

**FINAL REPORT  
FROM THE  
CHAPEL HILL STORMWATER UTILITY  
DEVELOPMENT AND IMPLEMENTATION  
STUDY COMMITTEE**

**PRESENTED TO THE CHAPEL HILL TOWN  
COUNCIL ON  
NOVEMBER 26, 2001**

***STORMWATER UTILITY DEVELOPMENT AND IMPLEMENTATION STUDY  
COMMITTEE MEMBERS:***

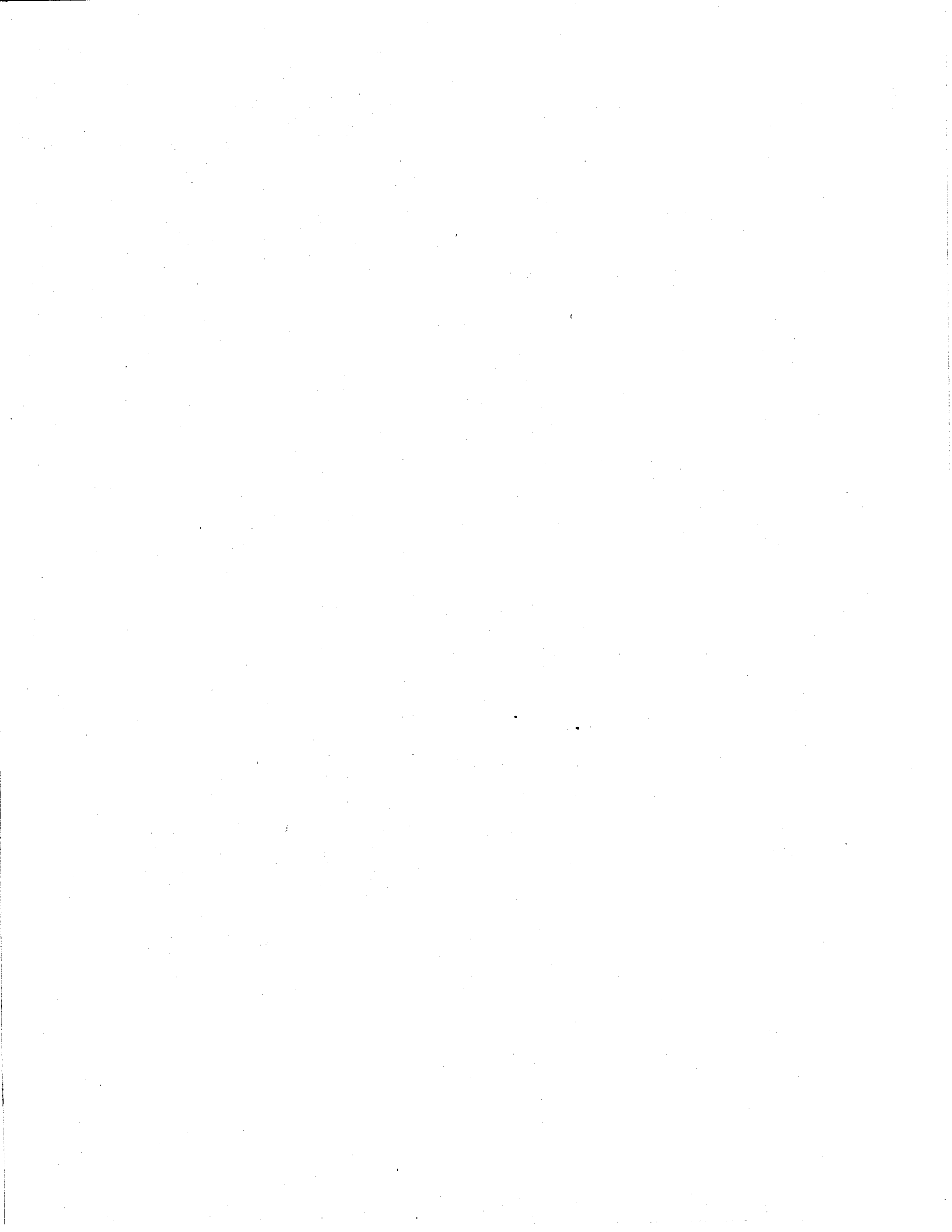
Phil Berke  
Paula Gee Davis, P.E.  
Ren Ivans  
Ed Holland  
Mike Hammersley, P.E.  
Julie McClintock  
James T. Mergner, P.E. (Chair)  
Sharon Myers  
Judith K. Weseman, P.E.  
Roy Williford  
Robin Vincent  
Al Lindsay  
Mia Burroughs

***Local Government Liaisons***

Alan Spalt – Alderman, Town of Carrboro  
Bill Strom – Councilmember, Town of Chapel Hill

***Committee Coordinator***

Fred Royal, EI, CFM, Stormwater Management Engineer, Town of Chapel Hill



2

# **FINAL REPORT FROM THE CHAPEL HILL STORMWATER UTILITY DEVELOPMENT AND IMPLEMENTATION STUDY COMMITTEE**

**November 26, 2001**

## **TABLE OF CONTENTS**

**Summary:** Needs and Opportunities for Comprehensive Stormwater Management in southern Orange County. (4 pages)

**Report and Recommendations** for a Comprehensive Stormwater and Floodplain Management Program for the Town of Chapel Hill and southern Orange County. (16 pages)

**Appendix A:** Southern Orange County Stormwater Management Program Analysis. (12 pages)



## SUMMARY

### **Needs and Opportunities for Comprehensive Stormwater Management in southern Orange County**

Surface water quality throughout the Chapel Hill area continues to decline primarily due to the effects of development. At the same time residents, businesses and public properties in many areas are being confronted with the prospects of greater vulnerability to both nuisance flooding and major flood disasters. Development pressures are strong in and around Chapel Hill, and are projected to continue through 2025 (Chapel Hill Data Book 2001).

The recent flood damages to Eastgate Shopping Center and Piney Mountain Road reflect the increasing vulnerability of both public and private interests in our community. Local surface water quality and biodiversity have experienced a continual decline as a result of stream bank erosion, sedimentation, streamside buffer degradation and other biological and chemical pollutant sources. Impaired stream health is a special concern since the Town's surface water flows into Jordan Lake, which is a drinking water-supply source and recreational area. Compounding these problems is the lack of understanding about issues related to flooding and water quality; and the lack of sufficient information to allow for a proactive decision-making process through which to effectively plan and mitigate these problems.

The Town of Chapel Hill should act to minimize risk to public health and safety. This would also serve to enhance protection of the environment in concert with local economic development strategies. The continual decline in water quality and the recent series of flooding incidents suggest that it is imperative that the community address stormwater management issues in a comprehensive fashion.

In order to protect its citizens from flooding and further water quality degradation, the Town must enhance its stormwater management program to include comprehensive long-range management efforts. Current resources directed toward stormwater management and watershed health are insufficient to fully address the Town's current needs or future water quality problems and flood risks.

#### **Policy Basis for Stormwater Management in the Town's Comprehensive Plan**

The policy basis for comprehensive stormwater management is set forth in the Town's 2000 Comprehensive Plan. Specific strategies include:

- Strategy 9F-1: Improve existing stormwater practices.
- Strategy 9F-2: Develop and implement an effective water quality performance review process.
- Strategy 8A-3: Preserve open space in residential development through the application of conservation development principles.

The plan also states that actions to improve stormwater management are to "*evaluate low impact development and sedimentation control requirements*" and "*develop a dedicated source of funding with a stormwater utility no later than January 31, 2004.*"

## Goals for Comprehensive Stormwater Management

Based on a public charette, previous committee recommendations and review of the Town's Comprehensive Plan and other relevant policy documents, the Stormwater Utility Development and Implementation Study Committee identified the following goals:

1. To prevent or reduce non-point source pollution to the maximum extent practicable.
2. To prevent flood damages caused by new development and reduce flood risk to existing development through mitigation strategies.
3. To reduce the negative impacts and disruption of the economy and local government services due to flooding and flood damages.
4. To protect or enhance surface water resources, water quality, riparian buffers and natural wildlife habitat.
5. To effectively educate and incorporate citizens, businesses and institutions in stormwater management issues and programs.
6. To promote inter-jurisdictional cooperation and programs that ensure a uniform and consistent application to meet the stated goals.
7. To ensure compliance with state and federal regulatory mandates for water quality protection (notable EPA's NPDES Phase II) and floodplain management.

## Recommendations for a Comprehensive Stormwater Management Program

The Stormwater Utility Development and Implementation Study Committee has developed two broad recommendations for the Council to consider. The recommendations are based on work by the Committee as a whole, and on particular contributions of local government staff members with the development of the Southern Orange County Stormwater Management Program Analysis attached to the Committee report.

One recommendation involves actions needed to initiate improved inter-jurisdictional cooperation. The second recommendation focuses on actions to create a Town stormwater utility that would provide a stable revenue stream for a comprehensive stormwater and floodplain management program that addresses the goals outlined by the Committee.

### *1. Support Inter-jurisdictional Cooperation*

The Committee recommends that the Chapel Hill Town Council direct the Manager to initiate formal discussions with neighboring jurisdictions of Carrboro, unincorporated Orange County, UNC-CH and OWASA to establish a *Stormwater Management Workgroup*. The workgroup should focus on how to implement the following recommendations:

- A. *Inter-jurisdictional monitoring, enforcement and elimination of illegal discharges.* Take joint action in monitoring water quality to detect trends in the health of streams that cross multiple jurisdictions, respond to non-compliance issues and take action to identify and enforce compliance through a series of technical and legal steps. This joint endeavor could increase efficiency and cost-effectiveness of individual efforts.

- B. *Public education.* Undertake a comprehensive and coordinated public education program to consistently inform citizens of stormwater, water quality and floodplain management issues, to enable them to take mitigation actions and to provide a simple mechanism to alert officials of observed problems.
- C. *Digital flood mapping and database management.* Replace outdated and inaccurate regulatory flood insurance rate maps locally using geographic information systems (GIS) technology. Provide further modeling and regulatory maps for additional streams and tributaries experiencing significant development pressure. Manage and compile floodplain data and mapping resources.
- D. *Sedimentation and erosion control.* Make available to Orange County expanded resources to ensure regular inspection and enforcement of erosion and sediment control regulations in the rapidly growing areas of the four jurisdictions.

