

2012 LAND DISTURBANCE TRAINING



**Nate Muenks
MoDOT Design**

Environmental & Historic Preservation Section

Why Is Land Disturbance Important for MODOT?

- **Erosion and Sediment Loss Causes Water Pollution**
- **MoDOT Supports Environmental Stewardship**
- **It's The Law**
- **Fines and Penalties Can and Will Be Imposed**

The Goal

- **Deliver the planned final product while assuring effective erosion, sediment and stormwater management throughout the construction process**
- **Be preemptive and effective with stormwater management**
- **Minimal instability = Reduced vulnerability**
(Work methodically through the job, FINISHING AS YOU GO)

Land Disturbance Regulation

- **1972 Clean Water Act**
 - Requires a permit to discharge water that has contamination in it.
 - In Missouri the permit is called a Missouri State Operating Permit
 - Nationally it is called National Pollutant Discharge Elimination System (NPDES)
- **Point Sources ('72) and Non-Point Sources ('87)**
- **Phase II Requirements effective March 10, 2003 require permits for Land Disturbance ≥ 1 acre.**

Missouri State Operating Permit

MO-R100007

Issued - June 2007 Expires - May 2012

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT WATER POLLUTION CONTROL PROGRAM

General Operating Permit

In compliance with the Missouri Clean Water Law, (chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.: MO-R100007

Owner: Missouri Department of Transportation (MODOT)
Address: PO Box 270
Jefferson City, MO 65102

Continuing Authority: Same
Same

Facility Name: MODOT, Road Construction Projects
Facility Address: P.O. Box 270
Jefferson City, MO 65102

Legal Description: Various throughout the state, Statewide County

Receiving Stream: Various throughout the state
First Classified Stream: Various throughout the state

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein.

FACILITY DESCRIPTION All Outfalls, SIC 1629

Construction or land disturbance activity (e.g., clearing, grubbing, excavating, grading, and other activity that results in the destruction of the root zone) that are performed by or under contract to a city, county, or other governmental jurisdiction that has a storm water control program for land disturbance activities that has been approved by the Missouri Department of Natural Resources.

This permit authorizes only wastewater, including storm waters, discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System. It does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law

May 31, 2007
Effective date

June 15, 2007
Issue date

Doyle Childers, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

May 30, 2012
Expiration date
MO 780-1481 (7-94)

Edward Galbraith
Director of Staff, Clean Water Commission

WHAT YOU NEED TO DO!

READ YOUR PERMIT!

(www.dnr.mo.gov/env/wpp/permits/issued/R100000.pdf)

- **The permit is a legal agreement between MODOT and DNR**
- **You will be held responsible for ensuring that your land disturbance is in compliance with all permit conditions and applicable regulations**
- **Remember, MDNR receives a quarterly report of all MoDOT LD jobs one acre or more and does inspect**

WHAT YOU NEED TO KNOW

- **The Owner (MoDOT) is responsible for compliance**
- **Permit is not transferrable to Contractor**
- **Permit does not authorize other impacts such as Historic Preservation Act, Endangered Species Act or Section 404**

Exemptions

- **Discharge to a combined sewer system**
- **Less than 1 acre of land disturbance**
- **Agriculture**
- **Strip or ribbon projects (generally utilities less than 6 feet wide)**

Prohibited Acts

- **To cause pollution of streams**



"A bit murky for low flow!"

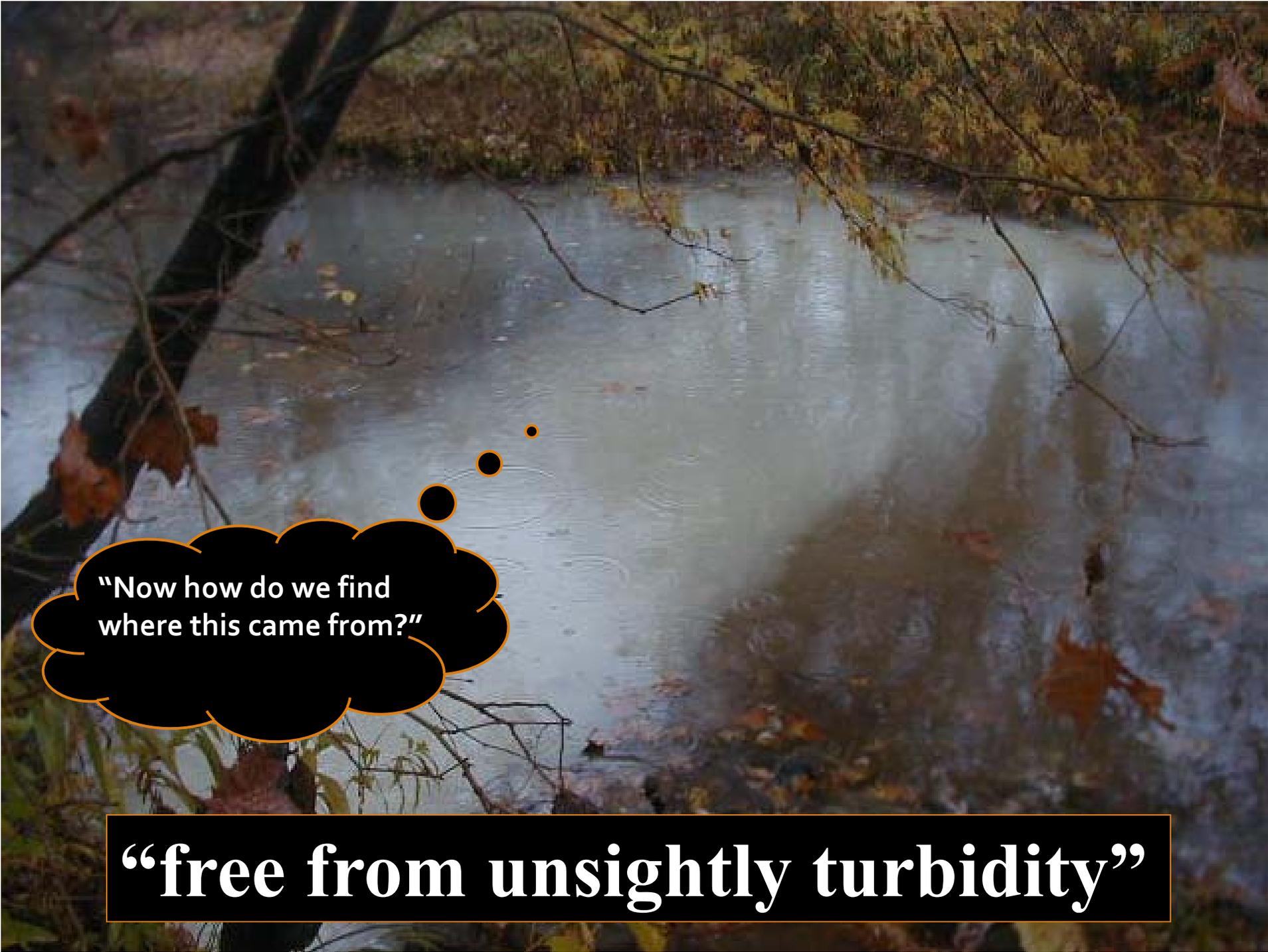
Prohibited Acts

- To cause pollution of streams
- To “put or place” pollutants in proximity to streams



Prohibited Acts

- To cause pollution of streams
- To “put or place” pollutants in proximity to streams
- **To exceed general or specific water quality criteria**



**“Now how do we find
where this came from?”**

“free from unsightly turbidity”

Prohibited Acts

- To cause pollution of streams
- To “put or place” pollutants in proximity to streams.
- To exceed general or specific water quality criteria
- **To exceed permit limits**

Prohibited Acts

Page 8 of 9

Permit No. MO-R100000

SAMPLING REQUIREMENTS AND EFFLUENT LIMITATIONS

1. Discharges shall not violate Water Quality Standards 10 CSR 20-7.031(3). Total Settable Solids shall not exceed a maximum of 2.5 ml/L/hr. for each storm water outfall. If there is a discharge to valuable resource waters, Total Settable Solids shall not exceed a maximum of 0.5 ml/L/hr.

Storm Water Pollution Prevention Plan (SWPPP)

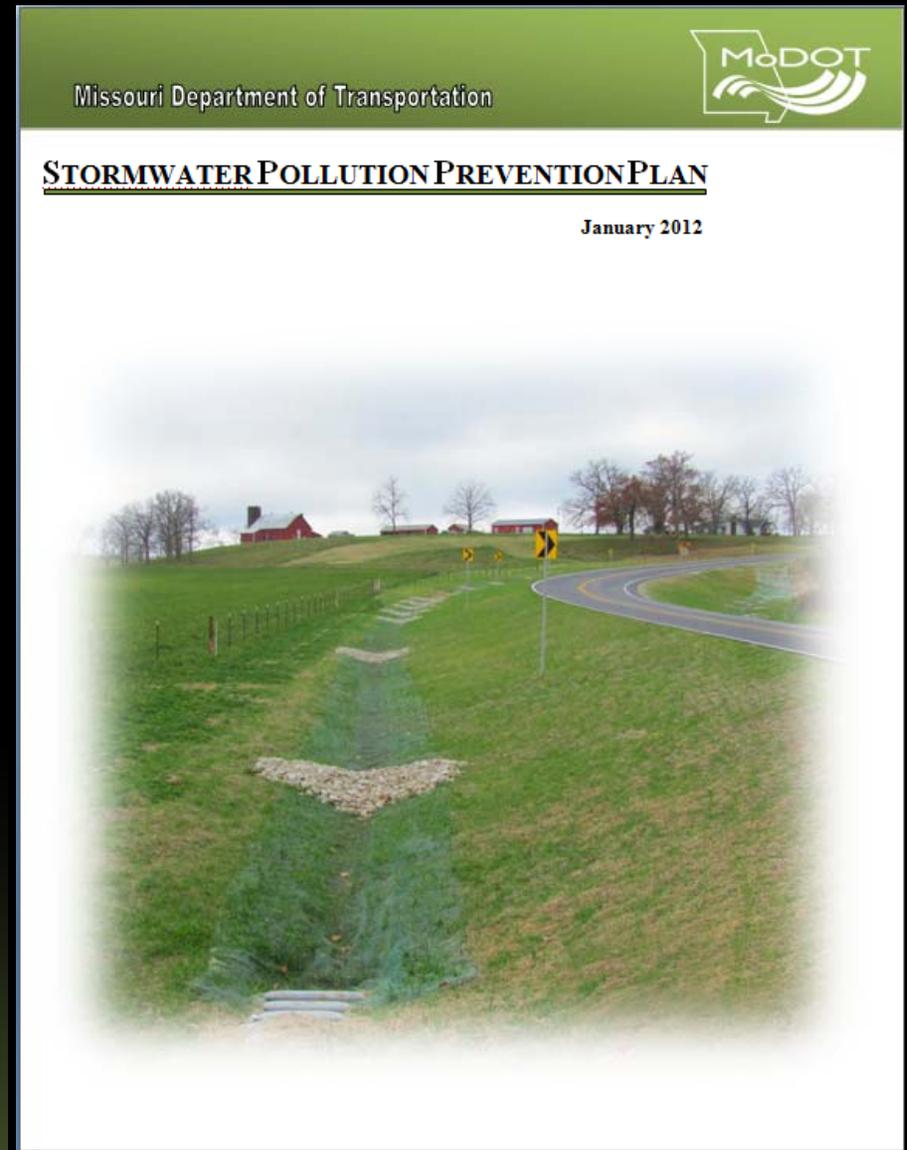
(Primarily Consists of a Written Plan & Site Maps)

- Each site must have one (Project-specific plans)
- Prepared before construction starts - Plans
- Dynamic - changes with project!
- Document all changes – written and plans
- Includes weekly Inspections - 7 Days
- Includes post-runoff checks - 48 hrs of event
- Maintenance plan during construction
- Removal and restoration

Stormwater Pollution Prevention Plan

Written Plan

- The written plan should be of sufficient detail to be of practical use to field personnel.
- If you do not have the January 2012 edition, you need to update!!!!



