



# ***Stormwater Inspection Manual Sedgwick County, Kansas***

***Prepared by:***



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## Table of Contents

<b>1 - INTRODUCTION</b>	<b>1</b>
1.1 PURPOSE AND OBJECTIVES	1
1.2 LEGAL AUTHORITY OF INSPECTORS	1
1.3 RESPONSIBILITIES OF INSPECTORS	2
1.3.1 PROCEDURAL RESPONSIBILITIES	2
1.3.2 INSPECTION PROCEDURES	2
1.3.3 SAFETY RESPONSIBILITIES	3
1.3.4 PROFESSIONAL RESPONSIBILITIES	3
1.3.5 PROFESSIONAL ATTITUDE	4
1.3.6 GIFTS, FAVORS, LUNCHEONS	4
1.4 INSPECTION AREAS	4
<b>2 - INSPECTION PROCEDURES</b>	<b>5</b>
2.1 PRE-INSPECTION PREPARATION	5
2.1.1 REVIEW OF FACILITY BACKGROUND INFORMATION	5
2.1.2 DEVELOPING AN INSPECTION PLAN AND/OR CHECKLIST	6
2.1.3 NOTIFYING THE FACILITY	6
2.1.4 PREPARING EQUIPMENT AND SUPPLIES	7
2.2 OFF-SITE SURVEILLANCE	7
2.2.1 CONSIDERATIONS	7
2.3 ENTRY	8
2.3.1 ENTRY PROCEDURES	8
2.4 DOCUMENTATION	9
<b>3 - CONSTRUCTION ACTIVITIES</b>	<b>11</b>
3.1 APPLICABILITY	11
3.2 NPDES PERMIT	11
3.3 BEST MANAGEMENT PRACTICES	11
3.4 STORMWATER POLLUTION PREVENTION PLAN REQUIREMENTS	11
3.5 INSPECTIONS	14
<b>4 - PERMANENT STORMWATER FACILITIES</b>	<b>16</b>
4.1 APPLICABILITY	16
4.2 INSPECTIONS	16
<b>5 - ILLEGAL ACTIONS</b>	<b>17</b>
5.1 APPLICABILITY	17
5.2 INSPECTIONS	17
<b>6 - ENFORCEMENT</b>	<b>19</b>
<b>7 - COURTROOM PROCEDURES</b>	<b>20</b>
7.1 INTRODUCTION	20
7.2 PRE-TESTIMONY MATTERS	20
7.2.1 PREPARATION	20
7.2.2 LEGAL ETIQUETTE, APPEARANCE, AND Demeanor	21
7.3 GIVING TESTIMONY	21
7.3.1 GENERAL CONSIDERATIONS	21
7.3.2 PRE-TRIAL TESTIMONY: DEPOSITIONS	22
7.3.3 TRIAL TESTIMONY: DIRECT EXAMINATION	22
7.3.4 TRIAL TESTIMONY: CROSS-EXAMINATION	23
7.4 SPECIAL CONSIDERATIONS	23
7.4.1 TECHNICAL TESTIMONY	23

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## APPENDICES

### Appendix A – KDOT TEMPORARY EROSION CONTROL MANUAL

- Appendix A-1 – PERMANENT SEEDING SUMMARY OF SEEDING QUANTITIES (LA850)
- Appendix A-2 – TEMPORARY EROSION AND POLLUTION CONTROL (LA852A)
- Appendix A-3 – EROSION CONTROL SEEDING-SODDING (LA852A-EC)
- Appendix A-4 – TEMPORARY EROSION AND POLLUTION CONTROL TEMPORARY SLOPE DRAIN, TEMPORARY STREAM CROSSING (AGGREGATE) (LA852B)
- Appendix A-5 – TEMPORARY EROSION AND POLLUTION CONTROL, TEMPORARY INLET SEDIMENT BARRIER (SILT FENCE) TEMP. INLET SEDIMENT BARRIER (T.S.D.) (LA852C)
- Appendix A-6 – TEMPORARY EROSION AND POLLUTION CONTROL SLOPE INTERRUPTIONS BIODEGRADABLE LOG / SILT FENCE (LA852D)
- Appendix A-7 – TEMPORARY EROSION AND POLLUTION CONTROL DITCH CHECKS (LA852E)
- Appendix A-8 – TEMPORARY EROSION AND POLLUTION CONTROL ROCK DITCH CHECKS BIODEGRADABLE LOG DITCH CHECKS (LA852G)
- Appendix A-9 – TEMPORARY EROSION AND POLLUTION CONTROL SEDIMENT STORAGE BASIN (LA852H)
- Appendix A-10 – INSTALLATION DETAIL EROSION CONTROL CLASS 1 SLOPE PROTECTION (LA855)
- Appendix A-11 – INSTALLATION DETAIL EROSION CONTROL CLASS 2 FLEXIBLE CHANNEL LINER (LA856)

### Appendix B – FORMS

## ABBREVIATIONS

BMPs	Best Management Practices
CBI	Confidential Business Information
KDHE	Kansas Department of Health and Environment
KDOT	Kansas Department of Transportation
MABCD	Metropolitan Area Building & Construction Department
MS4	Municipal Separate Storm Sewer System
NOI	Notices of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
OCI	Office of Central Inspection
PPE	Personal Protective Equipment
SARA	Superfund Amendments and Reauthorization Act of 1986
SIC	Standard Industrial Classification
SWP2	Stormwater Pollution Prevention
TSS	Total Suspended Solids

## Certification

This Inspection Manual has been prepared by or under the supervision of a Professional Engineer and is not intended for use in design or construction:



ALLIED ENVIRONMENTAL CONSULTANTS, INC.

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# 1 - INTRODUCTION

## 1.1 *PURPOSE AND OBJECTIVES*

Compliance inspections are a part of Sedgwick County's program to maintain and improve the quality of surface water and groundwater within the County. The primary goal of inspection efforts is to ensure and document whether entities regulated under the National Pollutant Discharge Elimination System (NPDES) program are complying with their obligations. The inspection program identifies and documents noncompliance, supports the enforcement process, monitors compliance with enforcement orders and decrees, establishes presence in the regulated community, deters noncompliance, supports the permitting process, and furthers the broad watershed protection and restoration goals of the NPDES program. The purpose of this guidance is to provide inspectors with an in-depth knowledge of the inspection process.

Routine inspections should be performed in a manner designed to:

- Determine compliance status with regulations, permit conditions, and other program requirements.
- Verify the accuracy of information submitted by permittees.
- Verify the adequacy of sampling and monitoring conducted by the permittee.

Other purposes of compliance inspections include:

- Gathering evidence to support enforcement actions
- Obtaining information that supports the permitting process
- Assessing compliance

## 1.2 *LEGAL AUTHORITY OF INSPECTORS*

The Sedgwick County Stormwater Pollution Prevention Resolution 196-10 (SWP2 Resolution), gives County officials the authority to regulate the discharge of pollutants to the County's Municipal Separate Storm Sewer System (MS4) and natural waters within the County. The SWP2 Resolution provides broadly defined authority obtain information through reporting and compliance inspections and take enforcement actions when violations of the SWP2 Resolution occur.

Several Departments in the County will be responsible for enforcing the various ordinance provisions. Those responsibilities are outlined in more detail in the following sections of this manual. The principal Departments involved are listed in Table 1-1. The SWP2 Resolution establishes the following as violations:

1. Illegal dumping or discharging.
2. Failure to get a State NPDES Permit.
3. Failure to prepare a Stormwater Pollution Prevention Plan (SWP2 Plan).
4. Failure to install Best Management Practices (BMPs).
5. Failure to maintain BMPs.
6. Failure to comply with an approved drainage plan
7. Failure to inspect and maintain stormwater control facilities
8. Failure to comply with any order or directive issued under the SWP2 Resolution.

**Table 1-1: Stormwater Departments**

<b>Department</b>	<b>Location</b>	<b>Phone</b>
Stormwater Management	2 <sup>nd</sup> Floor, Public Works 1144 S. Seneca St. Wichita, KS	(316) 660-1754
Public Works Dispatch	1 <sup>st</sup> Floor, Public Works 1144 S. Seneca St, Wichita, KS	(316) 660-1777
Sedgwick County Environmental Resources Department	1 <sup>st</sup> Floor, Public Works 1144 S. Seneca St. Wichita, KS	(316) 660-7200
Sedgwick County Haz-mat	Fire Station 33 10625 W 53 <sup>rd</sup> St. Maize, KS	911

### 1.3 RESPONSIBILITIES OF INSPECTORS

The primary role of an inspector is to gather information that can be used to determine the reliability of the permittee's self-monitoring data and evaluate compliance with permit conditions, the SWP2 Resolution, and other requirements. The inspector also plays an important role in case development and support. To fulfill these roles, inspectors are required to know and use policies and procedures for effective inspection and evidence collection, accepted safety practices, and quality assurance standards.

#### 1.3.1 PROCEDURAL RESPONSIBILITIES

Inspectors must be familiar with general inspection procedures and evidence collection techniques to ensure adequate inspections and to avoid endangering potential legal proceedings on procedural grounds.

#### 1.3.2 INSPECTION PROCEDURES

Inspectors should observe standard procedures for conducting each inspection element. The elements of the inspection process listed in Table 1-2 are common to most NPDES compliance inspections. They are grouped by the major inspection activities:

- Pre-inspection preparation
- Entry
- Opening conference
- Facility inspection
- Closing conference
- Inspection report

**Table 1-2: Inspection Procedures**

<b>Pre-inspection preparation – Establish purpose and scope of inspection.</b>
• Review background information and County records, including permit and permittee compliance file.
• Develop plan for inspection.
• Prepare documents and equipment, including appropriate safety equipment.
• Coordinate schedule with other appropriate regulatory authorities.
<b>Entry—Establish legal entry to facility.</b>
• Identify self and present official credentials to the responsible official.
• If denied entry, call your supervisor.
<b>Opening conference—Orient facility officials to inspection plan.</b>
• Discuss inspection objectives and scope.
• Establish working relationship with facility officials.

<b>Facility inspection—Document compliance/noncompliance with permit conditions; collect evidence including photographs and copies of records.</b>
<ul style="list-style-type: none"><li>• Conduct visual inspection of facility.</li><li>• Review facility records.</li><li>• Inspect monitoring location, equipment, and operations.</li><li>• Document inspection activities.</li></ul>
<b>Closing conference—Conclude inspection.</b>
<ul style="list-style-type: none"><li>• Collect additional or missing information.</li><li>• Clarify questions with facility officials.</li><li>• Review inspection findings and inform officials of follow-up procedures.</li><li>• Issue Compliance Violation, if appropriate.</li></ul>
<b>Inspection report—Organize inspection findings in a report with field notes, copies of records, photographs, and other relevant information.</b>
<ul style="list-style-type: none"><li>• Prepare narrative report, checklists, and documentary information as appropriate.</li><li>• Sign and date the report.</li></ul>

### Evidence Collection

Inspectors must be familiar with general evidence gathering techniques. Because the County's case in an enforcement action depends on the evidence gathered, inspectors must keep detailed records of each inspection. These notes and documentation will be used for preparing the inspection report, determining the appropriate enforcement response, and giving testimony in an enforcement case.

Inspectors must know how to:

- Substantiate facts with items of evidence, including samples, photographs, document copies, statements from witnesses, and personal observations.
- Evaluate what evidence should be collected.
- Write clear, objective, and informative inspection reports.

Inspection procedures are discussed in detail in Chapter 2 of this manual.

#### 1.3.3 SAFETY RESPONSIBILITIES

The inspection of stormwater and other environmental pollution control facilities and construction sites always poses a certain degree of health and safety risk. To avoid unnecessary risks, the inspector should be familiar with all safety obligations and practices. The safety equipment and procedures required for an inspector will be based on either standard safety procedures or the site-specific information from the facility. Inspectors should do the following:

- Use safety equipment in accordance with available guidance and labeling instructions.
- Maintain safety equipment in good condition and proper working order.
- Dress appropriately for the activity and wear appropriate protective clothing.
- Use any safety equipment customary in the establishment being inspected (e.g., hard hat or safety glasses).
- Never enter confined spaces unless properly trained, equipped, and permitted (if applicable).

For any safety-related questions not covered in this manual, the inspector should comply with the County's current approved safety requirements for greater detail, if one is available.

#### 1.3.4 PROFESSIONAL RESPONSIBILITIES

Inspectors are expected to perform their duties with the highest degree of professionalism. The procedures and standards of conduct listed below protect the individual and the County, as well as industry.

- All inspections are to be conducted within the framework of the U.S. Constitution and with due regard for individual rights regardless of race, sex, religion, or national origin.
- The facts of an inspection must be noted and reported completely, accurately, and objectively.
- During an inspection, any act or failure to act motivated by private gain is illegal. Actions that could be construed as such should be scrupulously avoided.
- A continuing effort should be made to improve professional knowledge and technical skill in the inspection field.

### 1.3.5 PROFESSIONAL ATTITUDE

The inspector is a representative of the County and is often the initial or only contact between the County and the permittees. In dealing with facility representatives and employees, inspectors must be professional, tactful, courteous, and diplomatic. A firm but responsive attitude will encourage cooperation and initiate good working relations. Inspectors should always speak respectfully of any product, manufacturer, or person.

### 1.3.6 GIFTS, FAVORS, LUNCHEONS

Inspectors may not accept favors, benefits, or job offers under circumstances that might be construed as influencing the performance of duties. It is prudent to avoid even the appearance of compromising ethics. If offered a bribe, the inspector must not accept money or goods. Since this act may violate state or federal laws, regulations and may also violate criminal statute, report the incident in detail as soon as possible to a supervisor.

## 1.4 *INSPECTION AREAS*

This manual provides guidance for the following inspection areas with regard to the SWP2 Resolution:

- Stormwater Pollution Prevention at Construction Sites
- Inspection of Permanent Stormwater Facilities
- Inspection and investigation of Illegal Actions (Dumping, Connections, etc.)

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# 2 - INSPECTION PROCEDURES

## 2.1 *PRE-INSPECTION PREPARATION*

Pre-planning is necessary to ensure that the inspection is focused and is conducted smoothly and efficiently. Pre-planning involves the following activities:

- Reviewing facility background information
- Developing an inspection plan
- Notifying the facility, if applicable
- Preparing equipment

### 2.1.1 REVIEW OF FACILITY BACKGROUND INFORMATION

Collection and analysis of available background information on the candidate facility is essential for effective planning and overall success of a compliance inspection. Materials from available files and other information sources can enable inspectors to familiarize themselves with the site, conduct a timely inspection, minimize inconvenience to the site by not requesting data previously provided, conduct a thorough and efficient inspection, clarify technical and legal issues before entry, and develop a sound and factual inspection report.

Various types of information that may be available for review are listed below. The list is not intended to be exhaustive and all listed information may not be relevant for all inspections. The inspector should determine the amount of background information necessary for the inspection and focus on the characteristics unique to the facility (e.g., design, historical practices, legal requirements).

#### ***General Facility Information***

- Maps showing site location, drainage inlets, outfalls, and geographic features.
- Site layout diagram.
- Names, titles, and telephone numbers of responsible site officials.
- Any special entry requirements (e.g., security).
- Any safety requirements.
- Climatological data.
- Available aerial photographs.

#### ***Requirements, Regulations, and Limitations***

- Notices of intent (NOI), regulations, requirements, and restrictions placed on permittee discharges, including Stormwater Pollution Prevention Plans (SWP2 Plans).
- Special exemptions and waivers, if any.

#### ***Facility Compliance and Enforcement History***

- Previous inspection reports.
- Correspondence.
- Complaints and reports, follow-up studies, findings, and remedial action.
- Documentation on past compliance violations, exceedances, status of corrective action, if any.
- Enforcement actions such as compliance schedules and consent orders.
- Previous deficiency notices that have been issued to the facility.
- Reports from special studies (e.g., stream monitoring, internal audits) or compliance schedules.

### 2.1.2 DEVELOPING AN INSPECTION PLAN AND/OR CHECKLIST

Inspection plans and inspection checklists are helpful tools for organizing and conducting compliance inspections. A plan is recommended to effectively conduct a compliance inspection. After reviewing the available background information, the inspector prepares a comprehensive plan to define inspection objectives, tasks and procedures, resources required to fulfill the objectives, and inspection schedule. When developing an inspection plan, inspectors should consider the following:

- Objectives
  - What is the purpose of the inspection?
  - What is to be accomplished?
- Tasks
  - What tasks are to be conducted?
  - What information must be collected?
- Procedures
  - What procedures are to be used?
  - Will the inspection require special procedures?
- Resources
  - What personnel will be required?
  - What equipment will be required?
- Schedule
  - What will be the time requirements and order of inspection activities?
  - What will be the milestones?
- Coordination
  - What coordination with laboratories or other regulatory agencies will be required?

An outline of tentative inspection objectives, meetings to be held, and records that will be reviewed can be prepared and presented to the facility officials during the opening conference.

In addition, inspectors may prepare a checklist to use during the inspection to ensure potential compliance issues have been assessed. The checklist content will vary depending on the type of inspection but should distill the applicable regulatory and permit requirements into a simple format allowing the inspector to easily assess and document compliance. Existing checklists may be used or modified for the inspection.

### 2.1.3 NOTIFYING THE FACILITY

#### ***Announced Inspections***

In cases where an inspection will be announced, inspectors should:

- Explain the nature and extent of the inspection.
- Provide a timeframe for the scheduled activities.
- Document any contact with the facility (e.g., phone call, letter, email).
- Request the availability of facility personnel and records/documents during the inspection.
- Inquire about special safety and security requirements.
- Inform the facility of its right to assert a confidentiality claim

The inspector should also determine whether there are program-specific forms or requirements that must be completed during the notification process.

#### ***Unannounced Inspections***

When the facility is not notified in advance, the inspector has an opportunity to observe normal facility operations, rather than a facility that has been prepared for an inspection. However, the inspector may miss interviews with unavailable personnel. The inspector may find that announced inspections are valuable when inspecting large or complex facilities. Decisions on whether an inspection will be announced or unannounced should be made in consultation with the inspector's management and, if necessary, counsel. Unannounced inspections are appropriate if there is concern that the facility may conceal or alter evidence of noncompliance, or if the inspection team suspects that illegal discharge(s) may be occurring.

2.1.4 PREPARING EQUIPMENT AND SUPPLIES

The inspector must prepare all equipment and supplies required for the inspection. Safety requirements must be met, not only for safety reasons, but to ensure that the inspector is not denied entry to the facility or parts of it. If the inspector will use a checklist, it should be developed or obtained during the pre-inspection preparation.

If sampling is to be performed, part of the pre-inspection process may involve preparing sampling equipment and the development of a Sampling Plan. A Sampling Plan is a tool for planners to document the type and quality of data needed and to describe the methods for collecting and assessing those data. Sampling requires additional equipment, which may vary according to the facility inspected and the type of inspection.

**Table 2-1. Inspection Equipment List**

<b>Typical Inspection Equipment</b>	
<b>Documents and Recordkeeping Tools</b>	
<ul style="list-style-type: none"> <li>• Credentials</li> <li>• Background files</li> <li>• Checklists</li> <li>• Bound, waterproof, chemical-resistant logbook</li> </ul>	<ul style="list-style-type: none"> <li>• Waterproof pen</li> <li>• Calculator</li> </ul>
<b>Personal Protective Equipment <sup>a</sup></b>	
<ul style="list-style-type: none"> <li>• Hardhat</li> <li>• Hearing protection</li> <li>• Safety shoes</li> <li>• Gloves</li> </ul>	<ul style="list-style-type: none"> <li>• Reflective safety vest (Class III)</li> <li>• Safety glasses/goggles</li> <li>• Rainwear</li> </ul>
<b>Safety Equipment</b>	
<ul style="list-style-type: none"> <li>• First-aid kit</li> </ul>	
<b>Tools</b>	
<ul style="list-style-type: none"> <li>• Multi-tooled jack knife (Swiss Army Type)</li> <li>• Tape measure</li> <li>• Extra batteries</li> <li>• Extra memory cards for camera, digital camera, video camera</li> <li>• Flashlight</li> </ul>	<ul style="list-style-type: none"> <li>• Screwdriver</li> <li>• Adjustable wrench and vise grips</li> <li>• Cell phone</li> </ul>

<sup>a</sup> Additional personal protective equipment (PPE) and safety equipment may be required for specific types of inspections.

2.2 *OFF-SITE SURVEILLANCE*

2.2.1 CONSIDERATIONS

Often many potential concerns can be identified prior to entering the site, such as illegal discharges, stressed vegetation, spills, smoke, or illegal dumping. Off-site surveillance also provides an opportunity for the inspector to observe traffic patterns into and out of the site. Off-site surveillance also provides the inspector with geographical coordinate information, which can be used to reference photos, locations, violations, etc., and allows the inspector to determine the layout of the site and make judgments about how to prioritize the inspection.

The inspector should document the following information when conducting off-site surveillance:

1. Location of the off-site surveillance: Was the off-site surveillance conducted from a public right-of-way?
2. Facility layout and orientation: A brief sketch of the layout and orientation (as viewed from the public right-of-way) should be noted (or utilize existing permit plans).

3. Visible concerns: What are some obvious concerns visible from public right-of-way?

## 2.3 ENTRY

### 2.3.1 ENTRY PROCEDURES

#### **Authority**

The authority for entry is found in Section 31 of the SWP2 Resolution, which states:

Right-of-Entry. The Director shall have the right to enter the premises of any person discharging storm water to the MS4 or to surface waters at any reasonable time to determine if the discharger is complying with all requirements of this Code, and/or with any State or Federal discharge permit, limitation, or requirement. Dischargers shall allow the Director ready access to all parts of the premises for the purposes of inspection, sampling, records examination and copying, and for the performance of any additional duties related to the determination, correction or elimination of the discharge in question.

Inspections should be conducted only as are necessary to enforce the provisions of the County SWP2 Resolution.

#### **Arrival**

The facility inspection should occur during normal working hours unless information indicates another time would be more appropriate. The inspector should announce him/herself by name, position, and employer. An attempt to ascertain whether the resident, builder, developer, owner/manager, or other individual in charge of the site is present prior to beginning any inspection. If the person is anyone other than the owner, manager, builder, developer, job foreman, or adult tenant, do not enter the site for inspection instead leave a business card and attempt to determine when the person in charge might return.

Prior to entering a facility, inspectors should observe it as thoroughly as possible from public right-of-way (e.g., roads, sidewalks).

#### **Credentials**

When a citizen requests the name and/or identification number of any inspector they are required to tell the citizen their first and last name and ID number. Before entering onto any private property for the purposes of inspection, the inspector County ID badge should be clearly displayed by being pinned or clipped to exterior clothing in a clearly visible manner.

#### **Introduction**

Clearly state the purpose of your visit (to discover and verify stormwater drainage or compliance with stormwater ordinances). Explain to the individual the inspection procedures.

Example Introduction:

“Hello, my name is \_\_\_\_\_. I am an inspector with the Sedgwick County Stormwater Department. I am performing inspections regarding the discharge of stormwater from your property. I would like permission to inspect your stormwater drainage facilities. I would like access to areas exposed to precipitation and any site stormwater controls.”

#### **Consent**

If the inspector is allowed to enter, entry is considered voluntary and consensual.

If the inspector is denied permission to enter the premises for inspection, the inspector will politely thank the occupant and leave the premises. Do not attempt entry or argue with any uncooperative occupant. The inspector may inform the occupant of the inspector's right to enter to inspect and examine records per County Resolution. Additionally, the inspector may inform the occupant of his/her right to request an administrative search warrant if access is denied. If there is a refusal to permit entry, however, the inspector must leave the private portion of the premises. Document any site conditions and the events related to the entry denial after leaving the facility and inform your immediate supervisor.

Once entry has been denied, you may request that an administrative search warrant be prepared. You may make an exterior inspection of the premises which are in plain view and can be noted from public property.

### ***Claims of Confidentiality***

If necessary, the inspector should explain the permittee's right to claim material as confidential business information (CBI). The facility representative should be made aware that the inspector may examine areas related to stormwater even if the permittee has asserted claims of confidentiality.

### ***Waivers, Releases, and Sign-In Logs***

If the facility provides a blank sign-in sheet, log, or visitor register, it is acceptable for inspectors to sign it. However, inspectors must not sign any type of "waiver" or "visitor release" that would relieve the facility of responsibility for injury or that would limit the rights of the County to use data obtained from the facility.

If such a waiver or release is presented, the inspectors should politely explain that they cannot sign and request a blank sign-in sheet. If the inspectors are refused entry because they do not sign the release, they should leave and immediately report all pertinent facts to the appropriate supervisor and/or legal staff. All events surrounding the refused entry should be fully documented. Problems should be discussed cordially and professionally.

Less desirable and as a last resort the inspector may cross-out and initial any wording that is unacceptable due to its restrictive nature. The facility must agree with this option.

### ***Important Considerations***

Inspectors should use discretion and avoid potentially threatening or inflammatory situations. If a threatening confrontation occurs, the inspector should document it and then report it immediately to the supervisor or staff attorney. If feasible, statements from witnesses should be obtained and included in the documentation.

### ***Withdrawal of Consent During Inspection***

If the facility representative asks the inspector to leave the premises after the inspection has begun, the inspector should leave as quickly as possible following the procedures discussed previously for denial of entry. All activities and evidence obtained before the withdrawal of consent are valid. The inspector should ensure that all personal and government equipment is removed from the facility.

### ***Vacant or Unoccupied Sites***

If the site is unoccupied, and if the property is clearly marked with "No Trespassing" signs, the inspector may proceed to make an exterior inspection of the premises which are in plain view and can be noted from public property. If the property is vacant and is not posted with a "No Trespassing" sign, the inspector may proceed to make an exterior inspection by walking around the property. If, however, there is a locked fence, or gate, the inspector should not attempt to open the gate or fence and should not climb the fence. The inspector may make whatever exterior inspection from areas outside the fence, on public property, or on adjoining private properties where proper permission has been obtained.

## **2.4 DOCUMENTATION**

Providing documentation of an inspection is an inspector's basic responsibility. Documentation serves to "freeze" the actual conditions existing at the time of inspection so that evidence can be examined objectively by compliance personnel.

Documentation is a general term referring to all printed information and electronic media produced, copied, or taken by an inspector to provide evidence of suspected violations. Forms of documentation include the field forms, statements, photographs, videotapes, drawings, maps, printed matter, mechanical recordings, and copies of records.

The core of all documentation relating to an inspection is the field notes, which provide accurate and inclusive documentation of all inspection activities.

### ***Inspection Notes***

An inspector may need to testify in an enforcement proceeding. Therefore, it is imperative that each inspector keep detailed records of inspections, investigations, samples collected, and related inspection functions. An inspector should note the date and time of arrivals and departures each day of the inspection and document the sequence of events during each day of the inspection. The types of information that should be entered into the field notes include the following:

### ***Observations***

Record all conditions, practices, and other observations that will be useful in preparing the inspection report or that will validate other types of evidence. For example, weather conditions such as rain/snowfall events prior to and during the inspection are useful and can assist the inspector in determining whether inflow/infiltration is a problem with the facility, or whether stormwater controls were adequate.

### ***Documents and Digital Images***

All documents taken or prepared by the inspector such as the completed checklists for the inspection report should be noted and related to specific inspection activities. The inspector should adequately document each digital image so that its content can be properly identified with the site, date, GPS coordinates (if available), photographer name, and description of the digital image. The "Digital Images" section below contains additional documentation information.

The three types of digital images normally taken, depending on the situation, include:

- 1) the establishing shot,
- 2) the subject, and
- 3) the detail shot.

The "establishing shot" or wide angle shot is a digital image taken from a distance that shows the subject in relation to permanent landmarks that can be used for reference in establishing the location of the subject. The "subject" shot emphasizes a specific object or event. The "detail" shot or close-up is typically an area of interest within the subject, such as a nameplate or leaky valve. It may be helpful to include an object of known size for scale reference such as a notebook or pen.

### ***Unusual Conditions and Problems***

Note and describe unusual conditions and problems in detail.

### ***General Information***

List names and titles of all facility personnel contacted during the inspection and the activities they perform. Business cards of facility representatives may be useful. Any statements made by facility personnel during the inspection should be included in the field notes along with other general information. Information about a facility's recordkeeping procedures may also be useful in later inspections.