2. *Create a Utility to Support and Sustain a Comprehensive Stormwater and Floodplain Management Program in Chapel Hill*

The following are recommendations to effectively obtain the resources needed for a comprehensive stormwater and floodplain management program in Chapel Hill:

- A. Obtain the services of a professional consultant to evaluate existing local programs and procedures, to identify practical funding and rate options, and to develop scheduling, billing, collection, and accounting procedures for creating and implementing a Chapel Hill stormwater utility.
- B. Establish a citizen's *Stormwater Action Committee* to work directly with Town staff and a professional consultant to clearly define the program elements and more importantly to design a program to provide the necessary public awareness and to build support for funding the program. The action committee would be responsible for holding public information meetings and disseminating information to the public. It is anticipated that interested members of the current Stormwater Utility Development and Implementation Study Committee, who are Town residents, as well as other interested residents, might serve as members of the action committee.

The following tasks should be undertaken by the professional consultant to address the goals set forth in the Committee report:

- 1. Review the Town's current stormwater management, water quality monitoring, floodplain management, database management, drainage maintenance and capital improvements programs, budgets and policies.

(6)

2. Review previous stormwater committee reports and recommendations, current stormwater management and floodplain development regulations, the Town Code and the 2000 Comprehensive Plan.
3. Interview directors and other appropriate staff of the Engineering, Public Works, Planning, Finance and Inspections Departments to determine current departmental programs, policies, budgets and levels of service related to stormwater management, drainage maintenance and floodplain management.
4. Review the goals and recommendations set forth by the Stormwater Utility Development and Implementation Study Committee.
5. Schedule and conduct two meetings with the citizen's *Stormwater Action Committee* and Town staff. The first meeting would solicit input and initiate and develop public support for a Town stormwater utility. The second meeting would present a draft policy paper for final comment by the action committee.
6. Schedule and conduct two meetings with the inter-jurisdictional *Stormwater Management Workgroup* to define the levels of cooperation and responsibility necessary to increase program effectiveness, to jointly meet NPDES Phase II permit requirements where practicable and to reduce overall costs. The four areas of inter-jurisdictional cooperation in Section II of this report should be used as a general guide. The meetings would be conducted on a parallel timeframe with the *SWAC* meetings for continuity in writing the draft policy paper.
7. Within a twelve-month period, submit a Final Action Plan report to Council with recommendations for implementing a Town stormwater utility to meet local needs and State/Federal mandates. The report would include discussion and recommendations regarding:
  - A) Options for a stable, equitable and sufficient source of revenue including funding and rates, billing, collections, and accounting options.
  - B) Options for varying levels of stormwater management services, with the minimum level including only that which would be necessary to meet NPDES Phase II requirements.
  - C) Options for inter-jurisdictional cooperation including roles and responsibilities, possible joint services to be provided, cost analyses and NPDES Phase II co-permit possibilities.



*Recommendations for a  
Comprehensive Stormwater and Floodplain Management Program  
for the  
Town of Chapel Hill and southern Orange County  
(A Final Report to Chapel Hill Town Council prepared by the  
Stormwater Utility Development and Implementation Study Committee)  
November 26, 2001*

## INTRODUCTION

### A) Abstract

1. This report provides the Town Council an implementation plan designed to proactively meet the present and future stormwater and floodplain management program needs for Chapel Hill. When implemented, this program will benefit the Town and possibly surrounding areas in southern Orange County in three principal areas:
  - (a) Provide proactive programs and services that would address stormwater and floodplain management issues to better protect the health and safety of the general public and the natural aquatic environment while meeting new regulatory mandates; and
  - (b) Reduce the negative impacts and disruption of the economy and local governmental services due to flooding.
  - (c) Provide stable financing to replace or supplement Town expenditures currently made from the general fund, the capital improvement fund, and bond funds for stormwater management, drainage maintenance and floodplain management programs and services;
2. This report includes an analysis of current stormwater and floodplain management programs in Chapel Hill, as well as current programs in Carrboro, Orange County and UNC-Chapel Hill. The analysis highlights areas of current multi-jurisdictional cooperation and makes recommendations for enhanced cooperation. See Appendix A, *Stormwater Management Program Analysis* used as the basis used for these recommendations.

On August 23, 1999, the Town Council authorized establishing a new Stormwater Utility Development and Implementation Study Committee to prepare a report regarding

implementation and operation of a Stormwater Utility to serve Chapel Hill and possibly surrounding areas. The charge to the Committee included examining the following:

- Organization and management control system
- Budget areas and services to be provided
- Staffing and equipment needs
- Rate structure and basis for user fees
- Annual revenues and expenses

The committee discussed this issue and deemed it necessary to first consider the problems, goals and needs of the community at-large prior to making substantive utility recommendations.

On February 12, 2001, the Council received a Committee progress report and authorized the charge of the Committee be expanded to include analysis of inter-jurisdictional stormwater management issues on a watershed-wide basis with the goal of achieving regional (Southern Orange County) consensus and cooperation where practicable.

3. This report consists of three sections and Appendix A:

**Section I - Needs Assessment and Goals**

**Section II - Areas of Cooperation in Southern Orange County**

**Section III – Adequacy and Recommendations for Enhancements in Chapel Hill**

**Appendix A – Southern Orange County Stormwater Management Program Analysis**

## **B) Policy Basis for Comprehensive Stormwater and Floodplain Management**

1. 2000 Comprehensive Plan

The policy basis for much of the committee's work is set forth in the Town's 2000 Comprehensive Plan, adopted by the Council on May 8, 2000. The adopted actions recommend improved stormwater management programs and practices in Chapel Hill as a response to federally mandated water quality regulations and local needs. The Plan recommends implementing further stormwater management financing, regulations, policies, incentives, and programs to conserve valuable natural resources, including stream corridors and floodplains, and to pursue water quality improvement.

Specific strategies identified in the Plan are:

**Strategy 9F-1:** Improve existing stormwater management practices.

**Strategy 9F-2:** Develop and implement an effective water quality performance review process.

**Strategy 8A-3:** Preserve open space in residential developments through the application of conservation development principles.

The stated *actions* and *measures of progress* as a means of improving water quality in this section of the 2000 Comprehensive Plan are "...to evaluate low impact development sedimentation control requirements and **develop a dedicated source of funding with a stormwater utility no later than January 31, 2004**".

## 2. Previous Stormwater Committee Reports and Recommendations

This Committee's work builds on two previous reports presented to Council in 1994 and 1999. Each of these reports identified continuing stormwater and floodplain management needs in Chapel Hill:

- a) *Town of Chapel Hill Stormwater Management Committee, Final Report (November 1994)* – Identifies water quantity and water quality issues and recommends five specific policies and other regulatory program changes to improve the Town's Stormwater Management Program.
- b) *Town of Chapel Hill Stormwater Utility Technical Review Committee Report (January 1999)* - Concludes that it would be feasible and practical to formulate a public enterprise stormwater utility, based on user fees, to finance a comprehensive Stormwater Management Program for Chapel Hill and possibly the surrounding areas.

## SECTION I

### Needs and Goals for Comprehensive Stormwater and Floodplain Management in southern Orange County

#### Introduction

The Stormwater Utility Development and Implementation Study Committee has defined the stormwater management needs and goals of Chapel Hill and of the southern Orange County region in general. These needs and goals were derived from the two previous reports described above, the 2000 Comprehensive Plan and a public charette held by this Committee. In addition to the Committee members, public officials and staff, OWASA staff, citizens, engineers and planners and local business interests attended the charette.

The Committee developed broad-based stormwater and floodplain management goals to serve as guideposts in creating an effective stormwater management partnership involving the four political entities of Chapel Hill, Carrboro, unincorporated Orange County and UNC- Chapel Hill. These goals included, but were not limited to, goals required by NPDES Phase II permitting.<sup>1</sup>

---

<sup>1</sup> National Pollutant Discharge Elimination System Phase II (NPDES Phase II) is a U.S. Environmental Protection Agency mandate which will require each affected jurisdiction to submit a permit application to the N.C. Division of Water Quality by March 3, 2003. This mandate requires that the jurisdictions meet six specified minimum measures.

## A) Needs for Stormwater and Floodplain Management

The Committee identified the following needs to be addressed by comprehensive stormwater and floodplain management programming:

### 1) Flooding and Flood Damages

The recent flood damages to the Eastgate Shopping Center and Piney Mountain Road were only the latest in a long list of flooding trouble spots in the four-jurisdiction area. Many other flood damages occur to residential and commercial and public properties that do not involve the floodplain and are associated with localized drainage systems.

Key community challenges involving flooding and flood damages include:

- a) Managing stormwater runoff increases resulting from development and other types of development induced hydrologic alterations
- b) Mitigating the negative impacts caused by flooding to existing development
- c) Addressing and managing functionally obsolete drainage infrastructure systems
- d) Addressing inadequate watershed response information such as stream gauge and precipitation data
- e) Addressing decreases in naturally vegetated buffers or floodplains
- f) Addressing National Flood Insurance Program (NFIP) issues such as digital mapping, map amendments and revisions, public education and flood hazard mitigation

### 2) Water Quality and Riparian Area Health

Urbanized watersheds causes local surface water quality to decline and stream characteristics to become altered. Local stream health is important for many reasons, including that it is a water supply source for Jordan Lake. Key issues necessary for the improvement of impaired water quality and riparian area health in southern Orange County is the management of stormwater runoff from development and the use, preservation and management of the riparian areas adjacent to streams.

Additionally, enhanced programming is necessary to further assess ambient water quality, identify stream classifications (type), prioritize restoration needs, identify and eliminate illegal discharges and connections, perform benthic monitoring<sup>2</sup> and accurately map the stream systems on global information system (GIS). Mapping and managing this information using GIS as a tool would assist to

---

<sup>2</sup> Benthic monitoring is necessary to classify streams (ephemeral, intermittent, or perennial) and to evaluate stream health through benthic macroinvertebrate indicator species utilizing a protocol that has been developed and approved by the State of North Carolina Division of Water Quality.

efficiently prioritize improvement activities and to take intervention actions involving adverse or illegal conditions.