Past Regulatory Enforcement

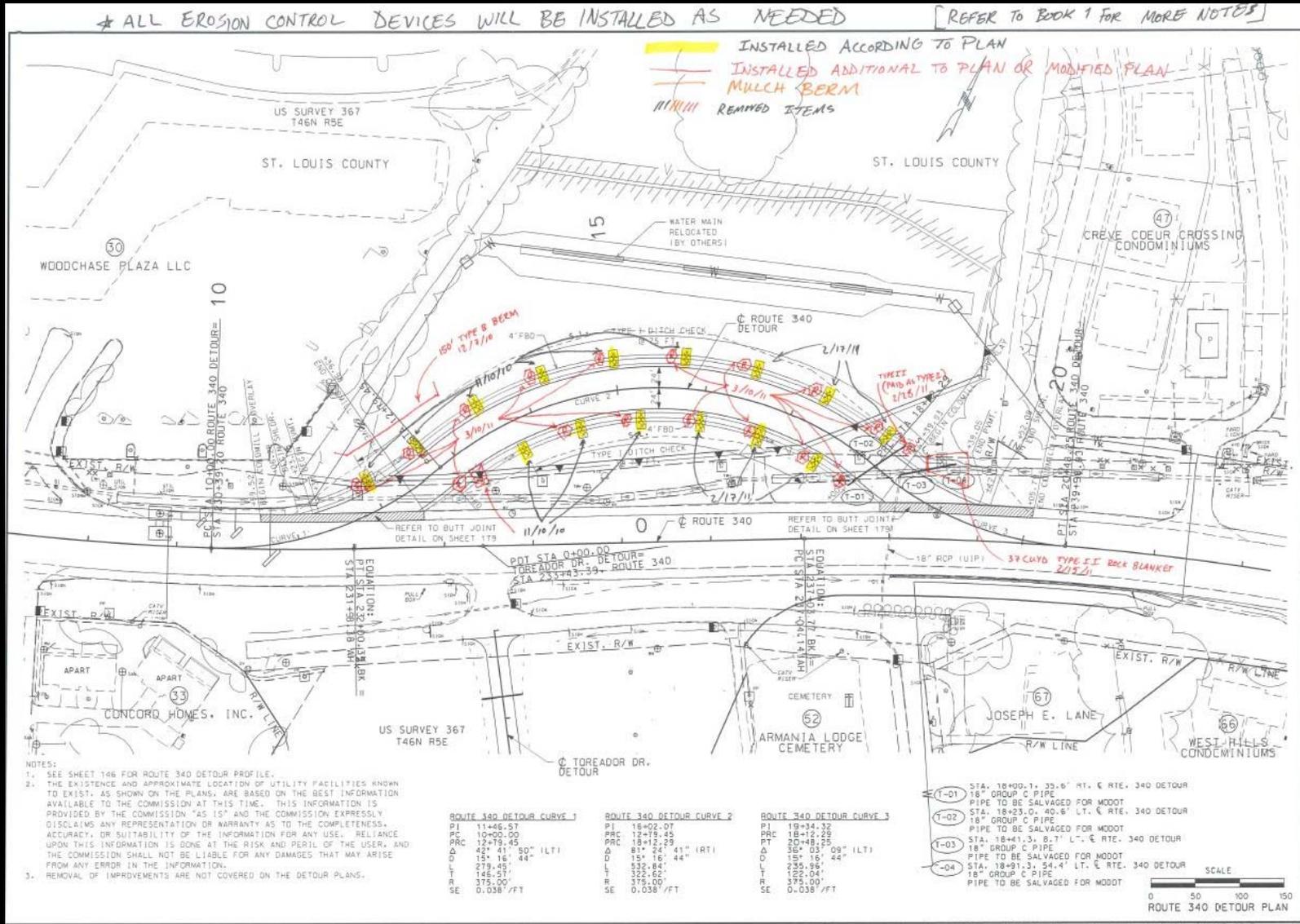
- Failure to "Develop" adequate SWPPP
- Failure to "Properly Implement" adequate SWPPP
- Failure to "Update or Amend" SWPPP
- Failure to "Properly Operate & Maintain BMPs" in accordance with the SWPPP

Stormwater Pollution Prevention Plan

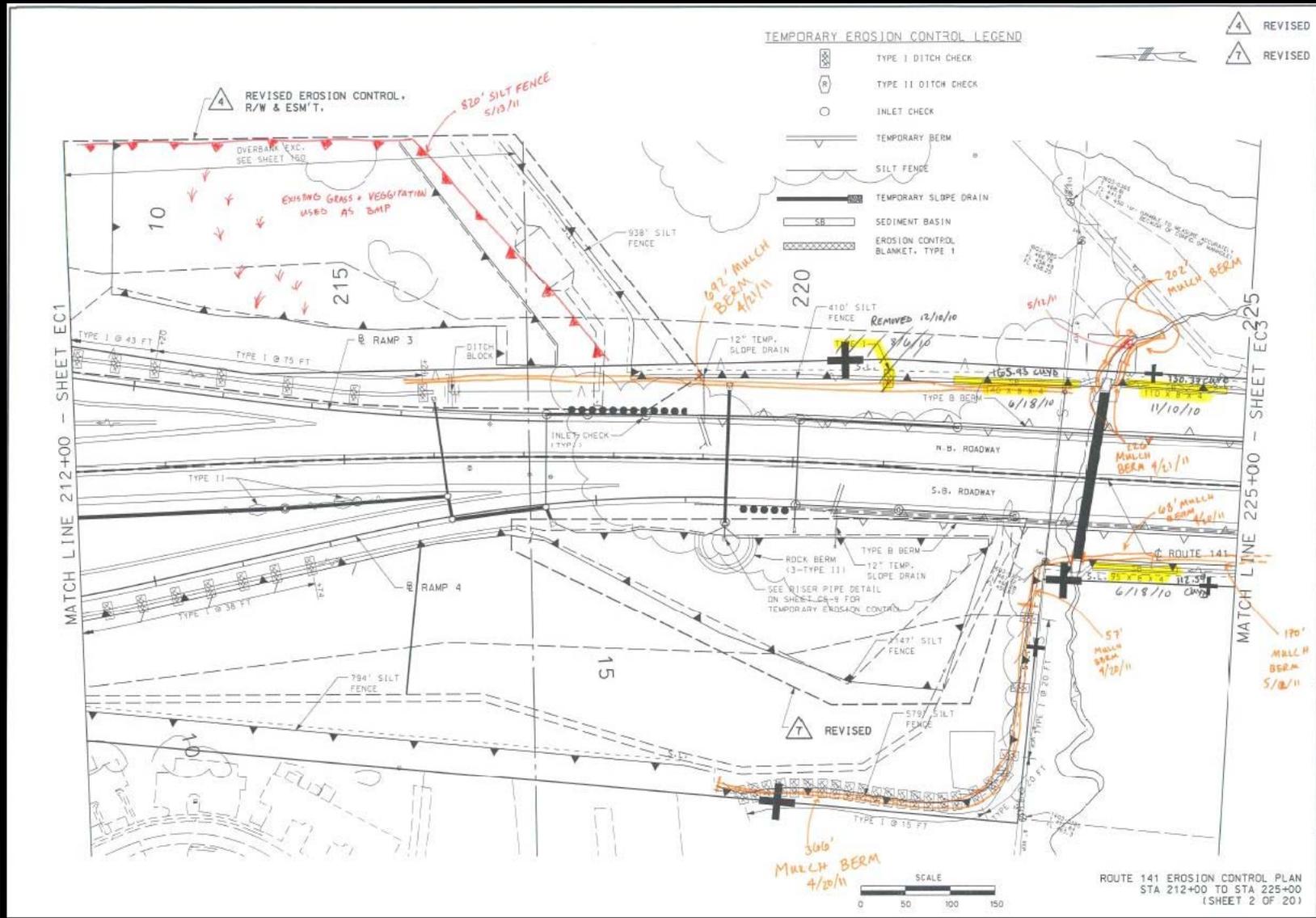
Site Maps (“Erosion Control Plans”)

- Identify site boundaries. (Generally R/W)
- Identify drainage patterns & outfall locations.
- Identify buffer & preservation areas.
- Identify BMPs & their locations.
- Update site maps as the project progresses.

Update & Amend SWPPP Site Map/EC Plan



Update & Amend SWPPP Site Map/EC Plan

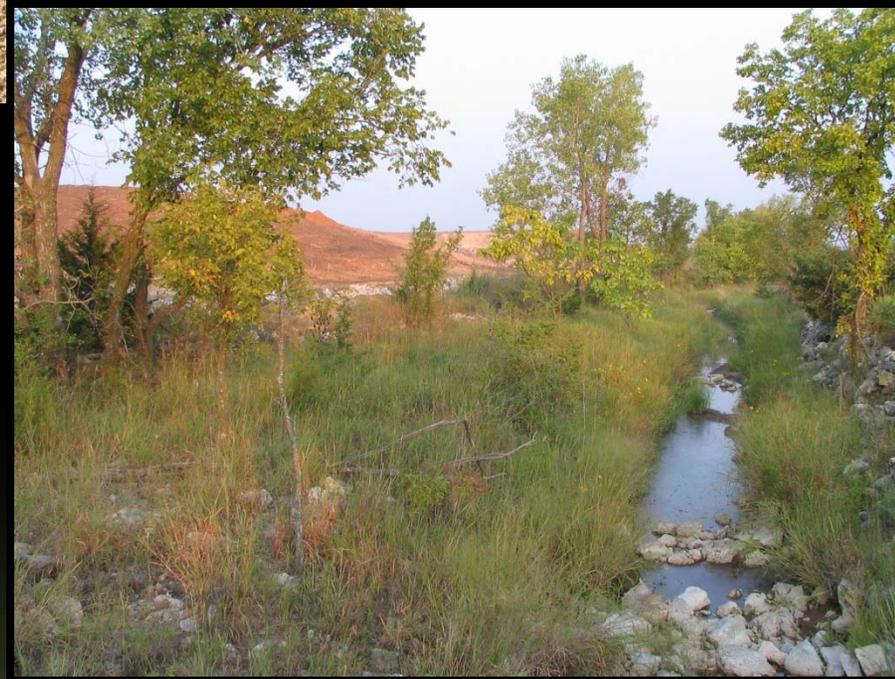


b) Select “non-structural” BMPs

(MO-R100007 p 4-5, #10b)

- **Temporary or Permanent**
 - **Minimize amount of time soil is disturbed**
 - **Inactivity for >six months should include vegetative cover**
 - **Preservation of trees**
 - **Protect vegetation (buffer strips)**
 - **Mulch**
 - **Sod**
 - **Temporary or Final Seed**
 - **Geotextiles**
 - **Soil stabilizing emulsions/tackifiers**
 - **Stabilized construction entrances**
-
- **Non-Structural BMPs Must Be Monitored**

Mark Out Buffer & Preservation Areas Before Site Disturbance



c) Select “Structural” BMPs

(MO-R100007 p 5, #10c)

- **Control/Divert flows**
- **Silt Fence (filter fabric or straw bale)**
- **Earthen dikes (berms)**
- **Sediment traps**
- **Ditch checks (rock or other types)**
- **Subsurface drains**
- **Pipe slope drains**
- **Sediment basins**

Structural and Non-structural



d) The SWPPP Shall provide,..