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# 3 - CONSTRUCTION ACTIVITIES

## 3.1 APPLICABILITY

Stormwater discharged from construction sites is a significant contributor of sediment to our surface waters. Sediment-laden construction stormwater discharges can result in aquatic habitat destruction and detrimental changes to hydrologic patterns, including increased stream flows and flooding. Total suspended solids (TSS) concentrations from uncontrolled construction site discharges can be more than 150 times greater than the concentration of TSS from stormwater discharges on undeveloped land. The SWP2 Resolution requires that construction sites for which an NPDES permit from KDHE is required provide controls that minimize or prevent pollutants from leaving the site. The controls and practices utilized are referred to as Best Management Practices (BMPs). Construction sites that result in land disturbance of <1 acre may also be subject to SWP2 Resolution requirements if the Director determines the potential for water quality impacts warrant it.

**Construction activities** can include road building, construction of residential houses, office buildings, industrial sites, or demolition.

**Land disturbance** can include exposed soil due to clearing, grading, or excavation activities.

**Larger common plan of development or sale** describes a situation in which multiple construction activities occur in a contiguous area (e.g. Subdivision).

**An operator** is a person that has either operational control of construction project plans and specifications, or day-to-day operational control of activities necessary to ensure compliance with stormwater permit conditions.

## 3.2 NPDES PERMIT

Any owner who intends to obtain coverage for stormwater discharges from a construction site under the Kansas General Permit for Stormwater Discharges From Construction Sites ("the construction general permit") shall submit a signed copy of its notice of intent (NOI) to MABCD/ER when a building permit application is made.

## 3.3 BEST MANAGEMENT PRACTICES

BMPs are a schedule of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States or the County's MS4. BMPs can include both temporary measures used during construction and permanent measures that are constructed in accordance with the provisions of the SWP2 Resolution. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage areas.

## 3.4 STORMWATER POLLUTION PREVENTION PLAN REQUIREMENTS

The SWP2 Plan, if required, must be prepared and approved by the County prior to initiation of construction activities. The construction project should follow the provisions of the SWP2 Plan throughout the construction period, as the SWP2 Plan represents what the operator plans to do to meet the effluent limits in the permit. The SWP2 Plan must be signed by a responsible official such as the president, vice president, or general partner. The construction facility must keep the SWP2 Plan on-site throughout the entire construction period or at an easily accessible location so that it can be made available at the time of an on-site inspection.

## Construction Activities

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The inspector should obtain a copy of and review the SWP2 Plan or at least parts of the SWP2 Plan during the inspection. At a minimum, the inspector should review the site map prior to conducting the field inspection to understand the site and the existing/planned stormwater controls. Depending on the time available for the inspection and the size of the SWP2 Plan, the inspector may complete the remaining portion of the SWP2 Plan review when he or she returns to the office.

In reviewing the SWP2 Plan, the inspector should evaluate if it contains all the required elements specified in the permit. The Construction General Permit requires that the SWP2 Plan identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges and describe and ensure implementation of practices that the operator will use to reduce pollutants in its stormwater discharges. The following items are typically required in all SWP2 Plans, although the inspector should always refer to the specific permit applicable to a particular construction site:

- Identification of the stormwater team.
- A description of the nature of the construction activity.
- Emergency-related projects.
- Identification of other site operators.
- A sequence (schedule) of major construction activity.
- A site map indicating construction area boundaries, locations of all surface waters, natural buffers, federally listed critical habitat for endangered or threatened species, topography of site, existing vegetative cover, storm drain inlets, drainage patterns, discharge locations, potential pollutant-generating activities, stormwater control measures, and chemical use and storage areas.
- Construction site pollutants.
- Non-stormwater discharges.
- Buffer documentation.
- Description of stormwater control measures including the measures to be used, use of treatment chemicals, and stabilization practices.
- Pollution prevention procedures including spill prevention and response and waste management.
- Procedures for inspection, maintenance, and corrective action.
- Personnel training.
- SWP2 Plan certification.
- Post-authorization additions to the SWP2 Plan include copies of the NOI, acknowledgement letter, and the permit.

Typically, measures and controls should include the following:

- **Install erosion and sediment controls**—The permittee is required to complete installation of stormwater controls by the time each phase of earth-disturbance has begun, unless infeasible, and to install these controls according to good engineering practices. The permittee must also ensure that all erosion and sediment controls remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.
- **Provide natural buffers or equivalent sediment controls**—The permittee is required to ensure that any discharges to surface waters through the area between the disturbed portions of the property and any surface waters located within 50 feet of the construction site are treated by an area of undisturbed natural buffer and/or additional erosion and sediment controls to achieve a reduction in sediment load equivalent to that achieved by a 50-foot natural buffer. If it is infeasible for the construction site to maintain a 50-foot natural buffer between earth disturbances and surface waters, erosion and sediment controls may be used.
- **Install perimeter controls**—The permittee must install sediment controls along those perimeter areas of the construction site that will receive stormwater from earth-disturbing activities. Sediment must be removed before it has accumulated to one-half of the above-ground height of any perimeter control.
- **Minimize sediment track-out**—The permittee must minimize the track-out of sediment onto off-site streets, other paved areas, and sidewalks from vehicles exiting the construction site.

- **Control discharges from stockpiled sediment or soil**—For any stockpiles or land clearing debris composed, in whole or in part, of sediment or soil, the permittee is required to: a) locate the piles outside of any natural buffers, b) protect from contact with stormwater (including run-on) using a temporary perimeter sediment barrier, c) where practicable, provide cover or appropriate temporary stabilization to avoid direct contact with precipitation or to minimize sediment discharge, d) do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water, and, e) unless infeasible, contain and securely protect from wind.
- **Minimize dust**—To avoid pollutants from being discharged into surface waters, to the extent feasible, the permittee must minimize the generation of dust through the appropriate application of water or other dust suppression techniques.
- **Minimize the disturbance of steep slopes.**
- **Preserve topsoil.**
- **Minimize soil compaction**—In areas of the construction site where final vegetative stabilization will occur or where infiltration practices will be installed, the permittee must either restrict vehicle/equipment use or use soil conditioning techniques.
- **Protect storm drain inlets**—The permittee, where applicable, must install inlet protection measures that remove sediment from the discharge prior to entry into the storm drain inlet. The permittee is required to clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised.
- **Requirements applicable only to sites using these specific stormwater controls:**
  - **Constructed stormwater conveyance channels**—The permittee should design stormwater conveyance channels to avoid unstabilized areas on the site and to reduce erosion, unless infeasible.
  - **Sediment basins**—The Construction General Permit requires that when a temporary/permanent sediment basin is installed, it must provide storage for either the calculated volume of runoff from a 2-year, 24-hour storm or 3,600 cubic feet per acre drained (Required for drainage areas with 10 acres disturbed at one time).
  - **Treatment chemicals**—Water treatment chemicals, such as polymers and flocculants, may be used as a form of erosion and sediment control. Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g., sediment basin, perimeter control) prior to discharge.
  - **Dewatering practices**—The permittee is prohibited from discharging ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, unless such waters are first effectively managed by appropriate controls.
- **Stabilization requirements**—Practices must be included for interim and permanent stabilization for the site, including a schedule of when the practices will be implemented. When construction activities temporarily or permanently cease on a portion of the site, stabilization measures must be initiated immediately for erosion control.
- **Pollution prevention requirements**—The permittee is required to design, install, and maintain effective pollution prevention measures to prevent the discharge of pollutants. All pollution prevention controls installed must remain in effective operating condition and be protected from activities that would reduce their effectiveness. Certain discharges are prohibited including wastewater from concrete washout, fuels, oils, soaps, solvents, detergents, and toxic or hazardous substances. The following activities require compliance with pollution prevention standards: fueling and maintenance of equipment or vehicles; washing of equipment and vehicles; storage, handling, and disposal of construction materials, products and wastes, and washing of applicators and containers used for paint, concrete, or other materials.
- **Emergency spill notification**—Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or more than a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302 occurs during a 24-hour period, the permittee must notify the National Response Center (NRC).

- **Fertilizer discharge restrictions**—The permittee is required to minimize discharges of fertilizers containing nitrogen or phosphorus.

The SWP2 Plan must also specify the operator personnel who is responsible for inspecting the construction site and the frequency of the inspections. The Construction General Permit requires that the operator complete an inspection at least once every seven days regardless of rainfall, or at least every 14 days and within 24 hours of each rainfall of 0.5 inches or more. The inspector should use appropriate rainfall data, either the data maintained by the permittee or provided by another acceptable source, to ensure that the permittee complies with the required schedule for site inspections.

### 3.5 INSPECTIONS

When conducting the field inspection of a construction site, inspectors should note several items:

- A current copy of the SWP2 Plan must be kept at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection, or upon request. Significant delays in producing the SWP2 Plan or finding knowledgeable stormwater personnel may indicate compliance problems.
- The opening conference with the owner/operator is extremely important. Often at larger residential construction sites, there will be multiple builders working together as co-permittees, each responsible for one or more aspects of SWP2 Plan implementation. It is important to identify the permittee and/or co-permittees and their respective responsibilities under the permit.
- It is good practice to review the site map before conducting the inspection because if the inspector does not know the site boundaries, it is difficult to identify and evaluate the runoff potential. The inspector can download aerial photos prior to the inspection to use along with the site map.
- The SWP2 Plan should reflect current conditions and provide a record of past conditions. The inspector should review the construction sequence and BMP sequence given in the SWP2 Plan and evaluate whether these have been met.
- The closing conference provides an opportunity to describe deficiencies found and identify areas of concern (e.g., parts of a SWP2 Plan missing, inspections not being done, silt fence not installed or not installed correctly, discharge of sediment or other pollutants to a storm drain). Given the transient nature of most construction sites, it is good practice to share information with the site owner/operator as quickly as possible (e.g., prior to issuance of final inspection report) so that any environmental harm can be minimized and corrections can be made prior to the next storm event.

In the field, the inspector should: verify that the SWP2 Plan reflects current site conditions including:

- identification of potential pollutant sources and control measures;
- verify whether structural control measures are properly installed, adequately maintained and in effective operating condition;
- verify whether nonstructural control measures such as stabilization and good housekeeping are being implemented as required by the SWP2 Plan,
- are timely and are adequate and appropriate.

Document all discharges of stormwater observed by the inspector as well as evidence of previous discharges such as accumulation of sediment (whether off-site or in waters, or on-site in gutters, on the street, within storm drains, etc.); and document any evidence of the discharge of other pollutants such as concrete washout or paint.

Appendix A provides examples of Construction BMPs and proper installation and common deficiencies.

Inspection procedures at construction sites should be as follows:

1. Do not conduct NPDES inspections for 24 hours following a rain of 0.25 inches or more.
2. Examine the perimeter of the construction site. Determine if eroded soil or any other pollutant has entered into any storm sewer, drain, or street. If it has not, look to see if any BMP devices are present at the site. If these devices are present and there is no evidence of any pollutant being

discharged, no violation has occurred, document and end the inspection. If pollutants have been discharged and/or if BMP devices are not being used, a violation has occurred.

3. Issue a "Notice of Violation" to the owner and contractor immediately, with a copy to Stormwater Management. Give them 48 hours to come into compliance. Compliance will be realized when effective BMP devices are installed to solve the problem. Reinspect the site within five days of any deadline established in the "Notice of Violation" to determine compliance.
4. If, using your judgement, the pollutants need to be cleaned up, the "Notice of Violation" shall also state a specific deadline for that to occur. Reinspect in accordance with paragraph 3., above.
5. If a contractor or utility company fails to comply with the stipulation in any "Notice of Violation", a citation will be issued. A copy of the citation shall be sent to the Stormwater Management. Photographs should be taken of all violations for later court documentation.
6. If any particular contractor or utility company continues to violate the terms and conditions of the Resolution and receives multiple citations, the administrative penalty process shall also apply. Contact the Environmental Resources Department if that occurs.
7. On individual building sites that disturb one acre or more, the owner/contractor is also subject to the administrative penalty clause in the Resolution. In all likelihood, this would be invoked only in cases of repeated violations by the same owner/contractor. Also, on those sites, the site is required to have a State NPDES permit and a Stormwater Pollution Prevention Plan (SWP2 Plan). When violations occur on these larger sites, the inspector should ask to see the SWP2 Plan and self-inspection reports. If these do not exist, additional violations have occurred for which additional citations can be issued, after issuing the appropriate "Notice of Violation".

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# 4 - PERMANENT STORMWATER FACILITIES

## 4.1 *APPLICABILITY*

Permanent Stormwater Facilities are required for new construction and certain redevelopments. The purpose of these facilities is to reduce the stormwater quantity and enhance the stormwater quality associated with increased runoff associated with impervious surfaces. In accordance with SWP2 Resolution and the Wichita-Sedgwick County Stormwater Manual, these facilities must submit design plans and operations/maintenance plans for approval before a building permit is issued for the site.

## 4.2 *INSPECTIONS*

Owners of permanent stormwater facilities are required to perform self-inspections with inspection reports submitted to the County on a bi-annual basis. The County may inspect these facilities to verify self-reporting and to ensure that the facilities are operating as shown in the approved As-Built Drawings. In most cases the approved Operations/Maintenance Plan will provide guidance to the inspector on applicable items for inspection. In general, the inspector should verify the following:

- Outfalls are in good condition
- Receiving areas do not show evidence of excessive erosion.
- There have been no unapproved changes to stormwater facilities.
- The stormwater facilities are functioning properly.

The Wichita-Sedgwick County Stormwater Manual provides additional details and information related to specific stormwater facilities and should be consulted prior to site inspections.

Locations with permanent stormwater facilities are mapped on the County GIS website. Inspection logs will be saved into the GIS for future reference and maintenance of records.

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# 5 - ILLEGAL ACTIONS

## 5.1 APPLICABILITY

Illegal actions refer to illegal dumping and illicit connections. These are expressly prohibited in the SWP2 Resolution. Illegal dumping occurs any time a substance is dumped or discharged into a lake, drain, or storm sewer that is not a permitted discharge. These violations will generally be found by citizen complaint or by County personnel. An illegal connection is defined as any connection to a storm sewer or outfall to a ditch or pond that discharges any prohibited substance. These connections can be reported by citizens or found by County personnel.

## 5.2 INSPECTIONS

The primary role of inspectors related to illegal actions is verifying information, providing documentation of the action, the materials involved and investigating the source or responsible parties resulting in a "incident report." The inspector should ensure that, if corrective action is needed, the responsible party immediately takes all reasonable steps necessary to minimize or prevent the discharge of pollutants, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events or does not cause a continuous source of pollutants to surface waters or groundwater. Any corrective actions taken should be recorded and documented.

The procedures to be used in dealing with illegal dumping situations are as follows:

1. Fill out an "Incident Report" form to document the occurrence.
2. Determine what the substance is. Call Stormwater Management, if necessary, for an analysis. Take pictures of the violation for later court documentation, if possible.
3. Determine the responsible party, if possible. Should this not be possible, it may be necessary to do additional site monitoring in an effort to determine who is responsible. If the party responsible cannot be determined, the situation should be called into the Sedgwick County Hazmat for potentially hazardous materials or Public Works for non-hazardous materials so that it can be cleaned up.
4. If the responsible party can be determined, issue a "Notice of Violation", and send a copy to Stormwater Management. On the "Notice of Violation", inform the responsible party that it is their duty to clean up the situation. Use judgement on the amount of time you give them to complete this. A minimum time of 24 hours and possibly three to four days for larger infractions is recommended. Reinspect violation for compliance.
5. The enforcement action ends when the responsible party cleans up the situation, but the site should be monitored periodically for any additional reoccurrences. A citation is not issued at this point.
6. If the site is not cleaned up or the responsible party fails to bring the property into compliance, a citation should be issued. Send Stormwater Management a copy of the citation.
7. If necessary, call Stormwater Management to have the situation cleaned up by Sedgwick County Haz-mat or Public Works. Stormwater Management will bill the responsible party.
8. Complete the "Incident Report" form. Send to Stormwater Management.
9. Monitor the site periodically to watch for any reoccurrences. If a reoccurrence occurs, issue a citation immediately.

## Illegal Actions

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The process to use on illegal connections is generally as follows:

1. Report all illegal connections to the Environmental Resources Department.
2. The Environmental Inspector will fill out the appropriate "Incident Report" and determine the nature of the substance being discharged as well as the responsible party. Pictures shall be taken.
3. If the substance is not a prohibited discharge, the investigation will end. Submit a completed "Incident Report" to Stormwater Management.
4. If the substance is determined to be a prohibited discharge, the Environmental Inspector will notify Stormwater Management. If the substance is found to be a hazardous substance, the Environmental Inspector will also notify Sedgwick County Haz-Mat immediately.
5. The Environmental Inspector will contact the owner, issue a "Notice of Violation", explain the problem, and set a date by which we expect the connection to be eliminated. If any subsequent clean-up is warranted, the time frame for that to be completed should be established in the "Notice of Violation." Use your judgement on the amount of time you give them. A minimum time of 24 hours and possibly three to four days for larger infractions is recommended. Reinspect violation for compliance.
6. If the clean-up of the substance is not completed upon reinspection, call Stormwater Management to make arrangements to have the substance cleaned up. Stormwater Management will bill the responsible party for the cost of the clean-up.
7. When the situation is resolved, complete the "Incident Report" and file it with Stormwater Management.

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# 6 - ENFORCEMENT

The Resolution generally provides for the following enforcement mechanisms:

1. Notices of Violation
2. Prosecution of Violations

These will generally apply as follows:

1. Notice of Violation:  
Whenever the Director of Environmental Resources (Director) has probable cause to believe that a violation has occurred, the Director may first issue a violation and order to comply. Notices of violation shall be served to the responsible party and shall outline the violation and the required actions to correct the violation.
2. Prosecution of Violations:  
In the event that violations are not promptly complied with, the Director may institute an appropriate action, which may include:
  - a. Stop Work Order
  - b. Cease and Desist Order
  - c. Requirement of Corrective Action
  - d. Compliance Order
  - e. Fines and Penalties
  - f. Withholding Certificate of Occupancy (from MABCD)

The Resolution also provides for some additional enforcement mechanisms that are implemented at the discretion of the Director in accordance with Sedgwick County Code.

"Notice of Violation" forms will be provided by the Environmental Resources Department, for use with this Resolution.

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# 7 - COURTROOM PROCEDURES

## 7.1 INTRODUCTION

Inspectors perform a vital role throughout the regulatory enforcement process. An enforcement action begins with the inspector collecting and documenting on-site evidence. This chapter deals with the inspector's responsibility to present evidence in formal legal proceedings.

Under most circumstances an inspector will be called as a "fact witness." A fact witness describes personal knowledge obtained through one of the five senses. Throughout the enforcement process, everything an inspector hears, sees, samples, or records may become evidence about which he or she may be questioned. Many cases are tried years after the field and laboratory activities have been conducted. Thus, the inspection report should be sufficiently detailed and legible to allow the inspector to reconstruct the inspection "on the record."

The following is general information regarding courtroom procedures which may change based on legal counsel instructions.

## 7.2 PRE-TESTIMONY MATTERS

### 7.2.1 PREPARATION

Preparation is the key to giving accurate and effective testimony. Successful preparation requires a substantial time commitment. Attorneys and witnesses work together in two types of preparation: factual and procedural.

The inspector will complete most of the factual preparation by writing the inspection report as described in this manual. The witness and the attorney will meet to discuss details from this report. Other items should also be discussed, including the photographs, and the inspector's qualifications. Qualifications include the inspector's educational degree, professional accreditations, inspector training, and on the job experience. The inspector's qualifications must never be exaggerated. Even a small exaggeration may cause the inspector's testimony to lack credibility.

The attorney has primary responsibility for procedural preparation, which includes assembling the facts for presentation in a formal legal setting. In addition to one-on-one preparation, the attorney may consider whether the inspector should participate in a mock trial or visit a hearing to observe other witnesses' testimony. During one-on-one preparation, the attorney and the inspector should discuss:

- Times and dates that require the inspector's attendance
- Legal etiquette and procedure
- General legal framework of the case
- Significance of the inspector's testimony in this framework
- Probable areas of questioning, including direct and cross-examination
- What documents, if any, will be used by the inspector during testimony

Before giving testimony, the witness should review inspection documents, his or her professional qualifications, and information provided by the attorney. This review should be repeated until the witness has thoroughly refreshed himself with the details of the facts relating to the case. Testimony should appear genuine, not contrived as if a script were being followed. Additionally, the attorney should prepare the witness as if he is testifying in court before the witness testifies in court. The witness may ask the attorney to prepare a mock trial to better understand and be comfortable with the process before the actual trial.

An inspector may be subpoenaed to give testimony by the opposing attorney. A subpoena is a mandatory Court Order to appear in court if an inspector is subpoenaed. Time will be short to prepare to give testimony or to respond to the subpoena.

### 7.2.2 LEGAL ETIQUETTE, APPEARANCE, AND Demeanor

A witness's conduct should reflect the solemn nature of the administrative or judicial proceedings. To act in accordance with required legal etiquette, a witness should:

- Dress conservatively following the advice of the County attorney.
- Arrive early and be available immediately when called to testify.
- Address the judge as "your honor."
- Treat an administrative proceeding as seriously as a court trial.

A witness should **not**:

- Whisper, talk, or make jokes in the hearing room. If necessary, a note may be passed.
- Bring magazines or newspapers into the hearing room.
- Discuss the case within earshot of anyone but the County attorney.

Posture, speech, appearance, and attitude influence a witness's credibility. An inspector is a professional who collects, preserves, and presents evidence. To convey a professional demeanor, an inspector should:

- Respectfully respond to questions posed by the opposing attorney on cross examination.
- Remain natural and animated, but not impatient or overly anxious to testify.
- Minimize nervous tendencies.
- Remain calm.
- Refrain from showing hostility toward the opposing counsel, the specific defendant, or the regulated community as a whole.

## 7.3 *GIVING TESTIMONY*

### 7.3.1 GENERAL CONSIDERATIONS

A witness gives testimony to create a legal record of the facts. Before giving testimony, a witness will take an oath that he or she will tell the truth. Failure to tell the truth is actionable as perjury. A witness may give pre-trial testimony in a deposition or trial testimony under direct examination or cross-examination.

To give effective testimony, a witness should 1) listen, 2) pause, and then 3) answer if possible. Listening carefully to the wording and implications of an attorney's questions requires significant effort. If the witness does not understand the question, he or she should stop to think, ask to have the question repeated, or ask to have the questions clarified or explained.

A witness should pause before answering. Pausing provides time to think, makes the response more considered and deliberate, and gives the attorney time to object if necessary. When pausing, the witness should not use words such as "um." These types of words may incorrectly indicate hesitation when later read from the written record.

When answering, a witness should:

- Reply with a "Yes" or "No" when appropriate.
- Speak in complete sentences when answering more fully.
- Be as descriptive as possible in referring to exhibits or photographs. For example, "In the upper right-hand corner, we see..." rather than "Here, we see..."
- Stop immediately if the judge or either of the lawyers begins to speak.
- Avoid memorizing answers to potential questions.
- Never manipulate an answer to benefit one side.

A witness's credibility is defined as the degree of confidence that the judge or jury gives to the witness's testimony. The opposing attorney will try to "impeach" a witness's credibility by suggesting the following: bias, inaccuracy, inability to recollect, false testimony, or even corruption. To minimize the opposing attorney's efforts to discredit the witness's testimony, the witness should:

- Always tell the truth.
- Answer only the question asked, without volunteering additional information.
- Explain answers fully. If the opposing attorney does not allow a full explanation, the County attorney can choose to give the witness an opportunity to explain the answer fully on redirect examination.
- Answer within the limits of the facts.
- Don't hesitate to say, "I don't know," or "I don't remember," if that is the case.
- Correct any mistakes in the testimony as soon as mistakes are identified.
- Carefully identify estimates.
- Never exaggerate.
- Never guess.
- Avoid absolutes, like "I always..." or "I never..."

### 7.3.2 PRE-TRIAL TESTIMONY: DEPOSITIONS

An inspector may be subpoenaed to give a deposition, which is pre-trial questioning under oath by the opposing attorney. Depositions are not often conducted in administrative hearings. Participants include the attorneys for each side, a court reporter, and the witness. Most importantly, a judge will have no role in deposition testimony unless one side abuses the process and the other side seeks relief.

The attorney may use a deposition to "discover" information or to contradict a witness's testimony at trial. In most cases, deposition testimony cannot be used as a substitute for live testimony. To properly prepare for and give deposition testimony, an inspector should:

- Read the notice of deposition.
- Consult with the County attorney to determine what preparation and review of documentation will be necessary.
- Realize that he or she is not "off the record" until completely away from the deposition setting.
- Request a break whenever needed.

After the deposition is transcribed, the witness can read it to make any appropriate corrections. Small errors always exist, but some transcripts contain absolute disasters. Errors in technical details, such as numbers and units, can have a large impact. A witness should never waive the right to read and sign the finished deposition.

### 7.3.3 TRIAL TESTIMONY: DIRECT EXAMINATION

The County attorney will question the inspector during direct examination to put the facts known by the inspector on the record in a well-organized and logical manner.

A good direct examination leads the inspector through his or her entire testimony using a dialogue of short questions and answers. The attorney is responsible for asking appropriate questions in the correct order and ensuring that nothing important is omitted. The witness is only responsible for answering the attorney's questions completely and truthfully.

To avoid legally objectionable or tactically unwise remarks, the witness should trust the County attorney's final decision concerning what questions to ask at the hearing. The attorney's reasoning behind the questioning may be limited, but the witness should trust that the attorney is asking the questions necessary to convey the story behind the violations. If the inspector has forgotten a fact, the attorney may refresh the inspector's recollection with documents, such as the inspection report. The County attorney might also ask, "Is there anything else?" to signal to the inspector that something has been left out.

Redirect examination is a round of questioning only concerning issues raised during cross-examination. Redirect will give the County attorney an opportunity to reduce any damage done to the credibility of the inspector's testimony during cross-examination.

#### 7.3.4 TRIAL TESTIMONY: CROSS-EXAMINATION

Cross-examination, questioning by the opposing attorney, will subject the witness to a more difficult interrogation than direct examination. The opposing attorney will try to cast doubt on the credibility of the witness's testimony. Many witnesses fear counsel techniques such as leading questioning and twisting interpretation. The County attorney will try to protect the witness from abusive uses of these techniques.

The witness can also protect the credibility of his or her testimony by 1) answering briefly, 2) answering accurately, and 3) remaining calm. Answering briefly consists of being responsive to the question, but not volunteering extra information. Avoid rambling, even if the opposing counsel remains silent.

In addition to the recommendations in the section "Giving Testimony," answering accurately requires listening carefully for the following types of questions:

- Questions that inaccurately paraphrase the witness's previous testimony. The error should be corrected or the previous answer restated in full.
- Hypothetical questions or questions requiring a "Yes" or "No" answer. If these questions may compel a misleading or incomplete answer, the witness should explain the answer fully at that time or later during redirect if cut short by the opposing attorney.
- Two-part questions. The inspector should ask the attorney to restate the question or carefully answer each part separately.

Even when a witness's truthfulness, occupational competence, or professional conclusions are challenged, he or she should remain calm. An angry, sarcastic, or argumentative answer is inconsistent with the inspector's role as a neutral government witness. Remaining calm will add credibility to the inspector's testimony. Becoming familiar with the process, including participation in a mock trial can help reduce the stress of cross-examination.

#### 7.4 *SPECIAL CONSIDERATIONS*

##### 7.4.1 TECHNICAL TESTIMONY

An inspector frequently presents technical facts. The inspector must balance the need to be technically accurate with the need to reduce scientific issues to simple terms and concepts.

The first barrier to communicating technical information is the use of jargon. The inspector should prepare carefully to simplify his or her language without over-simplifying the scientific concepts. The inspector should:

- Speak as clearly as possible. The court reporter may have difficulty recognizing numbers and unfamiliar technical terms.
- Ask your attorney to provide a glossary of technical terms, including acronyms, to the court reporter.
- Review the meaning of frequently used acronyms.

Even after the witness explains the definitions of the technical language, the underlying concepts may still be difficult to understand. To teach the necessary technical concepts, the inspector and attorney should consider using:

- Short answers in a logical progression of questions
- Well-paced questioning to avoid information overload
- Diagrams and pictures
- Appropriate analogies

Finally, the inspector should not try to outdo the opposing attorney on technical issues. Not only may the inspector confuse the judge or jury in the process, but also a well-prepared attorney will have thoroughly studied the subject before trial and will have a large advantage in legal debate. Inspectors should walk the judge or jury through a technical analysis using plain language and help them understand why the County

## Courtroom Procedures

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needs to take a particular action to protect public health or collect economic benefit to discourage further violations.

