

LITTLE OTTER CREEK RESERVOIR

By: Caldwell County Commission

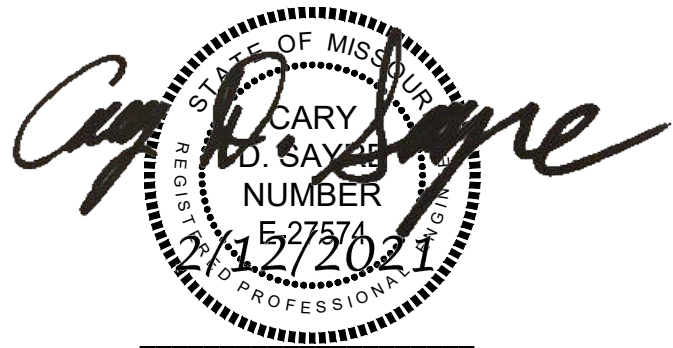
STORM WATER POLLUTION PREVENTION PLAN (SWPPP)



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**Construction Phase
Storm Water Pollution Prevention Plan
(SWPPP)**

for

LITTLE OTTER CREEK RESERVOIR

in

CALDWELL COUNTY, MO

for

CALDWELL COUNTY COMISSION

Construction Phase
Storm Water Pollution Prevention Plan
(SWPPP)

for

Little Otter Creek Reservoir

in

Caldwell County, MO

Prepared for:

Caldwell County Commission
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P.O. Box 67,
Kingston, MO 64650

February 12, 2021

by:

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PART 1.0
INTRODUCTION

1.0 INTRODUCTION

1.1 THE CONSTRUCTION NPDES PERMIT AND SWPPP

The NPDES general permit is for storm water discharges from construction activities that are classified as "associated with industrial activity" by EPA regulation. For construction projects that require the disturbance of more than one acre the U. S. Environmental Protection Agency (EPA) requires that the project owner or contractor apply for a storm water permit under the National Pollutant Discharge Elimination System (NPDES) program. For the purposes of the NPDES program, construction activities are defined as clearing, excavating, grading, or other land disturbing activities.

The State of Missouri is delegated by the EPA to administer the NPDES general permit for construction activities within the state that disturb one acre or more. A Missouri State Operating Permit for storm water discharges is required in accordance with Missouri regulations 10 CSR 20-6.200. Under the Missouri Clean Water Law, the Missouri Department of Natural Resources, Division of Environmental Quality, Water Pollution Control Program requires Form E - Application for General Permit and a Form G - Application for Storm Water Permit, or Form O- Permit for Land Disturbance (if the site is less than five acres in size).

This document comprises the Storm Water Pollution Prevention Plan (SWPPP) required by the State of Missouri Department of Natural Resources (MDNR), Division of Environmental Quality. This SWPPP establishes a plan to manage the quality of storm water runoff from construction activities associated with the Little Otter Creek Reservoir in Caldwell County, Missouri.

If any discrepancies are found between this document, the project plans, and project specifications, the Contractor shall seek clarification from the engineer.

1.2 PROJECT LOCATION AND DESCRIPTION

This project is located in Caldwell County, MO. in Sections 20, 21, 28, 29, 32 and 33 of T57N R27W or 39° 42' 08" N 93° 56' 52" W. (see figure1-1). The total property owned by the Caldwell County Commission is 852 acres. Construction is tentatively scheduled to be completed by Spring 2024.

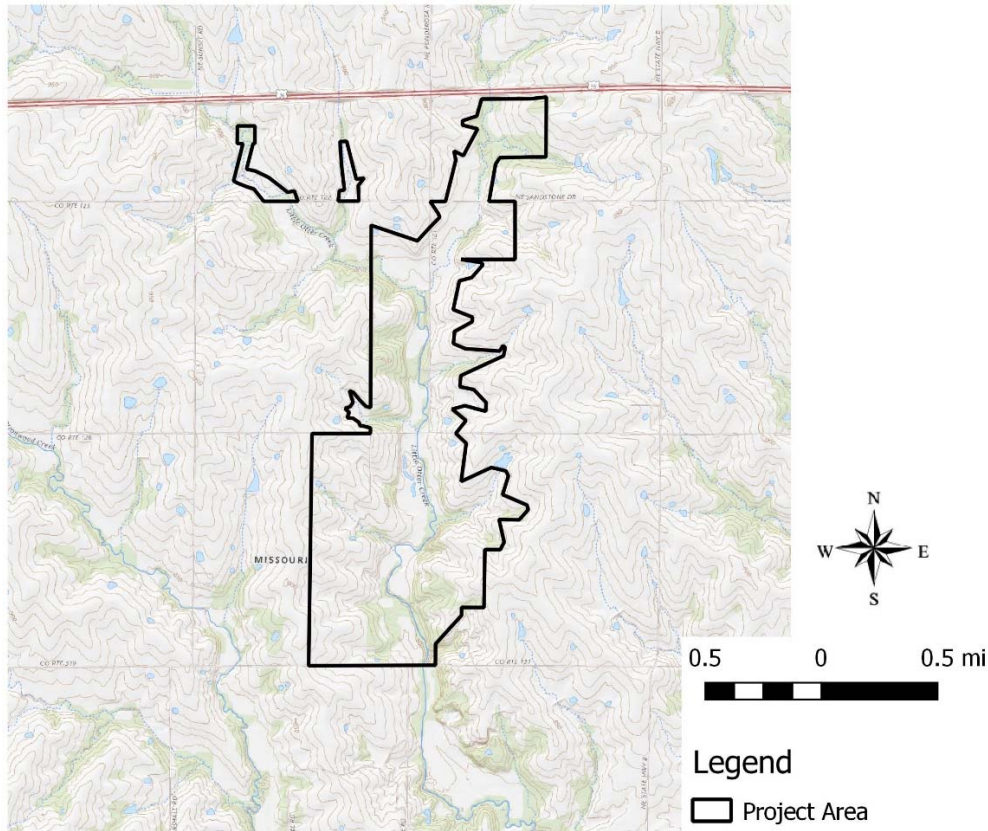


Figure 1-1

Regional Area

Hamilton East Quadrangle – Caldwell County, MO

Date: February 12, 2021

Location: Hamilton East Quadrangle
Sec 20, 21, 28, 29, 32 and 33, T57N, R27W
Caldwell County, Missouri

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1.3 PROJECT OWNER AND OPERATOR

The project owner is Caldwell County Commission. The commission's address is:

49 East Main
P.O. Box 67,
Kingston, MO 64650

The project contractor(s) are TBD.

The primary contact for this project is C.R. "Bud" Motsinger (Presiding Commissioner) for the Caldwell County Commission. Mr. Motsinger may be reached at (816) 586-2571.

Storm Water Inspector: _____
(name) (phone number)

24 hour Emergency Contact: _____
(name) (phone number)

1.4 CONTRACTOR/SUBCONTRACTOR SIGNATORY REQUIREMENTS AND CERTIFICATION

Before conducting any construction disturbances, all contractors and subcontractors must sign a copy of the following certification statement at the owner's office.

1.5 RETENTION OF RECORDS

Caldwell County Commission, as owner, must maintain a copy of this SWPPP on site from the date of project initiation to the date of final stabilization. The Owner shall retain copies of the SWPPP, and all reports required by the General Permit for a period of at least three years from the date that the project is completed.

1.6 STANDARD PERMIT CONDITIONS

This section contains information on state and federal penalties for non-compliance with the permit as well as termination of coverage of the permit. Further explanation of these issues is stated under each individual heading.

1.6.1 Duty to Comply with Permit Conditions

The EPA has substantial penalties for non-compliance with the permit. Any permit non-compliance constitutes a violation of the Clean Water Act and is grounds for enforcement action including: permit termination; revocation, reissuance, or modifications; or denial of permit renewal application. Individuals responsible for such violations are subject to criminal, civil and administrative penalties.

1.6.2 Final Stabilization and Termination of Coverage

Final stabilization is achieved when all soil-disturbing activities at the site have been completed and when a uniform perennial vegetative cover with a density of 70 percent has been established or equivalent measures (such as the use of riprap, gabions, or geotextiles) have been employed. When the site has been fully stabilized and all storm water discharges from construction activities that are authorized by this permit are eliminated, the final stabilization termination checklist must be completed. Upon completion and submission of the MDNR Request for Termination of Operating Permit Form (Replaced Termination Forms H and J), the project will be considered complete.

CONTRACTOR'S CERTIFICATION		
"I certify under penalty of law that I understand the terms and conditions of this Missouri Storm Water Pollution Prevention Plan and associated NPDES general permit that authorizes the storm water discharges associated with industrial activity from construction site identified as part of this certification".		
Signature	For	Responsible For
_____ (Name)	_____ (Company)	_____
_____ (Position)	_____ (Street / P.O. Box)	_____
_____ (Signature)	_____ (City, State, Zip)	_____
_____ (Date)	_____ (Phone)	_____ (Activity)
_____ (Name)	_____ (Company)	_____
_____ (Position)	_____ (Street / P.O. Box)	_____
_____ (Signature)	_____ (City, State, Zip)	_____
_____ (Date)	_____ (Phone)	_____ (Activity)
_____ (Name)	_____ (Company)	_____
_____ (Position)	_____ (Street / P.O. Box)	_____
_____ (Signature)	_____ (City, State, Zip)	_____
_____ (Date)	_____ (Phone)	_____ (Activity)

PART 2.0
CONSTRUCTION ACTIVITIES
AND SITE DESCRIPTION

2.0 CONSTRUCTION ACTIVITIES AND SITE DESCRIPTION

2.1 DESCRIPTION OF CONSTRUCTION ACTIVITIES

The scope of this project includes clearing, grubbing, and grading among other construction activities for the creation of a drinking water reservoir in Caldwell County, Missouri. A tentative sequence of major construction activities follows in Section 2.6. The total area of the site is approximately 852 Acres. Multiple large land disturbances will occur during the project including clearing and grubbing, creation of an ingress-egress road to the reservoir dam, and construction of principal spillway and dam structure. Road improvements, trail development, boat ramp and parking lot construction will also occur under this SWPPP. The total area of the site expected to undergo excavation is approximately 349 Acres (Total area disturbed may change as individual reservoir projects receive funding and go through final design). Contractors will be required to minimize disturbance of existing vegetation as much as possible.

2.2 POTENTIAL POLLUTANTS

The primary pollutant sources will be disturbed soils and subsequent surface water runoff within the construction site. Other potential pollutant sources include petroleum products needed for the construction equipment. If additional pollutant sources are brought on site, such as portable toilets, chemicals, paint, solvents, etc., these items will be noted and monitored on the storm water site inspection form.

2.3 SOILS

The soils on the site consist of lean to fat clays.

2.4 ESTIMATE OF RUNOFF COEFFICIENT

The runoff coefficient "C" is the ratio of the volume of storm water runoff from the project area compared to the total volume of precipitation that falls on the project area. The General Permit

requires an estimate of this ratio that represents runoff conditions both before construction and after construction activities are complete and the area is finally stabilized.

The estimate of "C" is based on variables from three general terrain categories: 1) soil properties (porosity, density, etc.), 2) ground slope, and 3) the character of the vegetative cover (woodlands, pasture, grassland, etc.). Another major variable affecting "C" is rainfall intensity and duration. For any given terrain, the ratio of runoff to rainfall is expected to increase as storm intensity or duration increases.

Pre-construction "C" value = 0.3

Post-construction "C" value = 0.55

2.5 SITE MAPS

A location map shows the project area relative to the surrounding area and is shown as Figure 1-1. The construction drawings for the facility are in Appendix A and include placement of erosion and sediment controls. Detailed descriptions of these Best Management Practices, or BMP's, are included in Appendix D.

2.6 SEQUENCE OF MAJOR CONSTRUCTION ACTIVITIES

This section contains a description of the construction sequence for the project.

- Secure necessary Land disturbance permits.
- Installation of erosion and sediment control devices.
- Clearing, grubbing and clearing, Excavation
- Ingress-Egress Road, Dam, and Principal Spillway construction
- Roadway improvements, trail, and boat ramp and associated parking construction
- Finish grading and stabilization
- Seed and mulch to stabilize

2.7 RECEIVING WATERS

The project site drains to Little Otter Creek.

2.8 DRAINAGE AREAS

In compliance with EPA and DNR regulations, clearing and grubbing within fifty (50) feet of defined drainage course should be avoided. Additionally, when changes to defined drainage courses occur as part of the project, clearing and grubbing within fifty (50) feet of the defined drainage course will be delayed until all materials and equipment necessary to protect and complete the drainage change are on site. Changes to the defined drainage course will be completed as quickly as possible once the work has been initiated. The area impacted by the land disturbance of the drainage course change will be revegetated or protected from erosion as quickly as possible. Areas within fifty (50) feet of defined drainage ways will be recontoured as needed, as well as revegetated, seeded, or otherwise protected within five (5) working days after grading has ceased.

