

DARDENNE



CITY OF DARDENNE PRAIRIE

STORM WATER MANAGEMENT PROGRAM

Renewal Application

Missouri Operating Permit Number (NPDES) MO-R040024

September 10, 2007

Amended October 10, 2007

(Storm Sewer Outfalls - 36" Equivalent Dia. and Larger Added)

RECEIVED
OCT 10 2007
WATER PROTECTION PROGRAM

PRESERVING OUR STREAMS

**A Part of the Environmental Protection Agency's
National Pollution Discharge Elimination System Phase II Storm Water Management**

THE CITY OF DARDENNE PRAIRIE

City of Dardenne Prairie Mayor and Board of Aldermen Members

Mayor: Pamela Fogarty

Board of Aldermen:

Ward 1: Scott Kolbe
Dave Kampelman

Ward 2: Bob Menichino
Wendi Murray

Ward 3: Michael Coyne
Sharon West (President of Board)

Planning and Zoning Commission:

Michael Conroy (Chairman)
Open (Vice-Chairman)
Lorna Aubuchon
Susan Fine
Penny King
Derek Cisler
Don Harbour
Alderman Dave Kampelman
Mayor Pamela Fogarty

Administration Department:

Robert Hussey, City Administrator

Kimberlie Clark, City Clerk / City Treasurer

Engineering Department:

Luke Kehoe, City Engineer

Legal Department:

David Hamilton, City Attorney
John Young, City Attorney

Table of Contents

Introduction

Mission and Purpose of the Program	1
Dardenne Prairie Geographic Location	1
Storm Water Management Program	2
Section 1 – Public Education and Outreach on Storm Water Impacts	3
Section 2 – Public Involvement and Participation.....	5
Section 3 – Illicit Discharge Detection & Elimination	8
Section 4 – Construction Site Storm Water Runoff Control	11
Section 5 – Post-Construction Storm Water Management in New Development & Redevelopment	13
Section 6 – Pollution Prevention & Good Housekeeping for Municipal Operations.....	16
Action Item Impact Summary Table	18
City of Dardenne Prairie SWMP Map	Appendix “A”
City of Dardenne Prairie Storm Water Ordinances	Appendix “B”
Storm Sewer Outfalls - 36" Equivalent Dia. and Larger List	Appendix “C”

INTRODUCTION

MISSION AND PURPOSE OF THE PROGRAM

The Dardenne Prairie Storm Water Management Program (SWMP) provides a comprehensive approach to storm water pollution management within the City. Specifically, the Program is designed to oversee the implementation of the NPDES Phase II requirements within the City. The City is currently operating under MDNR NPDES Phase II Permit No. MOR040024; which was approved in April 2003. All implementation times presented in the report reference the start date to be the time of permit approval.

The Program has established a five year action plan that will direct Dardenne Prairie's storm water management. The primary means of improving storm water runoff quality is through the use of best management practices (BMPs). This report outlines the fifth year renewal to the approved Program and the current status of BMPs under the six program areas. These six program areas are:

1. Public education and outreach on storm water impacts.
2. Public involvement/participation.
3. Illicit discharge detection and elimination.
4. Construction site storm water runoff control.
5. Post-construction storm water management in new development and redevelopment.
6. Pollution prevention/good housekeeping for municipal operations.

DARDENNE PRAIRIE GEOGRAPHIC INFORMATION

Since the Program was implemented, Dardenne Prairie has performed the following annexations, adding to its total geographic area:

1. 2003:
 - a. Ordinance 664, August 2003 – 9.0 acres
 - b. Ordinance 710, November 2003 – 3.8 acres
 - c. Ordinance 711, November 2003 – 3.9 acres
 - d. Ordinance 712, November 2003 – 3.8 acres
 - e. Ordinance 713, December 2003 – 1.3 acres
2. 2004:
 - a. Ordinance 759, June 2004 – 8.4 acres
 - b. Ordinance 834, December 2004 – 3.6 acres
3. 2005
 - a. Ordinance 873, May 2005 – 10.1 acres
 - b. Ordinance 898, June 2005 – 9.8 acres
 - c. Ordinance 916, August 2005 – 212.9 acres
 - d. Ordinance 928, September 2005 – 2.9 acres
4. 2006 (none)

5. 2007
 - a. Ordinance 1145, April 2007 – 10.0 acres
 - b. Ordinance 1157, May 2007 – 25.29 acres
 - c. Ordinance 1162, June 2007 – 4.08 acres
 - d. Ordinance 1167, June 2007 – 12.26 acres
 - e. Ordinance 1174, June 2007 – 2.23 acres

This has resulted in a total increase of approximately 323.36 acres to the City's boundaries. Please refer to Appendix "A" for the City's current SWMP map.

The legal descriptions for the locations of the storm sewer outfalls with 36" equivalent diameter and larger that are shown in the City's SWMP map are provided in Appendix "C".

STORM WATER MANAGEMENT PROGRAM

As previously discussed, this Program implements the following measures aimed at the reduction of storm water pollution:

- 1. Public education and outreach on storm water impacts.**
- 2. Public involvement/participation.**
- 3. Illicit discharge detection and elimination.**
- 4. Construction site storm water runoff control.**
- 5. Post-construction storm water management in new development and redevelopment.**
- 6. Pollution prevention/good housekeeping for municipal operations.**

SECTION 1

Minimum Control Measure 1 – Public Education and Outreach on Storm Water Impacts

NPDES Phase 2 Discussion

The overall thrust of the EPA program is to ensure that storm water related educational efforts adequately reach all types or categories of citizens within the community and that special emphasis is placed on intercepting those sources of pollution particular to Dardenne Creek and its tributary waters. The EPA believes that as various sectors of the community are educated and informed, their support for program initiatives will grow.

There is a single mandatory component requiring:

- M1. Implementation of a public education program to distribute educational materials to the community, or conduct equivalent outreach activities regarding the impacts of storm water discharge on water bodies and steps that can be taken to reduce storm water runoff.

1. IMPLEMENTATION STATUS:

a. General Summary:

In accordance with the permit, there are two action items the City will continue to address this minimum control measure:

1A. Maintain a storm water web page to provide the public with information on storm water pollution and storm water management within Dardenne Prairie. The site will also feature access to a storm water problem reporting form that can be used to notify the City of storm water concerns, detect illicit discharges, and provide input from the community on storm water management within Dardenne Prairie. The storm water problem reporting form will be filed with the City Clerk for citizens to access.

- Measurable Goal: Availability of the storm water web page.
- Measurable Goal: Documented and filed storm water problem reporting forms.

1B. Addition of a storm water impact section to the City's Newsletter. Twice each year, Dardenne Prairie will include a storm water impact section to the City Newsletter that will inform citizens of the website and the problem reporting form, describe where citizen's may obtain information related to storm water pollution, request volunteers for Clean Stream activities (See Section 2, Item 2B), and describe a different issue with each publication related to storm water pollutant runoff. The City's newsletter goes to each Dardenne Prairie household.

- Measurable Goal: City residences receiving storm water awareness sections in their newsletter semi-annually.

b. Program Elements Refined:

No Program elements have been refined for the area of public education.

c. Status of Measurable Goals:

These Program elements have been implemented and will continue.

2. OVERALL COMPLIANCE WITH PERMIT CONDITIONS:

a. Assessment of the Appropriateness:

These program elements should serve well to educate the public. Dardenne Prairie is a small community with a great deal of information exchanged to homeowner's and builders through the website and newsletter.

b. Progress towards achieving the statutory goal:

The overall effectiveness of the public education area for this permit should be most beneficial to homeowners in the City. These are probably the main contributors to any potential storm water pollution; even more so than agricultural users in the City.

3. INFORMATION COLLECTION AND ANALYSIS:

No information has been collected or analyzed for this program area as both of the items have been recently implemented.

4. SUMMARY OF ACTIVITIES FOR THIS REPORTING CYCLE:

On going storm water web page and newsletter inserts.

5. PROPOSED CHANGES TO THE PROGRAM:

a. Changes to BMPs:

None.

b. Changes to Measurable Goals:

N/A.

6. RELIANCE ON OTHER GOVERNMENT AGENCIES:

Dardenne Prairie is not relying on any other agency for the implementation of its public education program area.

7. SUMMARY OF NUMBER AND NATURE OF INSPECTIONS AND FORMAL ENFORCEMENT ACTIONS:

No inspection or formal enforcement actions have been taken for this program area in this reporting cycle.

SECTION 2
Minimum Control Measure 2 – Public Involvement and Participation

NPDES Phase 2 Discussion

The specific goals of this minimum control measure are to: (1) ensure that public notice requirements are met, and (2) that citizens have both a voice and involvement in the ongoing storm water program so that they feel they have a stake in the success in the program and a sense of ownership.

This Minimum Control Measure is designed to support the public education component described in Minimum Control Measure 1 by:

- M1. Ensuring adequate public notice be provided by municipalities regarding storm water related activities;
- M2. Developing and implementing formal procedures designed to provide organized citizen input to the decision making process, and;
- M3. Empowering citizens and citizen organizations, to enhance community support for city activities related to storm water management.

This is a single mandatory component that requires the City to comply with State and local public notice requirements. There are also three *suggested* components;

- S1. Inclusion of the public in developing, reviewing, and implementing the City storm water management program;
- S2. Efforts to involve all economic and ethnic groups in the public participation process, and;
- S3. Development of a formalized citizen work group (stakeholders) to participate in decision-making, hold public hearings, and work with volunteers.

1. IMPLEMENTATION STATUS:

a. General Summary:

Dardenne Prairie will develop sufficient public notice actions to be in compliance with NPDES public notice permit requirements. The City planned to develop public notice procedures in support of ongoing programs such as advertising group meetings, providing public notices of storm water management policy hearings, and other informational meetings in accordance with State requirements.

- 2A.** Describe and document public notice procedures for storm water related activities in accordance with Missouri public notice requirements. These may include public notice being provided for adopting the storm water management policy, new ordinances related to storm water management, or major development projects that could have an impact to storm water runoff
 - Measurable Goal: Maintain documentation (i.e. copies of postings, news releases, and public notice ads) of public notices for storm water related ordinances and other

actions if required by the State.

2B. Enlist volunteers and continually participate in the Dardenne Creek Clean Stream Day. Volunteers from area municipalities and organizations remove trash, debris, and other pollutants from Dardenne Creek.

- Measurable Goal: Notification of the event in the City's newsletter.
- Measurable Goal: Participation in the Dardenne Creek Clean Stream Day yearly.

2C. Development of a Storm Water Problem Reporting Form that will be accessible from the storm water section of the City's web site and made available with the City Clerk and provide regular notification of this form (See Section 1).

2D. Continued participation in the Dardenne Creek Greenway Commission which commissioned the comprehensive study and planning of a new Greenway along Dardenne Creek. The Dardenne Creek Greenway Study is to improve water quality and storm water management; provide community trails and connections; improve, restore, expand and ensure safe local parks; increase public access to the greenway experience; and preserve wildlife habitats. This study shall be used by each community involved in the project to program the above described purposes. The Communities involved are:

St. Charles County, City of St. Peters, City of O'Fallon, City of Dardenne Prairie, City of Cottleville and the City of St. Charles.

Other interested and participating organizations include the U.S. Army Corps of Engineers, The Greenway Network, St. Charles County Land Trust, USDA Natural Resources Conservation Service, the Missouri Department of Conservation and the Great River Alliance.

- Measurable Goal: Completed Dardenne Creek Greenway Study

b. Program Elements Refined:

No Program elements have been refined for the area of public involvement.

c. Status of Measurable Goals:

Many area citizens participate in the Dardenne Creek Clean Stream Day event by floating down Dardenne Creek and cleaning trash and debris from the creek. This is an annual event aimed at improving Dardenne Creek and making citizens more aware of the need for storm water pollution control. The Dardenne Greenway study has been completed the U.S. Army Corps of Engineers.

2. OVERALL COMPLIANCE WITH PERMIT CONDITIONS:

a. Assessment of the Appropriateness:

These program elements serve well to involve the public. However, public notice procedures and receiving input from the public will only be limited to minimum State requirements similar to that required of public notice for zonings in cities.

b. Progress towards achieving the statutory goal:

The overall effectiveness of the public involvement area for this permit should be beneficial for raising awareness of storm water pollutants and storm water management for citizens in the City. The focus on the City's main creek system, Dardenne Creek, should make residents very aware of how runoff affects this system.

3. **INFORMATION COLLECTION AND ANALYSIS:**
No information has been collected or analyzed for this Program area yet.
4. **SUMMARY OF ACTIVITIES FOR THIS REPORTING CYCLE:**
The Dardenne Creek Greenway study has been completed. The Dardenne Clean Stream Day occurs annually.
5. **PROPOSED CHANGES TO THE PROGRAM:**
 - a. **Changes to BMPs:**
No changes are proposed for the Program area's BMPs.
 - b. **Changes to Measurable Goals:**
N/A.
6. **RELIANCE ON OTHER GOVERNMENT AGENCIES:**
Dardenne Prairie relied on the other agencies involved in the Dardenne Greenway study.
7. **SUMMARY OF NUMBER AND NATURE OF INSPECTIONS AND FORMAL ENFORCEMENT ACTIONS:**
No inspection or formal enforcement actions have been taken for this Program area in this reporting cycle.

SECTION 3
Minimum Control Measure 3 – Illicit Discharge Detection and Elimination

NPDES Phase 2 Discussion

The primary thrust of this Minimum Control Measure is to identify and eliminate illicit discharges to the City storm water system. There are four mandatory program components to achieve this goal. The EPA has also made two suggestions pertaining to the program.

The mandatory components require:

- M1. Development of a storm sewer system map, or equivalent, showing locations of major pipes, outfalls, and topography. In addition, if data already exists (*the City is to*) show areas of concentrated activities likely to be a source of storm water pollution;
- M2. Effective prohibition of illicit discharges to the City's storm sewer system through ordinance, order, or similar means (to the extent allowable under State law), including implementation of appropriate enforcement procedures and actions;
- M3. Implementation of a plan to detect and address illicit discharges, including illegal dumping, to the City storm sewer system; and
- M4. Actions to inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of wastes.

The *suggestions* include:

- S1. Development of recycling or other public outreach programs to address potential sources of illicit discharges including used motor oil, antifreeze, pesticides, herbicides, and fertilizers, and
- S2. Implementation of a program to address discharges or flows from other identified sources, and assess whether such discharges or flows should be identified as significant sources of pollutants.

1. IMPLEMENTATION STATUS:

a. General Summary:

The summary of Dardenne Prairie's planned Program elements for this area is as follows:

- 3A.** Ongoing enforcement of an ordinance prohibiting illicit discharges to the storm water system, including funding, inspection, and enforcement mechanisms.
 - Measurable Goal: Documented Ordinance.
- 3B.** Maintaining a storm water web page with access to a Storm Water Problem Reporting Form on the City's existing web site. The storm water problem reporting form will also be made available with the City Clerk (See Section 1).
- 3C.** Addition of a storm water impact section to the City's Newsletter (See Section 1).
- 3D.** Maintenance of a storm sewer system map showing major storm sewer discharge points, outfalls, and topography. Part of this plan will include the requirement that all new

developments provide as built drawings (including CAD files) which display the location of storm water discharge points for consolidation in a master database. In addition, business license applications include a line for a storm water runoff ranking (3-Probable 2-Possible, 1-Unlikely). These rankings are documented in order to detect areas of concentrated activities of potential storm water pollution.

- Measurable Goal: Documented plan on record with the City Engineer.
- Measurable Goal: Documented as-built plans of all new developments on record with the City Engineer.
- Measurable Goal: Documented business related storm water runoff rankings and revised business license application including storm water runoff ranking.

b. Program Elements Refined:

No Program elements have been refined for the area of public involvement.

c. Status of Measurable Goals:

Ordinance No. 738 Regarding Urban Storm Water Quality Management was passed by the City of Dardenne Prairie on April 15, 2004, and is attached in Appendix "B". The ordinance prohibits illicit discharges in streams and establishes penalties for violations. As previously discussed, the implementation of the Storm Water Problem Reporting Form through the City's website and the City's newsletter insert is anticipated to occur this upcoming year. The creation of a storm sewer system map and data base is planned to be completed this upcoming year.

2. OVERALL COMPLIANCE WITH PERMIT CONDITIONS:

a. Assessment of the Appropriateness:

The plan is established for controlling illicit discharges and creating a storm sewer system map of the City. The Storm Water section of the website and newsletter address procedures and contact information for anyone observing illicit discharges and thereby establish a means of detecting them. Both provide notification of the hazards of illegal dumping to businesses and the public. Therefore, it is felt that these measures will effectively meet the permit requirements.

b. Progress towards achieving the statutory goal:

As discussed above, these measures are felt to be appropriate for meeting the permit requirements and preventing and eliminating illicit discharges.

3. INFORMATION COLLECTION AND ANALYSIS:

No information has been collected or analyzed for this Program area.

4. SUMMARY OF ACTIVITIES FOR THIS REPORTING CYCLE:

The storm sewer system map will continually be updated as development occurs and plans are submitted electronically. No other activities are anticipated for this reporting cycle.

5. PROPOSED CHANGES TO THE PROGRAM:

a. Changes to BMPs:

No changes are proposed for the Program area's BMPs.

b. Changes to Measurable Goals:

N/A.

6. RELIANCE ON OTHER GOVERNMENT AGENCIES:

Dardenne Prairie is not relying on any the other agencies for compliance with this program area.

7. SUMMARY OF NUMBER AND NATURE OF INSPECTIONS AND FORMAL ENFORCEMENT ACTIONS:

No inspection or formal enforcement actions have been taken for this Program area in this reporting cycle.

SECTION 4
Minimum Control Measure 4 – Construction Site Storm Water Runoff Control

NPDES Phase 2 Discussion

The primary thrust of this program is to ensure that construction sites control on-site erosion and sedimentation during construction activities, and limit the exposure of storm water to pollutants. There are four mandatory and *no suggested* components of this minimum control measure. The mandatory components are:

- M1. Development, implementation, and enforcement of a program to reduce pollutants in storm water runoff to the City storm sewer system from construction activities that result in land disturbance greater than or equal to one acre;
- M2. Development and implementation of an ordinance or other regulatory mechanism to control erosion and sedimentation to the maximum extent practicable and allowable under State law;
- M3. Requirements for construction site owners or operators to implement appropriate BMPs (i.e., silt fences, temporary detention ponds, hay bales, etc.); and
- M4. Pre-construction review of site management plans, regular inspections during construction, penalties to ensure compliance, and formal procedures for receipt and consideration of information and inquiries submitted by the public.

1. IMPLEMENTATION STATUS:

a. General Summary:

The City of Dardenne Prairie has already taken a number of steps that will contribute toward compliance with the Program Area of Construction Site Storm Water Runoff Control. These were done prior to issuance of the Phase II Permit and include:

4A. City ordinances that:

- Prohibit the release of any material except water from property.
- Require the person(s) responsible for any material release to remove said material.
- Require any person(s) performing any earth moving activity to comply with minimum erosion and siltation control standards.
- Create instructions for proper installation and maintenance of various techniques for sediment and erosion control.
- Require all subdivision and commercial developments to install temporary sedimentation basins.
- Require the establishment of separate escrows for sediment and erosion control.
- Establish penalties for non-compliance with any of these items in the amount of \$500 per day per violation.
- Establish a written procedure for the development, review, and approval of sediment and erosion control plans for all developments.
- Provide for regular inspections of sediment and erosion control.

- Measurable Goal: Documented Dardenne Prairie Ordinance Nos. 306, 371, and 372.

b. Program Elements Refined:

In April 2003, the City passed a grading ordinance, Ordinance No. 635, attached in Appendix "B", updating the grading permitting procedures of the City so that all land disturbance greater than or equal to 10,000 square feet to obtain permits, the standard siltation control details are the most current and effective structural BMPs, and all grading operations follow-up standard revegetation requirements.

c. Status of Measurable Goals:

Ordinance No. 635 regulating grading operations was passed in April 2003.

2. OVERALL COMPLIANCE WITH PERMIT CONDITIONS:

a. Assessment of the Appropriateness:

The City feels that these measures are highly appropriate for construction sites. Regular inspections of developments are made and deficiency letters are issued with follow-up dates assigned.

b. Progress towards achieving the statutory goal:

These measures have been highly effective at creating standards for developers and citizens to follow. Applicants that apply for grading permits are becoming more familiar with City standards for construction site run-off control. If nothing else, these ordinances have effectively established the criteria that the City expects from construction sites.

3. INFORMATION COLLECTION AND ANALYSIS:

No information has been collected or analyzed for this program area.

4. SUMMARY OF ACTIVITIES FOR THIS REPORTING CYCLE:

Implementation for this program area has been completed.

5. PROPOSED CHANGES TO THE PROGRAM:

a. Changes to BMPs:

No changes are proposed for the Program area's BMPs.

b. Changes to Measurable Goals:

N/A.

6. RELIANCE ON OTHER GOVERNMENT AGENCIES:

Dardenne Prairie is not relying on any the other agencies for compliance with this program area.

7. SUMMARY OF NUMBER AND NATURE OF INSPECTIONS AND FORMAL ENFORCEMENT ACTIONS:

Roughly 55 enforcement letters were issued in the fourth year of the permit requiring developers to maintain siltation control on their site. No other penalties were distributed by the City for violations.

SECTION 5

Minimum Control Measure 5 – Post-Construction Storm Water Management in New Development and Redevelopment

NPDES Phase 2 Discussion

The purpose of this Minimum Control Measure is to ensure that land development and redevelopment projects meet storm water BMP requirements, and that structural and non-structural BMPs are maintained in functional condition so that removal of storm water pollutants is not compromised. In order to accomplish this, the City will need to undergo a major reorientation in its development methods and approach. The approach will need to begin to incorporate full consideration of water quality impacts of development from the initial planning stages through post-construction maintenance and operation. This reorientation will affect zoning ordinances, subdivision regulations, the comprehensive planning process, construction site plan review and inspections, design criteria and guidance, the use of regional BMPs and master plan implementation. This will be a long-term process of change that needs to be masterminded and appropriately guided every step of the way. There will be a great need for consensus building and public education.

Development of a complete description of this Minimum Control Measure is not possible at this time without much more detailed discussions. However, the main points contained within this Measure will be briefly discussed.

There is one, programmatic mandatory component and a lengthy set of suggestions for this minimum control measure. The mandatory component includes development of a complete post-construction BMP-based water quality program including:

- M1. Development, implementation, and enforcement of a program to address storm water runoff from new development and redevelopment projects that result in land disturbance of greater than or equal to one acre and that discharge to the City storm sewer system;
- M2. Implementation of site-appropriate and cost-effective structural and nonstructural BMPs,
- M3. Provisions ensuring adequate long-term BMP operation and maintenance; and
- M4. Inclusion of in-place controls that would prevent or minimize water quality impacts.

1. IMPLEMENTATION STATUS:

a. General Summary:

The City of Dardenne Prairie has already taken some steps that will contribute toward compliance with Program Area 5. Other items are planned for implementation as part of this permit. These items are outlined as follows:

- 5A. The development of ordinances that prohibit the release of any material except water from property, require documented minimum erosion and siltation control standards, and establish penalties for non-compliance (See Section 4, Item 4A.)

5B. Participation in the creation of the Dardenne Creek Greenway Commission which undertook the comprehensive study and planning of a new Greenway along Dardenne Creek. (See Section 2, Item 2D.).

5C. A storm sewer system map showing major storm sewer discharge points, outfalls, and topography. This map will also include the storm water impact rankings of developments throughout the City. The comprehensive map and database will assist in determining priorities of long range planning and BMP implementation. It will also assist in tracking maintenance inspections. Overall the map will be an in place tool that should help prevent or minimize water quality impacts. (See Section 3, Item 3D.).

5D. Development of a comprehensive storm water policy that seeks to integrate storm water considerations in current regulations and comprehensive planning. This will include the development of internal policies, modification of ordinances, educational materials, inter-staff coordination, education, etc. The City should also document all activities sufficient for permit application and annual update purposes. This policy will be finalized with the update to the City's Comprehensive Plan.

- Measurable Goal: Documentation of the completed policy this upcoming year.
- Measurable Goal: Documented Revised Ordinances for compliance with the policy.
- Measurable Goal: Establishment of a means for long-term maintenance funds through the policy.

b. Program Elements Refined:

Three of the permit activities are being completed as part of other program area compliances. The fourth will be the completion of a comprehensive storm water policy that examines all City planning and development procedures/ordinances, which is planned to occur in the upcoming year.

c. Status of Measurable Goals:

The City is planning to make use of the storm sewer system map in the implementation of the City's storm water policy. As previously described, the Dardenne Creek Greenway study has been completed.

2. OVERALL COMPLIANCE WITH PERMIT CONDITIONS:

a. Assessment of the Appropriateness:

The City's comprehensive storm water policy is a conglomerate all City ordinances and policies related to urban storm water. This policy should achieve all mandatory requirements for storm water management criteria in new development and establishing post-construction operation/maintenance of the City's permit BMPs.

b. Progress towards achieving the statutory goal:

The measures already enacted in other Program areas will have a significant impact at protecting and improving water quality.

3. **INFORMATION COLLECTION AND ANALYSIS:**
No information has been collected or analyzed for this Program area.
4. **SUMMARY OF ACTIVITIES FOR THIS REPORTING CYCLE:**
No other activities are anticipated for this reporting cycle as implementation will take some time.
5. **PROPOSED CHANGES TO THE PROGRAM:**
 - a. **Changes to BMPs:**
No changes are proposed for the Program area's BMPs.
 - b. **Changes to Measurable Goals:**
N/A.
6. **RELIANCE ON OTHER GOVERNMENT AGENCIES:**
Dardenne Prairie is not relying on any the other agencies for compliance with this program area.
7. **SUMMARY OF NUMBER AND NATURE OF INSPECTIONS AND FORMAL ENFORCEMENT ACTIONS:**
No enforcement actions have been taken relative to this Program Area.

SECTION 6
***Minimum Control Measure 6 – Pollution Prevention and Good Housekeeping for
Municipal Operations***

NPDES Phase 2 Discussion

The purpose of this Minimum Control Measure is to ensure that municipalities plan and implement good housekeeping procedures to limit introduction of pollutants that might result from municipal activities to storm water, and to educate municipal employees in this area. There are two (2) mandatory and four (4) *suggested* components of this minimum control measure.

Mandatory components include:

- M1. Development and implementation of a cost-effective operation and maintenance program with the ultimate goal of preventing or reducing, pollutant runoff from municipal operations; and
- M2. Training of City employees, using available training materials approved by the City, to prevent or reduce storm water pollution from government operations such as park and open space maintenance, planning, building oversight, and storm water system maintenance.

1. IMPLEMENTATION STATUS:

a. General Summary:

Currently, the City of Dardenne Prairie has a very small amount of municipal operations and therefore, municipal operations very likely do not contribute to pollutant runoff. Sanitary sewer service and water service are provided by private companies and street maintenance is conducted by St. Charles County. The only possible contributor would be the municipal building. However, it is possible that in the future the City could have municipal operations that contribute more significantly to pollutant runoff; therefore, the City plans to undertake the following activities:

6A. Develop or improve post-development best management practices at government-owned facilities as appropriate.

- Measurable Goal: A review will be conducted of each existing and planned government-owned facility to evaluate if additional best-management practices should be implemented to control storm water pollution.

b. Program Elements Refined:

Concerning item *6A.*, a review of City Hall property, which has no equipment storage and no buildings besides a file storage shed and a modular building indicates that no additional best-management practices are required be implemented to control storm water pollution

c. Status of Measurable Goals:

This item has not yet been implemented.

2. OVERALL COMPLIANCE WITH PERMIT CONDITIONS:

a. Assessment of the Appropriateness:

Even though the City municipal operations are small, this item will raise the awareness of urban storm water pollution for City employees. Therefore, it will make the City staff more effective at identifying concerns at sites throughout the City. It will also make certain that municipal operations are setting the pace relative to storm water pollution control. This will prevent developers from questioning the City's ability to enforce pollution prevention standards.

b. Progress towards achieving the statutory goal:

The action items in this program area will likely have the least amount of overall impact to improving water quality since so little work is done by actual municipal operations. The majority of the work will be contracted or done by utilities. Nevertheless, it will still benefit water quality in the City as a whole if City operations are aware of the need for these standards.

3. INFORMATION COLLECTION AND ANALYSIS:

No information has been collected or analyzed for this Program area.

4. SUMMARY OF ACTIVITIES FOR THIS REPORTING CYCLE:

No other activities are anticipated for the this reporting cycle as implementation is not yet scheduled.

5. PROPOSED CHANGES TO THE PROGRAM:

a. Changes to BMPs:

No changes are proposed for the Program area's BMPs.

b. Changes to Measurable Goals:

N/A.

6. RELIANCE ON OTHER GOVERNMENT AGENCIES:

Dardenne Prairie is not relying on any the other agencies for compliance with this program area.

7. SUMMARY OF NUMBER AND NATURE OF INSPECTIONS AND FORMAL ENFORCEMENT ACTIONS:

No enforcement actions have been taken relative to this Program Area.

ACTION ITEM IMPACT SUMMARY TABLE SUMMARY TABLE:

Many of the proposed action items address a number of the minimum control measures. The following table provides an overall summary of each of the City's action items. This table has been updated to correspond with changes made as a result of this reporting period.

Section Item No		Municipal Action Items		Control Measure Addressed				Details		
				Control Measure	Mandatory	Suggested	Current/Proposed	Est. Implementation Time*	Mandatory Components	
1 - A		Storm Water Web Page w/ Storm Water Problem Reporting Form (Electronic and Hardcopy Files)	1 - M1 2 - M1, M2, M3 3 - M3, M4	M1, M2, M3 M3, M4	S1, S2 S2	Current	Continual	Est. Cost of Implementation \$3,000 set-up + \$1,000/yr		
1 - B		Newsletter Insert	1 - M1 2 - M1, M3 3 - M4	M1, M3 M4	S1, S2	Current	Annually	\$3,500/yr		
2 - A		Public Notice Procedures	2 - M1	M1		Current	Continual	\$1,000		
2 - B		Dardenne Creek Clean Stream Day	2 - M3	M3		Current	Annual Event	\$200/yr		
2 - C		Same as 1-A	N/A							
2 - D		Dardenne Creek Greenway Study	2 - M3 5 - M2, M4	M3 M2, M4	S2	Current	Existing	N/A		
3 - A		Illicit Discharge Ordinance	3 - M2, M3, M4 2 - M1 5 - M1, M4	M2, M3, M4 M1 M1, M4	S2	Current	Existing	\$1,000		
3 - B		Same as 1-A	N/A							
3 - C		Same as 1-B	N/A							
3 - D		Storm Sewer System Map and Database	3 - M1, M3, M4 5 - M4	M1, M3, M4 M4	S1, S2	Current	Continual	\$40,000*		
4 - A		Existing Development Ordinances	4 - M1, M2, M3, 5 - M4 M1, M2	M1, M2, M3, M4 M1, M2		Current	Existing			
5 - A		Same as 4-A	N/A							
5 - B		Same as 2-D	N/A							
5 - C		Same as 3-D	N/A							
5 - D		Comprehensive Storm Water Policy	5 - M2, M3, M4 1 - M1 2 - M3 4 - M1, M2, M3, 6 - M4	M2, M3, M4 M1 M3 M1, M2, M3, M4	S1, S2 S1, S2	Current	Existing	\$10,000 (Costs will be included in the update to the Comp. Plan)		
6 - A		City Facility Review	6 - M1, M2	M1, M2	S2	Current	Continual	\$1,000		

* Estimate: May vary on availability of information and degree of accuracy (all implementation periods reference the permit approval date as the start time).

APPENDIX A

**CITY OF DARDENNE PRAIRIE
SWMP MAP**

APPENDIX B

CITY OF DARDENNE PRAIRIE STORM WATER ORDINANCES

The following excerpts were taken from Dardenne Prairie Ordinance No. 105, Section 4.4 – The City’s Subdivision Ordinance, Improvement Plans and Installation:

- i. Plans for sediment control will be submitted to, and approved by, the City Engineer and County Highway Engineer (Ord. 208). A dollar amount equal to the proposed cost will be included in the performance guarantee.