To successfully answer questions regarding technical information, an inspector should:

- Examine questions and answers for assumptions and exceptions.
- Look for inaccurate paraphrasing of the inspector's previous testimony and politely correct them. An opposing attorney may try to restate your testimony with an inaccurate perspective to benefit the defendant.
- Always identify estimates.
- Use references in cases of complicated details. For example, the inspection report could be consulted before testifying about the characteristics of a specific sample.

## **APPENDIX A**

# **KDOT TEMPORARY EROSION CONTROL MANUAL**

# KANSAS DEPARTMENT OF TRANSPORTATION

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## TEMPORARY EROSION CONTROL MANUAL

### GENERAL INFORMATION

Version	Version Date	Notes
1	9/12/2023	



# TABLE OF CONTENTS

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<b>LIST OF ABBREVIATIONS .....</b>	<b>4</b>
<b>NPDES PERMITS .....</b>	<b>5</b>
<b>DESIGN OBJECTIVES .....</b>	<b>6</b>
<b>BMP SELECTION TABLE .....</b>	<b>7</b>
<b>REFERENCES &amp; ADDITIONAL RESOURCES .....</b>	<b>8</b>

# LIST OF ABBREVIATIONS

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<b><u>Abbreviation</u></b>	<b><u>Term/Phrase/Name</u></b>
BMPs	best management practices
Drainage Design Manual	Design manual Volume I (Part C) Bureau of Road Design, Elements of Drainage and Culvert Design
EPA	Environmental Protection Agency
General Permit	KDHE General Permit No. S-MCST-2208-1
HECPs	Hydraulic Erosion Control Products
KART	KDOTs Authentication and Resource Tracking
KDHE	Kansas Department of Health and Environment
KDOT	Kansas Department of Transportation
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
Standard Specifications	Standard Specifications for State Road & Bridge Construction – 2015
SWP2	Stormwater Pollution Prevention Plan
TSD	Triangular Silt Dike

# NPDES PERMITS

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In an effort to limit the pollution of the nation's streams, rivers, and lakes, the Environmental Protection Agency (EPA), directed by Congress, enacted Section 402 of the Clean Water Act. Section 402 established the National Pollutant Discharge Elimination System (NPDES) to regulate the discharge of pollutants from point sources. The EPA requires a NPDES Permit for stormwater discharges from construction activities that disturb one (1) or more acres of land or from smaller sites that are part of a larger, common plan of development or sale which will disturb a cumulative total of one (1) or more acres. For the purposes of the NPDES program, construction activities are defined as clearing, grubbing, grading, and excavation.

In the State of Kansas, the NPDES program has been delegated to the Kansas Department of Health and Environment (KDHE). Construction projects that will disturb one (1) or more acres of land are issued a certificate of coverage under KDHE General Permit No. S-MCST-2208-1 (General Permit), which authorizes the discharge of stormwater associated with construction activities into State waters. KDHE administers two types of NPDES Permits: general and individual. To apply for a general permit, a site owner (in this case, the Kansas Department of Transportation (KDOT)) must file a Notice of Intent (NOI). The NOI application requires basic information about the site's location, existing condition, future use, and stormwater pollution control measures. The general permit will apply to most projects. An individual permit is only required when certain pre-existing site conditions are encountered. These conditions concern proximity to one or more of the following: Indian Lands, contaminated soils, drinking water intakes, historical or archeological sites, and threatened or endangered species. Sites within one-half mile of a Critical Water Quality Management Area, Special Aquatic Life Use Waters, or an Outstanding Water Quality Management Area are also included. If any one of these site conditions is met, KDHE will investigate potential impacts and determine whether coverage under an individual permit is needed.

The core of the stormwater permit process is the Stormwater Pollution Prevention Plan (SWP2). A SWP2 is a listing of all planned erosion and sediment control practices on site. The SWP2 also addresses inspection and maintenance procedures. The SWP2 is not a required attachment to the NOI; however, it is necessary to have the SWP2 developed prior to NOI submission and to have a copy onsite at all times. Currently, the KDOT Environmental Services Section files the NOI for most projects. In addition to the NOI, the general contractor must complete and sign the Contractor's Certification Form. By signing this form, the contractor signifies that they understand the terms and conditions of the General Permit. This form should be kept on site with the SWP2. KDOT has a standard SWP2 policy for all its projects. This policy requires the contractor to develop a SWP2 which includes or references special provisions, standard drawings and specifications, inspection and maintenance report forms, the contractor's erosion control site plan, the KDOT policy on stormwater discharges, and a memorandum for design and field engineers.

Upon completion of the project and final stabilization of all disturbed areas, the owner files the Notice of Termination (NOT). A disturbed area achieves final stabilization when a uniform perennial vegetative cover with a density of 70% of the cover which is typical of undisturbed areas for that area has been established. Filing the NOT signifies that coverage under the General Permit is no longer needed.

If further information is needed, consult the [KDHE Construction Stormwater General Permit 2022](#) and the [KDHE CSGP Definitions and Acronyms](#) packages.

# DESIGN OBJECTIVES

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This document is to be used as guidance for temporary erosion and sediment control practices on construction sites carried out by KDOT. The Best Management Practice (BMP) devices listed in this resource are to be taken as a recommendation and do not replace any project plan, specification, special provision, SWP2, or other specific project commitments. These BMPs have been approved by KDOT for use on projects; other means and methods can be proposed as long as it meets the same end goal.

Note that this manual was prepared using the KDOT Standard Specifications for State Road & Bridge Construction – 2015 (Standard Specifications) as of October 1<sup>st</sup>, 2022. Any updates to the KDOT Standard Specifications would supersede references/links provided in this manual. KDOT Standard Specifications can be found on the KDOT website (<https://ksdot.org/>).

When developing a temporary erosion control plan (as part of the SWP2) at a site, decide which of the following three design objectives is most feasible:

- **Keep the soil at its original location.**  
Keeping the soil at its original location is the preferred objective. This option causes the least amount of harm to the environment. Not only does this option protect the surrounding land and water, but it also prevents costly regrading and redressing of slopes and ditches. However, keeping the soil at its original location is not always feasible due to challenging topography and other site variables.
- **Keep the soil close to its original location.**  
If the soil cannot remain at its original location, every attempt should be made to use the soil at adjacent locations to keep it close. This option will require some regrading and redressing of slopes and ditches.
- **Keep the soil on site.**  
Finally, if site conditions are such that neither of the first two objectives can be met, efforts should be made to prevent the soil from leaving the site. Soil transported offsite can cause far-reaching damage to the downstream environment. Loss of soil from the site should be avoided to the extent practicable.

# BMP SELECTION TABLE

The following table provides general guidance for the selection of the most appropriate temporary erosion and sediment control measures known as BMP's. The table progression is generalized and does not represent every condition that may be encountered in the field. The selection of temporary erosion and sediment control measures for some situations must be based on good judgment and experience with similar conditions. When first selecting BMPs, emphasis should be placed on implementing stabilization measures to minimize the amount of erosion occurring on a site. If erosion cannot be prevented, then temporary sediment control BMPs should be implemented to control the resulting sedimentation.

BMP Category	Condition	BMP Type
Ditches	Grade Less Than or Equal to 6%?	Erosion Control Blankets/Mulch
		Biodegradable Log Ditch Check
	Grade Greater Than 6%?	Rock Ditch Check
		Erosion Control Blankets
		Aggregate Ditch Lining
	High Flows Expected?	Erosion Control Blankets/Geotextiles
		Aggregate Ditch Lining
		Rock Ditch Check
	Slopes	Erosion Control?
Erosion Control Blankets/Mulch		
Geotextiles		
Hydraulic Erosion Control Products		
Rock Slope Protection		
Sediment Control?		Biodegradable Log Slope Interruptions
		Silt Fence Slope Interruptions
		Hydraulic Erosion Control Products
Inlet Protection	(No Decision Needed)	Biodegradable Log and Filter Sock Drop Inlet Protection
		Silt Fence Sediment Barrier
		TSD Inlet Sediment Barrier
		Curb Inlet Protection
Sediment Basin	>=10 acres	Sediment Basin

**Erosion and Sediment Control BMP Selection Table**

## REFERENCES & ADDITIONAL RESOURCES

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1. City of Omaha Environmental Quality Control Division. *Omaha Regional Stormwater Design Manual – Chapter 9 Erosion and Sediment Control*, 2014.
2. Environmental Protection Agency. *Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites*, 2007.
3. Iowa Department of Transportation. *Erosion and Sediment Control Field Guide*, 2020.
4. Kansas City Metropolitan Chapter of the American Public Works Association. *Erosion and Sediment Control*, American Public Works Association Division V Section 5100, September 2010.
5. Kansas Department of Transportation. *Design Manual Volume I (Part C) Bureau of Road Design, Elements of Drainage and Culvert Design*, 2016.
6. Kansas Department of Health and Environment. *General Construction Stormwater Program*, 2022.
7. Kansas Department of Transportation. *KDOT Authentication & Resource Tracking*, September 2022.
8. Kansas Department of Transportation. *KDOT Temporary Erosion-Control Manual*, January 2007.
9. Kansas Department of Transportation. *Standard Specifications for State Road & Bridge Construction*, 2015.
10. Missouri Department of Natural Resources. *Protecting Water Quality: A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri*, 2011
11. Nebraska Department of Transportation. *Construction Stormwater Best Management Practices Pocket Guide*.
12. Nebraska Department of Transportation. *Drainage Design and Erosion Control Manual*, 2006.
13. Ohio Department of Natural Resources, Division of Soil and Water Conservation. *Rainwater and Land Development, Third Edition*, 2006.

# KANSAS DEPARTMENT OF TRANSPORTATION

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## TEMPORARY EROSION CONTROL MANUAL

### SECTION 1 STABILIZATION

Version	Version Date	Notes
1	9/12/2023	



# TABLE OF CONTENTS

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- SECTION 1 STABILIZATION..... 4**
- Temporary Seeding .....4
- Permanent Seeding .....6
- Erosion Control Blankets ..... 10
- Hydraulic Erosion Control Products ..... 11
- Aggregate Ditch Lining..... 12
- Rock Slope Protection ..... 14
- Dust Control ..... 15
- Preserving Natural Vegetation..... 17

# SECTION 1 STABILIZATION

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## TEMPORARY SEEDING

### Purpose and Operation

Temporary stabilization measures for disturbed soils are necessary while conducting construction activities. Temporary seeding is by far the most efficient and cost-effective method for controlling onsite erosion. The key to controlling erosion with temporary seeding is the timeliness of the application. Temporary seeding should be initiated immediately whenever any clearing, grading, excavating, or other soil disturbing activities have temporarily or permanently ceased on any portion of the site and will not resume for a period exceeding 7 calendar days. Onsite erosion and offsite sedimentation will continue to occur as long as a section of exposed earth remains open.

To view KDOTs Standard Drawings for the temporary seeding, select the following link to the standard drawing with relevant detailed design information: [Landscape Standard LA 852A](#). This file can also be found on KDOTs Authentication and Resource Tracking (KART) webpage with a free account.

### Design

#### Material Specification

- Use approved seed mixtures as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2103 – Seeds](#) and [Section 904 – Seeding](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).
- Current temporary seed mixes for use in design are available for download from the KDOT KART website (<https://kart.ksdot.gov/>). Mixes are identified for rural areas in each district as well as a statewide mix for use in urban areas.
- Seed and seed mixtures should comply with the seed and noxious weed laws of the State of Kansas and applicable Kansas Department of Agriculture Rules and Regulations.
- Use approved fertilizers as referenced in the Contract Documents and KDOTs Standard Specifications [Section 903 – Fertilizer, Agricultural Limestone and Peat Moss](#), [Section 2107 – Agricultural Limestone](#), [Section 2108 – Fertilizers](#), and [Section 2109 – Peat Moss](#).
- Use approved mulching as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2110 – Mulch](#) and [Section 905 – Mulching](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).

### Installation

#### Seedbed Preparation

- Unless shown otherwise in the Contract Documents, prepare the seedbed and seed all disturbed or cultivated areas within the right-of-way and construction easements.
- Seed and mulch the area within 24 hours of seedbed preparation.
- Repair eroded areas before the seedbed is prepared.
- In urban areas, use a landscape box to level the seedbed. Grade seedbeds to the elevations of abutting sidewalks. Remove rocks and other debris detrimental to lawn maintenance equipment.
- Before seeding, use tillage equipment that penetrates 2 to 3 inches to prepare a firm, friable and weed-free seedbed. If the use of disks and harrows is impracticable, prepare the seedbed using hand methods.

- Prepare seedbeds in developed urban and residential areas using rotary tillers or similar equipment. Tractor mounted equipment is permitted if the area is large enough to facilitate the use of such equipment.
- Do not injure trees while preparing the seedbed. If the Engineer or Designer designates areas of desirable perennial native grasses to remain, do not till such areas. If areas of annual grasses such as cheat, crabgrass or triple-awn are encountered, destroy such grasses by thorough disking.
- Do not till areas if temporary or existing grasses provide stable slopes with no erosion.

#### *Fertilizer*

- Apply any fertilizers or soil amendments to the prepared seedbed at the rates designated in the Contract Documents.
- Use an agricultural type broadcast spreader or a fertilizer attachment on the seed drill to apply the fertilizer.
- Spread the fertilizer uniformly by hand methods in areas where it is impracticable to use a seed drill.

#### *Seed installation*

- Seed can be implemented using a seed drill, broadcaster seeder, or a hydro-seeder and should be applied at rates specified in the Contract Documents.
- In rural areas, use seed drills. If it is impracticable to operate a seed drill, broadcast the seed with a standard manufacture grass seeder. A hydro-seeder may be used in place of the broadcast seeder, when approved by the Engineer or Designer.
- In urban areas, apply the seed with equipment suitable for the size of the area. Use manually operated drop-seeders, cyclone spreaders or other similar equipment when appropriate. After the seeding, but before mulching, hand rake the seeded lawn areas.

#### *Mulching*

- After an area is fertilized and seeded, uniformly spread mulch over the area or apply hydromulch.
- Mulch or hydromulch should be applied at the rates shown in the Contract Documents. The rates shown in the Contract Documents are a guide. The Engineer or Designer will determine if the applied mulch is sufficient to protect the seeded area.
- Do not allow the mulching operations to lag behind the fertilizing and seed operations more than 24 hours.
- If rain is in the forecast, make every effort to mulch areas the same day as they are seeded.

### **Inspection and Maintenance**

Seeded areas should be inspected at least once within every 7-day inspection monitoring period to verify that a uniform vegetative cover is achieved. The following is a general list of questions that should be addressed during each inspection:

- Do the seeded areas show signs of erosion or washout?

Areas with erosion and where seed has been washed out should be repaired and reseeded.

- Are seeded areas still bare or lack appropriate vegetative cover?

Areas that fail to establish vegetative cover should be reseeded.

- Does the vegetation appear yellow/brown or stunted.

Additional fertilizer applications or scheduled watering can promote vegetative growth. Seasonal watering should be performed as necessary.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## PERMANENT SEEDING

### Purpose and Operation

Permanent stabilization measures for disturbed soils are necessary while conducting construction activities. Permanent seeding consists of the establishment of perennial vegetation. Permanent seeding is typically installed as long-term erosion control for areas that will be inactive for prolonged periods of time or in areas that have reached final grade. Permanent seeding is an efficient and cost-effective method for controlling onsite erosion. The key to controlling erosion with Permanent seeding is the timeliness of the application and use of designated regional seed mixes. Permanent seeding should be initiated immediately whenever any clearing, grading, excavating, or other soil disturbing activities have temporarily or permanently ceased on any portion of the site and will not resume for a period exceeding 7 calendar days. Onsite erosion and offsite sedimentation will continue to occur as long as a section of exposed earth remains open.

To view KDOTs Standard Drawings for the permanent seeding, select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 850](#). This file can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- Use approved seed mixtures as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2103 – Seeds](#) and [Section 904 – Seeding](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).
- Current permanent seed mixes for use in design are available for download from the KDOT KART website (<https://kart.ksdot.gov/>). Permanent seed mixes are identified for both rural and urban areas by District. Rural seed mixes are also identified by soil type and include wildflower mixes. Urban seed mixes also include warm season and cool season lawn mixes.
- Seed and seed mixtures should comply with the seed and noxious weed laws of the State of Kansas and applicable Kansas Department of Agriculture Rules and Regulations.
- Use approved fertilizers as referenced in the Contract Documents and KDOTs Standard Specifications [Section 903 – Fertilizer, Agricultural Limestone and Peat Moss](#), [Section 2107 – Agricultural Limestone](#), [Section 2108 – Fertilizers](#), and [Section 2109 – Peat Moss](#).
- Use approved mulching as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2110 – Mulch](#) and [Section 905 – Mulching](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).
- For mowing specifications refer to KDOTs Standard Specifications [Section 909 – Mowing](#).

### Installation

#### Seedbed Preparation

- Unless shown otherwise in the Contract Documents, prepare the seedbed and seed all disturbed or cultivated areas within the right-of-way and construction easements.
- Seed and mulch the area within 24 hours of seedbed preparation.
- Repair eroded areas before the seedbed is prepared.
- In urban areas, use a landscape box to level the seedbed. Grade seedbeds to the elevations of abutting sidewalks. Remove rocks and other debris detrimental to lawn maintenance equipment.
- Before seeding, use tillage equipment that penetrates 2 to 3 inches to prepare a firm, friable and weed-free seedbed. If the use of disks and harrows is impracticable, prepare the seedbed using hand methods.
- Prepare seedbeds in developed urban and residential areas using rotary tillers or similar equipment. Tractor mounted equipment is permitted if the area is large enough to facilitate the use of such equipment.
- Do not injure trees while preparing the seedbed. If the Engineer or Designer designates areas of desirable perennial native grasses to remain, do not till such areas. If areas of annual grasses such as cheat, crabgrass or triple-awn are encountered, destroy such grasses by thorough disking.
- Do not till areas if temporary or existing grasses provide stable slopes with no erosion. Seed the permanent grasses into the existing cover using a no-till drill.

#### *Fertilizer*

- Apply any fertilizers or soil amendments to the prepared seedbed at the rates designated in the Contract Documents.
- Use an agricultural type broadcast spreader or a fertilizer attachment on the seed drill to apply the fertilizer.
- Spread the fertilizer uniformly by hand methods in areas where it is impracticable to use a seed drill.

#### *Seed installation*

- Seed can be implemented using a seed drill, broadcaster seeder, or a hydro-seeder and should be applied at rates specified in the Contract Documents.
- In rural areas, use seed drills. If it is impracticable to operate a seed drill, broadcast the seed with a standard manufacture grass seeder. A hydro-seeder may be used in place of the broadcast seeder, when approved by the Engineer or Designer.
- In urban areas, apply the seed with equipment suitable for the size of the area. Use manually operated drop-seeders, cyclone spreaders or other similar equipment when appropriate. After the seeding, but before mulching, hand rake the seeded lawn areas.

#### *Mulching*

- After an area is fertilized and seeded, uniformly spread mulch over the area or apply hydromulch.
- Mulch or hydromulch should be applied at the rates shown in the Contract Documents. The rates shown in the Contract Documents are a guide. The Engineer or Designer will determine if the applied mulch is sufficient to protect the seeded area.
- Do not allow the mulching operations to lag behind the fertilizing and seed operations more than 24 hours.
- If rain is in the forecast, make every effort to mulch areas the same day as they are seeded.

- Hydraulic mulching slurry can be applied on top of punched mulch to provide additional erosion protection if in windy or high traffic areas.

#### *Mulch Tacking Slurry*

- When the mulching is applied with a straw blower, if required, remove the cutting knives to prevent cutting the mulch too short.
- Apply the mulch at the rates shown in the Contract Documents. The rates shown in the Contract Documents are a guide, the Engineer or Designer will determine if the applied mulch is sufficient to protect the seeded area.
- After the mulch is applied to an area, punch the mulching material (except wood chips and excelsior material) approximately 2" into the ground.
- Perform the punching operation longitudinally, using a mulch puncher.
  - When needed, use weights on the mulch puncher to punch the mulching material into the soil.
  - When the slope is too steep to use a mulch puncher, "pat" the mulch with forks as it is placed on the slope.
- Apply mulching tacking slurry or cover with a light application of soil or sand to reduce wind loss.
- On lawns and small areas in urban areas, apply the mulch material using hand methods, unless otherwise approved by the Engineer or Designer.
- As the mulch is placed, "pat" the mulch with a fork. Apply mulching tacking slurry or cover with a light application of soil or sand to reduce wind loss.
- Immediately after the designated areas are mulched and punched, use hydraulic slurry equipment to apply the mulching tacking slurry.
- Unless shown otherwise in the Contract Documents, apply the mulching tacking slurry at the rate of 900 pounds per acre.
- Distribute the mulching tacking slurry uniformly over the mulch, leaving no bare spots.
- Arrange work so the mulching tacking slurry can be placed within 24 hours after each area has been mulched.

#### *Sodding*

- Sod the project during the proper sodding season to protect the finished grading. This may require sodding different parts of the project at different times or seasons.
- Prepare the soil by repairing any eroded areas and remove all weeds and surface stones greater than 1" diameter.
  - Undercut the soil below the adjacent areas so that the top of the new sod is flush with the adjacent seedbeds or turfed areas, and 1" below sidewalks and tops of curbs.
  - Cultivate or pulverize the soil to a minimum depth of 1". Smooth the soil, maintaining the grades established by the Grading Contractor.
- Before sodding, place fertilizer as specified in the Contract Documents.
- Place and fit sod strips as close together as possible. Stagger the joints between horizontal rows. Fill gaps between sod strips with sod pieces cut to the shape and size of the gaps.
- Lay sod strips horizontally on slopes, starting at the bottom and working upwards, unless directed otherwise by the Engineer or Designer.

- If the sod is placed on slopes of 2½:1 or steeper, or in ditch bottoms, secure the sod with 6 stakes per square yard or per roll of sod. If the sod is placed on slopes steeper than 20:1 and flatter than 2½:1, secure the sod with 2 to 4 stakes per square yard or per roll of sod. Use wooden lath (approximately 6" long) or similar wooden materials or ungalvanized wire staples (1/8" wire diameter approximately 6" long) to stake the sod. Drive the stakes and staples flush with the sod surface.
- After the sod is placed and secured, firm the sod using a small roller, tamper or other method approved by the Engineer or Designer.
- Immediately after placing the sod, thoroughly water to a depth of 3". Continue watering the sod every other day for 20 days after the sod is placed.

#### Mowing

- Mowing can be implemented in areas that require vegetation management.
- Properly timed mowing can suppress unwanted weedy vegetation while favoring desired perennial plant species.
- Mowing can reduce competitiveness of temporary vegetative cover or unwanted weedy vegetation by opening the canopy to allow more sunlight to reach permanent seedlings that are beginning to establish.
- Mowing activities should avoid saturated ground conditions to minimize compaction and rutting of the right-of-way.
- If mowing produces enough clippings and debris to impede the growth of grass, remove and dispose of the clippings and debris.

### Inspection and Maintenance

Seeded areas should be inspected at least once within every 7-day inspection monitoring period to verify that a uniform vegetative cover is achieved. The following is a general list of questions that should be addressed during each inspection:

- Do the seeded areas show signs of erosion or washout?

Areas with erosion and where seed has been washed out should be repaired and reseeded.

- Are seeded areas still bare or lack appropriate vegetative cover?

Areas that fail to establish vegetative cover should be reseeded.

- Does the vegetation appear yellow/brown or stunted.

Additional fertilizer applications or scheduled watering can promote vegetative growth. Seasonal watering should be performed as necessary.

- Do seeded areas contain weedy or unwanted vegetative growth?

Weedy and unwanted vegetation can be managed through mowing.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# EROSION CONTROL BLANKETS

## Purpose and Operation

Erosion control blankets are used to help limit erosion and establish vegetation on slopes and in ditches where conventional seeding and/or structural methods would be inadequate. By reducing the negative effects of rainfall impact and runoff, erosion control blankets help to minimize erosion and provide slopes and ditches with a stable environment for seed to germinate.

Erosion control blankets are constructed of a variety of materials. These include straw, wood excelsior, coconut, or some combination thereof. These materials are then usually stitched or glued to some type of natural fiber netting. This netting is biodegradable.

Erosion control blankets can be used in a variety of locations:

- Slopes and disturbed soils where mulch would have to be anchored and other methods such as crimping or tackifying are not feasible and/or adequate.
- Steep slopes (generally 3:1 or steeper) or slopes where concentrated flows exist, or highly erodible soils are present.
- Locations where seeding is likely to be too slow in providing adequate protective cover.
- Critical slopes adjacent to sensitive areas, such as streams, wetlands, shorelines, and existing development.
- Areas prone to sloughing of topsoil.

To view KDOTs Standard Drawings for erosion control blankets select the following links which show the detailed drawings with relevant design information: [Landscape Standard LA 855](#) and [Landscape Standard LA 856](#). These files can also be downloaded from KDOTs KART webpage with a free account.

## Design

### Material Specification

- Use approved erosion control materials as referenced in the Contract Documents and KDOTs Standard Specifications [Section 2113 – Erosion Control Materials](#) and [Section 902 – Temporary Erosion and Sediment Control](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#)).

## Installation

Prior to the installation of erosion control blankets the site should be shaped and graded to the appropriate grade. Installation areas shall be free of erosion rills, rocks, clods, or other debris that may cause “tenting” or otherwise inhibit uniform contact. Appropriate soil preparation and the application of soil amendments, fertilizers, and seeding should be done so prior to the installation of the erosion control blankets.

Erosion control blankets shall be laid loosely in the direction of the slope, beginning at the bottom of the slope. For the blanket to be in contact with the soil, lay blanket loosely, avoiding stretching.

- Anchor slots: The top of the blanket should be “slotted in” at the top of the slope and anchored in place with anchors 6” apart. The slots should be 6” wide x 6” deep with the blanket anchored in the bottom of the slot, then backfilled, tamped, and seeded.

- Longitudinal Seams: The edges of the blanket should overlap each other a minimum of 6", with anchors catching the edges of both blankets.
- Splice Seam: When splices are necessary, overlap end a minimum of 8" in direction of water flow. Stagger splice seams.
- Terminal Fold: The bottom edge of blanket shall be turned under a minimum of 4", then anchored in place with anchors 9" apart.
- Typical Anchors: Anchor design shall be as recommended by manufacturer.
- Staple Check: Establish Staples in 2 rows 4' on center apart. Staple Checks shall be 30' apart.

Other anchoring methods such as wooden stakes, bio-degradable plastic staples, live willows, or steel pins that provide proper embedment and support may also be used per the manufacturer's recommendations.

### Inspection and Maintenance

Erosion control blankets should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does the erosion control blanket exhibit signs of "tenting" or is stormwater flowing under the blanket?

Verify that there is uniform contact with the soil surface (tenting is unacceptable), all seams and splices are secure, and all anchors are driven flush with the soil surface.

- Are there signs of erosion or washout under or adjacent to the erosion control blanket?

If erosion, washouts, or undermining are visible under the blankets, blankets should be reinstalled after damage to the soil surface is repaired. Consider implementing additional BMPs upslope to reduce stormwater velocities and minimize erosion and washout.

- Is the erosion control blanket dislodged, ripped, torn, or damaged?

Any dislodging or failure of the erosion control blankets should be repaired as per the manufacturer recommendations.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## HYDRAULIC EROSION CONTROL PRODUCTS

### Purpose and Operation

Hydraulic Erosion Control Products (HECPs) consists of mulches and adhesive polymers that are mixed with water and then sprayed onto the soil surface. HECPs can provide temporary erosion protection and assist with the establishment of vegetative cover. HECPs can be applied to disturbed areas to provide protection from wind and soil erosion.

### Design

#### Material Specification

- Use approved HECPs referenced in the Contract Documents and KDOTs Standard Specifications [Section 905 – Mulching](#), [Section 2110 – Mulch](#), and [Section 2111 – Mulch Tacking Slurry](#). and. See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#) and [Division 2100](#)).

- Do not use mulching material containing noxious weeds identified by the Kansas Department of Agriculture in the [“Kansas Noxious Weed List”](#).