(MO-R100007 p 5, #10d)

- **Physical description of the BMP**
- **Conditions necessary for BMP effectiveness**
- **Installation and construction procedures**
- **Operation and maintenance procedures**
- **Indicate temporary or permanent**
- **Where BMP is to be located**
- **When BMP is to be installed**
- **When BMP is to be removed**

(e-g) Special Waters Require Additional Attention

(MO-R100007 p 5, #10e)

- **Outstanding State/Federal Waters**
- **Ground Water**
- **Losing Streams**
- **Public Water Supplies**
- **Lakes and Reservoirs**
- **Endangered Species**
- **Section 303 (d) Streams will require restrictive effluent limits**
- **This may be going away with the new permit!**

h) Disturbed Areas

(MO-R100007 p 6, #10h)

Disturbed vs. Erodible

- **Erodible areas** are those areas with an exposed or inadequately protected soil or other surface (even fine rock)
- **Disturbed areas** are those areas that have not reached final stabilization in accordance with our permit (i.e., covered with concrete, asphalt, non-erodible rock or 70% vegetative cover over 100% of the disturbed area)
- So, seed and mulch may make the area **non-erodible**, but it is still **DISTURBED** until you get that 70% vegetative cover.
- What should we be reporting? **Disturbed Acreage**

h) Disturbed Areas

(MO-R100007 p 6, #10h)

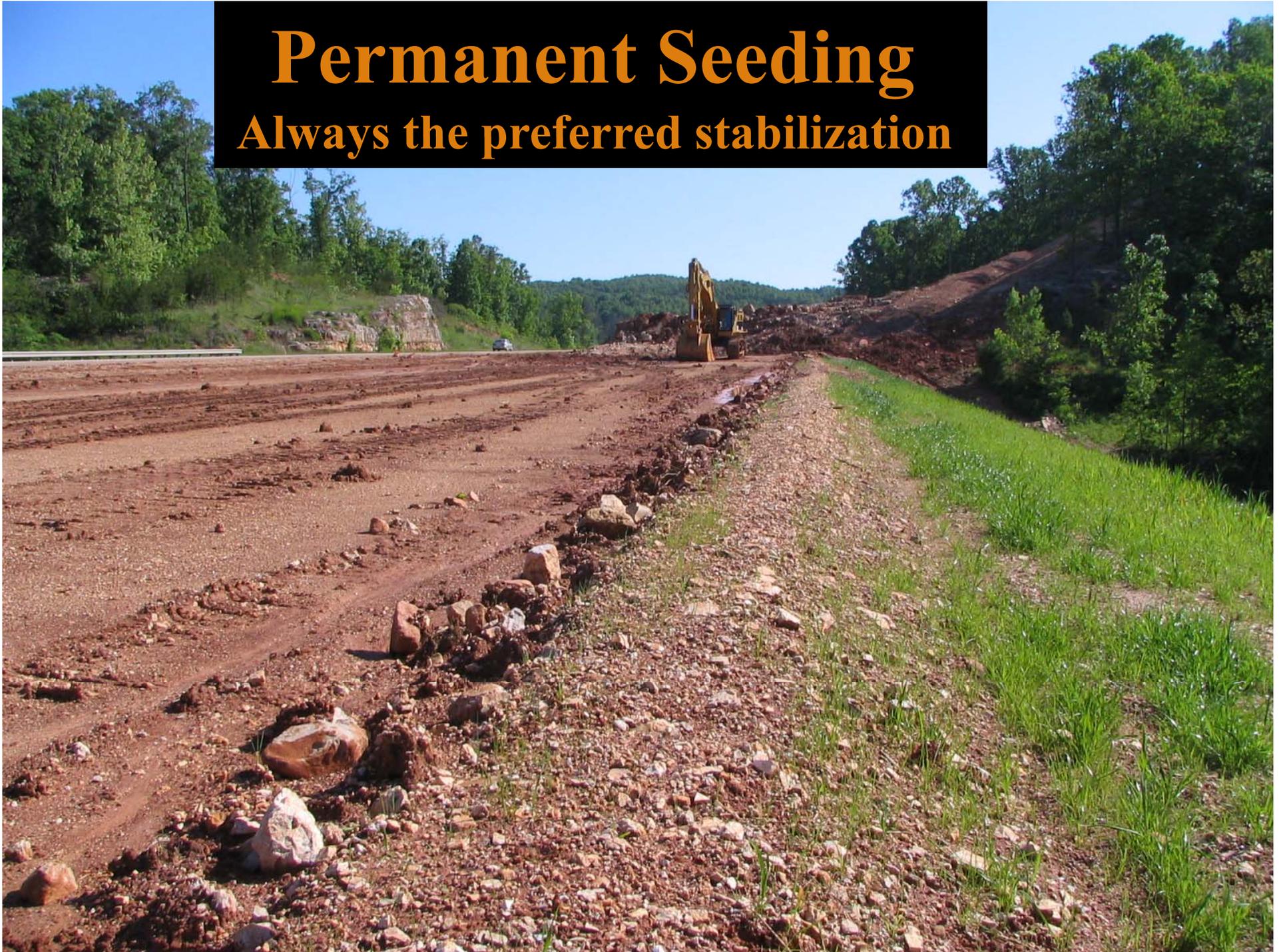
Slopes must be shown on site map

Where soil disturbance ceases for 14 days or more provide interim stabilization such as:

- **Sediment basins**
- **Check dams**
- **Sediment fences**
- **Mulch**

Permanent Seeding

Always the preferred stabilization



**Other measures are
allowed until permanent
stabilization of slopes**



h) Disturbed Areas

(MO-R100007 p 6, #10h)

Steep slopes must be addressed earlier

- **>3:1**
- **>3% and >150 feet in length**

Where soil disturbance ceases for 7 days or more provide interim stabilization.

Delays in work caused by inclement weather are not considered “ceasing operations” as long as the work resumes as soon as possible.



i) Installation

(MO-R100007 p 6, #10i)

- **Proper BMP Installation (when, where and how)**
- **Install peripheral or border BMPs BEFORE general site clearing**
- **Discharges must pass through appropriate impediment before leaving the site (sediment trap, basin, silt fence, etc.)**
- **Location of all BMPs must be included on the site map**

Install Perimeter & Outfall BMPs Before General Site Disturbance





**IF BMP is absent,
INSTALL IT!**

Type I devices should not be installed at project points of discharge.



j) Sediment Basins

(MO-R100007 p 6, #10j)

- **Required for L.D. areas ≥ 10 acres “at one time”**
- **Must have volume of 3600 ft^3 per disturbed acre & a stabilized spillway**
- **Remove sediment to maintain capacity**
- **Maintain basin until “final stabilization”**
- **Where sediment basin is impractical, other similarly effective BMPs may be used if they provide equivalent protection.**

j) Sediment Basins (MO-R100007 p 6, #10j)



Temporary



**Permanent
(Standard Plan)**

j) Sediment Basins

(MO-R100007 p 6, #10j)

- Stabilized spillways prevent berm erosion and failure.



Rock Lined

Standpipe



k) Dewatering

(MO-R100007 p 6, #10k)

- **SWPPP shall describe anticipated dewatering methods**
- **Include anticipated volumes**
- **Anticipated maximum flow (gpm)**
- **Specific BMP(s) that will be used to control sediment**
- **In no case shall water be pumped off site without being treated by the specified BMP**

**IF YOU INTEND TO PUMP
ANY WATER, YOU NEED A
DEWATERING PLAN!**



k) Dewatering

- Dewatering plans can be simple. They just have to effectively remove sediment from discharge water.



k) Dewatering

- **Make sure you aren't causing additional problems with your return water.**



I) Roadways

(MO-R100007 p 6, #10I)

- **All efforts shall be made to prevent deposition of sediment onto roadways.**
- **Where sediment is expected provide curb inlet protection.**
- **At terminus of roadway install BMP (gravel berm, silt fence, etc.).**
- **Roadways and curb inlets shall be regularly cleaned (weekly or more if necessary).**

1) Roadways

- **Stabilized construction entrances should be used to limit trackout onto public roadways.**



1) Roadways

- How can you limit, or even prevent trackout?

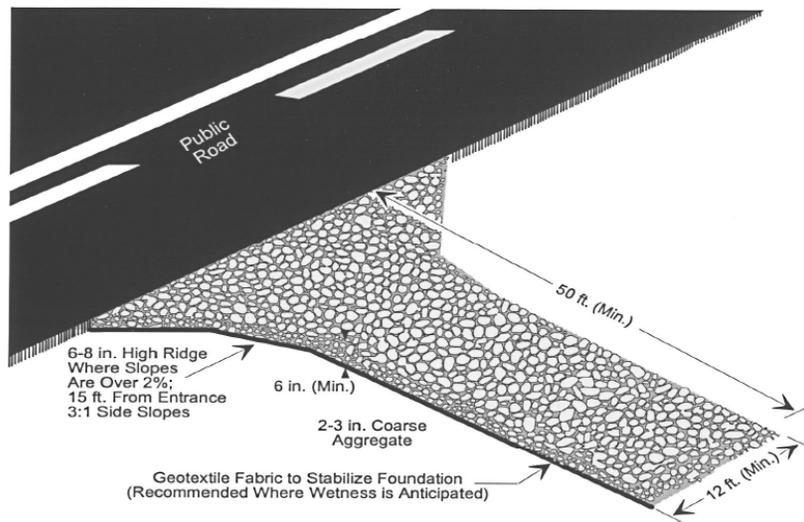


Figure 5.1 Typical Temporary Gravel Construction Entrance



“The Permittee Shall Amend the SWPPP”

(MO-R100007 p 7 #11)

- **Design, operation, or maintenance has changed.**
- **Project has changed such that storm water discharges also change.**
- **Inspections indicate problems.**
- **DNR notifies permittee of deficiencies in SWPPP or BMPs.**
- **SWPPP is determined to be ineffective (off site deposits).**
- **TSS exceeds 2.5 ml/L/hr (0.5 ml/L/hr – VRW)**
- **DNR determines violations (or potential violations) of WQS.**



Short Break!