Key community challenges involving water quality and riparian health improvements include:

- a) Addressing stream chemistry and benthic sampling/monitoring, data management and interpretation
  - b) Classification, mapping and prioritization of streams
  - c) Public awareness, education and involvement
  - d) Addressing illegal pollutant sources, discharges and connections and taking elimination actions
  - e) Addressing riparian area uses
  - f) Addressing best management practices (BMP) use for post-development treatment of polluted stormwater
- 3) National Pollutant Discharge Elimination System Permitting (NPDES Phase II)

In conjunction with the above local needs, responding to federal and state regulatory mandates regarding water quality is necessary. The NPDES Phase II program mandates that “urbanized areas” must plan and submit a permit by March 3, 2003 to manage non-point source pollutants found in stormwater. Actual programs and activities must be fully implemented within five years of the initial permit submittal. Many of the local jurisdiction’s water quality needs may be addressed cooperatively to efficiently meet these permitting mandates. See Section II of this report.

Staff representatives of the four jurisdictions in the committee have participated in a jurisdictional self-assessment outlined in Appendix A. This self-assessment was used as a guide, in part, to formulate Section II of this report.

Appendix A, entitled *Southern Orange County Stormwater Management Program Analysis*, summarizes current stormwater programming, including adequacies, areas in need of improvement and strategies to meet the defined stormwater and floodplain management goals for southern Orange County.

## **B) Goals for Stormwater and Floodplain Management**

Based on the work of the previous two stormwater management committees, the policy statements of the 2000 Comprehensive Plan, and the public charette conducted in December, 2000, the Committee has defined the following goals:

- 1) To prevent or reduce non-point source pollution to the maximum extent practicable
- 2) To prevent flood damages caused by new development and reduce flood risk to existing development through mitigation strategies

- 3) To reduce the negative impacts and disruption of the economy and local governmental services due to flooding and flood damages
- 4) To protect or enhance the surface water resources, water quality, riparian buffers and natural wildlife habitat
- 5) To effectively educate and incorporate citizens, businesses and institutions in stormwater management issues and programs
- 6) To promote inter-jurisdictional cooperation and programs that ensure a uniform and consistent application to meet the stated goals
- 7) To ensure compliance with state and federal regulatory mandates for water quality protection and floodplain management

## SECTION II

### Areas of Program Cooperation for southern Orange County

*(This section is a result of the Council resolution expanding the charge of the Committee to analyze inter-jurisdictional stormwater management issues on a watershed-wide basis with the goal of achieving regional consensus and cooperation where practicable (2001-02-12/R-8))*

#### Introduction

Cooperation on a watershed-wide basis, where it is practical and feasible, is an efficient and effective means of addressing stormwater and floodplain management issues. Cooperation can provide consistency and communication regarding initiatives that might not have been as effectively implemented on an individual basis. It also provides a basis upon which to plan and prioritize efforts needed by the community-at-large, including certain areas mandated by NPDES Phase II.

Carrboro, Chapel Hill, unincorporated Orange County and UNC- Chapel Hill reported on their current efforts and needs to achieve various goals as defined by the Committee. An analysis of these findings, as described in Appendix A of this report, shows that the four jurisdictions are satisfactorily working toward meeting many of the goals independently, but that there are four particular program areas in which they could cooperate to create more effective stormwater and floodplain management programming. In some areas, such as the established ambient water quality sampling and reporting agreement between Chapel Hill and Carrboro, the cooperative efforts are already underway. The committee recommends building upon the existing programs and expanding on them in new cooperative programs.

Since the jurisdictions prefer to continue to primarily operate as separate entities in their drainage and stormwater management activities, they will continue to fundamentally structure, finance and manage stormwater issues internally. Section III of this report describes the committee's recommendations to the Council regarding enhanced program and service elements of a stormwater and floodplain management program for Chapel Hill.

## A) Programs for Jurisdictional Cooperation

As provided by the supporting details found in Appendix A, Section IV, Strategies for Improvement, the Committee identified four feasible and practical programs for cooperation and three general programs in which the jurisdictions should continue to implement stormwater management programs internally.

### 1) Water Quality and Benthos Monitoring

To monitor, address or maintain the high surface water quality that our citizens expect and public health demands, the jurisdictions must sample and analyze (on an established frequency-basis) the chemical and biological constituents in the surface water and the benthic organisms present in the streambeds.

On several levels, cooperative efforts are underway to monitor water quality between the four jurisdictions and with OWASA staff. These informal efforts and formal agreements are working fairly well on the basis of transferring information. However, nothing is in place regarding formalized follow-up actions between all jurisdictions. The Committee recommends that these jurisdictions and OWASA continue cooperating in this manner and further develop a more comprehensive level of monitoring and follow-up activities.

One such action should be to develop an illicit connection/discharge identification and elimination program that crosses political boundaries on a watershed-wide basis. This is an NPDES Phase II requirement for each jurisdiction and by combining efforts each jurisdiction could likely realize a significant efficiency and cost-effectiveness in individual staff time and associated expenses. A multi-jurisdictional "water quality hotline" and a formalized education program would benefit this cooperative program as well. Another monitoring technique recommended is to purchase, install and manage a distributed series of rain and stream gauges to provide positive benefits for the entire community. (Addresses Goals 2, 5 and 7.)

**Recommendation: THE COMMITTEE RECOMMENDS THAT THIS PROGRAM BE ENHANCED.**

### 2) Public Education Program

Citizens from all the jurisdictions routinely come into contact with our streams and lakes. Some of their activities foster clean water and do not cause further flood risks. Some of their actions can introduce pollutants to the water or cause flooding problems to neighbors or other areas.

Many citizens are simply unaware of issues related to stormwater, water quality and drainage issues in general. Many issues can be presented to the general public. With increased understanding, the public would cause less negative

impacts and would alert officials of observed real problems. The overall effect would result in net cost savings, reduced pollutants and less property damages due to flooding.

Citizens may not realize that dumping grass clippings, woody debris or applying fertilizer near a ditch or creek adds significantly to nutrient loading or may cause flooding problems. These practices can become a chronic burden on public maintenance services or the downstream property owner. Many citizens and businesses do not know if their property is at risk due to flooding or understand that federally backed flood insurance is available to provide a protection to their investment and livelihood.

None of the four jurisdictions has a public education program for stormwater or floodplain management and water quality issues. The Committee recommends that the jurisdictions pursue a unified public education program to meet local needs as well as the NPDES Phase II mandated needs. Since there are existing and developing materials and programs currently available by the State, the Triangle J Council of Governments and others, this cooperative effort need not create every material and program from scratch. (Addresses Goal 6 and 7.)

**Recommendation: THE COMMITTEE RECOMMENDS THAT THIS PROGRAM BE IMPLEMENTED.**

**3) A Partnership in Digital Flood Mapping and Database Management**

When a developer submits a development plan adjacent to a stream in one of the jurisdictions, questions arise about the location of the floodplain. Although the jurisdictions promote "Do No Harm" as a standard for new construction, it is not always known by officials where the actual floodplain boundary is located and how to address flood hazard mitigation efforts locally. This problem is primarily due to outdated Flood Insurance Rate Maps (FIRM) for all jurisdictions.

Fortunately, the Federal Emergency Management Administration (FEMA) and the N.C. Division of Emergency Management (NCDEM) are working with Carrboro, Chapel Hill, and Orange County to provide updated regulatory maps. These maps will be in digital format, due to be completed (as preliminary versions) in August 2002. It is anticipated that these digital maps will show changes to the floodplain boundary in some areas. In Chapel Hill, this may affect the Resource Conservation District (RCD) boundary as well.

Our region will be required to adopt these new maps within six months of final completion as participants in the National Flood Insurance Program (NFIP). Due to limited funding, the new digital maps may prove to be partially sufficient, in terms of the streams studied in sufficient detail. It may be determined that additional engineering studies and mapping will be needed at the local level, depending upon development and flooding issues in the watershed.



The proper dissemination and understanding of this map information to the public will be vital. The data will be used for many purposes; by mortgage lenders to determine flood risk, map revisions and amendments, hazard mitigation planning and grant applications, further engineering studies and other uses. Chapel Hill and Carrboro have signed a Memorandum of Understanding with FEMA under the Cooperative Technical Partnership (CTP) program. Efforts must now be made to determine what cooperative should be carried out between the communities. The Committee recommends that this digital flood mapping effort be fully explored at the local level by working with NCDDEM in managing and maintaining this data locally.

A related challenge is that digital data may be reported differently by the jurisdictions. Fortunately, the regional GIS Users Group is working to eliminate those differences. The Committee recommends that the jurisdictions continue to pursue a uniform and consistent digital standard and create easy access to the data.

**Recommendation: THE COMMITTEE RECOMMENDS THAT THIS PROGRAM BE IMPLEMENTED.**

**4) Sedimentation and Erosion Control (S&EC)**

Erosion adds soil particles and pollutants to streams and the resulting deposition of sediment can increase flooding and maintenance requirements and destroy habitat. Orange County is performing S & EC inspection and enforcement for itself and for Carrboro and Chapel Hill. Because the University of North Carolina at Chapel Hill is exempt from the County requirements, the North Carolina Division of Land Quality is responsible for S & EC permitting and enforcement on the University property.

The Orange County S & EC staff members are doing an effective regulatory job given the limited staff resources. They also have a new and expanding role in enforcing both the Neuse River Basin Rules and NPDES Phase II measures as dictated by their newly adopted Stormwater Ordinance on March 9<sup>th</sup>, 2001.

The University plans to develop more than five million square feet over the next eight years associated with the O-I4 Zoning District; further development is expected to occur in association with the UNC Master Plan activities on the main campus and on the largely undeveloped Horace Williams tract. The Committee believes that the significant University growth will limit State's inspection capabilities and effectiveness and that Orange County capabilities to effectively issue permits, routinely inspect construction sites and enforce land disturbance regulations in southern Orange County will be pushed beyond its level of adequate capability.

