illegal discharges, compliance issues, complaint investigations, or other such evidence of off-site contamination from activities at the site. If such an action is needed the Department will specify in writing any additional sampling requirements.

PART IV MAINTENANCE PHASE

To be completed by DEVELOPER

The maintenance phase covers the period between the time that the subdivision improvements (streets, storm drainage facilities and utilities) are completed and approved, and the time that construction of residential housing units in the development is completed. The Developer will retain responsibility unless written notification is given to lot purchasers informing them that the Developer is transferring responsibility for sediment and erosion control to them prior to the sale of the lots. (For sites with a State Operating Permit, an Individual Lot Certification must be submitted to MDNR for each lot.)

In most instances it will be more practical for the developer to maintain sediment controls for the entire site rather than to attempt to provide sediment controls on a lot by lot basis. If the Developer elects to do this he must designate a **SEDIMENT CONTROL OFFICER** who has primary responsibility for ensuring compliance with the Stormwater Pollution Prevent Plan during this phase.

DEVELOPER **WILL** _____ **WILL NOT** _____ retain responsibility for sediment and erosion control during this phase.

NAME OF SEDIMENT & EROSION CONTROL OFFICER

PHONE #: _____ **FAX #:** _____

MOBILE #: _____ **PAGER #:** _____

PERFORMANCE GUARANTY

Prior to approval to the subdivision improvements, the Developer must submit a Security Agreement to guarantee his performance for the following items during this phase:

1. Maintenance of sediment controls specified on the SECP to remain in place during this phase. These will typically include the sediment basin or basins, vegetative buffers, silt barriers, or temporary diversions.
2. Maintaining sodded and seeded areas and repair of erosion within drainage easements for a period of one year after initial installation.
3. Cleaning sediment from the sediment basin and final establishment of vegetative cover in the basin.
4. Cleaning accumulated sediment from storm sewers and other drainage facilities.

Final cleanup and removal of sediment can be done when construction of houses, including establishment of lawns, is completed on 90% of the lots in the subdivision.

MAINTENANCE & INSPECTION PROCEDURES, MATERIAL MANAGEMENT PRACTICES, SPILL PREVENTION, SPILL CONTROL

The Developer will adhere to the same practices for maintenance and inspection of sediment controls, material management practices, spill prevention and spill control set forth in PART III of this plan.

MATERIALS INVENTORY: List below all materials which will be stored outside on the site during construction:

- _____ Residential building materials
- _____ Gravel and stone material
- _____ Concrete forming materials
- _____ Other (specify) _____

Please list ALL sources of possible pollution.

NOTE: Fuels, oils, and other petroleum products; forming oils and compounds; fertilizers; pesticides; or any other hazardous or toxic compounds shall not be stored outside on the site unless specifically approved in this plan.

PRECONSTRUCTION MEETING

Please be advised that a pre-construction meeting is strongly advised. Missouri Department of Natural Resources Staff should be contacted prior to this event. Please list date for the meeting here: _____

PART V CERTIFICATION

ENGINEER'S DECLARATION

I hereby certify that the Sediment & Erosion Control Plan and information contained in Part II of this plan has been prepared under my direction or supervision in accordance with County Regulations, and applicable State and Federal Regulations and that the information submitted is, to the best of my knowledge and belief, true accurate, and complete.

ENGINEER: _____

By: _____ Title: _____

Date: _____

DEVELOPER'S CERTIFICATION

I hereby certify, that I am the owner of the property described in this plan, or his legally authorized agent, and that I assume full responsibility for the performance of the operation stated in this plan .

DEVELOPER: _____

By: _____ Title: _____

Date: _____

GENERAL CONTRACTOR'S CERTIFICATION

I hereby certify that I understand the requirements stated in this plan, that I am responsible for completing the requirements which have been listed in the plan as being a part of my scope of work.

GENERAL CONTRACTOR:

By: _____ Title: _____

Date: _____

SUBCONTRACTOR'S CERTIFICATION

I hereby certify that I understand the requirements stated in this plan, that I am responsible for completing the requirements which have been listed in the plan as being a part of my scope of work.

SUBCONTRACTOR: _____
By: _____ Title: _____
Date: _____

RESPONSIBLE FOR: _____

SUBCONTRACTOR: _____
By: _____ Title: _____
Date: _____

RESPONSIBLE FOR: _____

SUBCONTRACTOR: _____
By: _____ Title: _____
Date: _____

RESPONSIBLE FOR: _____

SUBCONTRACTOR: _____
By: _____ Title: _____
Date: _____

RESPONSIBLE FOR: _____

SUBCONTRACTOR: _____
By: _____ Title: _____
Date: _____

RESPONSIBLE FOR: _____

Inspector's Name					Date of Inspection	
Weekly Inspection <input type="checkbox"/>		Rainfall Follow-up Inspection <input type="checkbox"/>		Date of Rainfall Event	Rainfall Amount:	
BMP	Properly Installed	Effectiveness (0-10) 0 = Not effective 10 = Very effective	Deficiencies	Corrective Actions	Date of Corrective Action	BMP Removed
Silt Fences						
Hay Bales						
Gravel Entrances						
Detention Basin						
Sediment traps						
Rock check dams						
Other:						
Other:						
Other:						
Other:						
Comments:						
Inspector's Signature:				Date:		

Inspector's Name					Date of Inspection	
Weekly Inspection <input type="checkbox"/>		Rainfall Follow-up Inspection <input type="checkbox"/>		Date of Rainfall Event	Rainfall Amount:	
BMP	Properly Installed	Effectiveness (0-10) 0 = Not effective 10 = Very effective	Deficiencies	Corrective Actions	Date of Corrective Action	BMP Removed
Silt Fences						
Hay Bales						
Gravel Entrances						
Detention Basin						
Sediment traps						
Rock check dams						
Other:						
Other:						
Other:						
Other:						
Comments:						
Inspector's Signature:				Date:		



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION AND SOIL CONSERVATION DIVISION
 SOUTHWEST REGIONAL OFFICE
STORMWATER INSPECTION CHECKLIST



Site Information				
Date of Site visit:	Project Name:	Location (Address/Legal Description):		
Permit # MO-_____	Issue Date:	Size of Disturbed Area:	Total Acreage:	
Size of Disturbed Area:	Total Acreage:			
Contractor Information				
Site Contact Name:		Address:		
Office Phone Number:		Cell Phone Number:		
Owner Information				
Owner Name:		Owner Company:		
Owner Address:		Owner Phone Number:		
Inspector Information				
Inspector Name:		Report Date:		

CHECKLIST

		Y	N	NA	NI	Comments
Regulatory Requirements						
1	* Land Disturbance Permit Required 644.051.2, 644.076.1 RSMo, 10 CSR 20-6.200(1)(A)					
Permit Requirements						
2	Designated Environmental Manager					
3	* Are Temporary/Permanent Non-Structural BMP's installed properly? 644.076.1 RSMO, 10CSR 20-6.200					
4	* Are Temporary/Permanent Structural BMP's installed properly? (Silt fences keyed in, straw bales staked, sediment basins properly sized, slope drains?) 644.076.1 RSMO, 10CSR 20-6.200					
5	* Are Temporary/Permanent Non-Structural BMP's maintained? (grass lined swales, trees, mulching, geotextiles, etc.) 644.076.1 RSMO, 10CSR 20-6.200					
6	* Are Temporary/Permanent Structural BMP's maintained? (filter fabric, bales, rock check dams) 644.076.1 RSMO, 10CSR 20-6.200					
7	If slope is >3:1 or if the slope is >3% and >150 ft. in length, is erosion stabilized if activities cease for more than 7 days ?					
8	If disturbed area lays fallow >14 days , is the area stabilized and protected?					
9	Are sedimentation Basins Present?					
10	Is there > .5 inches of sediment in the basin?					
11	Is > 10 acres being disturbed in one drainageway?					
12	* SWPPP on site/readily available? 644.076.1 RSMO, 10CSR 20-6.200					
13	Were samples taken for SS?					
14	Did permit holder inform all contractors of the terms of the SWPPP?					

		Y	N	NA	NI	Comments
Permit Requirements (Continued)						
15	Additional Site Management BMP's – Portable toilets.					
16	Is disturbed area inspected within 72 hours following heavy rains?					
17	Are all records being kept (analysis)?					
18	Is a site inspection log being maintained?					
Recommendations						
19	Construction Started (date)					
20	404 permit obtained for working in defined drainage/water course?					
21	Areas within 50 ft. of defined drainage restored, vegetated, seeded within 5 days of disturbance?					
22	Does SWPPP adequately describe BMP's to be used on site, maps, O&M installation procedures?					
23	Does the SWPPP/development activities require preservation of existing vegetation?					
Termination/Final Inspection						
24	Transfer of ownership of lots? To whom, individual/corporation?					
25	Does permittee hold an ILC if lots were transferred to a contract?					
26	Permit termination applied for?					
27	At termination of permit is there > 70% plant density?					
28	Permanent Storm Water BMP's after permit is terminated, outlet control devises, detention basins, oil/water seperators?					
29	Individual lot certification?					

Site Sketch/Notes

EROSION AND SEDIMENT CONTROL GUIDELINES

DRAFT

NOVEMBER 2005
CITY OF JOPLIN, MISSOURI
PUBLIC WORKS DEPARTMENT

DRAFT

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INTRODUCTION

These guidelines are intended to provide the designer, contractor and builder with design criteria and minimum standards for the installation of erosion and sediment controls to comply with the City of Joplin's Erosion and Sediment Control Regulations. The regulations were enacted to protect the health, safety, and property of the citizens of Joplin and to help protect area water resources from pollution due to erosion and transportation of sediment. The regulations are applicable to all land development and land disturbance activity within the City of Joplin where the area of disturbance is greater than 5,000 square feet. The regulations require that no person cause or allow sediment to be deposited in any public street, public land, or on any property not under their control as a result of land disturbance of more than 5,000 square feet resulting from construction activities.

You can comply with the regulations by meeting the following objectives:

- a. Minimize the area disturbed by construction and development;
- b. Provide for containment of sediment until areas are stabilized;
- c. Stabilize disturbed areas as soon as practical after project completion; and
- d. Provide permanent erosion, drainage, and detention controls.

GENERAL DESIGN GUIDELINES

Erosion is a natural process where soil and rock are loosened and removed. Natural erosion normally occurs at a very slow pace, but when land is disturbed on a construction site, the erosion rate often increases dramatically. When erosion occurs on a construction site and runoff carries sediment off the site, there is often a negative impact on downstream drainage systems and water quality.

The purposes of erosion and sediment controls are to minimize the amount of erosion that occurs as a result of construction activity and to prevent the sediment that is produced from leaving the property. Effective erosion and sediment control requires that the soil surface be protected from the erosive forces of wind, rain, and runoff and that the eroded soil be captured and retained onsite. The following principles are effective when they are integrated into a system of control practices and management techniques to control erosion and prevent sedimentation offsite.

When designing sediment and erosion controls, it is necessary to determine whether there is sheet flow or concentrated flow of stormwater on the property. Sheet flow occurs on gently sloping land without defined drainage ways. The stormwater tends to disperse evenly across the property, although the drainage may be in one direction due to the overall slope of the property. Concentrated flow occurs on property where there are defined drainage ways that may range from gentle swales to clearly defined

waterways. It is possible to have a combination of sheet flow and concentrated flow on the same property.