## Installation

### Hydraulic Erosion Control Products (HECPs)

- Apply the hydromulch by means of a standard hydraulic slurry seeding machine.
- Demonstrate, to the Engineer’s or Designer’s satisfaction, that the equipment and methods will result in a uniform application of the hydromulch.
- Mix and apply the hydromulch at the rate according to KDOT specifications or as recommended by the manufacturer.
- Obtain complete coverage from a consistent angle of approach while applying hydromulch.
- Achieve no more than 65% coverage from the primary angle of application, and 35% coverage from the secondary angle of coverage.
  - Maintain secondary angles of coverage of between 175° and 185° from the primary angle.
- Mixing proportions, application methods and rates may be adjusted based on the manufacturer’s recommendations.

## Inspection and Maintenance

HECPs should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Do areas where HECPs have been applied show signs of erosion or washout?

Areas where HECPs have eroded, washed out, or breakage occurs, repair damage or erosion to the area and reapply HECPs. Once the surface is broken, the matrix material must be reapplied.

- Do areas where HECPs have been applied lack appropriate coverage?

HECPs should be applied from two different angles to obtain appropriate coverage of disturbed soils.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## AGGREGATE DITCH LINING

### Purpose and Operation

Aggregate lined ditches operate by removing stormwater from the road and carrying it along and across the right-of-way. Aggregate ditch lining helps to reduce stormwater velocities, minimize erosion potential, and provide bank stabilization. These linings can often be less expensive than concrete lined ditches, however, grass and weedy vegetative growth can present additional maintenance problems if left unmaintained. Aggregate ditch lining is most common in areas where right-of-way restrictions require steeper ditch side slopes and in areas where there are rapid changes in ditch geomorphology.

To view KDOTs Standard Drawing for the aggregate ditch lining, select the following link which shows the detailed drawing with relevant design information: [Road Standard RD 502](#). This file can also be found on KDOTs KART webpage with a free account.

## Design

Design criteria for temporary erosion protection is documented in the most current edition of the KDOT Design Manual Volume I (Part C) Bureau of Road Design, Elements of Drainage and Culvert Design (Drainage Design Manual). Permanent aggregate ditch lining should be placed as soon as possible following final grading of the ditches to manage erosion throughout construction. Aggregate ditch lining design is based on Section 12.7 Design of Road Ditches with Aggregate Linings found in the Drainage Design Manual.

### *Material Specification*

- Use approved aggregate referenced in the Contract Documents and KDOTs Standard Specifications [Section 1114 – Stone for Riprap, Ditch Lining, and Other Miscellaneous Uses](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 1100](#)).

## Installation

### *Proper Installation Method*

- Construct the ditch to the lines and grades shown in the Contract Documents before placing the ditch lining.
- Prepare for the ditch lining by undercutting the finished ditch to the depth required for the ditch lining.
- When required, compact the excavated area.
- The subgrade shall be well compacted prior to placing ditch lining.
- After the ditch lining is completed, backfill and compact around the structures.
- Dumped aggregate shall be spread in reasonable conformity with the ditch section as shown in the Contract Documents and as directed by the Engineer or Designer.

### *Placement*

- Construct the aggregate ditch lining and aggregate backslope ditch lining according to the Contract Documents.

## Inspection and Maintenance

Aggregate ditch liners should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow around the aggregate ditch lining?

This is usually caused by insufficient depth/undercutting of the ditch line or incorrect grade/slope of the ditch and/or the ditch side slopes. If this occurs, ditches and aggregate ditch lining should be returned to appropriate grade/slope as specified in the Contract Documents or as directed by the Engineer or Designer. Aggregate should also be spread in reasonable conformity with the ditch section to promote positive drainage.

- Have high-velocity flows displaced any aggregate from the ditch lining?

Sometimes high-velocity flows can carry away portions of the aggregate ditch lining. After a large rainstorm, inspect the ditch lining for any displaced aggregate, undermining of aggregate, and erosion within or adjacent to the ditch. If a large portion of aggregate has been washed away, fill in void with new aggregate. In areas where erosion and undermining are present the lining should be maintained as specified to complete the work.

- Does sediment or debris need to be removed from the aggregate ditch lining?

Sediment accumulation within the aggregate ditch lining can impact the ditches' ability to reduce stormwater velocities resulting in higher erosion potential. In addition, accumulated sediments can provide a suitable environment for unwanted vegetation. Removal of accumulated debris should also be performed to promote positive drainage.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## ROCK SLOPE PROTECTION

### Purpose and Operation

Rock slope protection can be used to minimize erosion on steep slopes or slopes with highly erodible soils. Rock slope protection can help reduce stormwater velocities, minimize erosion potential, and provide stabilization.

To view KDOTs Standard Drawings for rock slope protection, select the following links which shows the detailed drawings, [Bridge Standard BR 131](#), [Bridge Standard BR 132A](#), and [Bridge Standard BR 132B](#). These files can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- Use approved aggregate referenced in the Contract Documents and KDOTs Standard Specifications [Section 1114 – Stone for Riprap, Ditch Lining, and Other Miscellaneous Uses](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 1100](#)).
- Use approved geotextiles referenced in the Contract Documents and KDOTs Standard Specifications [Section 1710 – Geosynthetics](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 1700](#)).

### Installation

#### Proper Installation Method

- Construct the bridge berms, fill slopes and channels to the lines and grades shown in the Contract Documents.
- Prepare for the slope protection by undercutting the finished berms, slopes, and channels to the depth necessary for the slope protection.
- After the slope protection is completed, backfill and compact around the structure.
- Construct the slope protection to the lines and grades shown in the Contract Documents. A tolerance of +6" from the slope lines and grades is allowed.
- Underlay the slope protection with geotextile fabric at the locations designated in the Contract Documents. Provide the Engineer or Designer with a copy of the manufacturer's recommendation.
- Install and secure the geotextile fabric as recommended by the manufacturer. Replace any geotextile fabric damaged or displaced during construction.
- Place the bedding for the slope protection at the locations designated in the Contract Documents.
  - Place the bedding in its full course thickness in one operation, using methods of placement that will not segregate the material.
  - The finished surface of the bedding shall be uniform. Compaction of the bedding is not required.

- Place the slope protection the full course thickness in one operation.
- Place the slope protection to produce a reasonably well-graded mass of rocks with a minimum number of voids.
- The finished slope protection shall be free of pockets of small rocks and clusters of larger rocks.
- Rearrange individual rocks (by hand or mechanical equipment) to the extent necessary to obtain a reasonably well-graded distribution of rock sizes.

*List of common placement/installation mistakes to avoid*

- Do not use methods of placing the rocks that will segregate the various sizes of rocks.
- Do not use heavy equipment (working on the slope protection) to spread the rocks.
- Do not place oversized rocks on the slopes.

## Inspection and Maintenance

Rock slope protection should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow around the rock slope protection?

This is usually caused by incorrect excavation or grading of slope protection. If this occurs, slopes should be returned to the appropriate grade as specified in the Contract Documents or as directed by the Engineer or Designer. Rock should be spread in reasonable conformity to promote positive drainage and reduce concentrated flows.

- Have areas of rock slope protection been displaced or washed out?

Sometimes stormwater flows can cause erosion that undermines sections of rock slope protection. After a large rainstorm, inspect the slope protection for any displaced rock, undermining of rock aggregate, and erosion of the slope. If a large portion of aggregate has been displaced, fill in the void with additional rock. Repair geotextile fabric as needed.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## DUST CONTROL

### Purpose and Operation

The purpose of dust control is to minimize the spread of surface dust via air movements as it originates from unstabilized, fugitive, and/or tracked out soils that occur during construction. It also helps reduce the spread of hazardous airborne particles that can pose problems to pedestrians and construction staff on the site. Dust control can be achieved with many different options.

### Design

#### *Material Specification*

- Control Measure Options
  - Vegetative Cover: Review the [Temporary Seeding Section](#) for options of vegetative cover.
  - Mulch: Review KDOTs Standard Specifications [Section 2110 – Mulch](#) and [Section 905 – Mulching](#) for mulch. See additional Special Provisions for KDOTs Standard Specifications ([Division 2100](#) and [Division 900](#)).

- HECs: Review the [HECs Section](#) for application options.
- Tillage: No outside material needed.
- Irrigation: Water from water trucks or other connections.
- Sweeping: Use of streetsweepers or sweeper attachments to collect and remove soils from paved surfaces.
- Aggregate: Standard base coarse aggregate.
- Geotextiles: Review the [Geotextiles Section](#) for options.
- Barriers: Can consist of board fence, wind fence, sediment fence or other barrier to limit the spread of dust. Engineer or Designer to specify if needed.
- Permanent Vegetation: Review the [Permanent Seeding Section](#) for options of permanent vegetation.

#### Placement

- Placement of device/control measure depends on the site and area of construction.
- Vegetation is best placed on steep slopes or in areas of little traffic to avoid killing plants.
- If being used, aggregate shall be placed on dirt roads or areas on a site where construction traffic is common.
- Barriers shall be placed perpendicular to the air currents on a site if they are used.
- If using tillage as a control measure, till the side of the site that faces the wind.

### Installation

#### *Proper Installation Method*

- Installation method and implementation shall be decided by the designer or contractor on site. Not all components are required to be used for dust control, as each site varies in needs for control.
- The control measures shall be installed or implemented in areas where movement of dust in the air is likely to occur.

#### *List of common placement/installation mistakes to avoid*

- Do not place vegetation or mulch in areas where trucks commonly drive on construction sites, or it will result in loss of plants.
- Do not place barriers parallel to the air currents on the site or they will prove to be ineffective.
- Only use measures in areas where dust is commonly a problem.

### Inspection and Maintenance

If structures for dust control are implemented, they should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Is dust a problem on the site?

If yes, verify that the current devices/control measures are in place and in working order. Work with the Engineer or Designer or contractor to implement new methods of dust control or repair existing methods to minimize the amount of dust generated onsite.

- Is the vegetation used for dust control not growing?

This is usually a result of vehicles or other equipment driving over seeded areas. In some cases, lack of vegetative growth can be a result of improper seedbed preparation or lack of scheduled watering

during dry periods. Check to confirm that seeding was placed in areas where construction traffic is not common. Educate crews and equipment operators to avoid seeded areas to minimize potential impacts and unnecessary re-work. Appropriate measures should be implemented during seeding (i.e., seedbed preparation, fertilizing, mulching, watering, etc.) to encourage favorable growing conditions for vegetative establishment.

- If a barrier is being used, is it damaged?

This can be caused by high winds or interference with equipment onsite. Verify the barriers are in places that are not obstructing traffic and repair if needed.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## **PRESERVING NATURAL VEGETATION**

### **Purpose and Operation**

Preserving natural vegetation protects existing stands of established vegetation which helps to reduce compaction of topsoil, minimize the overall area of disturbance, and reduce erosion. The existing vegetation can absorb stormwater, reduce runoff, and improve the water quality of runoff through natural filtration. It is best used in areas that already have healthy existing vegetation, especially around perimeter areas of the construction site, onsite overland flow paths, channels, streams, creeks, lakes, ponds, wetlands, steep slopes, or areas where constructed stabilization may be hard to put into place. Preservation of natural vegetation should be considered for all projects involving ground disturbance.

### **Design**

#### *Material Specification*

- Existing natural vegetation.
- Barrier or fence of some type to surround and designate the area being preserved.

#### *Placement*

- Preserve the natural vegetation in areas where there is not going to be development (no grading, no construction traffic). This is often beneficial around onsite channels, streams, creeks, lakes, ponds, wetlands, steep slopes, or areas where constructed measures would be complicated to construct. The placement is site dependent.

### **Preservation**

#### *Proper Preservation Method*

- Effectively mark the preservation area with spray paint, flags, or other devices before construction.
- Install barriers around the preservation area so that vehicles or people do not disturb the natural vegetation.
- If vegetation is being preserved for conservation reasons and is destroyed during construction, engage a landscape architect to design a replacement and establishment plan.

#### *List of common placement/preservation mistakes to avoid*

- Do not designate areas for preservation where grading or traffic will be occurring.
- Do not remove existing vegetation in areas that are under local, state, or federal regulations.

- Do not remove existing vegetation where native wildlife live, nest, or obtain food from.

### Inspection and Maintenance

Preserved natural vegetation should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Have markings and/or boundaries been removed from the preserved area?

Inspect to confirm these devices for the boundary have not been removed and if so repair and replace these to keep a set boundary around the preserved area.

- Is the natural vegetation damaged because of grading or construction traffic?

This damage could be caused by the preservation area being within the construction traffic area or within the grading limits. Reevaluate the preservation area so it does not result in this problem. Reiterate to crews and equipment operators the location of the preserved areas to avoid/protect before and during construction.

- Is the natural vegetation damaged?

Damaged natural vegetation could be a result of construction activities accidentally impacting the preserved area or from stormwater runoff and sediment discharging from the site. Repair or replace the vegetation to preconstruction conditions and/or until the reestablished vegetation has achieved a density of at least 70 percent of the native background vegetative cover. Consider installing additional temporary BMP devices to control runoff prior to discharging from site. If fertilizer is being used while reestablishing vegetation, confirm that the amount of fertilizer used is kept to a minimum to avoid water quality issues.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# KANSAS DEPARTMENT OF TRANSPORTATION

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## TEMPORARY EROSION CONTROL MANUAL

### SECTION 2 TEMPORARY DEVICES

Version	Version Date	Notes
1	9/12/2023	



# TABLE OF CONTENTS

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- SECTION 2 TEMPORARY DEVICES .....4**
- Biodegradable Log and Filter Sock Ditch Check and perimeter controls .....4
- Rock Ditch Check.....6
- Temporary Berm.....7
- Temporary Stream Crossing.....9
- Biodegradable Log Slope Interruption .....11
- Silt Fence Slope Interruption.....13

# SECTION 2 TEMPORARY DEVICES

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## BIODEGRADABLE LOG AND FILTER SOCK DITCH CHECK AND PERIMETER CONTROLS

### Purpose and Operation

Biodegradable logs and filter socks are devices used for ditch checks, slope interruption, or inlet protection. They provide sediment control by reducing the water velocity allowing the soil particles to drop out of the water column.

To view KDOTs Standard Drawings for a biodegradable log ditch check select the following links which show the detailed drawings with relevant design information: [Landscape Standard LA 862G](#) and [Landscape Standard LA 852E](#). These links can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- For low flow, construct logs using compost.
- For high flow, construct the logs using excelsior/wood chips/coconut fiber.
- Do not use straw logs for ditch checks.
- Stakes shall be wood or steel according to KDOTs Standard Specifications [Section 2114 – Silt Fence](#). Length of stakes shall be a minimum of 2 times the diameter of the log.
- For further specifications regarding biodegradable logs and filter socks refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#)).

#### Placement

- Biodegradable logs and filter socks shall extend up the fore and back slopes 4" vertically above the top of the device in the ditch bottom. See [Landscape Standard LA 852G](#).
- Overlap sections a minimum of 18".
- Each log (except compost filter logs) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the log and soil.
- Stakes need to be placed along the log with a maximum width of 4' between them.
- The tables on [Landscape Standard LA 852E](#) provide the spacing details for biodegradable logs and filter socks when being used as ditch checks.

### Installation

#### Proper Installation Method

- Excavate a trench along the length of the planned biodegradable log so that the depth of the trench is 25% of the height of the biodegradable log. Verify that the trench is excavated inside of a channelized flow path.
- Install the biodegradable logs perpendicular to flow of water and parallel to the slope contour.
- Optional: A downstream apron is required when directed by the Engineer or Designer.

- Once the biodegradable logs have been installed and anchored, excavated soils should be placed on both sides of the device and compacted to minimize water piping under the device.

*List of common placement/installation mistakes to avoid*

- Follow the prescribed ditch check spacing guidelines. If spacing guidelines are exceeded erosion will occur between the ditch checks.
- Do not allow water to flow around the ditch check. Verify that the ditch check is long enough so that the ground level at the ends of the check is higher than the top of the center of the log.
- Do not place biodegradable log ditch checks in channels with shallow soils underlain by rock. If the check is not anchored sufficiently, it will wash out.

## **Inspection and Maintenance**

Biodegradable log ditch checks should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow around the ditch check?

This is usually caused by insufficient ditch check length. If this occurs, extend the check far enough so that the ground level at the ends of the check is higher than the top of the lowest center log.

- Does water flow under the ditch check?

This is usually caused by the log not having full contact with the soil surface and not properly staked. If the problem is insufficient compaction, add more soil directly upstream of the check and recompact. If the problem is improperly trenched logs, the entire check should be removed and a new one installed, using the proper trench depth.

- Are logs degrading due to age and/or water damage?

Inspect the logs for signs of decomposition or damage and replace as necessary.

- Is there significant erosion between the ditch checks?

This is because there is too much space in between ditch checks. Install an additional ditch in between and follow the spacing guide for installation.

- Is there significant scour on the downstream side of the ditch check?

This is usually caused by too much water flowing into the ditch. Either install the optional apron on the downstream side of the biodegradable log or consult Engineer or Designer for alternative measures.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## ROCK DITCH CHECK

### Purpose and Operation

Rock ditch checks operate by intercepting and ponding sediment-laden runoff. Ponding the water dissipates the energy of any incoming flow and allows a large portion of the suspended sediment to settle out. Water exits the ditch check by flowing over its crest. Rock ditch checks are ideal for ditches that will eventually have a riprap lining. Upon completion of the project, the rock ditch checks can be spread out to form the riprap channel lining. Only use rock ditch checks where the ditch slope is 5% or greater.

To view KDOTs Standard Drawings for a rock ditch check select the following links which show the detailed drawings with relevant design information: [Landscape Standard LA 862G](#) and [Landscape Standard LA 852E](#). These links can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- Rock ditch checks should be constructed of clean aggregate, D50-6" and aggregate filler.
- Aggregate excavated on site may be used as an alternate to the 6" rock, if approved by the Engineer or Designer.
- Aggregate filler will comply with Filter Course Type 1, see KDOTs Standard Specifications [Section 1114 – Stone for Riprap, Ditch Lining, and Other Miscellaneous Uses](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 1100](#)).
- For further specifications regarding a ditch check refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#)).

#### Placement

- Rock ditch checks should be placed perpendicular to the flow line of the ditch.
- Rock ditches must be designed so that water can flow over them and not around them. The ditch check should extend far enough so that the ground level at the ends of the check are higher than the low point on the crest of the check.
- Rock ditch checks are best located in ditches that will eventually be lined with riprap so that the rock won't have to be removed at the completion of construction.
- The Engineer or Designer may approve the use of larger aggregates for the downstream portion of the check when conditions warrant their use.
- When the use of larger rock is approved, D50-6" rock will be placed between the larger aggregate and the aggregate filler.
- Aggregate filler will be placed on the upstream face of the ditch check.
- The table on [Landscape Standard LA 852G](#) provides ditch check spacing for a given ditch grade.

### Installation

#### Proper Installation Method

- Using approved aggregate material, construct a rock ditch check perpendicular to the ditch flow line. The ditch check should be 2' high and have side slopes no steeper than 1:1. The rock ditch check must be constructed so that water can flow over the top and not around the ends (i.e., the

ground level at the ends of the ditch check must be higher than the low point on the crest of the ditch check).

- The ditch area shall be reshaped to fill any eroded areas. Prior to placement of the rock, the ditch shall be excavated to the dimensions of the rock ditch check and to a minimum of 6" depth. After placement of the rock, backfill and compact any over-excavated soil to ditch grade.

*List of common placement/installation mistakes to avoid*

- Increasing the spacing between ditch checks. If spacing guidelines are exceeded, erosion may occur between the ditch checks.
- Do not allow water to flow around the ditch check. Confirm that the ditch check is long enough so that the ground level at the ends of the ditch check are higher than the low point on the crest of the ditch check.

## Inspection and Maintenance

Rock ditch checks should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow around the ditch check?

This is usually caused by insufficient ditch check length. If this occurs, extend the check a sufficient length so that the ground level at the ends of the check are higher than the low point on the crest of the check.

- Have high-velocity flows displaced any stones from the check?

Sometimes high-velocity flows can carry away portions of a rock ditch check. After a large rainstorm, inspect the rock ditch check for any displaced stones. If a large portion of a rock ditch check has washed away, fill in the void with new stone immediately. If stones from the ditch check are constantly displaced, consult the Engineer or Designer about increasing the diameter of rock used to construct the ditch check or decreasing the distance between ditch checks to further reduce high-velocity-flows.

- Does sediment need to be removed from the ditch check?

Sediment accumulated in front of the ditch check should be removed when it reaches one-half of the original exposed height of the rock ditch check. Allowing too much sediment to accumulate in front of a ditch check drastically reduces its effectiveness. One high-intensity rainfall can dislodge enough sediment from surrounding slopes to completely fill the space behind the ditch check. Therefore, it is extremely important to inspect ditch checks within 24 hours of a large rainfall event. The easiest way to remove sediment from in front of a rock ditch check is with a bulldozer or backhoe.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## TEMPORARY BERM

### Purpose and Operation

A temporary berm operates by diverting stormwater runoff to stabilized slopes or a temporary slope drain. The temporary berm is used in conjunction with the slope drain whenever stormwater needs to be carried down fill slopes and cut backslopes. This device can be used on either project fore slopes or backslopes depending on where it is most needed. This device may also be used for storm sewer culvert protection.

To view KDOTs Standard Drawings for the temporary berm with and without the slope drain option, select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852B](#). This file can also be found on KDOTs KART webpage with a free account.

## Design

### *Material Specification*

- Compacted fill for berm and surface of berm.
- 6" metal, plastic, or flexible rubber pipe for optional temporary slope drain.
- Rock dissipator or other approved material for optional temporary slope drain.
- For further specifications regarding the temporary berm refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#)).

### *Placement*

- Temporary berms can be placed on either project fore slopes or back slopes. It may also be placed at the inlet of storm sewer culverts.
- The length of a slope drain is determined by the length that is required to contain and direct runoff to the optional slope drain or sediment basin.
- The optional slope drain is placed in conjunction with berms whenever the flow of runoff needs to be discharged into a stabilized ditch or sediment basin without causing erosion.
- The length of the optional slope drain needs to match the height of the slope as earth operations progress.

## Installation

### *Proper Installation Method*

- Construct temporary berms with a 2' minimum width. Construct the berm using compacted fill and compact the berms until no further consolidation is observed, using a dozer track, grader wheel or other equipment. The slope of the berm should be a maximum of 2:1.
- If an optional temporary slope drain is being installed construct it as shown in the contract documents. The length of the specified slope drainpipe will depend on the height of the slope. The pipe will outflow at a rock dissipator and will discharge into a stabilized ditch or sediment basin.
- When the project is finished and the berm is no longer needed, remove the berm to blend with the natural ground. Remove any type of temporary slope drain if applicable.

### *List of common placement/installation mistakes to avoid*

- Do not undersize the temporary berm or the flows from the site will overtop the berm and will cause the structure to become ineffective.
- Do not use fill that is uncompacted or it will lead to a breakdown of the temporary berm.

## Inspection and Maintenance

A temporary berm should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Is erosion occurring at the outlet of the temporary berm's slope drain?

If yes, this is due to the outlet of the berm not being stabilized and will require BMP's to be designed and installed to prevent this erosion at the outfall.

- Is the structure falling apart after rainfall events?

This is most likely because the berm was not constructed using compacted fill. If this is occurring use a dozer track, grader wheel or other equipment to further compact the fill that is used to construct the berm.

- Is the berm experiencing erosion at high rates?

This high rate of erosion may be caused by too steep of a slope to the temporary berm. Confirm that the slope is 2:1 and if it is more restructure it to match this slope requirement.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## TEMPORARY STREAM CROSSING

### Purpose and Operation

A temporary stream crossing minimizes construction traffic from fording a waterway during a construction project. KDOT stream crossings can be surfaced with either articulated concrete blocks or aggregate fill. To view KDOTs Standard Drawings for the two temporary stream crossing options, select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852B](#). This file can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- Articulated concrete blocks with filter fabric or clean aggregate fill for surface of stream crossing.
- Steel pipes with a minimum pipe size of 12". Note that design flow calculations will determine required number and diameter of pipes after review and approval from Engineer or Designer.
- Clean aggregate fill to cover the pipe(s).
- For further specifications regarding temporary stream crossings refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#)).

#### Placement

- Place one pipe buried 6" into the stream bottom at the lowest point of the channel.
- Pipes should be placed parallel to the channel flow.
- Additional pipes may need to be placed to avoid overtopping. Engineer or Designer to specify based on conveyance capacity in the stream.
- Depending on the crossing type, place either more aggregate or articulated concrete blocks on top of this aggregate fill to allow for traffic crossings to occur. Engineer or Designer to specify.
- Temporary stream crossings should be constructed in the areas where they will cause the least amount of disturbance to the stream and adjacent vegetation.

### Installation

#### Proper Installation Method

- Prior to construction, record and document existing stream channel elevations and adjacent vegetation types.

- Excavate the foundation in the stream for the stream crossing and divert the stream flow to a bypass channel during installation.
- Place one pipe buried 6” into the stream bottom at the lowest point in the channel to allow the passage of aquatic organisms. Place additional pipes along the remainder of the stream bottom if necessary for conveyance flows.
- Cover these pipes with a minimum of 12” of clean aggregate fill.
- Remove crossing as soon as it is no longer needed. Restore the streambed and bank areas to their preexisting conditions.
- Refer to the Contract Documents for any project specific requirements.

*List of common placement/installation mistakes to avoid*

- Avoid steep slopes on the embankment of the channel which can create safety hazards.
- Do not place the pipes in a direction that will alter/inhibit stream flow.
- Stream crossings should not have a pipe that is set above the low point of the stream channel.
- Use of “dirty” or repurposed aggregate fill material in the construction of temporary stream crossings can increase silt/sediment pollution into the stream during construction. In addition, minimize the amount of fines contained with the aggregate fill used for construction of temporary stream crossings.

## Inspection and Maintenance

A temporary stream crossing should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Are the embankment slopes of the temporary stream crossing eroded?

This is caused by improper grading of the embankment slopes and should be repaired with erosion protection measures to stabilize the slopes surrounding the crossing.

- Is the streambank caving in or is erosion occurring below the pipe of the temporary stream crossing?

This is due to erosion control measures not being in place at the entrance and exit of the temporary stream crossing. Add appropriate stabilization measure for adequate protection such as rip rap.

- Is the roadway or surface of the temporary stream crossing overtopping with water?

This could be occurring for a variety of reasons including incorrect pipe diameter, not enough piping placed underneath/within the temporary stream crossing, or the pipe placement is too high, relative to the streambed. The Engineer or Designer either needs to redesign the pipe system to meet the needs of the stream or reevaluate the location of the pipe.

- Is there debris or materials blocking the flow of water through the pipes?

Streams naturally carry debris and other materials. If flow is obstructed, remove the debris or material from the blocked areas.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# BIODEGRADABLE LOG SLOPE INTERRUPTION

## Purpose and Operation

Biodegradable logs are devices used for ditch checks, slope interruption, or inlet protection. They prevent erosion by slowing the rate of water leaving a site and catching the sediments that are in that runoff. For slope interruption purposes the primary use is to slow sheet flow and collect sediments on a slope.

To view KDOTs Standard Drawings for a biodegradable log slope interruption select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852D](#). This file can also be found on KDOTs KART webpage with a free account.

## Design

### Material Specification

- For low flow, construct logs using straw/compost.
- For high flow, construct the logs using excelsior/wood chips/coconut fiber.
- Stakes shall be 2"x2" (Nom.).
- Stakes shall be wood or steel according to KDOTs Standard Specifications [Section 2114 – Temporary Sediment Barriers](#). Length of stakes should be 2 times the height of the log at a minimum with minimum ground embedment equal to the height of the log.
- The table on [Landscape Standard LA 852D](#) includes the guide to sizing the biodegradable log based on the slope gradient.
- For further specifications regarding the biodegradable log refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#) and [Section 2114 – Temporary Sediment Barriers](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#) and [Division 2100](#)).

### Placement

- Place as many biodegradable logs as necessary so that water does not flow around the end of the slope.
- Place logs tightly together with a minimum overlap of 18".
- Each log (except compost filter logs) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the log and soil.
- Stakes need to be placed along the log with a maximum width of 4' between them.

