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GEOSTORM

Hanson HEIDELBERGCEMENT Group Hanson Pipe & Precast

RM CONSTRUCTION

GEMS

Minotaur stormwater services limited

PICKSEED good things growing...

NILEX CIVIL ENVIRONMENTAL GROUP Unearthing better results.

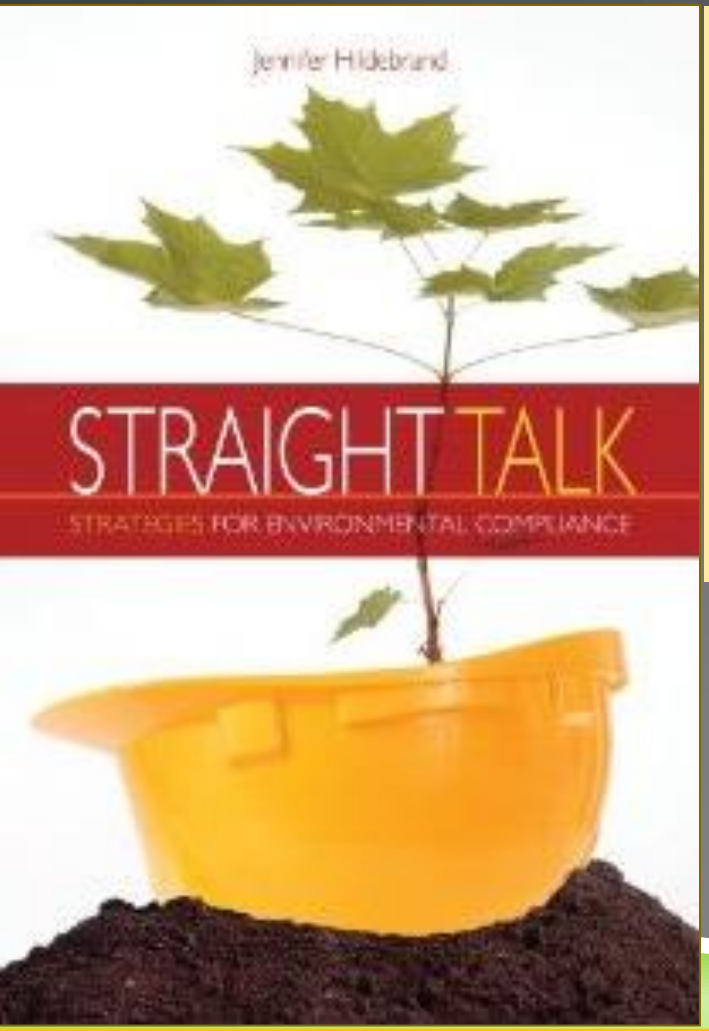
DYNEX CONSTRUCTION INC Since 1989

CVC a Leader for CleanWater

York Region

Media Partner

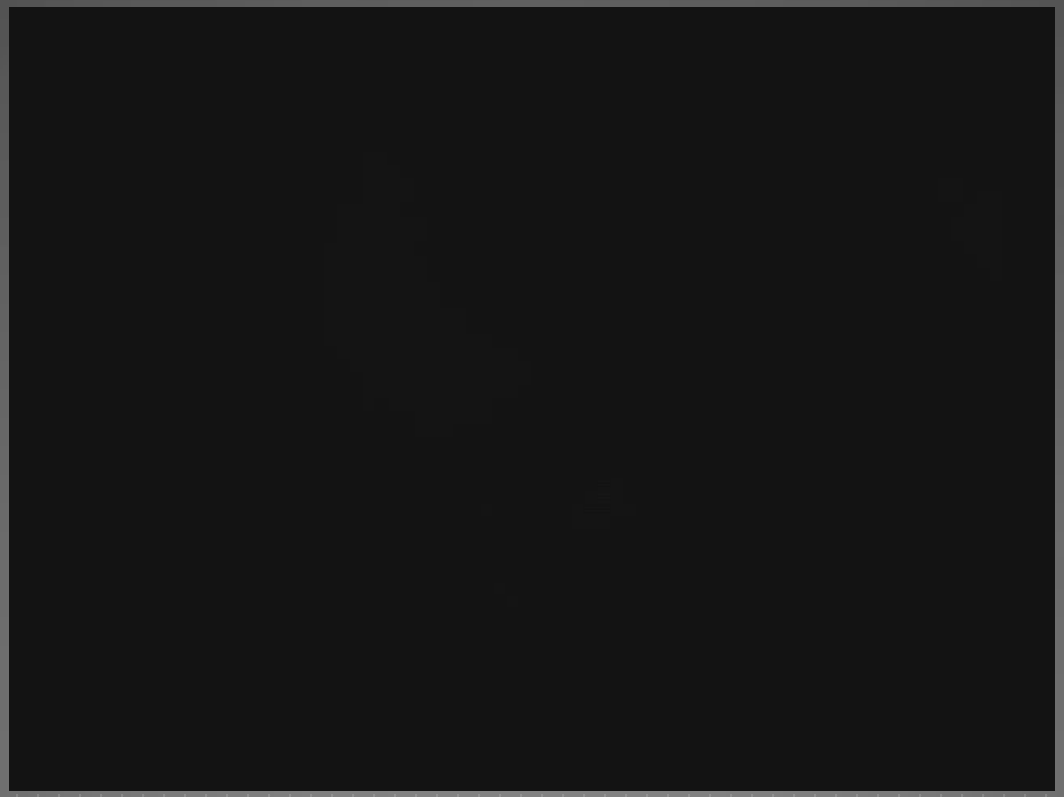
WATER CANADA THE COMPLETE WATER MAGAZINE



10 Steps to Construction Site Compliance

Jennifer Hildebrand
WSB & Associates, Inc.

STORMWATER REGULATIONS…



WHEN DID THIS START?

1970's

NPDES focused on **POINT** source pollution. These included things like….

- **Factories**
- **Wastewater Treatment Facilities**
- **Power Plant Cooling**

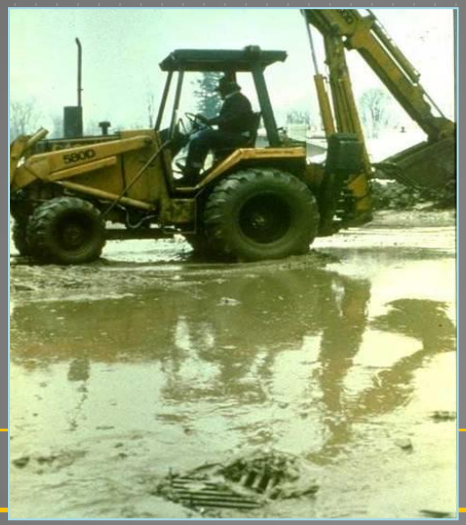
WHEN DID THIS START?

