



Wake County Stormwater Management Task Force Meeting #10

February 15, 2007

Cary • Fuquay-Varina • Garner • Holly Springs • Knightdale •
Morrisville • Raleigh • Rolesville • Wake County • Wake Forest •
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Springs • Knightdale • Morrisville • Raleigh • Rolesville • Wake County •
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Meeting Agenda

- Dinner and Welcome
 - Kenn Gardner, Wake County
- **Work Plan Process & Stormwater Managers Meeting Update**
- Inspections, Operation and Maintenance Tools
- Conservation, Restoration, Rehabilitation & Replacement Tools
- Task Force Feedback

Progress on Priority Tools Discussion

Tools and Strategies	Tools Addressed
Public education for good housekeeping	✓
Hydrologic and hydraulic modeling of drainage system	✓
Design and maintenance standards for sedimentation and erosion control devices	✓
Inspection and enforcement for sedimentation and erosion control devices	✓
Conserve land through open space acquisition, buffers, conservation easements, etc.	15-Feb
Monitoring requirements for stormwater facility performance and operations	15-Feb
Material use, exposure and disposal for municipal operations	15-Feb
Inspection and maintenance for stormwater facilities	15-Feb
Strategies to reduce impervious surfaces required for new development	
Water quality modeling for watershed (pollutant loadings)	✓
Illicit discharge detection and elimination**	15-Feb
Inspect, maintain and rehabilitate the sanitary sewer system**	15-Feb
Real estate disclosure of structural flooding**	
Site-level flood controls**	
Development of watershed-level water quality controls**	

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Inspection, Operations, & Maintenance

- Tools used to ensure that the stormwater system is free of debris and maintained to provide the level of service intended in the original design and to meet customer expectations.

Priority Tools

- 1) Inspection, Maintenance and Monitoring of the Stormwater System
- 2) Illicit Discharge Detection and Elimination (NPDES req.)
 - Including sanitary sewer and septic system activities
- 3) Material Use, Exposure, and Disposal for Municipal Operations (NPDES req.)

1. Inspection, Maintenance and Monitoring of the Stormwater System



Elements of Stormwater Program Operations and Maintenance

- Drainage System Maintenance
 - Catch basin cleaning & inspection
 - Culvert cleaning & inspection
 - Storm sewer cleaning & inspection
 - Stream/floodplain maintenance & inspection
 - BMP maintenance & inspection
 - Street sweeping



Why Do Inspection and Maintenance?



Task Force Survey Results System Maintenance

- How would you generally rate the maintenance of the storm drainage system within your area?
 - Very clean and very well maintained - 4%
 - Adequately maintained in most cases - 50%
 - Needs more frequent maintenance - 46%
- How well does the storm drainage system generally work in your area?
 - Works perfectly, no problems - 3%
 - Seems to work OK in most storms - 53%
 - Occasionally backs up water, creates potentially dangerous or nuisance flooding - 44%

Reported Operation and Maintenance Performance Trends

- Catch Basin Cleaning
 - 3 clean all catch basins at least once per year
 - 9 clean less than 10 percent per year
- Street Sweeping
 - 10 perform routine street sweeping
 - 6 sweep entire system once per year
 - 4 sweep entire system more than once per year



Reported Operation and Maintenance Performance Trends (continued)

- Jurisdictions are primarily responsive-based
 - 6 jurisdictions are 90 percent or more responsive
 - 3 jurisdictions are 50% or more routine
- Some incorporate pro-active maintenance
 - 5 jurisdictions have identified “hot-spots” within system
 - “Hot-spots” are inspected/cleaned prior to all major storm events



Approach and Benefits to Various Levels of Service for O&M

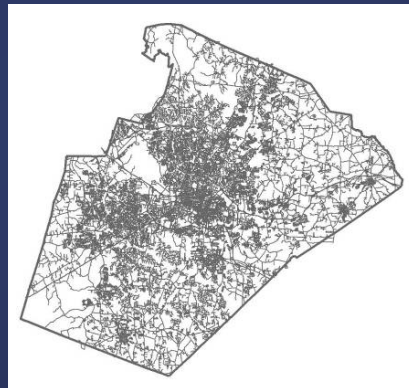
Maintenance Approach	Drainage System Characteristics
Reactive	O&M related flooding may continue to occur
Inspection-Based	O&M related flooding occurs but usually corrected
Proactive	O&M related flooding is effectively eliminated

Decision Point #1?

- What type of approach should local governments implement regarding maintenance of the stormwater drainage system?
 - a) Reactive to Public Complaints
 - b) Maintenance Based on Routine Inspections
 - c) Pro-Active, Routine Maintenance of the System

Should Maintenance Be Extended to NCDOT "Maintained" Roads?