Inspections

(MO-R100007 p 7 #12)

- **Regular inspections at a minimum of once every 7 calendar days or within 48 hours of a runoff event.**
- **Conducted by person responsible for environmental matters at the site or a person trained by resp. person.**
- **Inspections must occur until final stabilization.**
- **Deficiencies must be corrected in 7 days.**
- **If weather or site conditions preclude fixing deficiencies in 7 days, a justification report (including pictures) must be filed.**
- **Inspection reports must be signed and filed.**

Inspections

■ Inspections every 7 days or within 48 hours of a runoff event on the site.

■ **NEW INSPECTION RECORD** is now a guide to walk inspectors through the inspection process to ensure nothing is overlooked.

MISSOURI DEPARTMENT OF TRANSPORTATION LAND DISTURBANCE INSPECTION RECORD

Inspection Date: _____ Inspection Record No.: _____
 Project Number: _____ County: _____ Route: _____

Inspection Type: Weekly _____ Post-Runoff _____ Complaint _____ Final _____
 (Total Precip (in.) _____/Precip Duration (hrs) _____)

Total Disturbed Acreage on the Project _____ Total Authorized Acreage on the Project _____



Land Disturbance Inspection Checklist

	Yes	No	N/A
1 Current and updated SWPPP/site map on site and a copy given to the contractor?			
2 Permit public notification sign(s) posted at project's main entrance(s) and visible to the public?			
3 Are perimeter protection BMPs properly installed, maintained and depicted on the site map?			
4 Are outfall (concentrated discharge) protection BMPs properly installed, maintained, functioning as intended and depicted on the site map?			
5 Are BMPs in place to protect streams, wetlands and other environmentally sensitive areas from pollutants?			
6 Are all other erosion and sediment control BMPs properly installed and maintained according to SWPPP and depicted on the site map?			
7 Disturbed areas stabilized in accordance with permit within 14 days (7 days on slopes >3:1)?			
8 Is trackout controlled at project entrance/exit points?			
9 Are active stormwater inlets properly protected?			
10 Are dewatering operations effectively removing pollutants from the water?			
11 Does the project have a dewatering plan?			
12 Are litter, construction debris, fuels, lubricants and other construction chemicals controlled?			
13 Have all temporary BMPs that are no longer necessary been removed and removal depicted on the site map?			
14 Have all deficiencies from the last report been corrected in 7 days? If not, provide an explanation of adverse site conditions and attach photo evidence.			
15 Other:			

Explanation of checklist items identified above: _____

Describe areas where land disturbance activities have temporarily or permanently ceased. (Excluding weather shutdowns) Describe how these areas have been or will be stabilized. _____

Additional recommendations/notes: _____

Has the job reached final stabilization in accordance with the permit? Yes No

Inspector Name: _____ Inspector Signature: _____ Date: _____

RE Name: _____ RE Signature: _____ Date: _____

Distribution: Contractor (Hard Copy or Electronic
 Save to V:\Contract Information Archive & keep hard copy with inspector

Inspection Report Log

Erosion Inspection Report Summary

Project:				Route:		County:		Acreage		Comments
<u>Insp</u> Date	Inspection W/I 7 days?	72 hrs?	Rain Date	Amount	Deficiencies Listed	<u>Prev</u> <u>Corr</u>	Disturbed	Auth		
1/7/2005	N/A	N/A		0	N	N/A	1	10	Clearing on project	
1/14/2005	Y	Y	1/12,13/2005	2.25	Y	Y	1	10		
1/20/2005	Y	Y		0.00	N	H	1	10		
1/27/2005	Y	Y		0.00	N	Y	1	10		
2/4/2005	Y	Y	2/2/2005	0.75	N	N/A	1	10		
2/14/2005	H	H	2/6,7/2005	1.25	N	N/A	1	10	Insp. 4 days later, No inspection made w/i 72 hours	
2/17/2005	Y	H	2/13/2005	1.50	N	N/A	1	10	Insp. 4 days later, No inspection made w/i 72 hours	
2/24/2005	Y	Y	2/20,21,22/2005	0.75	N	N/A	1	10		
3/3/2005	Y	H	2/27/2005	trace	N	N/A	1	10		
3/10/2005	Y	Y	3/4,7/2005	0.25	N	N/A	1	10		
3/18/2005	H	Y		0.00	N	N/A	1	10	3/16/05: Doc Rec #7; 10 acre Auth, 1 acre open, 100% items correct	
3/28/2005	H	H	3/22/2005	0.75	N	N/A	1	10	Insp. 4 days later, No inspection made w/i 72 hours	
4/1/2005	Y	H	3/27/2005	1.00	N	N/A	1	10		
4/8/2005	Y	Y	4/6,7/2005	0.50	N	N/A	1	10		
4/15/2005	Y	Y	4/11,13/2005	0.75	N	N/A	1	10		
4/22/2005	Y	Y	4/20,21/2005	1.75	N	N/A	1	10		
4/29/2005	Y	Y	4/24,26,28/2005	1.50	N	N/A	1	10		
5/6/2005	Y	H	4/29/2005	0.50	N	N/A	1	10	No inspection made w/i 72 hours	
5/13/2005	Y	Y		trace	N	N/A	1	10		
5/20/2005	Y	H	5/13/2005	1.00	N	N/A	1	1	No inspection made w/i 72 hours	
5/27/2005	Y	Y		0.00	N	N/A	1	1		
6/2/2005	Y	Y		0.00	N	N/A	1	1		
6/10/2005	H	Y		trace	N	N/A	1	1		
6/17/2005	Y	H	6/11/2005	0.50	N	N/A	1	1	6/15/05: Doc Rec #17; 10 acre Auth, 1 acre open, 100% items correct	

Inspections

- Be sure to inspect receiving streams, lakes, ditches, etc. for off-sight contamination
- Permit says 50' downstream of last outfall – if possible!

Ummmm?



GOOD!



Records

(MO-R100007 p8, 1)

- **Permittee shall retain permit, SWPPP, amendments and inspection reports.**
- **The records shall be accessible during normal business hours.**
- **The records shall be retained for at least 3 years following termination.**

Records

(MO-R100007 p8, 2-4)

- **Permittee shall provide a copy of the SWPPP to MDNR, USEPA, or other local government if requested. (Records-2.)**
- **Permittee shall provide those responsible for installation, operation and maintenance of BMPs a copy of SWPPP. (Records-3.)**
- **Permittee and contractors shall have a copy of SWPPP with them when on project site. (Records-4.)**

Proper Operation and Maintenance (MO-R100007 p7, #13)

- **The permittee shall at all times maintain all pollution control measures and systems in good order to achieve compliance with the terms of this general permit.**

Clean Out and Maintenance

- **806.30.3 – Replace at the request of the Engineer**
- **806.30.3 – Ditch checks – Check performance after each storm event. Remove sediment when deposits reach 1/2 the original height.**
- **806.40 – Sediment basins - Remove sediment when deposits reach 1/3 the original height.
(Proposed permit says 50% full)**

**Now It's Time for the BMP Operation &
Maintenance Game!**

You Fill in the _____!

If It's Full, Clean It!



If It's Broken, Fix It!



If It Leaks , Plug It!



If It's Full , Clean It Out!



If It's Overwhelmed, Replace It!



If It's the Improper BMP, Replace It!



**If It's Begging For Mercy ,
Clean It & Replace It!**



**If It's No Longer Necessary,
Remove It!**



Public Notification

(MO-R100007 p7, #14)

- The permittee shall post a copy of the public notification sign provided by DNR at the main entrance to the site **or an alternate location if viewable to the public (New Language for May)**.
- This public notification sign must remain posted at the site until the permit has been terminated (for us this means job stabilized in accordance with the permit).



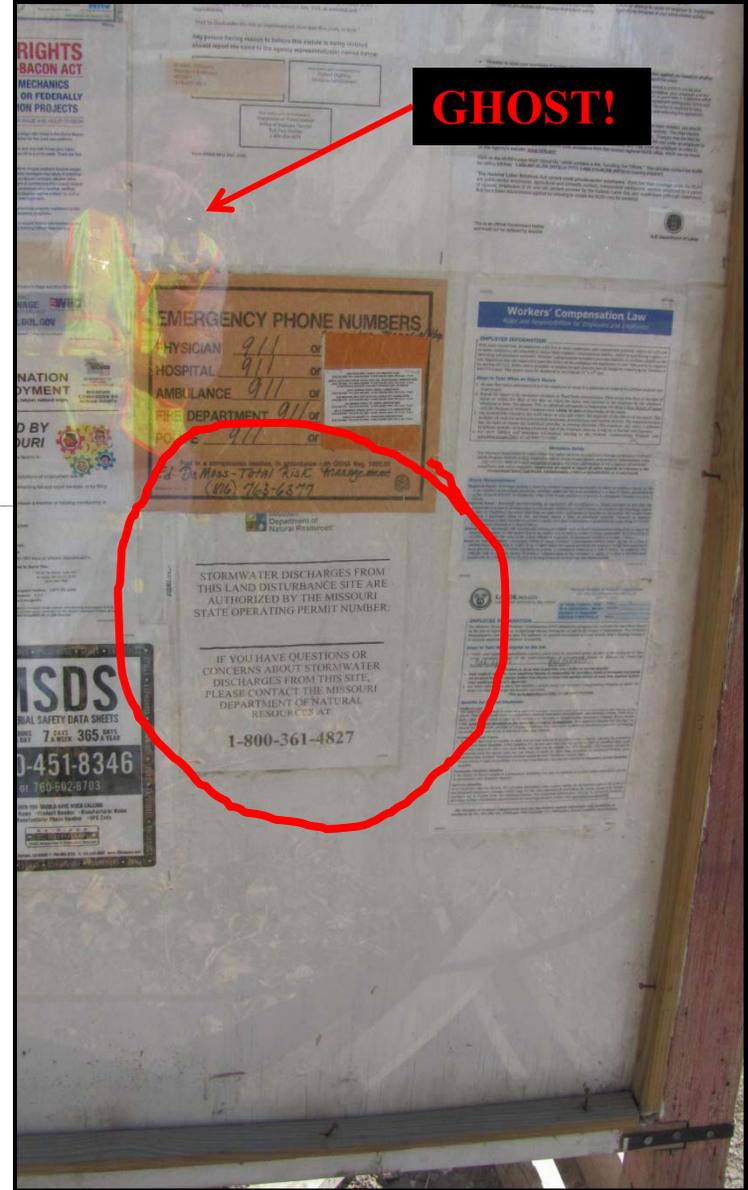
Missouri
Department of
Natural Resources

STORMWATER DISCHARGES FROM
THIS LAND DISTURBANCE SITE ARE
AUTHORIZED BY THE MISSOURI STATE
OPERATING PERMIT NUMBER:

MO-R100007

IF YOU HAVE QUESTIONS OR
CONCERNS ABOUT STORMWATER
DISCHARGES FROM THIS SITE,
PLEASE CONTACT THE MISSOURI
DEPARTMENT OF NATURAL
RESOURCES AT

1-800-361-4827



Other Discharges

(MO-R100007 p7)

- Hazardous substance and oil spills must be reported. (Call Design-Environmental Section Immediately)
- Removed substances – **Don't Haul Off!**
- MoDOT must notify DNR (telephone) no later than 24 hours of discovery. (Let Env. Folks handle this!)
- MoDOT must notify DNR (writing) no later than 14 days after discovery.