The following excerpt was taken from Dardenne Prairie Ordinance No. 372 establishing a means for funding siltation control inspections:

SECTION NO. 4.1: FILING FEES.

c. Construction Inspection: The Town of Dardenne Prairie shall charge the developer for inspection of all public improvements. Charges shall be invoiced based on hourly rates plus reimbursable expenses for work associated with inspections of public improvements and assurance that construction conforms with the plans and Town regulations.

BILL NO. 03-30

ORDINANCE NO. #635

AN ORDINANCE OF THE CITY OF DARDENNE PRAIRIE, MISSOURI PROVIDING FOR A GRADING PERMIT PROCESS AND AMENDING PARTS OF ORDINANCE NO. 105, AN AMENDED ORDINANCE PROVIDING FOR RULES OF LAND SUBDIVISION.

BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF DARDENNE PRAIRIE, MISSOURI, AS FOLLOWS:

Section 1: The following Section 4.3.2 shall be added to Ordinance No. 105:

4.3.2 GRADING PERMIT PROCESS

- A. Any development greater than ten thousand (10,000) square feet and requiring the preparation of complete improvement plans in accordance with Ordinance No. 105 as determined by the City Engineer shall be required to obtain a grading permit from the City of Dardenne Prairie. Once the preliminary plat or P.U.D. Area Plan has been approved by the Planning and Zoning Commission, the grading permit process shall be as described herein. Grading plans may be submitted to the City Engineer as part of the improvement plans, or separately prior to the submission of improvement plans; however, a grading permit shall be submitted and processed in either case.
- B. Filing Procedures: The applicant shall submit five (5) copies of the proposed Grading Plan, and a completed application form to the City Engineer.
- C. Information Required: The following information is required for all Grading Plan submittals for approval. The required information may be combined for presentation on one or more drawings or maps. In the interests of clarity, speed and efficiency in the review process, the City Engineer may request that information in addition to the Grading Plan be presented on drawings or maps. In all cases, the grading plan submission must minimally include the following:
 1. The grading plan shall be of a scale not to be greater than one (1) inch equals twenty (20) feet nor less than one (1) inch equals two hundred (200) feet, and of such accuracy that the City Engineer can readily interpret the Plan, and shall include more than one drawing where required for clarity.
 2. The property is identified by lot lines and location, including dimensions, angles and size, correlated with the legal description of said property. The grading plan shall be designed and prepared by a qualified land planner, registered professional architect, and engineer or land surveyor. It shall also include the name and address of the property owner(s), developer(s), and designer(s).

3. It shall show the scale, north point, boundary dimensions, natural features such as woodlots, streams, rivers, lakes, drains, topography (at least five (5) foot contours intervals; when terrain is irregular or drainage critical, contour interval shall be at least two (2) foot), and similar features. All topographic data shall directly relate to USGS datum.
4. It shall show existing manmade features such as buildings, structures, easements, high tension towers, pipe lines, existing utilities such as water and sewer lines, etc., excavations, bridges, culverts, and drains and shall identify adjacent properties within three hundred (300) feet and their existing uses.
5. Any proposed alterations to the topography or other natural features are indicated.
6. All filled places under proposed storm and sanitary sewer lines and/or paved areas shall be compacted to ninety (90) percent of maximum density as determined by the Modified AASHTO T-180 Compaction Test or ninety-five (95) percent of maximum density as determined by the Standard Proctor Test AASHTO T-99.
7. All fill placed in proposed roads areas shall be compacted from the bottom of the fill up to ninety (90) percent of maximum density as determined by the Modified AASHTO T-180 Compaction Test or ninety-five (95) of maximum density as determined by the Standard Proctor Test AASHTO T-99. All tests shall be verified by a soils engineer concurrent with grading and backfilling operations.
8. The sediment control plan must be implemented before grading begins. No graded area is to remain without at least seventy-five (75) percent of vegetative ground cover for more than thirty (30) days without being seeded and mulched or sodded. Also, positive steps must be exercised to prevent transported soil from damaging adjacent property and being deposited in the form of silt in storm drainage systems whether on-site or off-site.
 - a. Sediment & Erosion Control Plan Approval:
 - i. The sediment and erosion control plan must define the measures that shall be taken to meet erosion control principles and standards as defined in Section IIC, of these regulations. The plan must assure that the sediment is not transported from the site by a storm event of 25-year (frequency) 20 minute (inlet time) or less.

- ii. When a plan submitted, the City Engineer may make comments and recommendations. All such comments and recommendations shall be made within forty-five (45) days of receipt. Such comments may pertain to, but may not be limited to:
 - A. Erosion and sedimentation control.
 - B. Soil use limitation.
 - C. Environmental considerations.

- iii. All plans and specifications submitted for review and/or approval shall be prepared by or under the direct supervision of a registered Professional Engineer in the State of Missouri and shall be dated and bear his original seal and signature.

b. Principles and Standards:

- i. All excavations, grading, or filling shall have a finished grade not to exceed a thirty-three (33) percent (3 horizontal to 1 vertical) slope. Steeper grades may be approved by the City Engineer if the excavation is through rock or if the excavation or the fill is adequately protected (a designed head wall or toe wall may be required). Turf Reinforced Mattresses (TRM), rock slopes, and other Best Management Practice (BMP) designs may be utilized for slopes in excess of thirty-three (33) percent, but must be designed by a qualified geotechnical engineer hired by the developer and approved by the City Engineer prior to and/or during installation. Retaining walls that exceed a height of forty-two (42) inches shall require the construction of safety guards as identified in the appropriate sections(s) of the adopted BOCA Codes and must be approved by the City Building Code Official. Permanent safety guards shall be constructed in accordance with the appropriate sections(s) of the adopted BOCA Codes (latest edition). Also, the following water quality issues as a reference can be used: Protecting Water Quality - A field guide to erosion, sediment and storm water best management practices for development sites in Missouri. Publication of this manual was funded in part by the Missouri Department of Natural Resource, and administered by the Water Pollution Control Program, Division of Environmental Quality under an EPA 319 grant. Copies of this reference are available from the Missouri Department of Natural Resources.

- ii. Sediment and erosion control plans for sites that exceed 10,000 square feet of grading area shall provide BMPs for land disturbance. BMP's are a schedule of activities, practices or procedures that reduce the amount of soil available for transport or a device that reduces the amount of suspended solids in runoff before discharge to waters of the state. Types of BMP's from storm water control include, but are not limited to:
 - A. State-approved standard specifications and permit programs;
 - B. Employee training in erosion control, material handling and storage and housekeeping for maintenance areas;
 - C. Site preparation such as grading, surface roughening, topsoiling, tree preservations and protection, and temporary construction entrances;
 - D. Surface stabilization such as temporary seeding, permanent seeding, mulching, sodding, ground cover including vines and shrubs, riprap and geotextile fabric. Mulches may be hay, straw, fiber mats, netting, wood cellulose, corn or tobacco stalks, bark, corn cobs, wood chips or other suitable material which is reasonably clean and free of noxious weeds and deleterious materials. Grasses used for temporary seeding shall be a quick growing species such as rye grass, Italian rye grass or cereal grasses suitable to the area and which will not compete with the grasses sown later for permanent cover.
 - E. Runoff control measures such as temporary diversion dikes or berms, permanent diversion dikes or berms, right-of-way or perimeter diversion devices, and retention and detention basins; and sediment traps and barriers, sediment basins, sediment (silt) fence and staked straw bale barriers.
 - F. Runoff conveyance measures such as grass-lined channels, riprap and paved channels, temporary slope drains, paved flumes or chutes; and slope drains may be constructed of pipe, fiber mats, rubble, portland cement concrete, plastic sheets or other materials that adequately will control erosion;
 - G. Inlet and outlet protection;
 - H. Streambank protection such as a vegetative greenbelt between the land disturbance and the watercourse. Also, structural protection which stabilizes the stream channel;
 - I. A critical path method analysis or a schedule for performing erosion control measures; and
 - J. Other proven methods for controlling runoff and sedimentation as approved by the City Engineer.

- iii. A written Storm Water Pollution Prevention Plan shall be developed for the site in accordance with the Missouri Department of Natural Resources (MDNR) requirements. The plan shall briefly outline and discuss all proposed structural and non-structural BMPs, anticipated sources of any type of storm water pollution from the site, potential impacts to the regional stream conditions, and post-construction maintenance and operation of BMPs.
- iv. All BMP designs are to be approved by the City Engineer. Temporary siltation control measures (structural) shall be maintained until at least seventy-five (75) percent vegetative cover of area disturbed is established at a sufficient density to provide erosion control on the site, as determined by the City Engineer. (Refer to Appendix A).
- v. Where natural vegetation is removed during grading, vegetation shall be reestablished in such a density (at least seventy-five (75) percent vegetative cover of area disturbed) as to prevent erosion. Permanent type grasses shall be established as soon as possible or during the next seeding period after grading has been completed. (Refer to Appendix A.)
- vi. When grading operations are completed or suspended for more than thirty (30) days, permanent grass must be established at sufficient density (at least seventy-five (75) percent vegetative cover) to provide erosion control on the site. Between permanent grass seeding periods, temporary cover shall be provided according to the City Engineer's recommendations. (Refer to Appendix A.)
- vii. All finished grades (areas not to be disturbed by future improvement) in excess of twenty (20) percent slopes (5 horizontal to 1 vertical) shall be mulched and tacked as prescribed in Appendix A.
- viii. Provisions shall be made to accommodate the increased runoff caused by changed soil and surface conditions during and after grading. Unvegetated open channels shall be designed so that gradients result in velocities of two (2) feet per second or less. Open channels with velocities more than two (2) foot per second and less than five (5) foot per second shall be established in permanent vegetation by use of commercially available erosion control blankets or lined with rock riprap or concrete or other suitable materials as approved by the City Engineer. Detention basins, diversions, or other appropriate structures shall be constructed to prevent velocities above five (5) feet per second. (Refer to Figures 1 through 21)

- ix. The ground adjoining development sites shall be provided with protection from accelerated and increased surface water, silt from erosion, and any other consequences of erosion. Runoff water from developed areas (parking lots, paved sites, buildings, etc.) above the area to be developed shall be directed to diversion ditches, detention basins, concrete gutters and/or underground outlet systems. Sufficiently anchored straw bales may be temporarily substituted with the approval of the City Engineer. (Refer to Figures 1 through 21)
- x. Development along natural watercourses shall have residential lot lines, commercial or industrial improvements, parking areas or driveways set back a minimum of fifty (50) feet from the top of the existing stream bank or 100-year 20-minute water surface elevation where not defined bank exists. The watercourse shall be maintained and made the responsibility of the subdivision trustees or, in the case of a site plan, by the property owner. Permanent vegetation shall be left intact. Variances may be approved and may include designed streambank erosion control measures and shall be approved by the City Engineer. City of Dardenne Prairie, Federal Emergency Management Agency, and U.S. Army Corps of Engineers regulations and guidelines shall be followed where applicable regarding site development areas designated as floodplains and wetlands.
- xi. All lots shall be seeded and mulched at the rates defined in Appendix A or sodded before an occupancy permit shall be issued except that a temporary occupancy permit may be issued by the Building Department in cases of undue hardship because of unfavorable ground conditions.
- xii. All erosion and sediment control facilities shall be inspected following each rainstorm causing significant runoff, or being of sufficient intensity or duration as to stop construction or grading progress.
 - A. As a result of such inspections, or any time the following are found, the sediment control facilities shall be cleaned of sediment, repaired if damaged, and restored to serviceable conditions:
 - B. Excess sediment has accumulated in silt control devices,
 - C. Sediment/erosion control devices have been damaged,
 - D. Obvious gullies or sediment deposits have formed on the downstream side of control devices, or
 - E. Sediment has been carried beyond the working site;

- xiii. Pre-development and post-development drainage maps area required and must be developed from a base reproduction of the grading plan. The design criteria used in determining the amount of runoff shall be the same as set out in the City of Dardenne Prairie, Missouri, Ordinance No. 371, as amended. For areas not in a floodplain, the following information shall be provided by the developer.
 - A. No sheet flow will normally be allowed over terraces that are steeper than a thirty-three (33) percent slope and/or greater than five (5) feet in height. Berms and/or swales shall be provided to collect the flow at the top of the terrace and carry it to a drainage structure. Total accumulation inside berms and/or swales shall be a maximum of four (4) cubic feet per second.
 - B. Provide critical cross sections, profiles, and hydraulic computations for ditches and swales with flows in excess of one (1) cubic foot per second and creeks with flows in excess of four (4) cubic feet per second.
 - xiv. All low places whether on-site or off-site must be graded to allow drainage. This can be accomplished with temporary ditches.
 - xv. When applicable, the developer must also apply for MDNR Land Disturbance Permit. A copy of the MDNR application or approved permit must be included with this submittal. A copy of the approved MDNR permit must be submitted to the City when obtained.
- D. Review Procedures: The City Engineer shall review the grading plan for its conformance to standards and specifications set forth in this Ordinance and other applicable Ordinances. The City Engineer may request modifications in the grading plan. The City Engineer shall then confer approval, conditional approval or disapproval of the grading plan within forty-five (45) days of filing and shall notify the applicant with written reasons for its action.
- E. Effect of Grading Plan Approval: Grading Plan approval shall confer upon the developer, for a period of one (1) year from date of approval, the conditional right that the general terms and conditions under which the approval was granted will not be changed by the City Engineer. This one (1) year period may be extended by the City Engineer if the developer has applied in writing for such an extension and the City Engineer determines a longer period should be granted due to unusual circumstances. If an extension is not granted, the grading plan approval is null and void. After approval of the grading plan, the developer may proceed with the grading operations upon the final direction of the City Engineer.

Section 2: AS-BUILT PLANS

The developer shall cause the "as-built" location of each storm-sewer outfall of the project to be displayed on the "as-built" plans with horizontal coordinates of the end point of the outfall clearly labeled and referenced to the Missouri Coordinate System of 1983 as defined by R.S. Mo 60.401 and shall display the project Grid Factor. In addition, the vertical elevation of each outfall shall be labeled on the "as-built" plans and shall be referenced to the project's vertical datum.

One mylar set, two paper sets, and one digital copy in AutoCAD format of the "as-built" plans shall be submitted to the City Engineer before the City shall release the escrow established insuring or guaranteeing the stabilization and revegetation of the site as described in Section 3 below.

Section 3: ESCROW REQUIREMENTS

The developer shall post a lenders or escrow agreement insuring or guaranteeing the stabilization and revegetation of the site. The lenders or escrow agreement shall be the same as set out in Section 4.5 of the City of Dardenne Prairie, Missouri, Ordinance No. 105, as amended in the following amounts:

Grading sites of 0.01 to 5.00 acres.....	\$3,000/Acre
Grading sites of 5.01 to 20.00 acres.....	\$2,000/Acre
Grading sites of greater than 20.00 acres.....	\$1,500/Acre

Section 4: GLOSSARY

For the purposes of this regulation, the following words and phrases shall have the meanings respectively ascribed to them by this section.

BOCA: Refers to the currently adopted BOCA National Building Code; please note these regulations are designed to be used with the adopted BOCA Codes as a reference for minimum performance standards.

Best Management Practices (BMPs): A schedule of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage. Both structural and nonstructural measures to control, treat, or prevent stormwater runoff pollution within waters of the state. Structural BMPs are engineered devices. Nonstructural BMPs include, but are not limited to, alternative site design, ordinance and zoning, education and good housekeeping measures.

Debris or sediment basin: A barrier or dam built across a waterway or at other suitable locations to retain rock, sand, gravel, silt or other materials.

Diversion: A channel with or without a supporting ridge on the lower side constructed across or at the bottom of a slope.

Erosion: The wearing away of the land surface by the action of wind, water or gravity.

Excavation or cut: The removal, stripping or disturbance of soil, earth, sand, rock, gravel or other similar substances from the ground.

Existing grade: The vertical location of the existing ground surface prior to excavations or filling.

FEMA: Federal Emergency Management Agency.

Fill or filling: The placing of any soil, earth, sand, rock, gravel or other substance on the ground.

Finished grade: The final grade or elevations of the ground surface conforming to the proposed design.

Grading: Any excavation, filling, or combination thereof.

Natural Watercourse: A channel formed in the existing surface topography of the earth prior to changes made by unnatural conditions.

Open channel: A constructed ditch or channel designed for water flow.

Sediment: Solid material, mineral or organic, that has been moved by erosion and deposited in a location other than the point of origin.

Silt traps or filters: Staked bales or silt fencing systems that function as a filter and a velocity check to trap fine-grained sediment while allowing satisfactory passage for storm water runoff.

Site: A lot or parcel of land, or a contiguous combination thereof, where grading work is performed as a single unified operation.

Site Developments: Altering terrain and/or vegetation and constructing improvements.

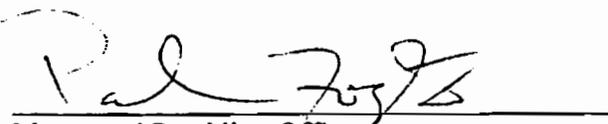
Streambank, top of existing: The usual boundaries, not the flood boundaries, of a stream channel. The top of the natural incline bordering a stream.

Section 5: That Ordinance No. 215 of the City of Dardenne Prairie, Missouri is hereby repealed.

Section 6: That in case of conflict between this Ordinance or any part thereof, and the whole or part of any other existing or future Ordinance, the most restrictive in each case shall apply.

Section 7: That this Ordinance shall be in full force and effect immediately upon its enactment and approval.

READ TWICE AND PASSED BY THE BOARD OF ALDERMEN OF THE CITY OF DARDENNE PRAIRIE, MISSOURI, THIS 17th DAY OF April, 2003.



Mayor and Presiding Officer

ATTEST:



City Clerk

APPROVED BY THE MAYOR OF THE CITY OF DARDENNE PRAIRIE, MISSOURI, THIS 17th DAY OF April, 2003.



Mayor

ATTEST:



City Clerk

APPENDIX A - TEMPORARY SEEDING

DEFINITION

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

PURPOSE

The purpose of this practice is to temporarily stabilize denuded areas that will not be brought to final grade or on which construction will be stopped for a period of more than 14 working days.

Temporary seeding helps reduce runoff and erosion until permanent vegetation or other erosion control measures can be established. In addition, it provides residue for soil protection during seedbed preparation and reduces problems of mud and dust production from bare soil surfaces during construction.

CONDITIONS WHERE PRACTICE APPLIES

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

CRITERIA

Plant selection - Select plants appropriate to the season and site conditions from Table 1.

TABLE 1
TEMPORARY SEEDING SPECIES, RATES AND DATES

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

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

Seedbed preparation:

1. Liming: Where the pH of the soil is below 5.5, apply one and one half to two tons per acre of finely ground agricultural limestone. If the seeding period is less than 30 days liming will not be required.
2. Fertilizer: Apply 500 pounds per acre of 10-10-10 fertilizer or equivalent. Incorporate lime and fertilizer into the top 2 - 4 inches of soil. If the seeding period is less than 30 days fertilizer will not be required.
3. Prepare a seedbed of loose soil to a depth of 3 to 4 inches. If recent tillage or grading operations have resulted in a loose surface, additional tillage or roughening may not be required except to break up large clods. If rainfall caused the surface to become sealed or crusted, loosen it just prior to seeding by disking, raking, harrowing, or other suitable methods. Groove or furrow slopes steeper than 3:1 on the contour before seeding.

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

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

Mulching - Seedings made during optimum spring and summer seeding dates, with favorable soil and site conditions, will not require mulch.

When temporary protection is needed see practice APPENDIX B – MULCHING.

CONSIDERATIONS

Temporary seedings should be used to protect earthen structures such as dikes, diversions, dams and other structures used for sediment control during construction. Temporary seedings can also reduce the amount of maintenance these structures may need. For example, the frequency of sediment basin clean-outs will be reduced if watershed areas, outside the active construction zone, are stabilized.

Proper seedbed preparation, selection of appropriate species, and use of quality seed are as important in this practice as in APPENDIX C - PERMANENT VEGETATION. Failure to follow established guidelines and recommendations carefully might result in an inadequate or short-lived stand of vegetation that will not control erosion.

Temporary seeding provides protection for no more than 1 year, during which time permanent stabilization should be initiated.

PLANS AND SPECIFICATIONS

Plans and specifications for temporary seeding shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

At a minimum, include the following items:

1. Plant species to be used
2. Dates of seeding
3. Seedbed preparation
4. Fertilization and seeding rates and methods. All plans shall include the installation, inspection, and maintenance schedules with the responsible party identified.

OPERATION AND MAINTENANCE

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

APPENDIX B - MULCHING

DEFINITION

The application of plant residues and other suitable materials to the soil surface.

PURPOSE

The purposes of this practice are as follows:

1. To prevent erosion and prevent surface compaction or crusting by protecting the soil surface from raindrop impact and reducing the velocity of overland flow.
2. To foster the growth of vegetation by conserving available moisture and providing insulation against extreme heat and cold.
3. To improve the aesthetics of the site.
4. To control weeds.

CONDITIONS WHERE PRACTICE APPLIES

Temporary Mulches:

1. Areas that have been seeded to provide a temporary or permanent seeding.
2. Areas that cannot be seeded because of the season of the year and need for soil surface protection.
3. For mud and dust control.
4. Provide Permanent protection during periods when construction or seeding cannot be done.

Permanent Mulches:

1. Used together with planting trees, shrubs, and other ground covers that do not provide adequate soil stabilization.
2. Used in lieu of vegetative planting for ornamental reasons or because the site is not suitable for vegetation.

CRITERIA

1. The choice of materials will be based on the type of soil to be protected, season and economics.
2. Prior to Application

- a. Shape and grade, as required, the waterway, channel, slope, or other area to be protected.
- b. Remove all rocks, clods, or debris larger than 2 inches in diameter that will prevent contact between the mulch and the soil surface.
- c. When open-weave nets are used, lime, fertilizer, and seed may be applied either before or after laying the net. When excelsior matting is used, these materials must be applied before the mat is laid.

3. Time of Application

- a. Immediately after seeding or planting by conventional method or hydroseeding. Can be applied with seeding as hydromulching.
- b. Immediately after seedbed preparation when dormant seedings are to be made by seeding over the mulch.
- c. When temporary erosion control is to be attained, mulch may be applied any time soil and site conditions are suitable for spreading and anchoring.

4. Application - Mulch materials shall be spread uniformly, by hand or machine. When spreading straw mulch by hand, divide the area to be mulched into approximately 1,000 sq. ft. sections and place approximately 90 lbs. of straw in each section to facilitate uniform distribution.

5. Mulch Anchoring - Straw mulch shall be anchored immediately after spreading to prevent wind blow. One of the following methods of anchoring straw shall be used:

- a. Mulch anchoring tool - This is a tractor-drawn implement (mulch crimper, serrated straight disk, or dull farm disk) designed to punch mulch approximately 2 inches into the soil surface. This method provides maximum erosion control with straw. It is limited to use on slopes no steeper than 3:1, where equipment can operate safely. Machinery shall be operated on the contour.
- b. Liquid mulch binders - Application of liquid mulch binders and tackifiers should be heaviest at edges of areas and at crests of ridges and banks, to prevent wind blow. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread; however, it is recommended sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is the most effective method.

The following types of binders may be used:

- i. Asphalt - Any type of asphalt thin enough to be blown from spray equipment is satisfactory. Recommended for use are rapid curing (RC-70, RC-250, RC-800), medium curing (MC-250, MC-800) and emulsified asphalt (SS-1, MS-2, RS-1, and RS-2).
 - ii. Synthetic Binders - Chemical binders may be used as recommended by the manufacturer to anchor mulch. These are expensive, and therefore, usually used in small areas or in residential areas where asphalt may be a problem.
 - iii. Wood Fiber - Wood fiber hydroseeder slurries may be used to tack straw mulch. This combination treatment is well suited to steep slopes, critical areas, and severe climate conditions.
- c. Mulch nettings - Lightweight, degradable, plastic, polyester, or paper nets may be stapled over the mulch according to manufacturer's recommendations.
 - d. Peg and twine - Because it is labor-intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8 to 10-inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine 2 or more times around each peg.

Chemical Mulches - Chemical mulches may be used alone only in the following situations:

1. Where no other mulching material is available.
2. In conjunction with temporary seeding during the times when mulch is not required for that practice.

Note: Chemical mulches may be used to bind other mulches or with wood fiber in a hydroseeded slurry at any time. Manufacturer's recommendations for application of chemical mulches shall be followed.

Nets and Mats - Nets may be used alone on level areas, on slopes no steeper than 3:1, and in waterways.

When mulching is done in late fall or during June, July, and August, or where soil is highly erodible, nets should only be used in conjunction with an organic mulch such as straw.

When nets and organic mulch are used together, the net should be installed over the mulch except when the mulch is wood fiber. Wood fiber may be sprayed on top of the installed net.

Excelsior blankets are considered protective mulches and may be used alone on erodible soils and during all times of year.

Other products designed to control erosion shall conform to manufacturer's specification and should be applied in accordance with manufacturer's instructions provided those instructions are at least as stringent as this specification.

Laying the Net:

1. Start laying net from top of channel or top of slope and unroll downgrade. Always lay netting in the direction of water flow.
2. Allow to lie loosely on soil - do not stretch.
3. To secure net: Upslope ends of net should be buried in a slot or trench no less than 6 inches deep. Tamp earth firmly over net. Staple the net every 12 inches across the top end. Edges of net shall be stapled every 3 feet. Where 2 strips of net are laid side by side, the adjacent edges shall be overlapped 3 inches and stapled together.

Staples will be made of plain iron wire, No. 8 gauge or heavier, and will be 6 inches or more in length. Staples shall be placed down the center of net strips at 3-foot intervals. DO NOT STRETCH net when applying staples.

Joining strips - Insert new roll of net in trench, as with upslope ends of net. Overlap the end of the previous roll 18 inches, turn under 6 inches, and staple across end of roll just below anchor slot and at the end of the turned-under net every 12 inches.

At bottom of slopes - Extend net out onto a level area before anchoring. Turn ends under 6 inches, and staple across end every 12 inches.

Check slots - On highly erodible soils and on slopes steeper than 4:1, erosion check slots should be made every 15 feet. Insert a fold of net into a 6-inch trench and tamp firmly. Staple at 12-inch intervals across the downstream portion of the net.

Rolling - After installation, stapling, and seeding, the net should be rolled to ensure firm contact between net and soil.

CONSIDERATIONS

1. A surface mulch is one of the most effective means of controlling runoff and erosion on disturbed lands.

2. The choice of materials for mulching shall be based on the type of soil to be protected, site conditions, season, and economics.
3. Organic mulch materials such as straw, wood chips, bark, and wood fiber have been found to be the most effective.
4. Chemical soil stabilizers or soil binders are not effective mulches when used alone. These materials are useful to bind organic mulches together.
5. A variety of mulch nets, mats, or blankets are available to use as mulching or to hold the mulch in place. Netting and mats are especially helpful on critical areas such as waterways.

Organic Mulches:

Straw - The mulch most commonly used in conjunction with seeding. The recommended straw should come from oats, wheat, rye or barley, and may be spread by hand or machine. Straw can be windblown and should be anchored to stay in place.

Wood Chips - Suitable for areas that will not be closely mowed, and around ornamental plantings. Chips decompose slowly and do not require tacking. They should be treated with 12 pounds nitrogen per ton to prevent nutrient deficiency in plants. They also can be very inexpensive mulch if obtained from trees cleared on the site.

Bark Chips, Shredded Bark - By-products of timber processing. They are often used in landscaped plantings. Bark is also suitable mulch for areas planted to grasses and not closely mowed; and may be applied by hand or mechanically. Bark is not usually toxic to grasses or legumes, and additional nitrogen fertilizer is not required.

There are other organic materials that make excellent mulches but are only available locally or seasonally. Creative use of these materials can reduce costs.

Chemical Mulches and Soil Binders:

A wide range of synthetic, spray-on materials are marketed to stabilize and protect the soil surface. These are emulsions or dispersions of vinyl compounds, asphalt, rubber, or other substances which are mixed with water and applied to the soil. They may be used alone or may be used to tack wood fiber hydromulches or straw.

When used alone, chemical mulches do not have the capability to insulate the soil or retain soil moisture that organic mulches have. This soil protection is also damaged by traffic. Application of these mulches is usually more expensive than organic mulching, and the mulches decompose in 60-90 days.

Nets and Mats:

When used alone, netting does not retain soil moisture or modify soil temperature. It stabilizes the soil surface while grasses are being established, and is useful in grassed waterways and on slopes. Light netting may also be used to hold other mulches in place.

The most critical aspect of installing nets and mats is obtaining firm, continuous contact between the material and the soil. Without such contact, the material is useless and erosion occurs. It is important to use an adequate number of staples and to roll the material after laying it to ensure that the soil is protected.

Aggregate Cover - Gravel and crushed stone provide a long-term protection against erosion, particularly on short slopes. Before the gravel or crushed stone is applied it should be washed. If vegetation is not desired, black polyethylene sheeting should be placed on the ground first to prevent seed germination and growth through the aggregate cover.

PLANS AND SPECIFICATIONS

Plans and specifications for applying mulch shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum include the following items:

1. Materials to be used.
2. How mulch will be anchored.
3. Location of different materials if more than one material is used on the site.

All plans shall include installation, inspection, and maintenance schedules with the responsible party identified.

OPERATION AND MAINTENANCE

All mulches should be inspected periodically, in particular after rainstorms, to check for rill erosion. Where erosion is observed, additional mulch should be applied. Nets should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, re-install netting as necessary after repairing damage to the slope. Inspections should occur until grasses are firmly established. Where mulch is used with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.

APPENDIX C - PERMANENT VEGETATION

DEFINITION

Establishing permanent vegetative cover to stabilize disturbed or exposed areas.

PURPOSE

The purposes of this practice are to:

1. Permanently stabilize disturbed or exposed areas in a manner that adapts to site conditions and allows selection of the most appropriate plant materials.
2. Reduce erosion and sedimentation from such areas.
3. Create a landscape that enhances soil permeability and the filtering of runoff pollutants, while improving wildlife habitat.

CONDITIONS WHERE PRACTICE APPLIES

1. Disturbed areas where long-lived vegetative cover is needed to stabilize the soil.
2. Rough graded areas that will not be brought to final grade for a year or more.
3. Other areas where permanent cover is desired.

CRITERIA

Selection of plant materials

Selection of plant materials shall be based on climate, topography, soils, moisture conditions, land use, available light (shade tolerance), aesthetics, planned use of the area, and the degree of maintenance desired. All seed shall be of high quality and comply with Illinois Seed and Weed Laws.

See Tables A, B and C for selection of grasses, forbs, ground covers, and vines under different moisture and light conditions. These tables provide information for selected species that are generally commercially available and suitable for use in urban and agricultural settings. The native species presented represent those that are more tolerant of disturbed urban situations where this practice would be applied. See the references given with the tables for information on additional species. The tables in this standard are not meant to be all-inclusive and the information in this standard can be applied to other species that may be desired or suitable for a given application. For trees and shrubs, see Section 17 of the Zoning Ordinance.

Site Preparation

The site shall not be worked when frozen or saturated. Install necessary erosion and sediment control practices before seeding, and complete grading according to the approved plan. The grading plan shall utilize techniques and equipment that minimize soil compaction. If the final graded site consists of subsoil that may have been compacted by heavy equipment during grading activities, the subgrade shall be scarified to a depth of at least four inches by chisel plowing, disking or harrowing. This practice will create at least limited pore space for water and root penetration and bonding of the topsoil and the subsoil. After the grading operation, spread topsoil where needed.

Seedbed preparation

If needed based upon soil conditions and desired vegetation type, incorporate the lime and fertilizer into the soil with a disk harrow, springtooth harrow, or similar tools to a depth of at least 3 inches. On sloping areas, the final operation shall be on the contour.

Prior to seeding or planting, the seedbed shall be relatively free of all weeds (> 80% weed free), stones, roots, sticks, rivulets, gullies, crusting and caking, or other debris which may interfere with seeding or planting operations or plant establishment.