2.8.1 Sedimentation Basins/Traps

A sedimentation basin/trap will be used when necessary and will be sized to comply with the governing authorities' guidelines. The basin/trap will be cleaned out and otherwise maintained as needed until the drainage area is stabilized. Both temporary and permanent sedimentation basins will have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

2.9 NRCS STRUCTURE LO-1

The Natural Resources Conservation Service (NRCS) has prepared land disturbance plans (Appendix K) for the dam structure. The Contractor shall utilize those erosion control plans and should still document implemented measures in Appendix B of this SWPPP document. If necessary, the Contractor shall provide additional erosion control BMPs during construction of the dam to prevent erosion.

PART 3.0
BEST MANAGEMENT PRACTICES

3.0 BEST MANAGEMENT PRACTICES

3.1 EROSION AND SEDIMENT CONTROL DEVICES

Soil erosion and sediment controls are measures that are used to reduce the amount of soil particles that are carried off of a land area and deposited in receiving water. This section, in conjunction with Appendix D, provides a general description of the most appropriate measures planned for this project. Appendix A contains construction drawings that clearly delineate each BMP proposed and its location. All applicable soil erosion and sediment control measures shall be implemented in accordance with the guidelines contained herein prior to commencement of field construction activities. Measures shall be maintained during and after the construction activity until final stabilization is accomplished. Upon successful revegetation of the disturbed area, all temporary soil erosion and sediment control measures will be removed. Appropriate impediments for storm water discharge will be implemented, and benchmarks referenced for proper installation, operation, and maintenance of drainage courses.

3.1.1 Temporary Stabilization

Temporary stabilization consists of activities such as terracing, mulching, or reseeding vegetation in all disturbed, unvegetated areas that are exposed during prolonged periods of construction inactivity. Due to the short nature of the many project activities, temporary stabilization will not always be required. However, temporary stabilization measures will be implemented if construction halts for more than 14 days and if construction will not resume within 21 days. If the slope is greater than 3:1, or greater than 3% and greater than 150 feet in length; the area will be protected from erosion by stabilizing the area with mulch, or another similarly effective BMP, if the activity ceases for more than 7 days. Exceptions include: 1) Snow or frozen ground; 2) Activities that will resume after 14 days; or 3) Arid or Semi-arid areas. This requirement does not apply to sedimentary basins or areas that drain thereto.

3.1.2 Permanent Stabilization

Permanent stabilization consists of the final planting of vegetation in all disturbed, unvegetated areas affected by construction. Permanent stabilization (groundcover) practices will be properly implemented within 30 days of final construction. See Section 3.3 for further details.

3.1.3 Temporary Erosion Control Practices

Prior to initiating construction, all temporary erosion and sediment control practices shown on the construction drawings will be in place. The erosion and sediment control details for these practices are located in Appendix D.

3.2 MAINTENANCE

All erosion and sediment control devices shown on the construction drawings shall be installed pursuant to the specifications in the construction details in Appendix D. These erosion and sediment control devices shall be checked: 1) on a weekly basis; and 2) within 72 hours of each 0.5-inch or greater rainfall event. A good faith effort will be made to inspect erosion and sediment control devices within 24 hours of a rainfall event that occurs Monday through Thursday.

Maintenance inspection reports will be completed after each inspection and included in the project file. If inspection results indicate a need for revision to the SWPPP, the plan shall be revised and implemented as appropriate, within seven calendar days following the inspection. The inspection reports shall identify any incidents of non-compliance. Copies of the report forms are to be completed by the designated SWPPP personnel inspector. A copy of the form to be used is attached in Appendix B and will be photocopied and used as needed for individual inspections.

Ineffective temporary erosion control measures shall be reported to the owner/contractor within 24 hours of identification so that they may be repaired in an efficient manner. Sediment will be removed from behind a silt fence when it reaches one-third the height of the barrier. The temporary erosion control devices shall be left in place until the site is permanently stabilized with

vegetation (at least 70 percent cover). Following the completion of construction and planting activities, the construction inspector shall conduct periodic site reviews to ensure that vegetation establishment is satisfactory. If vegetation cover is not adequate, special steps to correct problems shall be implemented such as re-seeding, mulching, sodding, or the use of erosion control blankets.

3.3 FINAL STABILIZATION AND CLEAN UP

After completion of final grading, the disturbed areas will be revegetated. All temporary soil erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation. All disturbed areas to be revegetated shall be seeded in accordance with soil erosion and sediment control practices. Revegetation of upland areas shall be conducted as specified in Table 3-1.

3.3.1 Seeding

When unfavorable conditions preclude permanent seeding, a temporary ground cover of quick germinating grasses shall be established. Permanent seeding will be done over all areas of soil disturbance using the seed mixture rates as indicated in Table 3-1. Adjustments made to table 3-1 may be made due to specific site characteristics, and/or upon the recommendation of a qualified professional.

**Table 3-1
Seeding Mix and Rates**

Seed Mix	Application Rate (Pounds per 1,000 square feet)
Areas of slope less than 4H:1V	
K-31 Fescue	7
Areas of slope greater than or equal to 4H:1V	
Perennial Ryegrass	7
K-31 Fescue	3

3.3.2 Fertilizing

Limestone shall be applied at a rate of two tons/acre or pulverized agricultural grade limestone at 90 lbs./1000sq. ft. A typical 12-12-12 fertilizer shall be applied at a rate of 10 lbs./1000 sq. ft. The lime and fertilizer shall be applied evenly and incorporated into the top 4 to 6 inches of soil. Wetland areas will have no lime or fertilizer applied to them.

PART 4.0
OTHER POLLUTION
PREVENTION CONTROLS

4.0 OTHER POLLUTION PREVENTION CONTROLS

4.1 WASTE DISPOSAL

All waste material will be collected and stored in a secure container or removed from the project site. The waste container will be inspected regularly with contents disposed of properly by the owner. No waste oil or other petroleum-based products will be disposed of on site (e.g., buried, poured, etc.); but shall be taken off-site for proper disposal.

4.2 HAZARDOUS WASTE

Any hazardous waste material will be disposed of in the manner specified by local and state regulations and by the manufacturer. Site personnel will be instructed to be aware of this requirement (see Part 5).

4.3 SANITARY WASTE

All sanitary waste will be collected from portable units as required and properly disposed of off-site in compliance with local and state regulations.

4.4 OFF-SITE VEHICLE TRACKING

Public roads that provide access to the right-of-way will be monitored for any tracking of sediments (mud, etc.) from the site onto the road as follows:

- 1) Weekly during dry periods, and
- 2) Daily after rainfall events that leave the project area wet and construction activity is proceeding.

The same inspection process will be implemented for the generation of dust during dry periods.

4.5 NON-STORM WATER DISCHARGES

There are no non-storm water discharges expected with this construction activity. However, the following non-storm water discharges are allowed under section 1.3 B of the CGP:

1. Discharges from fire-fighting activities

2. Fire hydrant flushings.
3. Waters used to wash vehicles where detergents are not used.
4. Water used to control dust in accordance with Subpart 3.4 G of the CGP
5. Portable water including uncontaminated water line flushing.
6. Routine external building wash down that does not use detergents.
7. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used.
8. Uncontaminated air conditioning or compressor condensate.
9. Uncontaminated ground water or spring water
10. Fountain or footing drains where flows are not contaminated with process materials such as solvents.
11. Uncontaminated excavation dewatering
12. Landscape irrigation

PART 5.0
SPILL PREVENTION AND CONTROL PLAN

5.0 SPILL PREVENTION AND CONTROL PLAN

5.1 INTRODUCTION

The Spill Prevention and Control Plan (SPCP) describes measures to prevent, control, and minimize impacts from a spill of a hazardous, toxic, or petroleum substance during construction of the proposed project in the State of Missouri. This plan identifies the potentially hazardous materials to be used during this project; describes transport, storage, and disposal procedures for these substances; and outlines procedures to be followed in the event of a spill of a contaminating or toxic substance.

5.2 MATERIAL MANAGEMENT PRACTICES

Properly managing these materials on the construction site will greatly reduce the potential for storm water pollution of these materials. Good housekeeping along with proper use and storage of these construction materials form the basis for proper management of potentially hazardous material.

5.2.1 Good Housekeeping

The proper use of materials and equipment along with the use of general common sense greatly reduces the potential for contaminating storm water runoff. The following is a list of good housekeeping practices to be used during the construction project:

- Storage of hazardous materials, chemicals, fuels, and oils and fueling of construction equipment, shall not be performed within 100 feet of any stream bank, wetland, water supply well, spring, or other water body.
- Contractor and contractor's employees shall be properly trained in handling materials used and/or kept at the job site.
- Contractors shall have proper access to all necessary safety items.

- Trash containers will be provided for waste disposal, and regular site clean-up will be conducted.
- An effort will be made to store only enough product required to do the job.
- Materials stored on the site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacture's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of the product will be used before disposing of the container.
- Manufacturer's recommendations for proper use and disposal of a product will be followed.
- If surplus product must be disposed of, manufacturers or local and state recommended methods for proper disposal will be followed.
- When possible, materials should be stored with secondary containment and in a covered structure such as a building or job trailer.

5.2.2 Product-Specific Practices

Due to the chemical makeup of specific products, certain handling and storage procedures are required to promote the safety of handlers and prevent the possibility of pollution. Care shall be taken to follow all directions and warnings for products used on the site. All pertinent information can be found on the Material Safety Data Sheets (MSDS) for each product. The MSDS sheets should be located with each product container they represent. Several product-specific practices are listed in the following sections.

5.2.2.1 Petroleum Products

On-site vehicles will be monitored for leaks and receive regular maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, that are clearly labeled.

Preferably the containers will be stored in a covered truck or trailer that provides secondary containment for the products.

Bulk storage tanks having a capacity of greater than 55 gallons will be provided with secondary containment. Containment can be provided by a temporary earthen berm or other means. After each rainfall, the contents of the secondary containment area will be inspected by the contractor. If there is no visible sheen on the collected water, it will be pumped away in a manner that does not cause scouring. If a sheen is present, it must be cleaned up prior to discharging the water. Bulk fuel or lubricating oil dispensers shall have a valve that must be held open to allow the flow of fuel. During fueling operations, the contractor shall have personnel present to detect and contain spills.

5.2.2.2 Fertilizers

Fertilizers used to stimulate vegetation growth will be used in minimal amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to storm water.

5.3 SPILL CONTROL AND CLEANUP

In addition to the best management procedures discussed previously, the following spill control and cleanup practices will be followed to prevent storm water pollution in the event of a spill:

- Spills will be contained and cleaned up immediately after discovery.
- Manufacturers' methods for spill cleanup of a material will be followed as described on the material's MSDS.
- Materials and equipment needed for cleanup procedures will be kept readily available on the site, either at an equipment storage area or on contractor's trucks. Equipment to be kept on the site will include but not be limited to brooms, dust pans, shovels, granular absorbents, sand, saw dust, absorbent pads and booms, plastic and metal trash containers, gloves, and goggles.

- Personnel on the site will be made aware of cleanup procedures and the location of spill cleanup equipment.
- Toxic, hazardous, or petroleum product spills required to be reported by regulation will be documented to the appropriate federal, state, and local agencies.
- Spills will be documented, and a record of the spills will be kept with this SWPPP.

If a spill occurs that is reportable to the federal, state, or local agencies, the contractor is responsible for making the notifications.

The federal reportable spill quantity for petroleum products is defined in 40 CFR 11.0 as any oil spill that:

- Violates applicable water quality standards,
- Causes a film or sheen upon or discoloration of the water surface or adjoining shoreline, or,
- Causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

Currently in the State of Missouri, a reportable spill of petroleum is the discharge into the environment of more than 50 gallons. It is the responsibility of the owner and contractor to comply with current regulations if changes were to occur.

A list of commonly used hazardous materials and reportable quantities is included in Appendix C of this document; however, the federal reportable spill quantities for all hazardous materials are listed in 40 CFR, Part 302.4 in the table entitled "List of Hazardous Substances and Reportable Quantities." A procedure for determining a reportable spill is included in Appendix C along with a copy of the Spill Report Form to be filled out in case of a spill.