Erosion Protection

Proper planning will help identify potential erosion problems, particularly highly susceptible areas, such as areas of concentrated flow. Removing the vegetative cover and altering the soil structure by clearing, grading, and compacting the surface increases an area's susceptibility to erosion. Scheduling can be a very effective means of reducing erosion. Schedule construction activities to minimize the exposed area and the duration of exposure. Apply stabilizing measures as soon as possible after the land is disturbed. Plan and implement temporary or permanent vegetation, mulches, or other protective practices to correspond with construction activities. Protect channels from erosion forces by using protective linings and the appropriate channel design. Consider possible future repairs and maintenance of these practices in the design. In scheduling, take into account the season and the weather forecast.

Clearing existing vegetation reduces the surface roughness and infiltration rate and increases runoff velocities and volumes. This is particularly a concern in areas of concentrated flow. Use measures that break the slopes to reduce the problems associated with concentrated flow volumes and runoff velocities. Practical ways to reduce velocities include conveying stormwater runoff away from steep slopes to stabilized outlets, preserving natural vegetation where possible, and mulching and vegetating exposed areas immediately after construction.

Sediment Containment

Even with careful planning some erosion is unavoidable, and the resulting sediment must be trapped on the site. In areas where runoff occurs primarily as sheet flow, containment of sediment is relatively simple. In these areas, temporary containment devices may be sufficient. Where concentrations of flow occur, containment of sediment becomes more difficult as the rate and volume of flow increase. In these areas, more extensive or permanent control devices need to be provided. Areas of steep topography and cut or fill slopes need to be given special consideration. Due to the environmental sensitivity of streams, rivers, losing streams, sinkholes, and mining features, special consideration also needs to be given to these areas. Plan the location where sediment deposition will occur and maintain access for periodic removal of accumulated sediment. Protect low points below disturbed areas by building barriers to reduce sediment loss. Sediment traps and basins should be constructed before other land-disturbing activities.

Temporary Versus Permanent Controls

Temporary controls, such as straw or hay bale dikes, silt fences, erosion control blankets, etc., are provided for the purpose of controlling erosion and containing sediment until construction is complete. Temporary controls are not needed after the area is stabilized.

Permanent controls consist of riprap, concrete trickle channels, detention basins, etc., which will remain in place through the life of the development. It is possible for the same facility to serve both a temporary and permanent purpose.

Maintenance

Inspection and maintenance are vital to the performance of erosion and sedimentation control measures. If not properly maintained, some practices may cause more damage than they prevent. Always evaluate the consequences of a measure failing when considering which control measure to use, since failure of a practice may be hazardous or damaging to both people and property. For example, a large sediment basin failure can have disastrous results, and low points in dikes can cause major gullies to form on a fill slope. It is essential to inspect all practices to determine that they are working properly and to ensure that problems are corrected as soon as they develop.

DESIGN STANDARDS AND CRITERIA

Following are erosion and sediment control practices to consider for each project as needed. Other methods that achieve the ordinance requirements are encouraged. It is important to coordinate the temporary erosion control measures with the permanent control features to assure economical, effective, and continuous erosion control. Sufficient land area and/or easements must be available for the construction and maintenance of all erosion and sediment control devices to be used during construction.

Erosion Protection

Grading

Prior to grading, topsoil should be stripped from the site and stockpiled for reuse. To minimize the potential for future erosion, the maximum grades of cut or fill slopes should not exceed 33 percent (3:1). Cut or fill slopes should also not exceed 15 feet in vertical height unless a horizontal bench area at least five feet in width is provided for each 15 feet of vertical height. To provide for flow of stormwater over grassed areas the minimum slope should not be less than one percent (100:1).

Cut and Fill Slopes

Cut and fill slopes need to be protected from erosion by constructing bale dikes, silt fences, diversion berms, or swales along the top of the slope. Where drainage must be carried down the slopes, pipe drains, concrete flumes, riprap chutes, or other nonerosive surfaces need to be provided. Suitable erosion control measures, such as riprap silting basins, should be provided at the bottom of the slope. Diversions should be maintained until permanent growth is firmly established on the slopes. Typical diversion details for swales and dikes are shown in Figures 1 and 2, respectively. For proper drainage, a minimum one percent (100:1) grade must be provided for the swale or along

the up-slope side of the dike. The dike must be compacted to a density equal to the adjoining area.

Figure 1. Diversion Swale

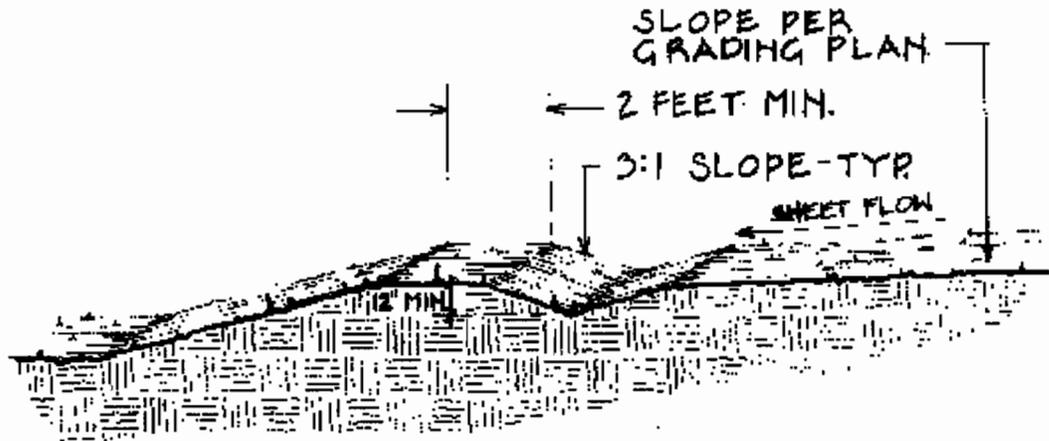
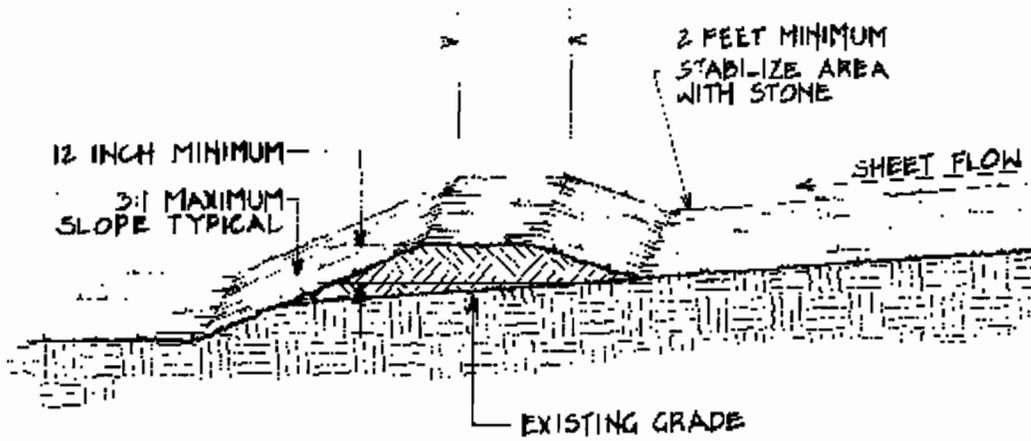


Figure 2. Diversion Dike



Channels and Swales

Permanent channels and swales should be provided with a stabilized invert (bottom of the channel or swale) consisting of sod, erosion control blankets or a non-erosive lining. A channel can be lined with sod where the average velocity of flow is five feet per second or less and there is no base flow. For channels with a bottom width less than 15 feet, sod should extend up the side slope to a minimum height of six inches above the toe (Figure 3). Channels with a bottom width of fifteen feet or greater should be graded

as shown in Figure 4, and a low flow area 15 feet in width should be lined with sod. Commercial erosion control blankets may be used in lieu of sod. The remainder of the channel slopes should be seeded and mulched as provided above.

Figure 3. Channel (Bottom < 15 ft Wide)

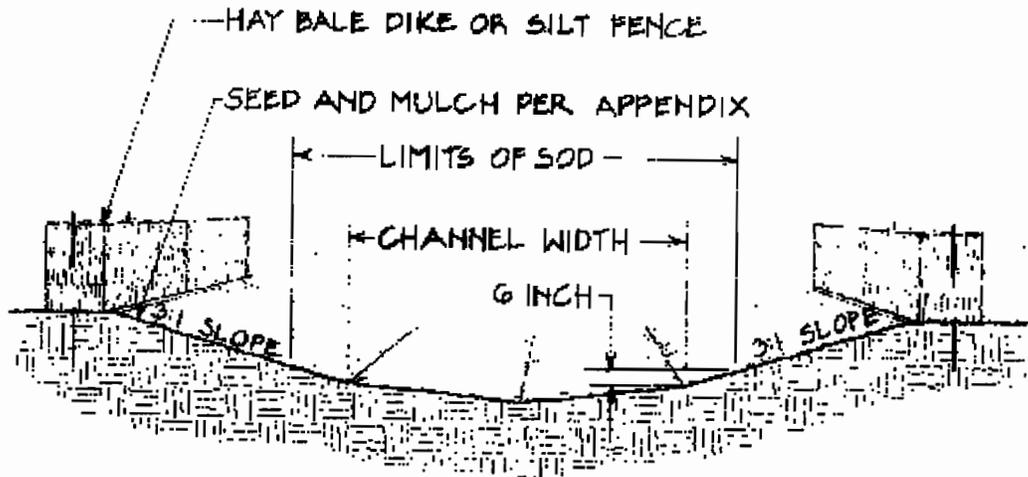
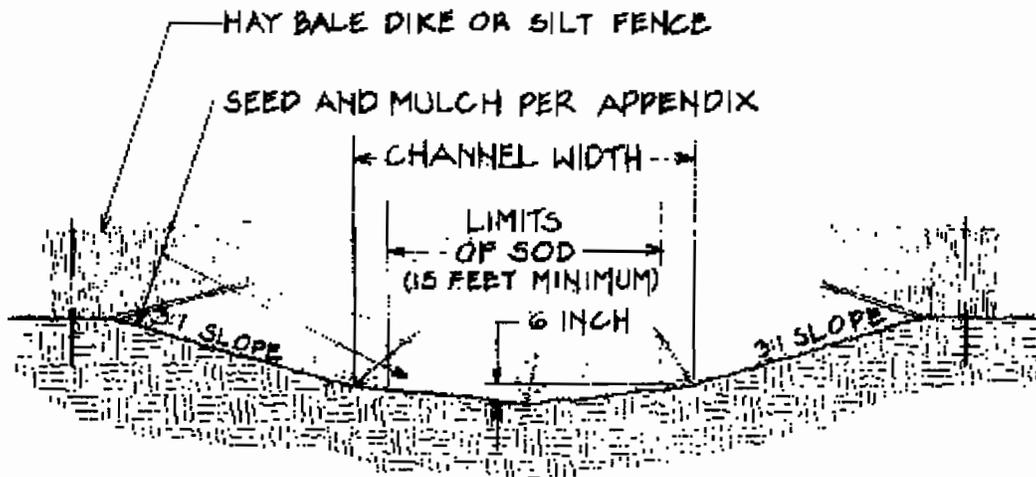


