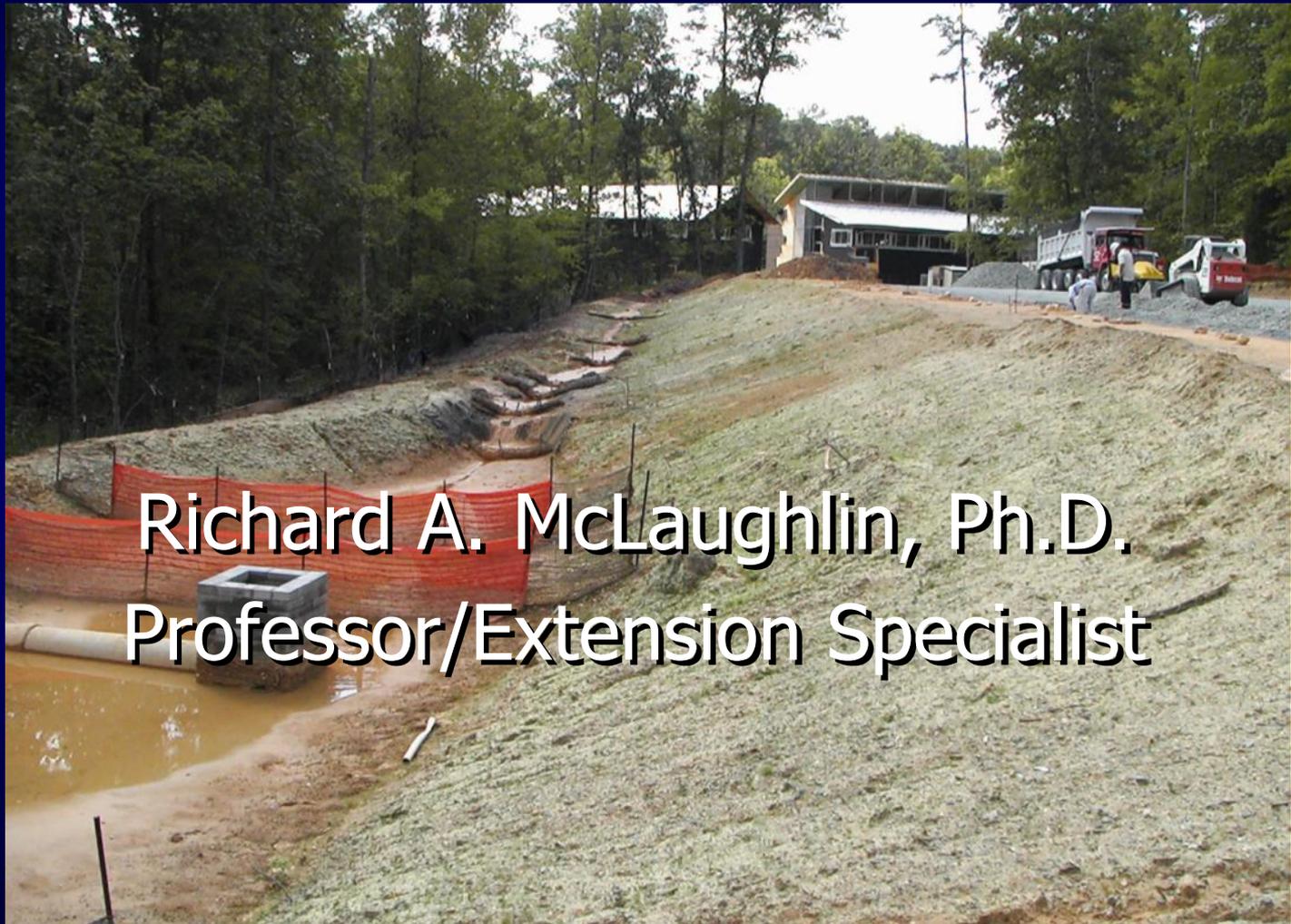


# Turbidity and Dust Control Research



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# International Conference in Raleigh Next February!