The reportable spill quantity for hazardous materials in the State of Missouri follows the Federal reportable quantity listed in 40 CFR, Part 302.4

If a spill is reportable, the contractor's superintendent will, within 2 hours of the spill, notify the Owner, as well as:

Federal:

National Response Center - 1-800-424-8802

EPA Region 7: 24-hour Emergency Response Center - (913) 281-0991

State:

Missouri Emergency Response Commission

Department of Natural Resources

(573) 634-2436 (in-state, 24 hours)

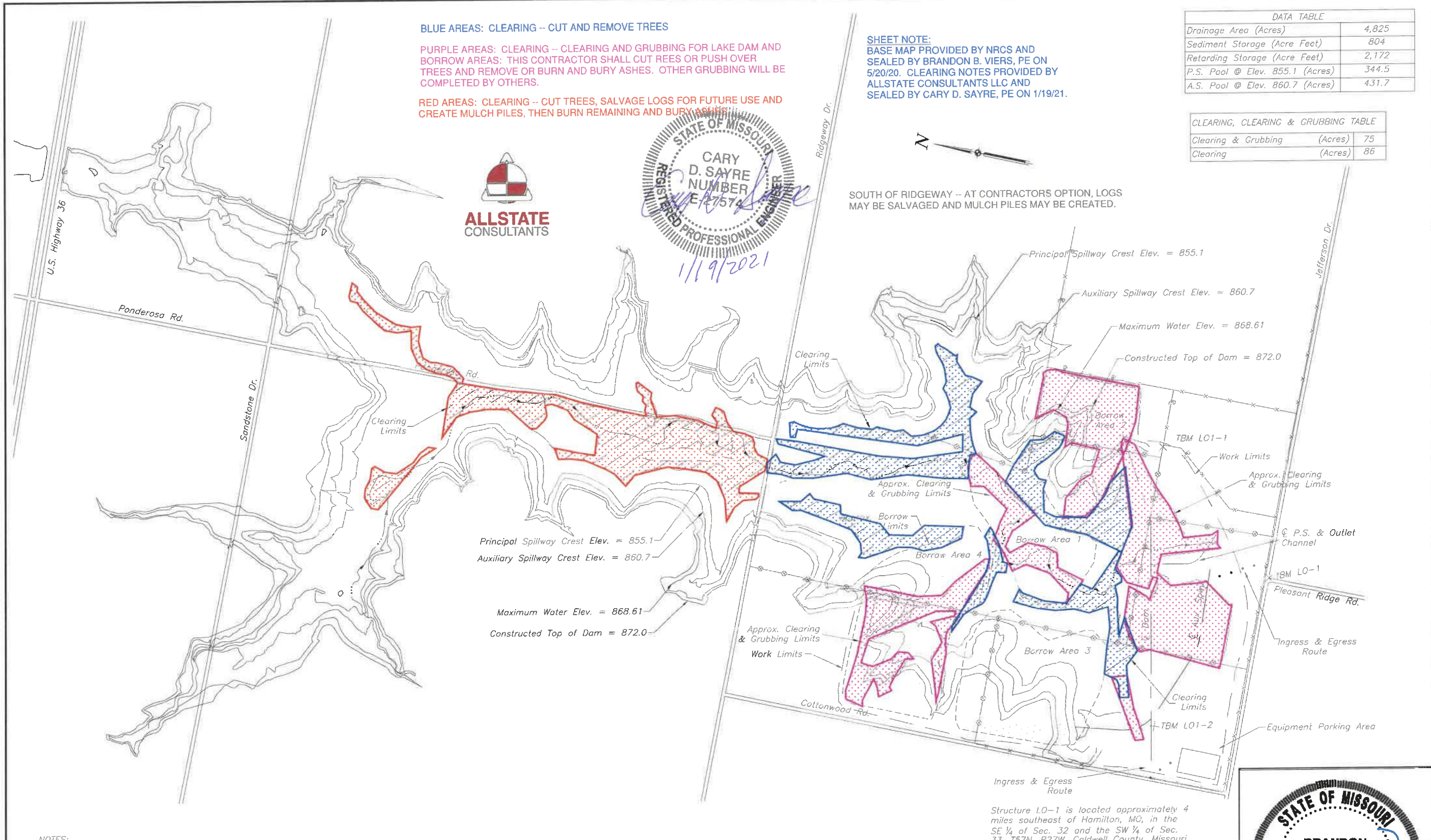
If a reportable release occurs, a modification to the SWPPP must be made within 14 days. The modification shall include: a description of the release, the date of the release; an explanation of why the spill happened; a description of procedures to prevent future spills or releases from happening; and a description of response procedures should a spill or release occur again. A written description of the release must be submitted to the permitting authority that includes: a description of the release, including the type of material and an estimated amount of spill; the date of the release; an explanation of why the spill happened; and a description of the steps taken to prevent and control future releases. These modifications to the SWPPP must be made by the contractor and will be documented on the form in Appendix C.

APPENDICIES

**APPENDIX A
CONSTRUCTION
PLANS AND DETAILS**

PLANS AND DETAILS

The Contractor shall document on the attached plan sheet the location of erosion control features including, but not limited to silt fence, mulch berms, sediment basins, and rock check dams. The document shall be updated when revisions to the erosion control BMPs are made.



BLUE AREAS: CLEARING -- CUT AND REMOVE TREES

PURPLE AREAS: CLEARING -- CLEARING AND GRUBBING FOR LAKE DAM AND BORROW AREAS: THIS CONTRACTOR SHALL CUT REES OR PUSH OVER TREES AND REMOVE OR BURN AND BURY ASHES. OTHER GRUBBING WILL BE COMPLETED BY OTHERS.

RED AREAS: CLEARING -- CUT TREES, SALVAGE LOGS FOR FUTURE USE AND CREATE MULCH PILES, THEN BURN REMAINING AND BURY ASHES

SHEET NOTE:
BASE MAP PROVIDED BY NRCS AND SEALED BY BRANDON B. VIERS, PE ON 5/20/20. CLEARING NOTES PROVIDED BY ALLSTATE CONSULTANTS LLC AND SEALED BY CARY D. SAYRE, PE ON 1/19/21.

DATA TABLE	
Drainage Area (Acres)	4,825
Sediment Storage (Acre Feet)	804
Retarding Storage (Acre Feet)	2,172
P.S. Pool @ Elev. 855.1 (Acres)	344.5
A.S. Pool @ Elev. 860.7 (Acres)	431.7

CLEARING, CLEARING & GRUBBING TABLE		
Clearing & Grubbing	(Acres)	75
Clearing	(Acres)	86



- NOTES:
- Topsoil removed from foundation of Dam, Auxiliary Spillway, Borrow Area, Ingress-Egress road and parking areas shall be conserved.
 - Topsoil may be removed down to a depth of 3 ± feet from Borrow Area No. 1 as approved by the Engineer. This borrow shall be a minimum of 400 feet upstream of the ϕ of dam.
 - Topsoil shall be placed to a depth of six (6) inches over the Ingress-Egress road and parking areas.
 - For details of silt fence and pollution control features see Sheets 36 and 37.
 - For details of Borrow Area see Sheets 47 thru 65.
 - For soil boring data see profile and geologic cross sections on Sheet 47 thru Sheet 65.

Bench Mark - Coordinate Data Table			
Horz. Datum NAD83, Mo.State Plane West Zone			
Vert. Datum NAVD88			
TBM	Northing	Easting	Elevation
LO-1	1286835.160	2944465.400	807.240
LO1-1	1288178.773	2945563.694	871.251
LO1-2	1287680.177	2942737.322	869.838

GENERAL PLAN OF RESERVOIR



Structure LO-1 is located approximately 4 miles southeast of Hamilton, MO, in the SE 1/4 of Sec. 32 and the SW 1/4 of Sec. 33, T57N, R27W, Caldwell County, Missouri.

TBM LO-1 ELEV 807.240
Top of Brass Cap 34 feet South of ϕ Jefferson Dr. 10 feet West of first Powerpole.
TBM LO1-1 ELEV 871.251
1/2" Iron Pin, ϕ Sta. 7+79.87, 127.22' Lt.
TBM LO1-2 ELEV 869.838
1/2" Iron Pin, ϕ Sta. 36+48.13, 31.49' Lt.



Brandon Viers - Engineer
E-2001018820

Date
April 19

Designed
MDS, BBV

Drawn
MDS, KAS, KRW

Checked
BBV, MJA

Approved

General Plan of Reservoir
Structure LO-1
Little Otter Creek Watershed
PL-566 Caldwell County, Missouri

United States
Department of
Agriculture

USDA

Natural Resources
Conservation Service

File Name

Drawing Name

Sheet 3 of 65

APPENDIX B
INSPECTION FORMS

**STORMWATER MANAGEMENT
SITE INSPECTION FORM**

Inspector Name/Title: _____ Date _____

Project Name _____

Project Number: _____ Client _____

Contractor _____

Has there been any Precipitation in the past 7 days? _____ Yes _____ No

If so, describe, as well as current weather conditions:

Do any BMP's need maintenance or attention? _____ Yes _____ No

Describe any deficiencies and measures taken to correct them:

Are there any areas where land disturbance operations have temporarily or permanently stopped?

_____ Yes _____ No

Are there major grading activities taking place on site?

_____ Yes _____ No

Note any changes that will be made to the SWPPP:

Location of pollutant discharge/ additional concerns or comments:

SIGNATURE OF INSPECTOR _____

**STORMWATER MANAGEMENT
SITE INSPECTION FORM
EXPANDED**

The deficiencies present and corrective measures taken to increase the effectiveness of BMP's at _____ are as follows:

SILT FENCE/MULCH BERMS:

EARTH DIKES/DIVERSION BERMS:

SEDIMENT TRAPS/ROCK CHECKS:

PIPE SLOPE DRAINS

DRAINAGE SWALE:

SEDIMENT BASIN:

BUFFER STRIPS/VEGETATIVE BYWAYS:

CRITICAL AREAS THAT NEED TO BE MONITORED:

APPENDIX C
SPILL REPORT FORM

Procedures for Determining if a Hazardous Material Spill is a Reportable Quantity

- 1) First determine the type and quantity of material that has been spilled.
- 2) Obtain a material safety data sheet (MSDS) for the spilled material and determine whether any of the constituents are listed in Table 302.4 in 40 CFR 302.
- 3) If none of the constituents in the spilled material are listed in the table (excluding ethylene glycol), the spill is not reportable.
- 4) If the constituents in the spilled material are listed in the table, use the following equation to determine the pounds of material spilled:

$$\text{Pounds Spilled} = (V) (Wt\%) (Sg) (0.0834)$$

Where:

V = Volume of the material spilled, in gallons

Wt% = The weight percent of the constituents in the spilled material (see the MSDS)

Sg = Specific gravity of spilled material (see MSDS)

For Example:

V = 7 Gallons

Wt% = 1.04

Sg = 1.04

$$\text{Pounds Spilled} = (7) (3.5) (1.04) (0.834) = 2.13 \text{ pounds}$$

- 5) If, based on the calculation, the pounds spilled are Greater than the Final RQ (reportable quantity) value listed in Table 302.4 of 40 CFR 302 or the State's reportable quantity minimum amount, the spill must be reported to the appropriate federal, state, and local agencies.

Storm Water Pollution Prevention Plan

Spill Report Form

Spill Reported By: _____
Name Phone Number

Date Reported: _____ Time: _____

Date of Spill: _____ Time: _____

Name of Facility: _____

Legal Description: _____ 1/4 _____ 1/4 _____ 1/4 SEC _____, TWP _____, Range _____,
County _____

Describe Spill Location and Events Leading to Spill: _____

Material Spilled: _____

Source of Spill: _____

Amount Spilled (Gallons or Pounds)- _____

Amount Spilled to Waterway (Gallons or Pounds): _____

Nearest Municipality: _____

Containment or Cleanup Action: _____

List Environmental Damage (fish kill, etc.) _____

List Injuries or Personal Contamination: _____

Date and Time Cleanup Completed or Terminated: _____

If Cleanup Delayed, Nature and Duration of Delay: _____

Description of Materials Contaminated: _____

Approximate Depth of Soil Excavation: _____

Action To Be Taken to Prevent Future Spills: _____

Agencies Notified:

Local: _____ Date: _____

State: _____ Date: _____

Federal: _____ Date: _____

Signed: _____

Contractor Superintendent or
Environmental Inspector

Table of Common Hazardous Materials Reportable Quantities

Hazardous Substance	CASRN	Statutory Codedagger	RCRA Waste #	Final RQ Pounds (Kg)
Acetic Acid	64-19-7	1		5000 (2270)
Acetone	67-64-1	4	U002	5000 (2270)
Aluminum Sulfate	10043-01-3	1		5000 (2270)
Ammonia	7664-41-7			100 (45.4)
Arsenic	1327-53-3	1,4	PO11	1 (0.454)
Chlorine	7782-50-5	1,3		10 (4.54)
Chloroform	67-66-3	1,2,3,4	UO44	10 (4.54)
Creosote	N.A.	4	UO51	1 (0.454)
Cupric Sulfate	7758-98-7	1		10 (4.54)
Diazanone	333-41-5	1		1 (0.454)
Ethanal	75-07-0	1,3,4	UOO1	1000 (454)
Ethyl Chloride	75-00-3	2,3		1000 (454)
Ethylene Glycol	107-21-1	3		5000 (2270)
Fluorine	7782	4	PO56	10 (4.54)
Hydrochloric Acid	7647-01-0	1,3		5000 (2270)
Lead	7439-92-1	2		10 (4.54)
Lindane	58-89-9	1,2,3,4	U129	1 (0.454)
Mercury	7439-97-6	2,3,4	U151	1 (0.454)
Phosphoric Acid	7664-38-2	1		5000 (2270)
Phosphorus	7723	1,3		1 (0.454)
Potassium Permanganate	7722-64-7	1		1000 (454)
Propane	96-12-8	4	U194	5000 (2270)
Sodium Hydroxide	1310-17-2	1		1000 (454)
Sodium Hypochlorite	7681-52-9	1		100 (45.4)
Vinyl Chloride	75-01-4	2,3,4	U239	100 (45.4)

**APPENDIX D
DESCRIPTION OF
IMPLEMENTED BMP'S**

Temporary Seeding

Practice Description Recommended

The establishment of fast-growing annual vegetation to provide economical erosion control for up to 12 months and reduce the amount of sediment moving off the site. Annual plants which sprout rapidly and survive for only one growing season are suitable for establishing temporary vegetative cover.

