

DEALING WITH EXTREME RAIN EVENTS

Erosion and Sedimentation Control
Planning and Design Workshop
December 2, 2014



SEVERE WEATHER in NORTH CAROLINA

- A STATE PRIMARILY OF A SUBTROPICAL CLIMATE
- WEATHER PATTERNS COME PREDOMINATELY FROM THE WEST
- APPALACHIAN MTNS SHIELDS IT FROM MIDWEST WEATHER
- THE GULF STREAM WARMS THE COAST
- HURRICANES & TORNADOES ARE SEVERE WEATHER SOURCES
- ISOLATED THUNDERSTORMS CAUSE MOST ECONOMIC LOSS

THUNDERSTORM



TORONADOES in NORTH CAROLINA

- STATE AVERAGE IS 31 EVENTS PER YEAR
- ASSOCIATED WITH OTHER SEVERE WEATHER, HIGH WINDS, SHOWERS AND THUNDERSHOWERS
- JULY 7, 2005, HURRICANE CINDY SPAWNED 8 TORONADOES



HURRICANES IN NORTH CAROLINA 1980 - 2014

- Approximately 110 Named Storms have passed through this state in the last 35 years
- More than 50 produced local rainfalls described as heavy or severe

INCLUDING:

- HURRICANE DENNIS (1981) – 10.7 inches of rain in Wilmington
- HURRICANE DIANA (1984) – 19 inches of rain in Wilmington
- TROPICAL STORM JUAN (1985) – Mud slides onto I-40
- HURRICANE HUGO (1989) – 1.7 Billion Dollars damage in NC
- TS BERYL (1994) – 13.8 inches of rain in Transylvania County
- HURRICANE FRAN (1996) – 10 ft storm surge, 2.55 Billion \$
- HURRICANE DANNY (1997) – 12.3 inches of rain in Albemarle
- HURRICANE BONNIE (1998) – Category 2, ran across state
- HURRICANE DENNIS (1999) – 19.9 inches of rain in Ocracoke
- HURRICANE FLOYD (1999) – 24 inches, 500 year storm event flooding areas in much of the Eastern third of the state



AND IN THE 21st CENTURY:

- TS HELENE (2000) – 8.31 inches of rain in Brunswick County
- TS ALLISON (2001) – 10 inches of rain in Currituck County
- TD BILL (2003) – 9.7 inches of rain in Transylvania County
- HURRICANE ISABEL (2003) – Isolates Hatteras Is. for 2 months
- HURRICANE FRANCES (2004) – 23.6 inches at Mt. Mitchell
- HURRICANE IVAN (2004) – 17 inches of rain, Haywood County
- TD ARLENE (2005) – 9.84 inches of rain in Transylvania County
- HURRICANE OPHELIA (2005) – 17.5 inches on the Outer Banks
- TROPICAL STORM ALBERTO (2006) – 7.16 inches in Raleigh
- HURRICANE IDA (2009) – 14 inches of rain in Manteo

AN UNNAMED STORM THIS PAST AUGUST



THE TEN YEAR STORM EVENT

in the

EROSION AND SEDIMENT CONTROL SENSE OF THE EXPRESSION

- A STATISTICALLY DETERMINATION
- NOT A PRACTICAL EXPECTATION

STORM PREPARATION for EROSION AND SEDIMENT CONTROL CONSTRUCTION SITES

1. PLAN FOR THE 10-YEAR STORM EVENT
2. INSTALL ADEQUATE SEDIMENT STORAGE DEVICES
3. KEEP ALL E&SC MEASURES PROPERLY MAINTAINED
4. ACHIEVE GROUND COVER QUICKLY



1. PLAN FOR THE 10-YEAR STORM EVENT

DON'T PENNY PINCH ON SEDIMENT STORAGE:

- SEDIMENT TRAPS: 3600 CUBIC FEET PER ACRE DRAINED
- SEDIMENT BASINS: 1800 CUBIC FEET PER ACRE DRAINED
- THE E&SC PLANNING AND DESIGN MANUAL ALLOWS STORAGE BEHIND SEDIMENT FENCE AT A RATE OF 1/4 ACRE DRAINAGE PER 100 LINEAR FEET OF FENCE....

ONLY IF IT WORKS!