1980's

- NPDES focused on NON POINT Source Pollution
  - Construction Sites
  - MS4's (Municipal Separate Storm Sewer Systems)
  - Industrial Permits (SIC codes and outdoor runoff)

MS4's

Construction Sites

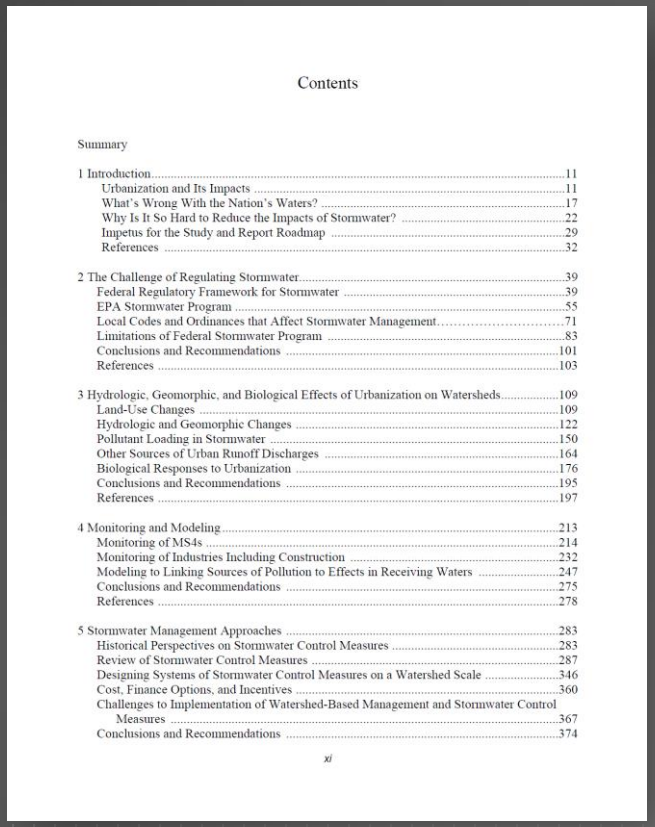


Industrial

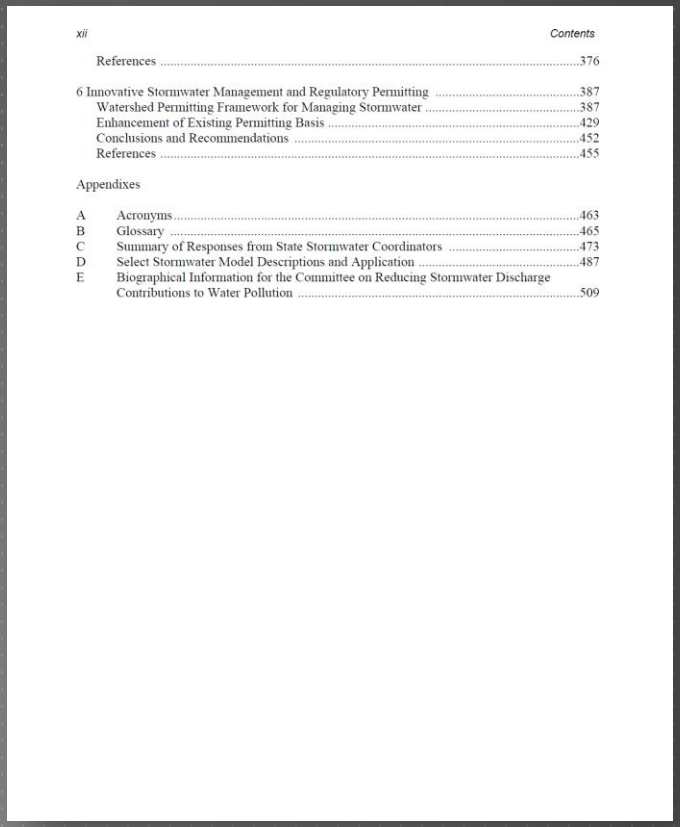
IMPORTANT SECTIONS OF CWA

- Section 303 – establishes water quality standards
- Section 401 – regulates water quality impacts and state certification programs
- Section 402 – establishes National Pollutant Discharge Elimination System (NPDES)
- Section 404 – regulates impacts to waters of the U.S.

URBAN STORMWATER MANAGEMENT IN THE UNITED STATES



Contents



www.epa.gov/npdes/pubs/nrc_stormwaterreport.pdf

Stormwater runoff from the built environment remains one of the great challenges of modern water pollution control, as this source of contamination is a principal contributor to water quality impairment of waterbodies nationwide. In addition to entrainment of chemical and microbial contaminants as stormwater runs over roads, rooftops, and compacted land, stormwater discharge poses a physical hazard to aquatic habitats and stream function, owing to the increase in water velocity and volume that inevitably result on a watershed scale as many individually managed sources are combined. Given the shift of the world's population to urban settings, and that this trend is expected to be accompanied by continued wholesale landscape alteration to accommodate population increases, the magnitude of the stormwater problem is only expected to grow.

Source: Urban Stormwater Management in the United States; October 2008, National Resource Council

THE RESEARCH IS DONE, NOW THE RULES ARE BEING WRITTEN

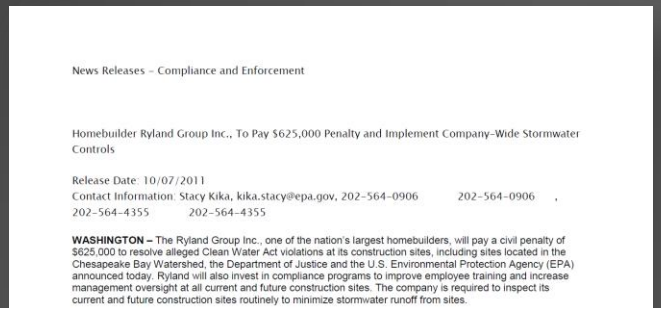
The deadline to propose the stormwater rules has been extended to December 2011. EPA intends to take final action by November 2015.

Source:
http://cfpub.epa.gov/npdes/stormwater/rulemaking/stakeholder.cfm

WIIFM?

Compliance is a choice, you can choose to comply profitably OR you can choose to risk an enforcement action…

$625,000 PENALTY – RYLAND HOMES

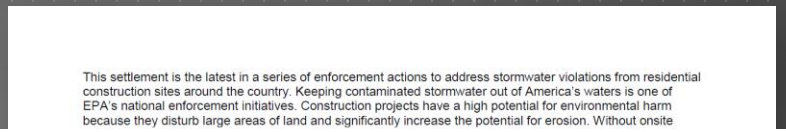


News Releases – Compliance and Enforcement

Homebuilder Ryland Group Inc., To Pay $625,000 Penalty and Implement Company-Wide Stormwater Controls

Release Date: 10/07/2011
Contact Information: Stacy Kika, kika.stacy@epa.gov, 202-564-0906 202-564-0906 , 202-564-4355 202-564-4355

WASHINGTON – The Ryland Group Inc., one of the nation's largest homebuilders, will pay a civil penalty of $625,000 to resolve alleged Clean Water Act violations at its construction sites, including sites located in the Chesapeake Bay Watershed, the Department of Justice and the U.S. Environmental Protection Agency (EPA) announced today. Ryland will also invest in compliance programs to improve employee training and increase management oversight at all current and future construction sites. The company is required to inspect its current and future construction sites routinely to minimize stormwater runoff from sites.