The image shows a screenshot of the IECA website. At the top left is the IECA logo with the tagline "International Erosion Control Association REGION ONE Protecting Soil and Water Resources". To the right are navigation links: "Sign In | Create Account | Cart | About IECA" followed by social media icons for Facebook, Twitter, and LinkedIn. Further right are "Join IECA" and a search icon. Below this is a horizontal menu with "Membership", "Education", "Events", "Get Involved", "Resources", and "Corporate Partnership". The main banner features a green background with a globe on the left and the text "Join Peers at the 2020 IECA Annual Conference February 23-26, 2020 | Raleigh, NC" in blue and white. The IECA logo is repeated in the bottom right of the banner. Below the banner, the text reads: "2020 IECA Annual Conference and Expo February, 23-26, 2020 | Raleigh Convention Center | Raleigh, North Carolina The IECA Annual Conference and Expo brings together the industry's most innovative minds in the erosion and sediment control and storm water".

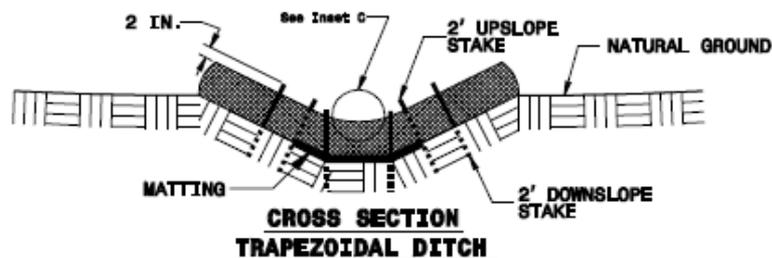
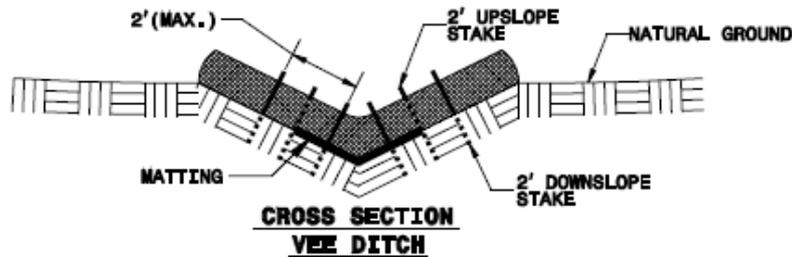
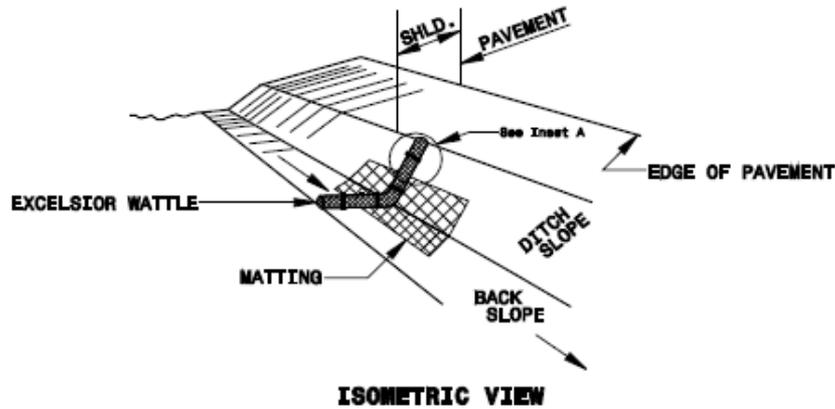
# Approach

Passive dosing is any system that relies on gravity flow in a conveyance to achieve flocculation.

- Check dams with dry granular polymer
- Other granular polymer uses
- Polymer logs or socks (in pipes and other structures)

**Remember, polymer-treated water needs to be settled or filtered prior to discharge!**

# Wattle with Polyacrylamide (PAM)



**NOTES:**

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTIONED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT TO WEDGE WATTLE TO BOTTOM OF DITCH.

