TOWN OF CHAPEL HILL
Stormwater Management Alternatives

This report was created by graduate students in the
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who were participating in a workshop course. The workshop was conducted under
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SUMMARY OF THE REPORT

The purpose of this report is to evaluate the feasibility of alternative development management tools for avoiding, reducing, or remedying the impacts of stormwater in the Town of Chapel Hill. Three categories of development management tools were explored, including: 1) stormwater capital improvements management; 2) impervious surface standards and best management practices; and 3) stream buffer protection. It was determined that the Town of Chapel Hill should taken action with respect to these three categories in order to enhance current stormwater management objectives. This is critical to ensure the public health of the Chapel Hill community as well as the ecosystem of Chapel Hill's watersheds.

The Town of Chapel Hill has a history of making stormwater management and water quality a priority. The Town's current regime includes a significant stormwater infrastructure; an annually appropriated funds for stormwater management; standards governing impervious surfaces, riparian buffers and on going construction; and a limited water monitoring program. Although these elements are significant, to meet demands for improved stormwater services the Town will need to increase its spending on stormwater capital facilities and work to integrate its capital facilities into other aspects of stormwater management. In addition, in order to meet water quality and flood management goals, the Town will need to initiate a more proactive approach to managing the effects of impervious surfaces through site level standards and best management practices (BMPs), as well as work to more effectively protect and restore the town's most sensitive environmental features with expanded buffer requirements. A comprehensive stormwater management regime that accounts for all threes of these objectives will contribute significantly to protecting and enhancing watershed health in the Town of Chapel Hill.

1. STORMWATER CAPITAL IMPROVEMENTS MANAGEMENT

Fifty years ago, the capital facilities that local governments were expected to provide included roads, schools, parks and usually sewers. Today, however, this list has expanded to include a wide variety of facilities including sophisticated stormwater management systems. Municipalities have found that today many citizens simply demand increased levels of service. Perhaps more importantly, towns are increasingly being required to expand their facilities to meet increased regulatory mandates. For Chapel Hill, the NPDES Phase II rules and the mandates of the Town's *Comprehensive Plan* are particularly significant. Finally, many local governments now realize that increasing levels of development intensify environmental pressures on already fragile water resources. To date, Chapel Hill has addressed its capital facilities needs in the following ways:

- Developed an extensive stormwater capital facilities system.
- Annually appropriates money to the Drainage Assistance Fund, the fund used to maintain and upgrade townwide stormwater capital facilities.

- Created a mandate for improved stormwater capital facilities and stormwater capital facilities funding through the *Comprehensive Plan.*
- Developed some joint management agreements with neighboring jurisdictions.
- Established a stormwater education program for local schools to help meet NPDES Phase II requirements.
- Established the annual Big Sweep program, a community wide riparian cleanup program that also contributes toward NPDES Phase II compliance.
- Established a limited water monitoring program, which could be used to help direct future stormwater capital facilities planning.

The following report features both an analysis of current conditions in Chapel Hill as well a collection of case studies about the implementation of stormwater management programs in other North Carolina municipalities. Summaries of each case study have been included in the report. Based on the case studies, the report makes the following general conclusions:

- Most of the municipalities studied combined a dedicated source of funding, such as a stormwater utility, with an ad hoc source of funding, such as a yearly appropriation from the general fund.

- Though not required by NPDES, the only truly dedicated source of funding for meeting capital improvements goals was a stormwater utility.

- The most comprehensive programs all have a clear mandate from a comprehensive plan and a capital improvements schedule derived from accurate and comprehensive information (such as accurate maps and monitoring information).

- Effectively implemented programs go hand in hand with other effective growth management tools, such as riparian buffer requirements and impervious surface limits.

- At present, the average citizen of Chapel Hill pays significantly less than citizens in other North Carolina communities for stormwater management. Even a modest increase in costs to Town residents could significantly increase the funds available for stormwater management.

More specifically, the report recommends that the Town do the following:

1) Assess the total costs of expanding the capital improvements system and monitoring program to meet both Town goals and NPDES Phase II requirements.

2) Assess how much of these costs realistically should or could be covered by annual appropriations to the Town Drainage Assistance Fund.

3) Develop a dedicated funding source to pay for expenses not covered by the Drainage Assistance Fund.

4) Analyze how much a dedicated funding program will cost each local property owner annually.

5) Tie the capital CIP and capita improvements budget to water quality monitoring data.