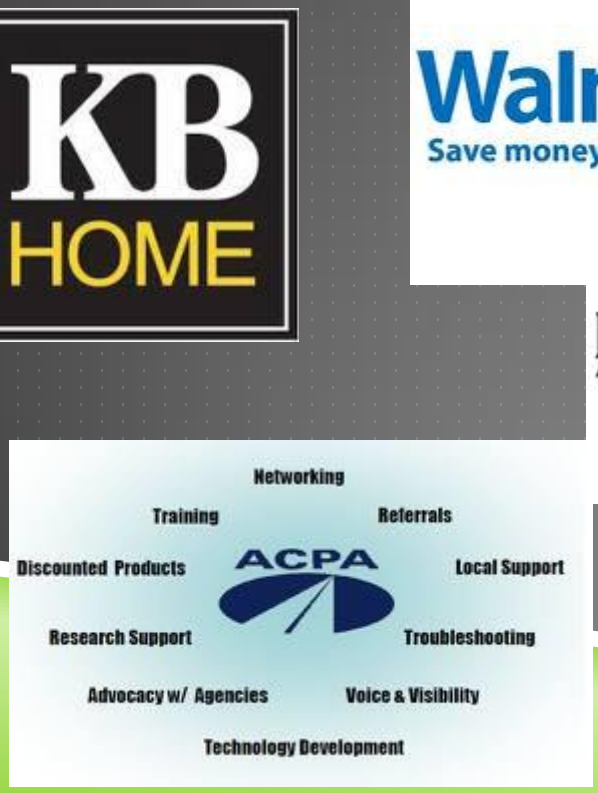


This settlement is the latest in a series of enforcement actions to address stormwater violations from residential construction sites around the country. Keeping contaminated stormwater out of America's waters is one of EPA's national enforcement initiatives. Construction projects have a high potential for environmental harm because they disturb large areas of land and significantly increase the potential for erosion. Without onsite

This settlement is the latest in a series of enforcement actions to address stormwater violations from residential construction sites around the country. Keeping contaminated stormwater out of America's waters is one of EPA's national enforcement initiatives. Construction projects have a high potential for environmental harm because they disturb large areas of land and significantly increase the potential for erosion. Without onsite pollution controls, sediment-laden runoff from construction sites can flow directly to the nearest waterway and degrade water quality. In addition, stormwater can pick up other pollutants, including concrete washout, paint, used oil, solvents and trash. Polluted runoff can harm or kill fish and wildlife, degrade aquatic habitats and affect drinking water quality.

MYTH OR FACT?

EPA has addressed the ***top 10*** companies that build homes, the ***top 6*** retail companies that build big box stores, and ***10%*** of the companies that manufacture ready mix concrete and/or sand, gravel, or crushed stone, for compliance with stormwater permits.



ENFORCEMENT…

SOME INTERESTING STATISTICS

- 19000 CFO's (Concentrated Feeding Operations)
- 89000 Industrial Stormwater
- 200,000 Construction Stormwater Sources

MYTH OR FACT?

Fiscal Year (FY)	Estimated Pollutants to be Reduced or Treated (lbs)*	Estimated Investments in Pollution Control ($)**	Civil Penalties ($)***
2008	1,300 million	$69 million	$7.7 million
2009	200 million	$59 million	$4.9 million
2010	660 million	$99 million	$7.4 million

In 2010, there have been over ***$7.4 million dollars*** of issued nationally with direct connection to violations of the Clean Water Act.

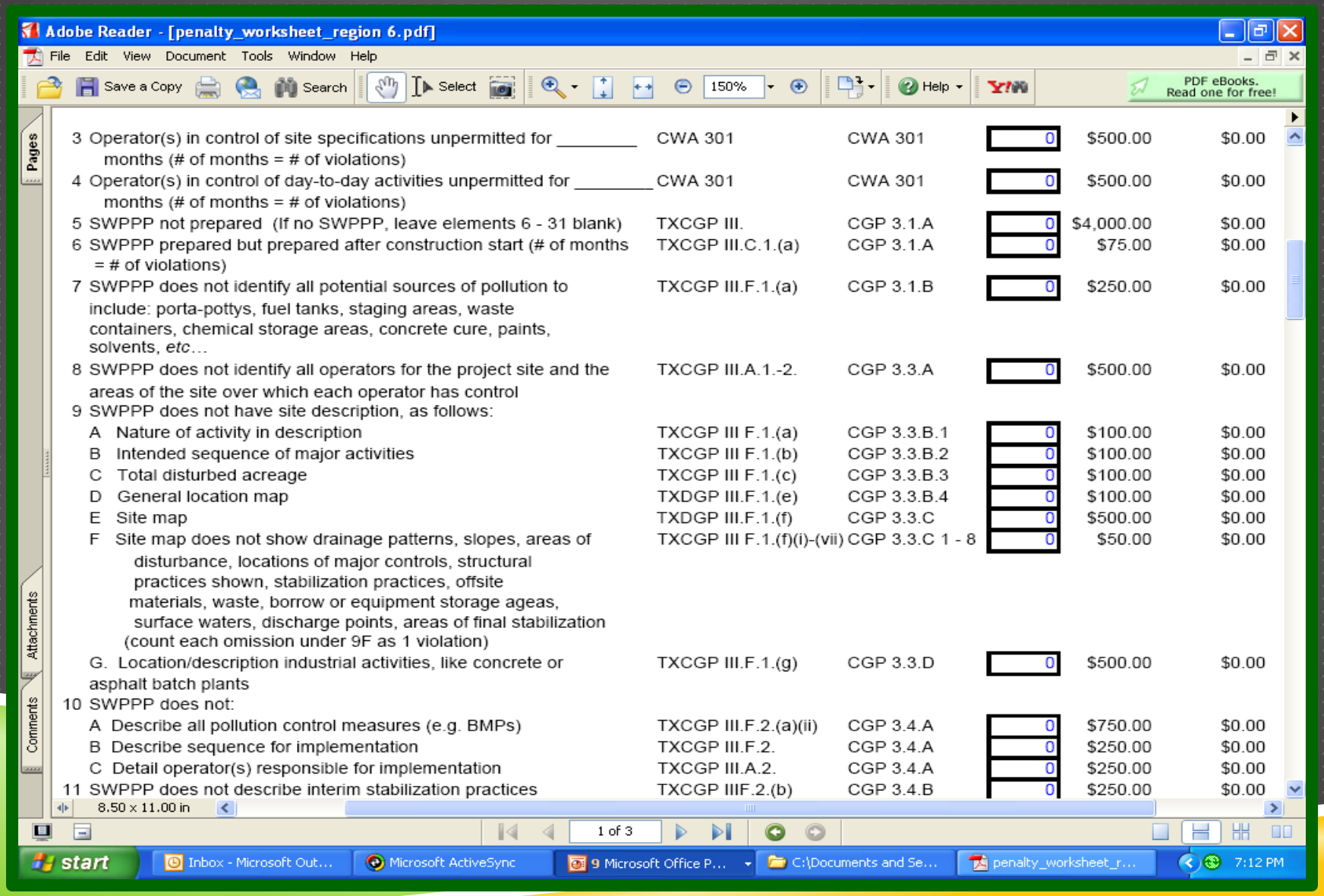
ENFORCEMENT AND PENALTIES

- U.S. EPA has three types of enforcement:
  - Administrative orders
  - Civil actions
  - Criminal prosecutions

ADMINISTRATIVE ORDERS

- U.S. EPA can impose fines and penalties without court action
- Maximum is $11,000 per day with a maximum of $137,500
- Fine must consider nature of violation, circumstances, prior history, etc

ESO WORKSHEETS…..