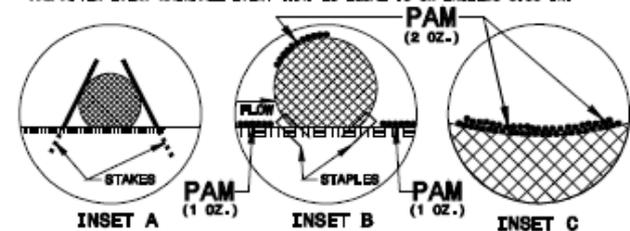
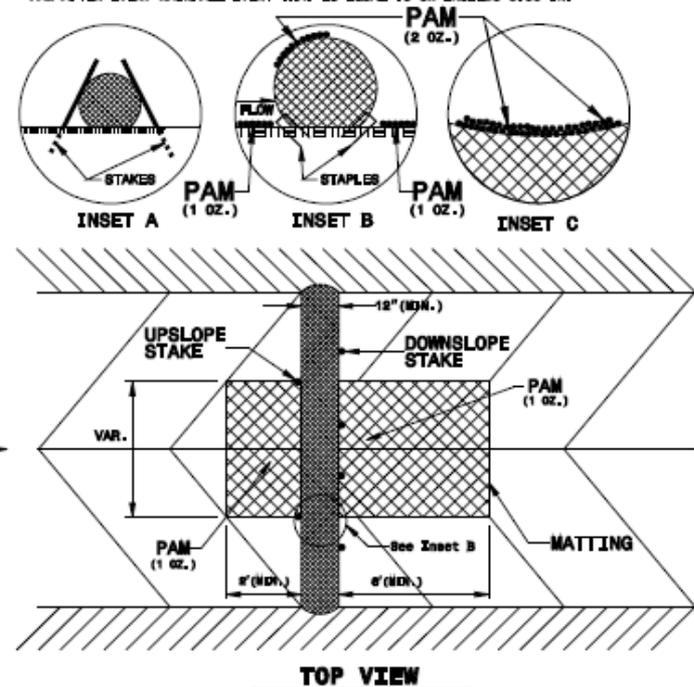
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1691 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OPPOSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.60 IN.



# Installation Guide



**Is there a gap at the upturned edge of the wattle?**



**Weave wire staples through mesh at an angle to the wattle-space every 1 ft.**



**Fill gaps with excess fabric**

# Check Dam Pooling



# Simple Check Dams



# Can use materials on hand...



**Sprinkle 100 grams (1/2 cup) of PAM 705 on the lower, center portion of the wattle where water is going to flow over.**



**A thin, wide band is ideal**

**Must replace with new PAM every so often as the weather dictates  
Maintenance is always important!**



# Examples of Poor Installation



# Very good results most of the time!

Sediment Discharge per Storm:

Standard 4,198

Fiber dams + PAM 30

Fiber dams only 187

937 lbs

2 lbs

5 lbs

**Site 1**

Standard 852

Fiber dams + PAM 64

9 lbs

2 lbs

**Site 2**

# Cost Estimate Comparison

## Site 1:

<b>450' Standard section</b>	<b>\$1.98 / foot</b>
<b>668' Fiber check dams + PAM</b>	<b>\$1.32 / foot</b>
<b>461' Fiber check dams only</b>	<b>\$1.70 / foot (spacing closer)</b>

## Site 2:

<b>508' Standard section</b>	<b>\$1.75 / foot</b>
<b>489' Fiber check dams + PAM</b>	<b>\$1.63 / foot</b>