This practice applies where short-lived vegetation can be established before final grading or in a season not suitable for permanent seeding. It helps prevent costly maintenance operations on other erosion control systems such as sediment basin clean-out. Temporary or permanent seeding is necessary to protect earthen structures such as dikes, diversions, and the banks and dams of sediment basins.

Minimum Requirements

Prior to start of construction, plant materials, seeding rates and times should be specified by a qualified professional. Plans and specifications should be referred to by field personnel throughout the construction process. To ensure emergence, vigorous growth of seedlings and continued plant growth, prepare seedbed, add lime and fertilizer according to soil tests, mulch all but the most ideal sites and follow seeding dates.

- **Seedbed Preparation:** Loosen soil to depth of 3 inches for broadcast seeding or drilling. If compacted, loosen soils for no till drilling. Avoid excessively wet conditions.
- **Amendments:** Fertilizer and lime (if soil pH is less than 5.3) incorporated 3 to 6 inches into the soil. See Table 5.1.
- **Seed Quality:** Certified seed, tested within the past 9 months
- **Plants:** Recommended temporary erosion control plant species. Rate of application and seeding dates are listed in Tables 5.2 and 5.3.
- **Mulch:** 75% of the ground surface should be covered with approved mulching materials (See *Mulching*). Mulching is critical for the less than ideal situations found on development sites.
- **General:** Inspect seeded areas 2 to 4 weeks after seeding for establishment, erosion control and weed control. Repair and reseed, as necessary.
- **Reseed:** After 1 year if site is not in permanent vegetation

Installation

Successful vegetative establishment is directly dependent on the nutrients in the soil. For optimum results, take soil samples from the top 6 inches in each area to be seeded. Submit samples to a soil testing laboratory for liming and fertilizer amendment recommendations.

Seedbed Preparation

Seedbed preparation is essential for the seed to germinate and grow. For broadcast seeding and drilling, loosen the soil to a depth of approximately 3 inches. For no-till drilling, the soil surface does not need to be

loosened unless the site has surface compaction. Use a disk, ripper, chisel, harrow, or other acceptable tillage equipment to loosen compacted, hard or crusted soil surfaces. Avoid preparing the seedbed under excessively wet conditions.

Liming

Acid soils with an extremely low pH can prevent seeding success. Most of the recommended temporary vegetation is tolerant of low pH soils and will establish on all but the lowest pH soils. If soil pH in the region is known to be extremely low, **conduct a soil pH test** to determine if limestone is necessary for temporary seeding. Amend soils with lime according to information in Table 5.1. Soils with a pH above 7.0 should not be limed.

Table 5.1 Liming Requirements for Temporary Sites

pH Test	Plant Response	Recommended Application of Agricultural Limestone
below 6.0	poor growth	lime according to soil test
6.0 - 6.5	adequate growth	no lime recommended
greater than 6.5	greater than 6.5	no lime recommended

Fertilizer

Subsoil will most likely be deficient in nutrients required for growth. A **soil test will provide the best guide** for the amount and types of fertilizer to apply for optimum plant growth. A general recommendation is to broadcast 90 lbs. of **actual** N-P-K per acre for areas receiving more than 30 inches of precipitation and 50 lbs. of N-P-K per acre in areas receiving less than 30 inches of precipitation.* For best results incorporate the fertilizer into the top 3 to 6 inches before seeding.

* For example, to compute the bulk pounds of product to use
$$\frac{\text{Actual \# Needed}}{\% \text{ Available}} \quad \text{or} \quad \frac{90\#}{28\%} = 321\# \text{ Bulk}$$

Seeding

Apply seed evenly with a broadcast seeder, drill, cultipacker seeder or hydro seeder. Plant small grains no more than 1 1/2 inches deep. Plant grasses and legumes no more than 1/2 inch deep. Prior to mulching, harrow, rake or drag a chain to lightly incorporate broadcast seed and enhance germination. Cover broadcast or drilled seed with mulch (See *Mulching*). On bare soils, firm lightly with a roller or a cultipacker.

Table 5.2 Temporary Seeding Plant Materials and Minimum Seeding Rate *

Species	Seeding Rates		Plant characteristics
	lbs. per Acre	lbs. per 1,000 sq.ft.	
Oats	80	2	not cold tolerant, height up to 2 feet
Cereals: Rye/Wheat	90 / 120	2.0 / 2.5	cold tolerant, height up to 3 feet, low pH tolerant
Millet, Sudan grass	45 / 60	1.0 / 1.25	warm season annual, aggressive growth, height up to 5 feet
Annual Ryegrass	75	2	may be added to mix, not heat tolerant, height up to 16 inches
Annual Lespedeza** plus Tall Fescue	15 plus 45	0.5 plus 1.0	warm season annual legume, makes own nitrogen, tolerates low pH

* In areas receiving less than 30 inches of precipitation, use 75 percent of these rates.

** If there is any possibility that the seeding will be required to control erosion for more than one year, then consider the addition of fescue or another permanent species as part of a mixture when seeding.

Planting Dates

Plant according to the design plan. In absence of a plan, choose a recommended temporary species or mixture appropriate for the season from Tables 5.2 and 5.3. Plant during optimum seeding dates if at all possible. Use mulch if planting during acceptable seeding dates. Roll and cultipack broadcast seed for good soil-to-seed contact. Use high quality seed. For best results use certified seed. When using uncertified seed, use the highest recommended seeding rate.

Table 5.3 Seeding Dates for Temporary Seedings

Species	Seeding Dates Optimum & Acceptable											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Oats												
Cereals: Rye/Wheat												
Millet, Sudan grass												
Annual Ryegrass												
Annual Lespedeza** plus Tall Fescue												

1- if site may not be developed within one year, consider permanent species

Table Key:

Optimum Seeding Dates	
Acceptable Seeding Dates	

Mulching

Mulching is recommended to conserve moisture and reduce erosion. Evenly cover 75% of the ground surface with mulch material specified in the design plan. Tack or tie down according to plan (See *Mulching*).

Construction Verification Check materials and installation for compliance with specifications.

Troubleshooting: Consult with a qualified design professional if the following occurs:

- Design specifications for seed variety, seeding dates or mulching cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

Maintenance

Check temporary seedings within 2 to 4 weeks of planting to see if stands are of adequate thickness (more than 30% of the ground surface covered). Stands should be uniform and dense for best results. Fertilize, reseed and mulch bare and sparse areas immediately to prevent erosion. Mowing is not recommended for cereals seeded alone. Cereals seeded with a grass can be mowed when height is greater than 12 inches. However, to prevent damage to grasses, do not mow shorter than 4 inches. Millets and Sudan grass should be mowed before height is greater than 6 inches to allow regrowth and continued erosion protection. Annual lespedeza and tall fescue may be mowed after height exceeds 8 inches. Do not mow shorter than 4 inches. Replant temporary or permanent vegetation within 12 months as annual plants die off and no longer provide erosion control. Consider no-till planting where possible.

Common Problems

Inadequate seedbed preparation causes poor seedling emergence and growth—repair gullies, prepare seedbed, fertilize, lime (if necessary), mulch and reseed. Unsuitable choice of plant materials; resulting in poor germination or inadequate stand (less than 30% of the ground surface covered)—choose plant materials appropriate for season, prepare seedbed and replant. Inadequate mulching: resulting in poor or spotty stands—cover area evenly and tack or tie down mulch properly, especially on slopes, ridges and in channels.

Lack of nitrogen; causes poor plant vigor, yellow color, and short height—add 50 lbs. of nitrogen fertilizer per acre. Do not apply over the top of existing plants from June 1 to August 15 or on frozen ground. Dying plants; usually caused by soil compaction that limits root growth and water availability to plants—loosen soil if reseeding is necessary or before seeding permanent vegetation.

Detention Ponds and Basins

Practice Description

A dam designed to hold stormwater runoff and release the water slowly to prevent downstream flooding and stream erosion. Detention ponds and basins are an extremely effective water quality control measure and significantly reduce the frequency of erosive floods downstream. Ideally, a detention pond will store at least the first 1/2 inch of runoff from the design storm and release the remainder at the predevelopment rate. Their usage is best suited to larger, more intensively developed sites of over 20 acres.

Regular detention ponds have less storage and different outlet conduits than extended detention ponds. Both can have permanent pools of water or be designed as dry basins. Both can be designed to hold sediment.

Recommended Minimum Requirements

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

- **Drainage Area:** 20 to 50 acres
- **Structure Life:** 10 years or more
- **Detention:** 24 to 48 hour detention of runoff from the design storm
- **Trap efficiency:** The length to width ratio of the basin should be 2:1 or greater; 5:1 is optimal to capture fine sediments. Inlet: Locate as far upstream as possible from the outlet. Collector Channels: Leading to the detention pond should be constructed of riprap, concrete or paved material to route water to the detention pond.
- **Anti-seep Devices:** Either of the following is recommended:
 - At least two watertight anti-seep collars should be used around the outlet conduit; collars should project 1 to 3 feet from the pipe, or
 - a sand diaphragm
- **Embankment Slopes:** 2.5:1 or flatter; 3:1 where maintained by tractor or other equipment.
- **Basin Slopes:** No steeper than 3:1 and no flatter than 20:1
- **Vegetative Buffer:** A minimum width of 25 feet around the pond
- **Settlement:** Allow for at least 10% of extra fill
- **Site Access:** Reserved for bringing in heavy maintenance equipment and to remove and dispose of sediments

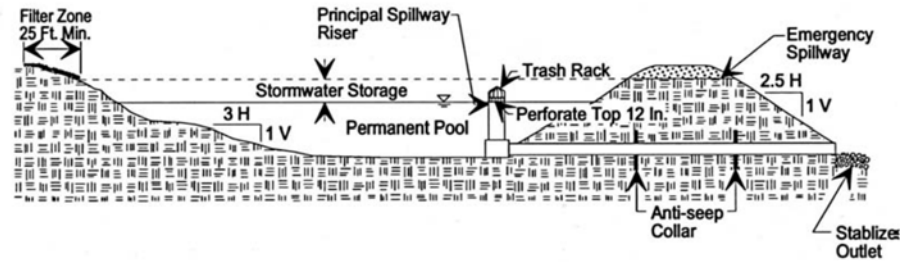


Figure 5.43 Typical Detention Pond

Construction

Site Preparation

Locate the detention pond as close to the stormwater collection system as possible, considering pool area, dam length and spillway conditions. Locate all underground utilities. Clear, strip and grub the dam location, removing all woody vegetation, rocks, and other objectionable material.

Follow all federal, state, and local requirements on impoundment sites.

Dispose of trees, limbs, logs, and other debris in designated disposal areas.

Excavate the embankment foundation (outlet apron first), stockpiling any surface soil having high amounts of organic matter for later use.

Principal Spillway

Clear the sediment pool to facilitate sediment clean out. Situate the spillway pipe and riser on a firm, even foundation. Prepare the pipe bedding.

Place around the barrel a 4-inch layer of moist, clayey, workable soil (not pervious material such as sand, gravel, or silt), and compact with hand tampers to at least the density of the foundation soil. (Don't raise the pipe from the foundation when compacting under the pipe haunches.) Perforate the top 12 inches of the riser with 1/2-inch diameter holes spaced 3 inches apart. Set the top elevation of the riser to allow the detention pond to store the first 1/2 inch of basin runoff in this 12-inch perforated zone, or according to the design plan.

Embed the riser at least 12 inches into concrete (which serves as an anti-flotation block). The weight of the concrete should balance the buoyant force acting on the riser.

$$\text{Buoyant Force} = \text{Volume of Riser} \times 62.4 \text{ lbs./ft}^3$$

Surround the base of the riser with 2 feet of clean uniformly graded stone.

Place a trash rack around the riser inlet. The trash rack should have 4- to 6-inch square openings.

At the pipe outlet, install a riprap or concrete apron at least 5 feet wide and 10 feet long to a stable grade.

Optional: A slotted or V-notch weir, constructed within an open channel spillway, can be used in place of a riser and conduit as a principal spillway.

Embankment

Scarify the embankment foundation before placing fill.

Use fill from predetermined borrow areas. It should be clean, stable, mineral soil free of organic material, roots, woody vegetation, rocks, and other debris; and must be wet enough to form a ball without crumbling, yet not so wet that water can be squeezed out.

Place the most permeable soil in the downstream toe and the least permeable in the center portion of the dam.

Compact the fill material in 6- to 8-inch continuous layers over the length of the dam. (One way is by routing construction equipment over the dam so that each layer is traversed by at least one wheel of the equipment). Tracked construction equipment does not provide adequate compaction.