3 Operator(s) in control of site specifications unpermitted for _____ months (# of months = # of violations)	CWA 301	CWA 301	0	$500.00	$0.00
4 Operator(s) in control of day-to-day activities unpermitted for _____ months (# of months = # of violations)	CWA 301	CWA 301	0	$500.00	$0.00
5 SWPPP not prepared (If no SWPPP, leave elements 6 - 31 blank)	TXCGP III.	CGP 3.1.A	0	$4,000.00	$0.00
6 SWPPP prepared but prepared after construction start (# of months = # of violations)	TXCGP III.C.1.(a)	CGP 3.1.A	0	$75.00	$0.00
7 SWPPP does not identify all potential sources of pollution to include: porta-pottys, fuel tanks, staging areas, waste containers, chemical storage areas, concrete cure, paints, solvents, *etc*…	TXCGP III.F.1.(a)	CGP 3.1.B	0	$250.00	$0.00
8 SWPPP does not identify all operators for the project site and the areas of the site over which each operator has control	TXCGP III.A.1.-2.	CGP 3.3.A	0	$500.00	$0.00
9 SWPPP does not have site description, as follows:					
A Nature of activity in description	TXCGP III F.1.(a)	CGP 3.3.B.1	0	$100.00	$0.00
B Intended sequence of major activities	TXCGP III F.1.(b)	CGP 3.3.B.2	0	$100.00	$0.00
C Total disturbed acreage	TXCGP III F.1.(c)	CGP 3.3.B.3	0	$100.00	$0.00
D General location map	TXDGP III.F.1.(e)	CGP 3.3.B.4	0	$100.00	$0.00
E Site map	TXDGP III.F.1.(f)	CGP 3.3.C	0	$500.00	$0.00
F Site map does not show drainage patterns, slopes, areas of disturbance, locations of major controls, structural practices shown, stabilization practices, offsite materials, waste, borrow or equipment storage ageas, surface waters, discharge points, areas of final stabilization (count each omission under 9F as 1 violation)	TXCGP III F.1.(f)(i)-(vii)	CGP 3.3.C 1 - 8	0	$50.00	$0.00
G. Location/description industrial activities, like concrete or asphalt batch plants	TXCGP III.F.1.(g)	CGP 3.3.D	0	$500.00	$0.00
10 SWPPP does not:					
A Describe all pollution control measures (e.g. BMPs)	TXCGP III.F.2.(a)(ii)	CGP 3.4.A	0	$750.00	$0.00
B Describe sequence for implementation	TXCGP III.F.2.	CGP 3.4.A	0	$250.00	$0.00
C Detail operator(s) responsible for implementation	TXCGP III.A.2.	CGP 3.4.A	0	$250.00	$0.00
11 SWPPP does not describe interim stabilization practices	TXCGP IIIF.2.(b)	CGP 3.4.B	0	$250.00	$0.00

CIVIL PENALTIES

- U.S. EPA may bring civil suit without administrative order
- Maximum penalty is $37,500 per violation (per day) with no upper limit
- Court must consider seriousness of violation, history of violations, etc.

CRIMINAL PENALTIES

- U.S. EPA may refer case to Department of Justice for criminal prosecution
- Violations may include failure to maintain proper records, BMPs, etc.
- Penalties from $37,500 per day to $1M and imprisonment, or both

CITIZEN SUITS

- CWA allows private citizens to initiate civil actions against alleged violators
- Must file notice of intent to sue and provide 60-day grace period before filing suit in federal district court

COURTS ARE DEFINING…

- The scope of MEP
- The applicability of WQS
- State authority to impose WQS
- Applicability and scope of TMDL's
- Adequacy of the regulations
- Legality of general permits
- Performance timelines
- Adoption of measurement standards
- Taxing/service fee authority of local agencies
- Federal obligations to participate
- Benchmarks and action levels
- Legality of BMP's as compliance

OKAY, LET'S SAY I WANT TO COMPLY PROFITABLY……HOW?

VOLUME CONTROL

- Geographical variations on what quantity to treat
- Capacity for infiltration; *challenging*
- Maintenance and operations concerns for some infiltration techniques

TURBIDITY MEASUREMENTS

- NEL's not yet agreed upon
- Grab sampling not cheap or easy
- Non-construction established protocol
- When is MEP feasible and profitable

IS DIRT REALLY A PROBLEM, ANYWAY?

TABLE 1-1 Top 15 Categories of Impairment Requiring CWA Section 303(d) Action

Cause of Impairment	Number of Waterbodies	Percent of the Total
Mercury	8,555	14%
Pathogens	8,526	14%
Sediment	6,689	11%
Metals (other than mercury)	6,389	11%
Nutrients	5,654	10%
Oxygen depletion	4,568	8%
pH	3,389	6%
Cause unknown - biological integrity	2,866	5%
Temperature	2,854	5%
Habitat alteration	2,220	4%
PCBs	2,081	3%
Turbidity	2,050	3%
Cause unknown	1,356	2%
Pesticides	1,322	2%
Salinity/TDS/chlorides	996	2%

Note: "Waterbodies" refers to individual river segments, lakes, and reservoirs. A single waterbody can have multiple impairments. Because most waters are not assessed, however, there is no estimate of the number of unimpaired waters in the United States. SOURCE: EPA, National Section 303(d) List Fact Sheet (http://iaspub.epa.gov/waters/national_rept.control). The data are based on three-fourths of states reporting from 2004 lists, with the remaining from earlier lists and one state from a 2006 list.

THE "AGENCY" HAS ISSUES

- Tight timelines
- Federal oversight guidelines
- Limited staff
- Untrained enforcement officers
- Size of project: massive reach

STORMWATER RETROFITS

- Imagine retrofitting development costs for infiltration
- Consider operations and maintenance concerns
- Requirements vary significantly according to geographic region

Summary of State Stormwater Standards

Office of Water
Office of Wastewater Management
Water Permits Division

June 30, 2011 DRAFT
(This document is draft as EPA is accepting any necessary corrections)

This document summarizes the post-construction stormwater standards for all 50 states and the District of Columbia.

The following table briefly presents the information on selected aspects of each program (such as size threshold and the type of volume control requirement). The program names are linked to the full summary later in the document. Each summary follows a consistent format for comparison purposes.

These summaries were based on regulations, design manuals, or other information published by each program. The sources used to develop the summary are identified. State water quality agencies were given the opportunity to review and comment on their standard summary. Where individual states have commented on their standard, those comments have been incorporated into this draft.

For comments or corrections contact:
Jeremy Bauer
US Environmental Protection Agency
bauer.jeremy@epa.gov

http://www.epa.gov/compliance/data/planning/priorities/cwastorm.html

OKAY, SO YOU MENTIONED PROFIT?