2. INSTALL ADEQUATE SEDIMENT STORAGE DEVICES

- SEDIMENT TRAPS AND BASINS NEED TO GO IN FIRST



2. INSTALL ADEQUATE SEDIMENT STORAGE DEVICES

PROBLEMS WITH SEDIMENT FENCE STORAGE:

- TERRAIN RELIEF: THE FENCE AT THE LOWEST ELEVATIONS IS RECEIVING ALL STORMWATER FLOW

TERRAIN RELIEF



2. INSTALL ADEQUATE SEDIMENT STORAGE DEVICES

PROBLEMS WITH SEDIMENT FENCE STORAGE:

- TERRAIN RELIEF: THE FENCE AT THE LOWEST ELEVATIONS IS RECEIVING ALL STORMWATER FLOW
- FUNCTIONALITY: NOT ALL SECTIONS OF AN EXPANSIVE LENGTH OF SEDIMENT FENCE IS RECEIVING UNIFORM FLOW

FUNCTIONALITY



2. INSTALL ADEQUATE SEDIMENT STORAGE DEVICES

PROBLEMS WITH SEDIMENT FENCE STORAGE:

- TERRAIN RELIEF: THE FENCE AT THE LOWEST ELEVATIONS IS RECEIVING ALL STORMWATER FLOW
- FUNCTIONALITY: NOT ALL SECTIONS OF AN EXPANSIVE LENGTH OF SEDIMENT FENCE IS RECEIVING UNIFORM FLOW
- PRACTICALITY: BUILDING DOUBLE OR TRIPLE SPANS OF SEDIMENT FENCE DO NOT DOUBLE OR TRIPLE STORAGE CAPACITY

PRACTICALITY



FINAL VERDICT OF SEDIMENT FENCE:

SEDIMENT STORAGE OF A SEDIMENT FENCE ONLY EXISTS BEHIND THE FUNCTIONAL SECTION OF THE FENCE.

3. KEEP ALL E&SC MEASURES PROPERLY MAINTAINED



4. ACHIEVE GROUNDCOVER QUICKLY



4. ACHIEVE GROUNDCOVER QUICKLY

NPDES STORMWATER DISCHARGE GENERAL
PERMIT NCG010000 PLACES STRICT AND RAPID
TIMELINES TO ACHIEVE GROUNDCOVER

4. ACHIEVE GROUNDCOVER QUICKLY

- SLOPES 50 FEET OR GREATER AND 4:1 SLOPE – 7 DAYS
- SLOPES LESS THAN 50 FEET AND 3:1 SLOPE – 7 DAYS
- SLOPES 10 FEET OR LESS AND 2:1 SLOPE – 7 DAYS
- ALL OTHER SLOPES AND FLAT EXPOSED AREAS – 14 DAYS



SUMMARY:

THE FOUR POINTS OF STORM PREPARATION

1. PLAN FOR THE 10-YEAR STORM EVENT
2. INSTALL ADEQUATE SEDIMENT STORAGE DEVICES
3. KEEP ALL E&SC MEASURES PROPERLY MAINTAINED
4. ACHIEVE GROUND COVER QUICKLY

A FINAL POINT

- THE EXTREME RAIN EVENT HAS COME AND PASSED
- THE CONSTRUCTION PROJECT'S SITE CONDITIONS HAVE PERSERVERED
- FLOOD WATER IS STANDING
- PEOPLE WHO ARE FLOODED START CALLING:

“I HAVE STANDING WATER AND IT CAME FROM THE CONSTRUCTION THAT MY NEIGHBOR DID NEXT DOOR. WHAT CAN YOU DO ABOUT MY FLOODING?”



“Probably nothing.”



NC SUPREME COURT CASE LAW:

Pendergrast versus Aiken (1977)

- Establishes rights and limitations to water runoff redirection
- Adopts the concept of “*reasonable use rule*”

REASONABLE USE RULE:

Landowners are allowed to make reasonable use of their Property without liability

Who determines reasonableness?

PENDERGRAST vs. AIKEN (1977)

- Surface water litigation will be addressed on a case-by-case basis.
- Reasonableness of the land use by either party will be a question of fact for a court judge to decide.
- Surface water drainage disputes are private nuisance actions which arise when one landowner either diverts or increases the flow of water onto another's property. If the injured landowner does not proceed with private nuisance action (civil action), there is no other judicial remedy available.

QUESTIONS?

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