The seedbed shall not be worked when frozen or saturated. Prior to seeding or planting the surface shall be disked or raked to a depth of 2-3 inches either by hand or mechanical means to create a smooth uniform seedbed. This operation should result in a seedbed comprised of soil aggregates ranging from fine to coarse, with none larger than two inches in diameter.

In areas that have not been regraded, which have grown up in weeds, or to be no-till seeded, a herbicide application may be necessary to reduce competition with the desired vegetation. An approved herbicide may be used to treat such areas to kill all existing vegetation. Herbicide application shall be done at least 15 days prior to seeding or planting.

Fertilization

Fertilizer or lime is generally not recommended for native vegetation establishment unless soil tests indicate pH < 5.5, P < 15 lb./ac., or K < 150 lb./ac. If levels are below this, apply lime and fertilizer according to a soil test and the needs of the vegetation selected.

Seed

All legumes shall be inoculated with the proper inoculants prior to seeding. Seeding rates given in Tables A and B are based upon Pure Live Seed (PLS).

Seed mixtures shall be selected according to site conditions and desired use and appearance. Other considerations include soil moisture condition, shade tolerance, mowing tolerance, winter hardiness, flooding tolerance, mature height, emergence time, and salt tolerance.

All seeds shall have the proper stratification and/or scarification to break seed dormancy for spring or early summer plantings. No treatments are needed for late summer, early fall, or dormant seeding.

Seeding

Seeding may be done by any of the following methods:

1. Conventional Drill

- a. Apply seed uniformly at a depth of 1/4 to 1/2 inch with a drill (band seed) or cultipacker seeder. On sloping land, seeding operations should be on the contour wherever possible.
- b. Apply mulch or erosion blanket following seeding as required.

2. Broadcast Seeding

- a. Cultipack or roll seedbed, then apply seed uniformly and cover to 1/4 to 1/2 inch depth with a cultipacker, or similar tool. Spinning disc type broadcasters equipped with an agitator are effective with native seed mixes. Often broadcasters require the use of a carrying agent such as oats or vermiculite. Attention should be given to seed mixes with seeds of varying size and weight so that the seed remains effectively mixed during seeding operations.
- b. On sloping land, dragging, harrowing or cultipacking should be done on the contour to ensure seed-soil contact and reduce erosion.
- c. Apply mulch or erosion blanket following seeding as required.

3. Hydroseeding

- a. For areas to be hydroseeded, final seedbed preparation shall leave the soil surface in a slightly roughened condition.
- b. Lime and fertilizer shall be incorporated prior to seeding unless they are to be applied at the same time as the seed (applying lime with a hydroseeder may be abrasive to the equipment). Do not use hydrated lime in a slurry mix.
- c. A minimum of 1000 gallons of water per acre shall be used. The hydraulic seeding equipment shall include a pump rated and operated at no less than

100 gallons per minute and at no less than 100 pounds per square inch pressure. The tank shall have a mechanical agitator powerful enough to keep all materials in a uniform suspension in the water. Calibration of the hydraulic equipment shall be accurate.

- d. When seeding legumes, increase the recommended rate for inoculant four times for hydroseeding. If legume inoculant is added to a fertilizer and/or lime, seeding should be applied within 30 minutes.
- e. If seed and fertilizer are mixed together, they should be seeded within 2 hours of mixing.

4. Dormant Seeding

Dormant seeding may be done between November 15 and March 15 by using conventional drill or broadcast methods.

If soil conditions are suitable during the dormant seeding period, prepare the seedbed and seed as indicated in this specification. Apply mulch or erosion blanket following seeding.

5. No-till

In some instances it may be desirable to sow seed into existing sod, a temporary cover crop, or natural vegetation. Drilling may be done after herbicide application to non-native sod or undesirable weeds such as Canada thistle. A rangeland type grass drill with a no-till attachment shall be used. Seeds should be drilled to the depth appropriate for the species, according to the supplier's recommendations.

The seeds of some plants require light to stimulate germination and growth. In situations with some of these species, particularly some native forbs, a combination of broadcasting and no-till drilling may be used. Grasses should be drilled first, followed by broadcasting of the desired forbs.

Plugs and Rootstock

Some plants cannot be grown readily from seed and must be planted vegetatively (see Table A). Plugs are young plants that are grown in a nursery or greenhouse for transplant. Rootstock may consist of fragments of horizontal stems or roots that include at least one node (joint).

1. Plugs

Plugs shall be planted in designated areas according to site plans and the recommendations of the supplier for that species. Attention should be given to soil moisture, anticipated flooding, shade, and other factors.

- a. Plugs shall be planted in a hole dug with a trowel, spade, planting bar, or suitable instrument such that the hole is of a minimum diameter and depth to accommodate the plug, with its roots, without damage.
- b. The soil excavated from the planting hole should be used to backfill around the plant and lightly packed to secure the roots in the soil.
- c. Plugs shall be watered upon completion of planting enough to keep soil moist but not saturated.
- d. If planting is delayed more than six hours after delivery, store plugs in the shade, protect from the weather and mechanical damage, and keep them moist and cool. All plugs should be planted within 24 hours of delivery.
- e. Plugs shall be obtained from a reputable nursery or grown from seed. Plugs shall not be collected from wild populations of plants.

2. Rootstock

Plant tubers and other rootstock into a properly prepared area according to the following and in accordance with the suppliers recommendations for that species.

- a. Tubers and rootstock should be freshly dug before planting. If planting is delayed, protect material from weather and mechanical damage, and keep moist and cool. Do not use materials that have been in cold storage more than 45 days.
- b. Holes for planting rootstock shall be dug in locations shown on plans or as adjusted in the field.
- c. Holes shall be dug with a trowel, spade, planting bar or other suitable instrument, such that holes are of a minimum depth and diameter to accommodate the tuber or rootstock without damage.
- d. Rootstock shall be obtained from a reputable nursery or grown from seed. Rootstock shall not be collected from wild populations of plants.

Ground Covers

Most shrub and vine type ground covers are available as bare root stock, balled and burlapped, or in containers or pots. Many ground covers and vines perform best when

planted in the spring. Container-grown plants can be planted throughout the growing season if adequate water is provided.

Ground covers and vines are plants that naturally grow very close together and close to the ground or climbing over other plants. This can cause severe competition for space, nutrients and water. Soil for ground covers should be well prepared. A well-drained soil high in organic matter is best. If the area to be planted is so large or difficult to prepare due to steepness or rockiness that adding amendments to the soil as a whole would be impractical, organic matter and fertilizer may be added to each planting hole.

Lime and fertilize according to soil test, if needed. If no soil test is available and the soil is believed to be deficient, add 30 lbs. of 10-10-10 fertilizer and 100 lbs. of ground agricultural limestone per 1000 square feet. Incorporate into the top 4 to 6 inches of the soil.

When planting individual plants, prepare a hole slightly larger than the container or ball and deep enough that the roots can extend to the bottom. Most ground covers should be planted ½" to 1" deeper than they have grown in the pot or container.

Mulching/Erosion Blanket

All permanent seedings shall be mulched upon completion of seed application or planting. Refer to practice standard APPENDIX B - MULCHING. Erosion blanket should be substituted for mulch on steep slopes (10% slope or greater) or wherever highly erosive conditions exist (e.g. in drainage swales or waterbody shorelines). When planting plugs and tubers, particularly in wetland plantings, mulch or erosion blanket should NOT be used except in specific areas with erosive conditions. When planting ground covers it may be advantageous to apply mulch or erosion blanket prior to planting. Plants should then be tucked into the soil through slits or holes. In all cases, planting should be done in a staggered pattern to minimize erosion.

CONSIDERATIONS

Where feasible, deep-rooted native species are preferred because of their abilities to enhance soil permeability and pollutant filtering and their reduced needs for fertilizer, herbicides, irrigation, and mowing. Care also should be taken to avoid non-native aggressive species that could spread beyond the site boundaries.

The best time for seeding depends upon the species; there is no single best time to seed. There are certain groups of species which do best fall planted and are compromised by spring seeding. There are other groups of species that do best spring planted and are compromised by fall seeding. Some species are not tolerant of nurse or temporary cover crops while others benefit by them. Some species are difficult to establish in the field from seed and are far more practical to install as plugs.

Some species require light for germination and are thus less successful if drilled into the soil, while others require burial to have successful germination. Broadcasting is generally favored for native species for this reason, and so the plants do not become established in

unnatural looking rows. A temporary cover crop may be necessary to hold soil until permanent vegetation becomes established. See practice standard APPENDIX A - TEMPORARY SEEDING.

Using an intact native soil is the most desirable situation, but in most cases, stabilization is needed because of earthwork activities. In many instances, the topsoil may have been removed and/or stockpiled during earthwork activities. Evaluate the capabilities and limitations of the soil to be seeded or planted and the desired use and appearance of the area. Special attention needs to be given to soil pH, texture, internal water movement, moisture regime, steepness, and stability in order to plan the appropriate treatment.

PLANS AND SPECIFICATIONS

The plans and specifications for seeding or planting and mulching shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum, include the following items:

1. Seed mixtures and rates or plant species and density.
2. Site preparation methods.
3. Fertilization rates and methods of application.
4. Seeding or planting methods.
5. Seeding or planting periods.
6. Mulching or erosion blanket materials and application rates.

All plans shall include the installation, inspection and maintenance schedules with the responsible party identified.

OPERATION AND MAINTENANCE

High-maintenance areas are mowed frequently, fertilized and pesticide treated regularly, and either (1) receive intensive use (e.g., athletic fields or golf courses) or (2) require maintenance to a particular aesthetic standard (e.g., home lawns). Grasses or ground covers used for these situations are long-lived perennials that form a tight sod and are fine-leaved in appearance. They must be well adapted to the geographic area where they are planted and able to endure the stress of frequent mowing. Sites where high-maintenance vegetative cover is commonly utilized include homes, industrial parks, schools, churches, and active recreational areas.

High-maintenance seedings should be fertilized one year after planting to strengthen the plants and insure proper stand density. The following recommendations may be used:

1. For grass only stands, apply 200 lbs./acre (5 lbs/1000 sq. ft.) of 27-3-3, or equivalent.

2. For grass-legume or pure legume stands, apply 500 lbs/ac. (12 lbs./1000 sq. ft.) of 10-20-20, or equivalent.
3. The best time to apply fertilizer is between March 1 and May 30 or August 1 and September 30.

Do not mow high-maintenance turf seedings until the stand is at least 6 inches tall. Do not mow closer than 3 inches during the year of establishment.

In areas adjacent to waterbodies and wetlands, fertilizer should be used sparingly to minimize runoff of nutrients causing undesired growth of aquatic plants (eutrophication).

Low-maintenance areas are mowed infrequently or not at all, and do not receive lime, pesticide or fertilizer on a regular basis. Plants must persist with little maintenance over long periods of time. Native grass, forb, and legume mixtures are favored for these sites because they are deep-rooted and can add nutrients to the soil. Legumes in particular are a source of soil nitrogen.

Mixed stands are more resistant to adverse conditions. Sites suitable for low-maintenance vegetation include steep slopes, stream or channel banks, lake shorelines, stormwater drainage and detention facilities, office campuses, low-density residential properties, some commercial properties and areas adjacent to roadways.

Native plants typically do not require fertilization to become established. Experience in prairie restoration suggests that fertilizing adds to weed problems and promotes undesirable species. For this reason, conventional fertilizing is not recommended for native plantings.

Low-maintenance stands should be mowed only as needed to control weeds. Native plantings should be mowed to control weeds prior to August 15 during the establishment period (2-3 years). Mowing should be done before undesirable weeds set seed. Keep mowing height above the height of the seeded plants (6-12 inches).

Prescribed burning is the preferred maintenance technique for native prairie vegetation. Burns should be performed after the establishment period (2-3 years) on a 2-3 year rotational basis to control invasive weeds and to encourage a balance between grass and forb species. Less-frequent burning may be appropriate once the prairie is well established.

Goose or other nuisance wildlife control may be needed on some plantings. For example, plantings (plants, rootstock or seed) of native wetland plants must be protected from depredation by Canada geese. Goose exclosures constructed of fence posts and "chicken wire" netting is usually recommended during the first year of establishment.

Vine and shrub type ground covers may need hand weeding until the area is well covered.

For ground covers and vines, prune old growth in the spring as needed to improve appearance and promote growth. If pruning is desired, it should be done every year rather than when the plants have developed into an overgrown state.

High and low maintenance areas

Vegetation cannot be expected to provide erosion control cover and prevent soil slippage on a soil that is not stable due to its structure, water movement, or excessive slope.

The operation of equipment is restricted and may be unsafe on slopes steeper than 3:1. Where steepness prohibits the use of farm machinery, seedbed preparation, fertilization, and seeding or planting may need to be done by hand.

Moisture is essential for seed germination and seedling establishment. Supplemental irrigation can be very helpful in assuring adequate stands in dry seasons or to speed development of full cover.

Protect the planted area from human, animal and vehicular traffic until the stand is adequately established.

Inspect all planted areas for failures and make necessary repairs, replacements, reseedings, and re-mulching within the planting season, if possible. If a stand has less than 70% ground cover, re-evaluate the choice of plant materials, quantities of lime and fertilizer, seeding or planting methods, time of seeding or planting and available light and moisture. Re-establish the stand with modifications based on the evaluation.

After initial planting and/or seeding, irrigate to keep the seedbed moist (not wet) for at least 7 to 10 days after seeding depending on conditions. This may require watering daily the first week, especially during hot weather, and less frequently thereafter. Water application rates and delivery must be carefully controlled to prevent runoff and erosion. Inadequate or excessive amounts of water can be more harmful than no supplemental water. Irrigation is seldom needed for low-maintenance seedings made at the appropriate time of the year.

Herbicides may also be used for weed control. Apply all herbicides according to rates specified on the label.

Table A. Grass, forb, and sedge species for low maintenance areas.

Species <u>1/</u>	Common name	Moisture	Sunlight	Seeding rate <u>2/</u>	Aggressive	Salt tolerance	Seeds/oz. <u>3/</u>	Recommended planting method
GRASSES								
Agrostis alba	red top	mesic-wet	full-partial	.5-1.0	N	High	312000	seed
Andropogon gerardi	big blue stem	mesic	full	2.0-5.0	N	No consensus	8200-10000	seed
Avena sativa	oats	mesic-dry	full	30-50	N	Moderate	<u>3/</u>	seed
Bouteloua curtipendula	side oats grama	mesic-dry	full	5	N	Low	6000-8000	seed
Bromus inermis	smooth brome	mesic-dry	full	24	Y	High	8500	seed
Bromus pubescens	woodland brome	mesic	shade-partial	0.031	N	Low to Moderate	70875	seed
Calamagrostis canadensis	blue joint grass	wet	full	.03-.25	N	Low	95000-280000	transplants (plugs)
Cinna arundinacea	common wood reed	mesic	shade-partial	0.1-1.0	N	Low to Moderate	56700	seed
Dactylus glomerata	orchard grass	mesic-wet	full-partial	4-8	N	High	41000	seed
Echinochloa crusgalli	barn yard grass	mesic-wet	full-partial	.375-4.0	Y	High	31500	seed
Elymus canadensis	nodding wild rye	mesic-wet	full-partial	.02-3.0	N	Low-Moderate	4200-5200	seed
Elymus virginicus	Virginia wild rye	mesic-wet	full-partial	.06-1.0	N	No consensus	4200-4500	seed
Festuca elatior	tall fescue (many varieties)	mesic-dry	full-partial	10-30	N	Moderate to High	14000	seed
Festuca rubra	red fescue (many varieties)	mesic	full-partial	10-20	N	Moderate to High	38000	seed
Glyceria striata	fowl manna grass	mesic-wet	full-partial	.05-1.0	N	Low to Moderate	113000-160000	seed
Hystrix patula	bottlebrush grass	mesic	shade-partial	0.062	N	Low to Moderate	4700-7600	seed

<i>Leersia oryzoides</i>	rice cut grass	wet	full-partial	.1-1.0	N	No consensus	34000-94000	seed, rhizomes
<i>Lolium multiflorum</i>	annual ryegrass	mesic-dry	full-partial	10-30	N	Moderate to High	14000	seed
<i>Lolium perenne</i>	perennial ryegrass	mesic-dry	full-partial	10-30	N	Moderate to High	14000	seed
<i>Panicum virgatum</i>	switch grass	mesic-wet	full-partial	.125-1.0	N	Moderate to High	14000-18000	seed
<i>Phleum pratense</i>	timothy	mesic	full-partial	.375-2.0	N	High	77000	seed
<i>Schizachyrium scoparium</i>	little blue stem	dry	full	1.0-6.0	N	No consensus	8800-15000	seed
<i>Sorghastrum nutans</i>	Indian grass	mesic	full	2.5-6.0	N	Moderate to High	8300	seed
<i>Spartina pectinata</i>	prairie cord grass	wet	full-partial	.125-2.0	N	High	157500	rhizomes, transplants
<i>Sporobolus heterolepis</i>	prairie drop seed	dry	full	.5	N	Low	14000-16000	seed
<i>Zizania aquatica</i>	wild rice	wet	full	3	N	No consensus	3/	seed

FORBS & GRAMINOIDS (grass-like)

<i>Acorus calamus</i>	sweet flag	6-20in. water	full-partial	.006-.25	N	No consensus	750-3300	rhizomes
<i>Asclepias incarnata</i>	swamp milkweed	wet	full	.31	N	Moderate to High	4650	seed
<i>Alisma subcordatum</i>	water plantain	0-6in. water	full	.06-.5	N	Moderate to High	60000-70000	seed
<i>Aster leavis</i>	smooth blue aster	mesic-dry	full-partial	.02-.125	N	Low	48000-55000	seed
<i>Aster lanceolatus</i>	panicked aster	mesic-wet	full-partial	.03-.06	N	Low to Moderate	3/	seed
<i>Aster novae-angliae</i>	New England aster	mesic-wet	full-partial	.03-.375	N	Low to Moderate	66000-70000	seed
<i>Bidens cernua</i>	nodding beggarsticks	wet	full-partial	.25-.5	N	Moderate to High	14000-21000	seed
<i>Bidens frondosa</i>	common beggarsticks	wet	full-partial	.125	Y	Moderate to High	28000	seed
<i>Carex comosa</i>	bristly sedge	0-12in. water	full-partial	.125-.375	N	Low to Moderate	29000	transplants (plugs)

Carex cristatella	crested oval sedge	wet	full-partial	.125	N	Low to Moderate	141750	fresh seed
Carex granularis	pale sedge	wet	full-partial	.031	N	Low	3/	fresh seed
Carex hystricina	porcupine sedge	wet	full-partial	0.125	N	Low	29840	seed
Carex lanuginosa	wooly sedge	wet	full	.125	N	Moderate to High	23625	seed
Carex scoparia	lance-fruited oval sedge	wet	full-partial	0.125	N	Low	84000	seed
Carex stipata	awl-fruited sedge	wet	full-partial	.125	N	Low to Moderate	35000	seed
Carex vulpinoidea	fox sedge	wet	full-partial	.06-.5	N	Moderate	100000-141000	seed
Coreopsis tripteris	tall coreopsis	mesic	full-partial	.25-.5	N	Low to Moderate	11500-14000	seed
Coreopsis palmata	prairie coreopsis	mesic	full	.015-.5	N	Low	8800	seed
Echinacea pallida	pale purple cone flower	mesic	full	.25-.5	N	Low	5100	seed
Eleocharis obtusa	blunt spike rush	wet	full	.02-.4	N	Moderate	3/	seed
Eleocharis smallii	creeping spike rush	wet	full	.02-.4	N	Moderate	3/	seed
Eupatorium maculatum	spotted joe pye weed	wet	full	.06-2.0	N	Low to Moderate	85000-95000	seed
Eupatorium perfoliatum	common boneset	wet	full	.06-.125	N	Low to Moderate	160000-200000	seed
Gentiana andrewsii	bottle gentian	mesic-wet	full-partial	.015-.125	----	Low to Moderate	800000	seed
Geranium maculatum	wild geranium	mesic	shade-partial	0.54	N	Low	350	seed
Helenium autumnale	sneezeweed	wet	full-partial	.12-.5	N	Low to Moderate	130000	seed
Helianthus grosseserratus	sawtooth sunflower	wet	full	.15-.31	Y	Moderate to High	15000	seed
Iris virginica	blue flag iris	wet	full-partial	.06-.625	N	Low to Moderate	850-1000	rhizomes, transplants
Juncus effusus	common rush	wet	full-partial	.37	N	Moderate to High	3/	rhizomes
Juncus torreyi	Torrey's rush	wet	full-partial	.006-.375	N	Moderate to High	70875	rhizomes

<i>Liatriis pycnostachya</i>	prairie blazing star	mesic-wet	full	.125	N	Low	11500	seed
<i>Liatriis spicata</i>	marsh blazing star	wet	full	.125	N	Low	11500	seed
<i>Lotus corniculatus*</i>	bird's foot trefoil	mesic	full	8	Y	High	25000	seed
<i>Medicago sativa*</i>	alfalfa	mesic	full	8	Y	Moderate to High	12500	seed
<i>Lobelia cardinalis</i>	cardinal flower	wet	full-partial	.06	N	No consensus	300000-400000	seed
<i>Monarda fistulosa</i>	wild bergamot	mesic	full-partial	.125-1.0	N	Moderate	75000-78000	seed
<i>Petalostemum purpureum*</i>	purple prairie clover	mesic	full	.25	N	Low to Moderate	19000	seed
<i>Phlox divaricata</i>	woodland phlox	mesic	shade-partial	0.13	N	Low	12500	seed
<i>Polygonum amphibium</i>	water smartweed	0-20in. water	full	.5-1.5	N	No consensus	3/	seed
<i>Pycnanthemum virginianum</i>	common mountain mint	mesic-wet	full	.02-.06	N	No consensus	220000-284000	seed
<i>Ratibida pinnata</i>	yellow cone flower	mesic	full	.125-.25	N	No consensus	27000-30000	seed
<i>Rudbeckia hirta</i>	black-eyed susan	mesic	full-partial	.125-.5	N	Moderate	92000-100000	seed
<i>Sagittaria latifolia</i>	broadleaf arrowhead	6-20in. water	full-partial	.06-.25	N	Moderate	56700	rhizomes, transplants
<i>Scirpus acutus</i>	hardstem bulrush	0-36in. water	full	.06-.25	N	High	18000-30000	rhizomes
<i>Scirpus americanus (pungens)</i>	chairmaker's rush	0-16.5in. water	full	.06-.125	N	Moderate to High	3/	rhizomes
<i>Scirpus fluviatilis</i>	river bulrush	0-30in. water	full-partial	.06-.125	N	Moderate to High	3375	rhizomes
<i>Scirpus tabernaemontani (validus)</i>	soft-stem bulrush	12-20in. water	full	.06-.25	N	Moderate to High	31000-38000	rhizomes
<i>Silphium laciniatum</i>	compass plant	mesic	full	.03-.19	N	Low to Moderate	655	seed
<i>Silphium terebinthinaceum</i>	prairie dock	mesic-wet	full	.03-.19	N	Moderate	1050	seed

Smilacina racemosa	false solomon's seal	mesic	shade-partial	----	N	Low to Moderate	900-1000	seed, transplants
Solidago gigantea	late goldenrod	mesic-wet	full	.06-.3	N	Moderate to High	378000	seed
Sparganium eurycarpum	common burreed	0-12in. water	full-partial	.2-.375	N	Low to Moderate	550	rhizomes
Tradescantia ohiensis	spiderwort	mesic-dry	full-partial	.06-1.0	N	Low to Moderate	8000	seed
Trifolium hybridum*	alsike clover	mesic	full-partial	4-8	N	High	44000	seed
Trifolium pratense*	red clover	mesic	full-partial	4-8	N	Moderate to High	17000	seed
Verbena hastata	blue vervain	wet	full	.015-.125	N	Moderate to High	93000-100000	seed
Vernonia fasciculata	common iron weed	wet	full	.01-.19	N	No consensus	20000-24000	seed, transplants

1/ The nomenclature (plant names) used follow Kartesz (1994) which has been largely adopted as a national standard.

Some commonly used synonyms are given in parentheses.

2/ All seeding rate information is pounds per acre and based upon Pure Live Seed (PLS).

Seeding rates are given as ranges, since the actual seeding rate desired depends upon whether it is used as part of a mix or for a pure stand.

3/ The seeds per ounce data is taken from supplier catalogues where available.

Where no data was available or where large conflicts between sources existed this entry is blank.

* Legumes requiring proper inoculant.

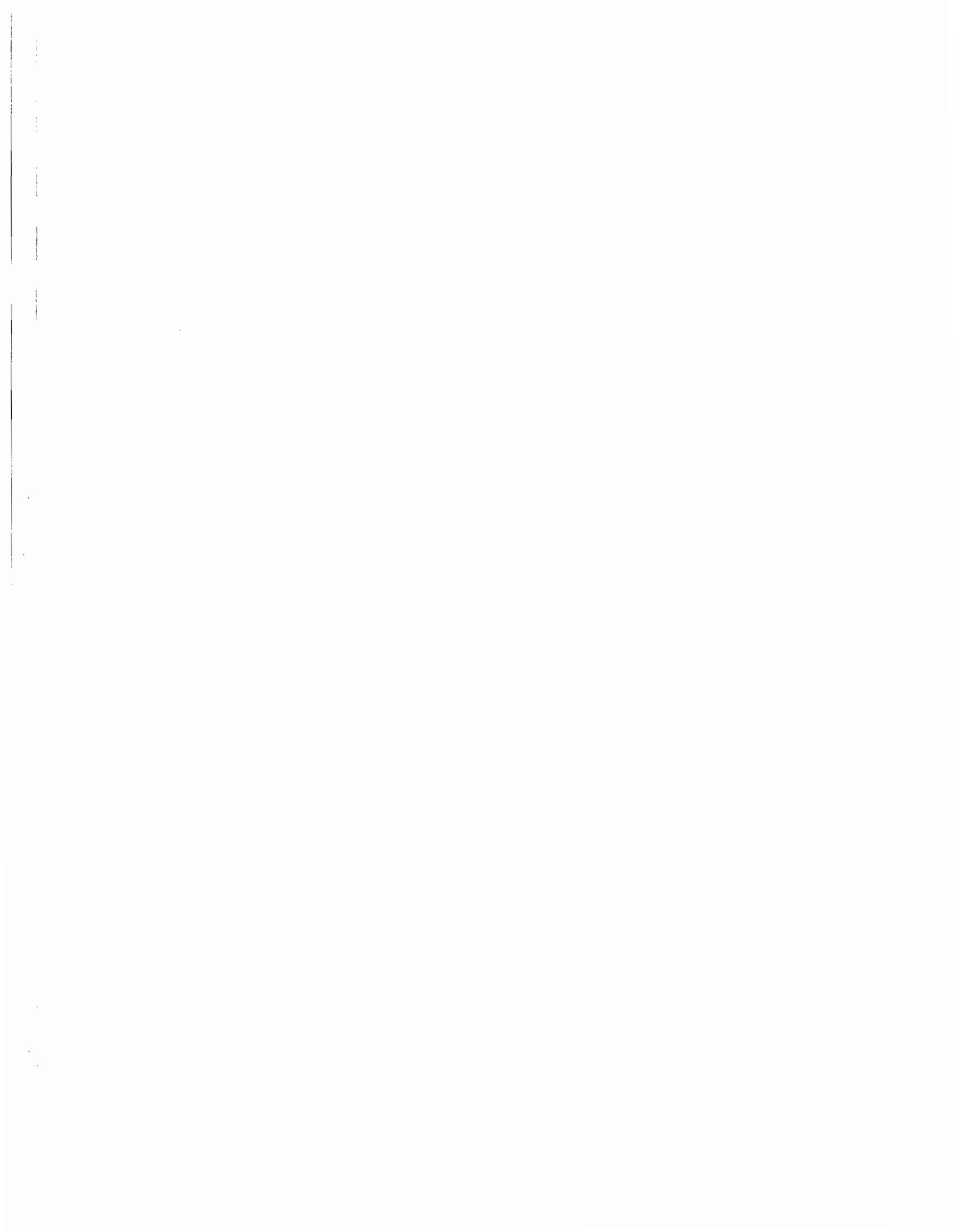
Table B. High Maintenance (Turf Grass) Seed Mixtures

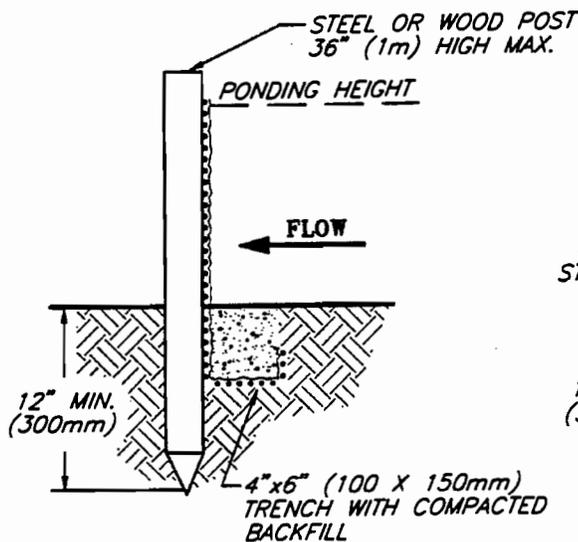
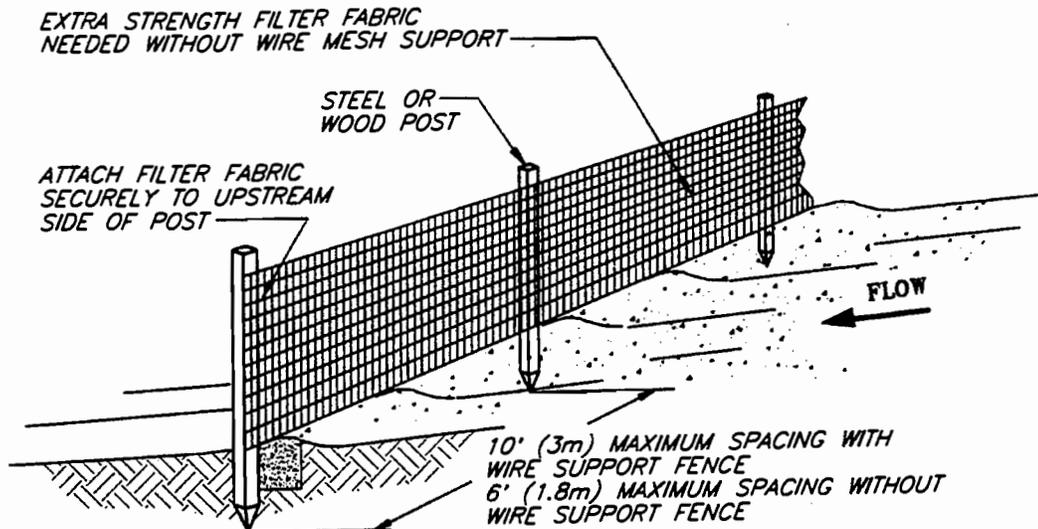
Seed Mixture	Moisture Regime	Sun Light	Salt Tolerance	Seeding Rates (PLS) lbs/ac.	lbs/1000sq ft
Kentucky blue grass Use at least 3 varieties	dry-well drained	full-partial	moderate	88-130	2-3
Kentucky blue grass	dry-well drained	full	moderate	110	2.5
Red fescue				44	1.0
Tall fescue (turf type)	dry-wet	full-shade	moderate	220-260	5-6
Red fescue	dry-well-drained	full-partial	moderate to high	110	2.5
Kentucky blue grass				44	1.0
Kentucky blue grass	dry-well-drained	full-partial	moderate	86	2.0
Perennial ryegrass				43	1.0
Red fescue	wet - moist	full-partial	high to very high	35	0.8
Alkali grass				35	0.8
Squirreltail grass				15	0.35
Spring Seeding			Early spring to May 15		
Fall Seeding			August 1 to September 20		
Dormant Seeding			November 15 to March 1		

Table C. Ground Covers and Vines.