⑩

The Committee recommends that Orange County be given sufficient resources to ensure routine inspections in the four jurisdictions' growing development areas, including University developments. On State-owned lands, the committee believes that an inspection agreement may be possible between the State and Orange County, where the County would perform routine inspections and report to the State. Additionally, the Committee believes that the University should investigate utilizing the more stringent Orange County S&EC design criteria. The State would continue to perform all enforcement activities under this consideration. The Committee also recommends that the jurisdictions review and utilize regulatory fines for those who do not meet the minimum sedimentation and erosion control requirements. S&EC is an NPDES Phase II permit requirement. (Addresses Goals 5 and 7.)

**Recommendation: THE COMMITTEE RECOMMENDS THAT THIS PROGRAM BE ENHANCED.**

### **C) Areas for jurisdiction-specific stormwater management**

The committee believes that there are areas where current stormwater programming within each jurisdiction should remain separated. This is primarily due to the institutional and practical realities of existing programs and the complexities of the suggestion of merging programs, such as capital improvements or maintenance.

The following general areas are recommended to remain jurisdictionally separated:

- 1) **NPDES Phase II permits-** The committee understands that each jurisdiction plans to submit its own permit application to the North Carolina Division of Water Quality to receive an NPDES Phase II stormwater permit. This process may require that a Notice of Intent (NOI) or General Permit be submitted by March 3, 2003, detailing how they will meet the six minimum measures over a five-year implementation period. However, several of the six minimum measures required, such as public education and erosion control, are included in the above cooperative programs recommended. Therefore, the responsibilities and details must be clearly worked out locally in considering these cooperative efforts prior to submittal of the individual permits. (Addresses Goals 1, 4, 5, 6 & 7)
- 2) **Stormwater and Drainage Infrastructure-** Each jurisdiction remains responsible for inventory and GIS mapping, drainage maintenance and capital improvements of their stormwater infrastructure. (Addresses Goals 3, 4 and 5)
- 3) **Housekeeping-** Each jurisdiction is responsible for housekeeping tasks such as street sweeping and incorporating best management practices (BMP) into public facility design and practice. (Addresses Goals 4 and 5.)

**SECTION III****Chapel Hill's Stormwater and Floodplain Management Program:  
Adequacy and Recommendations for Enhancements****Introduction**

The purpose of this section is to evaluate and review the adequacy of the Town's existing stormwater and floodplain management, drainage maintenance and water quality programs and services and to make recommendations for enhancements. Secondly, this section describes estimated costs for current stormwater programs and for purposes of clarity, the estimated cost projections for implementing the NPDES Phase II water quality permit program, without considering any other program enhancements that this report recommends.

Appendix A was developed for the purpose of analyzing current program adequacies and areas in need of enhancement. This Appendix was used, in part, as a guide for the development of the Town's program enhancement recommendations.

**A) Current Chapel Hill Stormwater and Floodplain Management Program and Imperative For Program Enhancements**

The Town's existing stormwater and floodplain management programs and services are performed at the highest possible level of service, given the staff and financial resources available. These programs and services are the responsibility of several Town Departments. The following are general departmental programs and services currently in place:

**Public Works Department Drainage Maintenance Program:**

- Right-of-way drainage maintenance
- Capital Improvements
- Street Sweeping
- Debris Removal
- Drainage Assistance Program

**Engineering Department Stormwater and Floodplain Management Program:**

- Water Quality Sampling
- Development Drainage Design Review
- Stormsewer Infrastructure Inventory and GIS Mapping
- Stormwater Facility Bonds and Inspection (Water Supply Watershed areas)
- Design Manual and Standard Details
- Best Management Practice Standards
- Technical Assistance
- Bridge Replacement and Capital Improvements
- National Flood Insurance Program Administration

- Resource Conservation District Determinations and Mapping

Inspections Department Program:

- Building Permits and Inspections
- Building Finish Floor Elevation Verification
- Building Code and Development Ordinance Enforcement

Planning Department Programming:

- Preliminary Plan Review
- Permit Administration
- Development Ordinance and Comprehensive Plan Administration

With the current staffing and financial resources, the Town is sometimes unable to promptly and effectively meet current stormwater and floodplain management and drainage program and service needs, including the items listed above. There are several key factors leading to the conclusion that an enhancement of existing programs are necessary in order to operate effectively in meeting current needs, and to prepare to meet new needs.

The following statements are a synthesis of the items described in Appendix A that indicates a need for stormwater program enhancements:

- 1) Development permit review requirements for stormwater management are increasing
- 2) Constructed stormwater management facilities (public and private) are increasing
- 3) Town costs to provide drainage maintenance and capital improvements are increasing
- 4) Drainage Assistance Program (public/private projects) requests and project costs are increasing
- 5) Functionally obsolete and failing public drainage systems are increasing
- 6) Public and private property damages due to flooding are increasing
- 7) NPDES Phase II regulations mandate an increase in Town stormwater management programming and resources
- 8) Revised Flood Hazard Maps will identify expanded or modified areas of flood hazards requiring increased Town floodplain management and mitigation activities
- 9) Opportunities and needs for public education, grants and cooperative efforts will require increasing Town resources

The Committee understands that the Town's citizens expect the highest possible level of stormwater management programming and service that will ensure a safe and healthy environment. The Committee also understands that our citizens are reluctant to pay additional taxes to provide the expected services. However, additional funding resources are necessary to provide for the services and programs this Committee is recommending.

## B) NPDES Phase II Stormwater Permit Program: Sample Cost Projections

The fiscal projections below are for demonstrative purposes to show estimated current stormwater management and maintenance costs in Chapel Hill and possible future costs of stormwater programming. This assumes no increases to the current programming with the exception of meeting the NPDES Phase II permitting program mandates. The EPA has established an estimated cost range from \$2.50 to \$7.50 per capita per year for this water quality permit requirement. All population projections are estimates only, not taken from most current census.

The fiscal projections also do not take into consideration any cost savings due to the effectiveness of cooperative efforts, which would serve to reduce the costs at the local level. The amount of this cost savings has not yet been determined.

The sample projections assume a modest \$2.50 per capita per year for FY 2003 and increasing to \$7.50 per capita per year by FY 2007, assuming full NPDES Phase II implementation. These projections suggest that modest program costs could increase by 17% in fiscal year 2003 with a limited NPDES Phase II startup program, and by 26% in fiscal year 2007 assuming full Phase II implementation. This assumes no real increases to current stormwater and floodplain management, capital improvements and maintenance programming.

The cost per capita per year of \$30.07 represents a *moderate* Stormwater Management Program, based on typical costs nationwide for similar programs. Comprehensive (or proactive) stormwater and floodplain management programs can cost in excess of \$50.00 per capita per year, based on figures for existing programs nationally.

### 1. Estimated Current Town Program Costs (FY '00) (administrative costs not included)

-Drainage Maintenance/Street Sweeping:.....\$ 700,000  
-Engineering:.....\$ 250,000

-Total Current General Fund Stormwater Program Costs: \$950,000

**-Total Current Stormwater Program cost per capita (FY '00): \$20.41**  
(assumes population of 46,545)

### 2. Estimated Town Program Costs including limited NPDES Phase II permit requirements for startup\* (FY '03):

(assumes 3% increase per year for current programs & limited NPDES Phase II startup costs)

-Drainage Maintenance/Street Sweeping:.....\$ 765,000  
-Engineering:.....\$ 273,000

-NPDES Phase II start-up (year one):.....\$ 123,000  
*(assumes \$2.50 per capita)*

-Total Estimated Stormwater Program Costs (FY '03): \$1,161,000

**-Total Estimated Stormwater Program cost per capita (FY '03): \$23.85**  
*(assumes population of 48,669)*

*\*A limited initial approach to NPDES Phase II might include one new technician level position, requiring existing staff to absorb most additional tasks/responsibilities.*

3. Estimated Town Program Costs with full NPDES Phase II implementation (FY '07)

*(assumes 3% inflation per year for current programs & five year NPDES Phase II implementation period)*

-Drainage Maintenance/Street Sweeping:.....\$ 860,000

-Engineering:.....\$ 306,000

-NPDES Phase II start-up (year five):.....\$ 387,502  
*(assumes \$7.50 per capita)*

-Total Estimated Stormwater Program Costs (FY '07): ..... \$1,553,502

**-Total Estimated Stormwater Program cost per capita (FY '07): \$30.07**  
*(assumes population of 51,667)*

## SECTION IV

### Conclusions and Recommendations

#### Introduction

Resulting from the committee's discussions surrounding the many issues of a comprehensive stormwater and floodplain management program in southern Orange County, the committee has developed the following conclusions and recommendations for Council to consider.

#### A) Conclusions

- 1) The NPDES Phase II program requires the Town of Chapel Hill to submit a permit application no later than March 3, 2003.
- 2) The Chapel Hill community desires a level of service beyond that required to just meet the requirements of the NPDES Phase II program.

- 3) The Committee identified the key issues and areas of cooperation regarding stormwater and floodplain management in and around Chapel Hill. The Committee believes that further defining the issues, priorities and opportunities for cooperation involving the four jurisdictions will be productive.
- 4) The Committee identified moderate increases in projected costs to meet minimum NPDES Phase II mandates, assuming no other real increases in existing stormwater and floodplain management services in and around Chapel Hill.
- 5) The Committee identified that additional local needs and associated programs will be best addressed by the implementation of a stormwater utility to provide a stable revenue stream to fund such a program within Chapel Hill.
- 6) The Committee identified that a detailed program analysis in Chapel Hill including alternative levels of service and a recommendation on how to proceed is needed. A fully qualified professional working with Town staff and a citizen's advisory committee best accomplishes this.