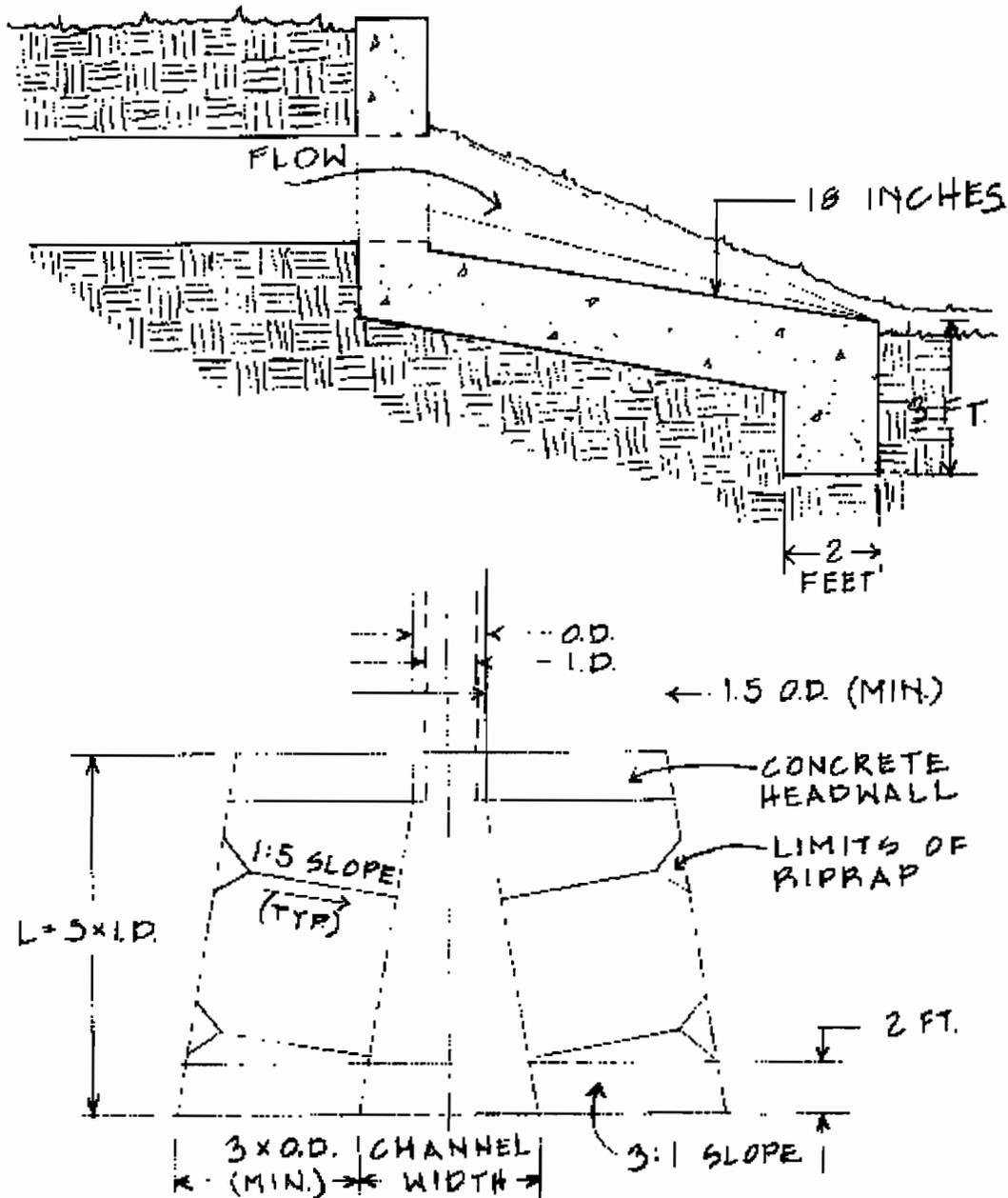
Figure 4. Channel (Bottom > 15 ft Wide)



In grass channels where base flow occurs, a nonerosive low-flow channel of riprap or concrete should be provided. Low flow channels should have a minimum capacity of five cubic feet per second. For channels with an average velocity of five feet per second or greater, a non-erosive lining of riprap, concrete, or other approved material should be provided.

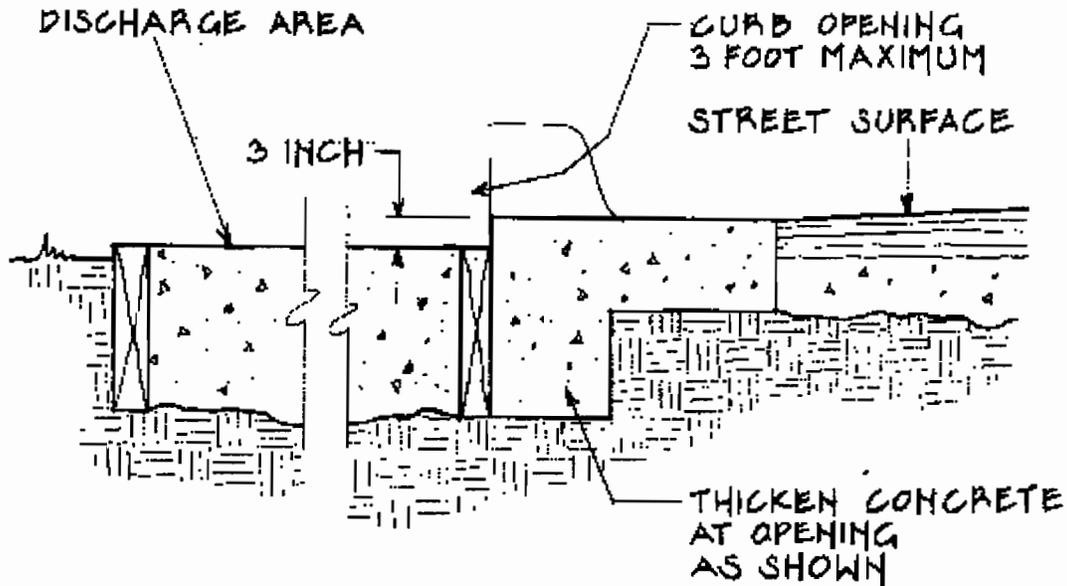
Erosion protection should be provided at storm sewer and culvert outlets. Minimum erosion protection should typically consist of a flared end section or a concrete headwall and a non-erosive lining. Non-erosive lining should consist of riprap or a suitable substitute. Field stone, gabions, or riprap should extend to the point at which average channel velocity for the peak flow rate from the minor (2 year) storm has decreased to five feet per second maximum. The length of protective lining to be provided should be as shown in Figure 5 for average outlet velocities up to ten feet. For average outlet velocities greater than ten feet per second, the Missouri Department of Transportation

Figure 5. Outlet Protection



standard energy dissipater headwall or other suitable substitute should be used. The height of erosion protection should not be less than the top of the pipe. Toewalls should be provided at the down-stream end of all headwalls and flared end sections. Toewalls should typically extend a minimum of 18 inches below channel grade.

Figure 6. Curb Opening Erosion Protection



Where drainage flows from paved areas to grass areas through curb openings, erosion protection should be provided as shown in Figure 6. The riprap discharge area should be a minimum of 5 feet on a side and one-foot deep with a border of 2-inch by 12-inch CCA boards.

In grass channels, grades and velocities may be controlled by use of grade checks and drop structures. Grade checks should be placed in natural channels where average velocity for the peak flow rate from the minor storm exceeds five feet per second for post-development conditions.

Erosion protection should be provided at spillways and outlet structures for detention ponds. Erosion protection should extend to the point where flow has been stabilized and average velocity in the outlet channel does not exceed the erosive velocity of that channel.

Seeding and Mulching

As soon as practical, disturbed areas should be seeded and mulched to reduce the potential for further erosion. Seeding may be permanent if all work in the disturbed area is complete or temporary if the area is to be disturbed again at a later date. Proper seedbed preparation, selection of appropriate species, and use of quality seed are

important. Failure to carefully follow established guidelines and recommendations, below or provide by suppliers, can result in an inadequate or short-lived stand of vegetation that will not control erosion.

Seedbed Preparation. Good seedbed preparation is essential to successful plant establishment. Before preparing seedbeds, complete grading and install all necessary erosion control practices, such as dikes, waterways, and basins. Steep slopes should be minimized because they make seedbed preparation difficult and increase the erosion hazard. If soils become compacted during grading, loosen them to a depth of 6-8 inches using a ripper, harrow, or chisel plow. If recent tillage operations have resulted in a loose surface, additional roughening may not be required except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by discing, raking, harrowing, or other suitable methods. Slopes steeper than 33 percent (3:1) grade should be grooved or furrowed on the contour before seeding. A good seedbed is well pulverized, loose, and uniform. Prior to permanent seeding, a minimum depth of two inches of loose topsoil should be spread on areas to be seeded. Where hydro-seeding methods are used, the surface may be left with a more irregular surface of large clods and stones.

Lime should be applied according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of two tons/acre is usually sufficient. Lime should be applied uniformly and incorporated into the top 4-6 inches of soil. Soils with a pH of six or higher need not be limed.

Fertilizer should also be applied based on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700-1,000 lbs. per acre. Fertilizer should also be incorporated into the top 4-6 inches of soil.

Seeding. Disturbed areas that will not be brought to final grade for a period of more than 14 working days need to be temporarily stabilized by planting rapid-growing annual plants, which sprout and grow rapidly and survive for only one season, are suitable for establishing initial or temporary vegetative cover. Annual rye grass, wheat, or oats should be used for temporary seeding. Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established. Temporary seeding also preserves the integrity of earthen sediment control structures such as dikes, diversions, and the banks of dams and sediment basins. It can also reduce the amount of maintenance associated with these devices. For example, the frequency that sediment basins will have to be cleaned out will be reduced if watershed areas, outside the active construction zone, are stabilized. In addition, it provides residue for soil protection and seedbed preparation and reduces problems of mud and dust production from bare soil surfaces during construction. Applications of this practice include diversions, dams, temporary sediment basins, temporary road banks, topsoil stockpiles and completed areas not ready for permanent seeding.

Temporary seeding provides protection for no more than one year, during which time permanent stabilization should be initiated. Permanent seeding should be applied based on your supplier's recommendation or as follows.

SEED	BROADCAST RATES	DRILLED SODDED RATES
Tall Fescue	30 LB/acre	25 LB/acre solid
Kentucky Bluegrass	3 LB/acre	2 LB/acre solid
Red Fescue	10 LB/acre	7 LB/acre
Wheat or Rye	120 LB/acre	100 LB/acre
Annual Ryegrass	100 LB/acre	100 LB/acre

Evenly apply seed using a cyclone seeder (broadcast), drill, cultipacker seeder, or hydro-seeder. Broadcast seeding and hydro-seeding are appropriate for steep slopes where equipment cannot be driven. Distributing seed by hand is not recommended because of the difficulty in achieving a uniform distribution.

Small grains should be planted no more than one inch deep, and grasses and legumes no more than 1/2 inch. Broadcast seed must be covered by raking or chain dragging, and then lightly firmed with a roller or cultipacker. Hydro-seeded mixtures should include wood fiber (cellulose) mulch.

Seeded areas should be maintained for one year following permanent seeding to ensure a healthy lawn.

Mulching. The use of appropriate mulch will help ensure the vegetation is established under normal conditions and is essential to seeding success under harsh site conditions. Harsh site conditions include:

- a. Seeding in fall or winter cover (wood fiber mulches are not considered adequate for this use);
- b. Slopes steeper than 33 percent (3:1) grade;
- c. Excessively hot or dry weather;
- d. Adverse soils (shallow, rocky, or high in clay or sand; and
- e. Areas receiving concentrated flow.