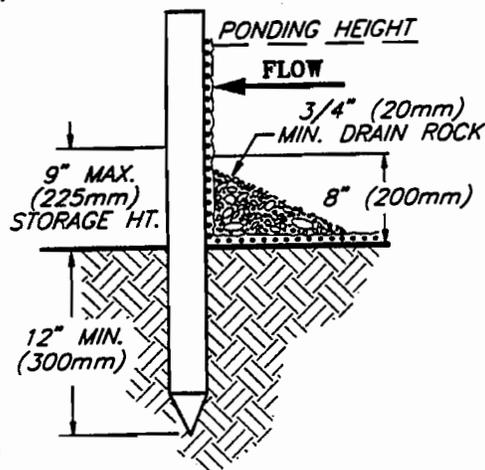
Species	Common Name	Mature Height	Moisture	Sunlight	Spacing	Invasive	Flowers
Ajuga reptans	bugleweed	6-12"	mesic-dry	full sun-shade	12"	Yes	blue
Asarum canadense	wild ginger	6"	mesic	partial-shade	18"	No	red
Celastrus scandens	American bittersweet	vine	mesic-dry	full-partial	12"	Yes	green
Ceanothus americanus	New Jersey tea	18-30"	mesic-dry	full	18"	No	white
Clematis terniflora	sweet autumn clematis	vine	mesic-dry	partial-shade	12"	No	white
Clematis virginiana	Virginia's bower	vine	wet	partial	12"	No	white
Convallaria majalis	lily of the valley	6-12"	mesic-dry	partial-shade	12"	slightly	white
Cotoneaster adpressa	creeping cotoneaster	6-12"	mesic-dry	full	18"	No	pink
Dioscorea villosa	wild yam	vine	wet-mesic	partial-shade	12"	slightly	green
Duchesnia indica	false strawberry	6-12"	wet-dry	full-shade	18"	Yes	yellow
Euonymus fortunei	wintercreeper	12-18"	mesic-dry	full-shade	12"	Yes	purple
Galium odoratum	sweet woodruff	<6"	mesic-dry	partial-shade	12"	No	white
Gysophyla repens	creeping baby's breath	6-12"	mesic-dry	full	12"	No	white
Hedera helix	English ivy	<6"	mesic-dry	full-shade	12"	No	
Hemerocallis fulva	day lily	12-18"	wet-dry	full-shade	18"	Yes	various
Hosta lancifolia	hosta (plaintain lily)	12-18"	wet-mesic	partial-shade	18"	No	various
Hydrangea petiolaris	climbing hydrangea	vine	wet-mesic	partial	36"	No	white
Ilex verticillata	winterberry holly	18-36"	wet	partial	12"	No	white
Juniperus horizontalis	creeping juniper	6-18"	mesic-dry	full	30"	No	
Lonicera prolifera	yellow honeysuckle	vine	mesic	partial-shade	12"	No	yellow

<i>Pachysandra terminalis</i>	Japanese spurge	6-12"	mesic	partial-shade	12"	No	green
<i>Parthenocissus quinquefolia</i>	Virginia creeper	vine	mesic	partial-shade	18"	No	green
<i>Phlox stolonifera</i>	creeping phlox	6-12"	mesic	partial	12"	No	various
<i>Phlox subulata</i>	moss phlox	12-18"	mesic	full	12"	No	various
<i>Polygonum Reynoutria</i>	dwarf fleece flower	<6"	mesic	full-partial	12"	Yes	white
<i>Potentilla fruticosa</i>	shrubby cinquefoil	18-36"	mesic-dry	full	36"	No	yellow
<i>Ranunculus repens</i>	creeping buttercup	6-12"	wet-mesic	full-partial	36"	slightly	yellow
<i>Ribes alpinum pumilum</i>	dwarf alpine current	18-36"	mesic	full-partial	36"	No	
<i>Ribes americanum</i>	wild black currant	to 48"	wet	full-partial	36"	No	yellow
<i>Ribes missouriensis</i>	wild gooseberry	to 48"	mesic	partial-shade	36"	No	yellow
<i>Rosa arkansana</i>	sunshine rose	12-36"	mesic-dry	full	18"	No	white-pink
<i>Rosa blanda</i>	early wild rose	12-36"	wet-dry	full	18"	No	white-pink
<i>Rosa carolina</i>	pasture rose	12-36"	dry	full	18"	No	white-pink
<i>Sedum acre sexangulare</i>	large-leaf stonecrop	<6"	mesic	full	12"	No	yellow
<i>Thymus serpyllum</i>	creeping thyme	<6"	mesic	full-partial	6"	No	various
<i>Vinca minor</i>	common periwinkle	6-12"	wet-mesic	partial-shade	12"	slightly	violet





TRENCH DETAIL



INSTALLATION WITHOUT TRENCHING

NOTES:

1. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY. 9" (225mm) MAXIMUM RECOMMENDED STORAGE HEIGHT.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

NOT TO SCALE

DARDENNE



PRAIRIE

EROSION & SEDIMENT CONTROL DETAILS

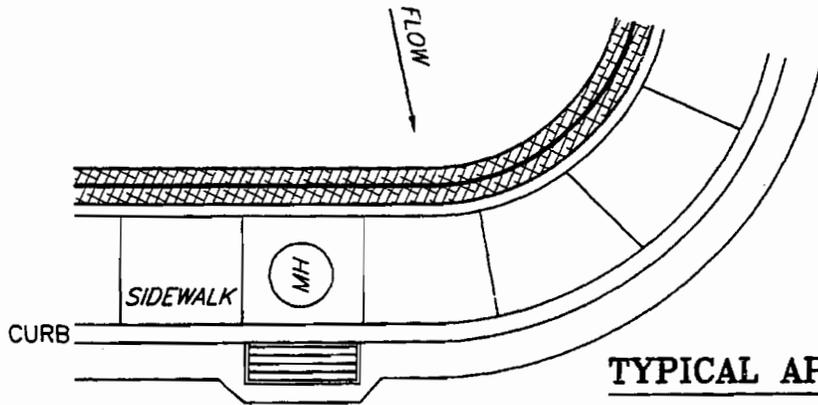
SILT FENCE

DARDENNE PRAIRIE, MISSOURI

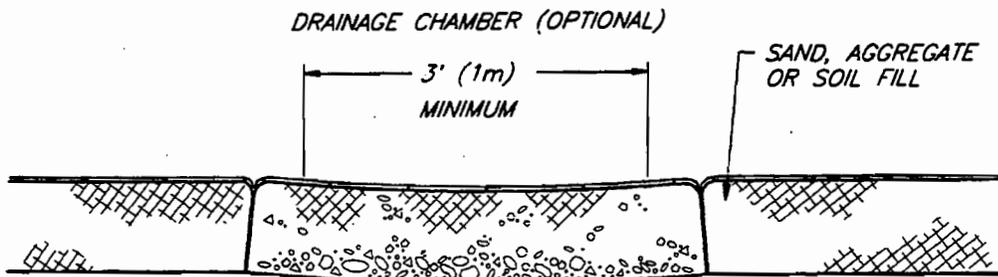
DATE:

FIGURE:

1

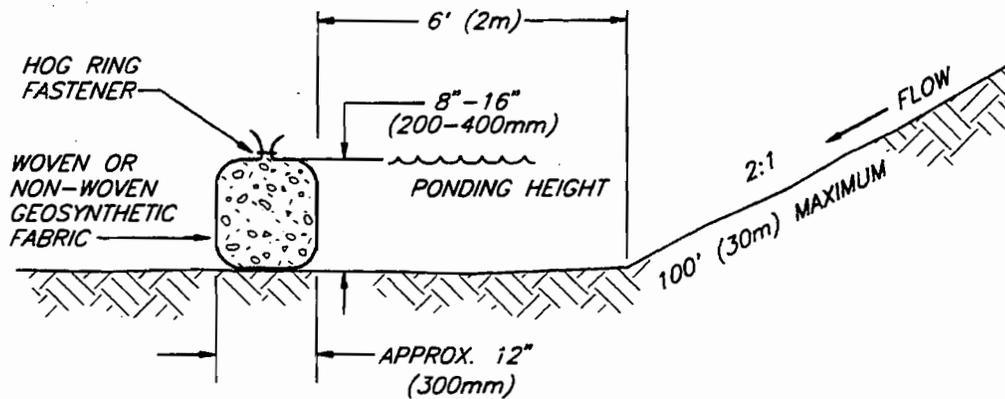


TYPICAL APPLICATION
PERIMETER SEDIMENT BARRIER



LOCATE DRAINAGE CHAMBER
AT LOW SPOT FOR ADEQUATE
DRAINAGE OF PONDED STORM WATER

FRONT VIEW



SIDE VIEW



EROSION & SEDIMENT CONTROL DETAILS

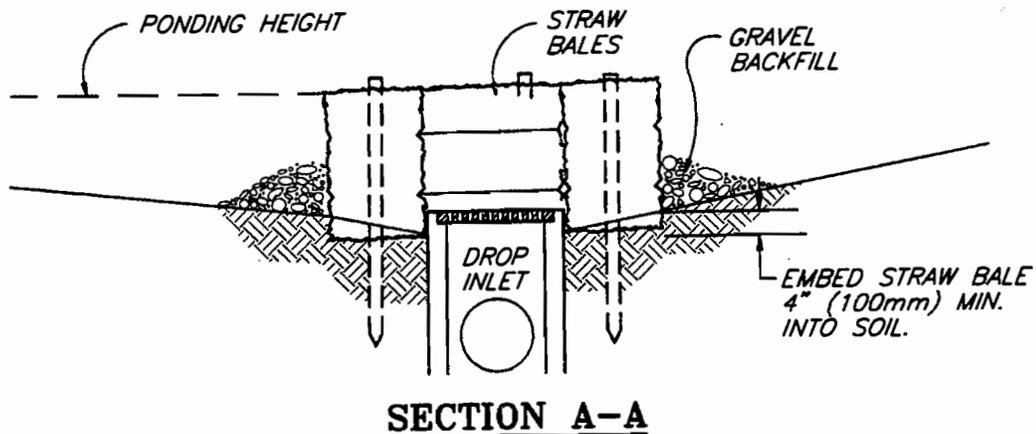
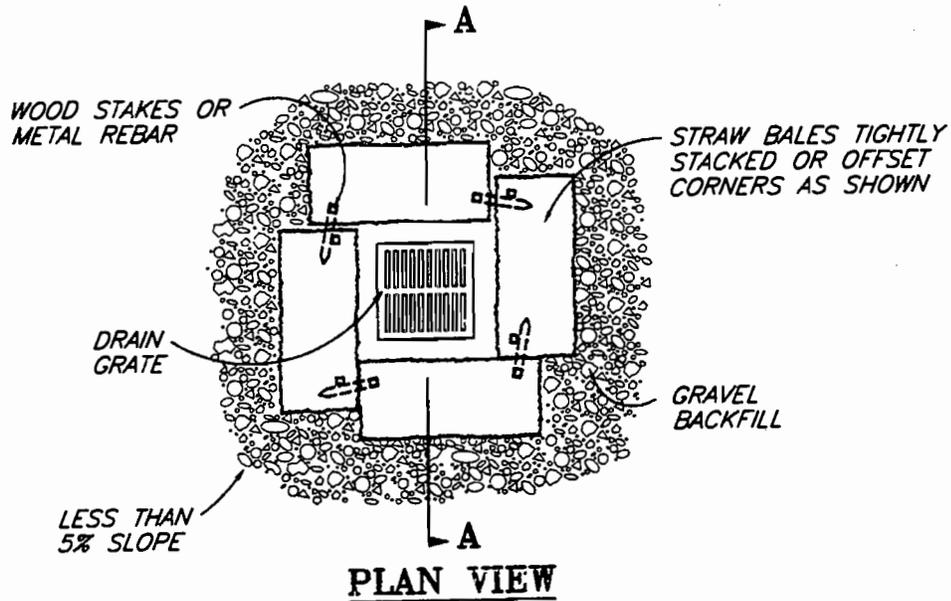
CONTINUOUS BERM

DARDENNE PRAIRIE, MISSOURI

DATE:

FIGURE:

2



NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. EMBED THE BALES 4" (100mm) INTO THE SOIL AND OFFSET CORNERS OR PLACE BALES WITH ENDS TIGHTLY ABUTING. GRAVEL BACKFILL WILL PREVENT EROSION OR FLOW AROUND THE BALES.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. EXCAVATION OF A BASIN ADJACENT TO THE DROP INLET OR A TEMPORARY DIKE ON THE DOWNSLOPE OF THE STRUCTURE MAY BE NECESSARY.



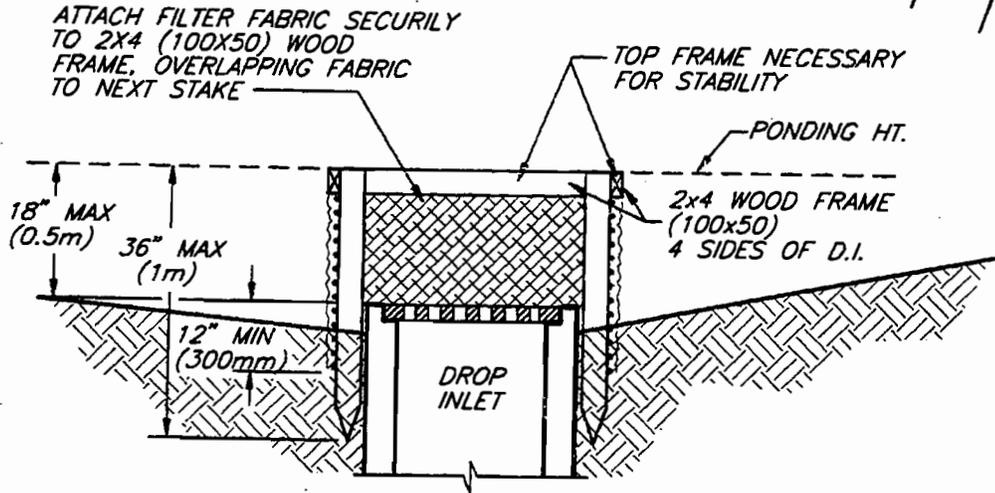
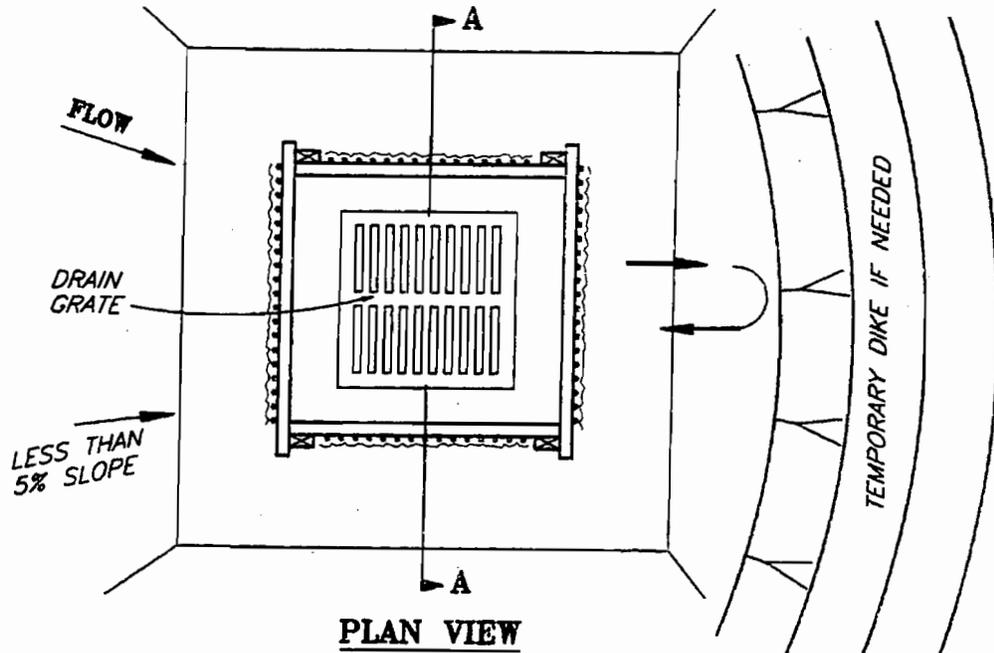
EROSION & SEDIMENT CONTROL DETAILS
STRAW BALES / GRAVEL DROP INLET
SEDIMENT BARRIER

DARDENNE PRAIRIE, MISSOURI

DATE:

FIGURE:

3



SECTION A-A

NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. USE 2"x4" (100X50mm) WOOD OR EQUIVALENT METAL STAKES, 3' (1m) MINIMUM LENGTH.
3. INSTALL 2"x4" (100X50mm) WOOD TOP FRAME TO INSURE STABILITY.
4. THE TOP OF THE FRAME (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BY-PASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.

NOT TO SCALE



EROSION & SEDIMENT CONTROL DETAILS

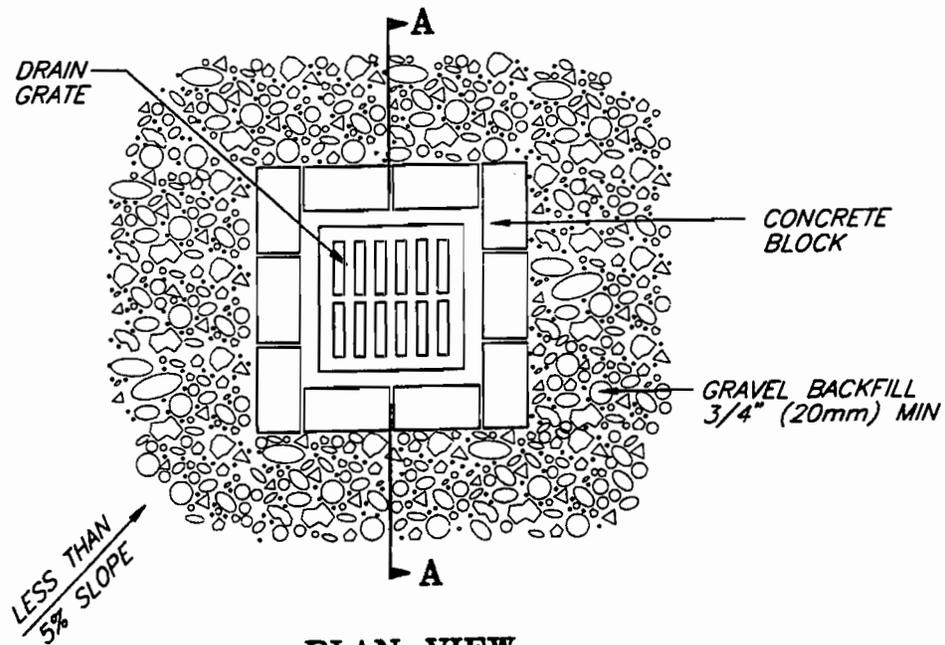
**SILT FENCE DROP INLET
SEDIMENT BARRIER**

DARDENNE PRAIRIE, MISSOURI

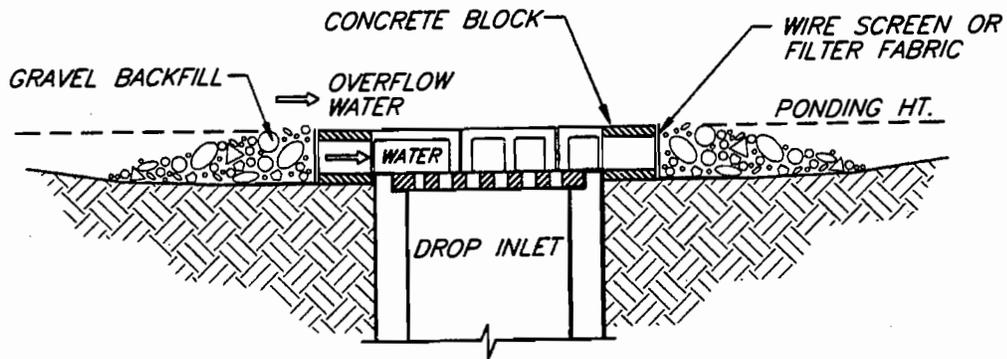
DATE:

FIGURE:

4



PLAN VIEW



SECTION A - A

NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. EXCAVATE A BASIN OF SUFFICIENT SIZE ADJACENT TO THE DROP INLET.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.

DARDENNE



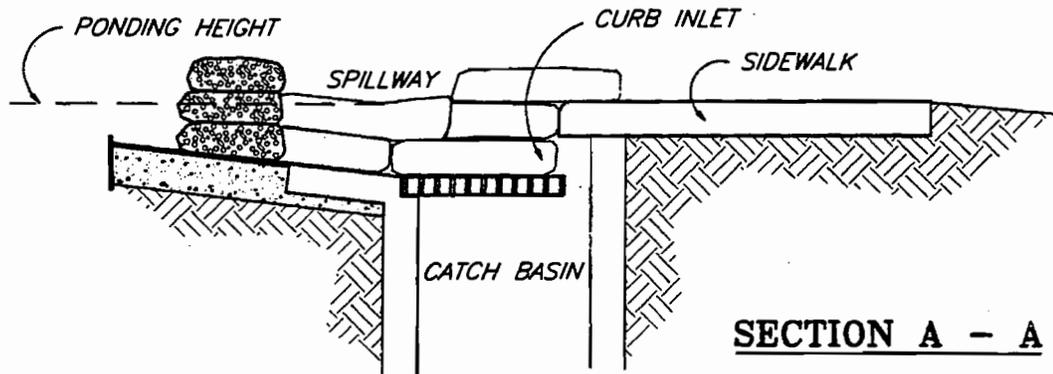
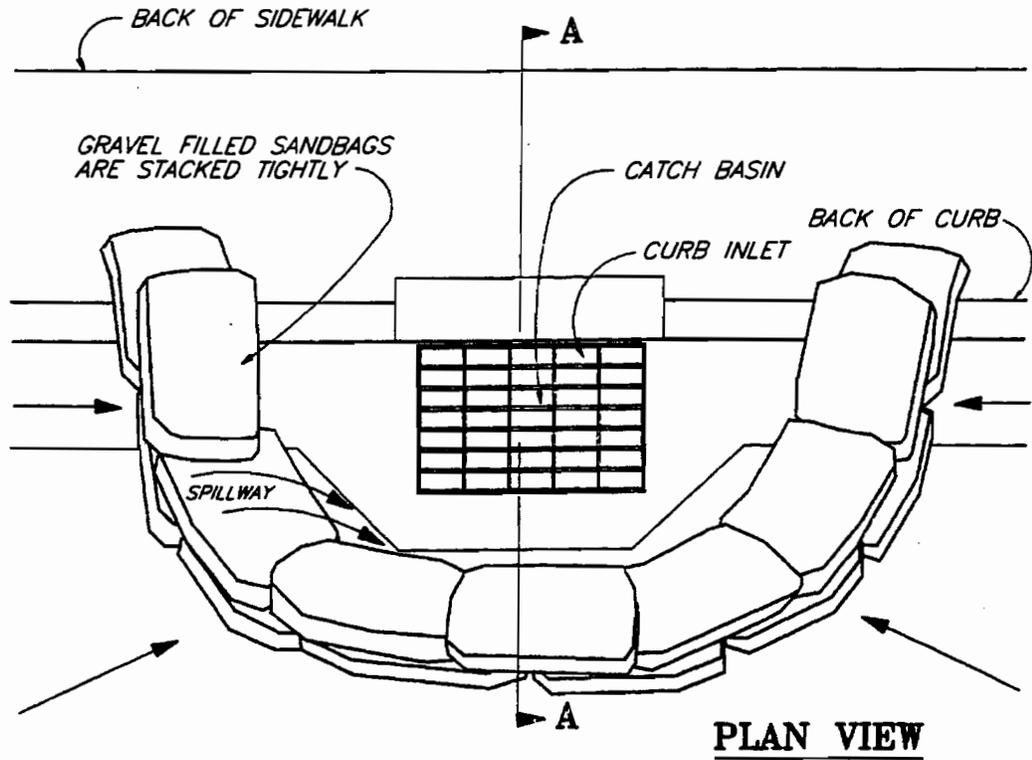
EROSION & SEDIMENT CONTROL DETAILS
BLOCK AND GRAVEL DROP INLET
SEDIMENT BARRIER

DARDENNE PRAIRIE, MISSOURI

DATE:

FIGURE:

5



NOTES:

1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
2. SANDBAGS, OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY.
3. LEAVE ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.
4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.

DARDENNE



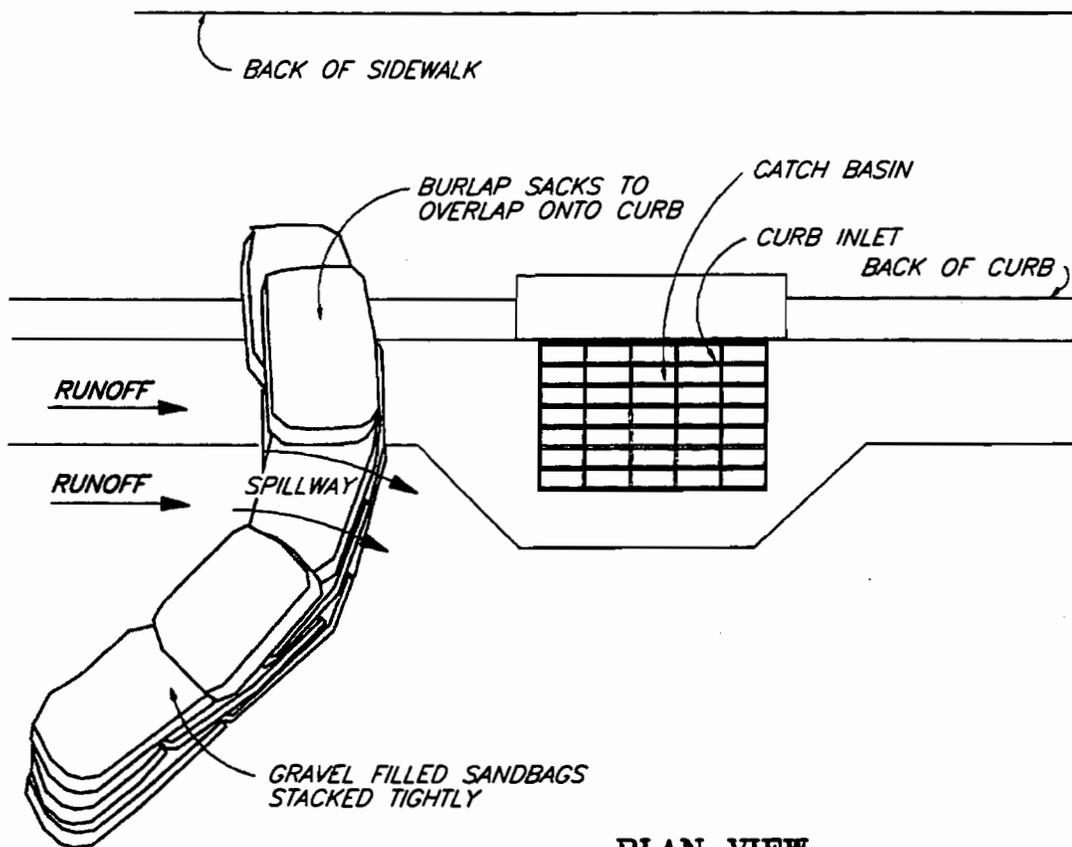
EROSION & SEDIMENT CONTROL DETAILS
CURB INLET SEDIMENT BARRIER
(SANDBAGS)

DARDENNE PRAIRIE, MISSOURI

DATE:

FIGURE:

6



PLAN VIEW

NOTES:

1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
2. SANDBAGS OF EITHER BURLAP OR WOVEN 'GEOTEXTILE' FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY.
3. LEAVE A ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.
4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.

DARDENNE



EROSION & SEDIMENT CONTROL DETAILS

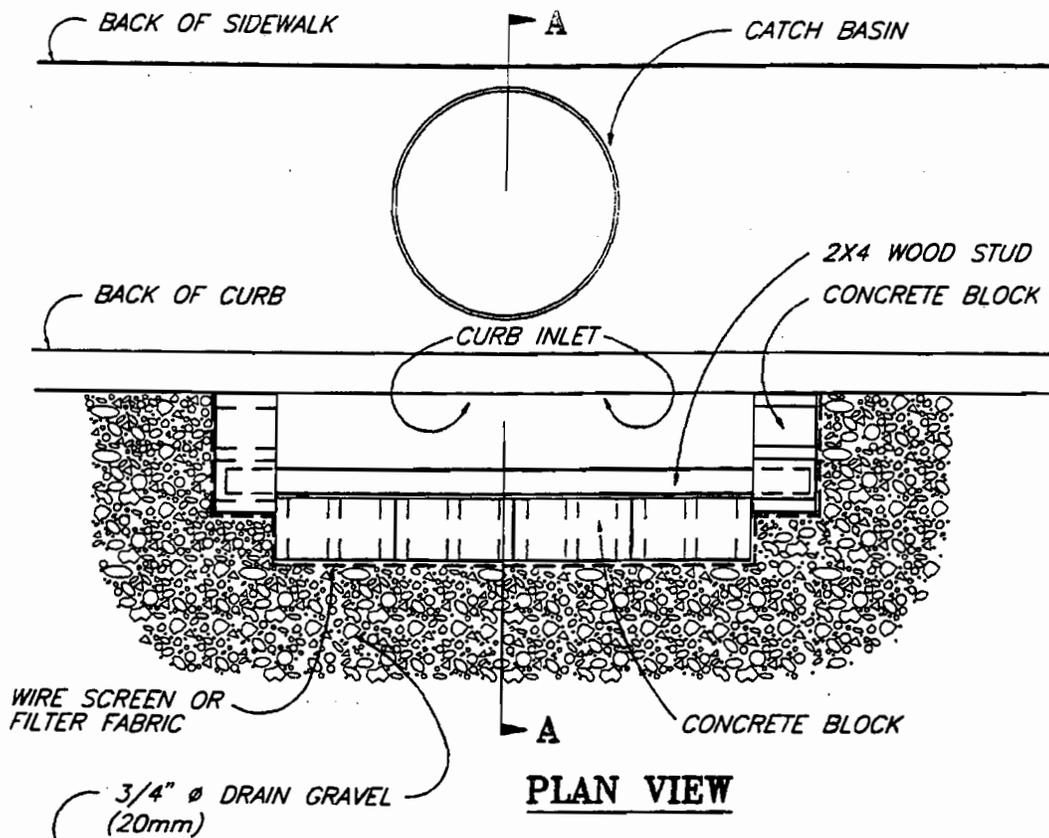
**CURB AND GUTTER SEDIMENT
BARRIER**

DARDENNE PRAIRIE, MISSOURI

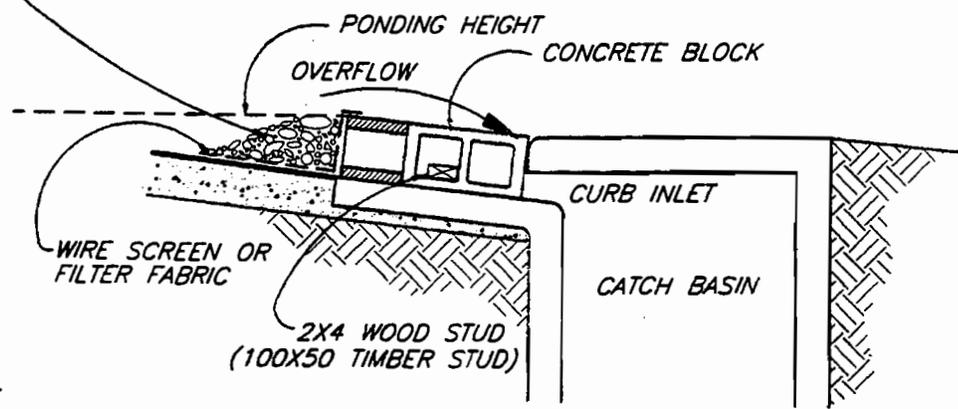
DATE:

FIGURE:

7



PLAN VIEW



SECTION A - A

NOTES:

1. USE BLOCK AND GRAVEL TYPE SEDIMENT BARRIER WHEN CURB INLET IS LOCATED IN GENTLY SLOPING STREET SEGMENT, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
2. BARRIER SHALL ALLOW FOR OVERFLOW FROM SEVERE STORM EVENT.
3. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.