Protect the spillway barrel with 2 feet of hand tamped, compacted fill before traversing over the pipe with equipment. Place a stake at the height sediment must be cleaned out of the basin (50% of design elevation).

Emergency Spillway

Construct the spillway in undisturbed soil around one end of the embankment and locate it so that all excess flow will return to the receiving channel without damaging the embankment.

Erosion Control

Stabilize the spillway with vegetation as soon as grading is complete; or install paving material to finished grade if the spillway is not to be vegetated.

Minimize the size of all disturbed areas. At the completion of each phase of construction, vegetate the disturbed areas to minimize erosion.

Use temporary diversions to prevent surface water from running onto disturbed areas.

Divert sediment-laden water to the upper end of the sediment pool to improve trap effectiveness.

Direct all runoff into the pond at low velocity.

Stabilize all disturbed areas (except the lower one-half of the sediment basin) immediately after construction.

Safety

Because detention ponds that impound water are hazardous, the following precautions should be taken:

- Avoid steep slopes; cut and fill slopes should be 2.5:1 or flatter; 3:1 where maintained by tractor or other equipment.
- Fence area and post with warning signs if trespassing is likely.
- Provide a means of dewatering the basin between storm events.

Construction Verification

Check the finished grades and configuration for all earthwork. Check elevations and dimensions of all pipes and structures.

Troubleshooting: Consult with registered design professional if the following occurs:

- Seepage is encountered during construction; it may be necessary to install drains.
- Variations in topography on site indicate detention pond will not function as intended.
- Design specifications for fill, pipe, seed variety or seeding dates cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

Maintenance

Inspect the detention pond after each storm event.

Remove and properly dispose of sediment when it accumulates to one-half the design volume.

Periodically check the embankment, emergency spillway and outlet for erosion damage, piping, settling, seepage or slumping along the toe or around the barrel, and repair immediately.

Remove trash and other debris from the riser, emergency spillway and pool area. Clean or replace the gravel around the riser if the sediment pool does not drain properly. Remove nuisance vegetation on embankment.

Remove rodents that burrow into the dam.

Common Problems

Piping failure along conduit; caused by improper compaction, omission of anti-seep collar, leaking pipe joints or use of unsuitable soil—repair damage, check pipe joints and seal leak if necessary. Use suitable soil for backfill. Consider installing anti-seep collar.

Erosion of spillway or embankment slopes; caused by inadequate vegetation or improper grading and sloping—repair damage and establish suitable grade and/or vegetation.

Slumping and/or settling of embankment; caused by inadequate compaction and/or use of unsuitable soil—excavate failed material and replace with properly compacted suitable soil.

Slumping failure; caused by steep slopes—excavate failed material and replace with properly compacted suitable soil. Consider flattening slope.

Erosion and caving below principal spillway; caused by inadequate outlet protection—repair damaged area and install proper outlet protection.

Basin not located properly for access; results in difficult and costly maintenance—relocate basin to more accessible area or improve access to site.

Sediment not properly removed; results in inadequate storage capacity— remove sediment at regular frequent intervals and after major storms.

Lack of anti-flotation; results in riser damage from uplift—install anti flotation structure.

Lack of trash guard; results in the riser and barrel being blocked with debris—remove blockage and install properly designed trash guard.

Principal and emergency spillway elevations too high relative to top of dam; results in overtopping—lower principal and emergency spillway elevations to decrease overtopping potential.

Sediment disposal area not designated on design plans; results in improper disposal of accumulated sediment—locate acceptable disposal area and indicate location on plans.

Safety and/or health hazard from pond water; caused by gravel clogging the drainage system—clean out clogged drainage system on regular basis.

Principal spillway too small; results in frequent operation of emergency spillway and increased erosion potential—consider increasing capacity of principal spillway, install supplemental spillway or install suitable erosion protection in emergency spillway.

Stormwater released from pond or basin too rapidly; caused by spillway pipe sized too large—consider resizing spillway pipe.

Riprap-lined Channel

Practice Description

Waterways with an erosion-resistant rock lining designed to carry concentrated runoff to a stable outlet. This practice applies where conditions are expected to be unsuitable for use of grass-lined channels, such as: 1) channels with average grades over 5%, continuous or prolonged flows occur, potential for damage from traffic exists, or soils are erodible and soil properties are not suitable for vegetation; 2) design velocities exceed 5 feet per second; 3) channel location warrants the use of increased protection; or 4) channel will have prolonged periods of wetness which will hinder growth of grass.

Recommended Minimum Requirements

Prior to start of construction, riprap-lined channels should be designed by a registered design professional. Plans and specifications should be referred to by field personnel throughout the construction process. The channel should be built according to planned alignment, grade, and cross section.

- **Cross Section:** As shown in the design specifications
- **Side Slopes:** 2:1 or flatter
- **Riprap/Rock:** Size and gradation as shown in design specifications. Riprap should consist of a well-graded mixture of stone. Larger stone should predominate, with sufficient smaller sizes to fill the voids between the stones. The diameter of the largest stone size should be not greater than 1.5 times the d_{50} size.
- **Riprap Thickness:** Minimum thickness of riprap should be 1.5 times the maximum stone diameter.
- **Stone or Rock Quality:** Select stone for riprap from field stone or quarry stone. The stone should be hard, angular, and highly chemical- and weather- resistant. The specific gravity of the individual stones should be at least 2.5.
- **Foundation:** Geotextile filter fabric or rock aggregate filter layer under the riprap
- **Outlet:** Stable, non-erosive

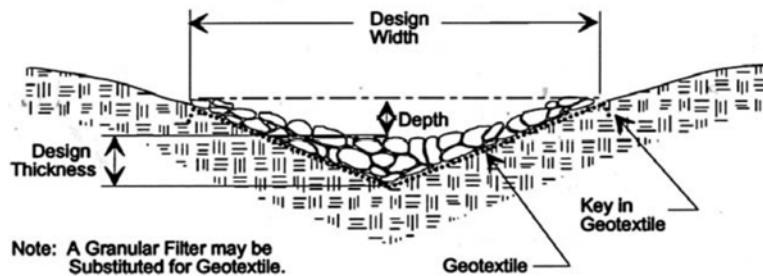


Figure 5.20 Typical V-shaped Riprap-lined Channel

Construction

Site Preparation

Determine exact location of underground utilities.

Remove brush, trees and other debris from the channel and spoil areas and dispose of properly.

Excavate cross section to the lines and grades shown in design specifications. Over excavate to allow for thickness of riprap and filter material.

Installation

Install geotextile fabric or aggregate in the excavated channel as a foundation for the riprap. Anchor fabric in accordance with design specifications.

As soon as the foundation is prepared, place the riprap to the thickness, depth and elevation shown in the design specifications. It should be a dense, uniform, and well-graded mass with few voids.

Blend the finished rock surface with the surrounding land surface so there are no overfalls, channel constrictions or obstructions to flow.

Erosion Control

Stabilize channel inlet points and install needed outlet protection prior to or during channel construction.

Stabilize disturbed areas after construction is completed.

Construction Verification

Check finished grade and cross section of channel throughout the length of the watercourse. Verify channel cross sections at several locations to avoid flow constrictions.

Troubleshooting: Consult with registered design professional if the following occurs:

- Variations in topography on site indicate channel will not function as intended; changes in plan may be needed.
- Design specifications for riprap sizing, filter fabric or aggregate filter cannot be met; substitution may be required. Unapproved substitutions could result in channel erosion.

Maintenance

Inspect channels at regular intervals and after storm events.

When stones have been displaced, remove any debris, and replace the stones in such a way as to not restrict the flow of water.

Give special attention to outlets and points where concentrated flow enters the channel and repair eroded areas promptly.

Check for sediment accumulation, piping, bank instability and scour holes; repair promptly.

Common Problems

Foundation excavation not deep enough or wide enough; may cause riprap to restrict channel flow and result in overflow and erosion—deepen channel and replace riprap.

Side slopes too steep; causes instability, rock material movement and bank failure—flatten side slopes.

Filter omitted or damaged during stone placement; may result in piping and bank instability—install filter and replace stone.

Riprap poorly graded or stones not placed to form a dense, stable channel lining; may result in rock displacement and erosion of the foundation—replace riprap with properly sized, well graded material.

Riprap installed smaller than specified; may result in rock displacement—selectively grouting over rock materials may stabilize the situation.

Riprap not extended far enough downstream; may result in undercutting—the channel should outlet on a stable location; extend riprap as needed.

Riprap not blended to ground surface; may result in gulying along edge of riprap—regrade riprap to blend with ground surface.

Riprap not installed until after washout of other materials has occurred—replace eroded material and install riprap.

Riprap just dumped and not properly shaped; may result in rock displacement and erosion—repair eroded area and reshape riprap to attain proper channel shape.

Sediment Fence

Practice Description

A temporary sediment barrier consisting of a geotextile fabric which is attached to supporting posts and trenched into the ground. Sediment- laden runoff ponds uphill from the sediment fence and runoff is temporarily stored to allow sediment to settle out of the water. This practice applies where sheet erosion occurs on small disturbed areas. Sediment fences are intended to intercept and detain small amounts of sediment from disturbed areas in order to prevent sediment from leaving the site. Sediment fences can also prevent sheet erosion by decreasing the velocity of the runoff.

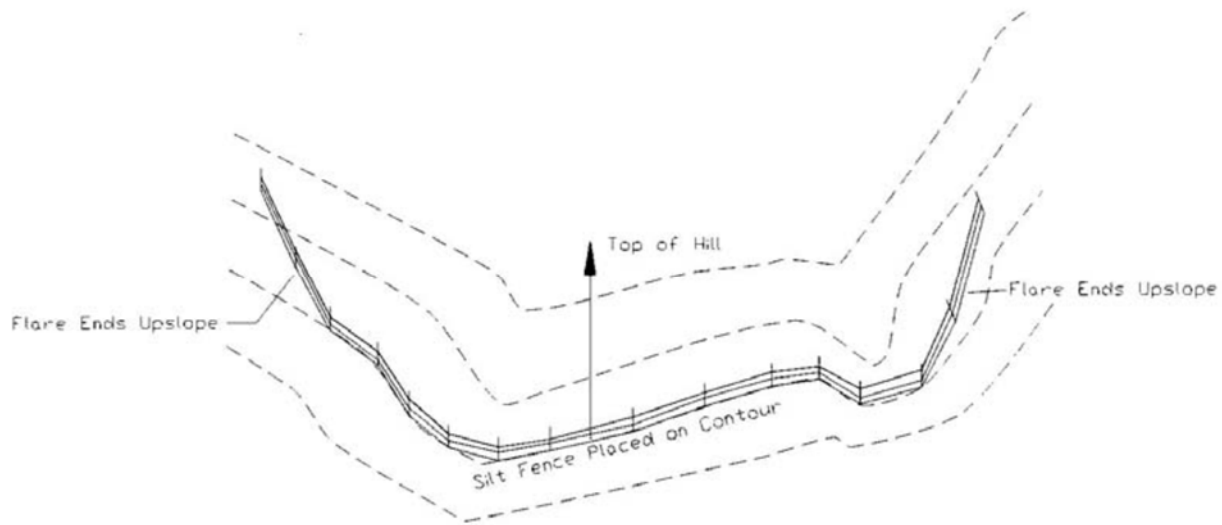


Prior to start of construction, sediment fences should be designed by a qualified professional. Plans and specifications should be referred to by field personnel throughout the construction process.

- **Drainage Area:** Limited to $\frac{1}{4}$ acre per 100 feet of fence. Area is further restricted by slope steepness as shown in Table 5.16.
- **Location:** Fence should be built on a nearly level grade and at least 10 feet from the toe of the slope to provide a broad shallow sediment pool. Install on the contour, where fence can intercept runoff as a sheet flow; not located crossing channels, waterways, or other concentrated flow paths; not attached to existing trees.
- **Length:** Maximum of 600 feet; flare ends of fence uphill to temporarily impound water as shown in Figure 5.33a.

Table 5.16 Typical Land Slope and Distance for Sediment Fence

Land Slope (%)	Maximum Slope Distance * above Fence (feet)
less than 2	100
2 to 5	75
5 to 10	50
greater than 10	*



* Follow manufacturers' recommendations for proper spacing.

Figure 5.33a Placement of Sediment Fence

- **Spacing of Support Posts:** 10 feet maximum for fence supported by wire; 6 feet maximum for high strength fabric without supportive wire backing
- **Trench:** Bottom 1 foot of fence must be buried minimum of 6 inches deep.
- **Impounded Water Height:** Depth of impounded water should not exceed 1.5 feet at any point along the fence.
- **Support Posts:** 4-inch diameter wood or 1.33 lb./linear foot steel, buried or driven to a depth of 24 inches with support wire; 2-inch square wood or 1.0 lb./linear foot steel without support wire. Steel posts should have projections for fastening fabric.