Mulching is not necessary but recommended where slopes are less than five percent (20:1) grade. Where slopes are less than 25 percent (4:1) grade, cereal grain mulch can be applied at the rate of 100 pounds per 1,000 square feet (4,500 LB/acre). Where slopes are 25 percent (4:1) or greater grade, Type 3 mulch should be used. If the area to be mulched is subject to concentrated water flow, as in channels, anchor mulch with netting.

Sediment Containment

Sediment must be contained whenever grading or removal of existing vegetation disturbs land.

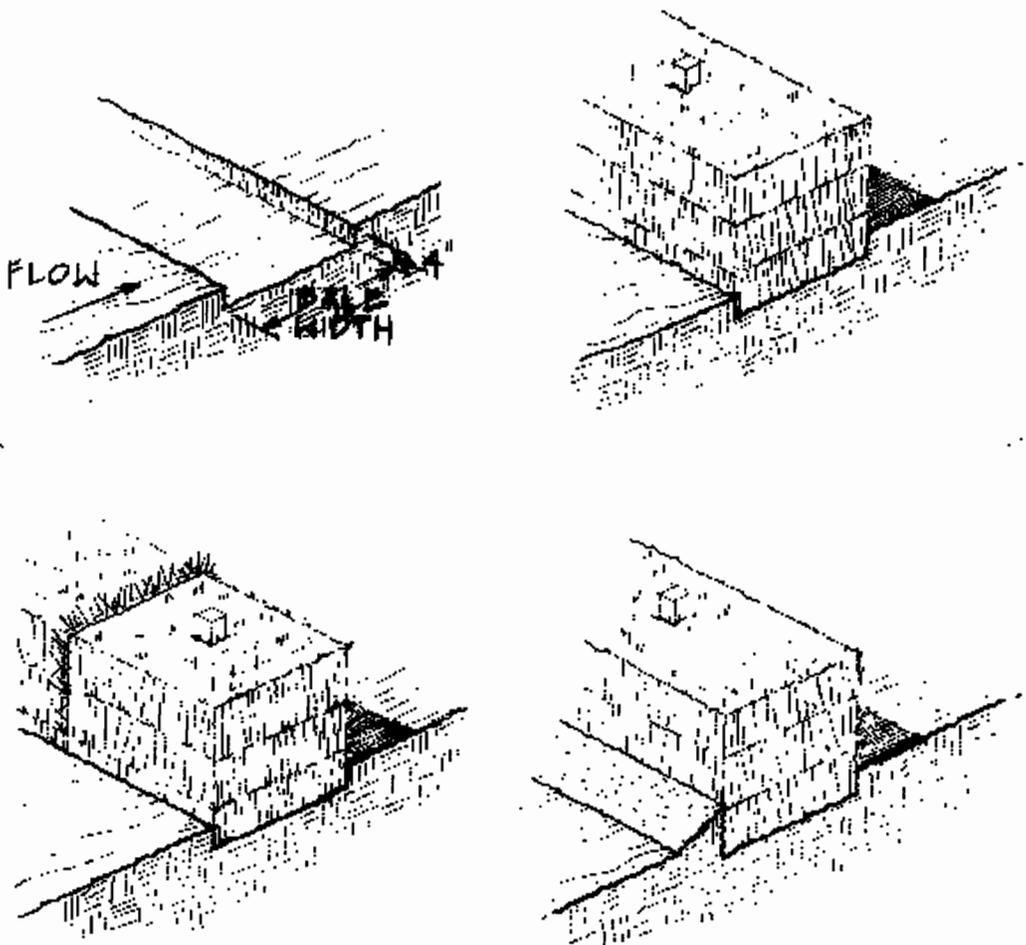
Existing Vegetation

Existing vegetation can be an effective means to filter and contain sediment in areas where sheet flow occurs and the existing vegetative growth is of sufficient density and in sufficiently good condition to provide for filtration of sediment. An area of existing vegetation a minimum of twenty-five feet in width should be maintained between the area to be graded and a property line, water course, or mining feature. The existing ground slope should not exceed a twenty percent (5:1) grade. If existing vegetation does not prove to be effective, bale dikes or silt fences should be installed.

Bale Dikes

Hay and straw bale dikes should be used for temporary containment only when control will be required for three months or less. The area draining to the barriers should be 1/2 acre, or less, with no concentration of water in a channel above the barrier (sheet flow). The maximum slope length above the barrier should not exceed 100 feet and the grade

Figure 7. Bale Dike Construction

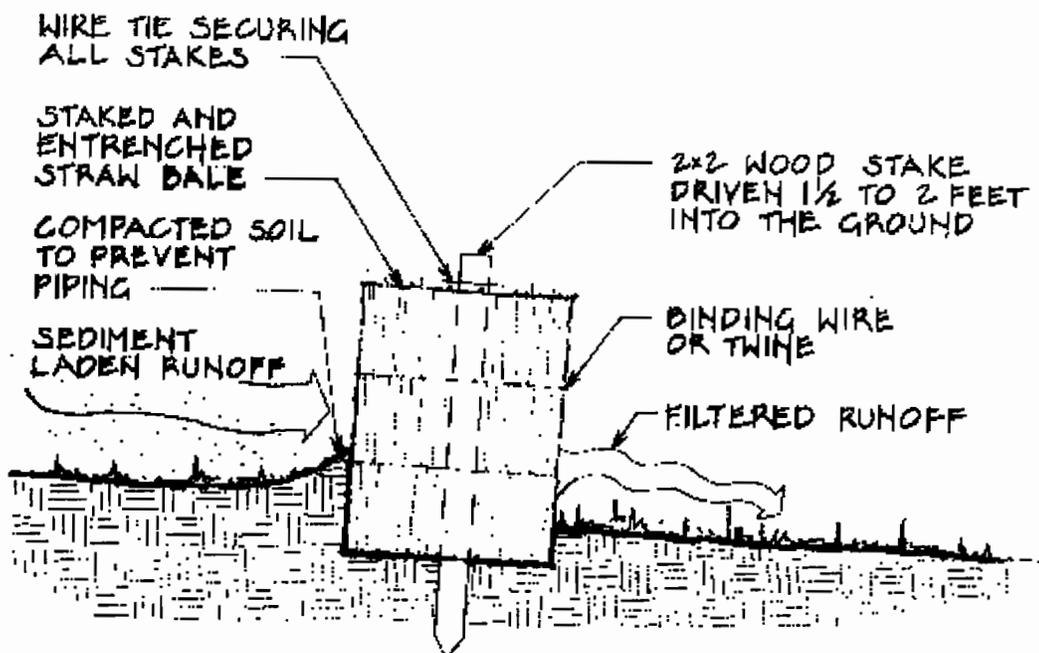


above the barrier should not exceed two percent (50:1). When placed across a small-swale, the maximum flow is one cubic foot per second.

Bale dikes should not be used on high sediment producing areas, above "high risk" areas, where water concentrates, or where there would be a possibility of a washout. Either cereal grain straw or hay can be used for bale dikes. Straw/hay bale dikes should be constructed as shown in Figures 7 & 8. The following guidelines apply for sheet flow applications.

- a. Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another.
- b. All bales should be either wire-bound or string-tied. Straw bales should be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales.

Figure 8. Bale Dike Construction



- c. The barrier should be entrenched and back-filled. The trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of four inches. After the bales are staked and chinked, the excavated soil should be back-filled against the barrier. Back-fill soil should

conform to the ground level on the downhill side and should be built up to four inches against the uphill side of the barrier.

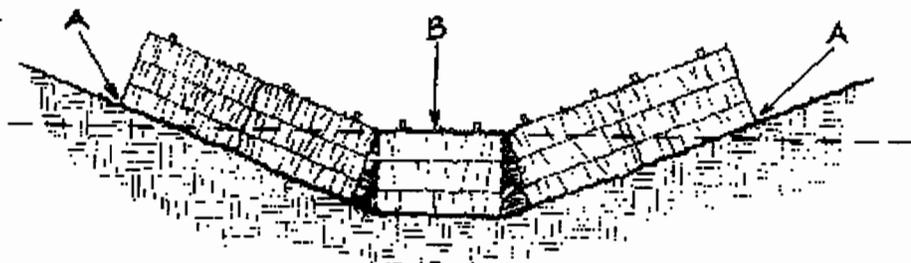
- d. At least two stakes or rebar driven through the bale should securely anchor each bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together. Stakes or rebar should be driven deep enough into the ground to securely anchor the bales.
- e. The gaps between bales should be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw should be scattered over the area immediately uphill from a straw bale barrier to increase the barrier efficiency.
- f. Bale dikes should be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

If the dike will be constructed in a shallow swale, the above construction needs to be modified. Bales should be placed in a single row, lengthwise, oriented perpendicular to the contour, with ends of adjacent bales tightly abutting one another. The barrier should be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the dike but not around it (Figure 9).

Figure 9. Bale Dike Construction



(a) INCORRECT AND (b) CORRECT ADJUTMENT OF STRAW BALES IN A TRENCH



POINTS A SHOULD BE HIGHER THAN B

Bale dikes should be inspected immediately after each rainfall and at least daily during prolonged rainfall. Close attention should be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales should be done promptly. Sediment deposits should be removed after each rainfall and in no event should accumulated silt be allowed to exceed a depth of one-half the height of the barrier. Remove the barrier and unstable deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

Silt Fences

Silt fences may be used in lieu of hay or straw bales and are preferred because they last longer if properly installed. Silt fences are temporary sediment barriers consisting of filter fabric buried at the bottom, stretched, and supported by posts. They are intended to intercept and detain small amounts of sediment from disturbed areas during construction operations by reducing the velocity of sheet flows and low-to-moderate level channel flows. They are applicable in ditch lines, around drop inlets, and at temporary locations where continuous construction changes the earth contour. Filter barriers should have an expected usable life of six months.

The area draining to the silt fence should not exceed one acre, or 1/4 acre per 100 feet of fence, with no concentration of water in a channel above the barrier (sheet flow). The maximum slope length above the barrier should not exceed 100 feet and the grade above the barrier should not exceed twenty percent (5:1). When placed across a small-swale, the maximum flow should be one cubic foot per second. The sediment fence should be constructed to store runoff without damaging the fence or the submerged area behind the fence.

Silt fences should be constructed as shown in Figure 10. Use a synthetic filter fabric which:

- a. Contains ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F;
- b. Has an equivalent opening size of a U.S. standard sieve of 70; and
- c. The tensile strength at 20 percent elongation is 30 pounds/lineal inches.

Where flows do not exceeding one cubic foot per second, silt fences can be constructed as follows.

- a. The height of a filter barrier should be a minimum of 15 inches and a maximum of 18 inches.
- b. Posts should be either 4-inch diameter wood or 1.33 pounds per linear foot steel with a minimum length of five feet. Steel posts should have projections for

fastening wire to them. The posts should be spaced a maximum of three feet apart at the barrier location and driven securely into the ground (minimum of eight inches).

- c. A trench should be excavated approximately four inches wide and four inches deep along the line of stakes and upslope from the barrier.
- d. The filter material should be wired to metal posts or stapled to wooden posts using at least 1/2-inch long staples. Filter material should not be stapled to existing trees. The filter fabric should be installed in a continuous sheet the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth should be spliced together only at a support post, with a minimum 6-inch overlap, and securely sealed. Eight inches of the fabric should be extended into the trench.
- e. If wire fence reinforcement is used, it should be 36 inches high, 14-gauge, and a maximum mesh spacing of 6 inches. The fence should be fastened securely to the upslope side of the posts using heavy duty wire staples at least one inch long, tie wires or hog rings. The wire should extend into the trench a minimum of two inches.
- f. The trench should be back-filled and the soil compacted over the filter material.