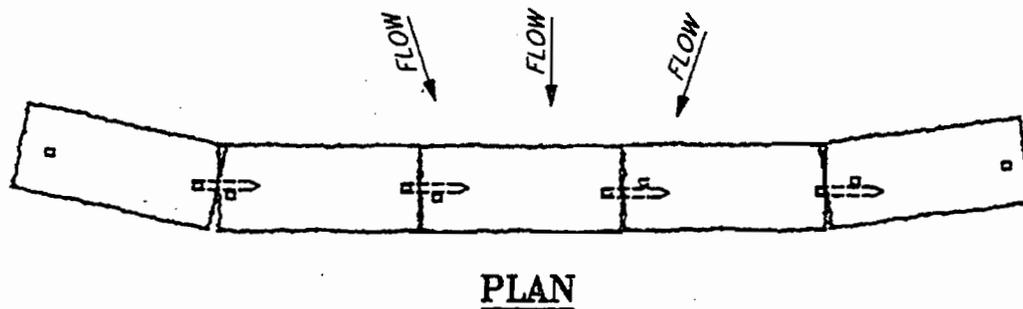
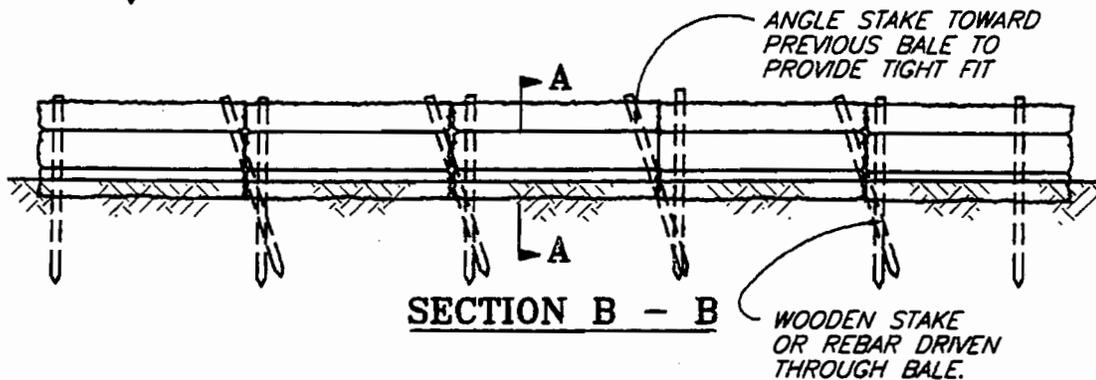
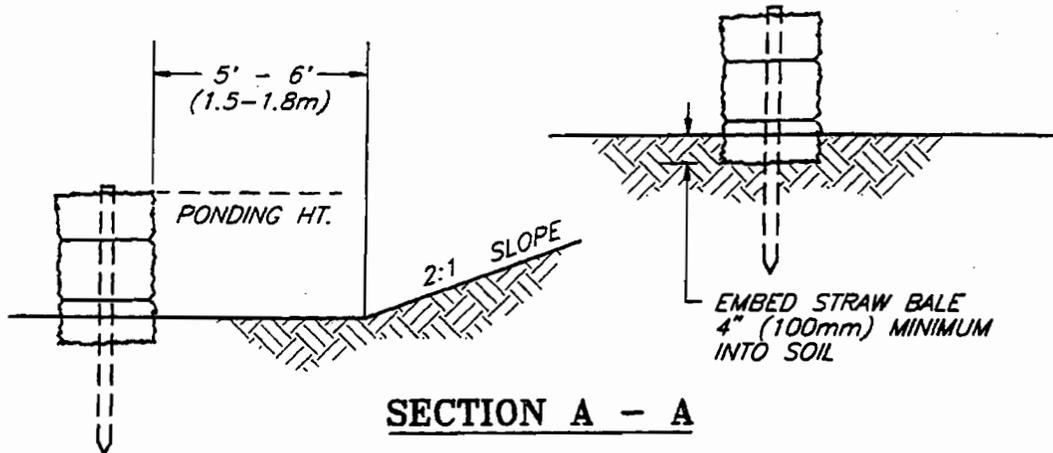


EROSION & SEDIMENT CONTROL DETAILS
CURB INLET SEDIMENT BARRIER
(BLOCK AND GRAVEL)
DARDENNE PRAIRIE, MISSOURI

DATE:

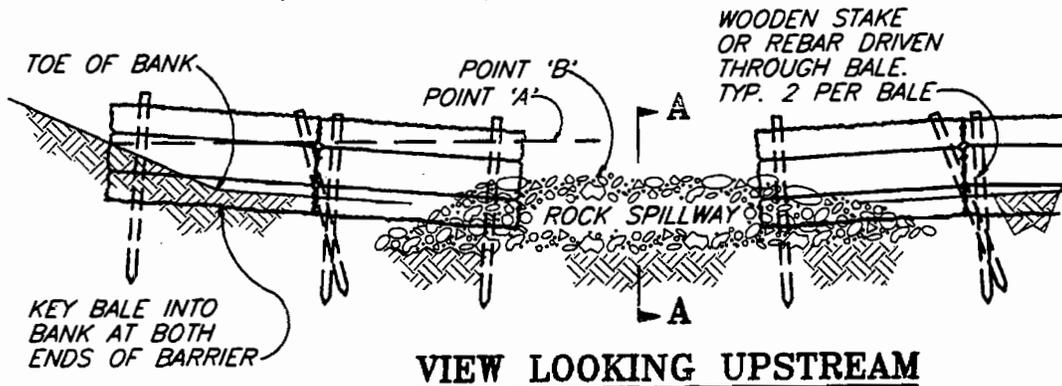
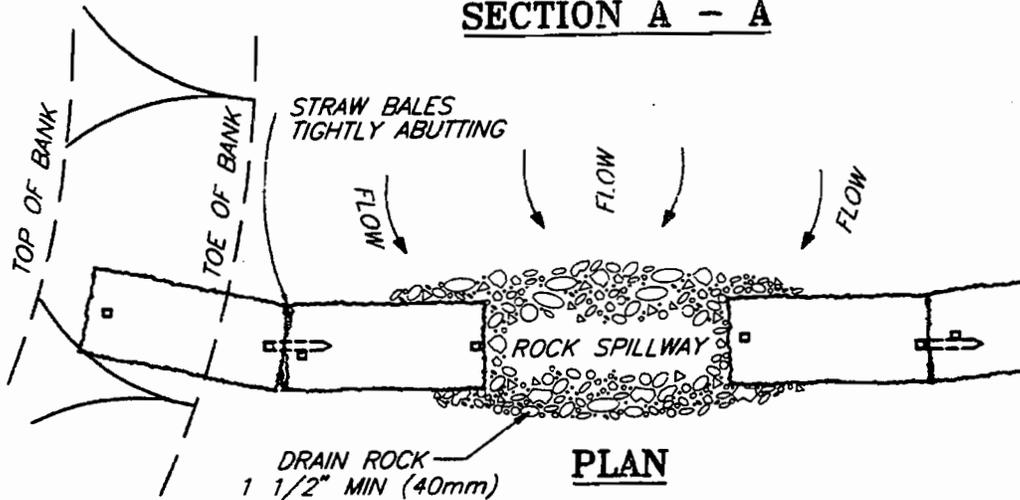
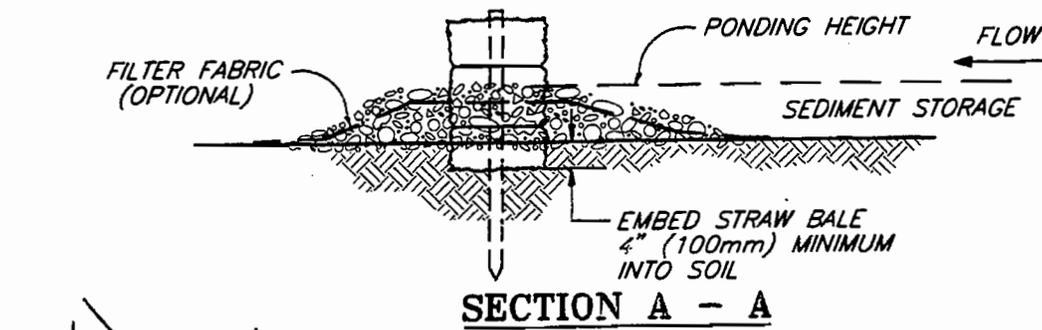
FIGURE:

8



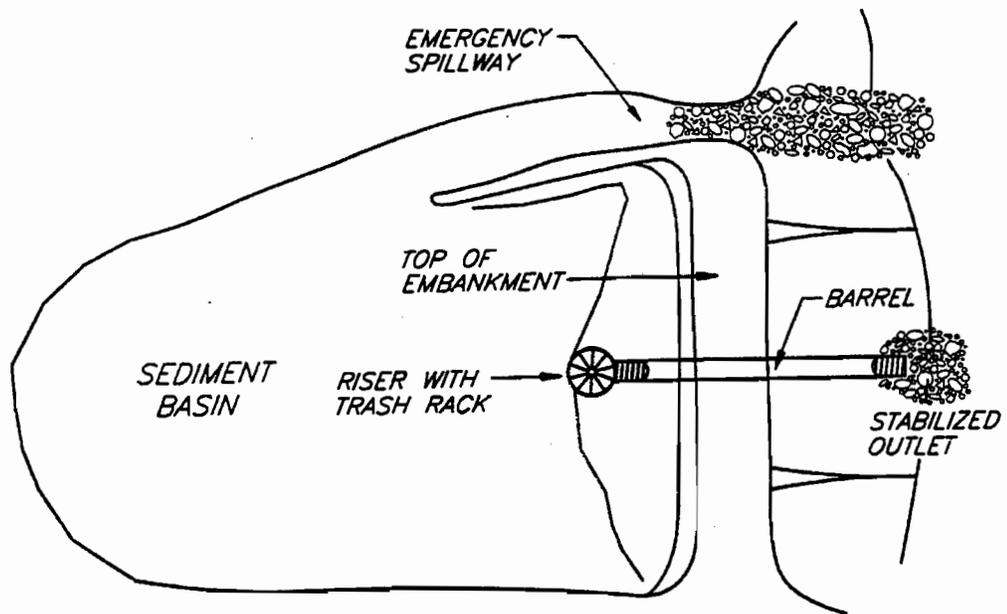
NOTES:

1. THE STRAW BALES SHALL BE PLACED ON SLOPE CONTOUR.
2. BALES TO BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING.
3. KEY IN BALES TO PREVENT EROSION OR FLOW UNDER BALES.

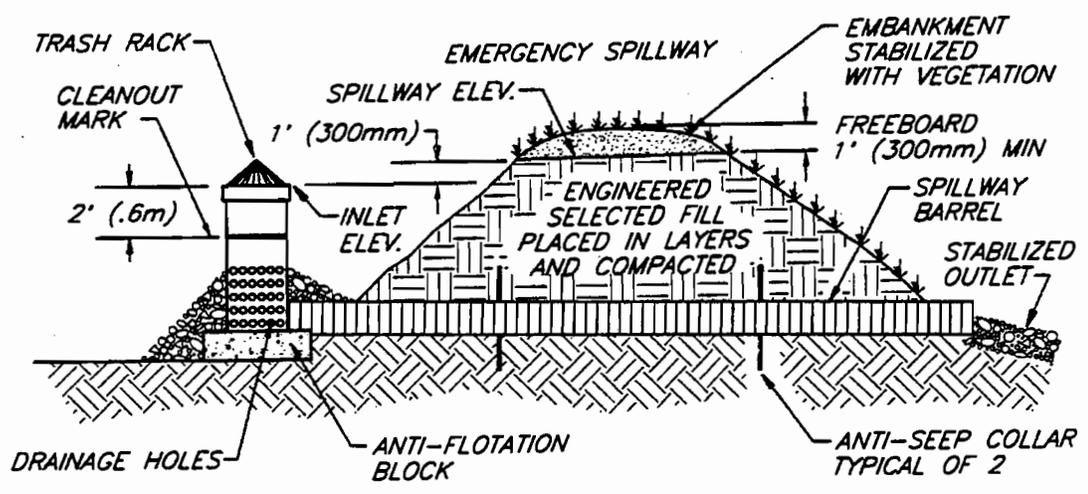


NOTES:

1. PLACE BALES PERPENDICULAR TO FLOW.
2. EMBED THE BALE 4" (100mm) INTO THE SOIL AND "KEY" THE END BALES INTO THE CHANNEL BANKS TO PREVENT FLOW AROUND THE BALES.
3. BALES PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING.
4. POINT "A" SHALL BE HIGHER THAN POINT "B".
5. SPILLWAY HEIGHT SHALL NOT EXCEED 24" (0.6m).



PLAN



SECTION

- NOTES:
1. THE TEMPORARY SEDIMENT BASIN, DESIGNED BY A QUALIFIED PROFESSIONAL, IS REQUIRED FOR DISTURBED AREAS GREATER THAN 5 ACRES WITHIN A DRAINAGE AREA LESS THAN 100 ACRES.
 2. THE SEDIMENT BASIN WILL BE REMOVED WITHIN 3 YEARS.



EROSION & SEDIMENT CONTROL DETAILS

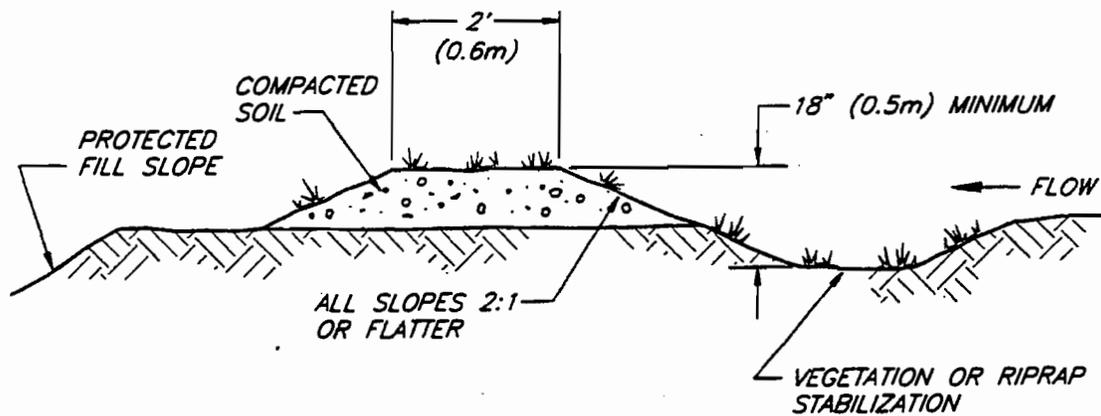
TYPICAL SEDIMENT BASIN

DARDENNE PRAIRIE, MISSOURI

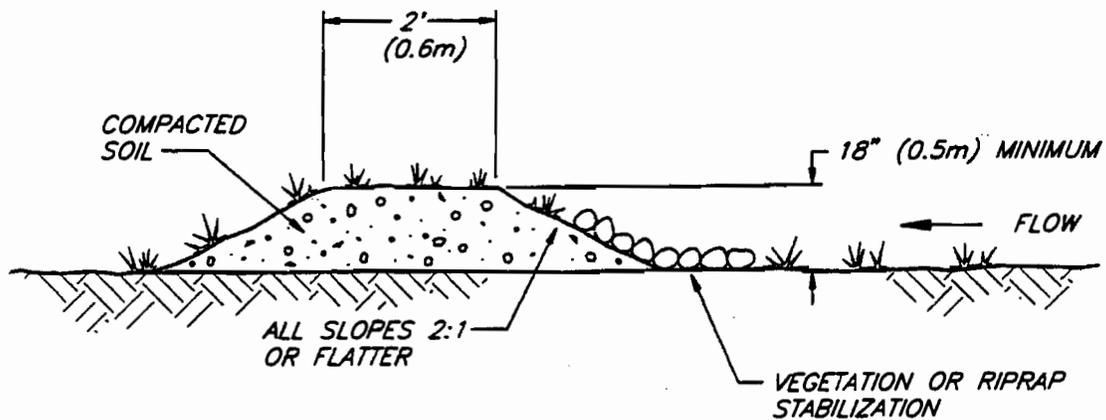
DATE:

FIGURE:

11



TYPICAL FILL DIVERSION



TYPICAL TEMPORARY DIVERSION DIKE

NOTES:

1. THE CHANNEL BEHIND THE DIKE SHALL HAVE POSITIVE GRADE TO A STABILIZED OUTLET.
2. THE DIKE SHALL BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
3. THE DIKE SHALL BE STABILIZED WITH TEMPORARY OR PERMANENT SEEDING OR RIPRAP.

DARDENNE



PRAIRIE

EROSION & SEDIMENT CONTROL DETAILS

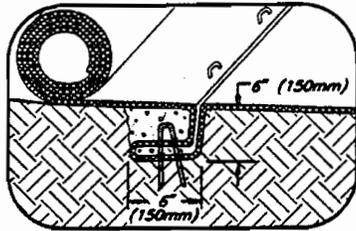
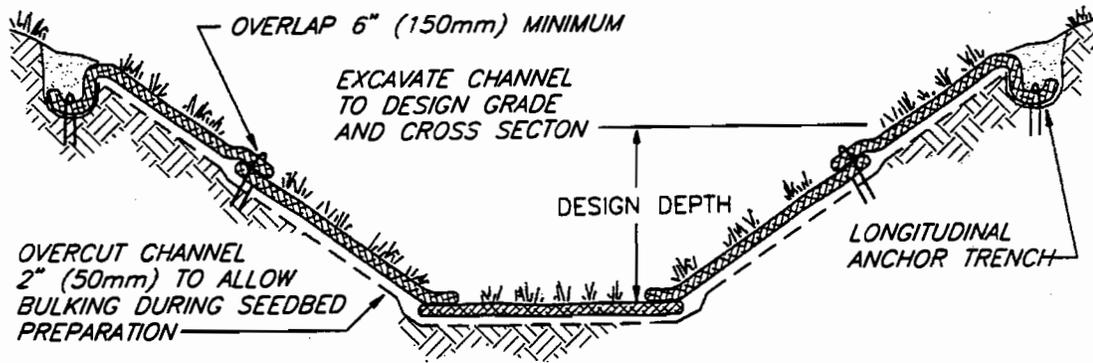
TEMPORARY DIVERSION DIKE

DARDENNE PRAIRIE, MISSOURI

DATE:

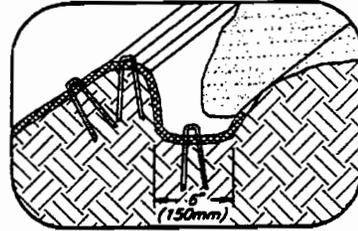
FIGURE:

12



INTERMITTENT CHECK SLOT

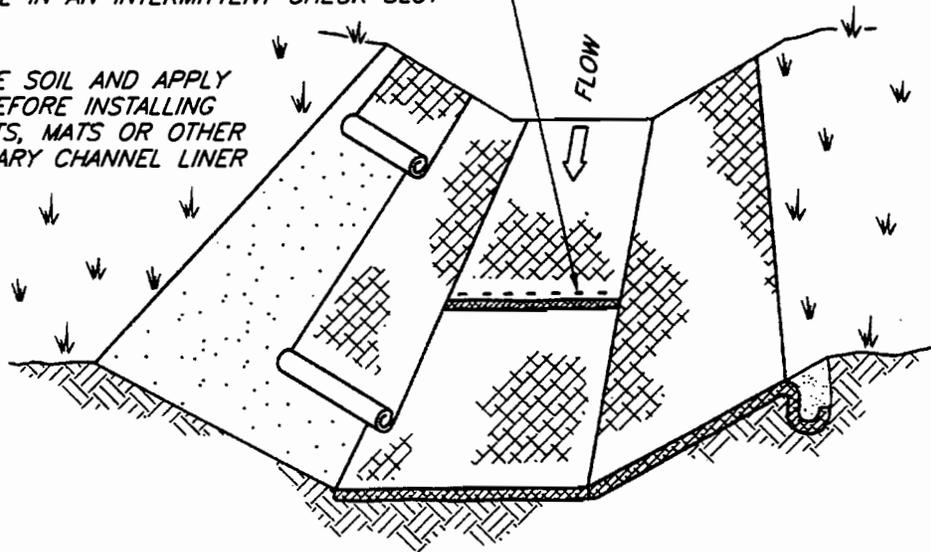
TYPICAL INSTALLATION WITH EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS



LONGITUDINAL ANCHOR TRENCH

SHINGLE-LAP SPLICED ENDS OR BEGIN NEW ROLL IN AN INTERMITTENT CHECK SLOT

PREPARE SOIL AND APPLY SEED BEFORE INSTALLING BLANKETS, MATS OR OTHER TEMPORARY CHANNEL LINER SYSTEM



NOTES:

1. DESIGN VELOCITIES EXCEEDING 2 FT/SEC (0.5m/sec) REQUIRE TEMPORARY BLANKETS, MATS OR SIMILAR LINERS TO PROTECT SEED AND SOIL UNTIL VEGETATION BECOMES ESTABLISHED.
2. GRASS-LINED CHANNELS WITH DESIGN VELOCITIES EXCEEDING 6 FT/SEC (2m/sec) SHOULD INCLUDE TURF REINFORCEMENT MATS.

NOT TO SCALE

DARDENNE



EROSION & SEDIMENT CONTROL DETAILS

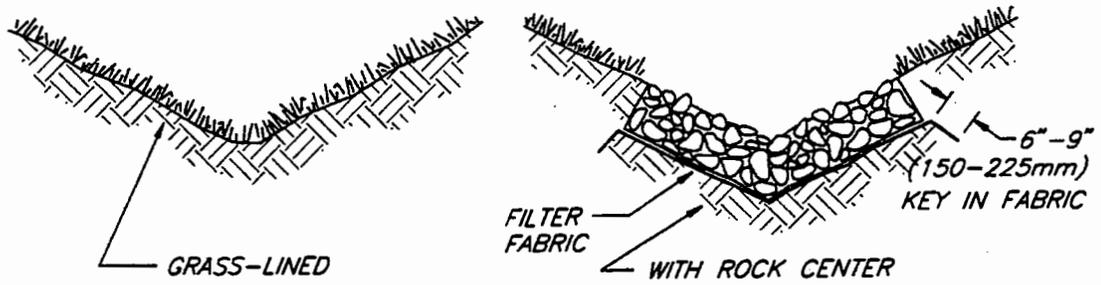
**GRASS - LINED CHANNEL
TYPICAL INSTALLATION**

DARDENNE PRAIRIE, MISSOURI

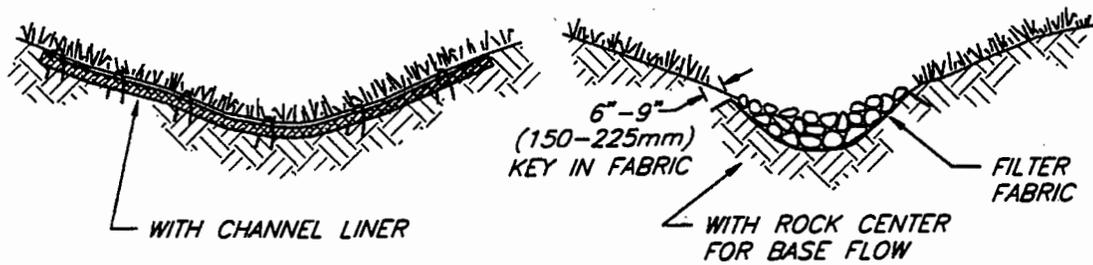
DATE:

FIGURE:

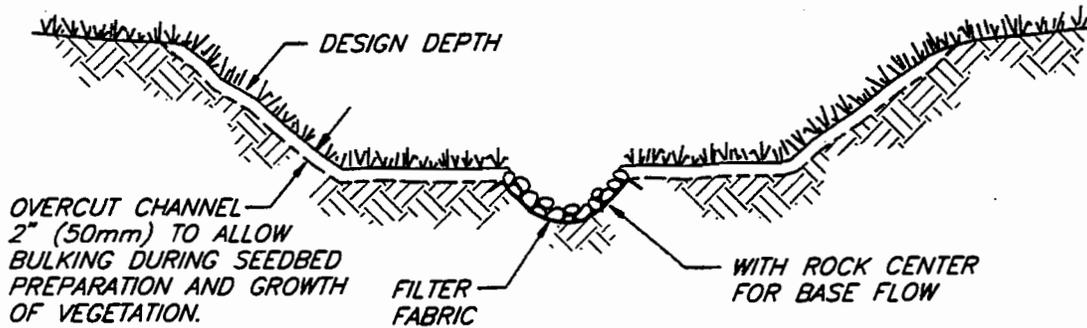
13



**TYPICAL V-SHAPED CHANNEL
CROSS-SECTION**



**TYPICAL PARABOLIC CHANNEL
CROSS-SECTION**



**TYPICAL TRAPEZOIDAL CHANNEL
CROSS-SECTION**

DARDENNE



EROSION & SEDIMENT CONTROL DETAILS

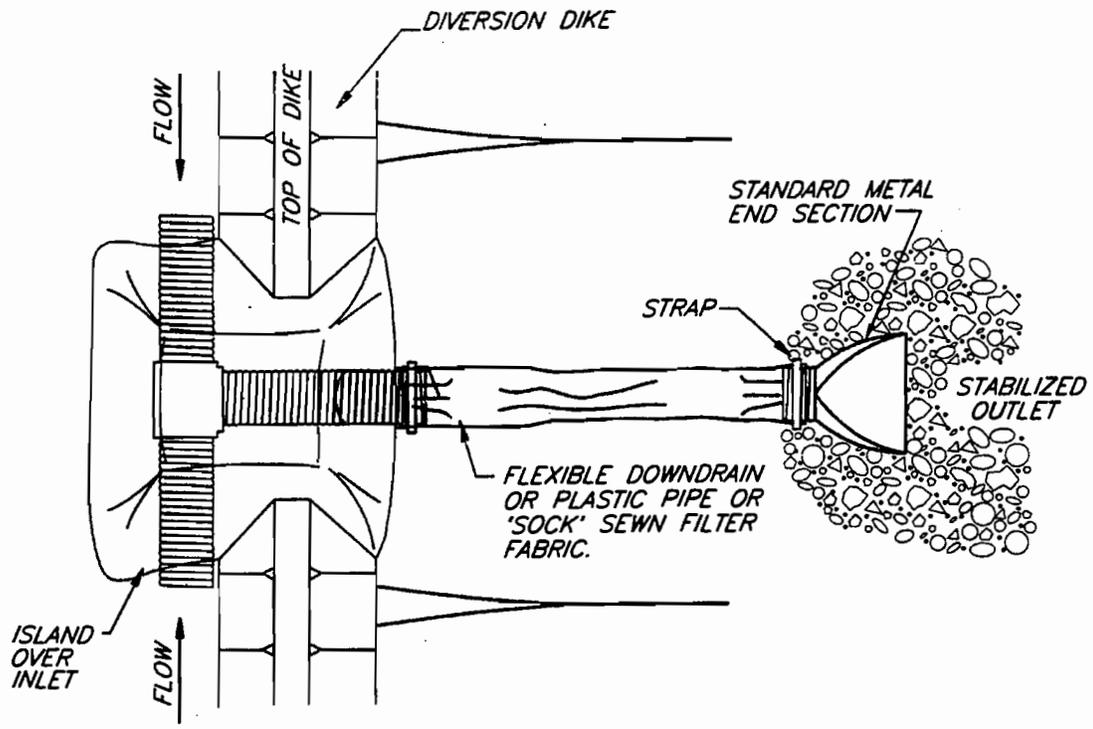
**GRASS - LINED CHANNEL
TYPICAL CROSS SECTION**

DARDENNE PRAIRIE, MISSOURI

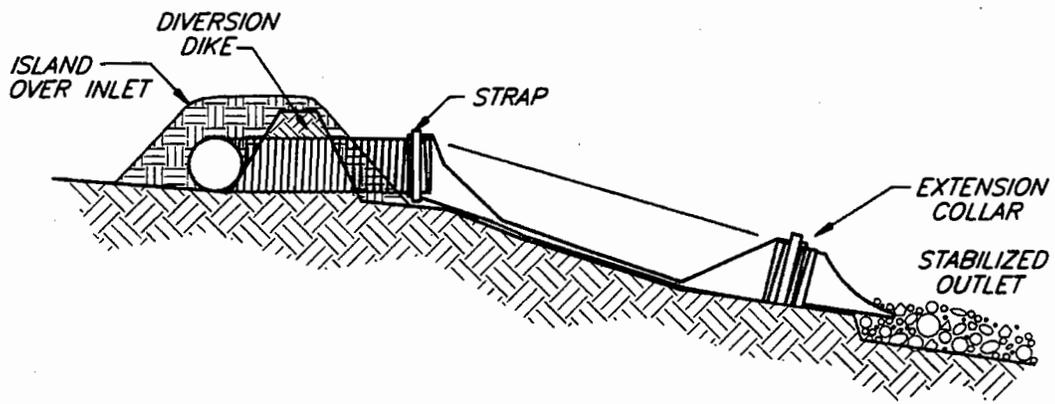
DATE:

FIGURE:

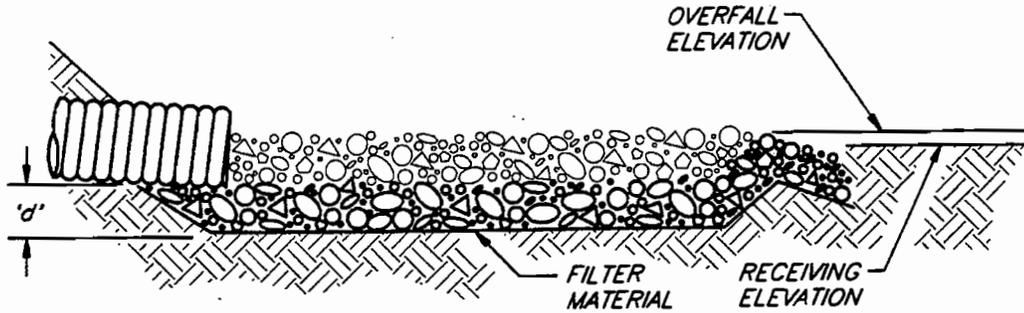
14



PLAN VIEW

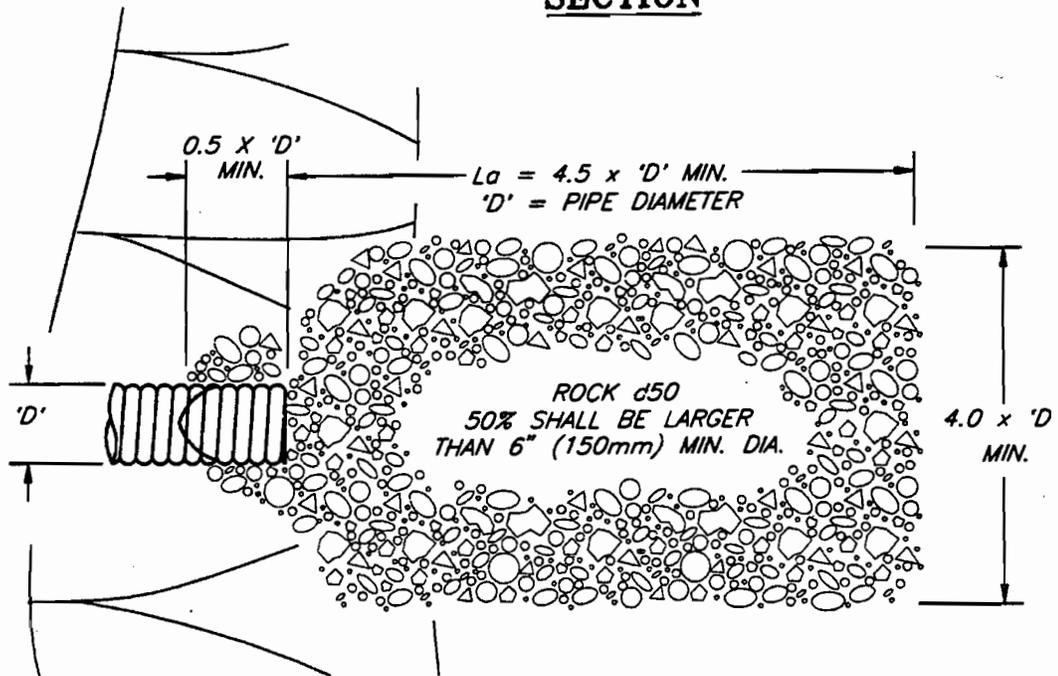


SECTION



THICKNESS ('d') = 1.5 x MAX. ROCK DIAMETER - 6" (150mm) MIN.