## **B) Recommendations**

Therefore, the Committee requests that Council consider acting on the following:

- 1) Initiate formal discussions with appropriate officials of neighboring jurisdictions and OWASA with the goal of implementing the four areas of cooperation described in Section II of this report. These areas include:
  - Water quality and benthic monitoring and identification and elimination of illegal discharges
  - Public Education
  - Digital Flood Mapping and other NFIP activities
  - Sedimentation and Erosion Control activities
- 2) Discuss with the neighboring jurisdictions and OWASA the establishment of a small inter-jurisdictional *Stormwater Management Work Group*. This group of selected individuals is envisioned to be a continuing work group that will have as its mission the implementation of the areas of inter-governmental cooperation in stormwater and floodplain management, such as a public education program. Tasking will include detailing areas in which cooperation may occur which is both feasible and mutually beneficial. It is envisioned that each jurisdiction may formally appoint two persons (one staff member and one citizen) and the group will meet at least quarterly. This group will also be tasked to define how the NPDES Phase II permit may include these combined efforts.
- 3) Authorize the Manager to obtain the services of a professionally experienced consultant to develop the details of and an implementation schedule for the proposed Chapel Hill stormwater utility. The utility will carry out a comprehensive stormwater and floodplain management program in Chapel Hill and may provide selected services to other jurisdictions. Particular attention will be given to ensuring inter-jurisdictional cooperation to increase the effectiveness



of the program and to reduce the costs. The consultant will work with Town staff and the *SWAC* (see Item #4) to recommend ways for the utility to have a stable and reliable source of revenue, billing, collection and accounting system, and a means of implementing a public communications and education program. The consultant will also define at least three levels of service with the minimum being the resources required to satisfy the requirements of the NPDES Phase II program with no enhancements to the current program.

- 4) Establish a citizen's *Stormwater Action Committee (SWAC)* tasked to work with Town staff and the professional consultant for the detailed definition and recommendation of an enhanced Stormwater and Floodplain Management Program, financed by a public enterprise stormwater utility. This committee would consist of Town residents only and would serve as citizen liaisons during the utility development. Current committee members who are Town citizen's might serve as initial members.

#### **ATTACHMENTS**

- 1) Appendix A: Southern Orange County Stormwater Management Program Analysis



Southern Orange County  
Stormwater Management Program Analysis

23

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Justification for Assessment	Strategy to Meet Goals	Goals Addressed	Responsible Party
<b>I. Flooding Related Issues</b>						
a. Development in or near FEMA floodplain	University	The Stormwater Master Plan ensures all development complies with floodplain regulations.	Adequate	To adhere to the requirements of the Stormwater Master Plan.	Goal 3, 4 and 5	UNC-CH Facilities Planning & Construction
	Chapel Hill	RCD Ordinance - No building within the floodway and 2 feet higher than the regulatory floodplain elevation unless meets permitted uses or no-rise conditions. National Flood Insurance Program participant. Out-dated maps need replacement.	(Revised Development Ordinance provisions stated to re-define RCD "buffer zones" and permitted uses. Town to coordinate with FEMA and partner (CTP) with Town of Carboro.	Utilize Development Ordinance revisions for RCD revisions and utilize new digital flood maps for development and mitigation activities.	Goal 2, 3 and 5	Town of Chapel Hill
	Carboro	Section 15-254 No building within the floodway and no building within the floodplain unless deprived of all uses of the property.	Adequate	Continue with existing regulation	Goal 3 and 5	Town of Carboro
	Orange County	In State-classified protected watersheds no development is allowed within floodplains or within a stream buffer which is fifty feet minimum measured from the FEMA boundary. Outside of the 12 mile radius line, there are currently no mandated stream buffers; however a text amendment is before the BOCC to mandate a minimum 50 ft. stream buffer measured from the bank on each side of perennial and intermittent streams anywhere within the County.	Adequate	Continue enforcing current regulations		Orange County
b. Development near intermittent streams or tributaries. This is in anticipation of future Cape Fear Basin Buffer rules established by the NC Environmental Management Commission.	University	Continue to comply with RCD regulations	Adequate	Follow existing policy	Goal 1, 2, and 5	UNC-CH Facilities Planning & Construction
	Chapel Hill	RCD Ordinance - Intermittent streams not addressed	Intermittent streams should be identified and regulated with minimum buffer widths	Develop Policy and Regulation	Goal 2,3 and 5	Town of Chapel Hill
	Carboro	Section 15-269 Requires a 60 foot buffer from the centerline of the intermittent stream (w/o a FEMA flood hazard area, and drains less than 640 acres but more than 50 acres)	Adequate	Continue with existing regulation	Goal 2,3 and 5	Town of Carboro
	Orange County	In State-classified protected watersheds no development is allowed within floodplains or within a stream buffer which is fifty feet minimum measured from the FEMA boundary. Outside of the 12 mile radius line, there are currently no mandated stream buffers; however a text amendment is before the BOCC to mandate a minimum 50 ft. stream buffer measured from the bank on each side of perennial and intermittent	Adequate	Continue enforcing current regulations		Orange County
c. Nuisance flooding	University	Development is being designed to ensure the rate of runoff, the total volume of runoff and quality not be negatively impacted. Nuisance flooding issues resulting from prior development will be addressed in the stormwater master plan.	In Implementation Phase Just beginning but will be adequate when program is implemented.	Implement creative solutions such as porous pavement, green roofs, etc.	Goal 2, 3, 4, 5, 7	UNC-CH Facilities Planning & Construction

Southern Orange County  
Stormwater Management Program Analysis

12

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Infrastructure/Asset Assessment	Strategy to Meet Goals	Goals Addressed	Responsible Party
	Chapel Hill	Drainage Assistance Program/CIP - Assists private property owners with 50/50 cost-share drainage assistance projects and provides for limited public right-of-way maintenance.	Very limited program currently.	Provide more comprehensive programs through funding and prioritization.	Goal 2,3 and 5	Town of Chapel Hill
	Chapel Hill	Citizen Assistance Services - Provides technical assistance to citizens and staff covering drainage, maintenance, etc.	Citizen complaint/concern response efficiency is low. Assistance typically limited to technical assistance.	Provide more comprehensive programs through funding and prioritization.	Goal 2,3 and 5	Town of Chapel Hill
	Carboro	Section 15-269 Requires a 30 foot buffer from the centerline of minor intermittent streams (drains less than 50 acres) plus a storm water management plan is required of all developments Section 15-263 Currently cooperating with FEMA to identify and "temp" areas of concern	Adequate	Continue with existing regulation	Goal 2,3 and 5	Town of Carboro
	Orange County University	Addressed on an as needed basis. Specific needs will be addressed in the stormwater master plan.	Adequate	Continue with existing practice	Goal 2,3, and 5	Orange County
d. Inadequate drainage infrastructure (old, ill-maintained systems).	Chapel Hill	The public drainage system maintenance is primarily limited to existing rights-of-way. Inadequate systems are generally addressed on an ad-hoc basis with maintenance or capital improvements. Funding is primarily through bonding and general revenue.	Drainage system inventory needed	Correct drainage problems as needed. Map infrastructure in GIS.	Goal 1,2	UNC-CH Facilities Planning & Construction
	Chapel Hill	The public drainage system maintenance is primarily limited to existing rights-of-way. Inadequate systems are generally addressed on an ad-hoc basis with maintenance or capital improvements. Funding is primarily through bonding and general revenue.	The public and private drainage system inventory is currently being conducted. It is revealing the need for additional maintenance and improvements throughout Town on both public and private locations.	Improve planning, funding and staff resources for the Capital Improvements and drainage maintenance programs on both public and private properties. Improvements on private property would remain in private easement.	Goal 1,3,4	Town of Chapel Hill
	Carboro	The public drainage system is primarily limited to existing rights-of-way. Inadequate systems are generally addressed on an as needed basis.	Under Assessment. A drainage system inventory is currently being conducted	Modify Capital Improvements Program to address deficiencies	Goal 1 and 2	Town Engineer
	Orange County	Orange County does not have a storm drainage system and does not anticipate installing one.	Adequate	Keep impervious surface to a minimum	Goals 2,3,4,5,6 (Neuse only)	Orange County
e. Increased discharges off of developed sites not previously regulated.	University	A stormwater master plan for all watersheds and sub-basins on main campus is being developed. This plan will address runoff volume, rate and quality issues from new construction and will mitigate many of the problems from past construction.	In implementation phase. Just beginning but will be adequate when program is implemented.	Implement creative solutions such as porous pavement, green roofs, etc.	Goals 2,3,4,5,7	UNC-CH Facilities Planning & Construction
	Chapel Hill	All commercial and industrial developments must provide detention for the 25-yr. storm event	Post-development runoff controls not required for single-family development and overall release rate criteria needs review.	Address in Development Ordinance stormwater management revisions	Goal 1,2,3,4 and 5	Town of Chapel Hill
	Carboro	Section 15-263 All developments shall be constructed and maintained so that they do not cause stormwater related damage to upstream or down stream properties.	Adequate	Continue with existing regulation	Goal 2,3 and 5	Town of Carboro

Southern Orange County  
Stormwater Management Program Analysis

25

Identified Stormwater Management Problems	Quality	Current Program Requirements	Program Effectiveness	Strategy to Meet Goals	Quality Addressed	Responsible Party
<p><b>II. Water Quality Issues</b></p> <p>a. Lack of stream data</p>	Orange County	Impervious surface is limited to the maximum under the ordinance. That is no expansion of impervious surface if the current exceeds the maximum	Adequate	Continue with existing regulation	Goal 2, 3, 5 & 6 (Neuse only)	Orange County
	University	Benthic and fish studies conducted in Meeting of the Waters and Battle Branch Summer 2001 and every 6 months thereafter. Wet weather samples twice a year. Dry weather samples twice a year. Hourly chemical monitoring and flow gauging on Meeting of the Waters.	Adequate	Exceeds Federal and State mandates. Additional sampling may be conducted for specific illicit discharge detection.	Goals 1, 2, 5, and 7	UNC-CH Environment, Health & Safety
	Chapel Hill	Ambient sampling since 1983. Ad-hoc benthic studies. One USGS funded gauge on Morgan Creek & one on Battle Branch.	Limited ambient data interpretation and follow-up. Comprehensive benthic program recommended for TMDL's and intensive surveys program needed for NPDES Phase 2 mandated illicit discharge identification and elimination program. Precipitation and stream gauges recommended.	Needs expanding for illicit discharge enforcement and TMDL's monitoring.	Goal 1, 2, 5 and 7	Town of Chapel Hill
	Carboro	4 benthic studies during FY 00-01 with 1 per year thereafter along Bolin Creek, 2 grab samples per month-Toms Creek and Bolin Creek (Since 894)	Adequate but remote water quality sampling would be ideal. Benthic studies along Morgan Creek may be beneficial.	Exceeds Federal and State mandates but may need expanding for illicit discharge enforcement	Goal 1, 2, 5 and 7	Town of Carboro
	Orange County	Orange County does not have a stream monitoring program now. The Neuse River Basin rules will require formulation of a monitoring program for TSS and nitrogen.	Will need new monitoring program to meet Neuse River Basin rules.	Formulate new monitoring program to meet Neuse River Basin rules.	Goal 1, 2, 5, and 7	Orange County
b. Lack of precipitation data	University	A rain gauge was recently installed on UNC-CH property.	Adequate	Meets requirements	Goal 3, 4, and 7	UNC-CH Environment, Health & Safety
	Chapel Hill	The Town uses rain gauge data provided upon request by OWASA, Horrace Williams Airport and RDU.	Each gauge provides limited information. Additional continuous output gauges throughout area would be beneficial for flooding analysis.	Additional gauging is necessary for accurate modeling and precipitation, discharge and pollutant information. Very useful for public education.	Goal 3, 4, 6 and 7	Town of Chapel Hill
	Carboro	The Town uses rain gauge data provided upon request by OWASA.	Adequate but additional remote gauges throughout would be desirable	Meets Requirements	Goal 3, 4 and 7	Town of Carboro
	Orange County	The Planning Department is not aware of any precipitation data gathered.	Can start requiring rain gauges on construction sites		Goal 3, 4, and 7	Orange County