**The logs and wattles do not have to be removed either, they can decompose in place.**

# Flume Testing of Check Dams

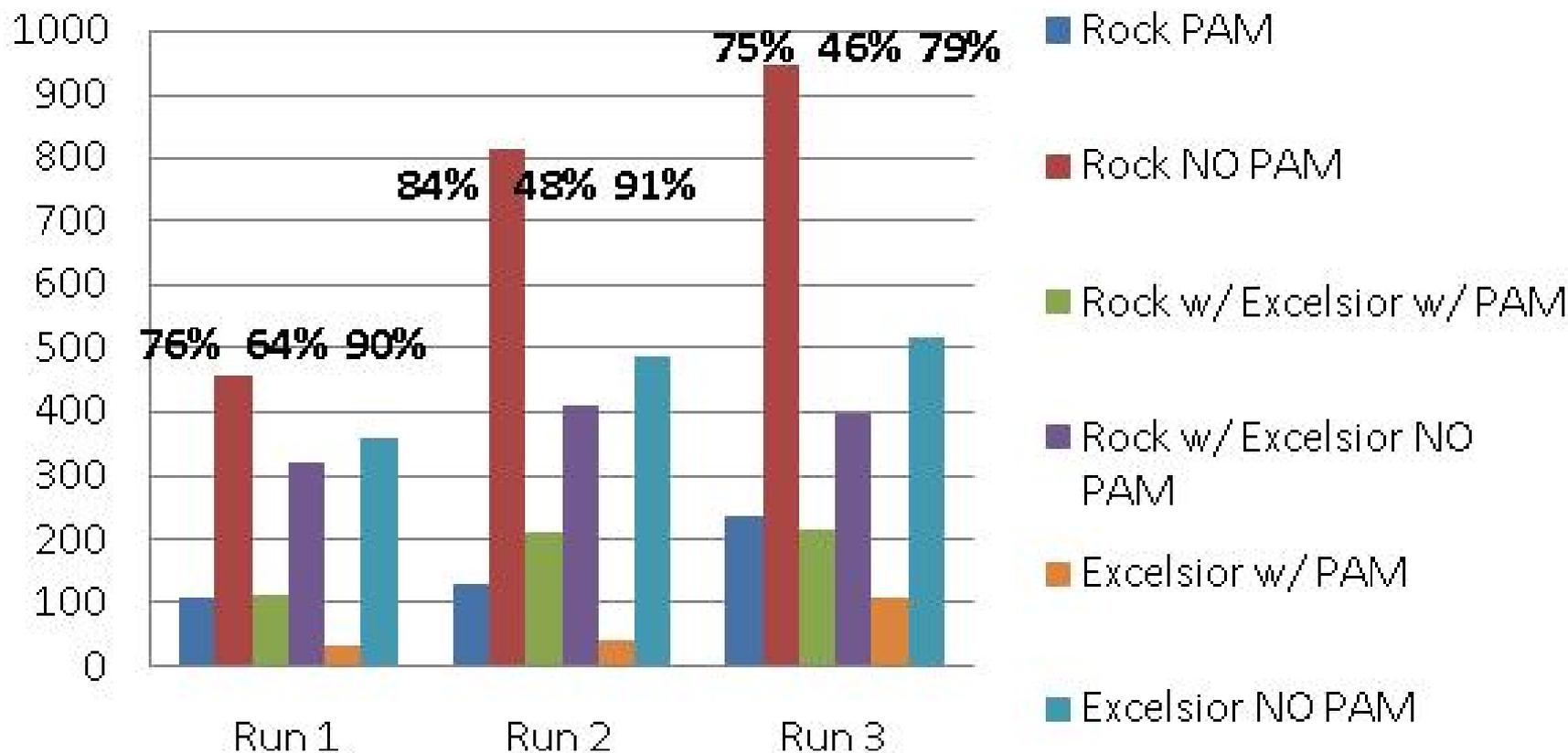


Storms simulated and water samples collected:

- 4 minutes at 0.5, 1.0, 2.0, 1.0, and 0.5 cfs
- Soil added at 6,000 mg/L
- 4 samples were collected in each bottle, 5 bottles total
- 3 consecutive "storms" run
- Sediment depth and length was measured and a LIDAR scan was taken

# Check Dams w/ PAM: Turbidity

## Turbidity Reduction w/ PAM



# Need a Ditch or Swale for the Wattles!



# New Alternative: Compressed Berm



# Passive Treatment #2: Rock+Fabric

- Modified Type A Silt Check with addition of excelsior (or coir) matting on top of Sediment Control Stone