Table 5.17 Example Specifications for Sediment Fence Fabric

Physical Property	Minimum Requirement
Filtering Efficiency	85%
Tensile strength at 20% (maximum) elongation:	
Standard strength	30 lb./linear inch
High strength	50 lb./linear inch

Source: Adapted from North Carolina Field Manual, 1991

- **Support Wire:** Wire fence (14-gauge with 6-inch mesh), necessary if standard strength fabric is used
- **Reinforced, Stabilized Outlets:** Should be located to limit water depth to 1.5 feet measured at lowest point along crest line.
Crest Height: 1 foot maximum
Width of splash pad: 5 feet maximum
Length of splash pad: 5 feet minimum
Supports: 4 foot spacing
- **Synthetic Geotextile Fabric:** Conforming to specifications in Table 5.17 and containing ultraviolet light inhibitors and stabilizers. **Minimum design life of 6 months.**

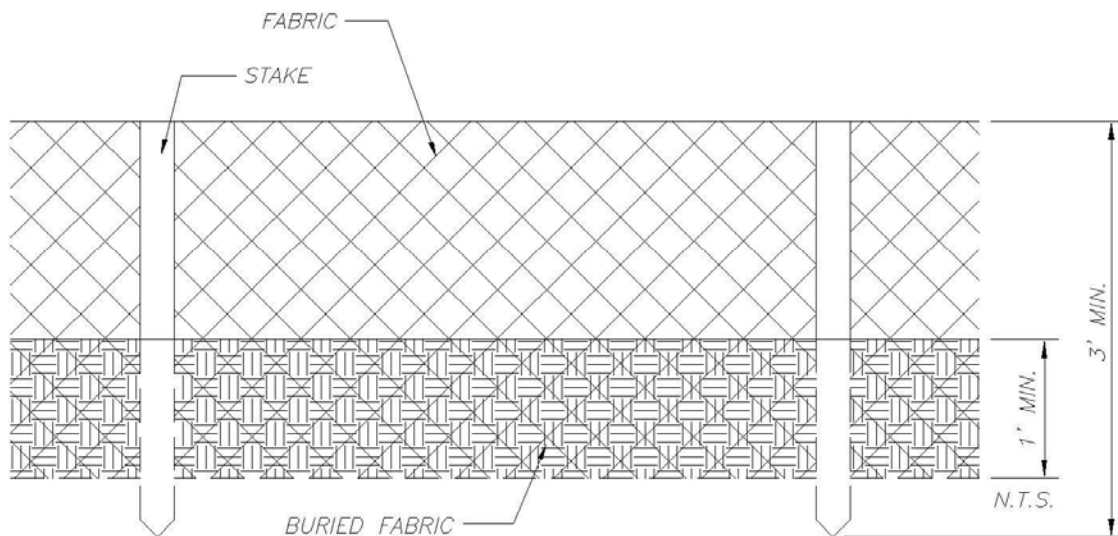


Figure 5.33 Installation of Sediment Fence

Construction

Site Preparation

Determine exact location of underground utilities. Grade alignment of fence as needed to provide broad, nearly level area upstream of fence.

Fence Installation

Dig a trench at least 6 inches deep along the fence alignment as shown in Figure 5.34.

Drive posts at least 24 inches into the ground on the downslope side of the trench. Space posts a maximum of 10 feet if fence is supported by wire, or 6 feet if high strength fabric and no support fence is used.

Fasten support wire fence to upslope side of posts, extending 6 inches into the trench as shown in Fig. 5.33.

Attach continuous length of fabric to upslope side of fence posts. Try to minimize the number of joints. Avoid joints at low points in the fence line. Where joints are necessary, fasten fabric securely to support posts and overlap to the next post.

Place the bottom 1 foot of fabric in the 6-inch deep trench (minimum), lapping toward the upslope side. Backfill with compacted earth or gravel as shown in Figure 5.34.

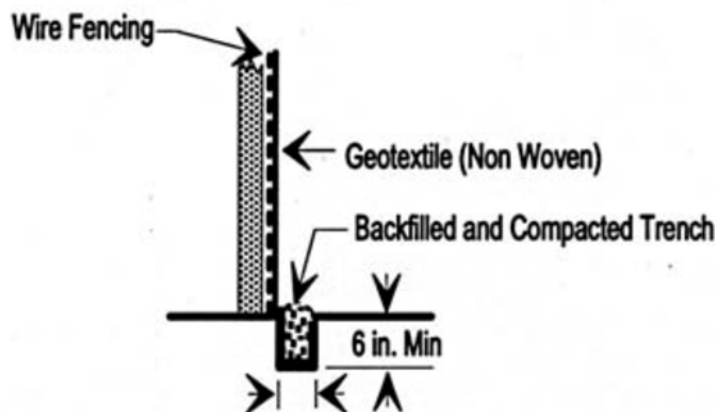


Figure 5.34 Detail of Sediment Fence Installation

To reduce maintenance, excavate a shallow sediment storage area in the upslope side of the fence. Provide good access in areas of heavy sedimentation for clean out and maintenance.

Reinforced Stabilized Outlet Installation

Allow for safe bypass of storm flow to prevent overtopping failure of fence. Set outlet elevation so that water depth cannot exceed 1.5 feet at the lowest point along the fence. Drive posts securely at least 24 inches into the ground, at a spacing of 4 feet. Install a horizontal brace between the support posts to serve as an overflow weir and to support the top of the fabric. Immediately downslope of the fabric, excavate foundation for

splashpad a minimum of 5 feet wide, 5 feet long and 1 foot deep. Place 1 foot of riprap in the excavated foundation. The surface of the riprap should be flush with the undisturbed ground (no outfall).

Erosion Control

Stabilize disturbed areas in accordance with vegetation plan.

Construction Verification

Check finished grades and dimensions of the sediment fence. Check materials for compliance with specifications.

Troubleshooting: Consult with registered design professional if any of the following occur:

- Variations in topography on site indicate sediment fence will not function as intended; changes in plan may be needed.
- Design specifications for filter fabric, support posts, support fence, gravel or riprap cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

Maintenance

Inspect sediment fences at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a sediment-fence collapse, tear, decompose or become ineffective, replace it promptly.

Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid damaging or undermining the fence.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

Common Problems

Drainage area too large or too much sediment accumulation allowed before cleanout; results in overtopping, sagging or collapse of fence. Increase sediment storage capacity upslope of fence or remove accumulation more frequently—repair fence.

Approach too steep; results in collapse of fence due to high velocity or undercutting of fence—reduce slope of approach area or consult with registered design professional.

Fence not adequately supported; results in sagging or collapse of fence—add additional supports.

Bottom of fence not buried properly, results in undercutting of fence--reinstall fence using proper method of trenching.

Fence installed across drainageway; results in sagging, collapse or undercutting of fence—relocate fence away from drainageway.

Mulch Berm

Practice Description

A temporary sediment barrier consisting of an uncompacted berm of composted or shredded mulch from tree removal on the project. Sediment- laden runoff ponds uphill from the mulch berm and runoff is temporarily stored to allow sediment to settle out of the water. This practice applies where sheet erosion occurs on small disturbed areas. Mulch berms are intended to intercept and detain small amounts of sediment from disturbed areas in order to prevent sediment from leaving the site. Mulch berms can also prevent sheet erosion by decreasing the velocity of the runoff. Mulch berms may be used in place of silt fence.

Location

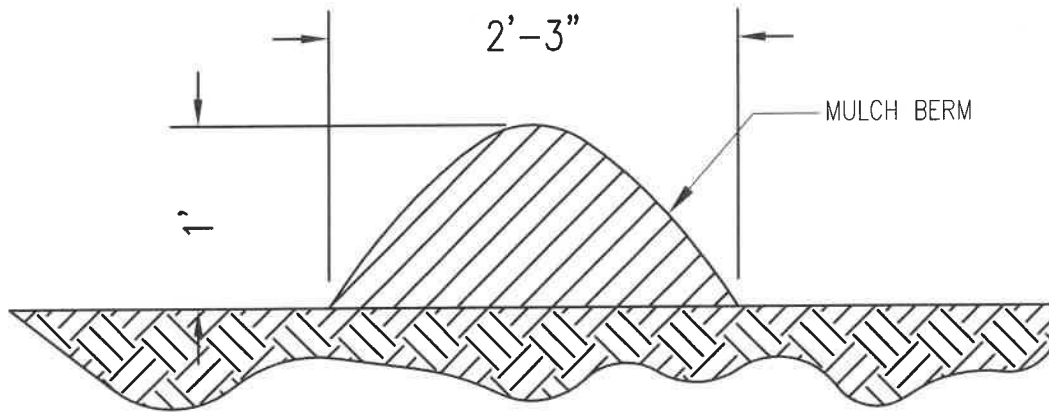
Do not use mulch berms in any runoff channels.

Installation

Place berms on denuded areas as soon as possible. Mulch/compost and/or temporary or permanent vegetation shall be applied/established above the mulch berms when necessary for additional erosion control. The mulch berms shall be a minimum of one (1) foot tall and two (2) feet three (3) inches in width at the base of the berm.

Maintenance

When sediment fills the area behind the mulch berms to one-half (1/2) the height of the mulch berms, the contractor shall remove the sediment and plugged mulch and reshape the berm with clean mulch as needed.



1. MULCH BERMS MAY BE USED IN PLACE OF SILT FENCE
2. THE EROSION CONTROL BERM SHALL BE PLACED, UNCOMPACTED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. BERM SHALL CONSIST OF COMPOST BERM OR SHREDDED MULCH BERM. SHREDDED MULCH FROM TREE REMOVAL ON PROJECT IS ACCEPTABLE.
3. IF COMPOST, SEED WITH ANNUAL RYE IMMEDIATELY UPON PLACEMENT.
4. DO NOT USE MULCH BERMS IN ANY RUNOFF CHANNELS.
5. PLACE BERMS ON DENUDED AREAS AS SOON AS POSSIBLE. MULCH/COMPOST AND/OR TEMPORARY OR PERMANENT VEGETATION SHALL BE APPLIED/ESTABLISHED ABOVE THE MULCH BERMS WHEN NECESSARY FOR ADDITIONAL EROSION CONTROL.
6. WHEN SEDIMENT FILLS THE AREA BEHIND THE MULCH BERM TO $\frac{1}{2}$ THE HEIGHT OF THE MULCH BERM, THE CONTRACTOR SHALL REMOVE THE SEDIMENT AND PLUGGED MULCH AND RESHAPE BERM WITH CLEAN MULCH AS NEEDED.
7. WATER FROM TRENCH DEWATERING TO BE PUMPED BEHIND MULCH BERM OR OTHER SUITABLE EROSION CONTROL STRUCTURE.

MULCH BERM
N.T.S.



**ALLSTATE
CONSULTANTS**
P.O. BOX 158, 30801 HIGHWAY 5
MARCELINE, MO 64658
(660) 376-2941
allstateconsultants.net

DATE
1/11/21

MISSOURI STATE CERTIFICATE
OF AUTHORITY #2007004004

RELIEF OF THIS DRAWING IN ANY MANNER IS
STRICTLY PROHIBITED WITHOUT THE WRITTEN
APPROVAL OF
ALLSTATE CONSULTANTS LLC

**LITTLE OTTER CREEK RESERVOIR
WATERSHED PROTECTION AND FLOOD PREVENTION
TREE FALLING and HARVESTING
CALDWELL COUNTY COMMISSION**

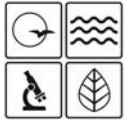
JOB NUMBER
16273.01

SCALE
N.T.S.

SHEET

1

APPENDIX E
MDNR PERMIT TERMINATION FORM



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
REQUEST FOR TERMINATION OF OPERATING PERMIT
(REPLACES TERMINATION FORMS H AND J)

FOR OFFICE USE ONLY

DATE RECEIVED

IF A FACILITY OR SITE HAS BEEN SOLD, BUT PERMITTED ACTIVITIES HAVE NOT CEASED, A TRANSFER OF OWNERSHIP FORM (MO 780-1517) MUST BE COMPLETED RATHER THAN A TERMINATION FORM.

ALL APPLICABLE SECTIONS OF THIS FORM MUST BE COMPLETED.

1. FACILITY INFORMATION

PERMIT NUMBER		COUNTY	
NAME OF FACILITY			
PHYSICAL ADDRESS		CITY	STATE ZIP CODE
FACILITY CONTACT NAME	FACILITY CONTACT TELEPHONE NUMBER	FACILITY CONTACT EMAIL	

2. OWNER

NAME		TELEPHONE NUMBER WITH AREA CODE	
ADDRESS		CITY	STATE ZIP CODE
EMAIL			

3. CONTINUING AUTHORITY

NAME		TELEPHONE NUMBER WITH AREA CODE	
ADDRESS		CITY	STATE ZIP CODE
EMAIL			

4. REASON FOR TERMINATION REQUEST (CHECK ONE)

- ☐ Permitted activities have ceased, or facility is closed (must select facility type in section five and attach photographs or any other supporting documents as required).
- ☐ General Permit MO-G _____ or MO-R _____ has been issued and covers all regulated activities.
- ☐ Site specific permit MO- _____ has been issued and covers all regulated activities.
- ☐ Facility has obtained a "No Exposure" certification, MO-NX _____.
- ☐ Industrial activity (SIC Code # _____) is not regulated.
- ☐ For CAFOs, facility size is unregulated (Class II and smaller operations only).
- ☐ Other (Specify).