Southern Orange County  
Stormwater Management Program Analysis

26

Category	Entity	Current Stormwater Management Programs	Future Stormwater Management Programs	Strategy to Meet Goals	Quality Assurance	Responsible Agency
c. Not considering development from a regional perspective.	University	A stormwater master plan for all watersheds and sub-basins on main campus is being developed. This plan will address runoff from new construction and will mitigate many of the problems from past construction.	IN IMPLEMENTATION PHASE Just beginning but will be adequate when program is implemented.	Will meet NPDES requirements	Goal 3, 4, and 7	UNC-CH Facilities Planning & Construction
	Chapel Hill	Revised digital flood study underway by NCDDEM, with Carboro/Chapel Hill in the FEMA Cooperative Technical Partnership.	ADEQUATE in meeting minimum NFIP standards, improvements necessary for proposed programs	Meets basic federal and state requirements.	Goal 1, 3, 4, 8 and 7	Town of Carboro, Chapel Hill, NCDDEM, FEMA and others
	Carboro	Build out Hydros model of upper Bolin Creek completed with assistance from Chapel Hill in 1992 flood plain study underway, with Chapel Hill in the FEMA Cooperative Jurisdiction Program.	Adequate	Meets basic NPDES requirements unless joint applications for NPDES Permits are mandated	Goal 3, 4 and 7	Town of Carboro, Chapel Hill, FEMA and others
	Orange County	University lake Watershed limited to a maximum of 6% impervious surface. Non watershed, (Rural buffer) no restrictions	Adequate	Meets basic federal and state requirements.	Goal 3 & 5	Orange County
d. Sedimentation	University	Sedimentation issues are enforced by the NCDENR.	Adequate	Meets NPDES requirements	Goal 2 and 5	NCDENR
	Chapel Hill	Town Erosion Control Ordinance provides for the permitting and enforcement of the Ordinance by the Orange Co. Soil and Erosion Control Officer.	Adequate to the extent that inspection and enforcement activities remain to be effective.	Meets Town Ordinance & NPDES Phase 2 requirements.	Goal 1, 2, 4, 5 and 6	Town of Chapel Hill & Orange Co. Erosion Control
e. TMDL listed streams (State list)	Carboro	Section 15-264 provides for the enforcement of the Orange County Soil and Erosion Control Ordinance by the Orange Co. Soil and Erosion Control Officer.	Adequate	Meets NPDES requirements	Goal 2 and 5	Orange Co. Erosion Control
	Orange County	All sites greater than 20,000 sq. ft. must apply for permit. Sites greater than 10,000 sq. ft. within the University Lake protected watershed must apply for permit. Any site causing off-site sedimentation, or that has the potential for causing off-site sedimentation may be covered under program.	Adequate. Does not need enhancement	Meets NPDES requirements	Goal 1, 2, 4, 5 and 7 (plus goal 6 in Neuse basin)	Hillsborough, Mebane, Carboro and Chapel Hill are all included in this program at this time
	University	Listed streams are within UNC-CH jurisdiction.	No monitoring of sediment loads has been done.	Monitor sediment loads and reduce sedimentation into campus streams by practicing better erosion control practices.	Goals 1, 2, and 5	UNC-CH Facility Planning & Construction, UNC-CH Environment, Health & Safety, NCDENR
	Chapel Hill	Several stream reaches in Chapel Hill are on list.	Watershed/stream assessments required with the intent to programatically have the streams removed from the EPA 303(g) list.	Monitor stream health (see Section II. A. above).	Goal 1, 2 and 5	NCDWQ, Town of Chapel Hill and Orange Co. Erosion Control
	Carboro	No 303(d) list streams are within Carboro's jurisdiction (except for about 800 feet of Morgan Creek below Smith Level Road)	Adequate with monitoring of sediment loads below Smith Level Road.	Continue to monitor sediment loads and erosion control devices	Goal 1, 2 and 5	Town of Carboro and Orange Co. Erosion Control

Southern Orange County  
Stormwater Management Program Analysis

Category	Entity	Current Program	Proposed Program	Priority	Goal	Responsible Agency
	Orange County	If listed stream is in a protected watershed the stream buffer requirements stated above apply.	No Position		Goal 1, 2, and 5	Orange County
f. Biological impairment / loss of diversity	University	Benthic studies are conducted on Meeting of the Waters and Battle Branch	Adequate	Use data to identify water quality problems and to guide solutions.	Goal 1, 2 and 5	UNC-CH Environment Health & Safety Town of Chapel Hill
	Chapel Hill	See Section II. A. above	Limited benthic analysis with new initiatives underway.	Comprehensive benthic program under planning stage.	Goal 1, 2 and 5	Town of Chapel Hill
	Carboro	Benthic studies (3) are conducted along Bolin Creek to monitor the biological diversity of the creek.	Consider expanding benthic studies on Morgan Creek	Test results are used to define problems and for the design of possible solutions	Goal 1, 2 and 5	Town of Carboro
	Orange County	No Position	No Position	No Position	Goal 1, 2 and 5	Orange County
g. Loss of stream buffers	University	Continue to comply with RCD regulations	Adequate	Follow existing policy	Goal 1, 2, and 5	UNC-CH Facilities Planning & Construction
	Chapel Hill	RCD Ordinance allows permitted uses in buffer of perennial streams.	Permitted uses should be revised. Intermittent streams program should be developed.	Address in Development Ordinance revisions	Goal 1, 2 and 5	Town of Chapel Hill
	Carboro	Section 15-269 (d) requires buffer to be replaced or the establishment of vegetation if needed.	Adequate	Continue with existing policy	Goal 1, 2 and 5	Town of Carboro
	Orange County	Buffers required within protected watersheds that extend outward from edge of floodplain based on slope calculations. Subdivisions outside protected watersheds and the Neuse River Basin do not have buffer requirements at this time. A text amendment is under consideration by the BOCC that will set minimum stream buffers for areas not in a protected watershed.	BOCC reviewing. Goals are met within protected watersheds and the Neuse River Basin.	Changes to ordinance to include all areas of Orange County have been proposed, but not adopted.	Goal 1, 2 and 5	Orange County
h. Increasing impervious surfaces resulting in more runoff and pollution	University	A stormwater master plan for all watersheds and sub-basins on main campus is being developed. This plan will address runoff volume, rate and quality issues from new construction and will mitigate many of the problems from past construction.	In implementation phase. Just beginning but will be adequate when program is implemented.	Implement creative solutions such as porous pavement, green roofs, etc.	Goal 2, 3, 4, 5, 7	UNC-CH Facilities Planning & Construction
	Chapel Hill	Jordan Lake Watershed Protection District is limited to 24% (low density option) or 50% (high density option); other areas are not based on impervious surface determinations.	Town-wide impervious surface restrictions should be considered. Release rate criteria for all development should be considered.	Address in Development Ordinance revisions	Goal 1, 2 and 5	Town of Chapel Hill
	Carboro	Section 15-266 limits impervious surface in the University Lake Watershed to 4% residential and 6% commercial (24% w/BMP's). Jordan Lake Watershed Protection Area is limited to 24% (36% with swales); all areas subject to a storm water management plan that limits impervious surfaces in accordance with ability to manage stormwater.	Adequate	Continue with existing policy	Goal 1, 2 and 5	Town of Carboro