- Sprinkle lower, center portion of fabric lined weir with 4 oz ( $\frac{1}{2}$  cup) of PAM-705
- Reapply PAM after 0.5 inch rainfall or greater

# Channel into Corrugated Pipe



Pipe provides extra mixing, protects polymer

# Other Passive Approaches using Granular PAM



PAM sprinkled on coir baffle in basin (maybe)



PAM sprinkled on erosion control matting down a slope

# Solid PAM Blocks (Floc Logs™)

\$~125  
per  
block

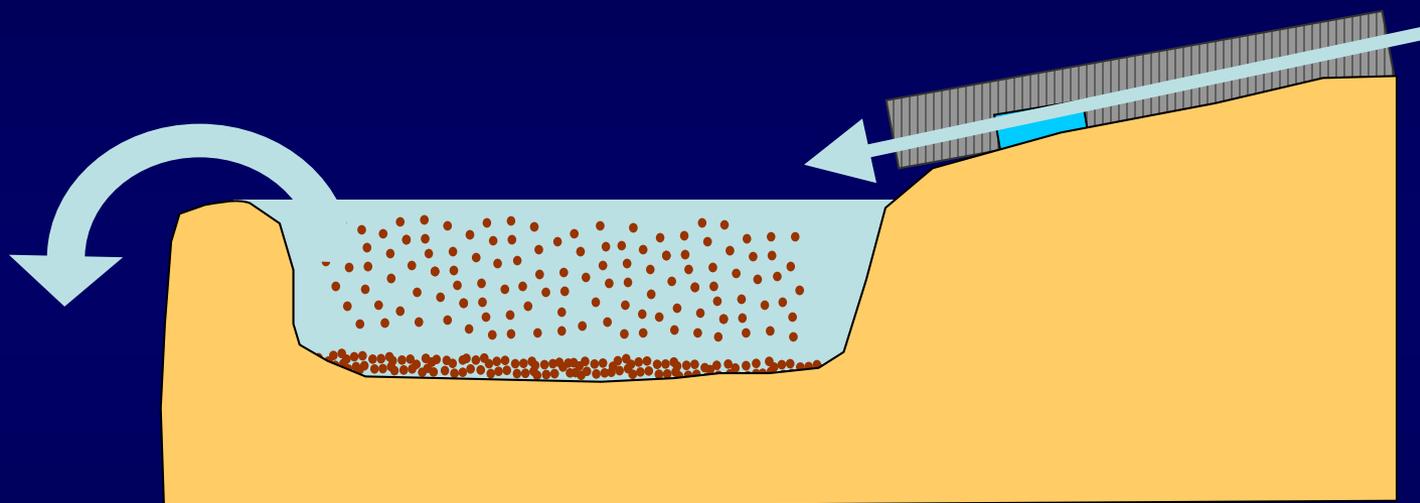


# Find the Floc Logs!

Too much sediment = Logs don't work



# Place PAM logs inside pipes



Discharge into basin/trap  
before discharging off  
site!