## Installation

### Proper Installation Method

- Excavate a trench the length of the planned slope interruption that is 25% of the height of the log deep and a log's width wide. Confirm that the trench is excavated along a single contour. When practicable, slope interruptions should be placed along contours to avoid a concentration of flow.
- Place the logs in the trench close together to avoid any gaps between them. Stakes should be driven into the logs with a 4' maximum distance between the stakes.
- Optional: A downstream apron is required when directed by the Engineer or Designer. Apron material will be paid at the contract unit price.

### *List of common placement/installation mistakes to avoid*

- When practicable, do not place biodegradable log slope interruptions across contours. Slope interruptions should be placed along contours to avoid concentrated flows. Concentrated flow over a slope interruption can cause it to degrade faster and lead to scour.
- Do not place biodegradable slope interruptions in channels with shallow soils underlain by rock. If the log is not anchored sufficiently, it will wash out.
- Do not allow the slope interruption length to exceed 250'.

### **Inspection and Maintenance**

Biodegradable log slope interruptions should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Are there any points along the slope interruption where water is concentrating?

When slope interruptions are not placed along contours, water concentrates at low points of the slope interruption. This concentrated flow usually causes a failure of the slope interruption. Even if the interruption does not fail, the concentration of flow drastically reduces the overall storage capacity of the slope interruption. The only solution to this problem is reinstalling the slope interruption (or sections of it) so that it is level.

- Does water flow under the slope interruption?

This is usually caused by the log not having full contact with the soil surface and not properly staked. If the problem is insufficient compaction, add more soil directly upstream of the check and recompact. If the problem is improperly trenched logs, the entire check should be removed and a new one installed, using the proper trench depth.

- Are logs decomposing due to age and/or water damage?

Inspect the logs for signs of decomposition or damage and replace as necessary.

- Is there significant scour on the downstream side of the slope interruption?

This is usually caused by too much water flowing into the log. Either install the optional apron on the downstream side of the biodegradable log or consult design Engineer or Designer for alternative measures.

- Is the biodegradable log undercut, scoured out, or incorrectly trenched in?

Biodegradable logs that have been undercut, scoured out, or incorrectly trenched in should be retrenched.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## SILT FENCE SLOPE INTERRUPTION

### Purpose and Operation

Silt fence slope interruptions operate by intercepting and ponding sediment-laden slope runoff. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle out. Water exits the silt fence by percolating through the silt fence fabric. Silt Fence Slope Interruptions should only be used as perimeter controls at the base of sheet flow areas. Do not use as intermediate interruptions on a slope!

To view KDOTs Standard Drawings for a silt fence slope interruption select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852D](#). This file can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- Silt fence fabric should conform to the AASHTO M288 silt fence specification.
- Stakes or posts shall be 4 ft. (min.) long and of one of the following materials:
  - Hardwood – 1 3/16" x 1 3/16" ;
  - Southern Pine – 2 5/8" x 2 5/8" ;
  - Steel U, T, L, or C Section – 0.95 lbs. per 1'-0"; or
  - Synthetic – same strength as wood stakes.
- Silt fence fabric should be attached to the wooden stakes or steel posts with three zip ties within the top 8" of the fence. Alternate attachment methods may be approved by the Engineer or Designer on a performance basis.
- The staples used should be wire staples that are 6" long x 1" wide (min.).
- For further specifications regarding silt fence refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#) and [Section 2114 – Temporary Sediment Barriers](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#) and [Division 2100](#)).

#### Placement

- Silt fence should be used at the toe of a slope when a ditch does not exist. The silt fence should be placed on nearly level ground 5' - 10' away from the toe of a slope. The barrier is placed away from the toe of the slope to provide adequate storage for settling out of sediment.
- When practicable, silt fence should be placed along contours to avoid a concentration of flow.
- Silt fence can also be placed along right-of-way fence lines to keep sediment from crossing onto adjacent property. When placed in this manner, the silt fence will not likely follow contours. This is not a substitute for construction fence.

### Installation

#### Proper Installation Method

- Excavate a trench the length of the planned silt fence that is 6" deep by 6" wide. Confirm that the trench is excavated along a single contour. When practicable silt fence should be placed along contours to avoid a concentration of flow. Place the excavated soil on the upslope side of the trench for later use.
- Roll out a continuous length of silt fence fabric on the down slope side of the trench. Place the edge of the fabric in the trench starting at the top upslope edge. Line the bottom and the

downslope sides of the trench with the fabric. Wires staples (6" long x 1" wide) should be used to pin the fabric to the bottom of the trench and spaced 3' on center. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt fence fabric should remain exposed.

- Lay the exposed silt fence upslope of the trench to clear an area for driving in the stakes or posts. Just down slope of the trench, drive stakes/posts into the ground to a depth of at least 24". Place stakes/posts no more than 4' apart.
- Attach the silt fence to the anchored post with zip ties. Alternate attachment methods may be approved by the Engineer or Designer on a performance basis

#### *List of common placement/installation mistakes to avoid*

- When practicable, do not place silt fence across contours. Silt fences should be placed along contours to avoid a concentration of flow. When the flow concentrates, it overtops the barrier, and the silt fence quickly deteriorates.
- Do not place silt fence stakes/posts on the upslope side of the silt fence fabric. In this configuration, the force of the water is not restricted by the posts, but only by the zip ties. The silt fence will rip and fail.
- Do not place silt fence in areas with shallow soils underlain by rock. If the silt fence fabric is not sufficiently anchored, it will wash out.
- Silt fence must be dug into the ground – silt fence at ground level does not work because water will flow underneath.
- Silt fence should be properly trenched in and compacted to minimize scouring or undermining of the silt fence fabric.
- Do not allow the silt fence length to exceed 250'.

## **Inspection and Maintenance**

Silt fence should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Are there any points along the silt fence where water is concentrating?

When silt fence is not placed along contours, water concentrates at low points in the silt fence. This concentrated flow usually causes a failure. Even if the silt fence does not fail, the concentration of flow drastically reduces the overall storage capacity of the silt fence. The only solution to this problem is reinstalling the silt fence (or sections of it) so that it is level.

- Does water flow under the silt fence?

This can be caused by posts that are too far apart, a trench that is too shallow, or an improper burial procedure. Stakes/posts should be no more than 4' apart. The trench should be at least 6" wide by 6" deep. The bottom edge of the silt fence should be anchored securely by installing wire staples to pin the fabric to the bottom of the trench and backfilling over the fabric in the trench with the excavated soil and then compacting. If these guidelines have not been met, the silt fence should be reinstalled, or the deficiencies should be remedied.

- Does the silt fence sag excessively?

Sagging silt fence is caused by excessive stake/post spacing and/or overtopping of the silt fence. Silt fence stakes/posts should be no more than 4' apart. If the stake/post spacing exceeds 4', additional stakes/posts should be added to decrease spacing between stakes/posts. Water should flow through

the silt fence and not over it. Silt fence installations quickly deteriorate when water overtops them. If a section of silt fence is regularly overtopped, it has probably been placed in a location that receives flows beyond its intended capacity. If this is the case, discontinue the use of silt fence in this area and try something different.

- Has the silt fence torn or become detached from the posts?

Silt fence can be torn by the force of ponded water, or by winds that rip the silt fence fabric away from the stakes/posts. If a silt fence develops tears for any reason, it should be replaced.

- Does sediment need to be removed from the silt fence?

Sediment accumulated in front of the silt fence, should be removed when it reaches one-half of the original exposed height of the silt fence. Allowing too much sediment to accumulate in front of the silt fence drastically reduces its effectiveness. One high-intensity rainfall can dislodge enough sediment from surrounding slopes to completely overtop the silt fence. That is why it is extremely important to inspect silt fences within 24 hours of a large rainfall event. When removing sediment from in front of the silt fence with a bulldozer or backhoe, take care not to damage the fabric or undermine the entrenched silt fence.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# KANSAS DEPARTMENT OF TRANSPORTATION

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## TEMPORARY EROSION CONTROL MANUAL

### SECTION 3 GEOTEXTILES

Version	Version Date	Notes
1	9/12/2023	



# TABLE OF CONTENTS

---

**SECTION 3 GEOTEXTILES ..... 4**  
    Geotextiles .....4

# SECTION 3 GEOTEXTILES

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## GEOTEXTILES

### Purpose and Operation

Geotextiles are flexible, porous, woven or nonwoven fabrics that can be used for erosion and sediment control purposes on construction sites. Geotextiles protect steep slopes, soil stockpiles, and other areas where mulching or other timely installation of the permanent slope protection is impractical. Geotextiles can also be used in combination with other BMPs (i.e., rock stabilization, riprap culvert protection, sediment basins, etc.) to minimize erosion, scouring, and washout.

To view KDOT's Standard Specifications for all geosynthetics click the attached link. This link provides more information about requirements of geotextiles as well as tables with minimum roll values: [Section 1710 – Geosynthetics](#).

### Design

#### Material Specification

- To view a list of geotextile fabrics approved by KDOT for stabilization click the following link and find products that are approved for Subgrade Stabilization: [List of Prequalified Geotextile Fabrics](#).
- Staples or similar devices shall be used to secure the geotextiles to the ground to achieve uniform contact with the surface. Method of securing the fabric will need to be approved by the Engineer or Designer.

#### Placement

- Geotextiles shall be placed over temporary slopes, soil stockpiles, or other areas where stabilization on a site is needed during construction.
- Geotextiles can be placed in conjunction with other BMPs to minimize erosion, scouring, and washout.

### Installation

#### Proper Installation Method

- It is recommended that the geotextile be installed where vegetative cover such as grass or weeds are not in place to provide support during construction.
- Install geotextiles in areas that are free of rills, rocks, clods, or other debris. The geotextile should be placed flat against the soil surface with no wrinkles or folds.
- Once placed in their designated area, secure the geotextile to the ground using staples or another device that is specified by the Engineer or Designer.

#### List of common placement/installation mistakes to avoid

- Do not place the geotextile in a spot where it can lead to the fabric to be easily ripped. For example, these areas can include high traffic areas, places where construction equipment will be used, or areas where there are debris or rocks on the soil surface.

### Inspection/Maintenance

Geotextile products should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Is the geotextile ripped or damaged?

This is due to the fabric being torn or impacted by some sort of outside source. Repair or replace the section of damaged geotextile as per the manufacturer recommendations.

- Is the geotextile loose?

This is due to missing or damaged staples or other devices. Replace or add additional staples or other devices to secure loose fabric in place.

- Does the geotextile exhibit signs of “tenting” or is stormwater flowing under the geotextile?

Verify that there is uniform contact with the soil surface (tenting is unacceptable), all seams and splices are secure, and all anchors are driven flush with the soil surface.

- Are there signs of erosion or washout under or adjacent to the geotextile?

If erosion, washouts, or undermining are visible under the geotextile, the geotextile should be reinstalled after damage to the soil surface is repaired. Consider implementing additional BMPs upslope to reduce stormwater velocities and minimize erosion and washout.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# KANSAS DEPARTMENT OF TRANSPORTATION

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## TEMPORARY EROSION CONTROL MANUAL

### SECTION 4 INLET PROTECTIONS

Version	Version Date	Notes
1	9/12/2023	



# TABLE OF CONTENTS

---

- SECTION 4 INLET PROTECTIONS..... 4**
- Biodegradable Log and Filter Sock Drop Inlet Protection.....4
- Silt Fence Inlet Sediment Barrier.....6
- Triangular Silt Dike Inlet Sediment Barrier .....9
- Curb Inlet Protection..... 11

# SECTION 4 INLET PROTECTIONS

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## BIODEGRADABLE LOG AND FILTER SOCK DROP INLET PROTECTION

### Purpose and Operation

Biodegradable logs and filter socks are devices used for ditch checks, slope interruption, or inlet protection. They provide sediment control by reducing the water velocity allowing the soil particles to drop out of the water column. For inlet protection purposes the primary use is to intercept, pond, and filter the sediment-laden runoff that would enter a drop inlet.

To view KDOTs Standard Drawings for a biodegradable log drop inlet protection, select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852C](#). This file can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- Use 100% shredded mulch or other non-compost biodegradable material as fill for logs.
- Use log mesh with ¼" openings or larger. It must allow water infiltration.
- Stakes shall be wood or steel according to KDOTs Standard Specifications [Section 2114 – Temporary Sediment Barriers](#).
- For further specifications regarding the biodegradable log and filter sock refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#) and [Section 2114 – Temporary Sediment Barriers](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#) and [Division 2100](#)).
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#### Placement

- Stakes should be placed every 4' along the biodegradable log or filter sock.
- Surround the entire drop inlet with a biodegradable log or filter sock. The ends of the biodegradable log or filter sock should overlap each other tightly to prevent unfiltered water from entering the drop inlet.
- 25% of the height of the biodegradable log or filter sock shall be keyed into ground during installation.

### Installation

#### Proper Installation Method

- Excavate a trench around the perimeter of the drop inlet so that the depth of the trench is 25% of the height of the biodegradable log or filter sock.
- Place the biodegradable log or filter sock in the trench. The ends of the biodegradable log or filter sock should be pressed together tightly and overlap each other by a minimum of 2'.
- Drive stakes into the biodegradable log or filter sock every 4'. The diameter of the biodegradable log or filter sock can range from 1'-6" to 1'-8". The Engineer or Designer is to specify the diameter of biodegradable log or filter sock to be used for drop inlet protection.
- Note: When a biodegradable log or filter sock drop inlet protection is placed in a shallow median ditch, the top of the barrier should not exceed the height of the adjacent paved road.

When the height of the barrier exceeds the height of the adjacent paved road, water may spread onto the roadway causing a hazardous condition.

*List of common placement/installation mistakes to avoid*

- Biodegradable logs and filter socks should be placed directly against the perimeter of the drop inlet. This allows overtopping water to flow directly into the inlet instead of flowing onto nearby soil, causing scour.
- Biodegradable log or filter socks drop inlet protection must be properly trenched in. Biodegradable logs and filter socks at ground level do not work as they can allow water to flow under the barrier.

## **Inspection and Maintenance**

Biodegradable log and filter sock drop inlet protections should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow under the biodegradable log or filter sock?

This is usually caused by not trenching in the biodegradable log or filter sock deep enough. If the problem is an improperly trenched biodegradable log or filter sock, the drop inlet barrier should be removed and a new one installed using the proper trench depth.

- Does water flow through gaps in the biodegradable log or filter sock?

This is usually caused by not tightly overlapping the ends of the biodegradable log or filter sock. If this is the case, then confirm that the biodegradable log or filter sock ends are placed together tightly or inspect the biodegradable logs or filter socks for any other gaps. The ends of the biodegradable log or filter sock should overlap each other by a minimum of 2'.

- Are the biodegradable logs or filter socks decomposing due to age and/or water damage?

This is usually due to the life span of a biodegradable log or filter sock. Inspect the biodegradable logs or filter socks for signs of decomposition and replace as necessary.

- Does sediment need to be removed from the drop inlet protection?

Sediment accumulated in front of the drop inlet barrier should be removed when it reaches one-half of the original exposed height of the biodegradable log or filter sock. Allowing too much sediment to accumulate in front of the drop inlet protection drastically reduces its effectiveness. One high-intensity rainfall can dislodge enough sediment from the drainage basin to completely overtop the drop inlet protection. Therefore, it is extremely important to inspect drop inlet protection within 24 hours of a large rainfall event. When removing sediment from a biodegradable log or filter sock drop inlet protection with a bulldozer or backhoe, take care not to damage or undermine the entrenched biodegradable logs or filter socks.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

## SILT FENCE INLET SEDIMENT BARRIER

### Purpose and Operation

Silt fence inlet sediment barriers work just like a ditch check or a slope barrier: the silt fence intercepts, ponds, and filters sediment-laden runoff. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle out. As the ponded water percolates through the silt fence fabric, much of the remaining suspended sediment is filtered out.

To view KDOTs Standard Drawings for a silt fence inlet sediment barriers select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852C](#). This file can also be found on KDOTs KART webpage with a free account.

### Design

#### Material Specification

- Silt fence fabric should conform to the AASHTO M288 silt fence specification.
- Stakes or posts shall be 4 ft. (min.) long and of one of the following materials:
  - Hardwood – 1 3/16" x 1 3/16";
  - Southern Pine – 2 5/8" x 2 5/8";
  - Steel U, T, L, or C Section – 0.95 lbs. per 1'-0"; or
  - Synthetic – same strength as wood stakes.
- Silt fence fabric and support backing should be attached to the wooden posts and frame with staples, wire, zip ties, or nails.
- Cross pieces shall be of same material as stakes.
- For further specifications regarding silt fence refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#) and [Section 2114 – Temporary Sediment Barriers](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#) and [Division 2100](#)).

#### Placement

- Place a silt fence inlet sediment barrier in a location where it is unlikely to be overtopped. Water should flow through silt fence and not over it. Silt fence drop inlet barriers often fail when repeatedly overtopped.
- When used as a drop inlet barrier, silt fence fabric and posts must be supported at the top by a frame that is constructed of the same material as the stakes.
- When a silt fence inlet sediment barrier is located near an inlet that has steep approach slopes, the storage capacity behind the barrier is drastically reduced. Timely removal of sediment must occur for a barrier to operate properly in this location.

### Installation

#### Proper Installation Method

- Excavate a trench around the perimeter of the inlet that is at least 6" deep by 4" wide.
- Drive posts to a depth of at least 24" around the perimeter of the drop inlet. The distance between posts should be 4' or less. If the distance between two adjacent corner posts is more than 4', add more posts between them.

- Connect the tops of all the posts with a frame made of 2" by 4" boards of the same material as stakes. Use nails or screws for fastening.
- Attach the wire or polymeric mesh backing to the outside of the post/frame structure with staples, wire, zip ties, or nails.
- Roll out a continuous length of silt fence fabric long enough to wrap around the perimeter of the drop inlet. Add more length for overlapping the fabric joint. Place the edge of the fabric in the trench, starting at the outside edge of the trench. Line all three sides of the trench with the fabric. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt fence fabric should remain exposed.
- Attach the silt fence to the outside of the post/frame structure with staples, wire, zip ties, or nails. The joint should be overlapped to the next post.
- Note: When a silt fence drop inlet sediment barrier is placed in a shallow median ditch, confirm that the top of the barrier is not higher than the paved road. If the top of the barrier exceeds the height of the adjacent paved road, water may spread onto the roadway, causing a hazardous condition.

*List of common placement/installation mistakes to avoid*

- Water should flow through a silt fence drop inlet sediment barrier and not over it. Place a silt fence inlet sediment barrier in a location where it is unlikely to be overtopped. Silt fence inlet sediment barriers often fail when repeatedly overtopped.
- Do not place posts on the outside of the silt fence inlet sediment barrier. In this configuration, the force of the water is not resisted by the posts, but only by the staples (wire, zip-ties, nails, etc.). The silt fence will rip and fail.
- Do not install silt fence inlet sediment barriers without framing the top of the posts. The corner posts around inlets are stressed in two directions whereas a normal silt fence is only stressed in one direction. This added stress requires more support.

## Inspection and Maintenance

Silt fence inlet sediment barriers should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow under the silt fence?

This can be caused by posts that are too far apart, a trench that is too shallow, or an improper burial procedure. Posts should be no more than 4' apart. The trench should be at least 6" wide by 6" deep. The bottom edge of the silt fence should be anchored securely by backfilling over the fabric in the trench with the excavated soil and then compacting. If these guidelines have not been met, the silt fence inlet sediment barrier should be reinstalled, or the deficiencies should be remedied.

- Does the silt fence sag excessively?

Sagging silt fence is caused by excessive post spacing or the lack of a frame connecting the posts. Silt fence posts should be no more than 4' apart. If the post spacing exceeds 4' additional posts should be added to decrease spacing between posts. If no post frame exists, one should be added. A sagging silt fence should be repaired immediately because it has the potential to create a bigger problem: flooding. If a silt fence falls over onto an inlet during a storm, the inlet can become blocked, causing flooding of the roadway.

- Has the silt fence torn or become detached from the posts?

Silt fence can be torn by the force of ponded water, or by winds that rip the silt fence fabric away from the posts. If a silt fence develops tears for any reason, it should be replaced.

- Does sediment need to be removed from the drop inlet barrier?

Sediment accumulated in front of the inlet sediment barrier should be removed when it reaches one-half of the original exposed height of the silt fence. Allowing too much sediment to accumulate in front of an inlet sediment barrier drastically reduces its effectiveness. One high-intensity rainfall can dislodge enough sediment from the drainage basin to completely overtop the inlet sediment barrier. Therefore, it is extremely important to inspect inlet sediment barriers within 24 hours of a large rainfall event. When removing sediment from a silt fence inlet sediment barrier with a bulldozer or backhoe, take care not to damage or undermine the entrenched silt fence.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# TRIANGULAR SILT DIKE INLET SEDIMENT BARRIER

## Purpose and Operation

Triangular Silt Dike (TSD) inlet sediment barriers operate by intercepting and ponding sediment-laden runoff. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle out. When the pond height reaches the top of the barrier, water flows over the TSDs and into the inlet.

To view KDOTs Standard Drawings for a Triangular Silt Dike inlet sediment barriers select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852C](#). This file can also be found on KDOTs KART webpage with a free account.

## Design

### Material Specification

- Triangular Silt Dikes™
- Metal landscape staples used to anchor the TSDs should be a minimum of at least 6” long.

### Placement

- TSD inlet sediment barriers should be placed directly around the perimeter of an inlet.
- When a TSD inlet sediment barrier is located near an inlet that has steep approach slopes, the storage capacity behind the barrier is drastically reduced. Timely removal of sediment must occur for a barrier to operate properly in this location.

## Installation

### Proper Installation Method

- For an inlet sediment barrier installation, orient the TSD so that the side bordering the inlet is vertical. Orient the TSD aprons so that the shorter of the two aprons lies beneath the longer one. Neither apron should be under the foam portion of the TSD.
- Place two full sections (approximately 7’ long each) of TSD against opposite sides of the inlet. These sections should extend beyond the edges of the drop sides of the drop-inlet – do not cut these to fit. Excavate trenches that are at least 6” deep by 6” wide near the ends of the TSD apron so that the outer 8” to 10” of the apron can be buried. Lay the outer 8” to 10” of apron into the trench and anchor it with minimum 6” long landscape staples on 18” centers. Backfill the trench with the excavated soil and compact. Anchor the remainder of the apron with a row of minimum 6” long landscape staples on 18” centers along the seam of the TSD.
- In the spaces where the TSDs extend beyond the edges of the inlet, cut new TSDs to fit. There should be a tight fit achieved between the cut TSDs and the existing TSDs. These cut sections should be oriented and anchored in the same manner as the initial sections.
- Note: When a TSD inlet sediment barrier is placed in a shallow median ditch, the top of the barrier should not exceed the height of the paved road. In this configuration, water may spread onto the roadway causing a hazardous condition.

### List of common placement/installation mistakes to avoid

- TSDs should be placed directly against the perimeter of the inlet. This allows overtopping water to flow directly into the inlet instead of onto nearby soil, causing scour.
- Orient the TSD properly. The side in contact with the inlet should be vertical and the shorter apron should lie beneath the longer one.
- If the receiving apron of a TSD is not dug into the ground, water will flow underneath.

## Inspection and Maintenance

TSD inlet sediment barriers should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Does water flow under the TSDs?

This is usually caused by not properly anchoring the TSD. Verify that the receiving apron is trenched in and that an adequate number of staples have been used.

- Does water flow through spaces between abutting TSDs?

This is usually caused by incorrect sizing of the cut sections. If the cut sections are too small, re-cut new sections so that they fit properly.

- Does sediment need to be removed from the TSDs?

Sediment accumulated in front of the TSDs should be removed when it reaches one-half of the dike height. Allowing too much sediment to accumulate in front of a TSD barrier drastically reduces its effectiveness. One high-intensity rainfall can dislodge enough sediment from surrounding slopes to completely overtop the inlet sediment barrier. Therefore, it is extremely important to inspect drop-inlet barriers within 24 hours of a large rainfall event. When removing sediment from behind a TSD with a bulldozer or backhoe, take care not to hook the receiving apron with the blade. This will damage the barrier and it will have to be replaced.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# CURB INLET PROTECTION

## Purpose and Operation

Curb inlet protection devices operate by intercepting, ponding, and filtering sediment-laden runoff that would enter a curb inlet. Ponding the water reduces the velocity of the incoming flow and allows most of the suspended sediment to settle out. When the pond height reaches the top of the device, water flows over the device and into the curb inlet.

To view KDOTs Standard Drawings for curb inlet protection select the following link which shows the detailed drawing with relevant design information: [Landscape Standard LA 852C](#). This file can also be found on KDOTs KART webpage with a free account.

## Design

### Material Specification

- The bags shall be made of synthetic net (3 mm mesh) or burlap.
- The bags shall be filled with rock that is 1" to 2" diameter.
- A 2"x4" wooden board.
- Alternative products or fill material may be used. These products or materials must be approved by the Engineer or Designer.

## Installation

### Proper Installation Method

- Place a 2"x4" wooden board in a standing position at the opening of the curb inlet.
- Place the bag(s) in front of the wooden board with the ends of the bags against the ends of the board, leaving a gap of 6" to 8" between the curb inlet opening and the bag. The height of the bag(s) (8" minimum diameter) must not be above the top of curb. If multiple bags are required, place them in such a way that no gaps are evident to avoid unfiltered water from leaking into the inlet.

### List of common placement/installation mistakes to avoid

- Do not allow the height of the bag to be above the top of the curb.
- Do not allow water to flow between gaps if multiple bags are being used. Place bags closely together to avoid this.
- Do not allow water to flow around the bags into the curb inlet opening. Place bags close to the wooden board to avoid this.

## Inspection and Maintenance

Curb inlet protection bags should be inspected at least once within every 7-day inspection monitoring period. The following is a general list of questions that should be addressed during each inspection:

- Are the bags damaged and not properly filtering sediment-laden runoff?

This is due to either a rip in the bag or degradation of the material on the outside of the bag. Replace the damaged bag with a new one to avoid sediment-laden runoff from entering the curb inlet.

- Is unfiltered water entering the curb inlet opening?

This is caused by gaps in between bags or between the wood board and the bags. Fix this issue by placing bags closely together with other bags or the wooden board to avoid any gaps in the protection.

- Does sediment need to be removed from the curb inlet protection?

Sediment accumulated in front or behind the curb inlet protection should be removed when it reaches one-half of the original exposed height of the bag(s). Allowing too much sediment to accumulate in front or behind the curb inlet protection drastically reduces its effectiveness. One high-intensity rainfall can dislodge enough sediment from the drainage basin to completely fill the space behind the curb inlet protection. Therefore, it is extremely important to inspect curb inlet protection within 24 hours of a large rainfall event. When removing sediment from the curb inlet protection with a bulldozer or backhoe, take care not to damage or undermine bags.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

# KANSAS DEPARTMENT OF TRANSPORTATION

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## TEMPORARY EROSION CONTROL MANUAL

### SECTION 5 SEDIMENT STORAGE BASINS

Version	Version Date	Notes
1	9/12/2023	



# TABLE OF CONTENTS

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**SECTION 5 SEDIMENT STORAGE BASINS..... 4**  
Sediment Basin.....4

# SECTION 5 SEDIMENT STORAGE BASINS

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## SEDIMENT BASIN

### Purpose and Operation

A sediment basin is a barrier, embankment, or excavated area with a controlled stormwater release structure formed by constructing an embankment of compacted earth fill to collect runoff before it discharges from a project site. This practice applies where erosion control measures are insufficient to prevent offsite sedimentation. In addition, sediment basins are required for each drainage area with 10 or more acres disturbed at one time. The purpose of a sediment basin is to detain sediment-laden runoff from disturbed areas in “wet” or “dry” storage long enough for most of the sediment to settle out.

To view KDOTs Standard Drawings for sediment basins select the following link which shows the detailed drawings with relevant design information: [Landscape Standard LA 852H](#). This file can also be found on KDOTs KART webpage with a free account.

For further specifications regarding the sediment basin refer to KDOTs Standard Specifications [Section 902 – Temporary Erosion and Sediment Control](#). See additional Special Provisions for KDOTs Standard Specifications ([Division 900](#)).

### Design

#### Design Considerations

Prior to the start of construction, sediment basins should be designed by a registered design professional. Plans and specifications should be referred to by field personnel throughout the construction process. The sediment basin should be built according to planned grades and dimensions.