Southern Orange County  
Stormwater Management Program Analysis

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Implementation Status Assessment	Strategy to Meet Goals	Goals Addressed	Responsible Party
	Orange County	Highly restricted impervious surface limits within protected watersheds, and critical areas, as well as requirements for infiltration of first inch of stormwater runoff	Program Development needed	Changes to ordinance to make program more easily understandable; additional cooperation needed between staff members to ensure all plans are compliant	Goal 1, 2 and 5	Orange County
I. NPDES Phase II permitting requirements	University	Public education, illicit discharge detection, post-construction runoff control, and pollution prevention / goodhousekeeping programs ongoing.	Work with other governments on education and sharing of information.	Work with other units of government on education and sharing of information.	Goal 1 and 7	UNC-CH Facility Services and UNC-CH Environment, Health & Safety
	Chapel Hill	Currently performing portions of permit application standards such as inventory, public education and illicit discharges.	Planning and permit development required. Many aspects of permit currently underway locally.	Work with other governmental units on education and illicit discharge components.	Goal 1, 6 and 7	Town of Chapel Hill and neighboring units of government.
	Carboro	Permit Application in progress with inventory and housekeeping components being developed	Need to complete inventory, illicit discharge, house keeping and education program components	Work with other governmental units on education and illicit discharge components.	Goal 1 and 7	Town of Carboro and neighboring units of government.
	Orange County	Public education, illicit discharge detection, post-construction runoff control, and pollution prevention / goodhousekeeping programs ongoing in Neuse. Working with Hillsborough to enforce in their ETJ.	Need additional Staff resources	Public education component contracted through triangle j council of governments. Request Hillsborough address illegal discharge component	Goal 1 and 7	Orange County
J. Lack of equity between existing and new development	University	Stormwater master plan does address this issue	In implementation phase. Just beginning but will be adequate.	Implement stormwater master plan	Goal 1, 2, 3	UNC-CH Facility Services
	Chapel Hill	Current Stormwater management plans account for existing conditions. Redevelopment plans requires that additional runoff be managed.	Adequate. New development must meet higher level of regulation, based on best available information.	Continue with existing policy to revise Ordinance as needed.	Goal 1, 2 and 3	Town of Chapel Hill
	Carboro	Current Stormwater management plans account for existing conditions. Redevelopment accepts existing but not additional runoff.	Adequate	Continue with existing policy	Goal 1, 2 and 3	Town of Carboro
	Orange County	In Neuse River only, retro fit is a Component in the Stormwater ordinance	Need Staff	In process of identifying three retro fit sites and apply for funding.	Goal 1, 2 and 5	Orange County
<b>III. Adequacy of Current Programs /Policies</b>						
a. Lack of water quality and stream discharge data	University	An sampling program implemented in 2001 which includes stream discharge data.	Adequate	Continue with the existing program	Gal 1, 2, 5, and 7	UNC Environment, Health & Safety
	Chapel Hill	Ambient sampling since 1993. Ad-hoc benthic studies. One USGS gauge on Morgan Creek. Intensive survey program recommended.	Ambient data sampling since 1993. Limited data interpretation and follow-up.	Expand upon existing sampling programs with intensive survey (gauges, field and lab analysis, pollutant identification and enforcement)	Goal 1, 2, 5, and 7	Town of Chapel Hill

Southern Orange County  
Stormwater Management Program Analysis

39

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Infrastructure Status Assessment	Strategy to Meet Goals	Goals Addressed	Responsible Party
	Carboro	4 benthic studies during FY 00-01 with 1 per year thereafter along Bolin Creek, 2 grab samples per month-Toms Creek and Bolin Creek (Since 8/94)	Adequate but remote water quality sampling would be ideal. Benthic studies along Morgan Creek may be beneficial.	Continue with existing program and add additional benthic studies to include Morgan Creek if possible.	Goal 1, 2, 5 and 7	Town of Carboro
	Orange County	Collaborate with professor Seth Reics (UNC Biology Dept 0 on ongoing water quality studies	Adequate	Continue with the existing program. Share data with all other local government's as it becomes available	Goal 1, 2, 5 and 7	Orange County
b. Expectations of community for stream water quality are high	University	Sedimentation, TMDL's, illicit discharges are key issues	Requires additional attention in the future	See III.A. above	Goal 1, 2 and 6	UNC Environment, Health & Safety
	Chapel Hill	Sedimentation, TMDL's, illicit discharges are key issues	Requires program development.	See III.A. above	Goal 1, 2 and 6	Town of Chapel Hill
	Carboro	Section 15-263 (a)1 regulates water quality (no damage)	Adequate	Continue with existing program	Goal 2	Town of Carboro
	Orange County	Citizen expectations vary depending on the part of the county the development is located	Requires attention.	Continue to work with NC State to improve Sediment basins	Goal 1, 2, & 5	Orange County
c. Inventory of stormwater infrastructure is partially complete	University	Infrastructure mapping is included as part of the bond funded stormwater project.	In implementation phase. Implementation of the mapping effort will lead to having and adequate inventory	Continue with implementation of mapping project	Goal 1 and 2	Facilities Planning & Construction
	Chapel Hill	Inventory using a GIS data base is underway	Comprehensive stormwater GIS data and map management desired	Underway	Goal 1	Town of Chapel Hill
	Orange County	No Stormwater Infrastructure	NA	NA	NA	Orange County
	Carboro	Inventory using a GIS data base is underway	Adequate	Underway	Goal 1	Town of Carboro
d. Maintenance of infrastructure: 1. Funding (resources) for maintenance of stormwater infrastructure	University	University bond program includes monies for extensive infrastructure repair/maintenance	Requires additional attention and investment in the future	The need to comply with the requirements of the O-4 zoning, development plan and NPDES Phase II will lead the University to increase the investment.	Goal 1 and 4	UNC Facilities Services, UNC Facilities Planning & Construction
	Chapel Hill	General revenue, bonds, grants	Recommend other source, including impervious surface based rating system	Not guaranteed or continuous. Need new source or allocation.	Goal 1 and 4	Town of Chapel Hill
	Carboro	Existing structure maintained through current public works procedures	Adequate	Continue with existing program	Goal 1 and 4	Town of Carboro
	Orange County	NA	NA	NA	NA	Orange County
	University	See D.1 above	Current CIP is limited	Continue to identify and prioritize projects.	Goal 1, 3 and 4	Town of Chapel Hill
2. Deteriorated condition of stormwater infrastructure	Chapel Hill	Extensive current and anticipated problems	Evaluation underway to determine extent of deterioration. (part of stormwater inventory)	Complete inventory and address on an as need basis.	Goal 1 and 4	Town of Carboro
	Carboro	Evaluation underway to determine extent of deterioration. (part of stormwater inventory)	Adequate	Complete inventory and address on an as need basis.	Goal 1 and 4	Town of Carboro
	Orange County	Not applicable (N/A)	N/A	N/A		Orange County
	University	Not applicable	N/A	N/A		Orange County
3. Privately owned stormwater-right to enter						

Southern Orange County  
Stormwater Management Program Analysis

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Infrastructure/Storm Assessment	Strategy to Meet Goals	Goals Addressed	Responsible Party
	Chapel Hill	Requires temporary easement from property owner	Adequate	Continue policy and revise Development Ordinance as required.	Goal 1, 4 and 6	Town of Chapel Hill
	Carboro	State Legislation requested to authorize "right to enter"	Legislation Pending	Seek legislation authorizing "right to enter"	Goal 1 and 4	State Legislature
	Orange County	Homeowner's Association normally is required by condition of approval to have ingress, egress and regress rights to	Adequate	Continue with current requirements		Orange County
e. Inadequate basis for policy making (mapping, watershed approach)	University	Watershed approach is being used in the development of the University's stormwater master plan.	Under development.	Implementation of the stormwater master plan with result in an adequate program.	Goal 1, 6 and 7	UNC Facilities Planning & Construction
	Chapel Hill	NFIP Flood Hazard Maps are 25 yrs old and being used for new and existing development decisions.	Under development.	Continue to work towards digital re-mapping products to manage locally.	Goal 1, 3 and 6	Town of Chapel Hill
	Carboro	Basic GIS is adequate but Topos are needed for accurate stream buffer and basin mapping and stormwater modeling.	INADEQUATE Need TOPOS	Continue to work with the county land records office to obtain topo maps	Goal 6 and 7	Town of Carboro and Orange County
	Orange County	Watershed approach is used for stormwater infiltration and detention. In a joint effort by County, State and FEMA, new floodplain maps due Nov. 2001. County wide 1988 orthophotos	Adequate	Zoning enforced, some free standing ordinances. Enforcement laborious and eats staff time	Goal 1, 2, 3, 4 & 5	Orange County
f. Pre and post development requirements	University	Fully addressed in the OI-4 zoning and development plan.	Adequate	Ensure development complies with all requirements.	Goal 1, 2, and 3	UNC Facilities Planning & Construction
	Chapel Hill	25-yr. pre/post release rate criteria in current ordinance for commercial and industrial only	Recommend multiple release rate criteria for all development	Make revisions in Development Ordinance	Goal 1, 2, and 3	Town of Chapel Hill
	Carboro	Appendix I of the Land Use Ordinance requires that post development should not exceed pre-development 10 year runoff.	Adequate	Continue with existing policy	Goal 1, 2, 3, 4, and 5	Town of Carboro
	Orange County	Various. 5% to 25% impervious based on watershed and zoning. For Neuse development, no net increase in peak flow	Adequate	Continue with existing policy	Goal 1, 2, 3, 4, and 5	Orange County
g. Local development ordinances fragmented:	University	NPDES Phase II requirements.	Adequate	Ensure development complies with all requirements.	Goal 1, 2, and 3	UNC Facilities Planning & Construction
	Chapel Hill	NPDES requirements meet or exceed	Adequate	Current revisions underway	Goal 1, 2, 3, 4, and 5	Town of Chapel Hill
	Carboro	NPDES requirements meet or exceed	Adequate	Continue with existing program	Goal 1, 2, 3, 4, and 5	Town of Carboro
	Orange County	NPDES requirements meet or exceed	No Position	Rewrite ordinances in a comprehensive approach to the problems.		Orange County
h. Conflict between local ordinance and/or state requirements	University	No conflicts of significance at this time	Adequate			University
	Chapel Hill	No Conflicts	Adequate	Amend Development Ordinance if necessary to resolve conflicts	Goal 1	Town of Chapel Hill
	Carboro	Conflicts minimal if any	Adequate	Amend Land Use Ordinance if necessary to resolve conflicts	Goal 1	Town of Carboro
i. More uniformity in stormwater management (i.e. ordinance provisions)	Orange County	Conflicts are minimal, generally Orange wants to exceed State Statutes	Adequate			Orange County
	University	N/A	N/A			University