2. Impervious Surface Standards/Best Management Practices

This report presents case studies for alternative management strategies for impervious surfaces. The report focuses on ways in which the Town of Chapel Hill can expand on existing impervious surface standards, best management practices (BMPs) requirements, and stormwater run-off controls.

Currently, the Town of Chapel Hill sets standards on impervious surface limits in the Watershed Protection and Water Quality Districts according to the state of North Carolina Water Supply Watershed Protection Rules adopted in 1992. In addition to complying with these rules, the Town of Chapel Hill has taken the following actions to manage the effects of impervious surfaces:

- Delineated critical and protected watershed areas according to the Water Supply Watershed Protection Program.
- Established site level impervious surface limits in the Watershed overlay districts and the Resource Conservation District.
- Mandated that stormwater run-off for proposed development conditions must equal to pre-development conditions.
- Require new development to mitigate the first 1-inch peak storm run-off.
- Require erosion and sediment control plans for all new development.
- Monitor and enforce construction activities based on erosion and sediment control plans.

The next steps for the Town of Chapel Hill to take toward a sustainable watershed management program include consideration of guidelines and regulations to enhance the existing requirements. Specific to impervious surface standards and BMPs, the Town of Chapel Hill should consider taking the following steps:

1) Re-evaluate impervious surface standards and intermittent and perennial stream buffer requirements in the RCD and the Water Supply and Watershed Protection Districts.

2) Consider Low Impact Development (LID) standards for all new development in order to reduce the overall impervious surface cover on a site.

3) Implement an Urban Forestry Program in order to preserve open space and prevent the unnecessary clearing of development sites.

4) Implement a stormwater utility to generate revenues for capital improvements to the existing stormwater infrastructure.

5) Revise the scope and definition of BMPs to include both water quality and quantity objectives.

6) Provide construction guidelines on the installation of alternative BMPs.

7) Increase enforcement of erosion and sedimentation from construction practices, including a rigorous monitoring and enforcement program for the implementation of BMPs.

8) Consider adopting more stringent performance standards for off-site impacts from runoff.

9) Incorporate a retrofitting program into its capital improvements program.

3. Stream Buffer/Resource Conservation District

This report has been developed in order to assist the Town of Chapel Hill in examining stream buffer alternatives and Town policy as part of coordinated stormwater management planning process.

Stream buffer research reveals that the Town's commitment to stream protection, demonstrated in the existing Resource Conservation District, provides a mechanism to achieve a range of community goals:

- Minimizing the impacts of floods;
- Providing for unimpeded flows in streams;
- Protecting the steams from erosion and sedimentation;
- Filtering non-point source pollutants that could impact water quality;
- Preserving Chapel Hill's unique community character;
- Maintaining wildlife and plant habitat;
- Buffering noise and offering attractive natural areas in an urban setting.

Examination of other municipalities' buffer protection schemes shows that there is substantial variation in the way that cities measure, delineate, design, and enforce stream buffers. Compared with other communities, Chapel Hill's existing Resource Conservation District has many positive aspects:

- The restriction of impervious surface within the RCD (6%-20%, depending on conditions);

- The limitation of the disturbance of vegetation with the RCD (this could be enhanced by more measurable standards for development, such as the tree-cutting standards of Charlotte-Mecklenburg);
- The freeboard requirement for structures within the floodway fringe being elevated 18 inches above the RCD flood elevation;
- The buffer expands to incorporate the regulatory floodplain;
- Citizen participation in stream restoration has been successful in the Town
- The perennial stream definition is more inclusive than the name might indicate;
- Buffer width is comparable to most contemporary ordinances.

Several modifications to the RCD are appropriate for the Town of Chapel Hill:

1) Incorporate zoned riparian buffer in Resource Conservation District;

2) Re-evaluate buffer width based on updated floodplain information;

3) Clarify some of the terminology in the Resource Conservation District section of the Town Development Ordinance, particularly the streams protected by the RCD and Town policy regarding land disturbance during construction;

4) Prioritize buffer enforcement, including making necessary staff additions to allow for regular monitoring and site inspections during construction;

5) Use water quality monitoring data as a policy guide and a measure of buffer impact;

6) Update the RCD to eliminate permitted uses that are inconsistent with Town water quality goals;

7) Fully incorporate stream buffers in community design goals; and

8) Foster citizen participation in stream restoration and monitoring