- Return on Investment
  - What does environmental compliance cost your organization?
- Capital Investment
  - What do you spend vs. what do you expect in return on environmental compliance?
- Responsibility
  - Who is responsible within your organization for tracking environmental compliance risk, and how does this influence business decisions?

BUSINESS VALUE CHAIN MODELS…

- How could you use environmental compliance to separate yourselves?
- How could environmental compliance minimize your competition?
- Do your clients value environmental compliance?
- Do you expect environmental compliance among your supply partners?

STEP ONE

- Know the Rules
  - Research where the project is, and what rules exist
  - Document your findings
  - Bid the project "right"

STEP TWO

- Do your homework
  - Make a site visit
  - Research local conditions and climate
  - Select partners and subcontractors that follow environmental compliance…..

SITE VISIT BENEFITS

- Why?
  - Soils
  - Existing Vegetation
  - Drainage patterns, surrounding environments
  - Political pressures
  - Signage
  - Traffic Patterns
  - Example neighboring sites

STEP THREE: AGREE TO A SWPPP

- Submit a Notice of Intent
- Set up your onsite documentation
- Establish and document your sequence of activity

SET UP PROJECT DOCUMENTATION, CORRECTLY…

STEP FOUR: HOLD A PRE-CON

- Invite the regulators

  (This isn't a typo)
- Discuss schedule and sequence expectations
- Identify site communication and compliance expectation

PRECON MEETING AGENDA

- Introductions (numbers/signatures…)
- Expectations
- Ramifications
- Clarifications of Responsibilities
- Phases of Construction
- Clarification of post construction installation requirements
- Q & A

STEP FIVE: MAKE IT EASY TO COMPLY

- Perimeter control management
- Use BMP's to manage the real problem
- Inlets open and maintained
- Make a plan for dewatering – plan ahead!

HOW DO YOU "TREAT" STORMWATER RUNOFF TO GET IT BELOW "280"?

- Settling
- Filtration
- Polymer or flocculant treatment
- Liquid polymer treatments
- Solid polymer treatments with land applications or velocity check applications

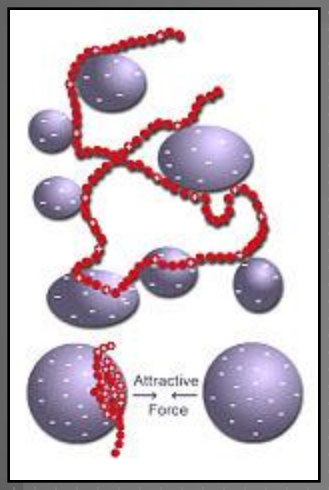
SETTLING

- Inlet and outlet spacing for detention time of water
- Allows settling of sediment from water column
- Clean water is then discharged
- Storage volumes are calculated for drainage areas

FILTRATION

- Equipment portable to site conditions
- Combinations of filter media and chemical treatment to flocculate the water
- Particles trapped during flow through process and clean water discharged

FLOCCULANTS AND POLYMERS



- Reaction of "negative" charge attracts soil particles to one another
- Numerous particles chained together are heavier than one particle
- Drop out of suspension faster than if non-treated

FLOCCULANTS MAY BE NATURAL MATERIALS…

Chistosan materials prior to powder form

AREN'T A LOT OF THESE THINGS HAZARDOUS TO THE ENVIRONMENT?

- Soil stabilizers are intended as bonding agents
- Only anionic forms of PAM are considered non toxic. Cationic PAM is most commonly toxic and harmful to the environment
- Most manufacturers will supply you with toxicity data from the regulatory authorities where their materials are manufactured
- Over-application, spills, or disposal concentrations can be problematic, caution should be undertaken for product management

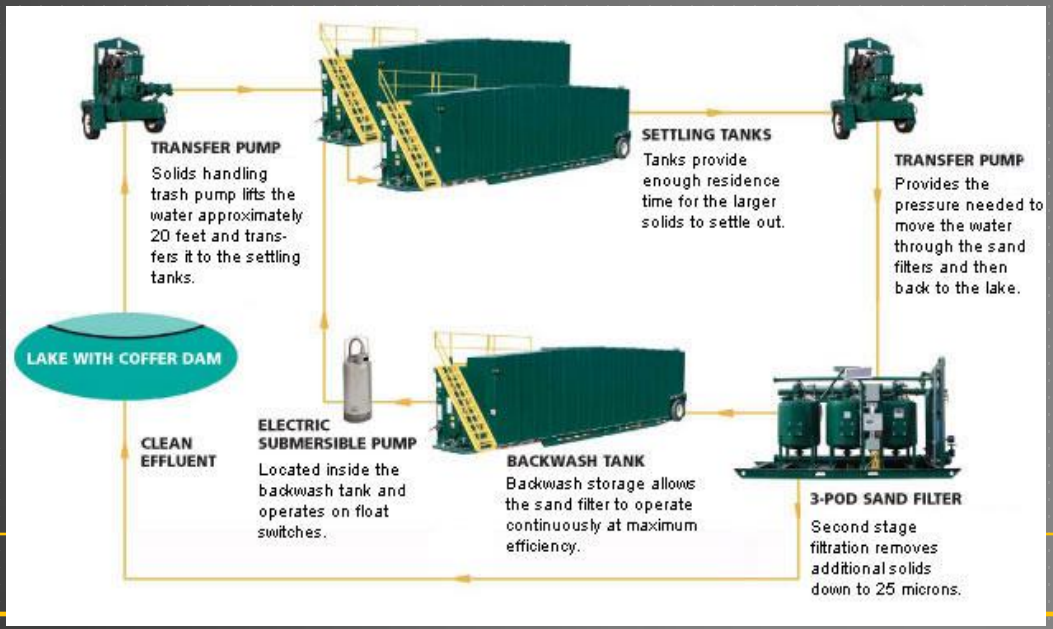
Aquatic Toxicity Test Data

	LC_{50} (in ppm)	95% CI (in ppm)
P. promelas Acute Tests in dechlor		
NEPS+ Formulation (renewed daily)	470	275-804
PAM alone (renewed daily)	771	593-1003
C. dubia Acute Test in dechlor	LC_{50} (in ppm)	95% CI (in ppm)
NEPS+ Formulation (static)	172	129-229
P. promelas Acute Test in LMW		
NEPS+ Formulation (renewed daily)	783	653-937
C. dubia Acute Test in LMW		
NEPS+ Formulation (renewed daily)	137	101-187
C. dubia Acute Tests in SHW		
NEPS+ Formulation (renewed daily)	105	57-193
PAM alone (static)	139	101-191
PAM alone (renewed daily)	124	82-187

LIQUID POLYMERS

Beaker on left shows untreated dirty water while beaker on right shows dirty water treated with StormKlear. Both beakers received the same amount of settling time.

WHO DO YOU CALL TO GIVE YOU AN ESTIMATE ON THIS STUFF?



- Applied Polymer Systems
  - www.siltstop.com
- StormKlear
  - www.stormklear.com
- Road Drain, Inc.
  - www.roaddrain.com
- Global sources
  - www.globalsources.com
- Rain for Rent
  - www.rainforrent.com
- Baker Enterprises
  - www.bakercorp.com

LAND BASED POLYMER APPLICATIONS

LET'S TALK SAMPLING

- Representative samples can be considered for lineal projects by appropriate authorities
- Often regulatory agencies are recommending at least 3 samples at each discharge point – local authorities may require more
- Even if representative sampling is allowed, all discharge points will be subject to compliance with limits

HOW DO YOU SAMPLE?