Southern Orange County  
Stormwater Management Program Analysis

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Program/Component Assessment	Strategy to Meet Goals	Goals Addressed	Responsible Party
	Chapel Hill	Ordinance language review required	Adequate	Continue to work regionally where specific cases or areas dictate.	Goal 1, 6, and 7	Town of Chapel Hill
	Carboro	Stormwater Management required of all projects	Adequate	Continue with existing program	Goal 1	Town of Carboro
	Orange County	Consistency needed in current regulations	Not programmed.	Review recommended by County	Goal 1	Orange County
	University	N/A	N/A			University
j. Resource Conservation District (RCD) standards (stream buffers)	Chapel Hill	See RCD above.	Buffer restrictions exist and are under revision.	Need buffer rules in revised ordinance	Goal 1, 2, 3, and 5	Town of Chapel Hill
	Carboro	Stream Buffers required throughout the Town's jurisdiction.	Adequate	Continue with existing program	Goal 1, 2, 3, and 5	Town of Carboro
	Orange County	Nusee Basin Rules	County program under consideration.	Program to meet Nusee Rules required.	Goal 1, 2, 3, and 5	Orange County
k. Need to examine development ordinance concerning impervious surface per Chapel Hill Comprehensive Plan	University	Not applicable, University does not have its own RCD standards, but in the past has met the Town's RCD requirements.	Adequate	Continue with existing program	Goal 1, 2, 3, and 5	UNC Facilities Planning & Construction
	Chapel Hill	Development Ordinance Intensity Regulations Sec. 13.11	Adequate	Continue with existing program	Goal 2	Town of Chapel Hill
	Carboro	N/A				Carboro
	Orange County	Ordinances are adequate in places and not so in others	Developing program.	Ordinances will be consolidated and rewritten where necessary		Orange County
l. BMP's regarding water quality need to be implemented as requirements with a Design Manual and Standards	University	Appropriate BMP's will be incorporated into all University development projects.	Adequate	Ensure designs meet the requirements of the OI-4 zoning and the development plan.	Goal 1, 2, 3, 5, and 6	UNC Facilities Planning & Construction
	Chapel Hill	Currently under development and verbal requirement by development community	Ad-hoc design guidelines.	Revised Development Ordinance provisions. Needs detailed attention.	Goal 1, 2, 3, 5, and 6	Town of Chapel Hill
	Carboro	BMP's that meet the States' standards may be used to meet the Town's water quality standards	Adequate	Continue with existing program	Goal 1, 2, 3, and 5	Town of Carboro
	Orange County	BMP's generally do not permit increase in impervious surface. They are allowed to provide greater stormwater protection.	Adequate	Continue with existing program		Orange County
m. Review Public Works department's role and activities in maintaining stormwater infrastructure	University	Street maintenance done by NC DOT or the Town of Chapel Hill as appropriate. Street sweeping needs to be done more frequently to reduce stormwater sediment loading.	Program Development needed	Seek additional resources to reinforce the street sweeping program.	Goal 1, 2, and 5	UNC Facilities Services, UNC Facilities Planning & Construction
	Chapel Hill	Street sweeping, street maintenance, drainage projects on a scheduled or CIP basis	Programs developed and operational	Drainage projects subject to limited resources	Goal 1, 2, 3, and 4	Town of Chapel Hill
	Carboro	Street sweeping, street maintenance, drainage projects on a scheduled or CIP basis	Adequate	Continue with existing program	Goal 1, 2, 3, and 5	Town of Carboro
<b>IV. Strategies for Improvement</b>						
a. Establish clear goals with measurable outcomes	University	To be developed as part of the application for a NPDES Phase II permit	Master Plan under development	Develop comprehensive program for stormwater management.	All goals.	UNC Environment, Health & Safety
	Chapel Hill	Under development	Under development	Develop comprehensive program for stormwater management.	All goals.	Town of Chapel Hill
	Carboro	Established by current stormwater management policy	Adequate	Re-examine periodically	Goal 1 and 7	Town of Carboro

Southern Orange County  
Stormwater Management Program Analysis

32

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Assessment	Strategy to Meet Goals	Goals Addressed	Responsible Party
b. Develop performance measures related to BMP's	Orange County	Established by current stormwater management policy	Adequate but short staffed	Requesting Commissioners for additional staff FY 2002	Goal 1-6	Orange County
	University	To be developed as part of the application for a NPDES Phase II permit and implement the development plan. On-going monitoring will measure performance.	Adequate	Meet the standards set forth in the development plan and continue the monitoring program.	Goal 1, 2, 3, 4, 5, and 6	UNC Environment, Health & Safety
	Chapel Hill	Under development	Under development.	Develop comprehensive program for stormwater management.	All goals.	Town of Chapel Hill
	Orange County	Stormwater management Program for Lands Within the Neuse River	Good Ordinance, need staff	Received approval from EMC Oct. 2001	All goals.	Orange County
	Carboro	Post development shall not exceed predevelopment conditions	Adequate	Continue with existing policy	Goal 2,3,4, and 5	Town of Carboro
c. Review Town's comprehensive plans:						
1. Conservation development principle	University	Not applicable		Continue to implement policy	Goal 2,3,4, and 5	University
	Chapel Hill	Natural environment considerations	Adequate	Continue with existing policy	Goal 2,3,4, and 5	Town of Chapel Hill
	Carboro	Natural constraints, 40% open space and net density requirements based on developable area.	Adequate	Continue with existing policy	Goal 2,3,4, and 5	Carboro
2. Low impact development (minimize disturbance of natural areas, etc.)	University	Not applicable				University
	Chapel Hill	Comprehensive Plan guidelines for cluster development	Adequate	Development Ordinance revisions to provide further guidance	Goal 2,3,4, and 5	Town of Chapel Hill
	Carboro	Primary and secondary constraints (floodway/floodplain, stream buffers, steep slopes, hardwood etc) limit development.	Adequate	Continue with existing policy	Goal 2,3,4, and 5	Town of Carboro
3. Water quality performance review process	University	Water quality information will be shared with local government.	Adequate	Cooperate fully with local officials in evaluating available water quality information.	Goal 2,3,4, and 5	UNC Environment, Health & Safety
	Chapel Hill	Monitoring at 14 sites	Monthly sampling of ambient and benthos baseline data collection	Develop comprehensive program for stormwater management.	Goal 2,3,4, and 5	Town of Chapel Hill
	Carboro	Stormwater management plans required for new developments to show post construction does not exceed pre construction conditions	Adequate	Continue with existing policy	Goal 2,3,4, and 5	Town of Carboro
d. Formalized comprehensive public education program is needed	University	To be developed as part of the NPDES Phase II process.	Needs to be developed	Cooperate fully with local officials to ensure a comprehensive program is implemented.	Goal 1, 6 and 7	Town of Carboro Town of Chapel Hill, Orange County, UNC, TJ COG, & State
	Chapel Hill	Ad-hoc elementary education program	Needs to be developed	Work with neighboring jurisdictions for comprehensive education program.	Goal 1, 6 and 7	Town of Carboro Town of Chapel Hill, Orange County, UNC, TJ COG, & State
	Carboro	Work with neighboring jurisdictions on a joint education program and work on a local stream watch and catch basin stencil program	Needs to be developed	Continue to work with neighboring jurisdictions	Goal 1, 6 and 7	Town of Carboro Town of Chapel Hill, Orange County, UNC, TJ COG, & State

Southern Orange County  
Stormwater Management Program Analysis

33

Identified Stormwater Management Problems	Entity	Current Programs or Regulations	Program Status	Goals	Responsible Party
e. Monitoring targets and indicator i.e. measurable goals in NPDES Phase 2 permit	Orange County	Has been developed with regard to Neuse River Basin.	Adequate	Continue with existing guidelines	Orange County
f. Develop funding sources and annual budget required to carry out goals and requirements ( user fees, grants, bonds, other)	University Chapel Hill Carboro	To be developed as part of the application for a NPDES permit Under development To be developed as part of the application for a NPDES permit The bond funded stormwater project in place, funding for on-going activities to be identified.	Needs to be developed Needs to be developed Needs to be developed Future needs remain unfunded	Complete as part of application Complete as part of application Complete as part of application Seek funding from all possible sources.	UNC Environment, Health & Safety Town of Chapel Hill Town of Carboro UNC Environment, Health & Safety, UNC Facilities Services, and UNC Facilities Planning & Construction Town of Chapel Hill
g. Identify Federal and State funding opportunities (water resources grants)	University Chapel Hill Carboro Orange County	General revenue, bonds, grants Programs, projects and cost need to be determined first One time Stormwater review fee (Neuse only) Requires continuing attention to ensure opportunities are not missed.	Reliable funding source needed Assessing Assessing Adequate	User fee based on impervious surface recommended to consideration. Assessing Assessing As grant possibilities are identified, we will pursue them.	Town of Chapel Hill Town of Carboro Orange County UNC Environment, Health & Safety, UNC Facilities Services, and UNC Facilities Planning & Construction Town of Chapel Hill Town of Carboro Orange County
h. Comprehensive mapping and modeling (manage up-coming NFIP models locally)	University Chapel Hill Carboro Orange County	Grants have been awarded to Chapel Hill Programs, projects and cost need to be determined first Identified retrofit funding, primarily Hillsborough via Neuse Rules Continue to work with the State with regard to mapping updates Continue to work with the State with regard to mapping updates	Ad-hoc grant writing program Assessing Assessing Adequate Developing program.	Pursue grants comprehensively. State mandate, has to be done Partnership with Carboro and FEMA for improved management. Partnership with Chapel Hill and FEMA for improved management. No Position To be developed.	Town of Chapel Hill Town of Carboro Orange County UNC Facilities Planning & Town of Chapel Hill Town of Carboro
i. NPDES compliance (6 minimum measures and local needs)	University Chapel Hill	Six minimum measures to be developed over a multi-year period, Current programs meet several measures. Six minimum measures to be developed over a multi-year period, Current programs meet several measures.	In Progress. In Progress.	To be developed. To be developed.	UNC Environment, Health & Safety Town of Chapel Hill

Southern Orange County  
Stormwater Management Program Analysis

Identified Stormwater Management Problems	Entity	Current Programs or Best Management Practices	Assessment Findings	Recommended Actions	Priority	Responsible Agency
	Carrboro	Measures and needs have been identified and efforts are underway to complete the stormwater inventory, devise house keeping programs, an illicit discharge discovery and response program and a education program	Development Ordinance seems adequate. Efforts to concentrate on inventory, illicit discharge, education, and house keeping	Work with neighboring jurisdictions to devise an education and an illicit discharge program. Complete housekeeping and inventory programs.	Goal 1	Town of Carrboro and other units of Govt.
	Orange County	By implementing Stormwater ordinance County wide can achieve NPDES compliance	No staff for Countywide AT this time	Request additional staff	Goal 1	

\*Jurisdictional/Staff Assessment Note:

The following staff members contributed to the assessment comments:

- The University of North Carolina at Chapel Hill - Jim Mergner, Sharon Myers
- Town of Carrboro - Roy Williford
- Town of Chapel Hill - Fred Royal, Richard Terrell
- Orange County - Ren Mins

30