- Total Road Miles in County
 - 5,500 miles
- Total NCDOT Road Miles in County
 - 2,300 miles



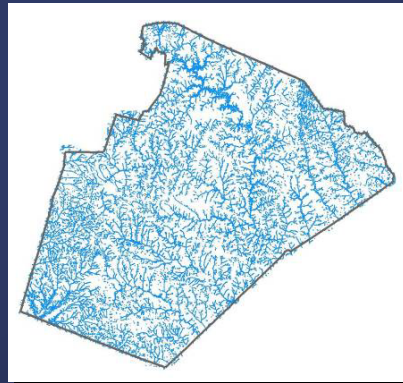
Decision Point #2?

- What approach should local governments pursue regarding maintenance of NCDOT roads?
 - a) No maintenance on NCDOT roads (i.e. status quo)
 - b) Perform maintenance of stormwater infrastructure on NCDOT roads as necessary

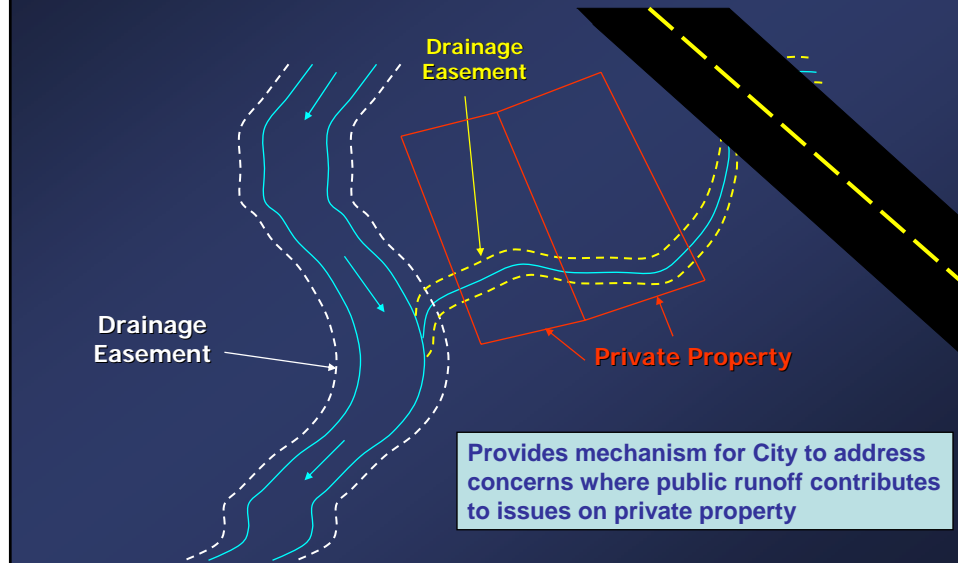
Should Maintenance Be Extended to Private Property?

- Total Stream Miles in County
 - 6,800 miles
- Total Stream Miles on Publicly Owned Land
 - 1,400 miles

Approximately 5,400 miles of stream are located on private property



What Are the Benefits of Maintaining the Private Drainage System?



What Are the Drawbacks of Maintaining the Private Drainage System?

- Increased Level of Service Means Increased Program Cost
- Maintenance on Private Property Increases Liability on the Jurisdiction
- Increased Maintenance Responsibility Further Strains Staff Resources



Cost Implications of Assuming Maintenance on Private Systems

City of Raleigh

- No maintenance on the private drainage system
- O&M Budget = \$1.6 mill.
- Cost per sq. mile
 - \$12K

City of Greensboro

- Assumes maintenance on private property that accepts public runoff
- O&M Budget = \$2.4 mill.
- Cost per sq. mile
 - \$20K

Cost of providing maintenance on private property would be much higher to start until problems/backlog issues are addressed

Decision Point #3?

- What approach should local governments pursue regarding maintenance on private property?
 - a) No maintenance on private property (i.e. status quo...or only within public right-of-way)
 - b) Cost share with private property owners on maintenance and repairs
 - c) Provide maintenance of the private drainage system that conveys runoff from public property
 - d) Provide maintenance on entire system (public and private)

Maintenance of Structural Stormwater BMPs

- Structural stormwater BMPs include detention basins, retention basins, infiltration basins, cisterns, etc.
- Necessary maintenance activities include:
 - Debris/litter removal
 - Silt/sediment removal
 - Clearing of vegetation
 - Minor repairs
 - Nuisance control



Typical Approach to Maintenance of Structural BMPs in the County

- Generally, maintenance is required of the property owner or homeowners' association by formal agreement
- Under the "Neuse Rules", jurisdictions require establishment of an escrow account to ensure funds are available for maintenance or repairs



Decision Point #4?