Additional Concerns

- **Solid waste (trash containers for litter and debris).**
- **Portable toilets.**
- **Storage of construction materials away from drainage courses and low areas.**
- **Containment berms or drip pans at petroleum product and liquid storage tanks and containers.**

Preconstruction Conference

Must discuss Erosion / Sediment Control

- Erosion control is important
- No sediment leaves the project
- Modifications will be necessary as construction proceeds
- Inspections will be performed and may result in order records
- DNR Notice of Violation will likely result in order record if fault of contractor – not if fault of MoDOT.

Notification To All Contractors

(Records – p. 8)

- **All contractors must be notified of the existence of the permit and SWPPP (Both in EPG/Internet/Intranet).**
- **Permittee shall ensure that each contractor has been provided a copy of the SWPPP.**
- **The permittee is responsible for damage a subcontractor may do to a BMP.**



COMPLIANCE WITH MODOT

MODOT

Design & Construction Considerations

Clearing Limitations

- Specification 806.4.4 Clearing and grubbing operations shall be scheduled and performed such that grading operations and erosion control features will follow immediately thereafter. The surface area of erodible earth material exposed at one time by clearing and grubbing, excavating fill or borrow shall not exceed 435,000 square feet (40,000 m²) within any individual drainage area without installation of erosion controls for that drainage area. The total erodible surface area exposed at one time for an entire project shall not exceed 750,000 square feet (70,000 m²) without specific, written approval from the engineer.

Clearing Limitations

Factors the Resident Engineer must consider:

- **Site Conditions**
- **Resources of the Contractor**
- **Contractor's plan to control erosion**
- **Response to deficiencies**
- **Contractor's history of compliance**

“What’s the Difference?”

“Erosion vs. Sediment Control.....It’s the Same Right?”

WRONG!

- **Erosion Prevention/Control** is the act of protecting the soil surface to prevent the displacement of soil particles by water or wind.
- **Sediment Control** is the act of trying to stop the migration of displaced soil particles that result from erosion.

Erosion Control is Preferred

- **Protect as much existing vegetation as possible.**
 - Leave a buffer along streams and drainages if possible (also acts as sediment control).
 - Avoid impacting vegetated drainage swales and areas of concentrated flow.
 - There is no better alternative than avoidance!
- **Cover up disturbed areas ASAP!**
- **Effective erosion control minimizes the maintenance of sediment control BMPs.**

Erosion Control is Preferred

- **Control stormwater run-on before it becomes problematic. (Intercept, divert, pipe across, spread out, slow down.)**



Erosion Control is Preferred

- Apply permanent stabilization to disturbed areas as soon as possible or use temporary cover until permanent protection can be applied.



Surface Roughening

Short term erosion control at clearing stage



Surface Roughening

Vertically tracking slopes can be an effective **short term** BMP (Still need to cover up promptly and have sediment control BMPs installed downgrade)



Mulching



Straw and Crimper



Mulching – Temporary Cover



(wood chips)

Temporary Seeding

(may be justified, but not much cheaper)

When Applied as Pay Item :

- **Specifications Enforced**

- **Seeding (Annual variety)**

- **20 plants / s.f.**

- **Mulch Application**

- **Min. 2 ½ tons / acre**

- **Mulch Overspray or Embedment Required**

**Acceptance in MoDOT specs is based on
20 plants/ft² of disturbed area**



Something like this!

**Remember that this spec does not meet the
permit definition for final stabilization, which =
70% cover over 100% of the disturbed area.**

Permanent Seeding (preferred stabilization)

- As soon as allowable to reduce need for other control measures. **“Finish as you go.”**
- **805.3.1 – Seeding shall be done before proposed seedbed becomes eroded.**
- **Minimizes need for BMP sediment removal.**

“...and they will seed and mulch next week.”



If final grade has been achieved and prepared for seed,...DO IT!

Those Vulnerable Slopes!

Once slopes reach grade, cover them up promptly.....



Your Parade



Ooh La La!!!



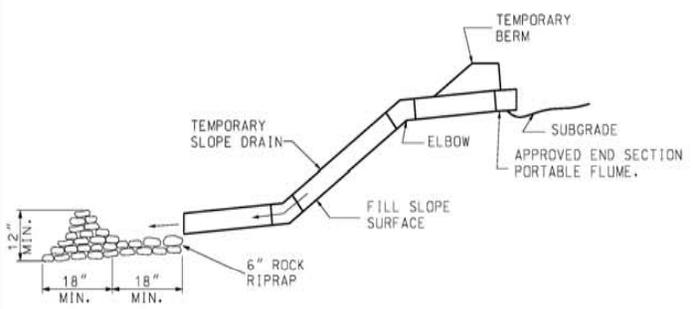
Blah, Blah, Blah!!!



Those Vulnerable Slopes!

.....and then use berms to divert runoff, and stabilized ditches or slope drains to carry stormwater down the slopes

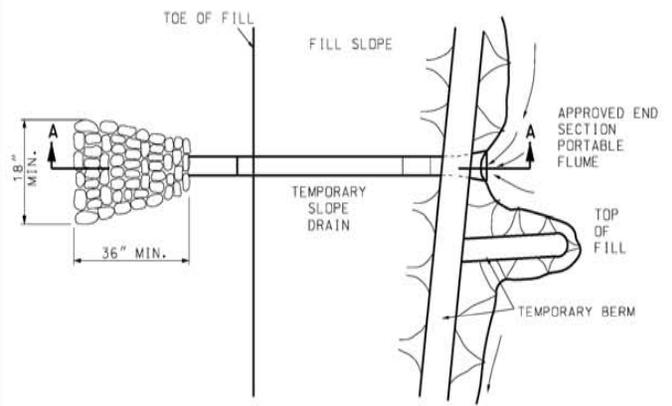




NOTE:

IN SOME CASES IT MAY BE NECESSARY TO EMBED METAL OR PALSTIC PIPE INTO THE FILL SLOPE TO SECURE PROPER ANCHORAGE.

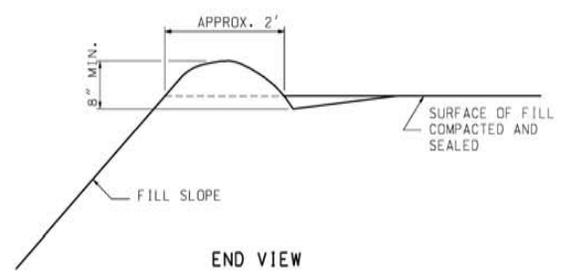
SECTION A-A



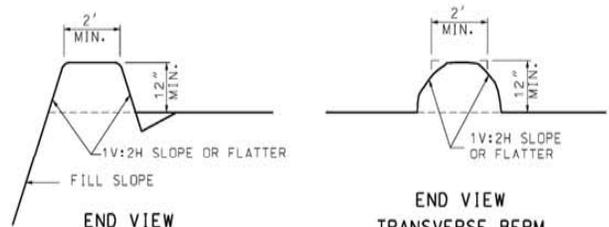
PLAN VIEW
TEMPORARY SLOPE DRAIN

(METAL, FLEXIBLE RUBBER OR PLASTIC PIPE)

NOTE:
MAXIMUM LENGTH BETWEEN SLOPE DRAINS SHALL BE APPROXIMATELY 500 FEET.

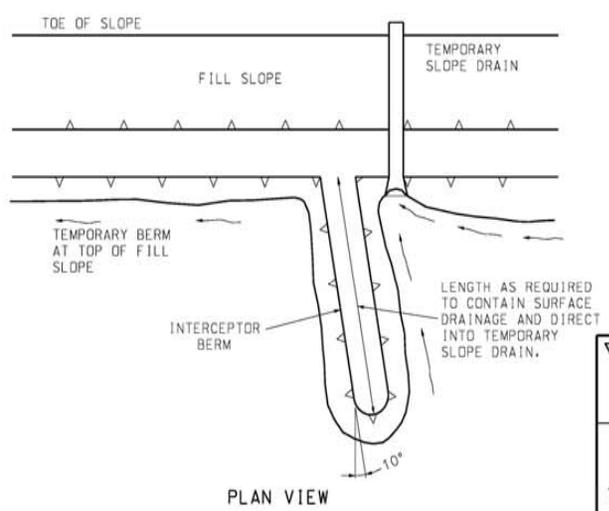


TYPE 'A' TEMPORARY BERM

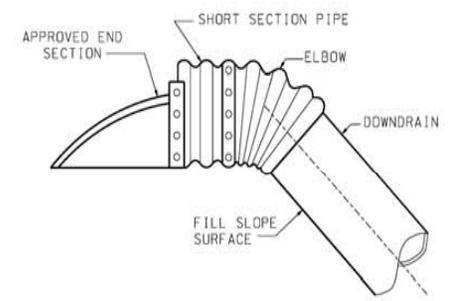


END VIEW
FILL BERM

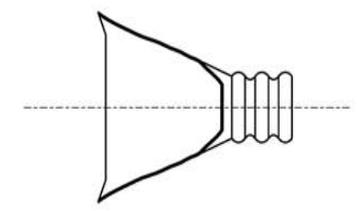
END VIEW
TRANSVERSE BERM



TYPE 'B' TEMPORARY BERM



INLET TREATMENT



PLAN VIEW END SECTION

TEMPORARY SLOPE DRAIN

MoDOT MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

TEMPORARY EROSION CONTROL MEASURES
TEMPORARY BERMS AND SLOPE DRAINS

DATE EFFECTIVE: 04/01/2009
DATE PREPARED: 8/26/2009
806.10H
SHEET NO. 5 OF 7

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

Stabilized Outlets!



Those Vulnerable Slopes!