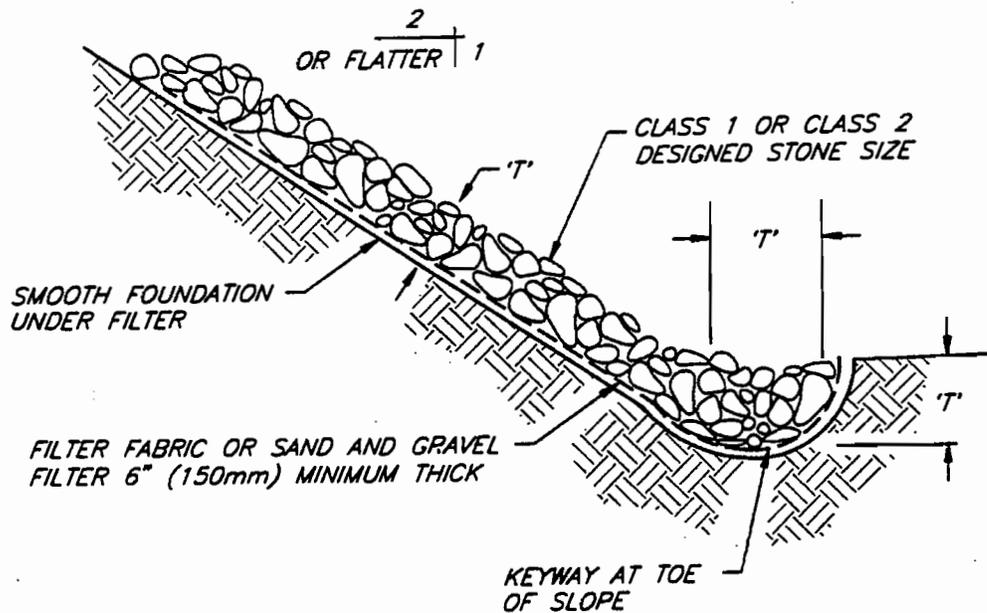
SECTION



PLAN

NOTES:

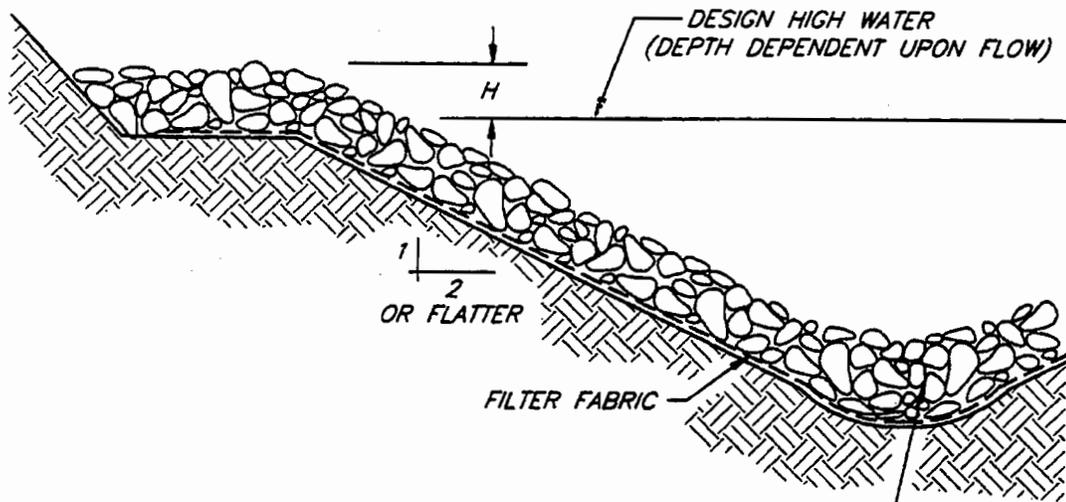
1. 'La' = LENGTH OF APRON. DISTANCE 'La' SHALL BE OF SUFFICIENT LENGTH TO DISSIPATE ENERGY.
2. APRON SHALL BE SET AT A ZERO GRADE AND ALIGNED STRAIGHT.
3. FILTER MATERIAL SHALL BE FILTER FABRIC OR 6" (150mm) THICK MINIMUM GRADED GRAVEL LAYER.



TYPICAL SECTION

NOTE:
 'T' = THICKNESS: THICKNESS SHALL BE DETERMINED BY THE ENGINEER.
 MINIMUM THICKNESS SHALL BE 1.5x THE MAXIMUM STONE DIAMETER,
 NEVER LESS THAN 6" (150mm).

DESIGN HEIGHT (H), WIDTH AND STONE SIZE SHALL
BE DETERMINED BY THE ENGINEER



MINIMUM 6" (150mm) THICK LAYER OF 2" (50mm) MINIMUM
DIAMETER DRAIN ROCK. LARGER STONE SHALL BE USED
DEPENDENT UPON GRADIENT, SOIL TYPE, AND DESIGN FLOW.

TYPICAL SECTION

DARDENNE



EROSION & SEDIMENT CONTROL DETAILS

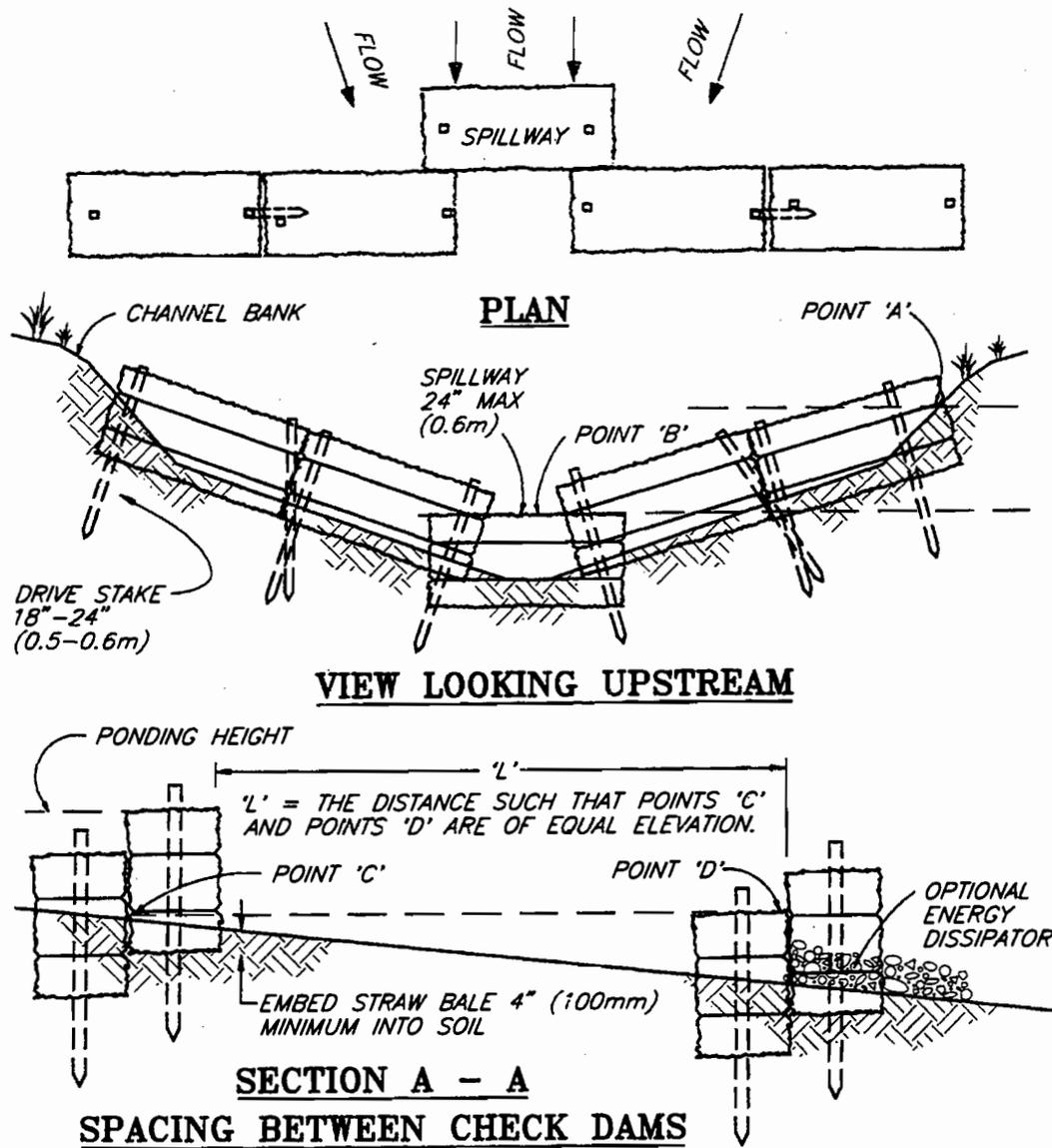
ROCK LINED CHANNEL

DARDENNE PRAIRIE, MISSOURI

DATE:

FIGURE:

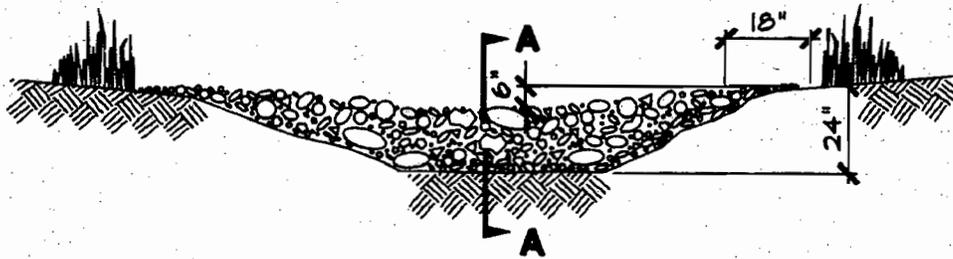
18



NOTES:

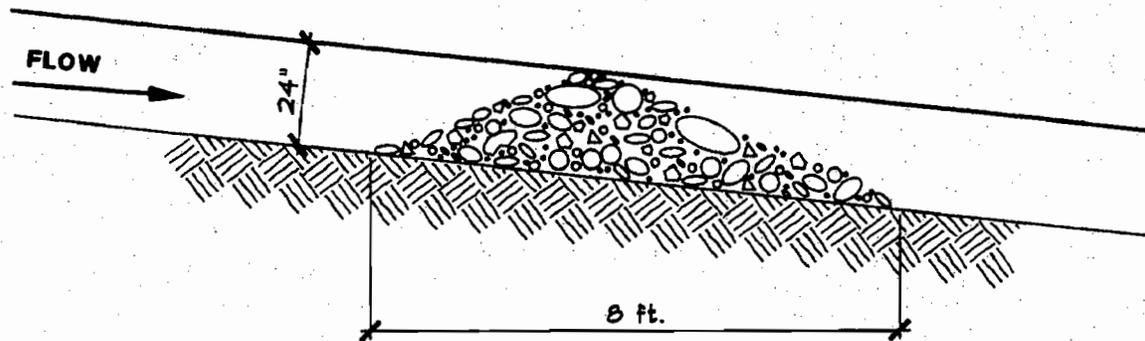
1. EMBED BALES 4" (100mm) INTO THE SOIL AND 'KEY' BALES INTO THE CHANNEL BANKS.
2. POINT 'A' MUST BE HIGHER THAN POINT 'B'. (SPILLWAY HEIGHT)
3. PLACE BALES PERPENDICULAR TO THE FLOW WITH ENDS TIGHTLY ABUTTING.
4. SPILLWAY HEIGHT SHALL NOT EXCEED 24" (0.6m).
5. INSPECT AFTER EACH SIGNIFICANT STORM, MAINTAIN AND REPAIR PROMPTLY.

NOT TO SCALE



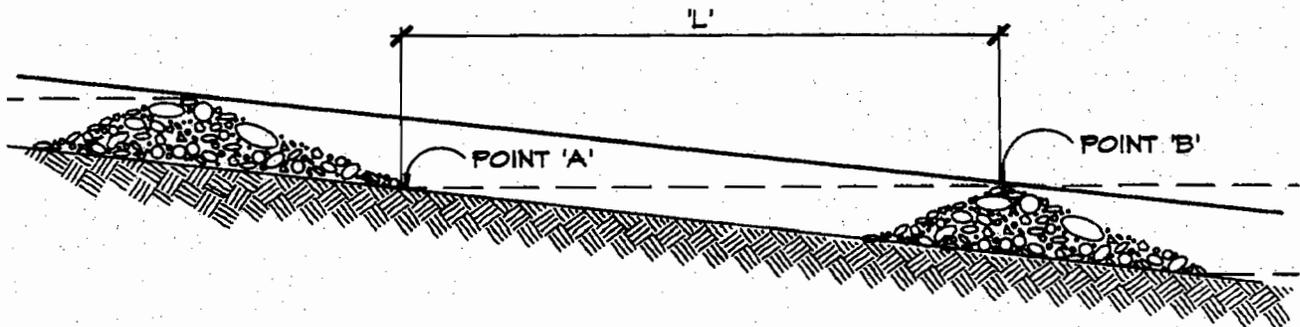
VIEW LOOKING UPSTREAM

NOTE:
 KEY STONE INTO THE DITCH BANKS
 AND EXTEND IT BEYOND THE ABUTMENTS
 A MINIMUM OF 18" TO PREVENT OVER
 FLOW AROUND DAM.

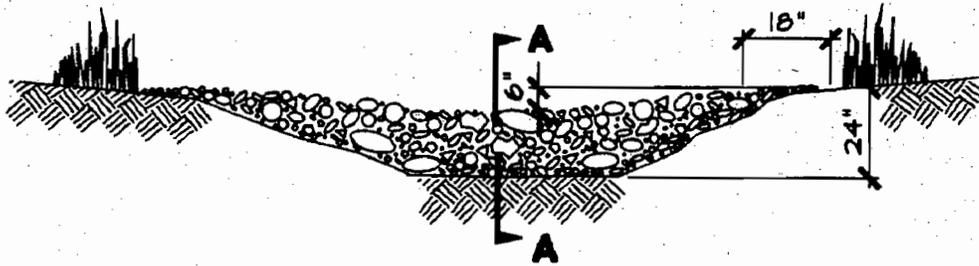


SECTION A - A

'L' = THE DISTANCE SUCH THAT POINTS 'A' AND
 'B' ARE OF EQUAL ELEVATION.

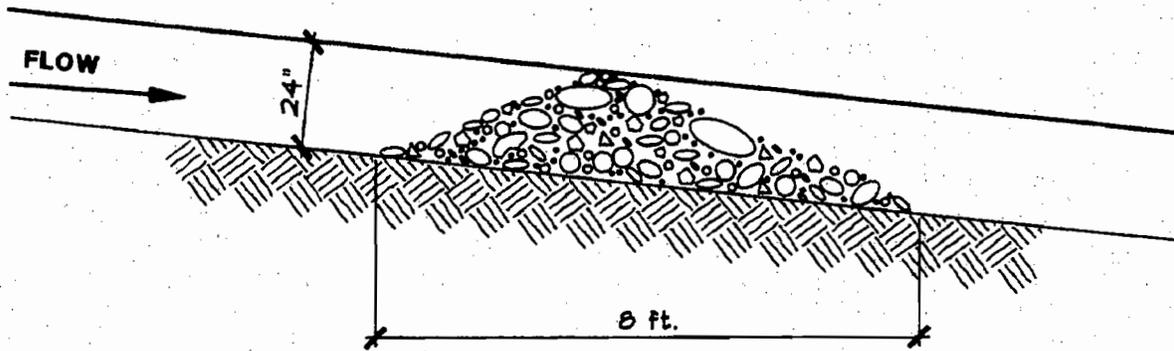


SPACING BETWEEN CHECK DAMS



VIEW LOOKING UPSTREAM

NOTE:
 KEY STONE INTO THE DITCH BANKS
 AND EXTEND IT BEYOND THE ABUTMENTS
 A MINIMUM OF 18" TO PREVENT OVER
 FLOW AROUND DAM.



SECTION A - A

DARDENNE



EROSION & SEDIMENT CONTROL DETAILS

ROCK CHECK DAM

DARDENNE PRAIRIE, MISSOURI

DATE:

FIGURE:

21

BILL NO. 04-31

ORDINANCE NO. 738

**AN ORDINANCE OF THE CITY OF DARDENNE PRAIRIE
REGARDING URBAN STORM WATER QUALITY MANAGEMENT
AND DISCHARGE CONTROL**

WHEREAS, the Board of Aldermen of the City of Dardenne Prairie has found it necessary for the benefit of the health, safety, and general welfare of citizens, and protect and enhance the water quality of watercourses and water bodies in a manner pursuant to and consistent with the Federal Clean Water Act (33 U.S.C. §1251 et seq.) to reduce pollutants in storm water discharges to the maximum extent practicable and to prohibit non-storm water discharges to the storm drain system

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF DARDENNE PRAIRIE, MISSOURI, AS FOLLOWS:

SECTION 1. Definitions: The terms used in this Ordinance shall have the following meanings:

“Best Management Practices” means activities, practices, and procedures to prevent or reduce the discharge of pollutants directly or indirectly to the municipal storm drain system and waters of the United States. Best Management Practices include but are not limited to: treatment facilities to remove pollutants from storm water; operating and maintenance procedures; facility management practices to control runoff, spillage or leaks of non-storm water, waste disposal, and drainage from materials storage; erosion and sediment control practices; and the prohibition of specific activities, practices, and procedures and such other provisions as the City determines appropriate for the control of pollutants.

“City” means the City of Dardenne Prairie.

“Clean Water Act” means the federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

“Construction Activity” means activities subject to NPDES Construction Permits. These include construction projects resulting in land disturbance of 5 acres or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

“Hazardous Materials” means any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

“Illegal Discharge” means any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Section 6 of this Ordinance.

“Illicit Connections” means an illicit connection is defined as either of the following:

(i) Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by a government agency; or

(ii) Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by the City.

“Industrial Activity” means activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

“National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permits” means general, group, and individual storm water discharge permits which regulate facilities defined in federal NPDES regulations pursuant to Section 402 of the Clean Water Act.

“Non-Storm Water Discharge” means any discharge to the storm drain system that is not composed entirely of storm water.

“Pollutant” means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure (including but not limited to sediments, slurries, and concrete rinsates); and noxious or offensive matter of any kind.

“Pollution” means the human-made or human-induced alteration of the quality of waters by waste to a degree which unreasonably affects, or has the potential to unreasonably affect, either the waters for beneficial uses or the facilities which serve these beneficial uses.

“Premises” means any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

“Storm Drain System” means publicly-owned facilities operated by the City by which storm water is collected and/or conveyed, including but not limited to any roads with drainage

systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures which are within the City and are not part of a publicly owned treatment works as defined at 40 CFR Section 122.2.

“Storm Water” means any surface flow, runoff, and drainage consisting entirely of water from rain storm events.

“Waters of the United States” means surface watercourses and water bodies as defined at 40 CFR § 122.2. including all natural waterways and definite channels and depressions in the earth that may carry water, even though such waterways may only carry water during rains and storms and may not carry storm water at and during all times and seasons.

SECTION 2. Applicability. This Ordinance shall apply to all water entering the storm drain system generated on any developed and undeveloped lands lying within the City of Dardenne Prairie including any amendments or revisions thereto.

SECTION 3. Responsibility for Administration. The City Engineer of the City shall administer, implement, and enforce the provisions of this Ordinance. Any powers granted or duties imposed upon the City Engineer may be delegated in writing by the City Engineer to persons or entities acting in the beneficial interest of or in the employ of the City.

SECTION 4. More Stringent State and Federal and Local Regulations.

(a) In any instance in which the State government or Federal government modifies an existing regulation or promulgates a new regulation which establishes treatment, pretreatment or discharge standards or requirements for new or existing users which are more stringent than those contained in this Ordinance, such State or Federal requirements shall, on the effective date of the new regulations, supersede the less stringent provisions of this Ordinance and shall be fully enforceable under this Ordinance as if fully set out herein.

(b) In any instance in which a State, Federal or local government agency imposes restrictions or limitations on the use of or discharges to any facilities regulated by this Ordinance which are more stringent than the provisions of this Ordinance, such restrictions or limitations shall take precedence within the jurisdictional area of the State, Federal or local government agency.

SECTION 5. Ultimate Responsibility of Discharger. The standards set forth herein and promulgated pursuant to this Ordinance are minimum standards: therefore this Ordinance does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants into waters of the U.S. caused by said person. This Ordinance shall not create liability on the part of the City of Dardenne Prairie, or any agent or employee thereof for any damages that result from any discharger's reliance on this Ordinance or any administrative decision lawfully made thereunder.

SECTION 6. Prohibition of Illegal Discharges. No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water. The commencement, conduct or continuance of any illegal discharge to the storm drain system is prohibited except as described as follows:

(a) Discharges from the following activities will not be considered a source of pollutants to the storm drain system and to waters of the U.S. when properly managed to ensure that no potential pollutants are present, and therefore they shall not be considered illegal discharges unless determined to cause a violation of the provisions of any state law, the Clean Water Act, or this ordinance: potable water line flushing; uncontaminated pumped groundwater and other discharges from potable water sources; landscape irrigation and lawn watering; diverted stream flows; rising groundwater; groundwater infiltration to the storm drain system; uncontaminated foundation and footing drains; uncontaminated water from crawl space pumps; air conditioning condensation; uncontaminated nonindustrial roof drains; springs; individual residential and occasional non-commercial car washing; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; street wash waters; and flows from fire fighting.

(b) The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered by the State of Missouri under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted by the City of Dardenne Prairie for any discharge to the storm drain system.

SECTION 7. Prohibition of Illicit Connections.

(a) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

(b) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

SECTION 8. Waste Disposal Prohibitions. No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, left, or maintained, in or upon any public or private property, driveway, parking area, street, alley, sidewalk, component of the storm drain system, or water of the U.S., any refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, so that the same may cause or contribute to pollution. Wastes deposited in streets in proper waste receptacles for the purposes of collection are exempted from this prohibition.

SECTION 9. Discharges in Violation of Industrial or Construction Activity NPDES Storm Water Discharge Permit. Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the City Engineer prior to or as a condition of a subdivision map, site plan, building permit, or development or improvement plan; upon inspection of the facility; during any enforcement proceeding or action; or for any other reasonable cause.

SECTION 10. Requirement to Prevent, Control, and Reduce Storm Water Pollutants.

(a) **Authorization to Adopt and Impose Management Plans.** Management plans for the control of accidental discharges or slug discharges shall be provided when required by State or Federal regulations.

(b) **New Development and Redevelopment.** The City may adopt requirements identifying appropriate management plans to control the volume, rate, and potential pollutant load of storm water runoff from new development and redevelopment projects as may be appropriate to minimize the generation, transport and discharge of pollutants. The City shall incorporate such requirements in any land use entitlement and construction or building-related permit to be issued relative to such development or redevelopment. The owner and developer shall comply with the terms, provisions, and conditions of such land use entitlements and building permits as required in this Ordinance and other applicable Ordinances of the City.

(c) **Responsibility to implement Management Plans.** Notwithstanding the presence or absence of requirements promulgated pursuant to subsections (a) and (b), any person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering storm water, the storm drain system, or waters of the U.S. shall implement management plans to the extent they are technologically achievable to prevent and reduce such pollutants. The owner or operator of a commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at the owner or operator's expense.

SECTION 11. Requirement to Eliminate Illegal Discharges. Notwithstanding the requirements of Section 18 herein, the City Engineer may require by written notice that a person responsible for an illegal discharge immediately, or by a specified date, discontinue the discharge and, if necessary, take measures to eliminate the source of the discharge to prevent the occurrence of future illegal discharges.

SECTION 12. Requirement to Eliminate or Secure Approval for Illicit Connections.

(a) The City Engineer may require by written notice that a person responsible for an illicit connection to the storm drain system comply with the requirements of this Ordinance to eliminate or secure approval for the connection by a specified date,

regardless of whether or not the connection or discharges to it had been established or approved prior to the effective date of this Ordinance.

(b) If, subsequent to eliminating a connection found to be in violation of this Ordinance, the responsible person can demonstrate that an illegal discharge will no longer occur, said person may request City approval to reconnect. The reconnection or reinstallation of the connection shall be at the responsible person's expense.

SECTION 13. Watercourse Protection. Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property reasonably free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse. The owner or lessee shall not remove healthy bank vegetation beyond that actually necessary for maintenance, nor remove said vegetation in such a manner as to increase the vulnerability of the watercourse to erosion. The property owner shall be responsible for maintaining and stabilizing that portion of the watercourse that is within their property lines in order to protect against erosion and degradation of the watercourse originating or contributed from their property.

SECTION 14. Requirement to Remediate. Whenever the City Engineer finds that a discharge of pollutants is taking place or has occurred which will result in or has resulted in pollution of storm water, the storm drain system, or water of the U.S., the City Engineer may require by written notice to the owner of the property and/or the responsible person that the pollution be remediated and the affected property restored within a specified time pursuant to the provisions of Sections 20 through 23 below.

SECTION 15. Requirement to Monitor and Analyze. The City Engineer may require by written notice of requirement that any person engaged in any activity and/or owning or operating any facility which may cause or contribute to storm water pollution, illegal discharges, and/or non-storm water discharges to the storm drain system or waters of the U.S., to undertake at said person's expense such monitoring and analyses and furnish such reports to the City of Dardenne Prairie as deemed necessary to determine compliance with this Ordinance.

SECTION 16. Notification of Spills. Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or water of the U.S. from said facility, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of a hazardous material said person shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). In the event of a release of non-hazardous materials, said person shall notify the City Engineer in person or by phone or facsimile no later than 5:00 p.m. of the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the City Engineer within three

business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 17. Authority to Inspect. Whenever necessary to make an inspection to enforce any provision of this Ordinance, or whenever the City Engineer has cause to believe that there exists, or potentially exists, in or upon any premises any condition which constitutes a violation of this Ordinance, the City Engineer may enter such premises at all reasonable times to inspect the same and to inspect and copy records related to storm water compliance. In the event the owner or occupant refuses entry after a request to enter and inspect has been made, the City is hereby empowered to seek assistance from any court of competent jurisdiction in obtaining such entry.

SECTION 18. Authority to Sample, Establish Sampling Devices, and Test. During any inspection as provided herein, the City Engineer may take any samples and perform any testing deemed necessary to aid in the pursuit of the inquiry or to record site activities.

SECTION 19. Notice of Violation. Whenever the City Engineer finds that a person has violated a prohibition or failed to meet a requirement of this Ordinance, the City Engineer may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:

- (a) The performance of monitoring, analyses, and reporting;
- (b) The elimination of illicit connections or discharges;
- (c) That violating discharges, practices, or operations shall cease and desist;
- (d) The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; and
- (e) Payment of a fine to cover administrative and remediation costs; and
- (f) The implementation of source control or treatment management plans.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by the City or a contractor designated by the City Engineer and the expense thereof shall be charged to the violator pursuant to Section 22 below.

SECTION 20. Appeal. Notwithstanding the provisions of Section 24 below, any person receiving a Notice of Violation under Section 20 above may appeal the determination of the City Engineer to the Board of Aldermen. The notice of appeal must be received by the Board of Aldermen within 5 days from the date of the Notice of Violation. Hearing on the appeal before

the Board of Aldermen or his/her designee shall take place within 15 days from the date of City's receipt of the notice of appeal. The decision of the Board of Aldermen or designee shall be final.

SECTION 21. Abatement by City. If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or, in the event of an appeal under Section 20, within 10 days of the decision of the Board of Aldermen upholding the decision of the City Engineer, then the City or a contractor designated by the City Engineer shall enter upon the subject private property and is authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the City or designated contractor to enter upon the premises for the purposes set forth above.

SECTION 22. Charging Cost of Abatement/Liens. Within 30 days after abatement of the nuisance by City, the City Engineer shall notify the property owner of the property of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the amount of the assessment with the City Clerk within 15 days. The City Clerk shall set the matter for public hearing by the Board of Aldermen. The decision of the Board of Aldermen shall be set forth by resolution and shall be final. If the amount due is not paid within 10 days of the decision of the Board of Aldermen or the expiration of the time in which to file an appeal under this Section, the charges shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment. A copy of the resolution shall be turned over to the County Assessor so that the assessor may enter the amounts of the assessment against the parcel as it appears on the current assessment roll, and the tax collector shall include the amount of the assessment on the bill for taxes levied against the parcel of land.

SECTION 23. Urgency Abatement. The City Engineer is authorized to require immediate abatement of any violation of this Ordinance that constitutes an immediate threat to the health, safety or well-being of the public. If any such violation is not abated immediately as directed by the City Engineer, the City of Dardenne Prairie is authorized to enter onto private property and to take any and all measures required to remediate the violation. Any expense related to such remediation undertaken by the City of Dardenne Prairie shall be fully reimbursed by the property owner and/or responsible party. Any relief obtained under this section shall not prevent City from seeking other and further relief authorized under this Ordinance.

SECTION 24. Violations. It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance. Any person found guilty of a failure to comply with any of the requirements of this Ordinance shall be guilty of a misdemeanor punishable by a fine of not more than Five Hundred Dollars (\$500.00) or imprisonment for a period of not more than Ninety (90) days. Each day in which any such violation shall continue shall be deemed a separate offense.

SECTION 25. Compensatory Action. In lieu of enforcement proceedings, penalties, and remedies authorized by this Ordinance, the City Engineer may impose upon a violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, etc.

SECTION 26. Violations Deemed a Public Nuisance. In addition to the enforcement processes and penalties hereinbefore provided, any condition caused or permitted to exist in violation of any of the provisions of this Ordinance is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored by the City at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken by the City.

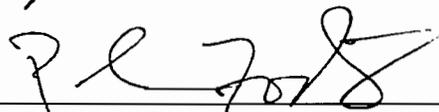
SECTION 27. Acts Potentially Resulting in a Violation of the Federal Clean Water Act. Any person who violates any provision of this Ordinance or any provision of any requirement issued pursuant to this chapter, may also be in violation of the Clean Water Act and/or State law and may be subject to the sanctions of those acts including civil and criminal penalties. Any enforcement action authorized under this Ordinance shall also include written notice to the violator of such potential liability."

SECTION 28. Severability. If any term, condition, or provision of this Ordinance shall, to any extent, be held to be invalid or unenforceable, the remainder hereof shall be valid in all other respects and continue to be effective and each and every remaining provision hereof shall be valid and shall be enforced to the fullest extent permitted by law, it being the intent of the Board of Aldermen that it would have enacted this Ordinance without the invalid or unenforceable provisions. In the event of a subsequent change in applicable law so that the provision which had been held invalid is no longer invalid, said provision shall thereupon return to full force and effect without further action by the City and shall thereafter be binding.

SECTION 29. Effective Date. This Ordinance shall be in full force and take effect from and after the date of its final passage and approval.

SECTION 30. Savings. Nothing contained herein shall in any manner be deemed or construed to alter, modify, supersede, supplant or otherwise nullify any other Ordinance of the City or the requirements thereof whether or not relating to or in any manner connected with the subject matter hereof, unless expressly set forth herein.

