

Monitoring and Evaluation Road Ditch Gully Erosion Demonstration

FY 07 CWA Section 319 Grant
by
City of Harrisburg, Arkansas
Project # FY 07-300

Principal Investigators
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Danny Faulkner, Superintendent
Dennis K. Carman, P.E.

Project Goals/Objectives

■ Demonstrate

- Practicality, cost efficiency, installation procedures, effectiveness
 - Controlling gully erosion along streets and road ditches
 - using a newly developed thermoformed plastic HDPE ditch lining technology
 - that can be installed with commonly available local People and equipment resources.

Primary Tasks

□ Completed

- ✓ Installation of new road ditch lining technology
- ✓ Install a conventional application (ie. Rock)

□ In Progress

- Monitor the stability and effectiveness of both ditch linings (in progress)
- Host field day(s) for adjoining mayors, county judges and maintenance personnel
- Prepare conclusion reports

Gully erosion-

A costly local maintenance issue

A typical 100 foot long eroding road ditch or gully will have voided 40 tons of soil or more directly to the stream system.



Gully Erosion – directly transported to the stream network



Larger Particles deposit upstream



Sands deposit further downstream

Smaller particles, clays move thru major tributaries

Harrisburg problems

Typical for many communities



2' ditch, Dogwood Lane



1' Ditch (deposition) on E. Main

HDPE trapezoidal sized to fit



12" HDPE for portions



12" inadequate for portions



24" section works

Before and After – Upper Dogwood



Before and After – Lower Dogwood



Before and After S. Main



Outlet section



Rock Demonstration



Prevent Erosion and the Resulting Sediment deposition



Instrumentation

Mini-Sat to communicate data

- Antenna
- Solar
- Rainfall
- Temperature
- Circuits
- Depth sensor



Depth sensor to measure and record flows



Outlet and “control”



Profile Pin Meter to measure sediment deposition and erosion



Installation Procedures and Experiences

- Danny Faulkner
 - Superintendent
 - City of Harrisburg, Arkansas

Shaping prior to installation



Excavation Removed



HDPE Lining sections connected while shaping is completed



Sealer installed between sections



Sections Connected with screws



Battery Power to connect sections



5 – 9' sections (45 feet) connected



5 – 9' sections (45 feet) moved to lining location



45' Placed in the shaped ditch



And aligned



Installation at Culvert



Impact Hammer to drive anchors



Anchors, cable and tie



Level the sides



The tools used



- Backhoe
- Level
- Power Drill
- Electric hammer drill
- Driving rod for anchors
- Manual “post driver”

Finished



Culvert – a good place to start



HDPE Before and After



Finished Section with sod



HDPE fits where other solutions do not

***note water line location



Finished Rock Demonstration



Culvert fitting - Upstream



Culvert fitting - downstream



Lower Dogwood Before and After



Lower Dogwood- Finished



Lower Dogwood during installation



Installation complete and shaped



Lower Dogwood Flowing Before and After



Upper Dogwood Flowing Before and After



S Main Street Installation



During Installation



HDPE Conclusions

- a viable alternative
- Fits in locations where other alternatives will not work
- Can be installed with city personnel and equipment
- Life expectance more than 20 years
- Will safely carry more flow on steeper grades
- Rock is less expensive for initial installation
- Rock can normally be installed using equipment and less labor
- Labor requirement for backfilling of HDPE is an issue

Cost of materials

- 12" HDPE trapezoidal \$32.00
- 24" HDPE trapezoidal \$40.00

- 12" comes in 9' sections
- 24" comes in 8' sections

- Technical Materials and Design Aides Available

Contact Information

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Thank You!