I recommend ECBs or TRMs on slopes steeper than 3:1 and in ditches/drainageways with erosive shear stresses



Erosion Blanket / Mats

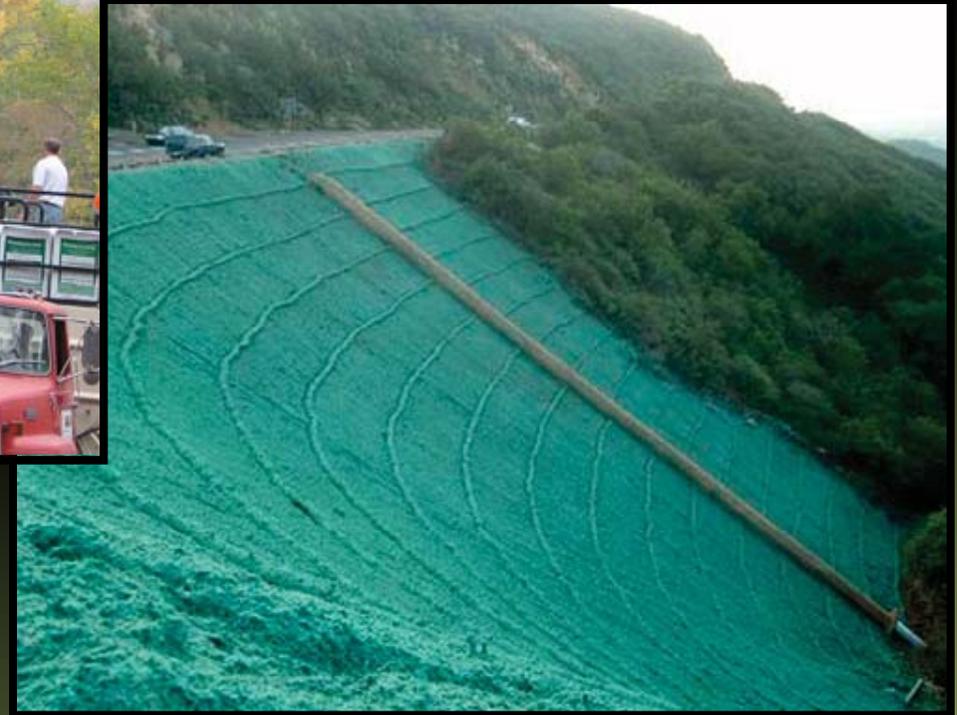


Alternative to ECBs

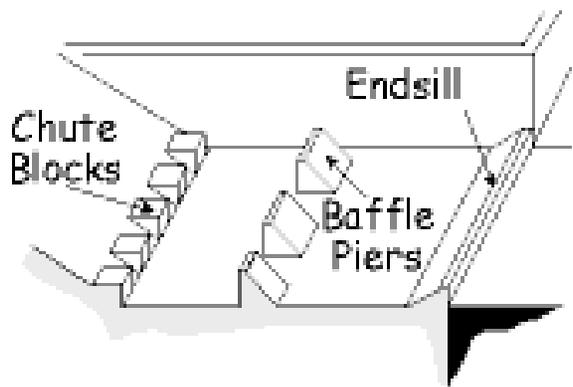
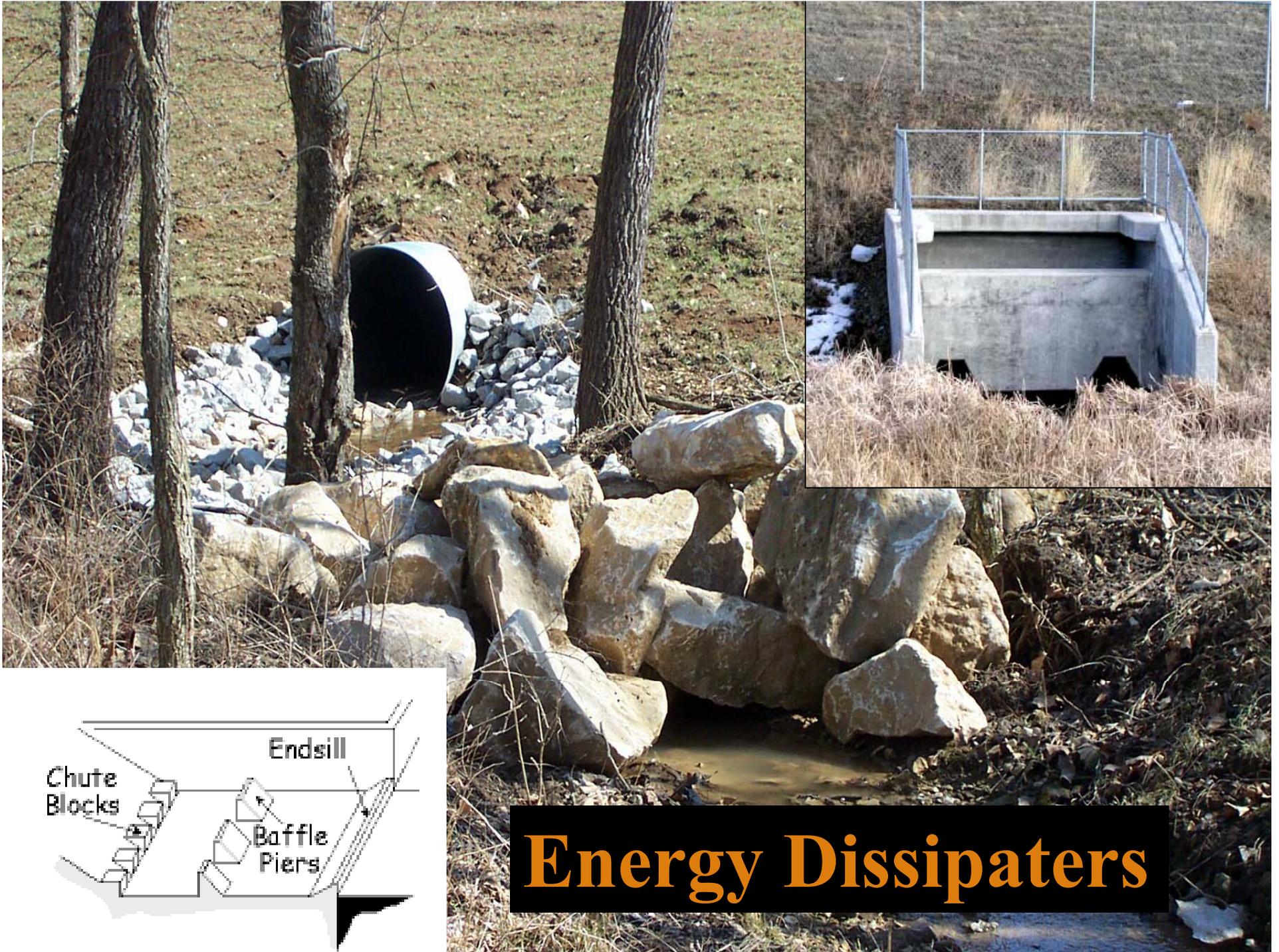
Fiber Reinforced Matrix (FRM), sometimes called **Flexible Growth Medium (FGM)** can be used in place of any of the ECB categories in the SWPPP and can be applied to rougher slopes.



- **FRM** binds to soil and promotes seed germination.



- **FRM** is not for use in drainage channels, only for slope protection.



Energy Dissipaters



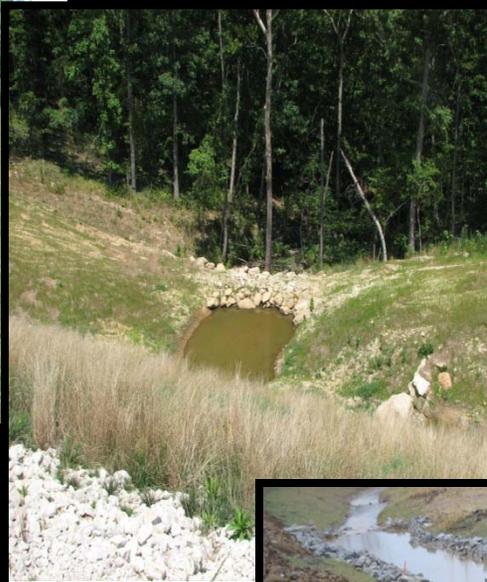
Short Break!

Sediment Control is Secondary

- Sediment control should be your secondary line of defense.
- It is easier to prevent soil particles from moving (**erosion control**) than it is stop them once they start moving (**sediment control**).
- Sediment control typically requires much more monitoring and maintenance than proper erosion control.

Sediment Control

- When you are at war with sediment-contaminated runoff you must first establish a strong **perimeter**.

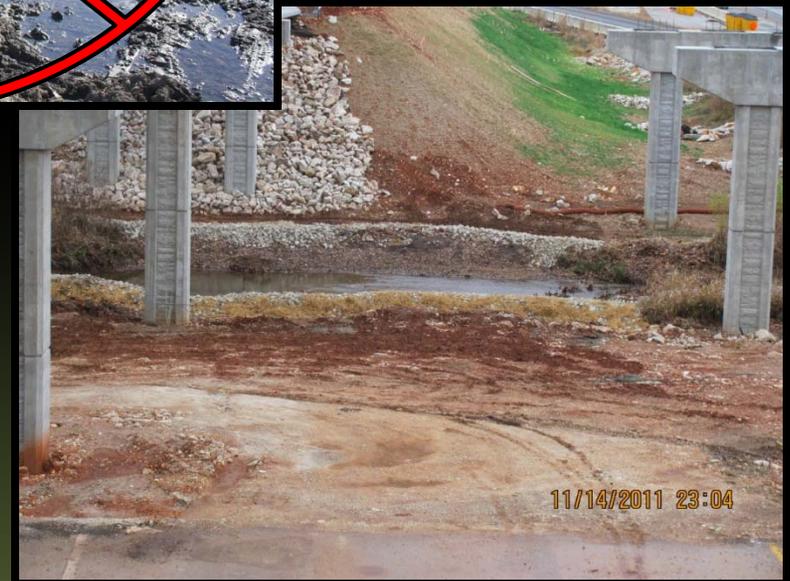


Ensure you have designed and installed the proper protection depending on whether you are fighting sheet or concentrated flows.