If a silt fence is to be constructed across a ditch line or swale, the barrier should be of sufficient length to eliminate end flow, and the configuration should resemble an arc or horseshoe with the ends oriented upslope.

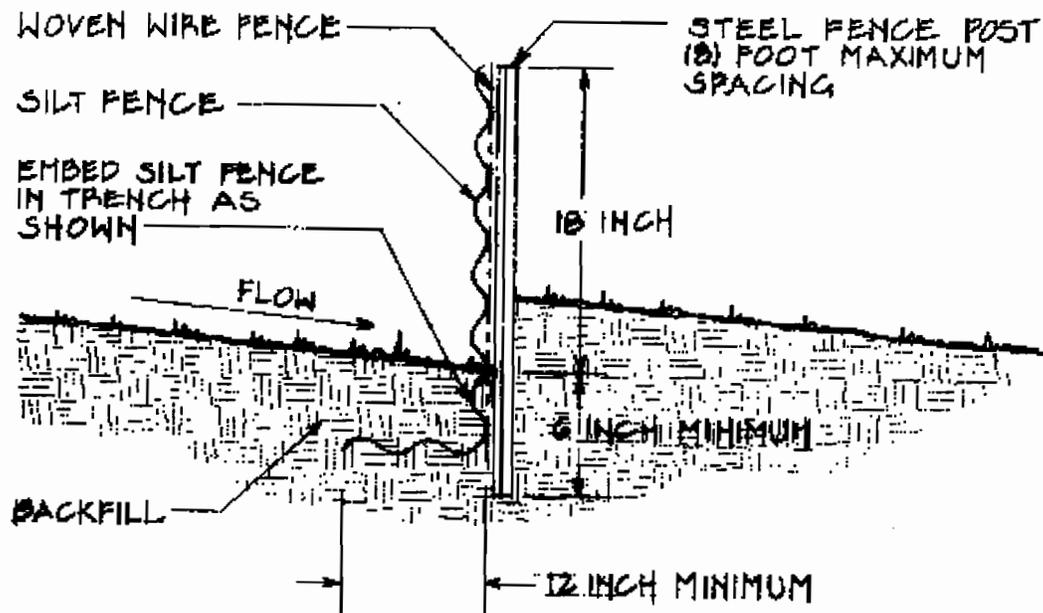
Where only sheet flows are expected, the silt fences can be constructed as described above except, the height of a silt fence can be increased to a maximum of 36 inches (higher fences may impound volumes of water sufficient to cause failure of the structure). The posts should be spaced a maximum of ten feet apart at the barrier location and driven securely into the ground (minimum of 18 inches) when used with the wire support fence, otherwise, post spacing should not exceed three feet.

A riprap splash pad or other outlet protection device should be provided for any point where flow may overtop the sediment fence, such as natural depressions or swales. Ensure that the maximum height of the fence at a protected, reinforced outlet does not exceed one foot and that support post spacing does not exceed three feet.

All silt fences should be inspected at least once a week and after each rainfall. Make any required repairs immediately. Should the fabric of a sediment fence collapse, tear, decompose, or become ineffective, replace it promptly. Remove sediment deposits as necessary after each storm to provide adequate storage volume for the next rain and to reduce pressure on the fence. Care needs to be taken to avoid undermining the fence when removing sediment.

All fencing materials and unstable sediment deposits should be removed and the area brought up to grade and stabilized after the contributing drainage area has been properly stabilized.

Figure 10. Silt Fence Construction



Temporary Sediment Basins

Temporary sediment basins should be provided for areas where concentrated flow from areas greater than one acre occurs. They are small temporary ponding areas formed by excavation, an embankment or a combination across a drainageway. Temporary sediment basins are designed to detain sediment-laden runoff from small disturbed areas for a period of time to allow sediment to settle reducing sediment deposits and runoff turbidity downstream.

Sediment trapping is achieved primarily by settling within a pool. Sediment-trapping efficiency is a function of surface area and geometry of the basin and inflow rate. Therefore, maximize the surface area in the design. Installations that provide pools with large length to width ratios reduce short circuiting and allow more of the pool surface area for settling.

Locations for sediment basins need to be selected during site evaluation. Note natural drainage divides and select basin sites so that runoff from potential sediment-producing

areas can be easily diverted into the basins. The drainage areas for each basin should not exceed five acres. Basins should be readily accessible for periodic sediment removal and other necessary maintenance. Plan locations for sediment disposal as part of basin site selection. In preparing plans for sediment basins, it is important to consider provisions to protect the embankment from failure from storm runoff that exceeds the design capacity. Consider non-erosive emergency bypass areas, particularly if there could be severe consequences from failure. If a bypass is not possible and failure would have severe consequences, consider alternative sites. Because well-planned sediment basins are key measures to preventing offsite sedimentation, they should be installed in the first stages of project development.

Temporary containment berms should be designed to contain a volume of 1,800 cubic feet per acre of drainage area (Figure 11). Measure volume below the crest elevation of the outlet. The volume of a natural sediment trap may be satisfactorily approximated by the equation:

$$\text{volume (ft}^3\text{)} = 0.4 \times \text{surface area (ft}^2\text{)} \times \text{max. pool depth (ft)}$$

Each end of the berm should turn upslope and extend until the ground surface rises to the top of the berm elevation. Berms for temporary sediment traps should not exceed five feet in height measured at the center line from the original ground surface to the top of the berm. Additional freeboard may be added to the berm height to allow flow through a designated bypass location. Construct berms with a minimum top width of five feet and side slopes of 2:1 or flatter. Where sediment pools are formed or enlarged by excavation, also keep side slopes at 2:1 or flatter for safety. Clear, grub, and strip the area under the embankment of all vegetation and root mat. Remove all surface soil containing high amounts of organic matter and stockpile or dispose of it properly. Ensure that fill material for the embankment is free of roots, woody vegetation, organic matter, and other objectionable material. Place the fill in lifts not to exceed nine inches and machine compact it. Over fill the embankment six inches to allow for settlement.

Temporary containment berms should have a perforated PVC pipe outlet (Figure 12) or equivalent. The perforated pipe should have holes sized and spaced to provide adequate detention time for settling. The height of the pipe (H) should be level with the top of the berm. The solid PVC pipe should be bedded in clean gravel.

An alternative is to construct an outlet using a stone section of embankment located at the low point in the basin (Figure 13). The stone section serves two purposes:

- a. The top section serves as a non-erosive spillway outlet for flood flows; and
- b. The bottom section provides a means of de-watering the basin between runoff events.

Figure 11. Temporary Containment Berm

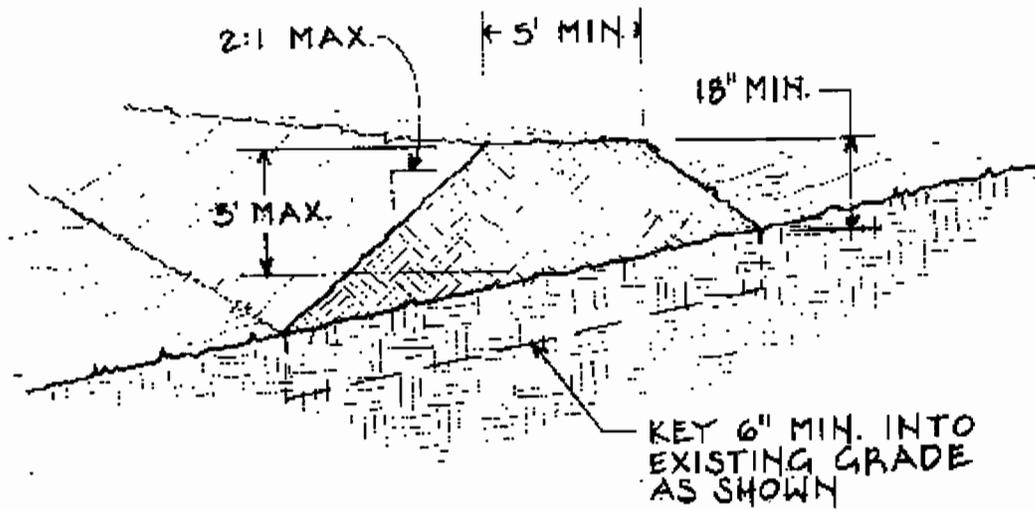
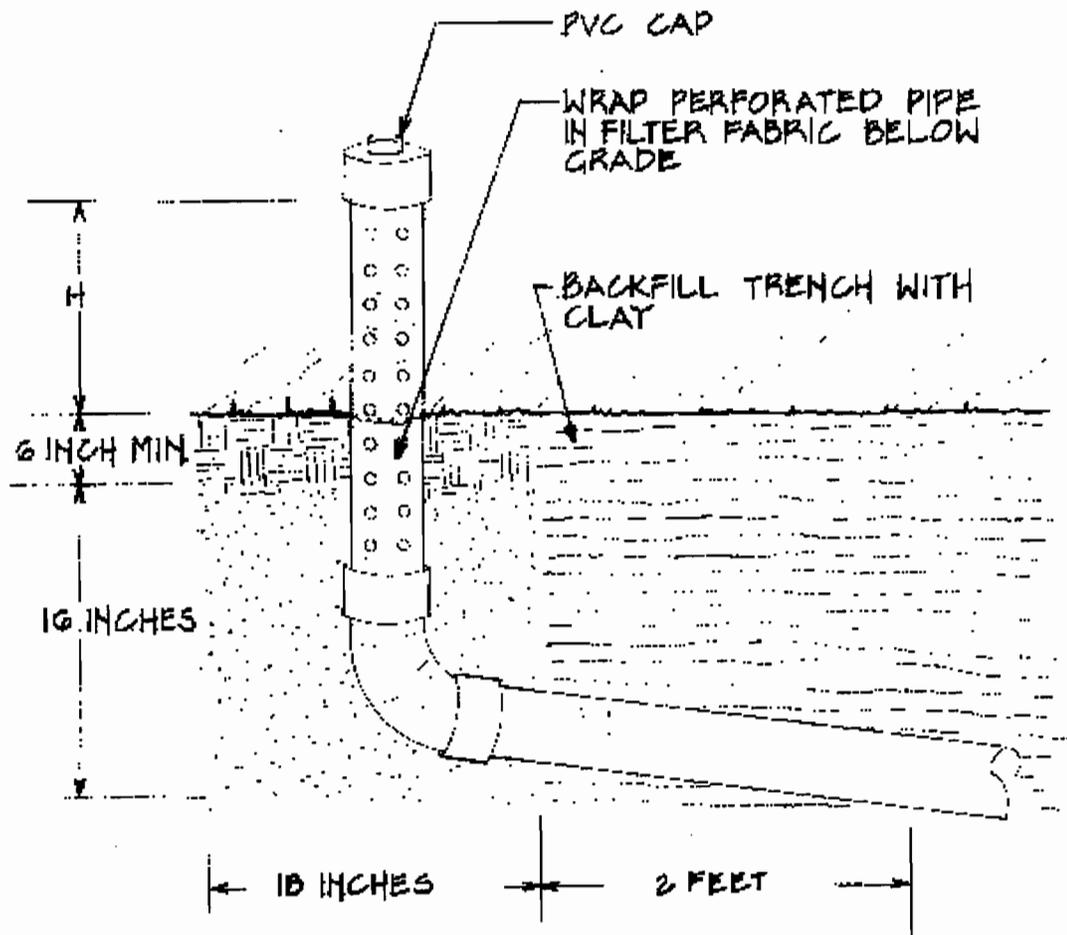


Figure 12. PVC Outlet Pipe



The outlet is constructed using material such as riprap. A one-foot thick layer of 1/2 to 3/4-inch aggregate should be placed on the inside face to reduce drainage flow rate. Keep the side slopes of the spillway section at 2:1 or flatter. To protect the embankment, the sides of the spillway need to be at least 21 inches thick. Keep the crest of the spillway outlet a minimum of 1.5 feet below the settled top of the embankment. Filter cloth should be placed on the foundation below the riprap to prevent piping. An alternative is to excavate a keyway trench across the riprap foundation and up the sides to the height of the dam. The spillway weir needs to be at least four feet long and sized to pass the peak discharge of the 10-year storm. There should be a maximum flow depth of one foot, a minimum freeboard of 0.5 foot, and maximum side slopes of 2:1.