Read two times and passed this 15th day of April, 2004.

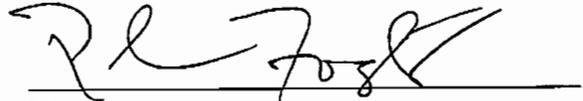


As Presiding Officer and as Mayor

Attest: 

City Clerk

Approved this 15th day of April, 2004.



Mayor

Attest: 
City Clerk

ORDINANCE NO. 1155

**AN ORDINANCE OF THE CITY OF DARDENNE PRAIRIE,
MISSOURI, AMENDING SECTIONS 410.080 AND 410.100 OF
THE MUNICIPAL CODE AND ENACTING A NEW CHAPTER
412 TO THE MUNICIPAL CODE OF THE CITY OF DARDENNE
PRAIRIE, MISSOURI**

**BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF
DARDENNE PRAIRIE, MISSOURI, AS FOLLOWS:**

SECTION 1. That Section 410.080 of the Municipal Code of the City of Dardenne Prairie, Missouri be and is hereby amended to read as follows:

SECTION 410.080: GRADING PERMIT PROCESS

- A. Any development greater than ten thousand (10,000) square feet or requiring the preparation of complete improvement plans in accordance with this Chapter as determined by the City Engineer shall be required to obtain a grading permit from the City of Dardenne Prairie. Once the preliminary plat or PUD area plan has been approved by the Planning and Zoning Commission, the grading permit process shall be as described herein. Grading plans may be submitted to the City Engineer as part of the improvement plans or separately prior to the submission of improvement plans; however, a grading permit shall be submitted and processed in either case.
- B. *Filing Procedures.* The applicant shall submit two (2) copies of the proposed grading plan and a completed application form to the City Engineer. Additional copies shall be requested upon review by the City Engineer. The grading plan shall be on sheets not greater than twenty-four (24) by thirty-six (36) inches.
- C. *Information Required.* The following information is required for all grading plan submittals for approval. The required information may be combined for presentation on one (1) or more drawings or maps. In the interests of clarity, speed and efficiency in the review process, the City Engineer may request that information in addition to the grading plan be presented on drawings or maps. In all cases, the grading plan submission must minimally include the following:
 - 1. The grading plan shall be of a scale not to be greater than one (1) inch equals twenty (20) feet nor less than one (1) inch equals two hundred (200) feet and of such accuracy that the City Engineer can readily interpret the plan and shall include more than one (1) drawing where required for clarity.

2. The property is identified by lot lines and location, including dimensions, angles and size, correlated with the legal description of said property. The grading plan shall be designed and prepared by a qualified land planner, registered professional architect and engineer or land surveyor. It shall also include the name and address of the property owner(s), developer(s) and designer(s).
 3. It shall show the scale, north point, boundary dimensions, natural features such as woodlots, streams, rivers, lakes, drains, topography (at least five (5) foot contours intervals; when terrain is irregular or drainage critical, contour interval shall be at least two (2) foot) and similar features. All topographic data shall directly relate to U.S.G.S. datum.
 4. It shall show existing manmade features such as buildings, structures, easements, high tension towers, pipelines, existing utilities such as water and sewer lines, etc., excavations, bridges, culverts and drains and shall identify adjacent properties within three hundred (300) feet and their existing uses.
 5. Any proposed alterations to the topography or other natural features are indicated.
 6. All filled places under proposed storm and sanitary sewer lines, building areas and/or paved areas and storm water detention basin berms shall be compacted to ninety percent (90%) of maximum density as determined by the Modified AASHTO T-180 Compaction Test or ninety-five percent (95%) of maximum density as determined by the Standard Proctor Test AASHTO T-99.
 7. All fill placed in proposed roads areas shall be compacted from the bottom of the fill up to ninety percent (90%) of maximum density as determined by the Modified AASHTO T-180 Compaction Test or ninety-five percent (95%) of maximum density as determined by the Standard Proctor Test AASHTO T-99. All tests shall be verified by a soils engineer concurrent with grading and backfilling operations.
 8. *A sediment and erosion control plan.* The sediment control plan must be implemented in accordance with the land disturbance permit issued for the proposed grading activities pursuant to Chapter 412.
- D. The City Engineer is authorized to promulgate rules and regulations for erosion and sediment management practices not inconsistent with the grading standards herein contained.
- E. A grading permit shall be issued and shall remain in force only upon compliance with the following requirements:

1. Surface waters-damage. Adequate provision shall be made to prevent surface waters from damaging the cut face of an excavation or the sloping surface of a hill.
2. Retaining walls-cribbing. Retaining walls or cribbing shall be required whenever necessary to prevent the surface of any excavation or fill from exceeding at any point the maximum allowable slopes as set forth herein.
3. Drainage. All drainage provisions shall be of such design to carry surface waters to the nearest practical storm drain, natural watercourse or street as approved by the City Engineer or his/her designee as a suitable place to deposit and receive such waters.
4. Protection of streets/property. No excavation shall be made so close to the property line to endanger any adjoining public or private street without supporting and protecting such public or private street or property from settling, cracking or other damage.
5. Fill/location. No fill shall be made so as to cause or to allow the same to be deposited upon or to roll, flow or wash upon or over the premises so affected; or upon or over any public street, walk, place or way; nor so close to the top of a bank of a channel as to create the possibility of bank failure and sliding. At a minimum, a setback of twenty-five (25) feet shall be provided as a buffer to sensitive areas.
6. Materials. Materials for fills shall consist of material obtained from excavation of cut areas, borrow pits or other approved source. Material shall be free of vegetative matter and deleterious material and shall not contain rocks in excess of six (6) inches in diameter, where compacted by rollers or other mechanical equipment.
7. Minimum standards. Minimum standards of excavations and fills shall be as follows; however, more stringent standards may be required based on site conditions:
 - a. The adjoining ground to development sites (lots) shall be provided with protection from accelerated and increased surface water, silt from erosion, and any other consequences of erosion. Runoff water from developed areas (parking lots, paved sites and buildings) above the area to be developed shall be directed to diversions, detention basins, concrete gutters and/or underground outlet systems.
 - b. Federal Emergency Management Agency (FEMA) and U.S. Army Corps of Engineers guidelines shall be followed where applicable regarding site development areas designated as flood plains and wetlands.

- c. All lots shall be seeded and mulched, or sodded, before an occupancy permit shall be issued except that a temporary occupancy permit may be issued by the Building Department in cases of undue hardship because of unfavorable ground conditions.
8. Compaction. All fills intended to support buildings or structures or sewers and conduits shall be compacted to a minimum of ninety percent (90%) compaction as determined by Modified Proctor, ASTM D-1557, unless a lesser percent is recommended to and approved by the City Engineer or his/her designee. Compaction of greater than ninety percent (90%) may be required where special conditions dictate (i.e. large structures, dams). Compaction of fills for buildings or structures must be certified by a registered professional engineer. Compaction of other fills shall be required where necessary as a safety measure to aid in preventing the saturation, slipping or erosion of the fill. The requirements of the City Engineer or his/her designee for the compaction of fills shall include, but shall not be limited to, the following:
- a. Areas to be graded by cutting or filling shall be rough graded to within two-tenths (2/10) of a foot of accepted elevation after allowance has been made for thickness of topsoil, paved areas and other installations.
 - b. The natural ground surface shall be prepared by removing topsoil and vegetation and by compacting the fill upon a series of terraces. Hillside or slope fills shall require plowing or scarification of original ground.
 - c. Grading on slopes will require silt control at intermediate levels to slow surface water, prevent rutting and decrease erosion.
 - d. Grading sites will require silting basins pursuant to erosion and sediment control practices to prevent mud from washing onto adjacent properties.
 - e. If fill material moisture content is below the requirement for compacting to maximum practical density, water in the proper amount shall be added. If moisture content is too great, fill material shall be aerated by blading or other satisfactory methods to reduce moisture content.
 - f. Frozen materials or soft, mucky, friable, easily compressible materials shall not be incorporated in fills intended to support buildings, structures, sewers or conduits, or in the embanked ends of fills. Fill material shall not be placed, spread or rolled while the ground is frozen or thawing.
 - g. The maximum uncompacted thickness of layers of the fill to be compacted shall not exceed eight (8) inches.

- h. Compaction shall be by tamping, sheeps foot rollers, multiple wheel pneumatic or other approved methods. Rolling shall be continuous until the desired maximum density is obtained.
 - i. Density of the proposed fill(s) shall be submitted with the grading permit application for approval by the City Engineer or his/her designee.
 - j. Topsoil disturbed by grading or building operations if stripped and piled for storage shall be stored only in an amount necessary to complete finished grading.
9. Removal of timber, rubbish, logs, trees, brush, vegetative matter and rubbish of any description shall be removed and disposed of so as to leave the disturbed area with a neat and finished appearance. Timber, rubbish, logs, trees, brush, vegetative matter and rubbish of any description shall be removed to the following depths:

Paved areas	2 feet below subgrade
Non-paved areas	2 feet below finished grade

Solid rock, shale or similar materials shall be removed to a depth of fifteen (15) inches below subgrade for paved area and two (2) feet below finish grade for lawn area except where it is impractical because of rock out-cropping. Burning of material shall fall under compliance of State Department of Natural Resources and local fire protection district regulations.

- F. *Review Procedures.* The City Engineer shall review the grading plan for its conformance to standards and specifications set forth in this Chapter and other applicable ordinances. The City Engineer may request modifications in the grading plan. The City Engineer shall then confer approval, conditional approval or disapproval of the grading plan within forty-five (45) days of filing and shall notify the applicant with written reasons for its action.
- G. *Effect Of Grading Plan Approval.* Grading plan approval shall confer upon the developer, for a period of one (1) year from date of approval, the conditional right that the general terms and conditions under which the approval was granted will not be changed by the City Engineer. This one (1) year period may be extended by the City Engineer if the developer has applied in writing for such an extension and the City Engineer determines a longer period should be granted due to unusual circumstances. If an extension is not granted, the grading plan approval is null and void. After approval of the grading plan, the developer may proceed with the grading operations upon the final direction of the City Engineer. (Ord. No. 635)

H. Inspections shall be made by the City Engineer or his/her designate during each stage of fill operations and final approval shall be required upon completion of operations. Applicant shall notify the City of the following:

1. Commencement of grading.
2. Completion of rough grading.
3. Completion of finish grading.
4. Completion of all re-establishment of ground cover and construction work, which disturb ground cover.

SECTION 2. That Section 410.100 of the Municipal Code of the City of Dardenne Prairie, Missouri be and is hereby amended to read as follows:

SECTION 410.100: ESCROW REQUIREMENTS

The developer shall post a lender's or escrow agreement insuring or guaranteeing the stabilization and revegetation of the site. The lender's or escrow agreement shall be the same as set out in this Chapter and in the amount provided in Section 412.080.

SECTION 3. That the Municipal Code of the City of Dardenne Prairie, Missouri be and is hereby amended by enacting a new Chapter 412, which shall read as follows:

CHAPTER 412: EROSION AND SEDIMENT CONTROL REGULATIONS

ARTICLE I. GENERAL PROVISIONS

SECTION 412.010: PURPOSE

- A. The purpose of this Chapter is to control soil erosion on land that is undergoing development for non-agricultural uses and to preserve the natural terrain and waterways of land within the City of Dardenne Prairie. Soil erosion may result in the loss of valuable top soil, the degradation of water quality and obstruct stormwater flows in storm sewers, road ditches and natural watercourses.
- B. The provisions in this regulation are intended to promote land preservation and the public welfare by guiding, regulating and controlling the design, construction, use and maintenance of any development or other activity that disturbs or breaks the topsoil or results in the movement of earth. Application of the regulations in this document is intended to control soil erosion and sedimentation.
- C. Damages due to conduct in violation of this Chapter shall be the sole liability of the party or parties in violation and not of the City of Dardenne Prairie.

SECTION 412.020: SCOPE OF AUTHORITY

Any person, firm, corporation or business proposing to remove any ground vegetation, to disturb or fill the land or to store soil affecting five thousand (5,000) square feet or more

or land within the City of Dardenne Prairie shall apply to the City Engineer for approval and issuance of a land disturbance permit. State and Federal permit conditions that are more stringent than the requirements set forth herein shall govern.

SECTION 412.030: DEFINITIONS

The following definitions shall apply in interpretation and enforcement of this Chapter, unless otherwise specifically stated:

DESIGN MANUAL: Current edition of St. Charles County's design criteria for the preparation of improvement plans.

RUNOFF: That part of rainfall that flows off the land into streams or other surface waters.

SUBSTANTIAL RAIN EVENT: A rain event which has a rainfall intensity that causes erosion or a rain event that exceeds one (1.00) inch in a twenty-four (24) hour period.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP): A SWPPP will identify the sources of pollution that affect the quality of storm water discharges from a site and describe and ensure the implementation of practices to reduce pollutants in storm water discharges. A SWPPP is required to be approved by the City Engineer prior to the issuance of a land disturbance permit as set forth in this Chapter.

ARTICLE II. LAND DISTURBANCE PERMIT

SECTION 412.040: LAND DISTURBANCE PERMIT REQUIRED

It shall be unlawful for the owner of a property and/or that owner's agent to perform land disturbance activities affecting five thousand (5,000) square feet or more without obtaining a land disturbance permit.

SECTION 412.050: EXEMPTIONS

Notwithstanding Section 412.040, a land disturbance permit will not be required for the activities listed below, provided that no change in drainage patterns or sedimentation onto adjacent properties will occur.

1. Land disturbance activities in public rights-of-way covered by a special use permit.
2. Land disturbance activities for or by any public utility for the installation, inspection, repair or replacement of any of its facilities.
3. Land disturbance activities in quarries and permitted sanitary landfills that do not drain off the property.

4. Land disturbance activity of land for farming, nurseries, landscaping or gardening or similar agricultural or horticultural use whenever there is substantial compliance with recommendations or standards of the local soil conservation authority.
5. Removal of existing or dying grass or similar vegetation by disturbing not more than a maximum area of ten thousand (10,000) square feet and resodding or reseeding with new landscaping to include preparation of the seed bed; provided erosion and sediment control measures are provided until the grass or other vegetation is established.
6. Gardening and similar activities on property occupied by one- or two-family dwellings.
7. Any emergency activity that is immediately necessary for the protection of life, property or natural resources.

ARTICLE III. GENERAL REQUIREMENTS

SECTION 412.060: PLAN SUBMITTAL REQUIREMENTS

Two (2) sets of plans (SWPPP) shall be submitted to the City Engineer for initial review along with the plan review fee. Additional copies of the plan shall be requested upon review by the City Engineer for review and approval. The review fee for the plans shall be per the fee schedule for services, permit applications, plan reviews, inspections, rezonings and conditional uses, which is on file in the office of the City Clerk. Initially submitted plans must include all items in Subsections (1) and (2) of this Section and must be supplemented by all items in Subsection (3) of this Section prior to issuance of any permit, unless an item is waived pursuant to Section 412.070.

1. General information.
 - a. Name, address and telephone number of property owner or permittee.
 - b. Property address and location map of land disturbance property.
 - c. Property boundaries and adjacent property owners.
 - d. A site map showing the outlines of the total project area and land disturbance areas.
 - e. Total acreage of site or property.
 - f. Total acreage of land disturbance.
 - g. Name and address of engineering firm or engineer.
 - h. Existing land use and zoning.
 - i. USGS benchmark source and site benchmark on USGS datum.
 - j. Plotted no larger than on twenty-four (24) inch by thirty-six (36) inch paper at an appropriate horizontal scale between one (1) inch equals two hundred (200) feet and one (1) inch equals ten (10) feet.
 - k. Topographic survey of physical features to at least twenty-five (25) feet beyond the land disturbance activity area.
 - l. Existing surface contours at interval no greater than two (2) feet to at least twenty-five (25) feet beyond the land disturbance activity area.
 - m. FEMA flood panel number and delineation of 100-year flood plain and floodway.

- n. Location of soil types, wooded areas, watercourses, wetlands, surface water bodies and soil borings.
 - o. Location of all underground and above ground utilities, including pipelines operated at a service pressure in excess of two hundred (200) psig.
 - p. Delineation of the trees to be preserved.
 - q. Delineation of the vegetative buffer plan.
 - r. Field surveyed natural watercourses showing top and toe of banks.
 - s. Proposed access to the site either from public right-of-way under a permit issued by the governing agency or through private property under an easement or license. (Attach copy of permit, easement or license.)
 - t. All proposed permanent improvements to be constructed as part of the land disturbance activity.
 - u. Proposed surface contours at intervals no greater than two (2) feet to at least twenty-five (25) feet beyond the land disturbance activity area.
 - v. Land disturbance activity notes, which includes a note stating that "The contractor shall contact the City Engineer to request inspection of the site at least two (2) days in advance of construction startup".
 - w. Construction details.
 - x. Signature, seal and date of a licensed professional engineer or registered land surveyor and his (her) statement identifying sources of topographical information.
 - y. A signed statement by the permittee assuming full responsibility for the performance of the land disturbance activities and that all State, County, City and private property or roads will be adequately protected.
 - z. Other items as required in the Design Manual or as required by the City Engineer.
2. Specific design information.
- a. A geotechnical report identifying the United States Department of Agriculture soil textures throughout the site; slope stabilization analysis for cut and fill slopes; and other pertinent data related to erosion or sediment concerns during land disturbance activities.
 - b. The sequence of all land disturbance activities including those listed below, and all installations of erosion and sediment controls listed below, shall be shown on construction plans:
 - (1) Stripping and clearing;
 - (2) After changes in drainage courses;
 - (3) Construction of underground infrastructure;
 - (4) Construction of structures, such as buildings, pavement, retaining walls;
 - (5) Final grading; and
 - (6) Landscaping.

The City Engineer may require that separate construction plans be submitted for separate phases of the project.
 - c. Stabilization of any stream bank erosion problems existing in natural watercourses that are to be left undisturbed, that may jeopardize private lots, public utilities or detention facilities.

- d. Details of any temporary drainage system proposed to be installed in connection with any and all phases of land disturbance activity.
 - e. Details of proposed water impoundment structures, embankments, sediment or debris basins, grass or lined waterways and diversions with the details and locations of proposed stable outlets and the location of any downstream impoundments which could be affected by the proposed land disturbance activities.
 - f. Location of construction traffic entrance and wash-off pad.
 - g. Description of erosion and sediment controls that will be installed prior to and during land disturbance activity to control pollutants in stormwater discharges, along with drainage area map with appropriate pre-development, appropriate interim and post runoff calculations for each proposed stormwater conveyance system and erosion and sediment control. (Calculations shall conform to Article IV of this Chapter.)
 - h. Drawing depicting the runoff travel paths, which are the route taken by a drop of effective rainfall falling at the most hydraulically remote point to the outlet of a drainage basin to determine the time of concentration used in item (g) above. Provide calculations for time of concentration and composite curve number (CN) for pre-developed watersheds.
 - i. Description and location of permanent erosion and sediment controls after land disturbance activities have ended.
 - j. Calculations required by Section 412.150.
3. Other required submittals. Other items, if applicable, must be submitted prior to issuance of a land disturbance permit.
- a. Alternative material and vendor specifications for erosion and sediment control devices.
 - b. Other City of Dardenne Prairie permits, such as floodplain development permit, special use permit, demolition permit and building permit for retaining walls.
 - c. Permits from other governmental agencies, such as United States Army Corps of Engineers Section 404 permit and Missouri Department of Natural Resources Section 401 permit.
 - d. Missouri Department of Natural Resources land disturbance permit.
 - e. Performance guarantee pursuant to Section 412.080.
 - f. Executed easements needed for land disturbance activities or access.

SECTION 412.070: WAIVER OF REQUIREMENTS

The applicant may request a waiver of specific plan submittal requirements to the City Administrator. The City Administrator, upon recommendation from the City Engineer, may grant the request for a waiver upon the determining that the item to be waived is not applicable to the project under review or that the request for a waiver is justified and that the remaining information on the submitted plans is sufficient to show that the work will comply with the objectives and principles of this Chapter.

SECTION 412.080: PERFORMANCE GUARANTEE

In order to obtain a land disturbance permit, the applicant must insure or guarantee the stabilization of the site upon completion or stoppage of the land disturbance activity.

1. Instruments of performance guarantee. The applicant shall post an escrow agreement, lender's agreement or (for amounts of five thousand dollars (\$5,000.00) or less) a certified check with the City Clerk in the amount established in this Section.
2. Amount of performance guarantee.
 - a. Except as provided hereafter in this Section, the amount of the performance guarantee shall be determined from the estimated land disturbance acreage rounded up to the nearest tenth (0.1) of an acre times the cost per acre according to the following schedule:

Land Disturbance Acreage	Cost per Acre
<5.0	\$3,000.00
5.1-20.0	\$2,500.00
>20.0	\$2,000.00

- b. However, additional amounts will be required equal to the costs of other proposed construction items referenced in Section 412.060(1)(t) and/or (2)(b).
 - c. Alternatively, the applicant may post a performance guarantee in an amount determined by a line-item cost estimate for all erosion and sediment controls and other proposed construction items referenced in Section 412.060(1)(t) and/or (2)(b).
 3. Release of performance guarantee funds.
 - a. The Board of Aldermen may authorize release up to fifty percent (50%) of any performance guarantee funds upon confirming by inspection that all erosion and sediment controls and other proposed construction items referenced in Section 412.060 (1)(t) and/or (2)(b) are in place and functioning properly, including establishment of vegetation.
 - b. The Board of Aldermen may authorize release up to ninety percent (90%) of any performance guarantee funds subject to an escrow or lender's agreement upon confirming by inspection that vegetation has been established and ongoing maintenance has been provided for all installed erosion and sediment controls. However, the amount retained shall not be reduced to less than the cost of maintaining the erosion and sediment controls.
 - c. The Board of Aldermen shall authorize release of all remaining performance guarantee funds only when the City Engineer certifies that all land disturbance work has been completed and all soil subject to the land disturbance permit is stabilized, including permanent vegetation.

SECTION 412.090: ISSUANCE OF A LAND DISTURBANCE PERMIT

A land disturbance permit shall be issued by the City Engineer only if:

1. The application for that permit is complete and includes all submittals required by this Chapter and not waived pursuant to Section 412.070; and
2. The design submitted for approval with the permit is consistent with the design standards established or authorized by Article IV of this Chapter.

SECTION 412.100: TRANSFER OF LAND DISTURBANCE PERMIT

Unless a permittee transfers a land disturbance permit as provided herein, that permittee remains bound by the terms of that permit even after transfer of ownership of land subject to it. A land disturbance permit may be transferred only if all of the following conditions are met.

1. The permittee must file a request for transfer with the City Engineer cosigned by the transferee, which must include:
 - a. A legal description of the area to be transferred; and
 - b. A map or plan showing the area to be transferred.
2. The City Engineer must determine from the request and supporting documentation that the area to be transferred includes substantially all of any drainage basin or basins wholly or partly within the area subject to the originally issued permit and give permittee and transferee written mail notice of that determination.
3. The transferee must submit to the City Engineer:
 - a. An executed escrow or lender's agreement or certified check (as provided in Section 412.080 above); and
 - b. A copy of the Missouri Department of Natural Resources land disturbance permit ownership transfer documentation per 10 CSR 20-6.200 for the same transfer (no City of Dardenne Prairie permit may be transferred without this document).

SECTION 412.110: REQUIREMENTS BEFORE CONSTRUCTION STARTUP

It is the responsibility of the permittee to ensure that the following items are performed prior to construction startup, unless deemed non-applicable to the project by the City Administrator.

1. Schedule a pre-construction conference with the City Engineer prior to the start of each construction phase of land disturbance activity including installation of the temporary construction entrance. The permittee will be responsible for notifying all contractors and other entities, including utility crews that will perform work at the site, to be in attendance.
2. Supply in writing to the City Engineer the name and telephone number of all contractors and subcontractors and a twenty-four (24) hour telephone number of the

permittee's designated agent supervising and directing all land disturbance activities on site.

3. Stake and post signs of tree preservation areas per the approved land disturbance plan and/or grading plan for the site and vegetated buffer areas per the approved land disturbance plan and/or grading plan for the site.
4. Identify in writing each erosion and sediment control product that is not a specification authorized by Article IV of this Chapter and submit manufacturer specifications and installation techniques for approval by the City Engineer for performance equivalency with City of Dardenne Prairie specifications.
5. Identify proposed good housekeeping practices to control general site pollutants, such as construction wastes, site litter, construction debris, dust and sanitary wastes.
6. Identify toxic or hazardous substances, petroleum products, pesticides, herbicides and other pollutants that will be used on site. Identify pollution control method for each substance and submit an emergency management plan for responding to any loss of toxic materials due to a containment failure. This plan must include documentation of actions and mandatory reporting to the Saint Charles County Division of Environmental Services, Solid Waste Enforcement.
7. Provide a location map depicting any proposed borrow or fill sites in the City of Dardenne Prairie and the proposed truck haul routes through the City of Dardenne Prairie.
8. Provide an erosion and sediment control installation sequencing schedule for approval by the City Engineer. The schedule should be a graph or tabulation of each erosion and sediment control installation consistent with Section 412.060 Subsection (2)(b).

SECTION 412.120: PLAN MODIFICATIONS DURING CONSTRUCTION

- A. Field Modifications. The permittee shall modify already approved plans or modify descriptions of pollution prevention methods in any of the following circumstances.
 1. Inspections by the City Engineer or by the Missouri Department of Natural Resources indicate deficiencies.
 2. Inspections by the permittee indicate deficiencies.
 3. Either the permittee or the City Engineer determines that the current installations are ineffective in significantly minimizing or controlling erosion of land or sedimentation in streams or lakes.
 4. Either the City Engineer or the Missouri Department of Natural Resources determines that total settleable solids from a stormwater outfall exceeds two and one-half (2.5) milliliters per liter per hour (ml/L/hr) or one-half (0.5) ml/L/hr in the event the land disturbance activity is within a valuable water resource area as determined by the Missouri Department of Natural Resources.
 5. Either the City Engineer or the Missouri Department of Natural Resources determines that violations of Water Quality Standards 10 CSR 20-7.031(3) may occur or have occurred.
 6. Either the City Engineer or the Missouri Department of Natural Resources determines that the pollution prevention methods submitted to the City Engineer as required by Section 412.100, above, are ineffective in preventing pollution of

waterways from construction wastes, chemicals, fueling facilities, concrete truck washouts, toxic or hazardous materials, site litter or other substances or wastes likely to have an adverse impact on water quality.

- B. Submittal Of Amended Plans. The permittee shall submit for the City Engineer's approval amended plans and descriptions of pollution prevention methods in any of the following circumstances.
1. The permittee seeks to modify the originally approved plans for the design, operation or maintenance of erosion and sediment controls.
 2. The permittee modifies the design for the construction project for which the permittee submitted those originally approved plans, so as to significantly affect the quality of stormwater discharges.
 3. The City Engineer determines that the temporary facilities or erosion and sediment controls installed according to approved plans fail to meet performance standards imposed by these regulations and that those failures require amendment of those plans and supporting documentation or calculations.

SECTION 412.130: INSPECTIONS AND REPORTS

- A. City of Dardenne Prairie Inspections.
1. The permittee consents to the City of Dardenne Prairie inspecting the proposed development site and all work in progress and to payment of additional administration and inspection fees. In order to recoup the actual costs for administration and field inspection of land disturbance and erosion control at the development site, the costs associated with administration of the land disturbance permit and associated field inspections shall be reimbursed to the City based on periodic billings to the permittee.
 2. The City Engineer or his designee shall make inspections and notify the permittee in writing when the work fails to comply with the conditions of the land disturbance permit.
 3. The permittee shall notify the City Engineer or his designee at least two (2) working days before the following activities to obtain timely inspection:
 - a. Establishment of tree preservation and stream buffer boundaries. Refer to Section 412.110(3);
 - b. Start of land disturbance or construction;
 - c. Installation of erosion and sediment controls;
 - d. Completion of site clearing;
 - e. Completion of rough grading;
 - f. Completion or suspension of final land disturbance activity;
 - g. Close of the construction season; and
 - h. Completion of final landscaping.
 4. The City Engineer or his designee shall inspect the property periodically for compliance with these regulations and after any notice to correct issued pursuant to Subsection (B) of Section 412.140. The City Engineer or his designee may

inspect the property upon receipt of a citizen complaint concerning erosion or sediment control issues.

B. Permittee Inspections And Reporting.

1. The permittee shall make regular inspections of the permitted site, observing all erosion and sediment control and other pollutant control measures, outfalls and off-site receiving waters. The inspections must be conducted by a person knowledgeable in the principles and practice of erosion and sediment controls, who possess the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of the erosion and sediment controls used.
2. Inspections must be made by the permittee at least once per week and no later than two (2) days after a substantial rain event. A reduction in the weekly inspections may be waived by the City Administrator upon recommendation of the City Engineer for the following reasons:
 - a. The entire site is temporarily stabilized;
 - b. Runoff is unlikely due to winter conditions, such as snow cover or frozen ground; and
 - c. Construction is during arid periods when no erosion or sediment has occurred.
3. All inspections by the permittee shall be documented in written form on reports with copies submitted to the City Engineer at the time interval specified in the permit. A report of each inspection shall be kept on site by the permittee if possible. Otherwise, the inspection form will be retained by the permittee at its closest business office located within the City of Dardenne Prairie. Falsification of reports is in violation of the permit and cause of immediate suspension or revocation of the permit. The inspection reports are to include the following minimum information:
 - a. Inspector's name and signature;
 - b. Date of inspection;
 - c. Observations relative to the effectiveness and deficiencies of the erosion and sediment controls and other pollution prevention controls;
 - d. Actions taken or necessary to correct deficiencies, including the log of field changes to the approved plan during the period covered by the report;
 - e. A listing of areas where land disturbance activities have permanently or temporarily stopped; and
 - f. Stormwater sampling information and analytical results, when applicable.
4. The permittee shall be responsible for correcting any deficiencies identified within seven (7) calendar days of the date of inspection required by this Subsection identifying these deficiencies.
5. The City Engineer shall make additional inspections as necessary to ensure the validity of the reports filed and, where applicable, to confirm the correction of reported deficiencies.

SECTION 412.140: VIOLATIONS, CORRECTIONS AND ENFORCEMENT

A. Violations.

1. It shall be a violation of this Chapter to construct, enlarge, alter, repair or maintain any land disturbance activity, excavation or fill, or cause the same to be done, contrary to any provision of this Chapter.
2. It shall be a violation of this Chapter to fail to install and maintain any erosion and sediment control measures and systems authorized and required by a duly issued land disturbance permit.
3. It shall be a violation of this Chapter to fail to comply timely with any notice to correct issued pursuant to Subsection (B) of this Section or correct timely any deficiencies identified by the permittee pursuant to Section 412.130(B)(4) above.
4. The need to halt or reduce the permitted construction or grading activity in order to maintain compliance with the permit conditions shall not be a defense to the permittee in an enforcement action.

B. Notice To Correct, Notice Of Violation And Service Of Notices.

1. Upon confirming any violation or deficiency, the City Engineer shall issue a written notice to correct directing abatement of those violations and/or correction of that deficiency within seven (7) calendar days. The notice shall state that failure to comply with its terms shall constitute an additional violation of this Chapter.
2. Upon confirming failure to comply timely with any notice to correct, the City Engineer shall issue a written notice of violation, including a stop work order and notice of fines as authorized by Subsection (C) of this Section.
3. Notwithstanding the foregoing provisions of this Subsection, when the City Engineer finds that any person has undertaken land disturbance activity without a land disturbance permit required by this Chapter, the City Engineer shall issue a notice of violation including a stop work order and notice of fines as authorized by Subsection (C) of this Section and such fines shall accrue from the day on which such unauthorized land disturbance commenced.
4. The City Engineer shall serve any written notice authorized by this Subsection by posting one (1) copy at the work site and by hand-delivering or mailing other copies to any and all persons responsible for the violation or deficiency.