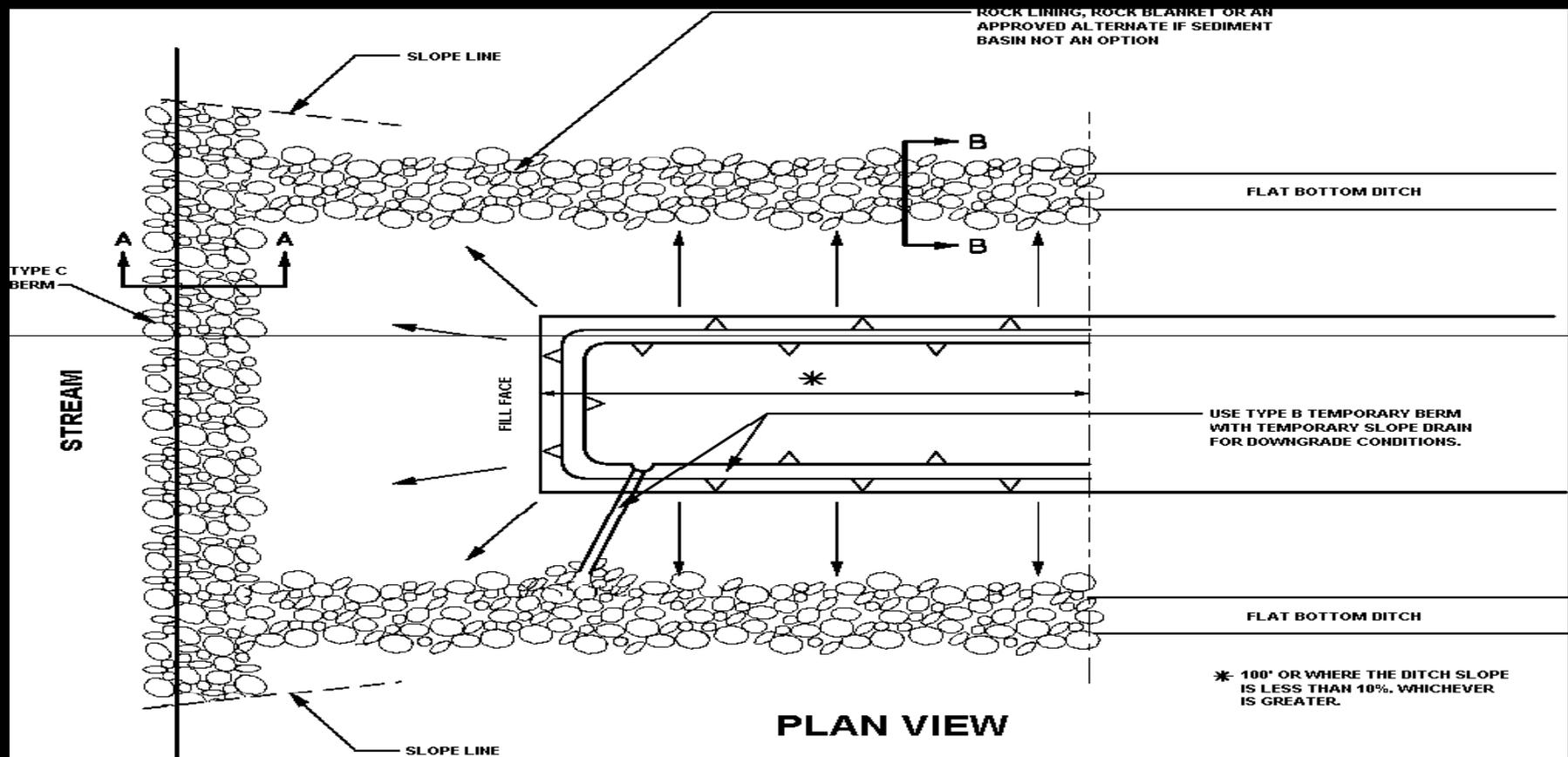


Streams, Ditches, Drainages, etc.

Our primary focus for erosion and sediment control should be holding and capturing sediment **BEFORE** it enters waters of the state

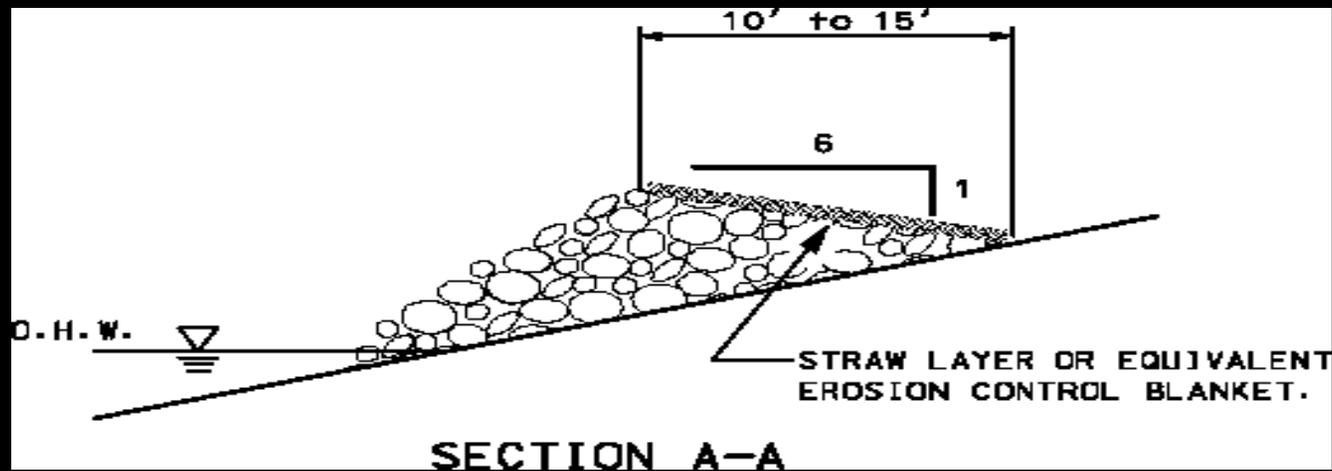


Construction at Streams



1. Type C Berm
2. Rock lined ditch
3. Type B Berm w/ slope drain

Type C Berm



Type C Berm is constructed:

- At top of stream slope
- From ditch backslope to ditch backslope
- Berm across ditches serves as ditch check.
- Straw / filter fabric serves as filter / preserves rock effectiveness
- Contractor activity does not damage

Sediment Basins

- Where practical, sediment basins are required for land disturbance areas ≥ 10 acres disturbed at one time and draining to a common outfall.
- They are required to have a minimum volume of 3600 ft³ per disturbed acre and a stabilized spillway.



Temporary



Permanent

Sediment Traps

- Sediment traps may be constructed of rock or other non-erodible material sufficient to temporarily impound water, or may be a simple excavated pit.



Brush Pile and Sediment Trap Combo

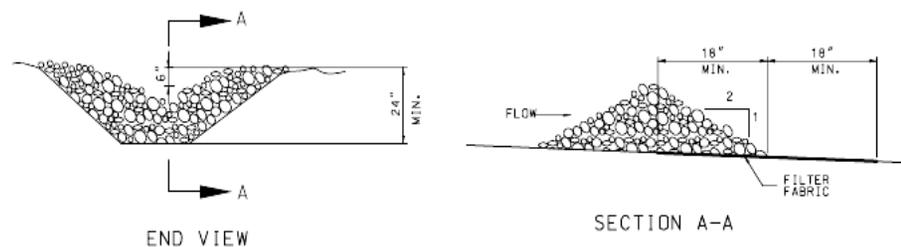
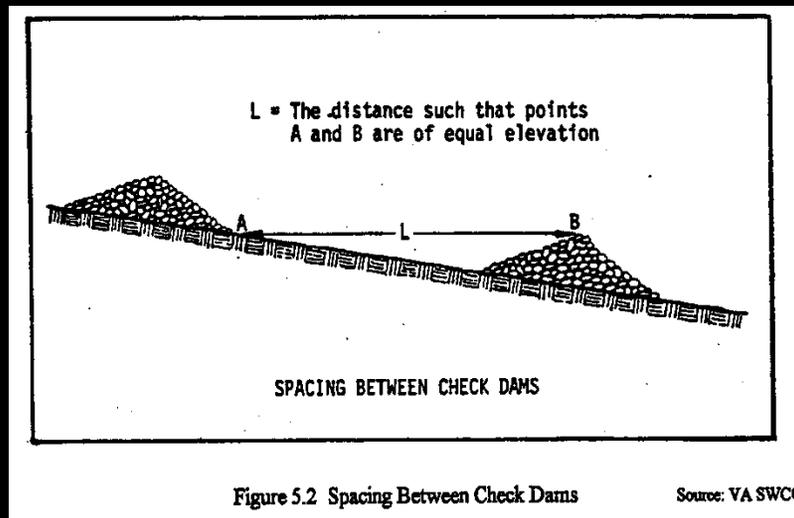


Ditch Checks

- **Most visible items on project**
- **Top to toe installation**
- **Correct distance up slopes**
- **Type I – small flow volumes**
- **Type II – larger flow volumes**

Ditch Checks

- Be Sure to Properly Install Ditch Checks



NOTE:

TYPE II DITCH CHECK IN THE CLEAR ZONE SHALL BE REMOVED AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE OR THE CONCRETE DITCH LINER HAS BEEN CONSTRUCTED.

Ditch Checks

- Common Problem with Improper Installation



Type I Ditch Checks

MoDOT has changed our SWPPP to state that Type I DCs can only be used in drainage areas **1 acre or less** and ditch grades **2% or less**.

(Used to be 3 acres and 10%)



Type I Ditch Checks Geotextile Silt Fence



Evaluate Carefully!



**Type I Ditch Checks
Straw Bales**

**If possible, AVOID
STRAW BALES!
Very limited applications**



**Consider Effective
Height!**



06/25/2010

Type II Ditch Checks

- Used when there are more concentrated flows
- Drainage area ≤ 50 ac.
- Ditch grade $\leq 10\%$
- Large flow volumes
- Examples:
 - Rock
 - Sand Bag
 - Triangular Silt Dike
 - EnviroBerm Porous Sediment Control System
 - GeoRidge
 - Filtrex/Fiber Rolls $> 8''$ in combination with ECB/TRM