- What approach should local governments pursue regarding maintenance of stormwater BMPs required by ordinance?
 - a) Require maintenance agreement and annual reporting by property owner; inspect to verify
 - b) Offer maintenance of BMPs by fee-for-service
 - c) Solicit easements and assume maintenance on all BMPs

Water Quality Monitoring in Wake County

- City of Raleigh is only jurisdiction with a monitoring program for stormwater (required by NPDES Phase I)
- Program includes:
 - Weekly ambient monitoring (9 sites)
 - Quarterly wet weather monitoring (7 sites)
 - Yearly Benthic monitoring (23 sites)
 - Neuse River Sampling Initiative



Current Water Quality Monitoring Sites in Raleigh



Proposed Sampling and Monitoring Plan to Address Secondary and Cumulative Impacts of D.E. Benton Plant (15 MGD)

- Additional seven water quality sampling stations to collect monthly data
- Stream corridor evaluations once every two years
- Installation of two USGS gauging stations
- Additional 13 benthic monitoring sites
- Fish community surveys at five locations
- 350 man-hours of mussel surveys every five years

Estimated \$5 to \$6 million dollar program

Pros and Cons of Water Quality Monitoring

Pros

- Comprehensive picture of overall stream quality
- Track long term improvement or degradation
- Catalog data to defend assessments by state and/or federal agencies
- Adds scientific and educational value to the stormwater program

Cons

- Can be very costly to implement
- Requires long-term commitment to get reliable results
- May expose deficiencies in program

Decision Point #5a and 5b?

- Should local governments expand current water quality monitoring activities within the County?
- If so, what would be the intended use of the program?
 - a) In-stream baseline water quality
 - b) Stormwater runoff quality/impacts
 - c) Evaluation of stormwater BMP devices

2. Illicit Discharge Detection and Elimination (IDDE)

- Definition: A dry weather flow that contains pollutants and/or pathogens
- Required program/activity by NPDES Permit
- Most significant sources:
 - Cross-connections from wastewater
 - Leaking sewer systems
 - Failing septic systems
 - Inappropriate discharges from industrial/commercial
 - Paint, oil, etc. dumped into storm drains

Required Activities to Meet NPDES Requirements for IDDE

- Establish legal authority
- Develop a base map
- Implement IDDE procedures
 - Prioritize areas for inspection
 - Design an outfall tracking system
 - Conduct outfall inspections
 - Trace and remove all illicit discharges
- Employee training
- Public education
- Establish a reporting mechanism



Current Local Government Compliance Efforts for NPDES

- General conclusions from survey of local stormwater managers
 - Larger communities have available staff to partially or fully implement the required program
 - Smaller communities lack staff or in-house expertise to implement at this time

Decision Point #6a and #6b?

- What should be the “cutoff” within the storm drainage system for inspection and detection of illicit discharges?
 - a) Limit to only what's required by the NPDES permit (i.e. status quo)
 - b) Expand program to include ALL outfalls to local streams
- Do you have any additional questions or suggestions regarding this program?
 - Comment as necessary

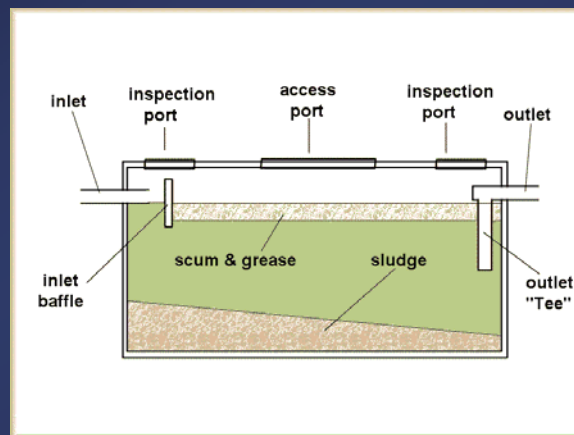
Inspect, Maintain & Rehabilitate the Sanitary Sewer System

- DWQ permit requires the following activities:
 - Up-to-date map of entire system
 - General inspection of entire system once per year (2 times per year for high priority lines)
 - Maintain a program for appropriately cleaning at least 10 percent of the system each year
 - Proper maintenance of easements & ROW
 - A CIP program to designate funding for reinvestment in the system



Inspection and Maintenance of Septic Tank Systems

- Presentation by Everette Lynn of Wake County



Decision Point #7a and #7b?