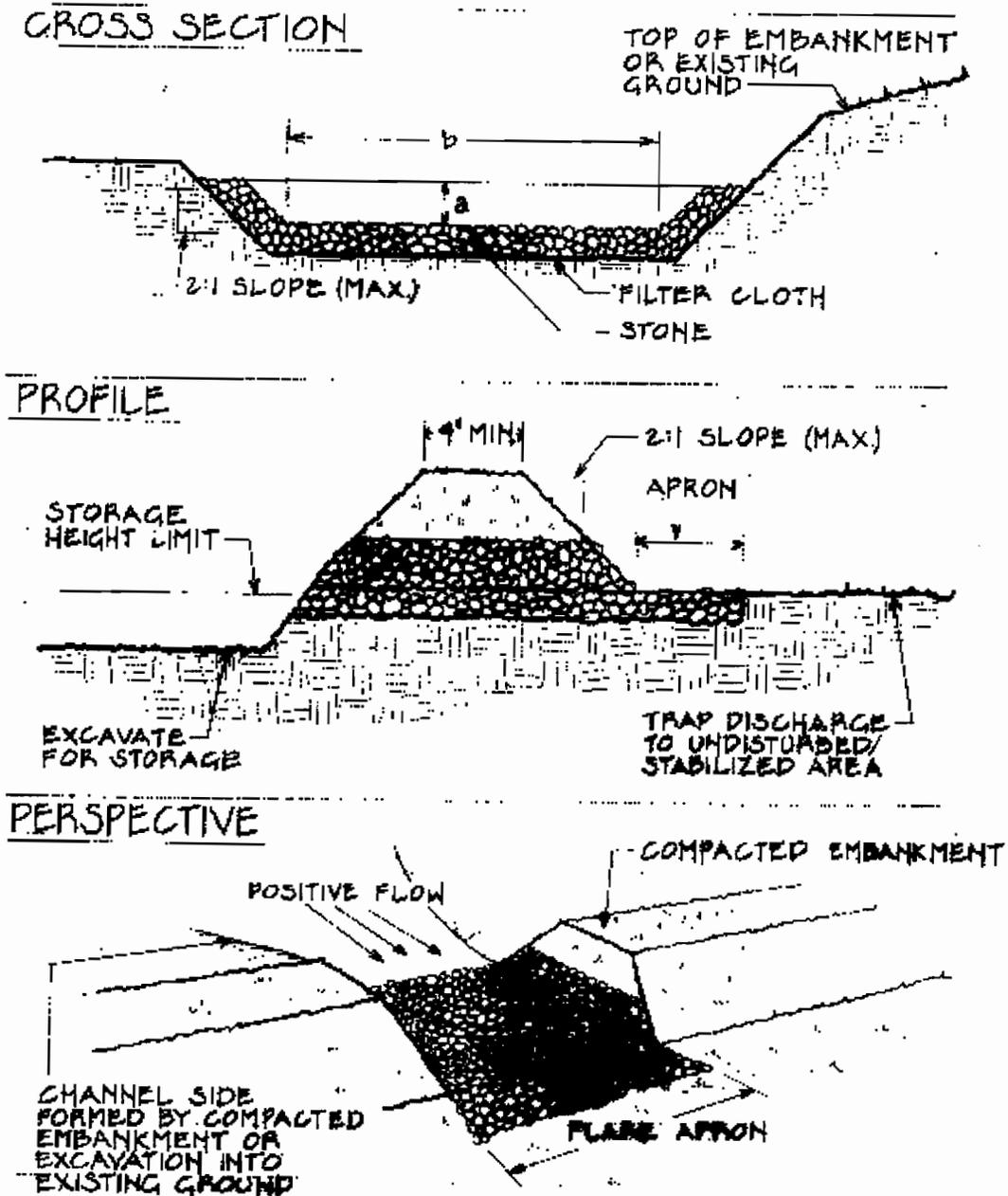
The outlet section is constructed in the embankment. The connection between the riprap and the soil from piping should be protected by using filter fabric or a keyway cutoff trench between the riprap structure and the soil.

- a. Place the filter fabric between the riprap and soil. Extend the fabric across the spillway foundation and sides to the top of the dam; or
- b. Excavate a keyway trench along the centerline of the spillway foundation extending up the sides to the height of the dam. The trench should be at least two-foot deep and two-foot wide with 1:1 side slopes.

The pond area below the elevation of the crest of the spillway should to be cleared to facilitate removal of sediment. Ensure that the stone (drainage) section of the embankment has a minimum bottom width of three feet and maximum side slopes of 1:1 that extend to the bottom of the spillway section. Construct the minimum finished stone spillway bottom width with 2:1 side slopes extending to the top of the over filled embankment. The thickness of the sides of the spillway outlet structure should be a minimum of 21 inches. The weir must be level and constructed to grade to assure design capacity. Ensure that the stone spillway outlet section extends downstream past the toe of the embankment until stable conditions are reached and outlet velocity is acceptable for the receiving stream. The edges of the stone outlet section should be flush with the surrounding ground and the center shaped to confine the outflow stream. Direct emergency bypass to natural, stable areas. Locate bypass outlets so that flow will not damage the embankment. Stabilize the embankment and all disturbed areas above the sediment pool and downstream from the basin immediately after construction.

Temporary sediment basins should be inspected after each period of significant rainfall. When the sediment has accumulated to more than 6 inches in depth, remove sediment and restore the trap to its original dimensions. The contaminated part of the gravel facing needs to be replaced. Also check the structure for damage from erosion or piping and the depth of the spillway to ensure it is a minimum of 1.5 feet below the low point of the embankment. Immediately fill any settlement of the embankment to slightly above design grade. Any riprap displaced from the spillway must be replaced immediately. After all sediment-producing areas have been permanently stabilized, remove the structure and all unstable sediment. Smooth the area to blend with the adjoining areas and stabilize properly.

Figure 13. Stone Outlet



Storm Drain Inlet Protection

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

an early stage of site development. Storm drain drop inlets or curb inlets need to be protected by sediment filters or temporary containment areas that trap sediment at the approach to the storm drainage systems. This method of inlet protection applies to both drop inlets and curb inlets where heavy flows are expected and an overflow capacity is necessary to prevent excessive ponding around the structure

There are several types of inlet filters and traps that have different applications dependent upon site conditions and type of inlet. Other innovative techniques for accomplishing the same purpose may be considered.

The following examples of inlet protection devices are for drainage areas of less than one acre. They are intended to keep sediment out of the storm drain, and they do not have a large sediment storage area. Excavating an area around the inlet for deposition of sediment will improve the capture rate, reduce frequency of maintenance, and allow the device to serve an area larger than one acre. The inlet protection device should be constructed in such a manner that will facilitate clean-out and disposal of trapped sediment and minimize interference with construction activities. The devices should also be constructed in such a manner that any resultant ponding or stormwater will not cause excessive inconvenience or damage to adjacent areas or structures. Shallow temporary flooding after rainfall should be expected.

None of these methods are applicable in public streets or rights-of-way. Sediment must be trapped before stormwater enters a public right-of-way.

Bale and Filter Fabric Filters

These methods of inlet protection are applicable where the inlet drains slopes with a five percent (20.1) grade or less and flows do not exceed 0.5 cubic feet per second. These methods should not be used for inlets receiving concentrated flows. Design is similar to other applications (Figures 14 & 15).

- a. Bales should be either wire-bound or string-tied with the bindings oriented around the sides rather than over and under the bales.
- b. Bales should be placed lengthwise in a single row surrounding the inlet, with the ends of adjacent bales pressed together.
- c. The barrier should be entrenched and back-filled. A trench should be excavated around the inlet the width of a bale to a minimum depth of four inches. After the bales are staked, the excavated soil should be back-filled and compacted against the filter barrier.
- d. Each bale should be securely anchored and held in place by at least two stakes or rebars driven through the bale.
- e. Loose straw should be wedged between bales to prevent water from entering between bales.