1. Identify locations where samples will be taken and ensure compliance with regulatory standards
2. Determine when (frequency and time) samples will be taken
3. Document equipment calibration and record activities
4. Synthesize how documentation and samples will be stored
5. Record and authenticate corrective actions taken to treat runoff
6. Provide sampling data to regulatory authority at pre-determined intervals

ACTIVE TREATMENT SYSTEMS

- **ATS** = operates by destabilizing the suspended particles by various mechanisms, aggregating them into larger particles that ar easier to remove through settling or filtering. Often combined with coagulation or flocculations, the densified floc can be removed more easily and effectively be via gravitational settling or media filtration.

PASSIVE TREATMENT SYSTEMS

- **PTS** = consist of a number of techniques that do not rely on pumping of stormwater or mechanical filtration, often times not as complex as ATS. These methods often use both solid and liquid forms of polymer combined with gravity to allow settling prior to discharge


04/27/2009

STEP SIX: KEEP YOUR DIRT ON YOUR SITE

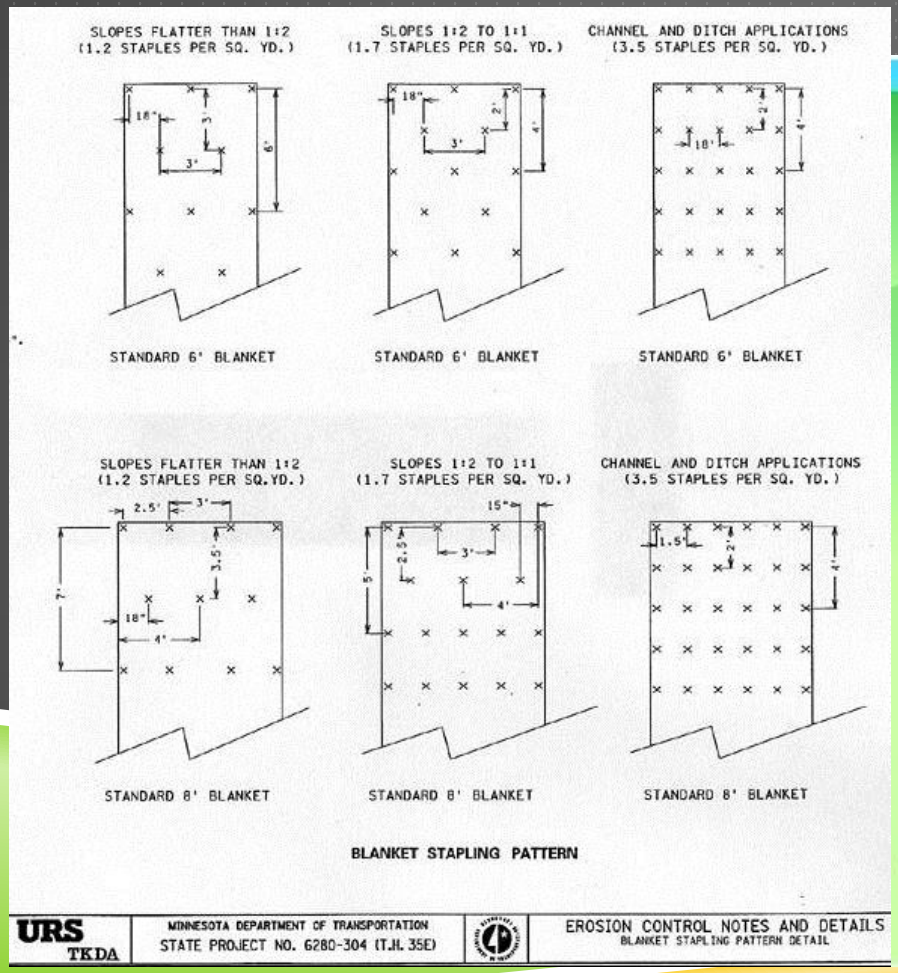
- Pick the right blanket, and install it correctly
- Not all mulches are the same – know what are true equals
- Think soil samples
- Manage stockpiles
- Protect channelized water flow

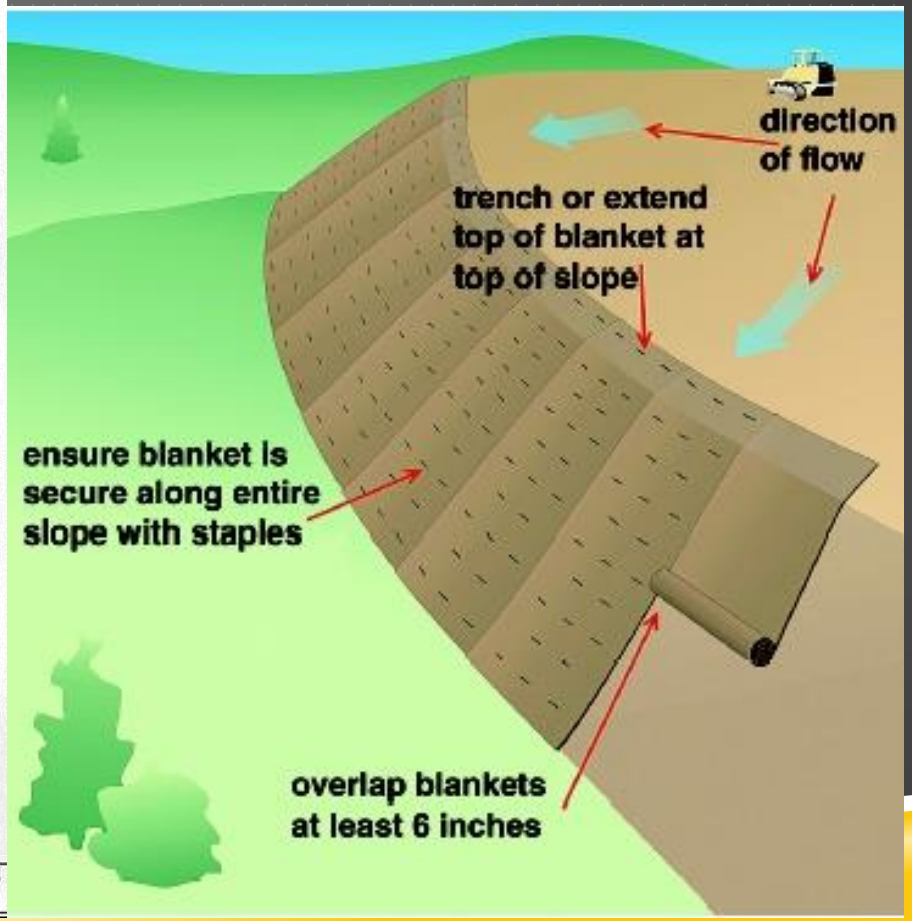
BLANKETS

Seed + blanket + staples

BLANKETS (CONT…)