# Two Chamber Basin Design



**100-200 NTU discharge here**

**4,000 – 5,000 NTU elsewhere**

DEPARTMENT OF CROP AND  
SOIL SCIENCES

# Pipes w/ Logs in Ditches



Basins below had very clear water



# PAM Bucket?



# Drop Inlets – Another Good Option for PAM Logs



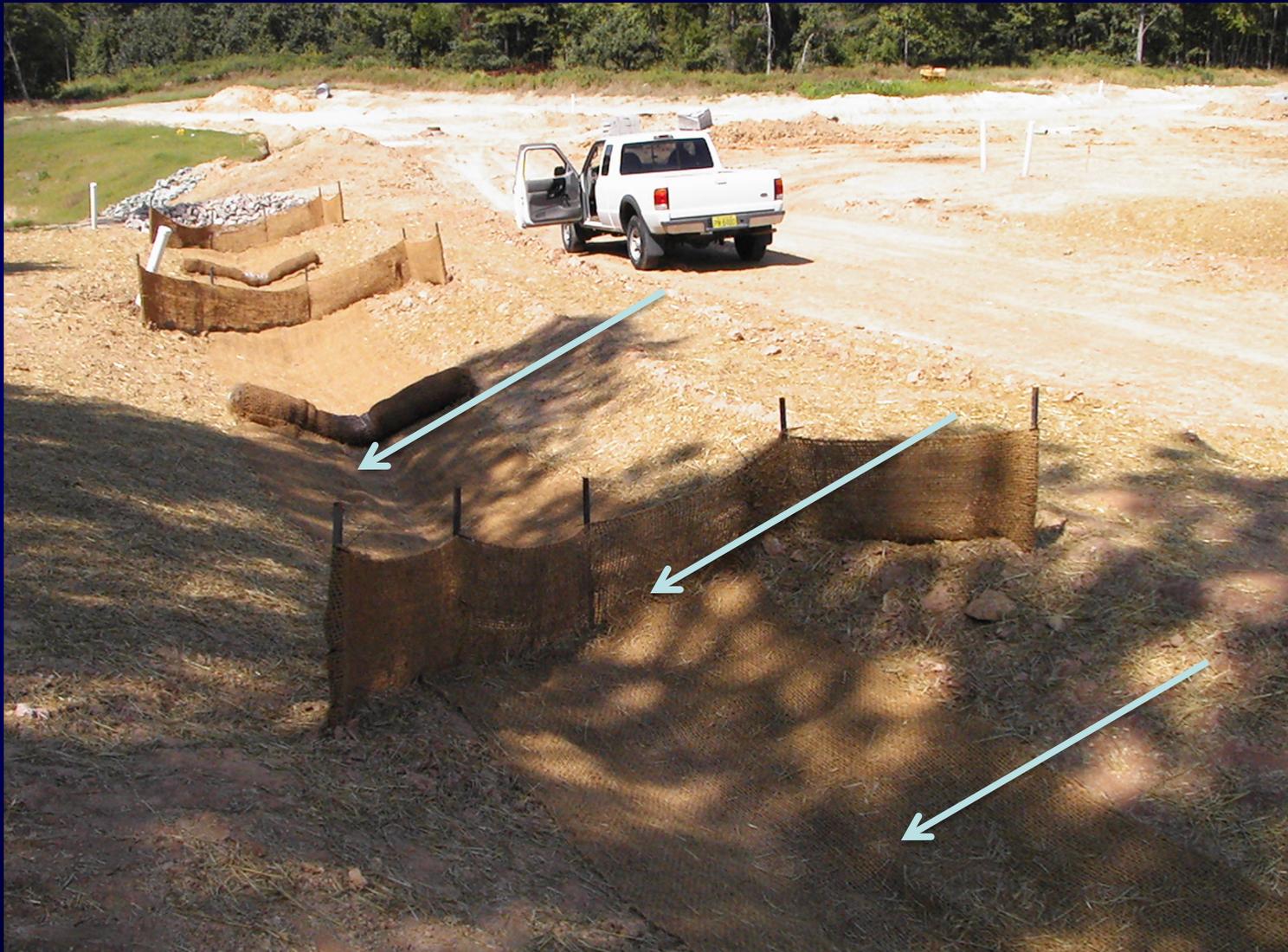
# Keys to Making PTS Work for You

- Match flocculant to your soil or suspended sediment and water chemistry.
- Reduce sediment load prior to flocculant treatment.
- Keep the flocculant moist.
- Create high flow onto flocculant.
- Create high mixing (turbulence) after flocculant.
- Allow for settling post-treatment.

# Ideal Passive Treatment Zone!



# Innovative Treatment



# Dust Control on Construction Sites



# Dust Collectors



# Truck Traffic – 20 Runs x 3

- Road divided into 4 sections, 2 samplers each
- Control (nothing), water, sodium chloride\*, and polyvinyl acetate applied



\*Supposed to be calcium chloride – both had same product name.