Figure 14. Bale Inlet Protection

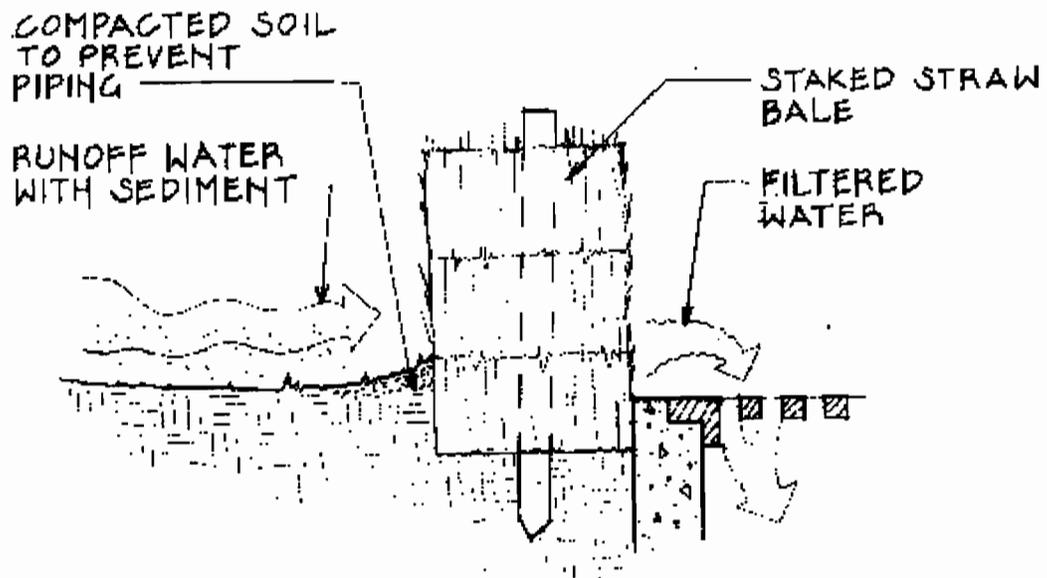
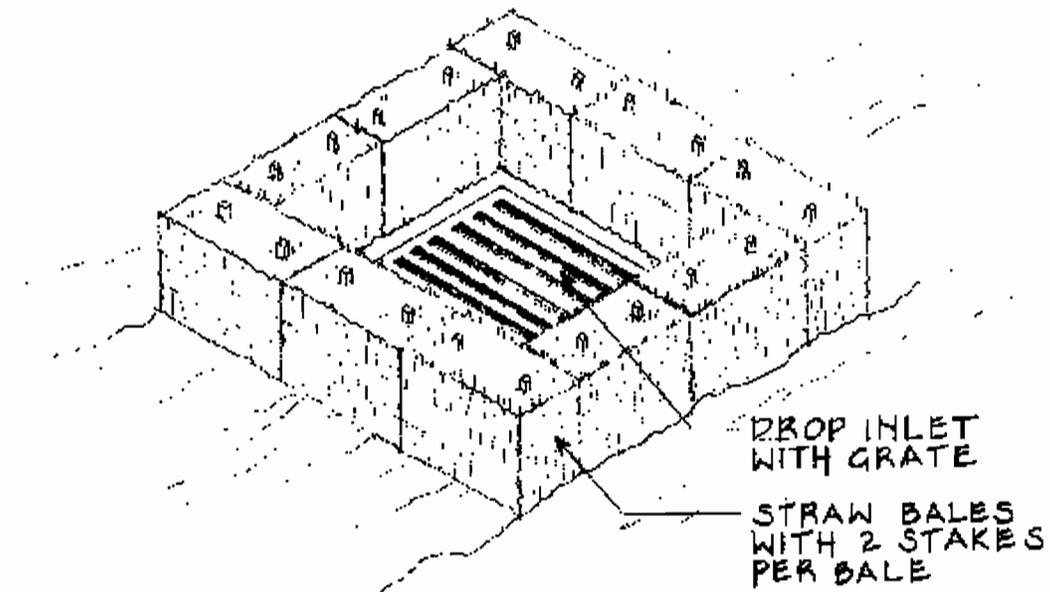
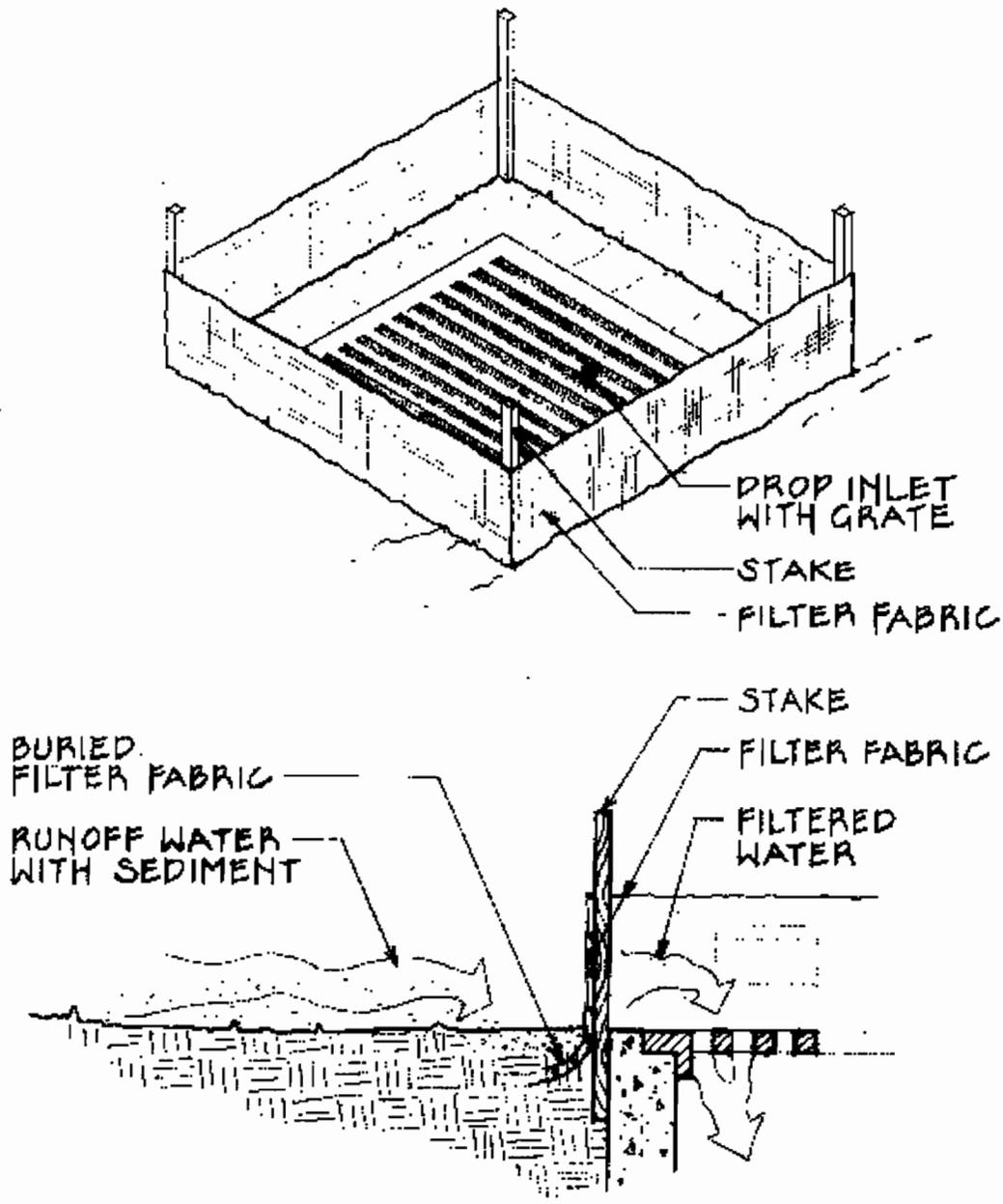


Figure 15. Silt Fence Inlet Protection



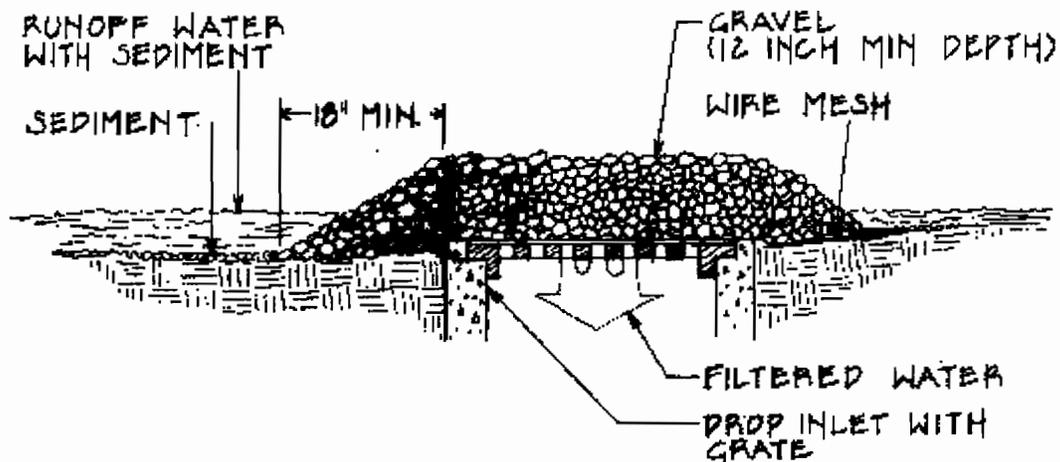
Gravel And Wire Mesh Sediment Filters

This method is effective where very concentrated flows are expected but not where ponding around the structure might cause excessive inconvenience or damage to adjacent structures or unprotected areas.

- a. Wire mesh should be laid over the drop inlet so that the wire extends a minimum of one foot beyond each side of the inlet structure. Hardware cloth or comparable wire mesh with 1/2-inch openings should be used. If more than one strip of mesh is necessary, the strips should be overlapped.
- b. One to two-inch clean aggregate should be placed over the wire mesh as indicated on Figure 16. The depth of stone should be at least 12 inches over the entire inlet opening. The stone should extend beyond the inlet opening at least 18 inches on all sides.
- c. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stones must be pulled away from the inlet, cleaned and replaced.

This filtering device has no overflow mechanism; therefore, ponding is likely, especially if sediment is not removed regularly. This type of device must never be used where overflow may endanger an exposed fill slope. Consideration should also be given to the possible effects of ponding on traffic movement, nearby structures, working areas, adjacent property, etc.

Figure 16. Gravel and Wire Mesh Sediment Filter



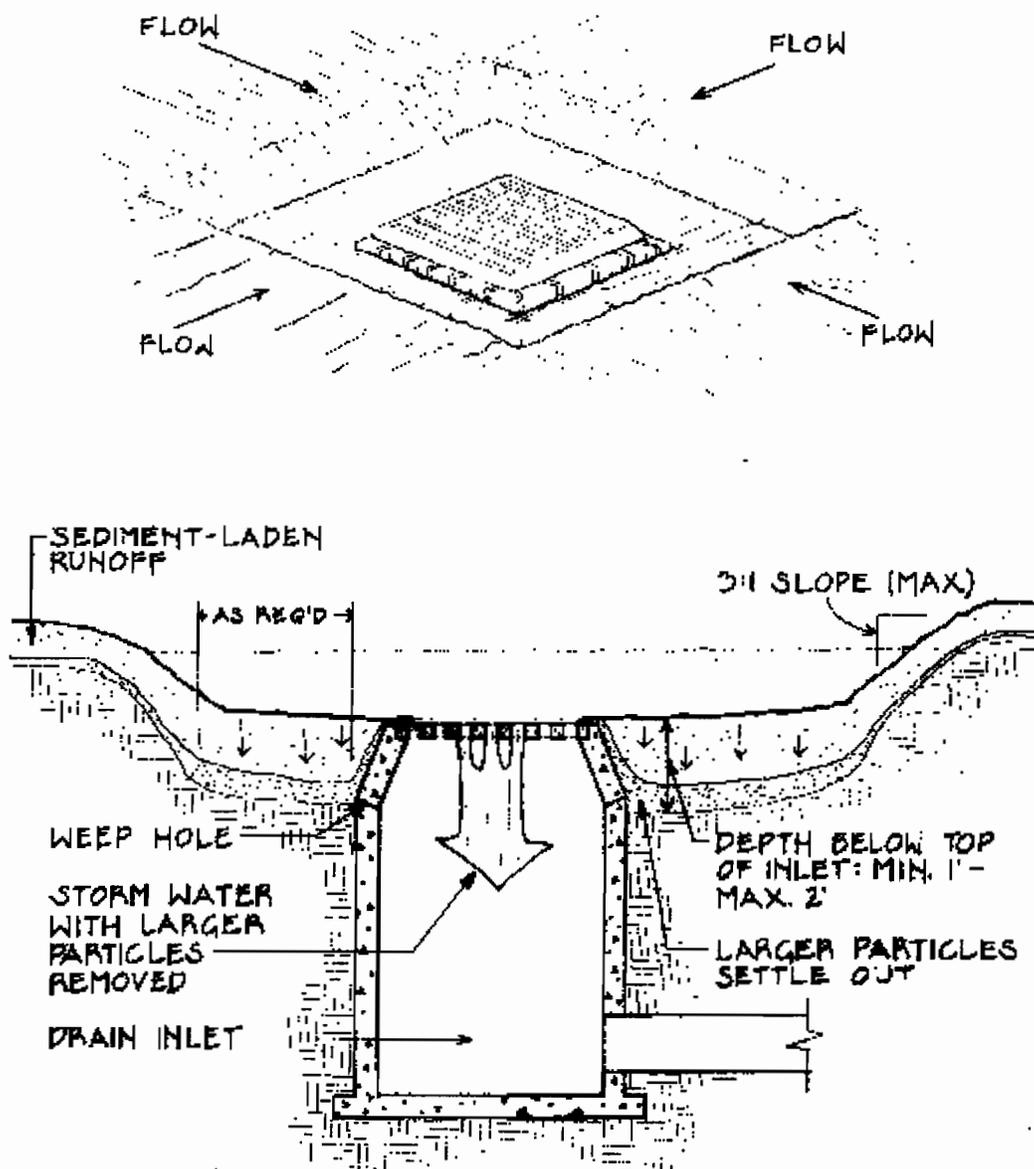
Excavated Drop Inlet Sediment Trap

This method is applicable where heavy flows are expected and where overflow capacity and ease of maintenance are desired (Figure 17).

a. The excavated trap should be sized to provide a minimum storage capacity calculated at the rate of 67 cubic yards for one acre of drainage area. A trap should be no less than one foot nor more than two feet deep measured from the top of the inlet structure. Side slopes should not be steeper than a 33 percent (3:1) grade.

b. The slope of the basin may vary to fit the drainage area and terrain. Observations must be made to check trap efficiency and modifications should be made as necessary to insure satisfactory trapping of sediment. Where an inlet is located to receive concentrated flows it is recommended that the basin have a rectangular shape in 2:1 ratio, with the length oriented in the direction of the flow.