Erosion Control Blankets Installation





BLANKETS

- Netting Types Include:
  - Biodegradable netting
  - Leno woven netting
  - Photodegradable netting
  - Coir netting
  - TRM's and permanent fiber netting

BLANKETS

- Staple Types
  - Wood Staples
  - Steel Staples
    - Loose
    - Cartridge
    - Circle Top
  - GreenStake™ Staples

MULCHES

Mulch

- Types:
  - Hydromulch
  - Straw mulch
  - Shredded wood mulch
  - Compost

INTERRUPTING SLOPE LENGTH & STEEPNESS

STOCKPILES

CHANNELS

STEP SEVEN: THIS IS NOT YOUR MOTHER'S CONSTRUCTION SITE

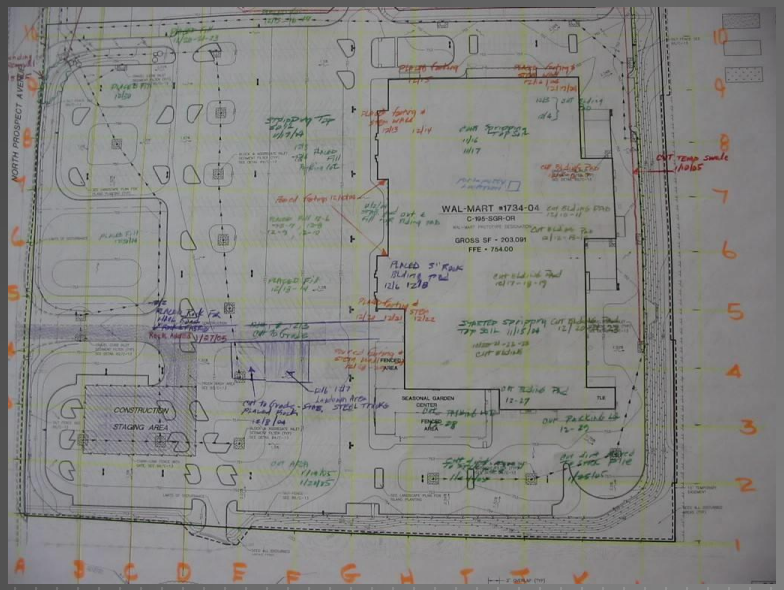
- Street sweeping is not a BMP
- Concrete Wash Out Systems
- Equipment & Leaks

ENTRANCE AND EXIT POINTS

CONCRETE WASH OUT

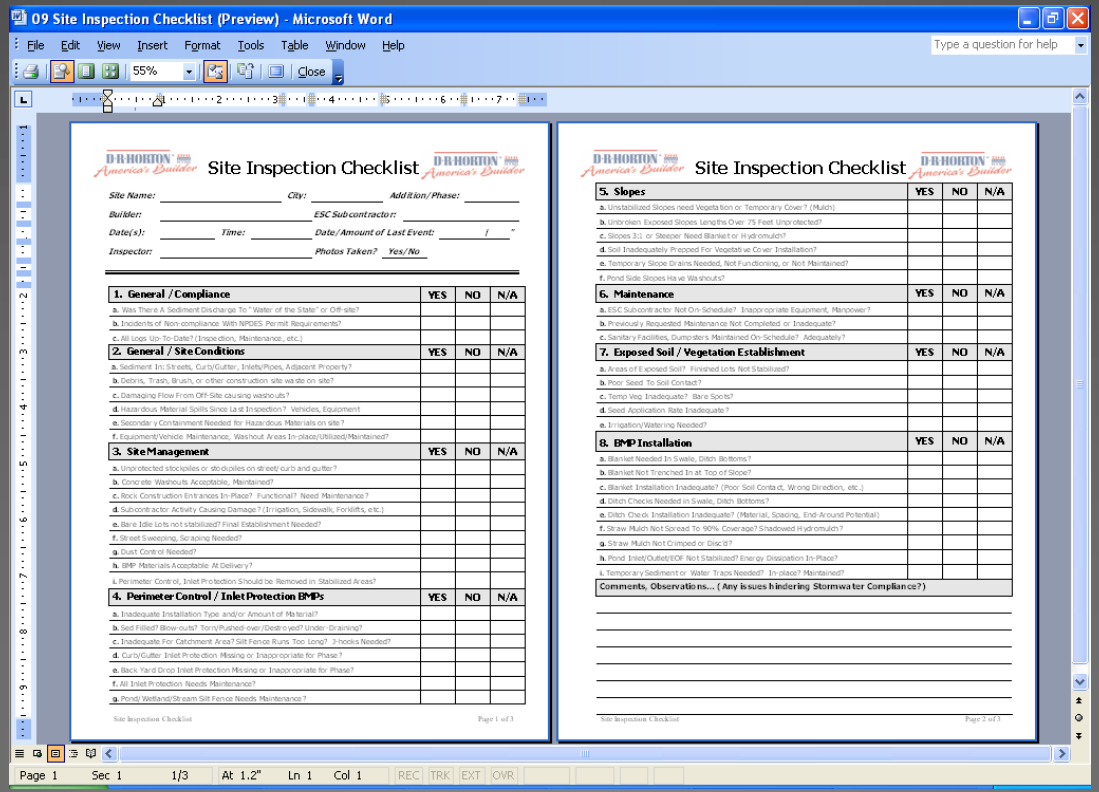
EQUIPMENT MAINTENANCE

STEP EIGHT: TELL YOUR STORY

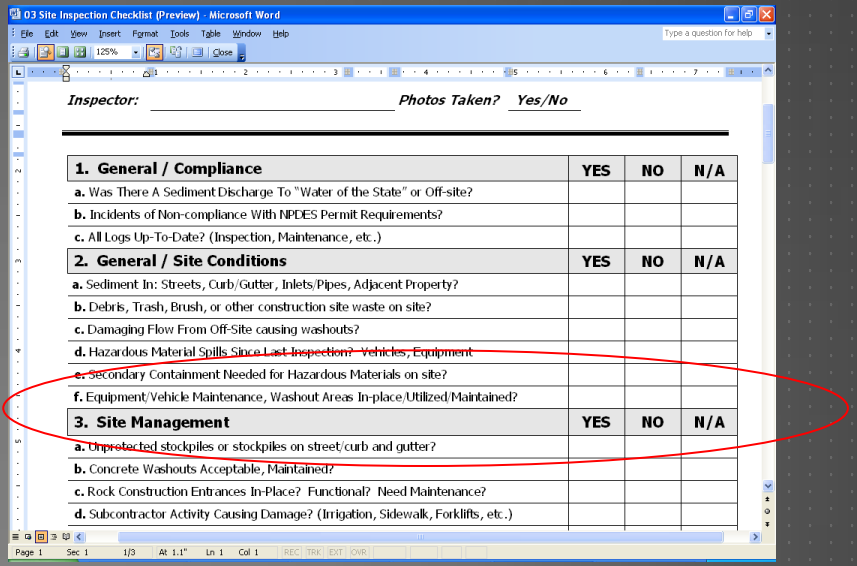


- Document changes
- Inspection Checklists
- Corrective Action Notices
- Photo Documentation
- Litigation Steps