Type II Sediment Control Wattles/Socks



NO Type I Ditch Checks @ Project Points of Discharge, i.e., Outfalls



Inappropriate BMP

Outlets = No Silt Fence



BMPs at Project Points of Discharge



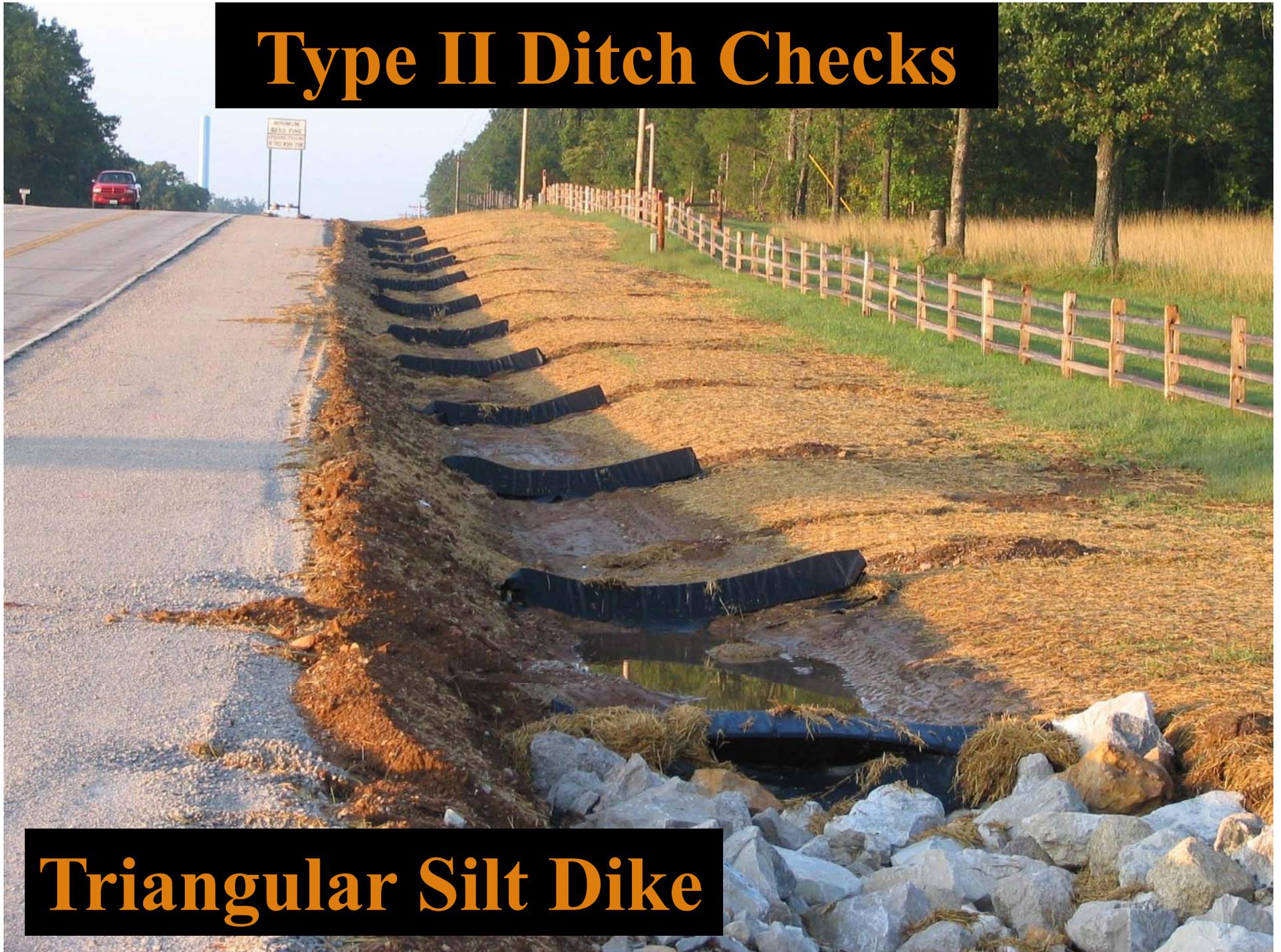
**Large Type II Device or
Sediment Trap/Basin**

Type II Ditch Checks



Rock Ditch Check

Type II Ditch Checks



Triangular Silt Dike

Type II Ditch Checks



Triangular Silt Dike

DISPOSAL



MAINTENANCE

Silt “Fence”

(an esoteric term within MoDOT)

- **Highly visible**
 - **Fabric**
 - **Straw Bales**
 - **Wattle logs/Socks**
 - **Mulch Berms**

- **Designed for sheet flow**

- **Requires wings if being placed down a grade to prevent linear flow erosion**

Silt Fence



Inlet Protection

- Consider clear zone safety!
- Selected BMP must be capable of withstanding concentrated and possibly large volume flows.



Inlet Protection

MoDOT no longer accepts Type I devices as inlet protection unless minimal drainage area and flows are expected at the inlet.



Stormwater Inlet (stand-pipe)



**Temporary measure
during active grading.**

No longer a Standpipe! Now protect with Type II.





ADDITIONAL CONCERNS

Design & Construction Considerations

Concrete Washout Slurry & DGR

Concrete washout and diamond grinding residue needs to be controlled on the job site and should never be allowed to reach surface or groundwater.



Sediment Drop Curtains



They work when applied/installed correctly!



766 ft

Image USDA Farm Service Agency
© 2010 Google

©2010 Google

Imagery Date: Jun 16, 2009

lat 39.712152° lon -92.111874° elev 776 ft

Eye alt 3437 ft

Temporary Stream Crossings

- **Sufficiently culverted** so as to not cause backwater on the upstream side during normal stream flow and should be able to pass a 2-year, 24-hour storm event
- Culverts shall allow for **aquatic life passage** (not perched, but rather placed at or slightly embedded below existing stream grade)
- Within the stream channel, fills shall consist of **clean rock** that is not easily erodible but is easily recoverable (i.e., larger stone, not soil or gravel)

Temporary Stream Crossings

Nope!



7/11/2002 13:41



Closer...



Pretty Much
There



Dam or Ditch Check?

Section 404 “Temporary Impacts”



Permit Jobs

Non-MoDOT – Adjacent Construction

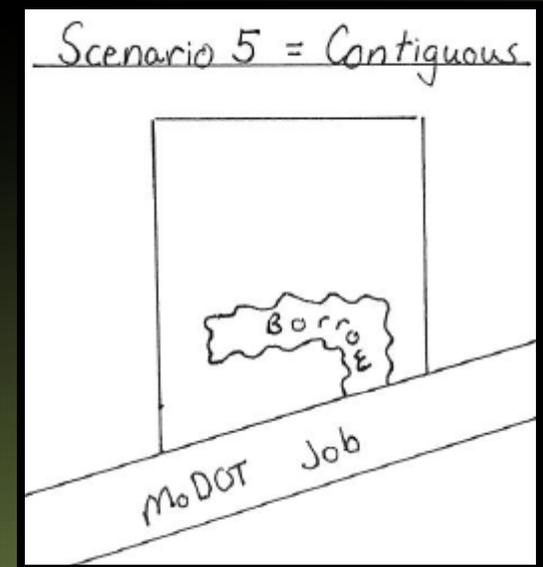
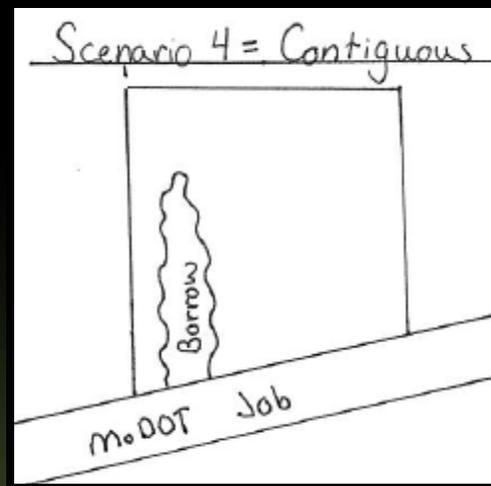
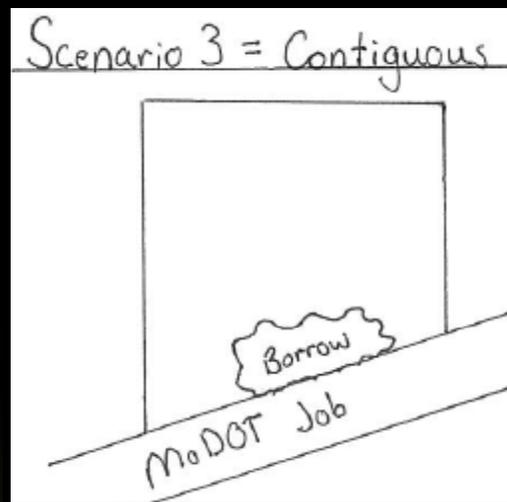
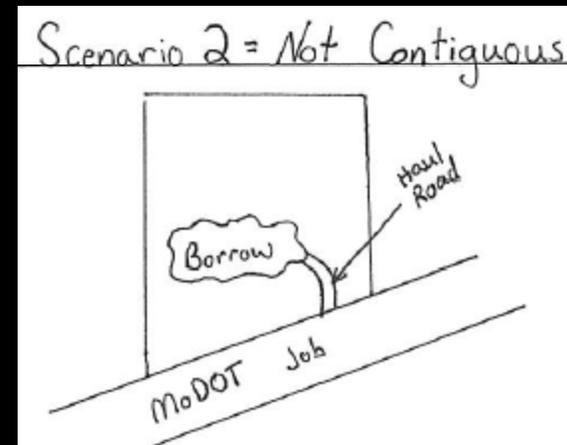
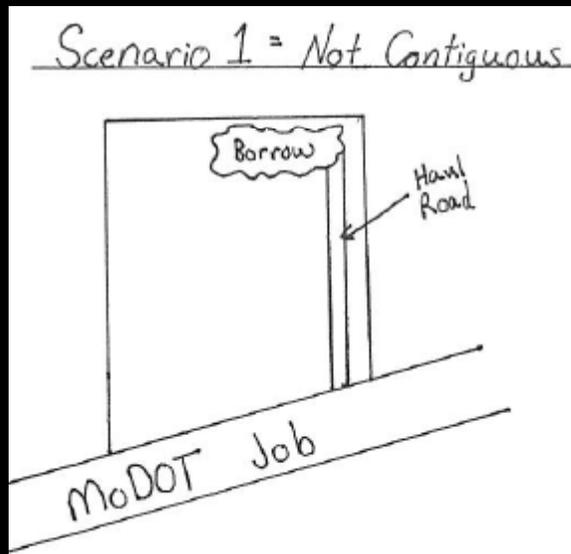
- **If on MoDOT R/W, comply with MoDOT permit/SWPPP.**
- **If touching MoDOT R/W, inquire about sponsor's State Operating Permit.**
- **If local entity has permit, but is not complying to MoDOT standards, inform MNDR???**

What's This Talk About “Contiguous” & What Does It Mean For Our Jobs?

- Contiguous – Being in actual contact with or touching along a boundary or at a point
- Borrow and excess (waste) disposal areas that are **contiguous** with MoDOT ROW can use (piggyback) the MoDOT land disturbance permit and the written SWPPP
- A haul road connecting the two does not meet the definition criteria for contiguous

What's This Talk About "Contiguous"

Applies to either Borrow or Excess (Waste) Areas



2012 Land Disturbance Permits

- **Renew February & May 2012**
- **New Good**
 - **Weekly/post-runoff inspections to only be required during the job's normal working hours – NOT WEEKENDS OR HOLIDAYS**
 - **Laxed the language regarding installation of peripheral and border BMPs during initial site clearing and gaining site access**
 - **Laxed language regarding stormwater inlets to only include those inlets “susceptible to receiving sediment from the LD site”**
 - **Sediment Basins – “Equivalent protection” is performance-based, not volume-based!**
 - **MDNR was proposing to lower the permit limit from 2.5 ml/L/hour to 1.0 ml/L/hour for most waters, but raise it from 0.5 ml/L/hr to 1.0 ml/L/hr for valuable resource waters – NOW ONLY 2.5 ml/L/hr**

Protect Yourself

- **Become Familiar with Your Permit
(Permits Expire/Renew in 2012)**
- **Become Familiar with Your Stormwater Pollution
Prevention Plan (SWPPP)**
- **Show Slopes, Outfalls and BMPs on Erosion
Control Plans (Site Maps)**
- **Update Site Maps as the Project Progresses**
- **Properly Install, Monitor, Maintain, Replace and
Remove BMPs**

QUESTIONS?