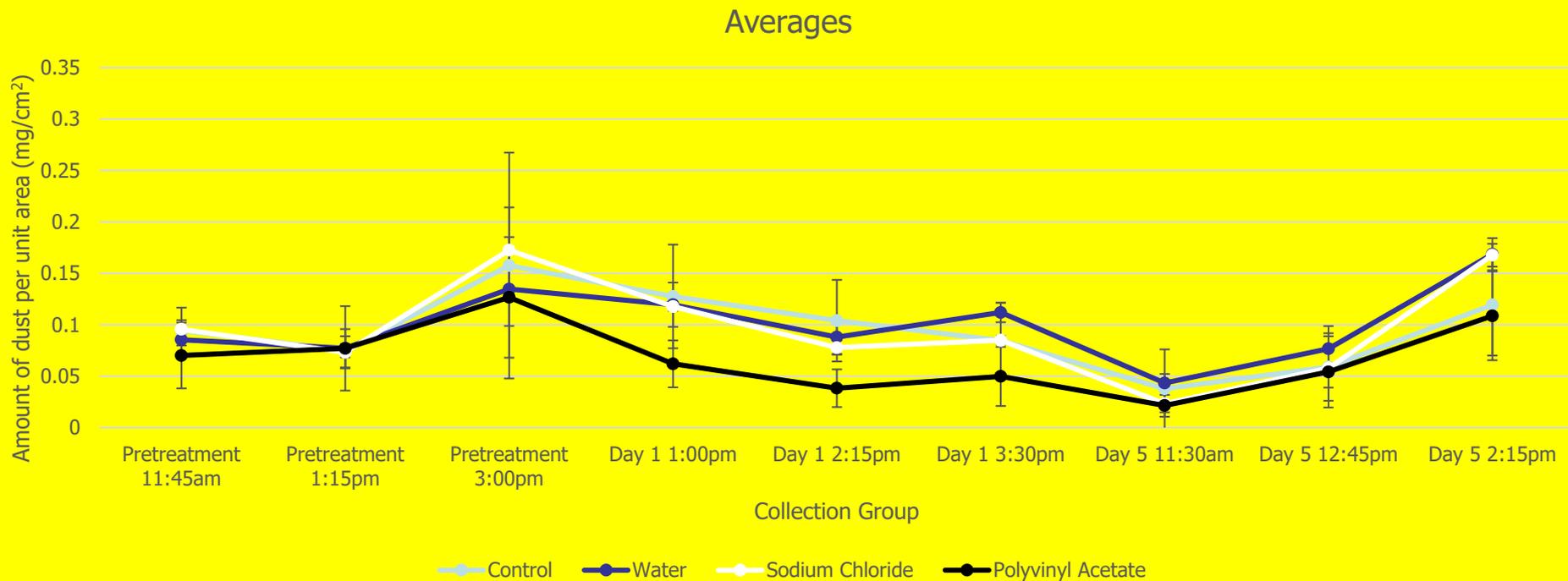
# Dust Collection

Funnel and paint can rinsed into bottle, rinsate was filtered in the lab to collect dust.