- Are malfunctioning septic systems an illicit discharge that should be addressed?
 - a) Yes
 - b) No

- If so, should the County evaluate options to address this issue?
 - a) Yes
 - b) No

3. Material Use, Exposure and Disposal for Municipal Operations

(also "Pollution Prevention and Good Housekeeping")

- Definition: examination or alteration of municipal operations to reduce the potential for pollution
- Required program/activity by NPDES permit
- Municipally-owned parcels
 - 2,200 parcels (< 1% of total)
 - 37 square miles (4 % of total)



Required Activities to Meet NPDES Requirements

- **Develop municipal operation and maintenance program**
- **Develop an inventory of all municipal facilities and routinely inspect sites**
 - Chemical storage areas, vehicle maintenance yards, solid waste, water & sewer facilities, etc.
- **Conduct staff training specific for pollution prevention**
- **Conduct annual reviews of municipal NPDES industrial permit holders**

Current Local Government Compliance Efforts for NPDES

- **General conclusions from survey of local stormwater managers**
 - Larger communities have available staff to partially or fully implement the required program
 - Smaller communities lack staff or in-house expertise to implement at this time

Decision Point #8?

- Do you have any additional questions or suggestions regarding this program?
 - Comment as necessary

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Conservation, Restoration, Rehabilitation & Replacement

- Tools used to preserve or restore the function and capacity of both natural and man-made stormwater systems.

Priority Tool

- Preserve land through open space acquisition, buffers, conservation easements, etc.



Progress Towards Open Space Goals

- Presentation by Chris Snow of Wake County

Wake County
Parks &
Open Space Plan

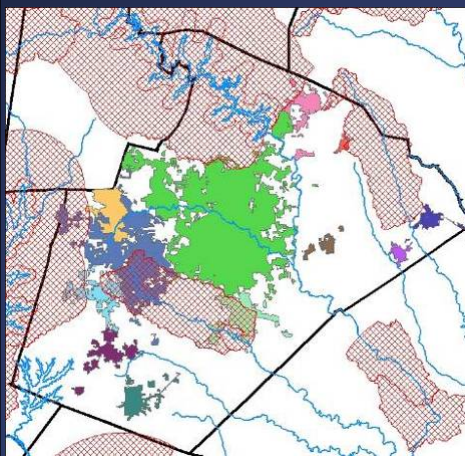
Decision Point #9a and #9b?

- Do you support the dedication of additional resources for acquiring/conserving open space?
 - a) Yes
 - b) No

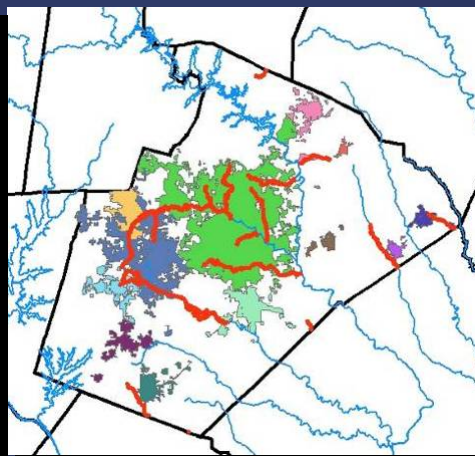
- Open space acquisition/conservation should be prioritized in the following locations?
 - a) Water Supply Watersheds
 - b) Areas of Impaired Waters (303d listed streams)
 - c) Wake County Watershed Management Plan Priority Watersheds (2002)
 - d) Regulated Floodplain areas
 - e) Other Suggestions

What Areas Should Be Targeted for Conservation and Acquisition?

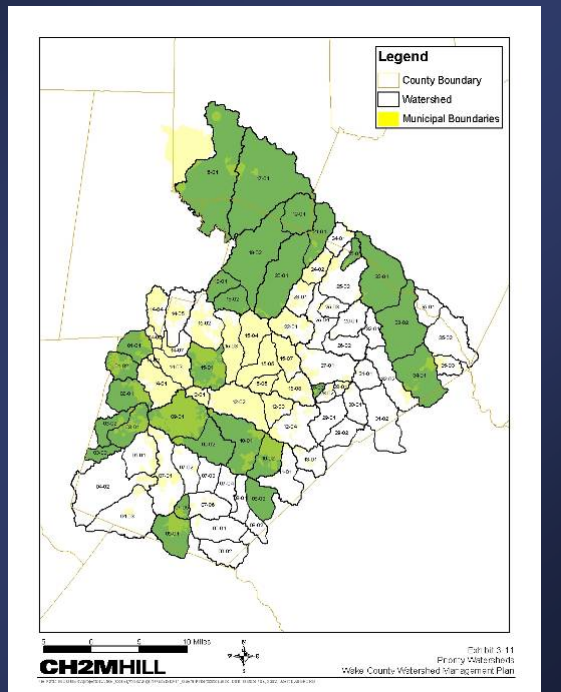
Water Supply Watersheds



Impaired Stream Areas



Wake County Watershed Management Plan Priority Watersheds



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**Thank You For Your
Time And Interest!**



CDM