#### Placement

The best location to construct a sediment basin is in a low area or natural drainage way. These basins should not be in protected waterways. The location of the basin should not be in an area where it can pose a threat to public safety. The placement of the basin should also not be where public roads or utilities would be disturbed if ponding were to occur.

#### Embankment

The maximum embankment height from the downstream toe to crest is 15'. The minimum top width is 6'; maximum slope of embankment face is 2.5:1. The embankment crest elevation will include 5% of the embankment height for settling. The embankment shall have cover approved for steep slopes. The fill material of the embankment shall be stable moist soil.

#### Volume

The required volume for a sediment basin is 3,600 cubic feet per acre of contributing drainage area. This specific drainage area can include offsite areas that flow into the basin unless the offsite flows are diverted from the disturbed area. The storage volume is calculated up to the rim elevation of the principal spillway overflow riser.

- A portion of the total volume is allotted for sediment storage. The General Permit restricts the sediment storage volume to 20% of the total.

According to the [KDHE CSGP Definitions and Acronyms](#) package, alternative storage volumes may also be approved for areas in Western Kansas where the 2-year, 30-minute rainfall event is less than 1.3”.

If this design is approved the minimum runoff coefficient for disturbed areas shall be 0.77 and undisturbed area runoff coefficients must be documented and justified.

### Surface Area

The surface area of the primary spillway of the sediment basin needs to meet at least one of the following requirements:

- The minimum surface area shall be 1,000 square feet per acre of drainage area, or
- Flow length from the major inlet to primary spillway shall be twice the average top width of the pond, or where A is the surface area at the top of the riser and L is the distance from entry of the largest flow volume to the riser. The flow length may be increased by use of wire backed silt fence or other baffle. If baffles are required, they shall be arranged to not interfere with silt removal.

$$L \geq (2*A)^{0.5}$$

### Skimmer Dewatering Device

The skimmer dewatering device shall be included in the design and will need to be sized to provide a drawdown time of 2 to 5 days. This device serves to release cleaner water from the surface rather than the bottom of a sedimentation basin. The dewatering device also occurs at a constant rate.

To view KDOTs Standard Drawings for the skimmer dewatering device, select the following link which shows the detailed drawings with relevant design information: [Landscape Standard LA 852H](#). This file can also be found on KDOTs KART webpage with a free account.

- All PVC pipes used for this device are to be schedule 40.
- HDPE flexible drainpipes are to be attached to the pond outlet structure with water-tight connections.
- The orifice shall be sized to provide a drawdown time of 2 to 5 days and will need to be approved by the Engineer or Designer.
- Other skimmer designs may be used that also dewater from the surface at a constant rate and they must be approved by the Engineer or Designer.

### Principal Spillway

The principal spillway shall consist of a conduit, riser pipe with a trash rack, and an anti-flotation block. The conduit shall go under the embankment and exit at a stabilized outlet. Refer to the drawings linked above to see a standard configuration of the principal spillway for a sediment basin. The riser shall be held in place with an anchor or large foundation to avoid the device from becoming buoyant. Anti-seep devices are also recommended to be used on the principal spillway conduit. One device option includes anti-seep collars around the outlet conduit, and they should project 1'-3' from the pipe. Engineer or Designer to specify what type of anti-seep device to be used.

### Emergency Spillway

The emergency spillway shall be constructed in a location that will not cause erosion to the embankment. It shall be trapezoidal in shape and have side slopes that are 3:1 or steeper. It should also be level and at least 20' long with a minimum width of 10'.

### Erosion Control

Erosion control measures also need to be followed for the construction of the sediment basin. It is important to vegetate and stabilize the area as soon as construction is complete. Refer to the

[Stabilization Section](#) of this manual for guidance on different stabilization measures. Use temporary diversion structures to prevent surface water from running into disturbed areas. Sediment-laden runoff should be diverted to the upper end of the sediment pool to improve trap effectiveness.

## Installation

### *Proper Installation Method*

- Follow the appropriate placement criteria that were mentioned in the previous section.
- Locate all the utilities on site where construction is occurring.
- Place any fencing or warning signs around the constructed area if trespassing is going to be likely.
- Remove any existing debris and excavate the basin. Save the fill excavated to use for other purposes.
- For the principal spillway, place the pipe and riser on a secure, flat ground and then surround the pipe with a 4" layer of fill soil and compact it to match the density of the foundation soil. This keeps the pipe secure. The lower half of the riser should then be perforated with 1/2" diameter holes spaced 3" apart. Embed the riser at least 12" into the concrete anchor or other foundation structure used to keep the device from becoming buoyant. Surround the riser with 2' of clean, uniformly graded stone. Place a trash rack at the opening of the riser. The type and size are to be dependent on the design and the Engineer or Designer will need to specify. Install a riprap apron at the pipe outlet that is at least 5' wide and 10' long to a stable grade.
- For the embankment, first scarify the foundation before placing any fill. The fill must be clean and should not contain debris. The most permeable fill is to be placed on the downstream section of the embankment and the least permeable fill in the center of the embankment. Compact the fill material to be 6"-8" continuous layers over the length of the embankment. Protect the spillway barrier with 2' of fill that has been compacted before traversing over with equipment. Construct and compact the embankment to an elevation 5% above the design height to allow for settling to occur. After construction place a reference stake at the sediment clean out elevation.
- For the emergency spillway, construct this structure in undisturbed soil around one end of the embankment, and locate it so that any flow will return to the receiving channel without any damage to the embankment. Stabilize the spillway as soon as grading is complete with vegetation or erosion control blankets. Install paving material to finished grade if the spillway is not to be vegetated.
- Once the sediment basin is installed verify that the basin drains between storm events.
- The basin shall remain until less than 10 acres remain of sediment basin contributing area needing final stabilization within the drainage basin. Whenever the basin is no longer needed, remove the basin. This is done by draining any water, removing the sediment in the basin, and smoothing the site to blend in with the surrounding area. After this has occurred then stabilize the area.

### *List of common placement/installation mistakes to avoid*

- Do not construct the sediment basin in an area that serves as a high point. The sediment basin should be located in an area that is easily accessed for maintenance purposes.
- Attach an anchor or foundation to the riser to reduce flotation.
- Do not make the principal spillway too small or this could result in an increased amount of erosion at the emergency spillway.

- Do not undersize the basin or place the spillways too high that could result in overtopping.
- Do not make the slopes of the embankment too steep or it could result in slumping.
- Apply proper erosion control measures to the sediment basin during construction.

## Inspection/Maintenance

A sediment basin should be inspected at least once within every 7-day inspection monitoring period. The sediment basin should also be inspected after each storm event. The following is a general list of questions that should be addressed during each inspection:

- Is the pipe failing along the conduit?

This is due to improper compaction, omission of an anti-seep collar, leaking of pipe joints, or use of unsuitable soil. To fix this, identify the problem and repair the embankment using proper construction methods and materials.

- Are the spillway or embankment slopes eroding?

This is most likely due to inadequate vegetation or improper grading or sloping. To fix this issue, repair by using proper grades and slopes or establish adequate vegetation to reduce erosion.

- Is the riser blocked and not allowing water to enter?

This problem is most likely due to the riser being blocked with debris. To fix this problem clean out the debris and confirm a trash rack is installed to filter debris from entering the riser.

- Is the sediment basin overtopping?

This overtopping is most likely due the elevation of the principal and emergency spillway being too high compared to the top of embankment elevation. To fix this, re-evaluate the spillway design and repair erosion damage. Consider re-sizing the sediment basin to have a larger storage capacity.

- Does the sediment basin water level seem to be too high or look dirty?

This problem could be due to gravel clogging the drainage system. To fix this problem, clean out the dewatering system regularly and after major storms.

- Does the emergency spillway seem to be used often and have extensive erosion?

This issue is due to the principal spillway being too small and causing the emergency spillway to be used in excess. Since this can also cause increased erosion potential, the solution should be to install a larger principal spillway or to investigate some type of supplemental spillway.

- Does the embankment look to be slumped or have settled too much?

This problem could be due to inadequate compaction or not using suitable fill soil. To fix this problem, add compacted fill material that is without debris to the embankment.

- Does there appear to be a slumping failure on slopes?

This is most likely due to the slopes being too steep. To fix this, flatten the slopes and verify they do not exceed the maximum slope of 2.5:1 on the embankment.

- Is there severe erosion below the principal spillway?

This problem is likely due to there not being adequate outlet protection. To fix this, install outlet protection like rip rap into place.

- Is maintenance to the sediment basin becoming difficult and costly?

This is most likely due to the basin not being adequately placed in an area that is easily accessible. Depending on the scope of the project and the site, consider relocating the basin or improving access to the site.

- Does the storage capacity seem to become inadequate over time?

This problem is most likely caused by the sediment not being properly removed from the sediment basin. To fix this issue, remove accumulated sediment more frequently and after major storms. Sediment also needs to be removed and properly disposed of whenever it accumulates to  $\frac{1}{2}$  of the design volume.

Please refer to the project specific SWP2, Contract Documents, and detailed drawings for additional inspection and maintenance criteria.

**APPENDIX A-1**  
**PERMANENT SEEDING SUMMARY OF SEEDING**  
**QUANTITIES**  
**(LA850)**



**APPENDIX A-2**  
**TEMPORARY EROSION AND POLLUTION CONTROL**  
**(LA852A)**

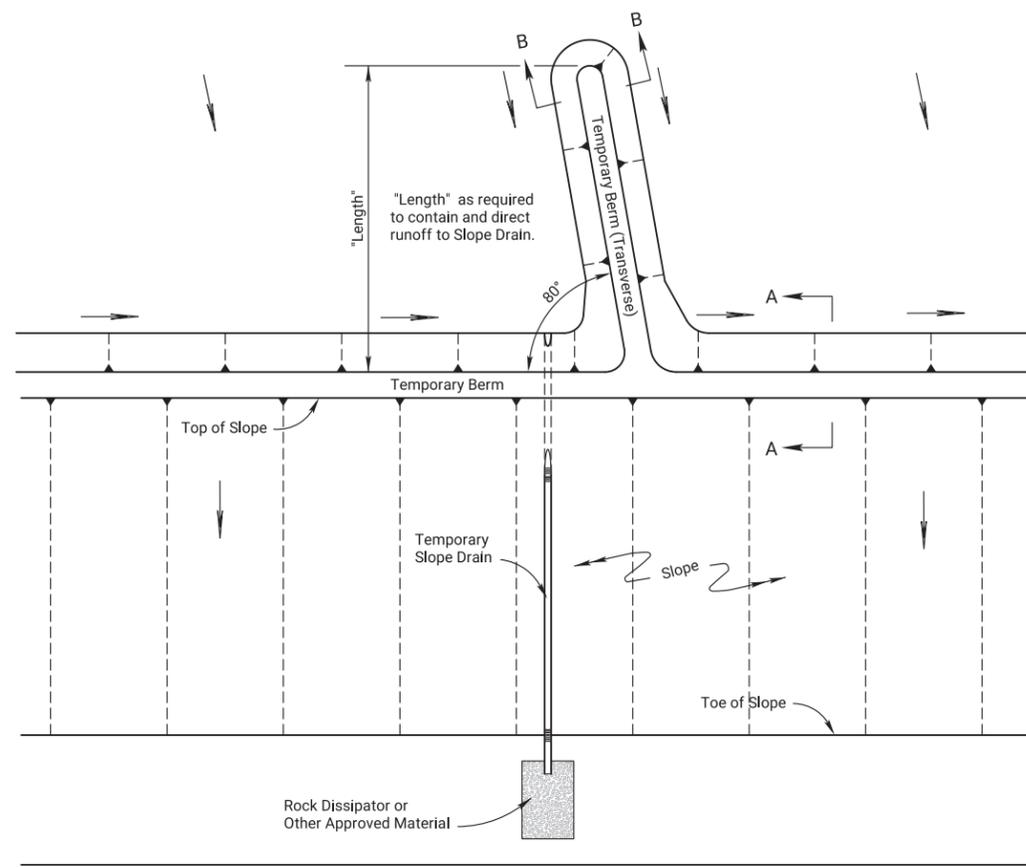


**APPENDIX A-3**  
**EROSION CONTROL SEEDING-SODDING**  
**(LA852A-EC)**

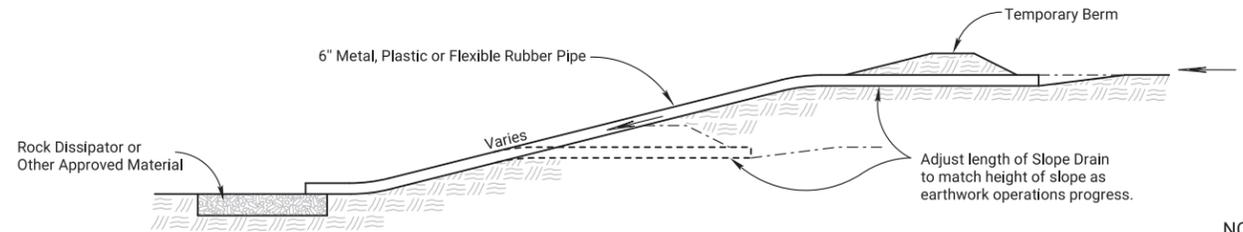


**APPENDIX A-4**  
**TEMPORARY EROSION AND POLLUTION CONTROL**  
**TEMPORARY SLOPE DRAIN, TEMPORARY STREAM**  
**CROSSING (AGGREGATE)**  
**(LA852B)**

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	0	0	0	0

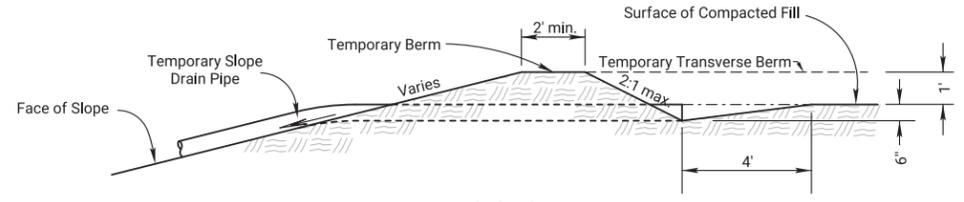


TYPICAL PLAN VIEW OF TEMPORARY BERM AND TEMPORARY SLOPE DRAIN  
NO SCALE

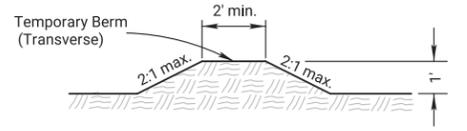


TYPICAL PROFILE OF TEMPORARY SLOPE DRAIN  
NO SCALE

- NOTES:
- 1) Temporary Slope Drain and Temporary Berm may be used on either project foreslopes or project backslopes.
  - 2) Discharge of Slope Drains shall be into stabilized ditch or area, or into Sediment Basin.
  - 3) Pipe shall be secured in place as approved by Engineer.
  - 4) Temporary Berms under 2,000 feet shall be bid by Set Price.

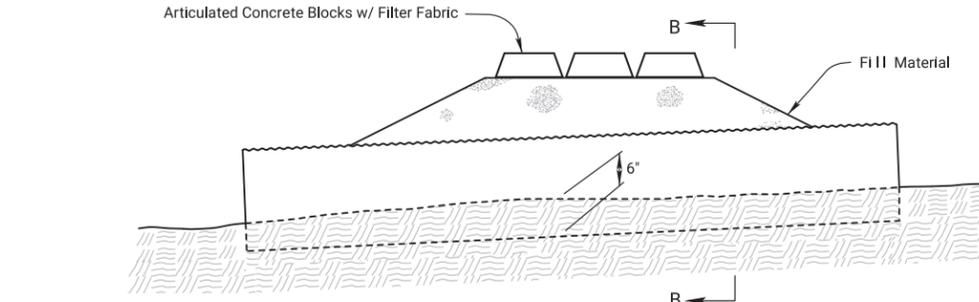


SECTION A-A  
NO SCALE

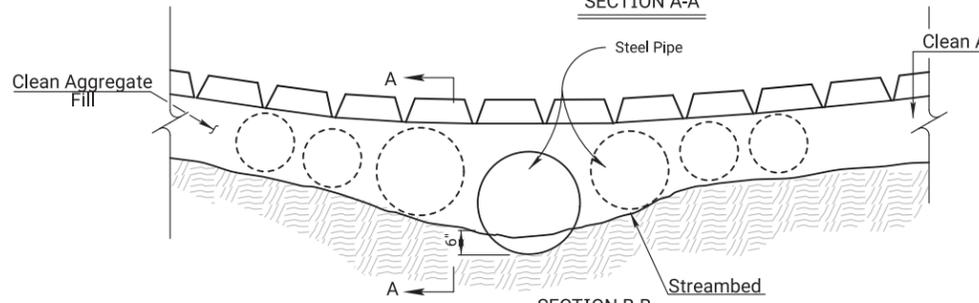


SECTION B-B  
NO SCALE

TYPICAL PROFILE OF TEMPORARY BERM  
NO SCALE



SECTION A-A



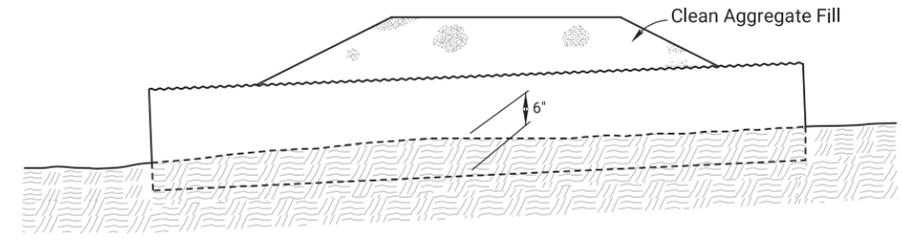
SECTION B-B

TEMPORARY STREAM CROSSING (ARTICULATED CONCRETE BLOCKS)  
NO SCALE

Pipe size may vary.  
Place 1 pipe buried 6" into stream bottom, in the lowest point of the channel to allow the passage of aquatic organisms, with additional pipes placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overtopping the crossing.

Clean aggregate fill will extend a minimum of 50' on the entrance and exit side of the crossing to prevent tracking. The aggregate shall be clean aggregate and a minimum of 6" thick and will be maintained through the use of the crossing.

See KDOT Specifications for more information.



SECTION B-B

TEMPORARY STREAM CROSSING (AGGREGATE)  
NO SCALE

Pipe size may vary.  
Place 1 pipe buried 6" into stream bottom, in the lowest point of the channel to allow the passage of aquatic organisms, with additional pipes placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overtopping the crossing.

Clean aggregate fill will extend a minimum of 50' on the entrance and exit side of the crossing to prevent tracking. The aggregate shall be clean aggregate and a minimum of 6" thick and will be maintained through the use of the crossing.

See KDOT Specifications for more information.

03	01-21-22	Temp Stream Crossing - Clean Aggregate Fill Note Added	M.R.D.	M.L.
02	08-24-21	Temp Stream Crossing - Clean Aggregate Fill Note Added	M.R.D.	M.L.
01	06-11-13	Revised Standard	M.R.M.	S.H.S.
NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION  
**TEMPORARY EROSION AND POLLUTION CONTROL**  
**TEMPORARY SLOPE DRAIN, TEMPORARY STREAM CROSSING (AGGREGATE)**  
LA852B

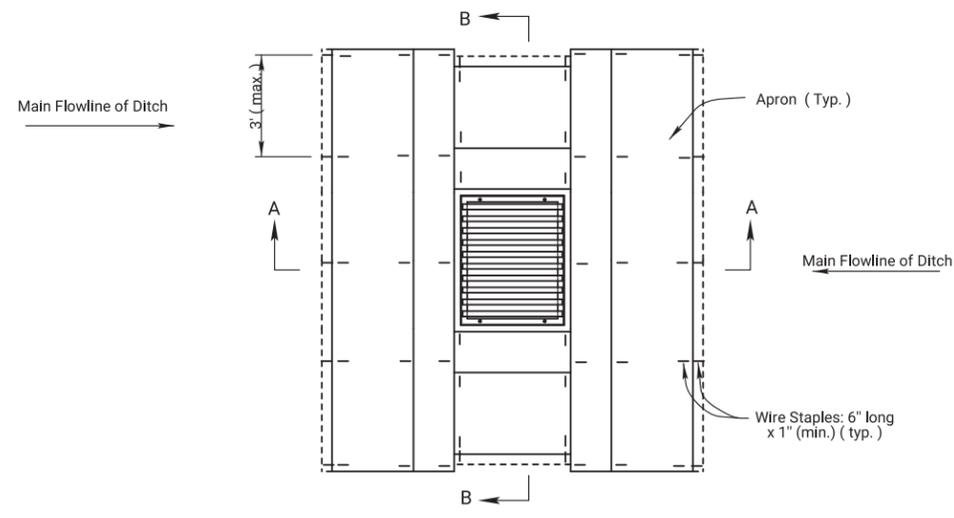
FHWA APPROVAL	01-21-22	APP'D	Mervin Lare
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

**APPENDIX A-5**

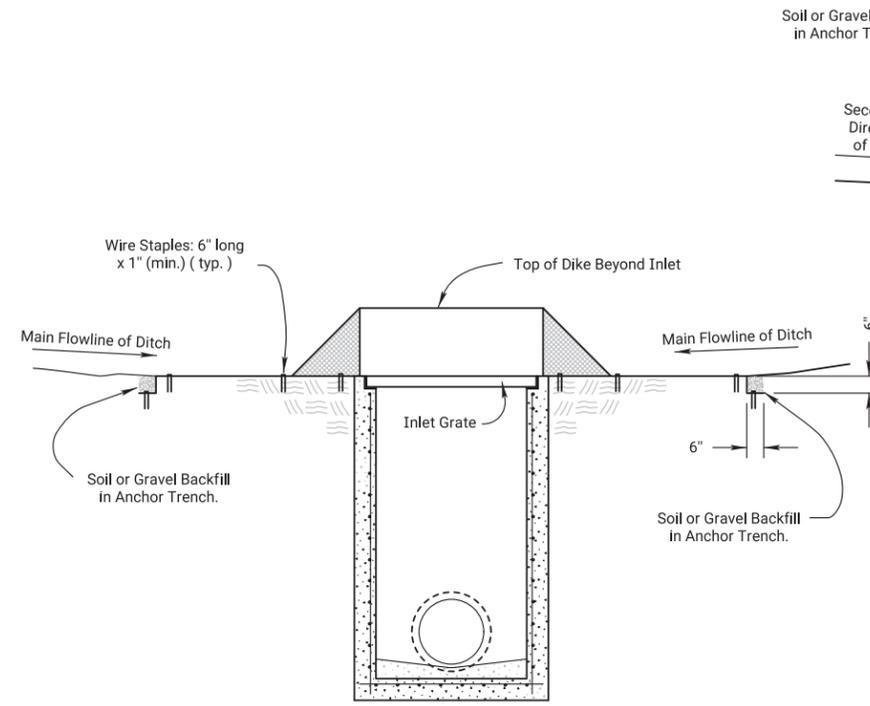
**TEMPORARY EROSION AND POLLUTION CONTROL,  
TEMPORARY INLET SEDIMENT BARRIER (SILT FENCE)  
TEMP. INLET SEDIMENT BARRIER (T.S.D.)**

**(LA852C)**

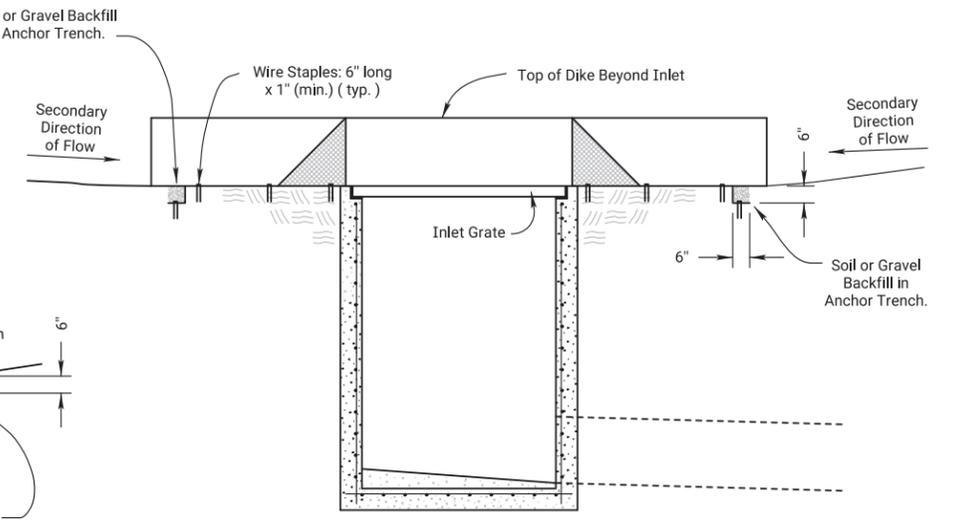
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	0	0	0	0



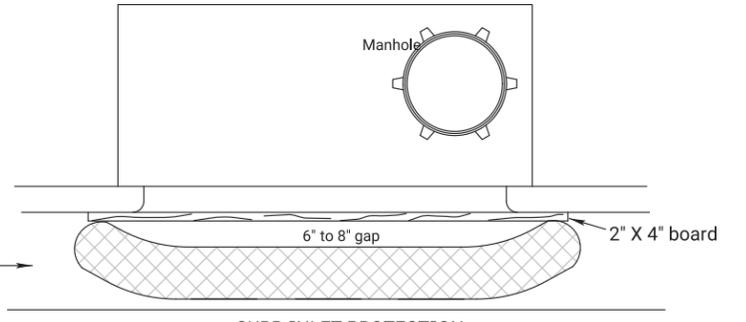
**PLAN**  
**TEMPORARY INLET SEDIMENT BARRIER**  
**(TRIANGULAR SILT DIKE METHOD)**  
 NO SCALE



**SECTION A - A**



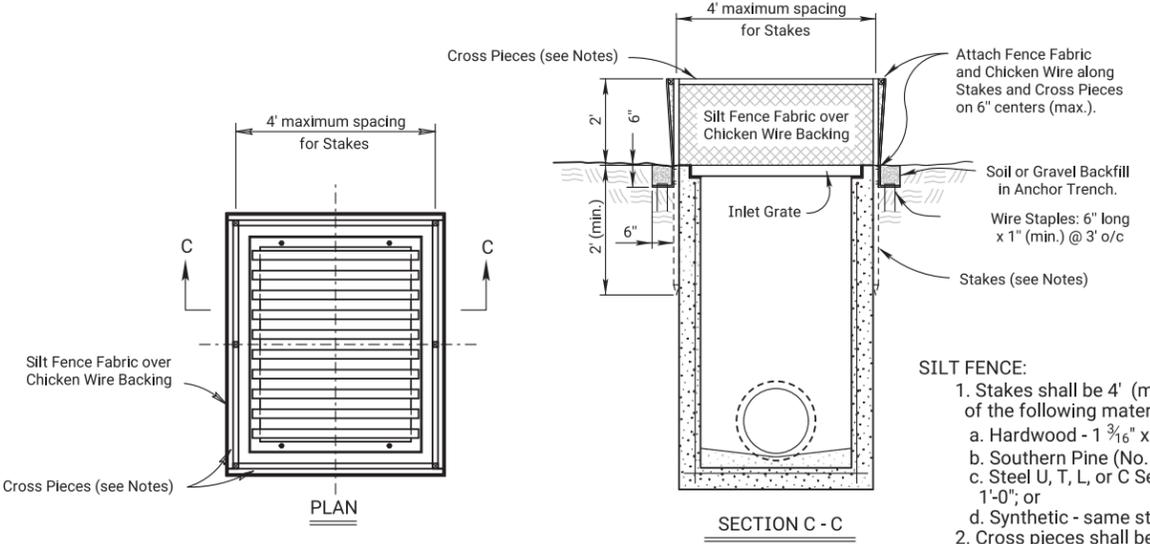
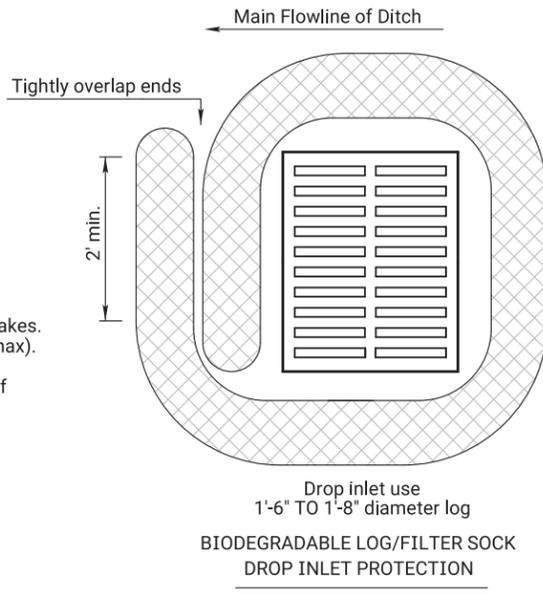
**SECTION B - B**



**CURB INLET PROTECTION**

1. If multiple gravel bags are required, place them in such a way that no gaps are evident.
2. Height of bags (8" minimum diameter) must not be above top of curb.
3. Alternative products may be used other than gravel bags such as the "Gutter Buddy". Products must be approved by the Engineer.
4. Curb inlet protection will be measured and paid for as Filter Sock.