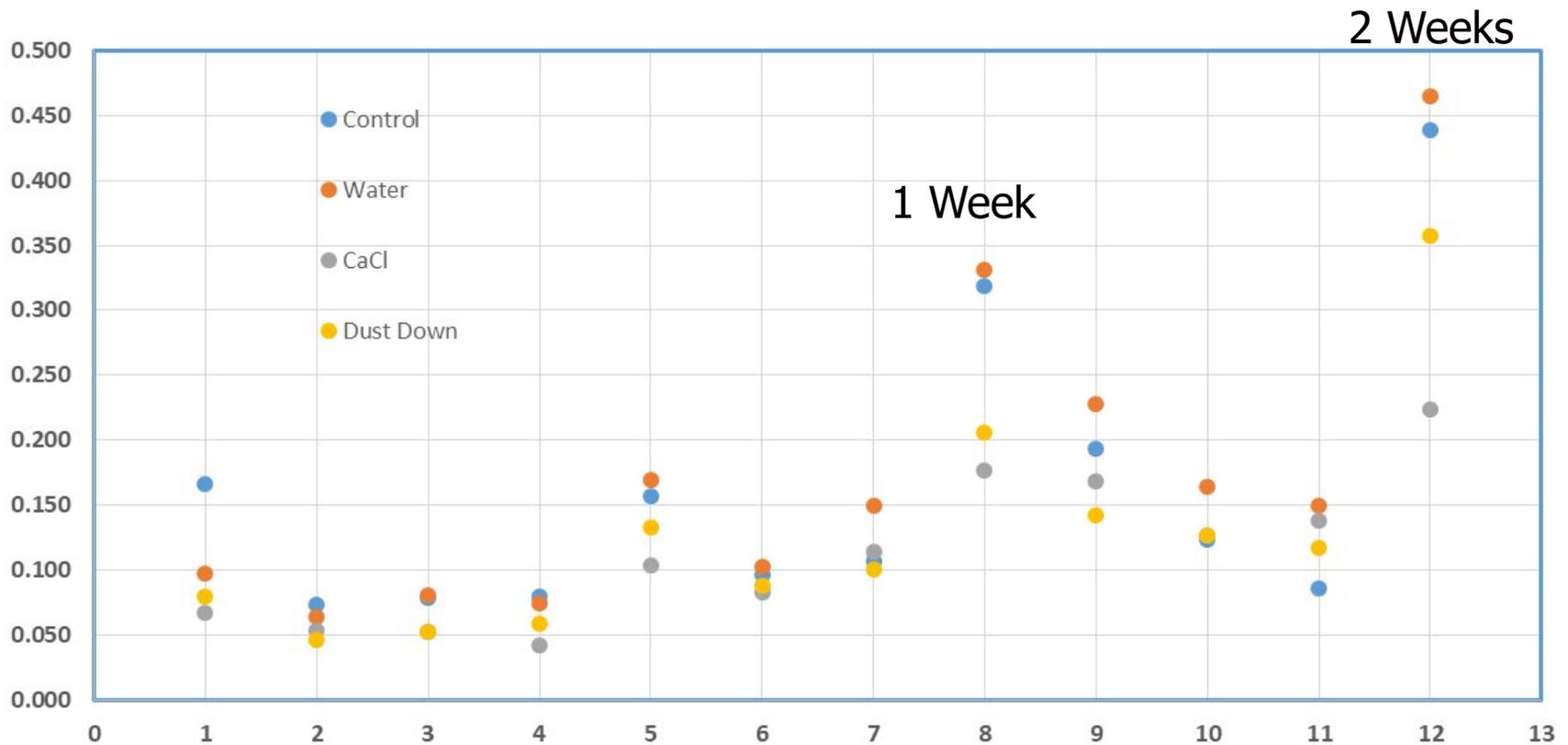
# Test 1: 5 Day Test

- Polyvinyl acetate appeared to best on first day after application, no effect day 5.



# Test 2: Two Week Test

Dust Collected (mg/cm<sup>2</sup>)



# Preliminary Dust Control Results

- Water effect disappears very quickly
- Polyvinyl acetate and calcium chloride appeared to have an effect.
- Cost Estimates: for ¼ mile, 20' wide
  - Polyvinyl acetate (Dust Down): \$2,000
  - Calcium Chloride (Sno Jo Melt): \$1,000
- Effect of heavy truck traffic not tested yet.

# Remote Sampling



# The Construction Site Dream

- Virtually no exposed soil during rain events
- Lined ditches, plenty of check dams with polyacrylamide
- Sediment basins with inlet protection, baffles, stable sides, surface outlet
- Inspectors, contractors, owners working together!

...and all our streams run clear!



# Questions?