DOCUMENTATION



CHECKLISTS



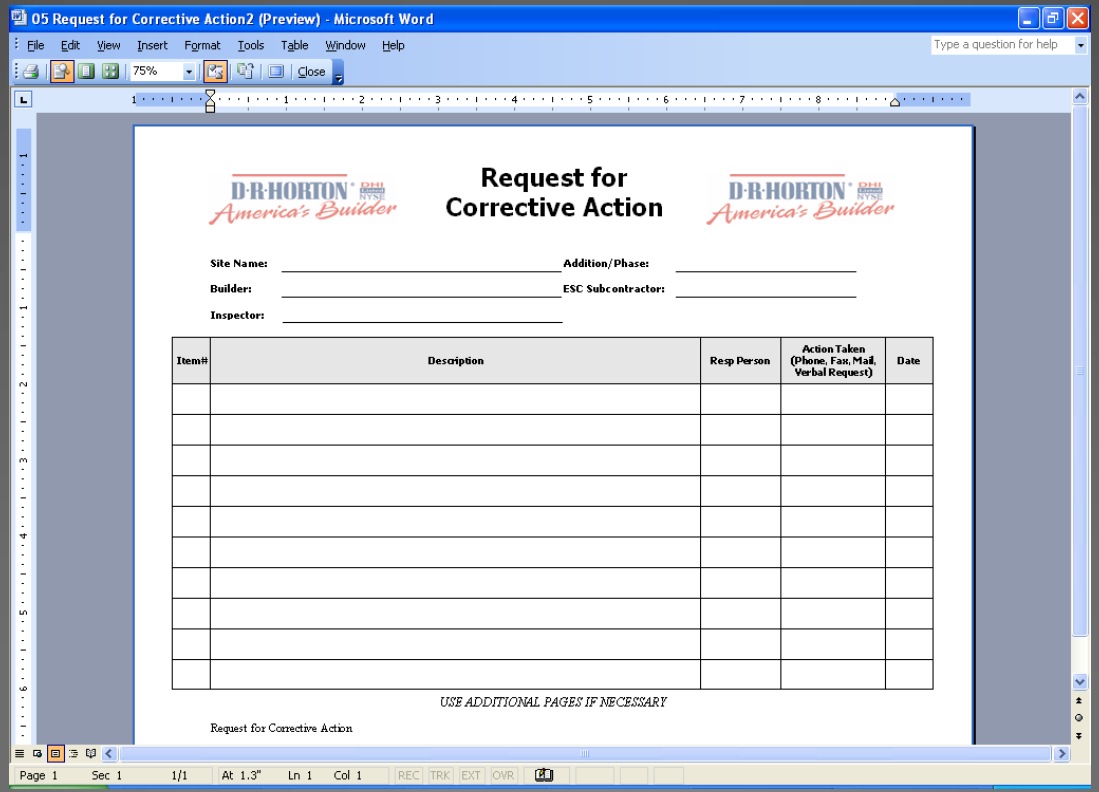
03 Site Inspection Checklist (Preview) - Microsoft Word

File Edit View Insert Format Tools Table Window Help

Inspector: _____ *Photos Taken?* *Yes/No*

1. General / Compliance	YES	NO	N/A
a. Was There A Sediment Discharge To "Water of the State" or Off-site?			
b. Incidents of Non-compliance With NPDES Permit Requirements?			
c. All Logs Up-To-Date? (Inspection, Maintenance, etc.)			
2. General / Site Conditions	**YES**	**NO**	**N/A**
a. Sediment In: Streets, Curb/Gutter, Inlets/Pipes, Adjacent Property?			
b. Debris, Trash, Brush, or other construction site waste on site?			
c. Damaging Flow From Off-Site causing washouts?			
d. Hazardous Material Spills Since Last Inspection? Vehicles, Equipment			
e. Secondary Containment Needed for Hazardous Materials on site?			
f. Equipment/Vehicle Maintenance, Washout Areas In-place/Utilized/Maintained?			
3. Site Management	**YES**	**NO**	**N/A**
a. Unprotected stockpiles or stockpiles on street/curb and gutter?			
b. Concrete Washouts Acceptable, Maintained?			
c. Rock Construction Entrances In-Place? Functional? Need Maintenance?			
d. Subcontractor Activity Causing Damage? (Irrigation, Sidewalk, Forklifts, etc.)			

CORRECTIVE ACTION NOTICES



WHEN SHOULD I TAKE PICTURES?

- Whenever you have impacts to a water of the state
- When you are in dis-agreement over a compliance issue
- When you "catch" a sub-contractor in violation of compliance
- When you suspect an upcoming issue of concern

STEP NINE: STABILIZE AS YOU GO…

- Dirt: get a soil test
- Seed: Use the right type
- Fertilizer: Apply only what you need
- Cover: Cheap insurance

GROUND PREPARATION

- Soil Testing

- Ph
- Organics
- Fertilizer requirements
- Seed germination issues

SOIL AMENDMENTS

- Ph / Alkaline
- Low Nitrogen
- Low organic content
- Contamination of hazardous substances
- Moisture Management

SEED BED PREPARATION

- Soil scarification
- Rock and debris collection
- Litter and contaminant removal
- Pulverizing topsoil layer of growth
- Adding organics

STEP TEN: TIDY UP AND GET OUT

- Take out your BMP's
- Signage & Documentation
- NOT
- Thank you's and leave behind messages

WOULD YOU HIRE THIS CONTRACTOR AGAIN?

REMEMBER…

1. Know the rules
2. Do your homework
3. Agree to a SWPPP
4. Hold a Pre-Con
5. Make it easy to comply
6. Keep your dirt on your own site
7. This isn't your mother's construction site (Haz. Mat'l)
8. Tell your story
9. Stabilize as you go
10. Tidy up…and get out

RESOURCES

- CPESC, Inc. *(CPESC, CPSWQ, CESSWI)*
  - www.cpesc.org
- Environmental Protection Agency
  - http://cfpub.epa.gov/npdes/home.cfm?program_id=6
- Construction Industry Compliance Assistance
  - http://www.cicacenter.org/
- EPA Region 10
  - http://www.epa.gov/region10/
- International Erosion Control Association
  - www.ieca.org
- Protecting Water Quality in Urban Areas, Plants, SW Manual
  - www.pca.state.mn.us/water/pubs/sw-bmpmanual.html
- Minnesota Urban Small Sites BMP Manual
  - www.metrocouncil.org
- Minnesota Erosion Control Association
  - www.mnerosion.org
- Resource Professionals Alliance
  - www.rp-alliance.com

WSB & Associates, Inc.

RESOURCES….(CONT.)

- Straight Talk Strategies for Environmental Compliance
  www.forester.net
- Erosion Draw
  www.erosiondraw.com
- Bio Draw
  www.biodraw.com
- Esenss
  www.salixaec.com
- Construction Site Erosion and Sediment Controls
  www.destechpub.com
- Land and Water
  www.landandwater.com
- Dirt Time with John McCullah
  www.dirttimetv.com
- Stormwater Permitting: A guide for builders and developers
  www.builderbooks.com
- Biotechnical and Soil Bioengineering Slope Stabilization
  www.ieca.org

WSB & Associates, Inc.

10 STEPS TO CONSTRUCTION SITE COMPLIANCE….

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