Figure 17. Excavated Drop Inlet Sediment Trap



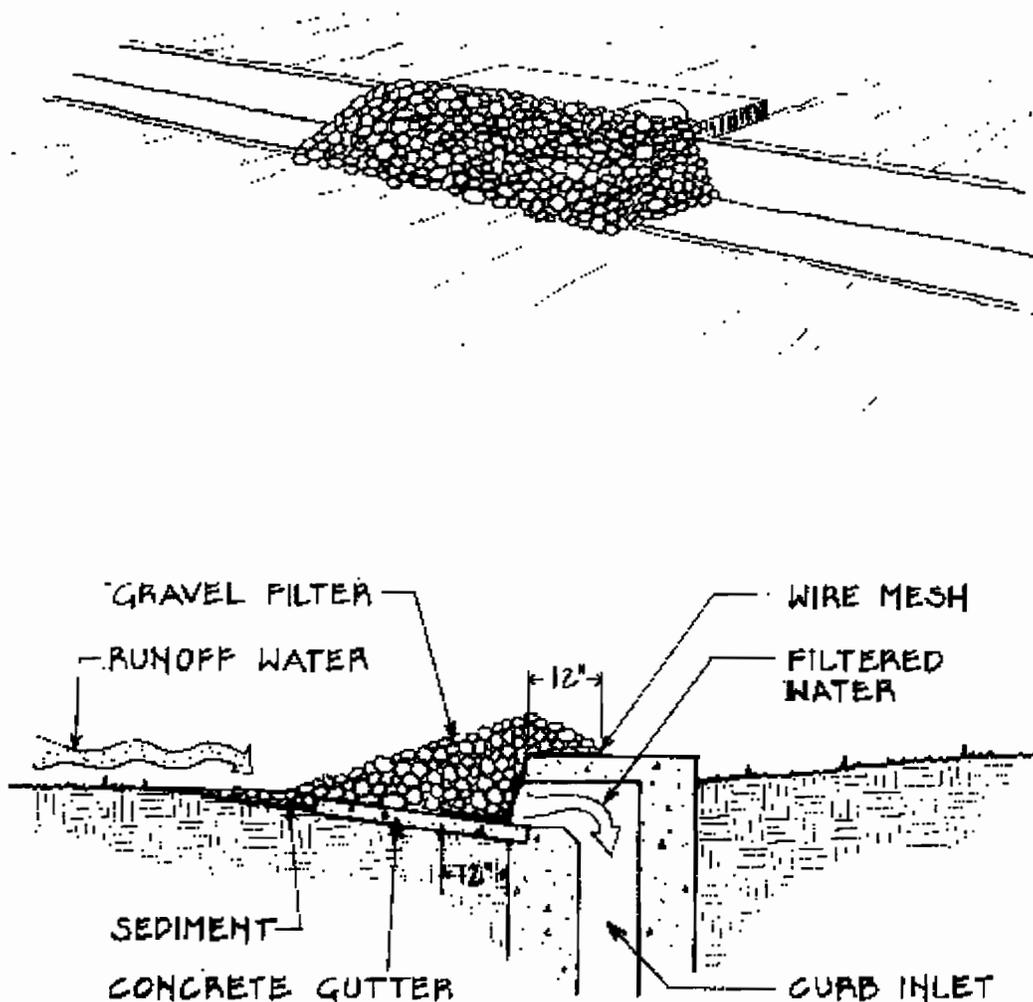
- c. Sediment should be removed and the trap restored to its original dimensions when the sediment has accumulated to 6 inches. Removed sediment should be deposited in a suitable area and in a manner such that it will not erode.

Gravel Curb Inlet Sediment Filter

This method can be used where ponding in front of the structure will not cause inconvenience or damage to adjacent structures and unprotected areas (Figure 18).

- a. Hardware cloth or comparable wire mesh with 1/2-inch openings should be placed over the curb inlet opening so that at least 12 inches of wire extends across the inlet cover and at least 12 inches of wire extends across the concrete gutter from the inlet opening.

Figure 18. Gravel Curb Inlet Sediment Filter



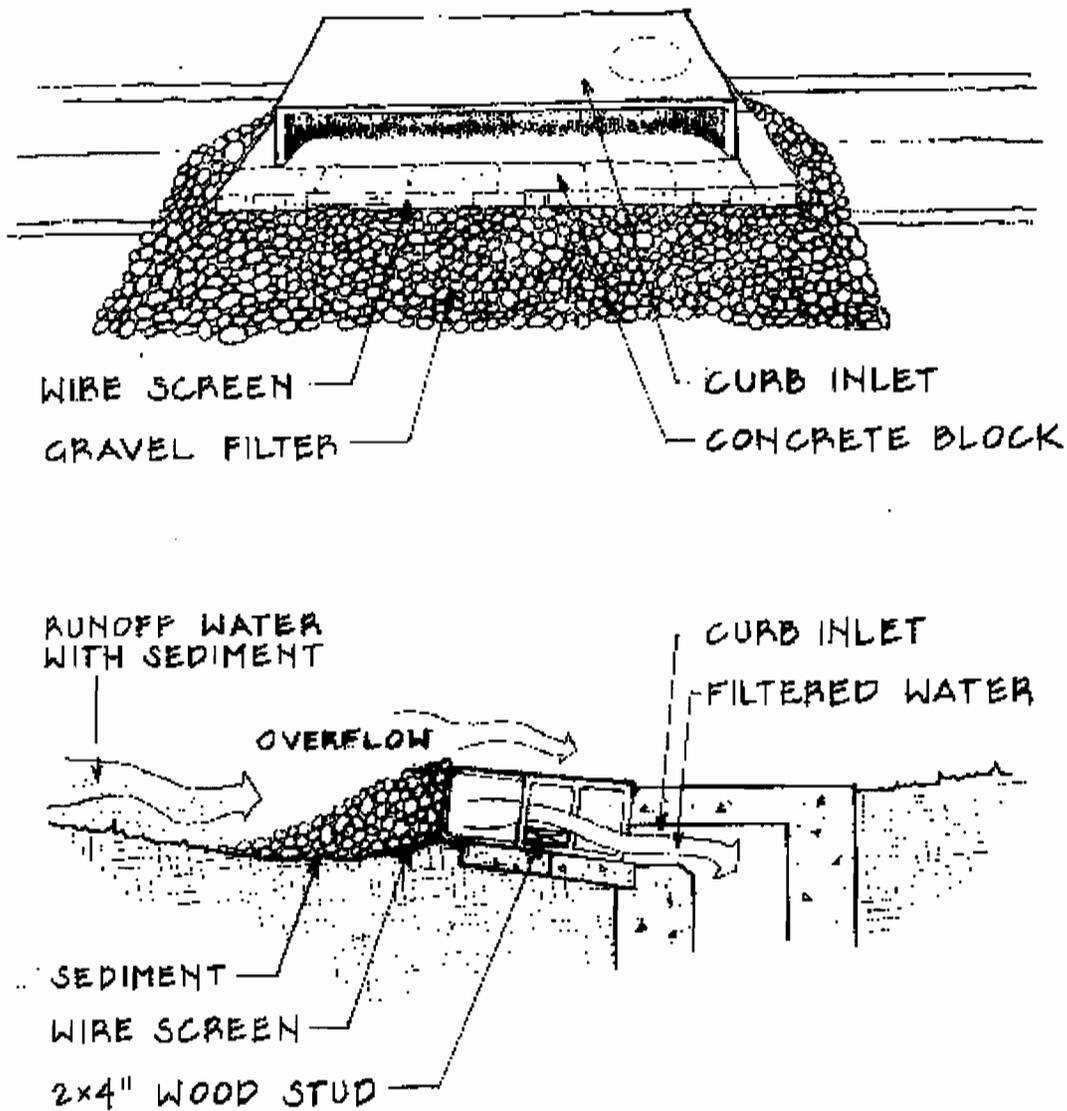
b. Stone should be piled against the wire so as to anchor it against the gutter and inlet cover and to cover the inlet opening completely. One to two-inch clean aggregate should be used.

c. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the block, clean, and replaced.

Block and Gravel Curb Inlet Sediment Filter

This method can be used where an overflow capability is necessary to prevent excessive ponding in front of the structure (Figure 19).

Figure 19. Block and Gravel Curb Inlet Sediment Filter



- a. Two concrete blocks should be placed on their sides abutting the curb at either side of the inlet opening.
- b. A two-inch by four-inch stud should be cut and placed through the outer holes of each spacer block to help keep the front blocks in place.
- c. Concrete blocks should be placed on their sides across the front of the inlet and abutting the spacer blocks.
- d. Wire mesh should be placed over the outside vertical face (webbing) of the concrete blocks to prevent stone from being washed through the holes in the blocks. Chicken wire or hardware cloth with 1/2-inch openings should be used.
- e. One to two-inch clean aggregate should be piled against the wire to the top of the barrier as shown in Plat 9.
- f. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the block, cleaned, and replaced.

All sediment traps should be inspected after each rain and repairs made as needed. Sediment should be removed and the trap restored to its original dimensions when the sediment has accumulated to 6 inches. Removed sediment should be deposited in a suitable area and in such a manner that it will not erode. Structures should be removed, and the area stabilized when the remaining drainage area has been properly stabilized.

SEDIMENT ON PUBLIC STREETS

City of Joplin regulations require that mud, dirt or other foreign matter not be deposited on city streets. Areas graded for construction vehicle transport and parking purposes are especially susceptible to erosion. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires, which generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable. Immediate stabilization of such areas with stone may cost money at the outset, but it may actually save money in the long run by increasing the usefulness of the road during wet weather. Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative, the early application of stone may solve potential erosion and stability problems and eliminate later re-grading costs. In certain cases, the stone will also remain in place for use as part of the base course of the road.

Temporary construction entrances should be constructed of two- to three-inch clean crushed limestone. The entrances should be a minimum of twelve feet wide and fifty feet long. Entrances to residential sites may be a minimum of 10 feet wide and 30 feet long. Minimum thickness of the crushed limestone surface shall be six inches.

Additional lifts of crushed limestone should be added if the surface of the initial drive deteriorates or becomes too muddy to be effective. In locations where an existing drive or street extends at least fifty feet into the site, the existing drive may serve as the construction entrance, and construction of a new gravel entrance is not necessary unless warranted by job conditions. Vehicle wheels should be cleaned to remove mud prior to entrance on to public rights-of-way. When washing is required, it should be done on an area, stabilized with crushed stone, which drains into a sediment trap. Streets adjacent to the site are required by ordinance to be completely cleaned of sediment and debris daily.