Material Requirements	
Use 100% shredded mulch or other non-compost biodegradable material as fill for logs.	
No compost or fines.	
No hay or straw.	
Do not use material which prohibits water infiltration.	
Log Mesh:	
Use mesh with 1/4" openings or larger. Mesh must allow water infiltration but also hold fill material in place.	



**PLAN**  
**TEMPORARY INLET SEDIMENT BARRIER**  
**(SILT FENCE METHOD)**  
 NO SCALE

- SILT FENCE:**
1. Stakes shall be 4' (min.) long and of one of the following materials:
    - a. Hardwood - 1 3/16" x 1 3/16";
    - b. Southern Pine (No. 2) - 2 5/8" x 2 5/8";
    - c. Steel U, T, L, or C Section - .95 lbs. per 1'-0"; or
    - d. Synthetic - same strength as wood stakes.
  2. Cross pieces shall be of same material as stakes.
  3. Attach fence fabric securely on 6" centers (max).
  4. Use of high flow material is acceptable.
  5. Refer to plan sheets to estimate the length of silt fence required.

Plotted by : Melissa.Davidson@ks.gov 15-SEP-2022 20:35  
 File : LA852C.dgn

NO.	DATE	REVISIONS	BY	APP'D
03	09-26-19	Changed Direction of Main Flowline of Ditch Arrow	M.R.D.	S.H.S.
02	03-10-15	Revised Standard	R.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

**TEMPORARY EROSION AND POLLUTION CONTROL, TEMPORARY INLET SEDIMENT BARRIER (SILT FENCE)**  
**TEMP. INLET SEDIMENT BARRIER (T.S.D.)**  
 LA852C

DESIGNED	R.A.	DETAILED	R.A.	QUANTITIES	TRACED
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN. CK.	TRACE CK.

Scott H. Shields  
 FHWA APPROVAL 03-10-15 APP'D  
 KDOT Graphics Certified 07-14-2022 Sh. No. 0

KDOT Graphics Certified

**APPENDIX A-6**  
**TEMPORARY EROSION AND POLLUTION CONTROL SLOPE**  
**INTERRUPTIONS BIODEGRADABLE LOG / SILT FENCE**  
**(LA852D)**

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		0	0	

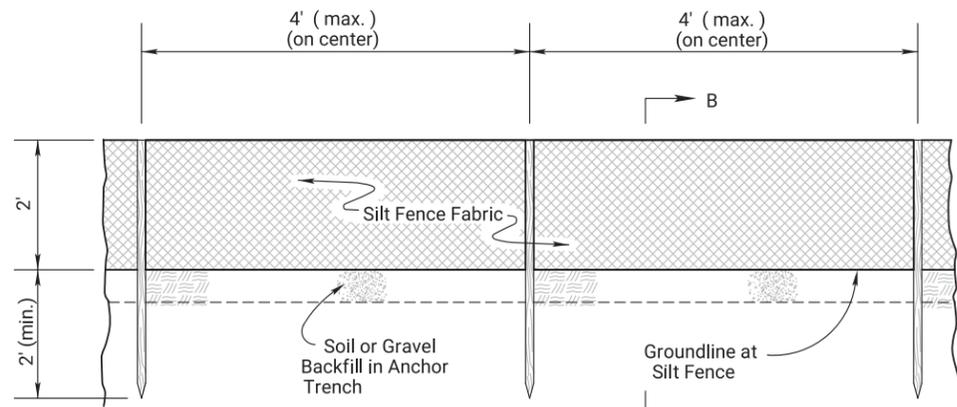
INSTALLATION NOTES

**SILT FENCE:**

- Stakes shall be 4' (min.) long and of one of the following materials:
  - Hardwood - 1 3/16" x 1 3/16";
  - Southern Pine (No. 2) - 2 5/8" x 2 5/8";
  - Steel U, T, L, or C Section - .95 lbs. per 1'-0"; or
  - Synthetic - same strength as wood stakes.
- Attach fence fabric with 3 zip ties within the top 8" of the fence. Alternate attachment methods may be approved by the Engineer on a performance basis.
- Use of high flow material is acceptable.
- Refer to plan sheets to estimate the length of silt fence required.

**BIODEGRADABLE LOG OR FILTER SOCK**

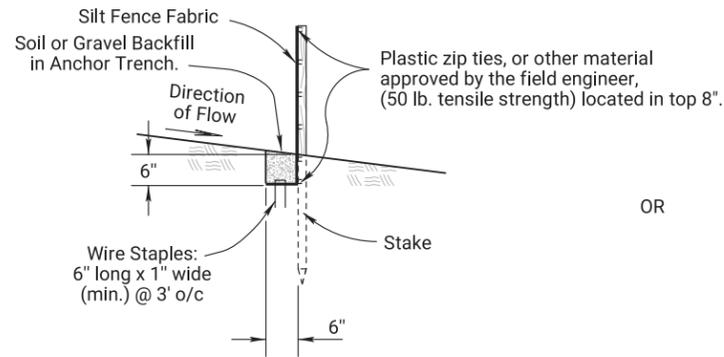
- Place biodegradable logs or filter sock tightly together minimum overlap of 18".
- Wood stakes shall be 2" x 2" (nom.).
- Refer to plan sheets to estimate length of biodegradable log and filter sock required.
- Each log or sock (except compost filter socks) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the sock and soil.
- Length of stakes should be 2 times the height of the log at a minimum with minimum ground embedment equal to the height of the log / sock.



TYPICAL ELEVATION

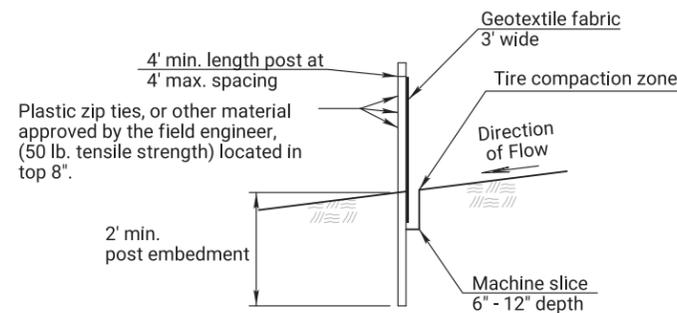
SILT FENCE BARRIER

NO SCALE



SECTION B-B

OR



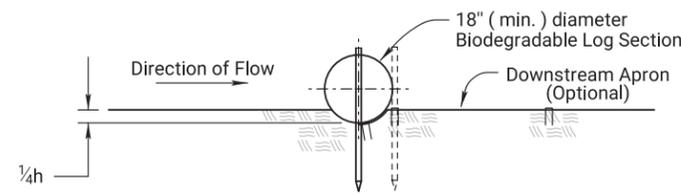
SECTION B-B

Biodegradable Log or Filter Sock Slope Interruptions

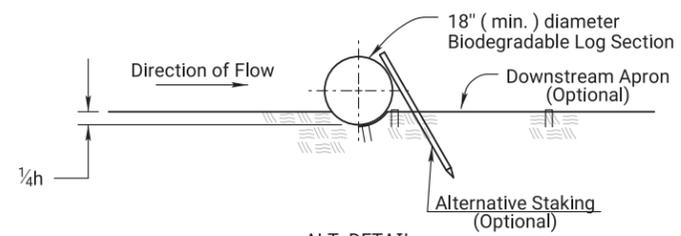
		PRODUCT		
		9" Sediment Log or 8" Filter Sock (ft)	12" Sediment Log or 12" Filter Sock (ft)	20" Sediment Log or 18" Filter Sock (ft)
Slope Gradient	≤4H:1V	40	60	80
	3H:1V	30	45	60

BIODEGRADABLE LOG MATERIAL		
	LOW FLOW	HIGH FLOW
9"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber
12"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber
18"-20"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber

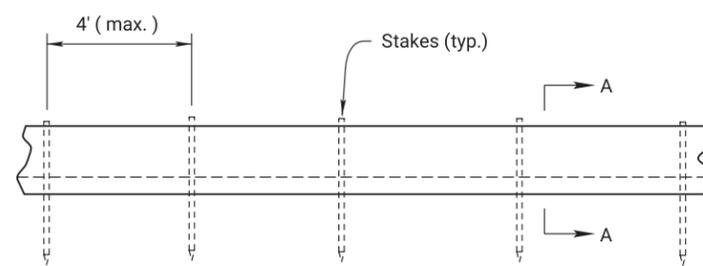
Deviations should be approved by the Field Engineer.



SECTION A - A



ALT. DETAIL  
OPTIONAL



TYPICAL ELEVATION

BIODEGRADABLE LOG SLOPE INTERRUPTIONS

OR Filter Sock

GENERAL NOTES

- Slope interruptions shall be placed along contour lines, with a short section turned upgrade at each end of the barrier.
- The maximum length of the slope interruptions shall not exceed 250 feet, and the barrier ends need to be staggered.
- Interruptions damaged by Contractor's negligence, including improper maintenance or lack of maintenance, shall be repaired immediately by Contractor at no additional cost to KDOT.
- Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

03	06-28-16	Revised Standard	R.A.	S.H.S.
02	03-01-15	Revised Standard	R.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.
NO.	DATE	REVISIONS	BY	APP'D

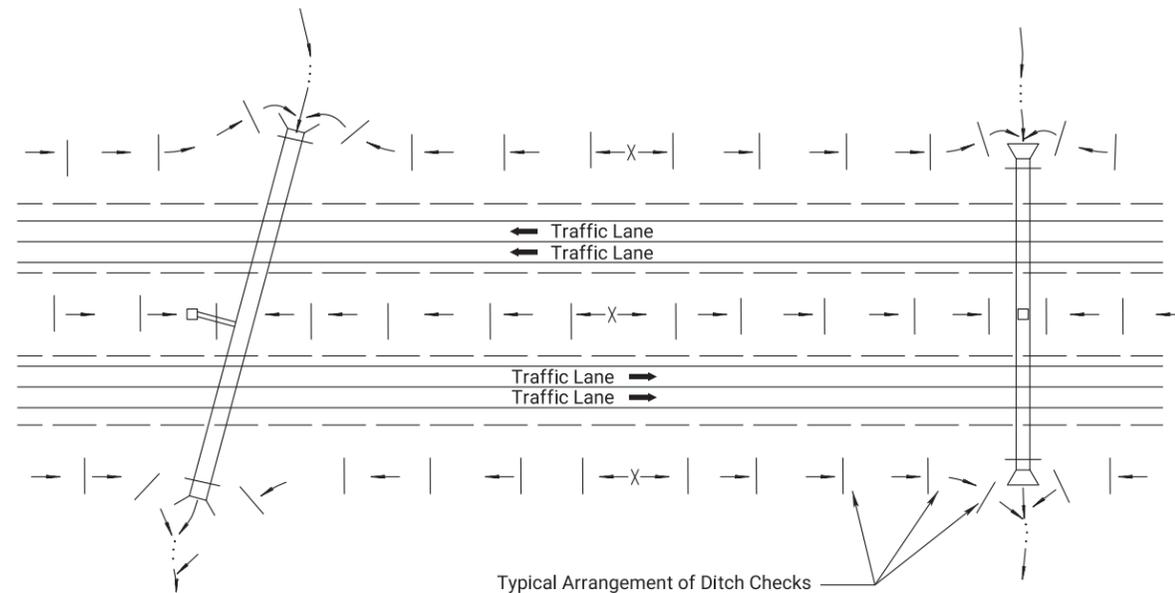
KANSAS DEPARTMENT OF TRANSPORTATION  
**TEMPORARY EROSION AND POLLUTION CONTROL**  
**SLOPE INTERRUPTIONS**  
**BIODEGRADABLE LOG / SILT FENCE**  
 LA852D

DESIGNED	S.H.S.	DETAILED	R.A.	QUANTITIES	TRACED
DESIGN CK.	S.H.S.	DETAIL CK.		QUAN. CK.	TRACE CK.

Scott H. Shields

**APPENDIX A-7**  
**TEMPORARY EROSION AND POLLUTION CONTROL DITCH**  
**CHECKS**  
**(LA852E)**

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		0	0	



TYPICAL DITCH CHECK LAYOUT PLAN  
NO SCALE

20" BIOLOG CHECK SPACING	
DITCH @ SLOPE (%)	SPACING INTERVAL (FEET)
1.0	125
2.0	60
3.0	40
4.0	30
5.0	25

NOTE: Use this spacing for all except Rock Ditch Checks.

18" FILTER SOCK CHECK SPACING	
DITCH @ SLOPE (%)	SPACING INTERVAL (FEET)
1.0	110
2.0	55
3.0	35
4.0	25
5.0	20

NOTE: Use this spacing for all except Rock Ditch Checks.

GENERAL NOTES

- 1) The choice of ditch check methods is at the option of the Contractor.
- 2) Use only rock checks in situations where the ditch slope is 6 percent or greater.
- 2) Ditch checks damaged by Contractor's negligence, including improper maintenance or lack of maintenance, shall be repaired by Contractor at no extra cost to KDOT.

03	08-10-16	Revised Standard	R.A.A.	S.H.S.
02	06-28-16	Revised Standard	R.A.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.
NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

**TEMPORARY EROSION AND POLLUTION CONTROL DITCH CHECKS**

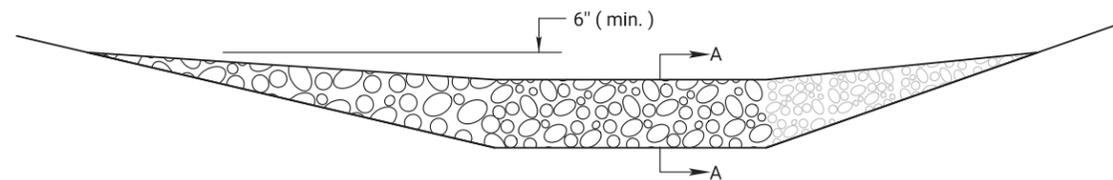
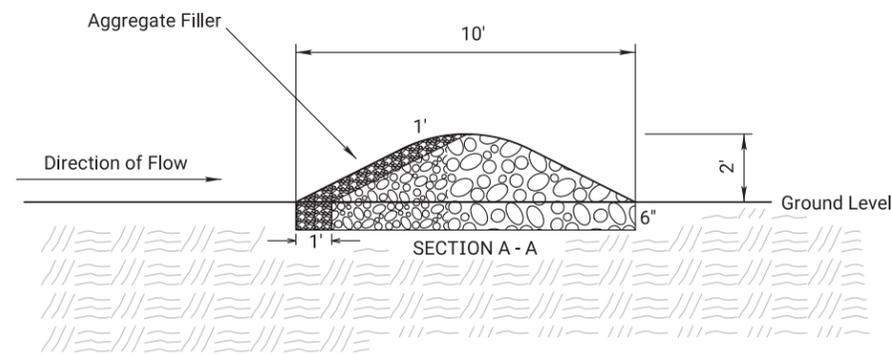
LA852E

DESIGNED	S.H.S.	DETAILED	R.A.A.	QUANTITIES	TRACED	R.A.A.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN. CK.	TRACE CK.	S.H.S.

FWHA APPROVAL 09-14-16 APP'D Scott H. Shields

**APPENDIX A-8**  
**TEMPORARY EROSION AND POLLUTION CONTROL ROCK**  
**DITCH CHECKS BIODEGRADABLE LOG DITCH CHECKS**  
**(LA852G)**

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	0	0	0	0



TYPICAL ELEVATION

ROCK DITCH CHECK

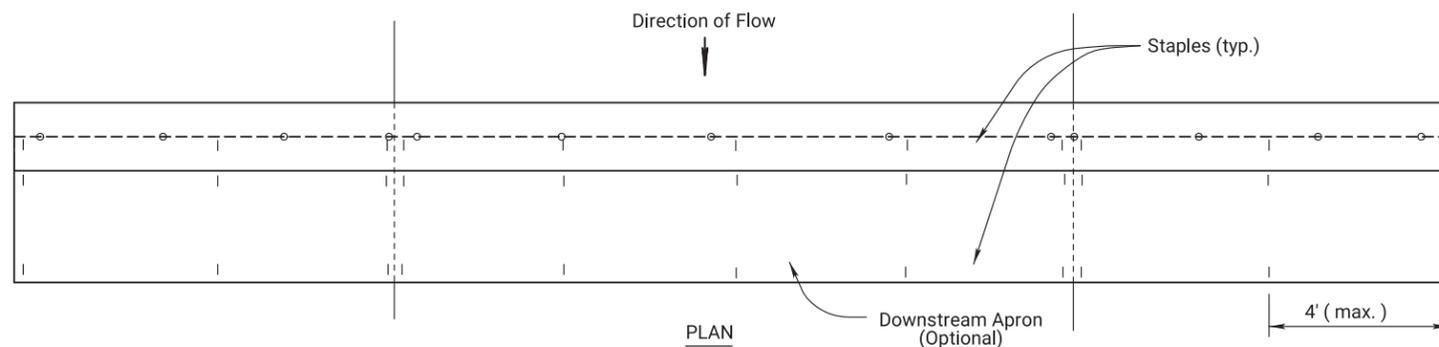
NO SCALE

TEMPORARY ROCK DITCH CHECK SPACING	
DITCH @ SLOPE (%)	SPACING INTERVAL (FEET)
5.0	60
6.0	50
7.0	43
8.0	36
9.0	33
10.0	29

NOTE: Use this spacing for Rock Ditch Checks only.

ROCK DITCH CHECK NOTES

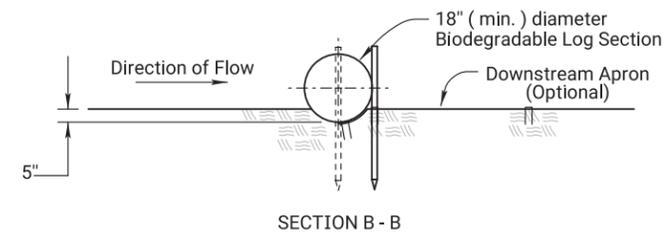
1. Rock shall be clean aggregate, D50-6" and aggregate filler.
2. Place rock in such manner that water will flow over, not around ditch check.
3. Do not use rock ditch checks in clear zone.
4. Excavation: The ditch area shall be reshaped to fill any eroded areas. Prior to placement of the rock, the ditch shall be excavated to the dimensions of the Rock Ditch Check and to a minimum depth of 6" (150mm). After placement of the rock, backfill and compact any over-excavated soil to ditch grade. This work shall be subsidiary to the bid item Temporary Ditch Check (Rock).
5. Aggregate excavated on site may be used as an alternate to the 6" rock, if approved by the Engineer.
6. The Engineer may approve the use of larger aggregates for the downstream portion of the check when conditions warrant their use.
7. When the use of larger rock is approved, D50-6" rock will be placed between the larger aggregate and the aggregate filler.
8. Aggregate filler will be placed on the upstream face of the ditch check. Aggregate filler will comply with Filter Course Type I, Division 1114.



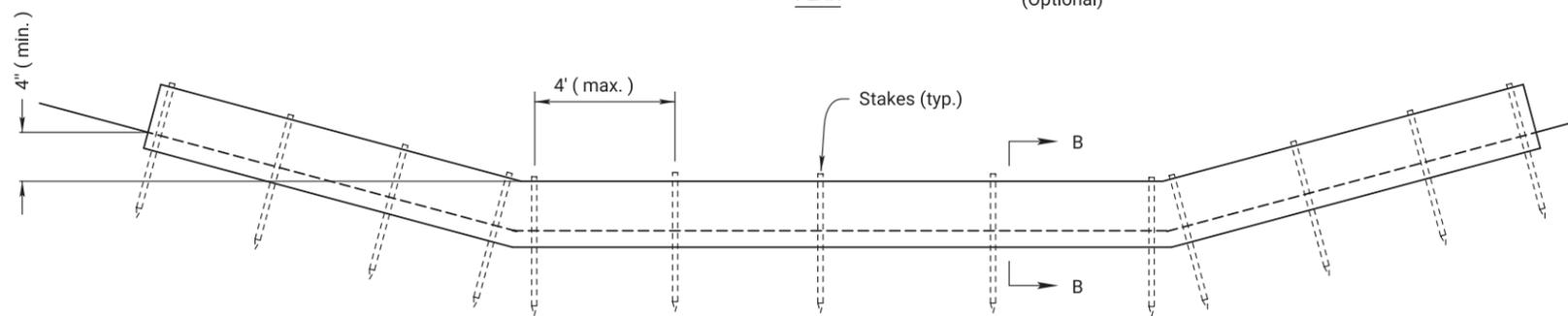
PLAN

Downstream Apron (Optional)

4' (max.)



SECTION B - B



TYPICAL ELEVATION

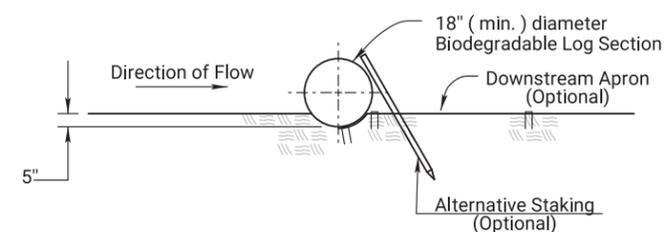
Stakes (typ.)

Downstream Apron (Optional)

BIODEGRADABLE LOG DITCH CHECK

OR Filter Sock Ditch Check

NO SCALE



ALT. DETAIL OPTIONAL

BIODEGRADABLE LOG DITCH CHECK NOTES

1. Use as many biodegradable log sections as necessary to ensure water does not flow around end of ditch check.
2. Overlap sections a minimum of 18".
3. Stakes shall be wood or steel according to Section 2114 of the Standard Specifications. Length of stakes shall be a minimum of 2 x the diameter of the log.
4. Use Erosion Control (Class 1) (Type C) as the downstream apron when required.
5. A downstream apron is required when directed by the Engineer. Apron material will be paid at the contract unit price.
6. Each log or sock (except compost filter socks) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the sock and soil.

NO.	DATE	REVISIONS	BY	APP'D
03	11-19-20	Revised Standard	M.R.D.	M.L.
02	08-10-16	Revised Standard	R.A.A.	S.H.S.
01	10-21-15	Revised Standard	R.A.A.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION  
**TEMPORARY EROSION AND POLLUTION CONTROL**  
**ROCK DITCH CHECKS**  
**BIODEGRADABLE LOG DITCH CHECKS**  
**LA852G**

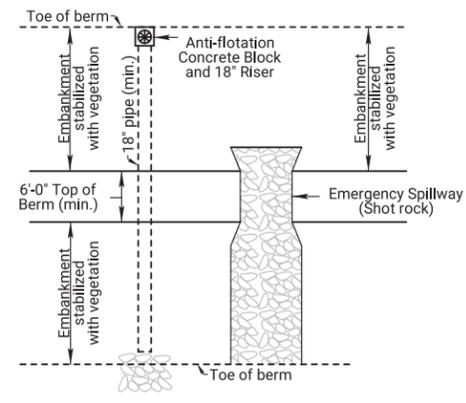
DESIGNED	M.L.	DETAILED	D.K.	QUANTITIES	TRACED	R.A.A.
DESIGN CK.	M.L.	DETAIL CK.	M.L.	QUAN. CK.	TRACE CK.	R.A.A.

FWHA APPROVAL: 11-19-20 APP'D: Mervin Lare

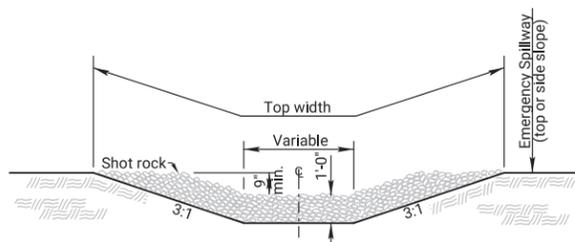
Plotted by : Melissa.Davidson@ks.gov 15-SEP-2022 20:36  
File : LA852G.dgn

**APPENDIX A-9**  
**TEMPORARY EROSION AND POLLUTION CONTROL**  
**SEDIMENT STORAGE BASIN**  
**(LA852H)**

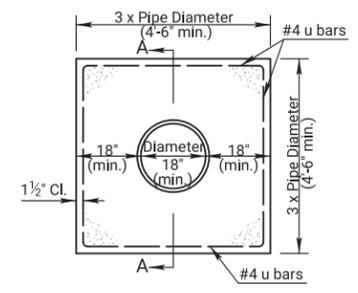
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	0	0	0	0



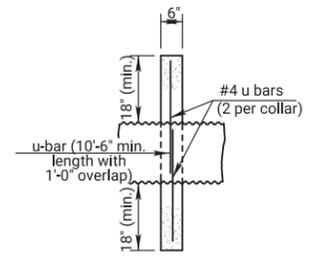
SEDIMENT STORAGE BASIN (PLAN)



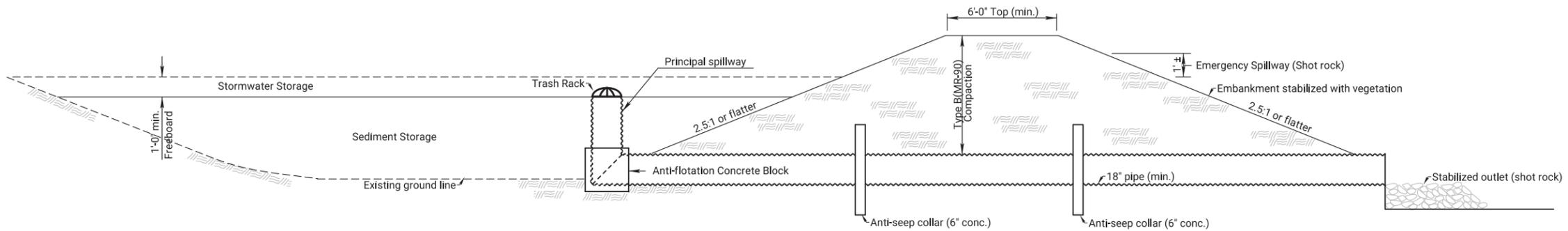
CROSS SECTION (EMERGENCY SPILLWAY)



CONCRETE ANTI-SEEP COLLAR



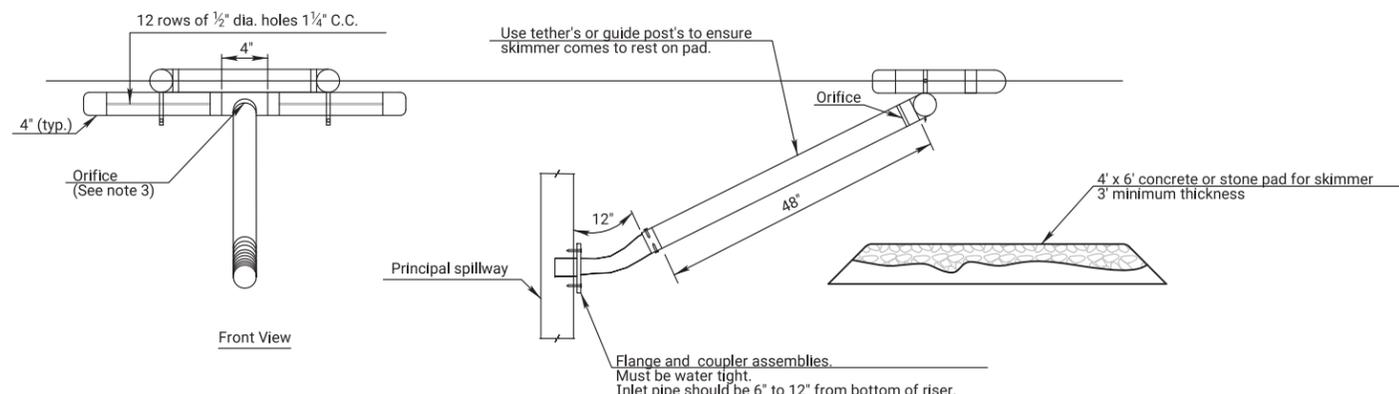
SECTION A-A



SEDIMENT STORAGE BASIN (ELEVATION)

NOTES:

- 1) Temporary Sediment Basins shall be constructed at locations as directed by the Engineer or as approved in the SWPPP Schedule. All work and materials necessary, including but not limited to, the fill material, compaction, drainage pipes, aggregates and all other incidentals necessary to construct the basin, shall be paid as "Temporary Sediment Basin".
- 2) Lengths and top dimensions shall be determined in the field by the Engineer.
- 3) Skimmer dewatering device required and must be used regardless of the size of the drainage area.