5. FACILITY TYPE (CHECK ONE FACILITY TYPE, COMPLETE ONLY IF PERMITTED ACTIVITY HAS CEASED OR FACILITY HAS CLOSED)

- ☐ For land disturbance sites, the area is stabilized; perennial vegetation, pavement, buildings or other permanent structures cover all areas that have been disturbed; no further land disturbance activities are planned; all building construction (commercial or residential) is completed; temporary best management practices are removed, and construction equipment is removed. With respect to areas that have been vegetated, vegetation cover shall be at least 70 percent over 100 percent of the site not covered in impervious material. Attach photographs showing stabilized areas.
- ☐ For wastewater treatment plants, the treatment plant is removed and sludge was removed and properly disposed of, and a closure plan in accordance with [10 CSR 20-6.010\(12\)](#) or [10 CSR 20-6.015\(5\)](#) was approved and implemented. Attach documentation required by the approved closure plan and photographs of the closed area. See the *Water Treatment Plant Closure* -PUB2568 fact sheet at dnr.mo.gov/pubs/pub2568.htm for more information on closure requirements for wastewater treatment plants.
- ☐ For industrial facilities, regulated activities have ceased, no "significant materials" remain on-site and disturbed areas are properly stabilized or vegetated. The area is stabilized when perennial vegetation, pavement, buildings or structures using permanent materials cover all areas that have been disturbed. Vegetation cover shall be at least 70 percent over 100 percent of the site not covered in impervious material. Attach applicable closure documents and photographs of the closed area that demonstrate no permitted activities or materials remain.
- ☐ For quarries or sand and gravel operations, submit documentation of release from the department's Land Reclamation Program.
- ☐ For landfills, official closure has been received from department's Solid Waste Management Program (SWMP); cap is vegetated as required by SWMP; and any additional industrial activities are permitted appropriately (i.e., transfer stations, mulching operations, land disturbance, etc.). Attach the official SWMP closure letter and permit numbers of any continuing active industrial or land disturbance activities.
- ☐ For CAFOs
- ☐ Class I CAFOs must properly close lagoons and waste storage structures per a closure plan in accordance with [10 CSR 20-6.300\(6\)](#) and approved by the department. Attach photographs of closed lagoons. Also attach any additional information that supports closure of the facility.
- ☐ Class II CAFOs must close waste storage structures in accordance with [10 CSR 20-6.300\(6\)\(B\)](#), or shall continue to maintain all storage structures so there is no discharge to waters of the state. Attach photographs of closed or re-purposed lagoons, or an explanation of "no discharge" methods. Also attach any additional information that supports closure of the facility.

6. CERTIFICATION

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

NAME AND OFFICIAL TITLE (TYPE OR PRINT)

TELEPHONE NUMBER WITH AREA CODE

SIGNATURE

DATE SIGNED

7. MAIL COMPLETED COPY TO:

For Site Specific (MO-), Abandoned Mine And Land Reclamation (MO-G05), Land Disturbance By County Or City (MO-R100), Pesticide Application (MO-G87), Sewer Extension Construction (MO-GC) and CAFO (MO-G01, MO-GS1) Permit Terminations:

Missouri Department of Natural Resources
Water Protection Program
Water Pollution Control Branch
Attn: Operating Permits Section
P.O. Box 176
Jefferson City, MO 65102-0176

For General Permit Terminations (MO-G or MO-R):

Send to the appropriate regional office.
Regional office is determined based on the county where the facility is physically located.

To determine the correct regional office for the permitted facility, see **dnr.mo.gov/regions**.

APPENDIX F
RELEVANT PERMITS

APPENDIX G
SWPPP AMENDMENTS

APPENDIX G

SWPPP AMENDMENTS

[illegible]

APPENDIX H
GRADING AND STABILIZATION LOG

APPENDIX H

GRADING AND STABILIZATION LOG

[illegible]

APPENDIX I
SWPPP TRAINING LOG

APPENDIX I
SWPPP TRAINING LOG

TRAINING DESCRIPTION	DATE(S)	NAME(S) OF TRAINERS	NAME(S) OF TRAINEES

***SWPPP Training is not required; if training occurs it should be noted here.**

APPENDIX J
OWNER CERTIFICATION AND CONSULTANT DECLARATION

Owner's Certification:

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

Owner: _____

By: _____

Title: _____ Date: _____

Owner's Signature: _____

Consultant's Declaration:

I hereby declare that the site plan, location map, and information contained in Sections 1 and 2 of this SWPPP has been prepared under my direction or supervision in accordance with Boone County's Regulations, and applicable State and Federal Regulations and that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Consultant: _____

By: _____

Title: _____ Date: _____

Consultant's Signature: _____

APPENDIX K
NRCS STRUCTURE LO-1 SWPPP

STORM WATER POLLUTION PREVENTION PLAN

Little Otter Creek, LO-1

Caldwell County, Missouri

Site Description.....	Page 1 of 3
Installation of BMPs.....	Page 2 of 3
Reporting and Records.....	Page 3 of 3
Location Map.....	Exhibit 1
Plan Map.....	Exhibit 2
Pollution and Erosion Control Features.....	Exhibit 3
Site Inspection Report Form.....	Exhibit 4



STORM WATER POLLUTION PREVENTION PLAN

Little Otter Creek, L0-1
Caldwell County, Missouri

Site Description (See Exhibit 1)
Sec. 32, T57N, R27W Caldwell County, MO

The subject site is a bottom land site located approximately 4 miles Southeast of Hamilton, MO. The proposed construction will result in a floodwater retarding structure.

Description of Best Management Practices (BMP's)

One or more of the following temporary or permanent BMP's will be installed or practiced on the site. Other practices not listed may be used during the course of construction if deemed necessary by Contractor in order to comply with permit requirements. Detailed descriptions of the BMP's are provided on the Pollution and Erosion Control Plan (Exhibit 2), and/or the applicable Construction Specification Sections of the Construction Contract as indicated below.

Protective Dikes (5) Sediment Basins (5)
Seeding/Mulching (6) Silt Fence (5)
Straw Bale Filters (5) Temporary Mulching (5 & 6)
Grass-lined Channels (5) Rip Rap Channels (5)
Diversion (5) Grass Filter Strips

Housekeeping – Handling, storage and disposal of chemical pollutants such as fuels, lubricants and human waste will be in accordance with Construction Specification 5 of the Construction Contract and with all applicable state and federal regulations concerning storage, dispensers, spill prevention, control and counter measures. An equipment parking area is designated on the Pollution and Erosion Control Plan (Exhibit 2).

Disturbed Areas

The work area is shown on Exhibit 2. In addition, vegetation and top soil will be stripped from foundation of dam, auxiliary spillway and borrow areas.

Installation of BMP's

BMP's will be installed at the locations shown on the Pollution and Erosion Control Plan (Exhibit 2). Installation will be in accordance with the appropriate Construction Specification, the Pollution and Erosion Control Plan (Exhibit 2), and other applicable drawings.

Temporary and Permanent Non-Structural BMP's

1. Staging of activities – Stripping, clearing, grubbing and earthwork activities will be staged in accordance with Construction Specification 5. Temporary brush dams will utilize cleared brush to assist in controlling sediment where feasible.

2. Temporary mulching – Disturbed areas will not be allowed to remain exposed for greater than 30 days of construction inactivity. Temporary mulch will be applied in accordance with Construction Specifications 5, and the General Clauses of the contract.

3. Seeding and Mulching – Permanent seeding and mulching will be installed on all disturbed areas above the Principal Spillway elevation in accordance with Construction Specification 6.

Temporary and Permanent Structural BMP's

Temporary diversions will be installed above the borrow areas in accordance with Construction Specification 5 to divert surface runoff as shown on Exhibit 2.

Silt Fence

A temporary silt fence will be installed as shown on Exhibit 2. The primary purpose for this silt fence is to protect the stream below the construction site and prevent erosion in the auxiliary spillway. The silt fence will be maintained in accordance with Construction Specification 5 until permanent vegetation is established on the site.

Inspection

Contractor will inspect the construction site at least once per week during periods of construction activity to ensure all installed BMP's and other pollution control measures are properly installed, operating and maintained. In addition, Contractor will conduct a site inspection within 72 hours following heavy rains provided the disturbed areas have not been finally stabilized with permanent BMP's and vegetation. During site inspections, locations where storm water leaves the site (below the sediment basin) will be inspected for evidence of erosion or sediment deposition. Any deficiencies found during inspections will be corrected within seven calendar days. The site contractor is responsible for operation and maintenance of the BMP's or any deficiencies.

A log of each inspection (NRCS-USDA Form MO-ENG-C95, Exhibit 4) will be kept in the project file.

Amendments

This SWPPP will be amended and updated during the term of the land disturbance activity when:

a. Design, operation, or maintenance requirements of BMP's is changed;

- b. Design of the construction project is changed in a manner that could significantly affect the quality of the storm water discharges;
- c. Owner inspections indicate deficiencies in the SWPPP or any BMP;
- d. MDNR notifies Owner of deficiencies in the SWPPP;
- e. The SWPPP is determined to be ineffective in significantly minimizing or controlling erosion and sedimentation (e.g., there is visual evidence, such as excessive sediment deposits in streams or channels);
- f. Total Settleable Solids from storm water outfall exceed 2.5 ml/L/hr; or
- g. MDNR determines violations of Water Quality Standards may occur or have occurred.

Sampling and Effluent Limitations

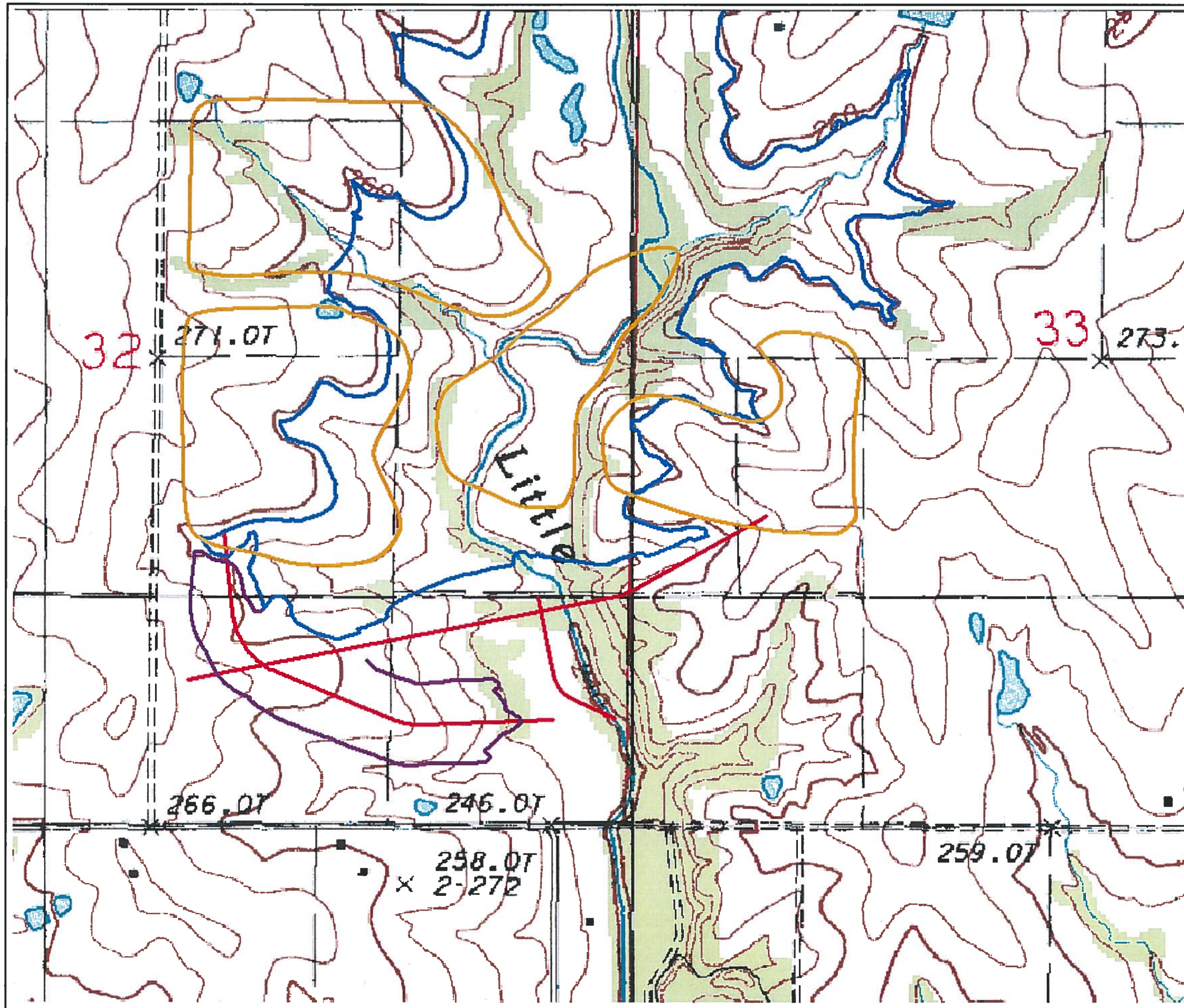
Although there are no routine sampling requirements, discharges from the site (Settleable Solids) are limited to a maximum of 2.5 ml/L/hr for each storm water outfall.