C. Enforcement.

1. Stop work order. The City Engineer shall also have the right to stop all or any part of the construction activities and development until all corrections set out in such notice have been satisfactorily made. To that end, the City Engineer shall issue and post on the site a written order directing that such construction activities and development be stopped immediately and shall serve that written order upon any person, firm, corporation or business engaged in such construction activities and development at the site that is the subject of the violation. Every day that such work continues shall constitute a separate violation. This Chapter does not preclude remedies available under Federal, State or common law.
2. Forfeiture of performance guarantee. In the event of a violation or deficiency that is not resolved in a reasonable time, the performance guarantee proceeds may be

used by the City of Dardenne Prairie to install pollution prevention controls to stabilize the site subject to the land disturbance permit. Prior to resumption of work, permittee must post a new performance guarantee in an amount determined pursuant to Section 412.080.

3. Fines. Any person responsible for a violation of this Chapter shall be guilty of a misdemeanor and liable for a fine not to exceed one thousand dollars (\$1,000.00) a day. Every day that such violation is ongoing shall constitute a separate violation.
4. Enforcement. It shall be the duty of the City Engineer to enforce this Chapter. In discharging that duty the City Engineer may request and shall receive, so far as may be necessary in the discharge of that duty, the assistance and cooperation of other City of Dardenne Prairie Officials.
5. Actions for fines and injunctive relief. In the event of a violation, the City Engineer may request the City Attorney to institute in the Municipal Court an appropriate action for fines and injunctive relief against the person or persons responsible for that violation.

SECTION 412.145: CLOSING OF LAND DISTURBANCE PERMITS

The City Engineer shall close land disturbance permits upon permittee's stabilization of all soil at the site subject to the permit and release the entire performance guarantee as authorized in Section 412.080(3).

ARTICLE IV. DESIGN REQUIREMENTS AND PERFORMANCE GOALS

SECTION 412.150: PURPOSE

This Article IV specifies or authorizes performance and design standards to reduce the amount of sediment and other pollutants in stormwater discharges associated with the land disturbance activities as required by these regulations. The applicant's engineer shall select and design erosion and sediment controls adequate to meet those requirements.

SECTION 412.160: PERFORMANCE STANDARDS

Designs for erosion and sediment controls shall meet the following performance standards.

1. Compliance with all standards imposed by Missouri Department of Natural Resources Missouri State Operating Permit MO-R100A or, if the land disturbance area is within a valuable water resource area as determined by the Missouri Department of Natural Resources, a Missouri State Operating Permit MO-R109 issued in compliance with the Missouri Clean Water Law (Chapter 644, RSMo., as amended), the Federal Water Control Act (Public Law 95-500, 92d Congress, as amended) and Missouri and Federal regulations pursuant thereto.
2. Compliance with the following additional standards stated herein.

- a. No land disturbance activity shall result in the impounding of surface water on property other than the permittee's unless the permittee obtains easements or licenses for that purpose.
 - b. Runoff into receiving streams from any area undergoing land disturbance activities that is greater than three (3) acres shall not exceed the six (6) month peak runoff rate for that area in its pre-developed state.
 - c. Temporary discharges into receiving streams from any area undergoing land disturbance activities shall not result in the accelerated erosion of those streams' channels at the point of discharge.
3. If temporary facilities and erosion and sediment controls installed pursuant to approved plans fail to meet the performance standards set out herein, the City Engineer may require the permittee to submit modified plans as provided in Section 412.120 above.

SECTION 412.170: DESIGN CRITERIA

- A. The erosion and sediment controls and temporary facilities identified in Subsection (B)(1) shall be designed to accommodate at a minimum the runoff for the design storm specified in that Subsection, using the runoff coefficients specified in Subsection (B)(2) and calculated according to the methods defined in this Section.
- B. If installed erosion and sediment controls, designed according to this Article, fail to meet its performance standards above, the permittee shall be required to correct the deficiency in question as provided in Section 412.120.
 1. Design storm. Designs for erosion and sediment controls and temporary facilities constructed during land disturbance activities shall be based on the design storms shown in Exhibit 1.

4. Exhibit 1--Design Storm	
Erosion and Sediment Control and Temporary Facilities	Design Storm
Stormwater Conveyance Systems:	6 month
On-site drainage ditches and diversions	
By-pass storm sewers and channels	2 year
Entrance road culvert	2 year
Storm Inlet Sediment Protection	6 month
Stream Crossing Structures:	
Duration of use: 4 months or less	2 year
Duration of use: longer than 4 months	10 year
Sediment Basin:	
Basin size	6 month
Basin overflow	10 year

2. Runoff coefficient. The runoff coefficient (C) corresponds to the effective runoff based on ground cover, ground slope and that portion of rainfall that is lost to surface runoff by processes such as depression storage, infiltration, interception

and evaporation. The runoff coefficients in Exhibit 2 shall be used in calculating peak runoff rates and stormwater volumes.

Exhibit 2--Runoff Coefficient Table (C)	
Ground Cover	Runoff Coefficient (C)
Pasture and unimproved areas	15%
Woods	10%
Lawns < 6% slope	15%
Lawns > 6% slope	30%
Graded/no vegetation < 6% slope	50%
Graded/no vegetation > 6% slope	60%
Gravel parking lot	75%
Gravel road	80%
Pavement, walks, buildings	95%

The runoff coefficients shall be determined for each drainage area to proposed erosion and sediment control and temporary facilities based on the following criteria.

- a. Land disturbance areas shall be considered stripped of all vegetation in determining runoff for erosion and sediment controls placed prior to land disturbance activities.
 - b. After cut and fill operations are completed, land disturbance areas shall be considered stripped of all vegetation and pavement installed in determining sediment controls, runoff conveyance systems and erosion prevention devices.
3. Peak runoff rate calculation method. The Rational Method, as developed by Mulvaney in 1851, shall be used to determine the peak (maximum) runoff rate. The Rational Method (also known as the Rational Formula) is:

$$Q = C i A$$

where Q = peak runoff rate in cubic feet per second (cfs)

C = runoff coefficient (dimensionless)

I = rainfall intensity rate in inches per hour

A = drainage area in acres

- a. The runoff coefficients (C) to be used are set out in tabular form in Subsection (B)(2), Exhibit 2 above.
- b. The rainfall intensity rates (i) were derived for St. Charles County from the Rainfall Frequency Atlas for the Midwest, Bulletin 71 by Huff and Angel, 1992 for a ten (10) minute rain event. The rainfall intensity rates in Exhibit 3 shall be used.

Exhibit 3--Rainfall Intensity Rates (i)	
Design Storm	Rainfall Intensity Rate (inches/hour)
6 month	2.86
1 year	3.54

2 year	4.38
5 year	5.53
10 year	6.62

4. Total runoff volume calculation. The total volume of runoff for calculating sediment basin size shall be based on the runoff coefficient times the total rainfall in a twenty-four (24) hour period, which is:

$$V = P \times C \times A \times 3630$$

where V = total runoff volume in cubic feet

P = inches of rainfall in a twenty-four (24) hour period

C = runoff coefficient (dimensionless)

A = drainage area in acres

- a. The runoff coefficients (C) to be used are set out in tabular form in Subsection (B)(2), Exhibit 2 above.
- b. The total inches of rainfall in a twenty-four (24) hour period was derived for St. Charles County from the Rainfall Frequency Atlas for the Midwest, Bulletin 71 by Huff and Angel, 1992. The following exhibit shall be used:

Exhibit 4 - Total Inches of Rainfall in a 24-Hour Period	
Design Storm	Rainfall Intensity Rate (inches/hour)
6 month	2.03
1 year	2.50
2 year	3.25
5 year	4.10
10 year	5.00

- B. Design Manual Authorized. The City Engineer is hereby authorized to develop design criteria for erosion and sediment controls that may be employed to comply with these regulations and to meet the performance standards set out above. The design criteria may include specific requirements or conditions for the use of any particular erosion and sediment control. Such design criteria shall be included in the Design Manual.
- C. Use Of Design Manual And Other Guidelines. Plans required by these regulations may include erosion and sediment controls included in the Design Manual, but the Design Manual is not intended to preclude use of other erosion and sediment control methods not included in it. Engineering professionals are encouraged to design innovative ways to address site specific conditions. In all cases, erosion and sediment control products shall be used and installed according to the manufacturer's specifications. In all cases, designs must be approved by the City Engineer and must be in compliance with these regulations and the terms and conditions of applicable Federal and State permits.

SECTION 412.190: SURFACE STABILIZATION REQUIREMENTS

- A. **Surface Stabilization Techniques.** Bare ground must be stabilized by vegetation, rock surfacing, erosion control blankets and netting, soil binders, structural topping, like concreting or other techniques authorized by the Design Manual or approved pursuant to Section 412.100 above. With respect to vegetation, the following provisions shall also apply.
1. Temporary seeding shall be used if the area will be disturbed later in the development. The area must be vegetated by permanent seeding or sodding, when no further land disturbance will occur.
 2. Seeding, fertilizing and mulching shall be applied at the rates and times specified in the Design Manual.
 3. Mulch can be used as temporary cover in unseeded areas to protect against erosion over the winter or until final grading and shaping can be accomplished. Application rates are shown in the Design Manual.
 4. Temporary seeding and mulching shall be placed on seventy percent (70%) of the total disturbed site area according to the stabilization schedule.
 5. Temporary seeding may be suspended in portions of the project area which have an active building permit. Upon completion of the building activity, the site must be permanently stabilized.
 6. Seeded areas shall be re-fertilized four (4) weeks after initial seeding. The seeded area shall be inspected at that time for uniform cover and adequate density. All areas which are bare and sparse (less than thirty percent (30%) ground cover) shall be reseeded and mulched.
 7. Non-degradable mats shall be used only as a permanent installation and in areas that will not be mowed.
- B. **Surface Stabilization Schedule.** Land disturbance activities shall be scheduled as provide in the table below:

Exhibit 5--Soil Stabilization Schedule	
Soil Disturbance Activity or Condition	Required Stabilization Time
Soil disturbance has ceased in areas greater than 2,000 square feet.	14 days
After construction of dikes, swales, diversions and other concentrated flow areas.	5 days
When slopes are steeper than 3 horizontal to 1 vertical.	7 days
When slopes are greater than 3% and longer than 150 feet.	14 days
Perimeter controls around soil stockpiles.	End of workday
Stabilization or covering of inactive stockpiles.	30 days
When land disturbance is completed, permanent	30 days

soil stabilization must be installed.	
---------------------------------------	--

- C. Land Disturbance Phasing. Land disturbance activities should be scheduled in stages of development, so that only the areas that are actively being developed are exposed. Land disturbance areas exceeding ten (10) acres may require phasing, if the City Engineer determines that runoff from the land disturbance area may adversely affect other property.

SECTION 412.200: EARTHWORK REQUIREMENTS

- A. Surface water shall be diverted from the face of all cut and fill slopes exceeding eight (8) feet in vertical elevation.
- B. Slope breaks shall be provided whenever the vertical elevation of any slope exceeds twenty (20) feet.
- C. Diversion berms shall not exceed eight hundred (800) feet in length.
- D. No excavation shall be made so close to the property line to endanger any adjoining public or private street without supporting and protecting such public or private street or property from settling, cracking or other damage.
- E. No fill material shall be placed so as to cause or to allow the same to be deposited upon or to flow onto another property without written consent of the owner.
- F. No fill material shall be placed so as to cause or to allow the same to be deposited upon or to flow onto any public street, walk, place or way, nor so close to the top of a bank of a channel as to create the possibility of bank failure.
- G. Materials for fills shall consist of material obtained from excavation of banks, borrow pits or other approved source. Material shall be free of vegetative matter and deleterious material and shall not contain large rocks or lumps except as certified by a geotechnical engineer to be acceptable fill material.
- H. No cut or fill slope shall be made steeper in slope than three (3) horizontal to one (1) vertical without a geotechnical report and approval by the City Engineer.
- I. Individual and isolated slopes, rock dikes, undisturbed natural slopes and slopes blending with the natural terrain may be steeper than the requirements as approved by the City Engineer.
- J. All fills and trench backfills shall be compacted to the minimums as defined in the Design Manual. Compaction of fills and backfills must be certified by a geotechnical engineer.
- K. Solid rock, shale, tree stumps, masonry and other obstructions shall be removed to a depth of two (2) feet below finished grade or pavement subgrade.

SECTION 412.210: STORMWATER CONVEYANCE REQUIREMENTS

Temporary conveyance of stormwater during land disturbance activities depends upon the peak runoff for the design storm and a suitable method to prevent erosion after construction. The requirements listed below shall be used for temporary conveyance of stormwater.

1. All drainage shall be designed to transport surface waters to the nearest practical storm drain, natural watercourse or street as approved by the City Engineer.
2. Diversion channels and ditches are to be designed to a non-erosive velocity as defined in the Design Manual or the geotechnical report required by Section 412.060 (2)(a). Diversion ditch length shall not exceed eight hundred (800) lineal feet.
3. A rock outlet is required at all pipe and improved channel discharges to open watercourses. The maximum design velocity shall be ten (10) feet per second (fps). If the discharge velocity exceeds ten (10) fps, an engineered energy dissipater may be required as determined by the City Engineer.

SECTION 412.220: SEDIMENT CONTROL REQUIREMENTS

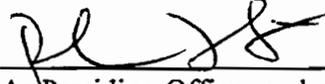
- A. A temporary construction vehicle wash-off pad is required to avoid tracking mud onto public roads and must be located where construction traffic leaves the site. The permittee shall remove any mud, sediment or debris tracked onto public roads by sweeping or other mechanical means.
- B. Sediment basins shall be used to meet water quality discharge requirements and predeveloped runoff rates during land disturbance activities. Sediment basins shall be designed for the following criteria.
 1. Sediment volume shall be determined from the Natural Resources Conservation Service's Revised Universal Soil Loss Equation (RUSLE).
 2. Wet volume shall contain the total runoff produced from the six (6) month twenty-four (24) hour storm.
 3. Dewatering time shall be twenty-four (24) hours for the total volume of wet storage of the basin.
 4. The outlet must be designed to convey the peak 10-year runoff with a minimum one (1) foot freeboard between the water surface of the outlet and the top of the basin embankment.
 5. Other sizing requirements are described in the Design Manual.

SECTION 4. Savings. Except as expressly set forth herein, nothing contained in this Ordinance shall in any manner be deemed or construed to alter, modify, supersede, supplant or otherwise nullify any other Ordinance of the City or the requirements thereof whether or not relating to or in manner connected with the subject matter hereof.

SECTION 5. Severability. If any term, condition, or provision of this Ordinance shall, to any extent, be held to be invalid or unenforceable, the remainder hereof shall be valid in all other respects and continue to be effective and each and every remaining provision hereof shall be valid and shall be enforced to the fullest extent permitted by law, it being the intent of the Board of Aldermen that it would have enacted this Ordinance without the invalid or unenforceable provisions. In the event of a subsequent change in applicable law so that the provision which had been held invalid is no longer valid, said provision shall thereupon return to full force and effect without further action by the City and shall thereafter be binding.

SECTION 6. Effective Date. This Ordinance shall be in full force and take effect from and after the date of its final passage and approval.

Read two times, passed, and approved this 16th day of May, 2007.



As Presiding Officer and as Mayor

Attest:

Kim Clark

City Clerk

Approved this 16th day of May, 2007.



Mayor

Attest:

Kim Clark

City Clerk

APPENDIX C

STORM SEWER OUTFALLS 36" EQUIVALENT DIA. AND LARGER LIST

DARDENNE



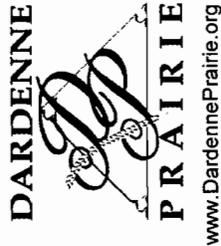
PRAIRIE

www.DardennePrairie.org

Project No.: 970780 Date: 9/10/2007
 Amended: 10/10/2007

Storm Sewer Outfalls - 36" Equivalent Dia. and Larger
Missouri Operating Permit Number (NPDES) MO-R040025

SECTION 6.00											SECTION 6.10		
Outlet No.	Point No.	Longitude hh°mm'ss.s"	Latitude hh°mm'ss.s"	Outlet Description	East of 5th Principal Meridian			Missouri County	Receiving Water				
					1/4	1/4	Sec.						
1	20104	N38 46 26.1	W90 45 0.7	36" RCP Flared End	SE	NW	1	46N	2E	St. Charles	Dardenne Creek (P)		
2	20105	N38 46 25	W90 45 15.6	54" RCP Flared End	SW	NW	1	46N	2E	St. Charles	Dardenne Creek (P)		
3	20107	N38 46 22	W90 44 28.5	42" RCP Flared End	NE	SE	1	46N	2E	St. Charles	Dardenne Creek (P)		
4	20108	N38 45 58.3	W90 45 3.6	66" RCP Flared End	SE	SW	1	46N	2E	St. Charles	Dardenne Creek (P)		
5	20109	N38 46 2.2	W90 45 4.4	48" RCP Flared End	SE	SW	1	46N	2E	St. Charles	Dardenne Creek (P)		
6	20110	N38 46 0.9	W90 44 57.4	66" RCP Culvert Flared End	SE	SW	1	46N	2E	St. Charles	Dardenne Creek (P)		
7	20111	N38 45 56.4	W90 44 20	48" RCP Flared End	SE	SE	1	46N	2E	St. Charles	Dardenne Creek (P)		
8	20112	N38 46 24.2	W90 45 16.6	(2) 4'x4' RCB	NW	SW	1	46N	2E	St. Charles	Dardenne Creek (P)		
9	20209	N38 46 18.5	W90 45 22.5	(2) 6'x5' RCB	NE	SE	2	46N	2E	St. Charles	Dardenne Creek (P)		
10	21101	N38 45 57.5	W90 45 44.2	16'x5' RCB Culvert	NW	NE	11	46N	2E	St. Charles	Dardenne Creek (P)		
11	21201	N38 45 57.2	W90 45 14.6	36" RCP Flared End	NW	NW	12	46N	2E	St. Charles	Dardenne Creek (P)		
12	21202	N38 45 30.2	W90 45 22.6	12'x8' 3-Sided RCB Culvert Bridge	NE	SE	12	46N	2E	St. Charles	Dardenne Creek (P)		
13	21203	N38 45 53.7	W90 44 18.6	72" RCP Flared End	NE	NE	12	46N	2E	St. Charles	Dardenne Creek (P)		
14	21204	N38 45 49.4	W90 44 16.3	36" RCP Flared End	NE	NE	12	46N	2E	St. Charles	Dardenne Creek (P)		
15	21205	N38 45 57.1	W90 45 3.4	8'x5' RCB Culvert	NE	NW	12	46N	2E	St. Charles	Dardenne Creek (P)		
16	30501	N38 46 1.7	W90 42 59.3	60" RCP Flared End	SW	SW	5	46N	3E	St. Charles	Dardenne Creek (P)		
17	30502	N38 46 0.5	W90 42 57.1	48" RCP Flared End	SW	SW	5	46N	3E	St. Charles	Dardenne Creek (P)		
18	30503	N38 45 58	W90 42 35.2	42" RCP Flared End	SE	SW	5	46N	3E	St. Charles	Dardenne Creek (P)		
19	30504	N38 45 57.3	W90 42 36	48" RCP Flared End	SE	SW	5	46N	3E	St. Charles	Dardenne Creek (P)		
20	30601	N38 46 12.9	W90 44 5.8	36" CMP Culvert	NW	SW	6	46N	3E	St. Charles	Dardenne Creek (P)		
21	30602	N38 46 12.8	W90 44 5.8	48"x76" Elliptical RCP	NW	SW	6	46N	3E	St. Charles	Dardenne Creek (P)		
22	30603	N38 46 8.8	W90 43 52.5	36" RCP Flared End	SE	SW	6	46N	3E	St. Charles	Dardenne Creek (P)		
23	30604	N38 46 3	W90 43 48.2	36" RCP	SE	SW	6	46N	3E	St. Charles	Dardenne Creek (P)		
24	30605	N38 45 59.4	W90 43 42.2	(2) 60" RCP Flared End	SE	SW	6	46N	3E	St. Charles	Dardenne Creek (P)		
25	30606	N38 45 57.4	W90 43 27.4	36" RCP Flared End	SW	SE	6	46N	3E	St. Charles	Dardenne Creek (P)		



Project No.: 970780 Date: 9/10/2007
 Amended: 10/10/2007

Storm Sewer Outfalls - 36" Equivalent Dia. and Larger
Missouri Operating Permit Number (NPDES) MO-R040025

SECTION 6.00										SECTION 6.10	
Outlet No.	Point No.	Longitude hh°mm'ss.s"	Latitude hh°mm'ss.s"	Outlet Description	East of 5th Principal Meridian			Missouri County	Receiving Water		
					1/4	1/4	Sec.			T	R
26	30607	N38 46	30.4 W90 43	3.4 78" CMP Culvert	SE	NE	6	46N	3E	St. Charles	Dardenne Creek (P)
27	30608	N38 46	4.9 W90 43	28.4 36" RCP Flared End	SW	SE	6	46N	3E	St. Charles	Dardenne Creek (P)
28	30701	N38 45	38.3 W90 43	55.3 8' Flat-Bottom Creek	SE	NW	7	46N	3E	St. Charles	Dardenne Creek (P)
29	30702	N38 45	38.4 W90 43	55.5 36" RCP Flared End	SE	NW	7	46N	3E	St. Charles	Dardenne Creek (P)
30	30703	N38 45	38.5 W90 43	56.6 36" RCP Flared End	SE	NW	7	46N	3E	St. Charles	Dardenne Creek (P)
31	30704	N38 45	38.1 W90 43	58.7 42" RCP Flared End	SW	NW	7	46N	3E	St. Charles	Dardenne Creek (P)
32	30705	N38 45	51.7 W90 43	4.3 42" RCP Flared End	NE	NE	7	46N	3E	St. Charles	Dardenne Creek (P)
33	30706	N38 45	53.2 W90 43	6.4 36" RCP Flared End	NE	NE	7	46N	3E	St. Charles	Dardenne Creek (P)
34	30707	N38 45	50.8 W90 43	13.2 (2) 8'x8' RCB Culvert	NE	NE	7	46N	3E	St. Charles	Dardenne Creek (P)
35	30708	N38 45	55.8 W90 43	28.2 48" RCP Flared End	NW	NE	7	46N	3E	St. Charles	Dardenne Creek (P)
36	30709	N38 45	47.7 W90 44	7.8 72" CMP Culvert	NW	NW	7	46N	3E	St. Charles	Dardenne Creek (P)
37	30710	N38 45	47.1 W90 44	5.6 48" RCP Flared End	NW	NW	7	46N	3E	St. Charles	Dardenne Creek (P)
38	30801	N38 45	54.2 W90 42	34.6 12' Flat-Bottom Creek	NE	NW	8	46N	3E	St. Charles	Dardenne Creek (P)
39	30802	N38 45	6 W90 42	57 36" RCP Flared End	SW	SW	8	46N	3E	St. Charles	Dardenne Creek (P)
40	30803	N38 45	7.2 W90 42	57.6 72" RCP Flared End	SW	SW	8	46N	3E	St. Charles	Dardenne Creek (P)
41	30804	N38 45	9.1 W90 42	53.5 36" RCP Flared End	SW	SW	8	46N	3E	St. Charles	Dardenne Creek (P)
42	31701	N38 44	50.1 W90 42	42.2 36" RCP Flared End	SE	NW	17	46N	3E	St. Charles	Dardenne Creek (P)
43	31702	N38 44	44.7 W90 42	35.6 36" RCP Flared End	SE	NW	17	46N	3E	St. Charles	Dardenne Creek (P)
44	31703	N38 44	40.5 W90 43	5 48" RCP Flared End	SW	NW	17	46N	3E	St. Charles	Dardenne Creek (P)
45	31704	N38 44	32.2 W90 42	55.3 54" RCP Flared End	NW	SW	17	46N	3E	St. Charles	Dardenne Creek (P)
46	31705	N38 44	33.5 W90 42	51 48" RCP Flared End	NW	SW	17	46N	3E	St. Charles	Dardenne Creek (P)
47	31706	N38 44	27.2 W90 42	45.3 (2) 8'x5' RCB Culvert	NE	SW	17	46N	3E	St. Charles	Dardenne Creek (P)
48	31707	N38 44	26 W90 42	34.4 42" RCP Flared End	NE	SW	17	46N	3E	St. Charles	Dardenne Creek (P)
49	31708	N38 44	50 W90 42	39.8 Dardenne Creek	SE	SE	17	46N	3E	St. Charles	Dardenne Creek (P)
50	31709	N38 44	13.3 W90 43	4 48" RCP Flapgate	SW	SW	17	46N	3E	St. Charles	Dardenne Creek (P)

DARDENNE



www.DardennePrairie.org

Project No.: 970780 Date: 9/10/2007
 Amended: 10/10/2007

Storm Sewer Outfalls - 36" Equivalent Dia. and Larger
Missouri Operating Permit Number (NPDES) MO-R040025

SECTION 6.00											SECTION 6.10	
Outlet No.	Point No.	Longitude hh°mm'ss.s"	Latitude hh°mm'ss.s"	Outlet Description	East of 5th Principal Meridian			Missouri County	Receiving Water			
					1/4	1/4	Sec.			T	R	
51	31710	N38 45 5	W90 43 2.1	36" RCP Flared End	NW	NW	17	46N	3E	St. Charles	Dardenne Creek (P)	
52	31711	N38 45 5.1	W90 42 54.6	(3) 12'x9' RCB Culvert	NW	NW	17	46N	3E	St. Charles	Dardenne Creek (P)	
53	31712	N38 44 38.7	W90 42 29.2	66" RCP Flared End	NW	SE	17	46N	3E	St. Charles	Dardenne Creek (P)	
54	31801	N38 45 0.3	W90 44 3	60"x42" CMP Pipe Arch	NW	NW	18	46N	3E	St. Charles	Dardenne Creek (P)	
55	31802	N38 44 45.5	W90 43 49.5	72" RCP Flared End Culvert	SE	NW	18	46N	3E	St. Charles	Dardenne Creek (P)	
56	31803	N38 44 50.9	W90 43 28.5	48" RCP Flared End	SW	NE	18	46N	3E	St. Charles	Dardenne Creek (P)	
57	31804	N38 44 44	W90 43 23.9	72" RCP Flared End	SW	NE	18	46N	3E	St. Charles	Dardenne Creek (P)	
58	31805	N38 44 36.8	W90 43 31.9	60" RCP Flared End	NW	SE	18	46N	3E	St. Charles	Dardenne Creek (P)	
59	31806	N38 44 20.9	W90 43 12.5	84" RCP Flared End Culvert	SE	SE	18	46N	3E	St. Charles	Dardenne Creek (P)	
60	31807	N38 44 17.5	W90 43 11.6	48" RCP Flared End	SE	SE	18	46N	3E	St. Charles	Dardenne Creek (P)	
61	31808	N38 44 22.1	W90 43 6.6	42" RCP Flared End	SE	SE	18	46N	3E	St. Charles	Dardenne Creek (P)	
62	31901	N38 44 4.5	W90 43 56.7	36" PVC Truss Pipe	NW	NE	19	46N	3E	St. Charles	Dardenne Creek (P)	
63	31902	N38 44 5.7	W90 43 47.1	36" PVC Truss Pipe	NW	NE	19	46N	3E	St. Charles	Dardenne Creek (P)	
64	31903	N38 43 46.5	W90 43 48.6	36" RCP Flared End	NE	SW	19	46N	3E	St. Charles	Dardenne Creek (P)	
65	31904	N38 43 55.8	W90 43 41	37'x10' Arch Bridge w/ 24" Flap	SW	NE	19	46N	3E	St. Charles	Dardenne Creek (P)	
66	31905	N38 43 57.8	W90 43 28.1	48" RCP Flap Gate	SW	NE	19	46N	3E	St. Charles	Dardenne Creek (P)	
67	31906	N38 43 57.4	W90 43 27.5	54" RCP Flared End	SW	NE	19	46N	3E	St. Charles	Dardenne Creek (P)	
68	31907	N38 43 57.2	W90 43 29.8	36" RCP Flared End	SW	NE	19	46N	3E	St. Charles	Dardenne Creek (P)	
69	31908	N38 44 2.1	W90 43 18.1	54" RCP Flared End	NE	NE	19	46N	3E	St. Charles	Dardenne Creek (P)	
70	31909	N38 43 31.1	W90 43 35.9	36" CMP	SW	SE	19	46N	3E	St. Charles	Dardenne Creek (P)	
71	32001	N38 43 46.6	W90 42 56.2	36" CMP	NW	SW	20	46N	3E	St. Charles	Dardenne Creek (P)	
72	32002	N38 43 45.6	W90 42 43	48" RCP Flared End	NE	SW	20	46N	3E	St. Charles	Dardenne Creek (P)	
73	32003	N38 43 42.9	W90 42 43.9	42" RCP Flared End	NE	SW	20	46N	3E	St. Charles	Dardenne Creek (P)	
74	32004	N38 43 37.6	W90 42 47.8	36" RCP Flared End	NE	SW	20	46N	3E	St. Charles	Dardenne Creek (P)	
75	20101	N38 46 51.1	W90 45 7.2	6' Flat-Bottom Creek	NW	NW	1	46N	2E	St. Charles	Lake St. Louis (L3)	

DARDENNE



PRAIRIE

www.DardennePrairie.org

Project No.: 970780 Date: 9/10/2007
 Amended: 10/10/2007

Storm Sewer Outfalls - 36" Equivalent Dia. and Larger
Missouri Operating Permit Number (NPDES) MO-R040025

SECTION 6.00										SECTION 6.10	
Outlet No.	Point No.	Longitude hh°mm'ss.s"	Latitude hh°mm'ss.s"	Outlet Description	East of 5th Principal Meridian			Missouri County	Receiving Water		
					1/4	1/4	Sec.			T	R
76	20102	N38 46 41.6	W90 44 59.5	42" RCP Flared End	NE	NW	1	46N	2E	St. Charles	Lake St. Louis (L3)
77	20103	N38 46 39.6	W90 44 55.4	36" RCP Flared End	NE	NW	1	46N	2E	St. Charles	Lake St. Louis (L3)
78	20106	N38 46 24.3	W90 44 27.8	54" RCP Flared End	SE	NE	1	46N	2E	St. Charles	Lake St. Louis (L3)
79	20201	N38 46 24.5	W90 46 4.8	(2) 60" RCP Flared Ends	SE	NW	2	46N	2E	St. Charles	Lake St. Louis (L3)
80	20202	N38 46 22.6	W90 46 3.4	66" RCP Flared End	NE	SW	2	46N	2E	St. Charles	Lake St. Louis (L3)
81	20203	N38 46 25.1	W90 45 57.3	7'x4' RCB Culvert	SE	NW	2	46N	2E	St. Charles	Lake St. Louis (L3)
82	20204	N38 46 25.3	W90 45 57.2	42" RCP Flared End	SE	NW	2	46N	2E	St. Charles	Lake St. Louis (L3)
83	20205	N38 46 26.3	W90 45 55.4	4' Flat-Bottom Creek	SE	NW	2	46N	2E	St. Charles	Lake St. Louis (L3)
84	20206	N38 46 27.6	W90 45 45	54" RCP Flared End	SW	NE	2	46N	2E	St. Charles	Lake St. Louis (L3)
85	20207	N38 46 30.9	W90 45 55.1	(2) 36" RCP Flared Ends	SE	NW	2	46N	2E	St. Charles	Lake St. Louis (L3)
86	20208	N38 46 31.4	W90 45 54.1	48" RCP Flared End	SW	NE	2	46N	2E	St. Charles	Lake St. Louis (L3)
87	31910	N38 43 23.2	W90 43 7.2	36" RCP Flared End	SE	SE	19	46N	3E	St. Charles	Schote Creek (P)
88	32005	N38 43 32.1	W90 42 34.6	36" CMP	SE	SW	20	46N	3E	St. Charles	Schote Creek (P)
89	32006	N38 43 22.8	W90 42 36.3	10' Flat-Bottom Creek	SE	SW	20	46N	3E	St. Charles	Schote Creek (P)
90	33001	N38 43 18.1	W90 43 20	48" RCP Flared End	NE	NE	30	46N	3E	St. Charles	Schote Creek (P)