SKIMMER DEWATERING DEVICE

Notes:

1. All P.V.C. pipes are to be schedule 40.
2. HDPE flexible drain pipes is to be attached to the pond outlet structure with water-tight connections.
3. The orifice shall be sized of to provide drawdown time to 2 to 5 days and approved by the engineer.
4. Other skimmer designs maybe used that dewateres from the surface at a controlled rate. The design must be approved by the engineer.

SEDIMENT STORAGE BASIN LOCATIONS		
STATION TO STATION	SIDE	REQUIRED STORAGE CAPACITY

02	09-03-13	Added Skimmer Dewatering Device	M.R.M.	S.H.S.
01	07-17-13	Revised Standard	M.R.M.	S.H.S.
NO.	DATE	REVISIONS	BY	APP'D

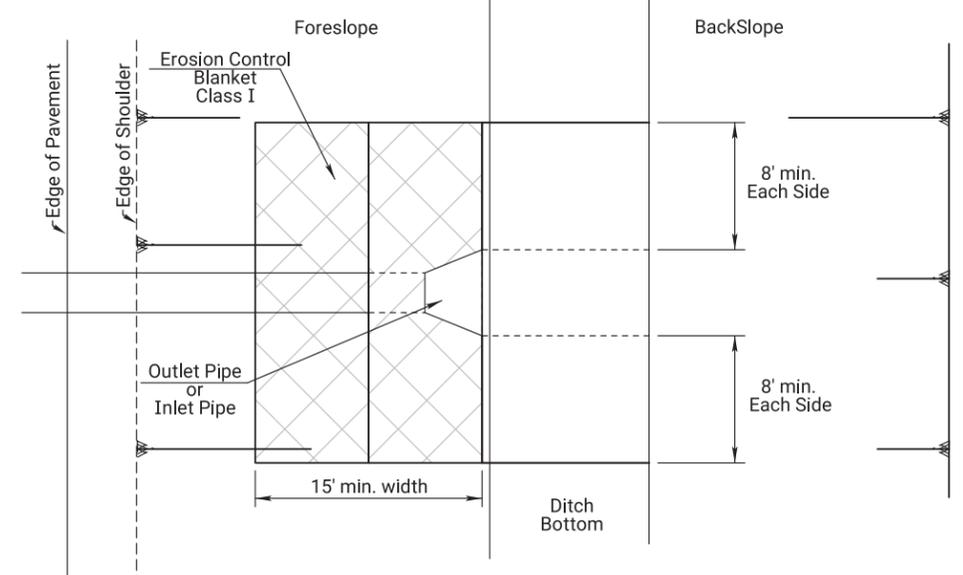
KANSAS DEPARTMENT OF TRANSPORTATION  
**TEMPORARY EROSION AND POLLUTION CONTROL  
SEDIMENT STORAGE BASIN**  
LA852H

DESIGNED	B.B.	DETAILED	B.B.	QUANTITIES	TRACED	B.B.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN. CK.	TRACE CK.	S.H.S.

Plotted by : Melissa.Davidson@ks.gov 15-SEP-2022 20:36  
File : LA852H.dgn

**APPENDIX A-10**  
**INSTALLATION DETAIL EROSION CONTROL CLASS 1 SLOPE**  
**PROTECTION**  
**(LA855)**

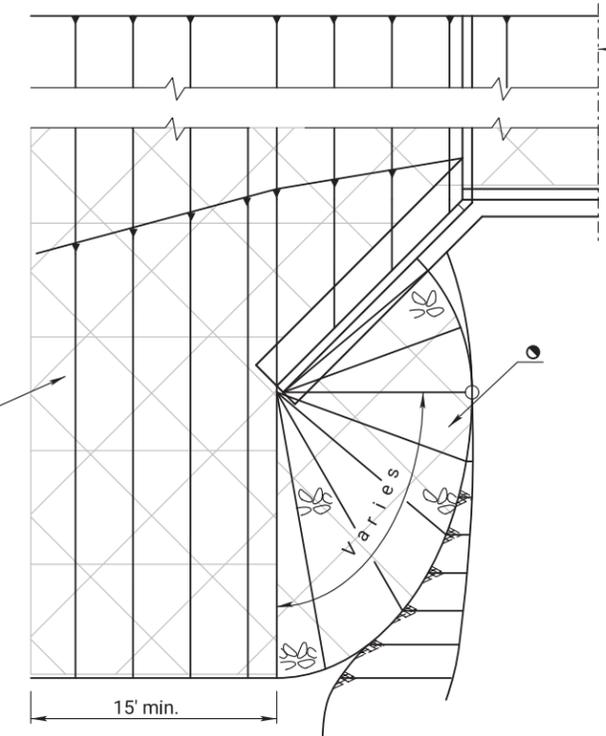
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	0	0	0	0



PARTIAL PLAN PIPE



Limits of Erosion Control Blanket



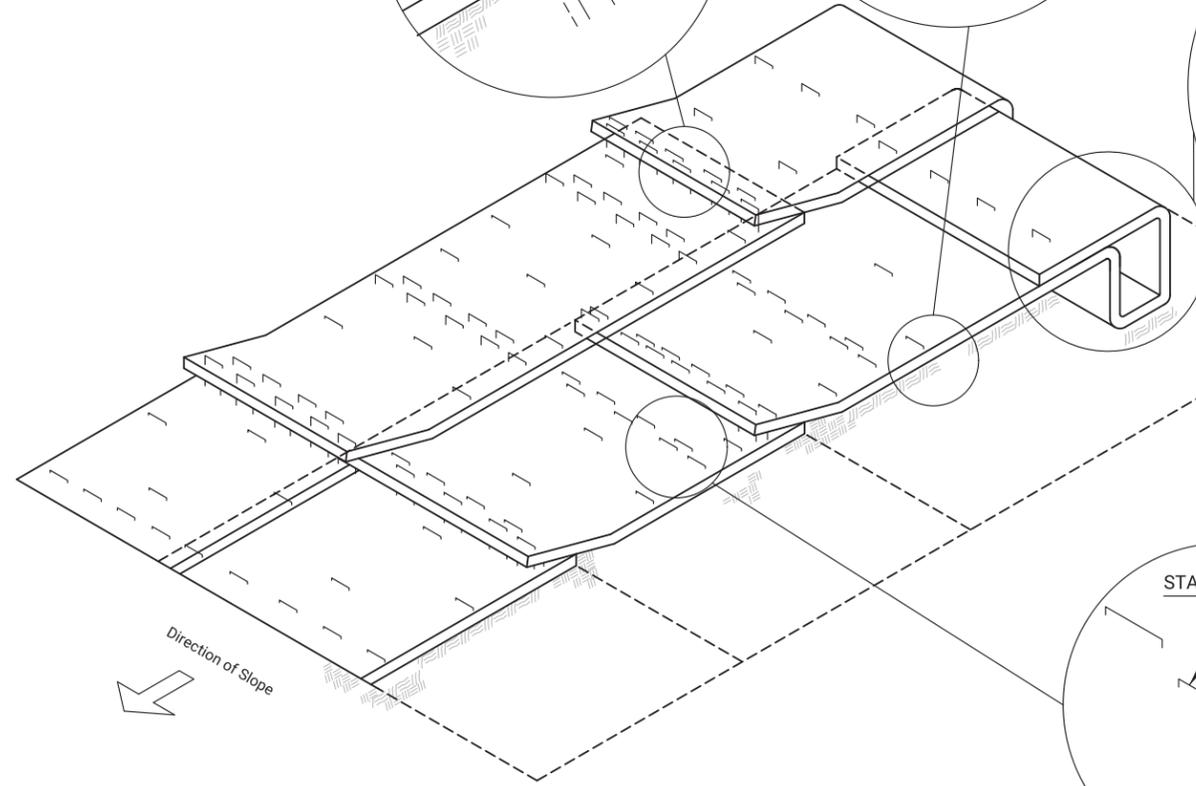
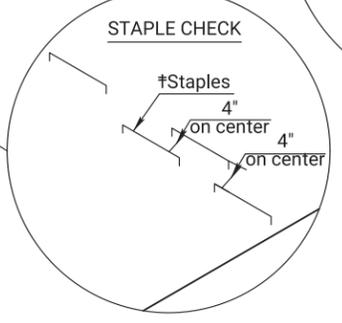
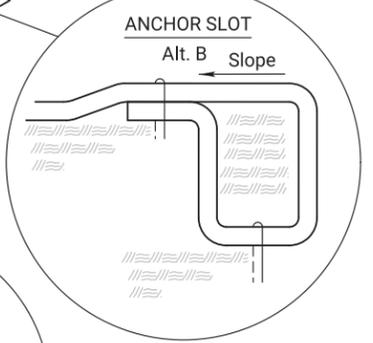
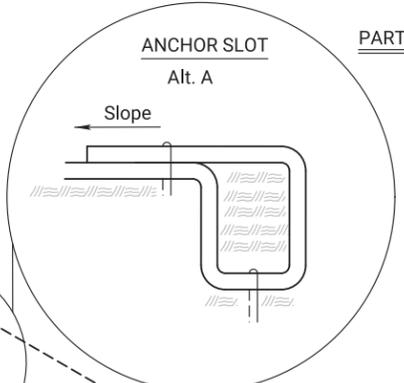
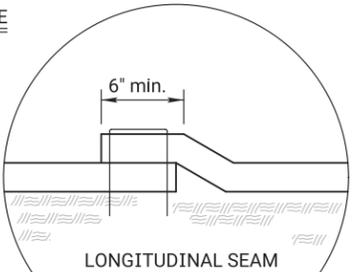
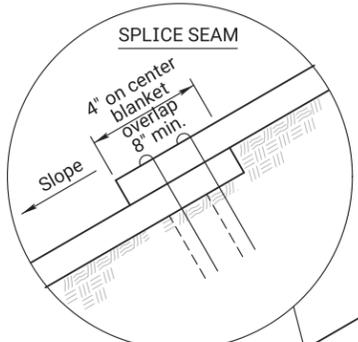
PARTIAL PLAN BOX CULVERT

**INSTALLATION DETAILS FOR EROSION CONTROL CLASS 1**

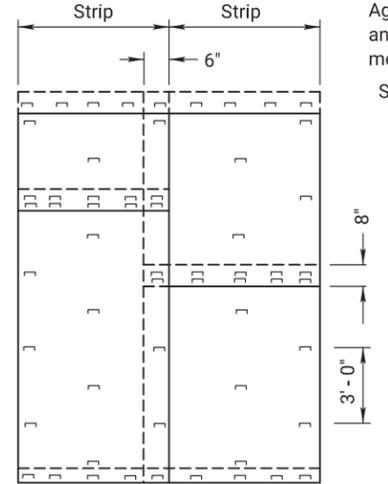
Erosion Control Blankets shall be laid loosely in the direction of the slope, beginning at the bottom of the slope. In order for blanket to be in contact with the soil, lay blanket loosely, avoiding stretching.

- ANCHOR SLOTS:** The top of the blanket should be "slotted in" at the top of the slope and anchored in place with anchors 6 inches apart. The slots should be 6 inches wide x 6 inches deep with the blanket anchored in the bottom of the slot, then backfilled, tamped and seeded.
- LONGITUDINAL SEAMS:** The edges of the blanket should overlap each other a minimum of 6 inches, with anchors catching the edges of both blankets.
- SPLICE SEAM:** When splices are necessary, overlap end a minimum of 8 inches in direction of water flow. Stagger splice seams.
- TERMINAL FOLD:** The bottom edge of the blanket shall be turned under a minimum of 4 inches, then anchored in place with anchors 9 inches apart.
- TYPICAL ANCHORS:** Anchor design shall be as recommended by the manufacturer.
- STAPLE CHECK:** Establish Staples in 2 rows 4" on center apart. Staple Checks - shall be 30' apart.

● Erosion Control Class I may be omitted if the area is immediately covered by permanent slope protection (where directed by the plans).



ISOMETRIC VIEW



PLAN VIEW - ANCHORING DIAGRAM

**NOTE:**  
Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.  
Single post ring and shank staple is acceptable.

04	03-01-15	Revised Standard	R.A.A.	S.H.S.
03	02-23-15	Revised Standard	R.A.A.	S.H.S.
02	09-15-14	Revised Standard	M.R.M.	S.H.S.
NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

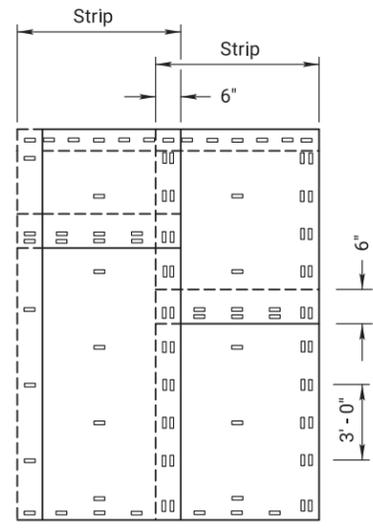
**INSTALLATION DETAIL  
EROSION CONTROL CLASS 1  
SLOPE PROTECTION**

LA855

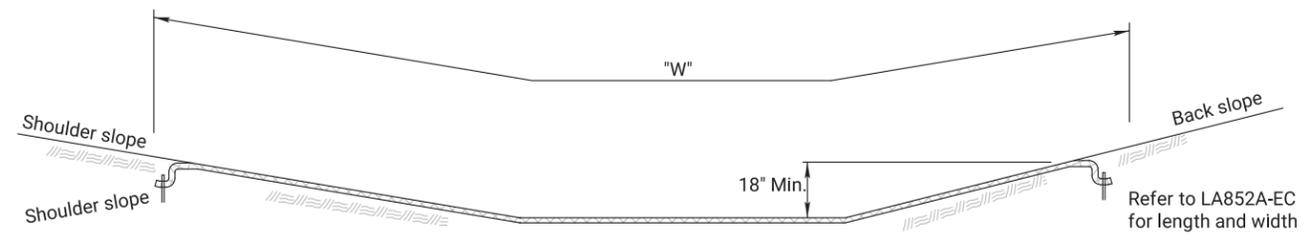
FHWA APPROVAL	03-10-15	APP'D	Scott H. Shields
DESIGNED	R.A.A.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

**APPENDIX A-11**  
**INSTALLATION DETAIL EROSION CONTROL CLASS 2**  
**FLEXIBLE CHANNEL LINER**  
**(LA856)**

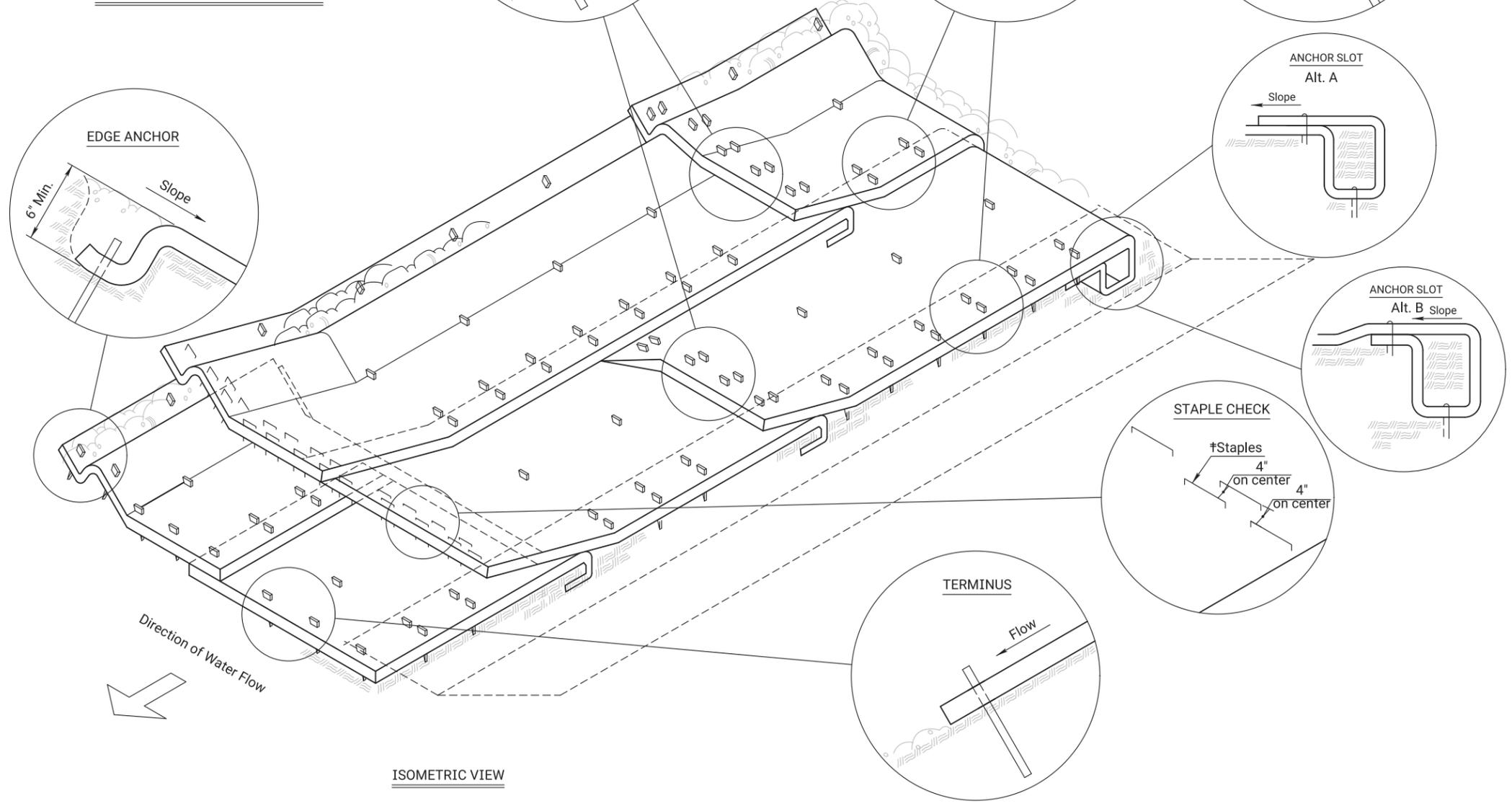
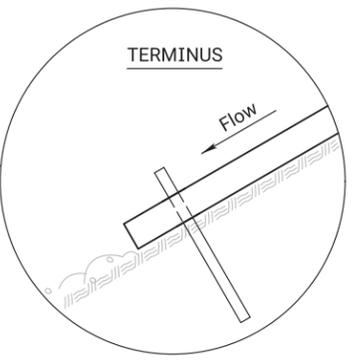
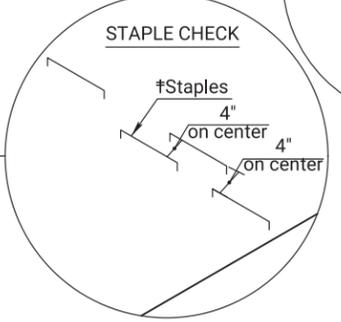
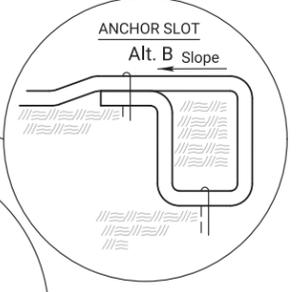
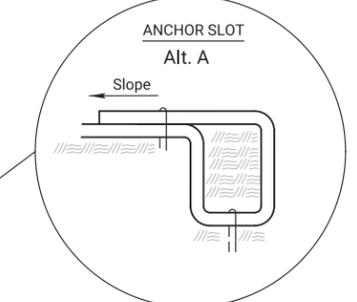
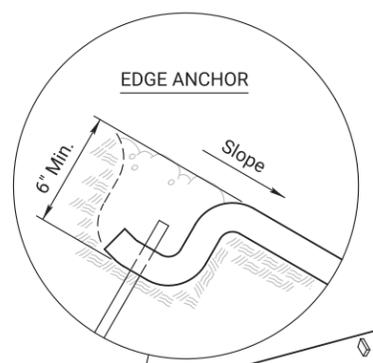
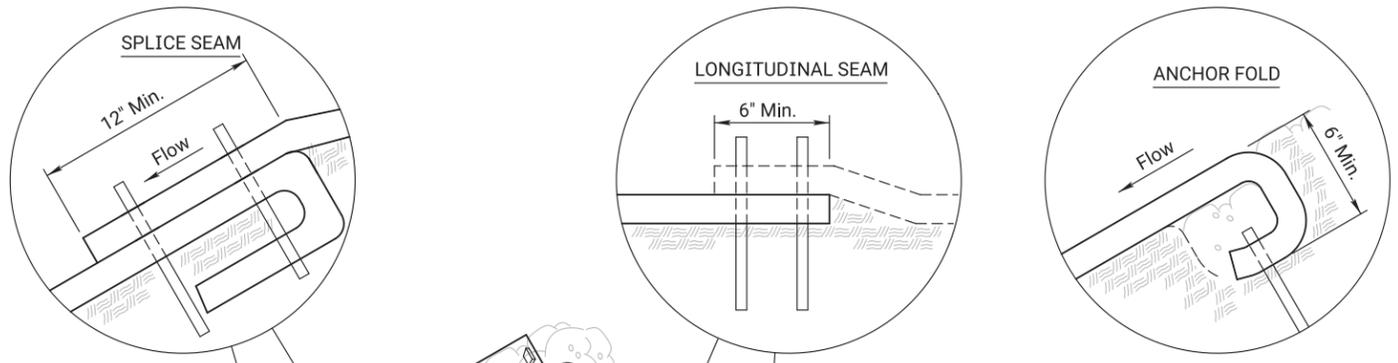
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		0	0	



PLAN VIEW - ANCHORING DIAGRAM



CROSS SECTION (Ditch Lining)



ISOMETRIC VIEW

INSTALLATION DETAILS FOR EROSION CONTROL CLASS 2

Erosion Control Mats shall be laid loosely in the direction of the flow, with the first course at the centerline of channel, where applicable. In order for the mat to be in contact with the soil, lay the mat loosely, avoiding stretching.

- ANCHOR FOLD:** The top of the mat should be folded under, buried and secured with approved anchors placed 6 inches apart. The top edge of the mat should be buried in a slot, 6 inches wide x 6 inches deep; anchored in the bottom of the slot, backfilled, and the mat folded over the top as shown in detail.
- LONGITUDINAL SEAMS:** The adjacent edges of the mat should overlap a minimum of 6 inches, with anchors catching the edges of both mats.
- SPLICE SEAM:** When splices are necessary, overlap end a minimum of 12 inches in direction of water flow. Stagger splice seams.
- STAPLE CHECK:** Establish Staples in 2 rows 4" on center apart. Staple Checks - shall be 30' apart.
- EDGE ANCHOR:** Lay outside edge of mat into trench at top of side slope. Anchor at 3 foot intervals along trench.
- TERMINUS:** The bottom edge of the mat shall be anchored in place with anchors spaced at 9 inch intervals along the terminating edge.
- TYPICAL ANCHORS:** Anchor design shall be as recommended by the manufacturer.

Plotted by : KDOT#CADD\_Support\_ks.gov 1-JUL-2022 00:22  
File : la8556.dgn

04	09-25-15	Modified Staple Check	R.A.A.	S.H.S.
03	09-15-14	Revised Standard	R.A.A.	S.H.S.
02	03-01-13	Revised Standard	M.R.M.	S.H.S.
NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

**INSTALLATION DETAIL**  
**EROSION CONTROL CLASS 2**  
**FLEXIBLE CHANNEL LINER**

LA856

DESIGNED	R.A.A.	DETAILED	R.A.A.	QUANTITIES	TRACED	R.A.A.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN CK.	TRACE CK.	

Scott H. Shields  
Scott H. Shields

## **APPENDIX B**

### **FORMS**

**STORMWATER POLLUTION PREVENTION  
COMMERCIAL BUILDING / CONSTRUCTION SITE  
INSPECTION FORM**

**Sedgwick County**

**Contractor Name** \_\_\_\_\_

**Contractor's Address** \_\_\_\_\_

**Site Address** \_\_\_\_\_

**Engr. No.** \_\_\_\_\_ **Inspection Date:** \_\_\_\_\_ **Inspector:** \_\_\_\_\_

**GROUNDS KEEPING:**

Do storm drains have effective sediment protection?	Yes	No
Does site have proper perimeter sediment controls?	Yes	No
Is there a properly constructed and maintained construction entrance?	Yes	No
Are all sediment controls in good working order?	Yes	No
Is the area free of spills or the evidence of spills?	Yes	No
Is the area free of any unchecked erosion?	Yes	No

**SWP2**

Is the construction area or potential construction area disturbed on site more than one acre?	Yes	No
Is storm water pollution prevention plan on site?	Yes	No
Does SWPPP include a copy of the approved state NOI?	Yes	No
Is contractor following their SWPPP?	Yes	No
Are there copies of weekly inspection reports on site?	Yes	No

**WASTE COLLECTION AREAS:**

Are containers and the area being properly maintained?	Yes	No
Is the area free of any evidence of spills or leaks?	Yes	No

**OUTSIDE STORAGE OF EQUIPMENT AND MATERIALS:**

Is the area free of any evidence of storm water contamination from equipment or materials stored outside?	Yes	No
Is the area free of any equipment or materials stored near an outfall?	Yes	No
Does fuel storage area have proper containment berms?	Yes	No
Is the area free of open containers/barrels that could overflow?	Yes	No
Is equipment or machinery free from contributing contaminants?	Yes	No

**VEHICLES AND MOBILE EQUIPMENT:**

Is the area free of vehicles/equipment leaking contaminants onto ground?	Yes	No
Is equipment or machinery free from contributing contaminants?	Yes	No

**MISCELLANEOUS OR OTHER:**

Is the area free of evidence of runoff contributing contaminants?	Yes	No
Notice of violation issued for site?	Yes	No
Verbal warning, requesting compliance?	Yes	No
Compliance date for NOV or verbal warning	_____	

**COMMENTS:**

**RECHECK COMMENTS:**

## Illegal Discharge/Dumping Incident Report Sheet 1

Incident Reported by:

a. Citizen Complaint  
(complete parts b, d, e & f)

Staff Identified  
(complete parts c, d, e & f)

Hotspot Inspection  
(complete parts c, d, e & f)

b. Call Received by:

Call date/time:

Caller name/contact information (optional):

c. Incident Reported by:

Date/time:

Contact Information for above:

d. Incident location. (Provide the address if known and a narrative describing the exact location. Include nearby landmarks and the distance from the center of road, if applicable).

e. Incident description. (Use the check boxes below as appropriate AND provide a narrative description.)

Problem Type:

Soils/Sediment

Oils/Solvents

Sewage

Litter

Solids

Liquids

Household Waste

Dead Animals (multiple)

Odor:

Sewage

Rancid/Sour

Petroleum (gas)

Sulfide (rotten eggs)

Natural gas

Chemicals

Other (describe below)

Appearance:

Oil Sheen

Cloudy

Bubbles/Foam

Deposits/Staining

Color (describe below)

Other (describe below)

Solids:

Litter

Dead Fish

Yard Waste

Algae

Sewage (toilet paper, etc.)

Other (describe below)

Identifying narrative description:

f. Other relevant information (suspected discharger/dumper etc.):

g. Sedgwick County Trained Investigator (give person's name, title, department, and phone #):

Fax or email to Incident Commander:

Susan Erlenwein, Director  
Sedgwick County Department of Environmental Resources  
Email: [susan.erlenwein@sedgwick.gov](mailto:susan.erlenwein@sedgwick.gov)  
Phone: 316-660-7200