Reporting of Other Discharges

1. Hazardous Substance and Oil Spill Reporting
2. Removed Substances
3. Change in discharge: In the event soil contamination or hazardous substances are discovered at the site during land disturbance activities, Sponsor Representative will notify MDNR in writing.

Records

Records required by permit, including a copy of the General Permit, this SWPPP including all amendments, results of any monitoring and analysis, and all site inspection records will be kept at the office of the Owner until the construction contract for the site is completed and closed. After closure of the construction contract the records will be kept in the NRCS State Office in Columbia, Missouri for a period of at least three years from the date of the Letter of Termination.



LEGEND

- Centerline of dam, Principal & Aux.
- Normal Pool
- Auxiliary Spillway
- Borrow Areas



The excavator is responsible for having all utilities located at the site or on ingress road prior to beginning work. Call 1-800-DIG-RITE (344-7483) or 811 or click www.mo1call.com 3 days before you dig! The landowner shall ensure that the excavator completes the utility locate request.

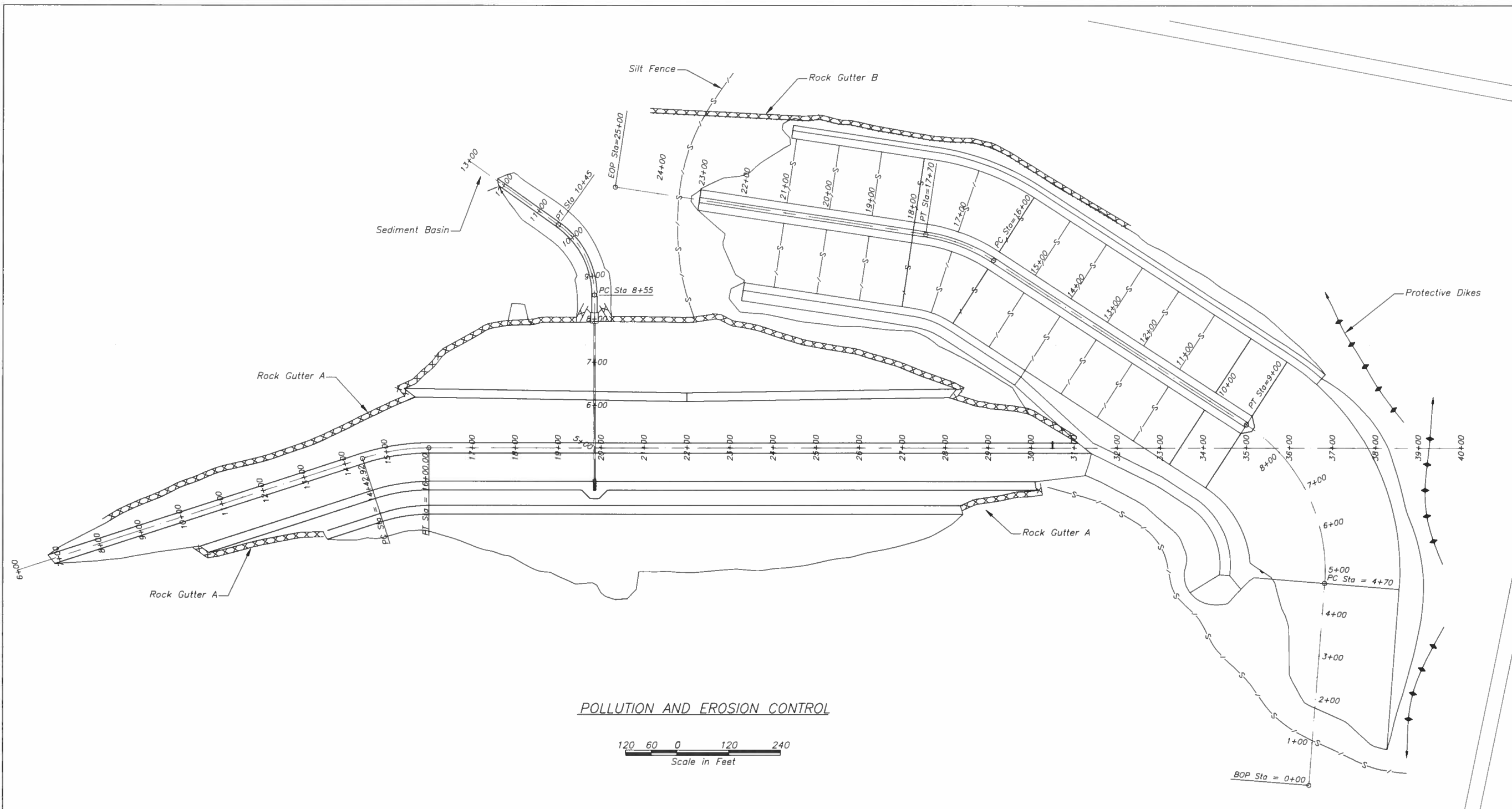


Little Otter Creek Structure LO-1 is located approximately 1.6 miles Northwest of New York, MO, Secs. 32 & 33, T57N, R27, Caldwell County, MO

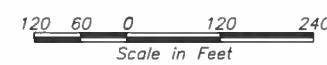


Brandon Viers
E-2001018820

Pollution Control Location Map - Exhibit 1 Structure LO-1 Little Otter Creek Watershed PL-566 Caldwell County, Missouri		Date Designed MDS BBV January 2020 Drawn BBV January 2020 Checked Approved	
United States Department of Agriculture Natural Resources Conservation Service	File Name		
	Drawing Name		
Sheet 1 of 3			



POLLUTION AND EROSION CONTROL



NOTES:

Protective Dike

Dike dimensions: 12" effective height; 4:1 side slopes; 4' top width.

Borrow Area

A strip of ground shall be left undisturbed, except for clearing and grubbing, between borrow area and creek to serve as a diversion to trap any sediment from borrow operations.

Quantities

Protective Dikes	850 Lin. Ft.
Silt Fence	5,500 Lin. Ft.
Temporary Seeding	40.0 Acres
Temporary Mulching	80.0 Tons
Excavation - Silt Fence	550 C.Y.
Excavation - Sediment Basin	200 C.Y.



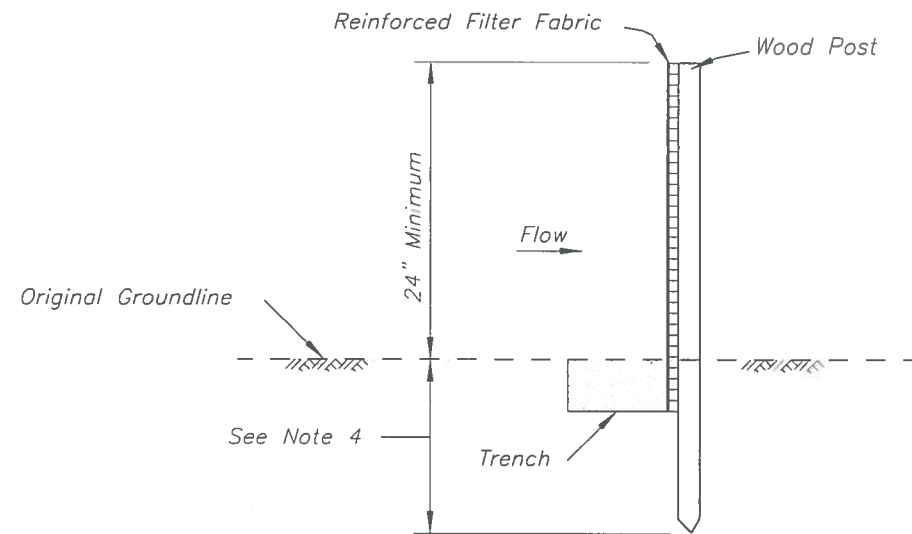
Brandon Viers
E-2001018820

Date	April 19
Designed	MDS, BBV
Drawn	MDS, KAS, KRW
Checked	BBV
Approved	

Pollution Control Plan - Exhibit 2
Structure LO-1
Little Otter Creek Watershed
PL-566 Caldwell County, Missouri

United States
Department of
Agriculture
USDA
Natural Resources
Conservation Service

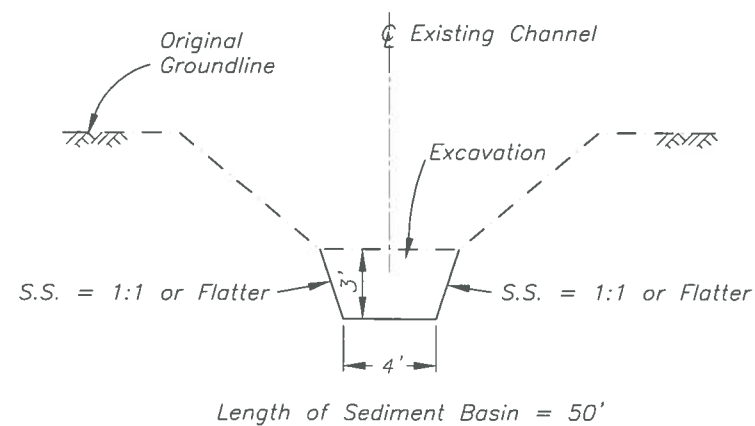
File Name
Drawing Name
Sheet 2 of 3



SILT FENCE DETAIL

NOTES:

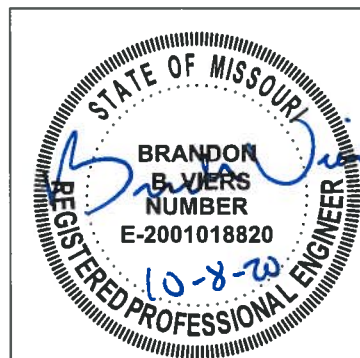
1. Trench dimensions: 6" deep; minimum 6" wide. Compacted backfill with the bottom 6" of fabric in trench.
2. Post spacing shall be as needed to properly support silt fence but shall not exceed 8 feet.
3. Drainage area above silt fence should not exceed flow capacity of geotextile (approximately 2 acres).
4. Post shall be driven into ground a sufficient distance as needed to properly support silt fence.
5. Wood posts shall be minimum 1 1/2" x 1 1/2" for softwoods such as Pine and minimum 1 1/8" x 1 1/8" for hardwoods such as Oak.



TYPICAL CROSS SECTION
OF SEDIMENT BASIN

NOTES:

1. Basin as drawn, contains approximately 40 cubic yards of excavation.
2. Size and location of basin may be adjusted as staked in the field.
3. Excavation and cleanout of sediment basin will be paid for under Pollution & Erosion Control.



Pollution Control Details - Exhibit 3 Structure LO-1 Little Otter Creek Watershed PL-566 Caldwell County, Missouri		Date April 19 April 19 May 19
United States Department of Agriculture Natural Resources Conservation Service	Designed MDS, BBV Drawn MDS, KAS, KRW Checked BBV Approved	
File Name		
Drawing Name		
Sheet 3 of 3		

Exhibit 4

NRCS-USDA

MO-ENG-C95
Rev. 9-03
File Code: 210-12

**STORMWATER POLLUTION PREVENTION PLAN
SITE INSPECTION REPORT**

Inspector's Name: _____		Date of Inspection: _____	
Site: _____		Watershed: _____	
Ia. Observations relating to the effectiveness of the best management practices (BMP's):			
		Satisfactory	Deficient
		N/A	
1.	Silt fences around stockpiles	_____	_____
2.	Silt fences around disturbed areas	_____	_____
3.	Location of stockpiles	_____	_____
4.	Protective dikes	_____	_____
5.	Diversion channels	_____	_____
6.	Rock gutters	_____	_____
7.	Sediment basins	_____	_____
8.	Temporary mulching	_____	_____
9.	Seeding/mulching	_____	_____
10.	Grass Filter Strips	_____	_____
11.	Dust Control	_____	_____
12.	Housekeeping	_____	_____
13.	Other (list) _____	_____	_____
Ib. Briefly describe deficiency(ies) for each BMP determined to be deficient. (Identify by # above. Use other side of form if necessary.)			
II. Briefly describe actions required to correct deficiencies found: (Identify by BMP # above if multiple deficiencies. Notify contractor responsible for maintaining BMPs.)			
III. Describe actions taken to correct deficiencies: (Identify by BMP #)			
IV. List areas where prior land disturbance operations have permanently or temporarily stopped:			
INSPECTOR'S SIGNATURE: _____			

NOTE: Conduct inspection and complete report weekly or within 24 hours after heavy rainfall.
Original copy of this completed form to be kept on file at project office and to become part of Contract Folder. Send one copy of completed form to NRCS State Construction Engineer.