

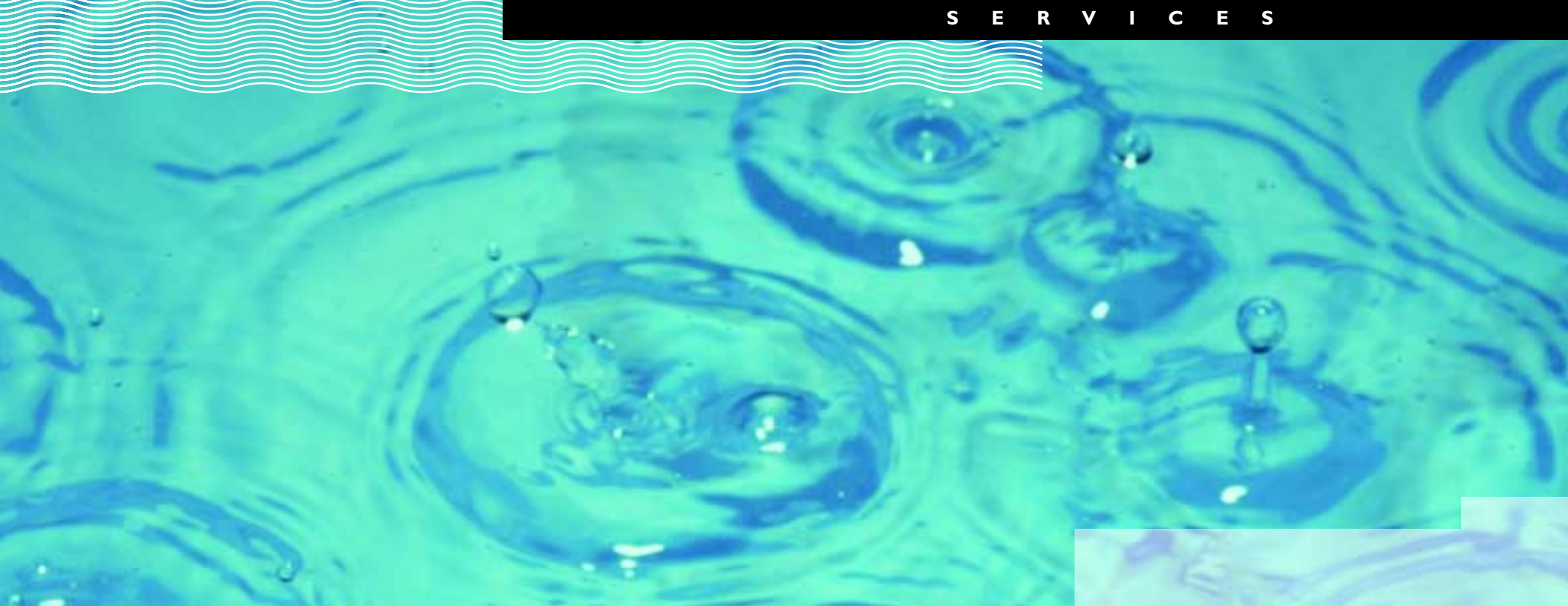
“ CELEBRATING TEN YEARS OF SERVICE ”

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CITY OF CHARLOTTE  
& MECKLENBURG COUNTY

# Storm Water

S E R V I C E S





looking back



planning for the future





**THE CITY OF CHARLOTTE AND MECKLENBURG COUNTY  
STORM WATER SERVICES CELEBRATE TEN YEARS OF SERVICE!**

THROUGHOUT THE PAST DECADE, CITY AND COUNTY STORM WATER SERVICES HAVE DONE MORE THAN SIMPLY REACT TO SEVERE WEATHER. THE AGENCIES HAVE WORKED TOGETHER TO CONTROL STORM WATER RUNOFF, INITIATE COMPREHENSIVE PROGRAMS OF FLOODPLAIN MANAGEMENT, ENSURE WATER QUALITY, CHAMPION ENVIRONMENTAL CAUSES AND MAINTAIN STORM DRAINAGE SYSTEMS ON NOT ONLY PUBLIC, BUT PRIVATE PROPERTY AS WELL – A SERVICE NOT PROVIDED BY MOST LOCAL GOVERNMENTS.



# looking back

## LOOKING BACK

While the birth of Charlotte-Mecklenburg Storm Water Services 10 years ago launched a new era in water quality and flood planning and prevention, the importance of controlling storm water runoff has long been recognized by officials, dating back to 1911, when legislation was enacted to establish the Mecklenburg County Drainage Commission.

The early- to mid-1900s mark the beginning of the transformation of once rural farmland into what is now the largest municipality in both the Carolinas. This process naturally impacted the rivers, lakes, creeks and streams that make up the nearly 2,000 miles of waterways in Charlotte-Mecklenburg. Surges in population and changes in land use and urban infrastructure – roads, buildings' rooftops and parking lots – affected both the quantity and quality of storm water runoff. The growth, and unfortunately the negligence, had sobering consequences: altered channels, flooding, pollution and erosion.

As the landscape continued to grow and evolve toward the middle of the century, it became apparent that drainage and floodplain management strategies from the early 1900s' Drainage Commission were

not changing with the times – they were outdated and simply not comprehensive enough to adequately address the growing problems and needs associated with storm water. The following decades saw a progressively increasing awareness of environmental issues. In 1972, local government adopted its first flood prevention ordinances and established an environmental protection program, just as the U.S. Environmental Protection Agency (EPA) mandated through the Clean Water Act that all localities of a particular size curb the amount of pollutants flowing into the nation's streams. In the late 1980s, the EPA ordered local governments to have funding dedicated solely to support storm water initiatives.

Charlotte-Mecklenburg Storm Water Services was created from local leaders' vision of a comprehensive storm water utility with a stand-alone fee structure that meets the infrastructure needs of the growing community, and the challenges that arise with expanding commercial development and the accompanying subdivisions of homes. The late 1980s saw local officials proceed with plans for a storm water program financed through a monthly utility charge. Shortly thereafter, a 25-member citizen's advisory task force

developed the framework and policies for such a program, recommending a set of guidelines to steer the creation and implementation of the program.

During 1992, as plans for drainage repairs were developed, an arduous task of developing a billing database for some 180,000 parcels was completed, and a system for adding the monthly storm water charge to water and wastewater bills was created.

In 1993, Charlotte Storm Water Services was born, and immediately began improving drainage infrastructure and eliminating sources of storm water pollution. Mecklenburg County subsequently instituted a parallel, fee-funded storm water program in January 1994 that included service to Cornelius, Davidson, Huntersville, Matthews, Mint Hill and Pineville.

Today, Charlotte-Mecklenburg and the surrounding towns work in unison to manage complementary storm water programs, focusing on water quality and "public storm water" on any property, whether publicly or privately owned.

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↳ Engineers model and design million dollar comprehensive storm water solutions for capital improvement projects affecting many homeowners. Along the larger creeks, the county tackles severe bank erosion that may be affecting neighboring private property. Within the city, the primary goal of these larger projects is to relieve flooding and the entire drainage area is studied to account for flooding structures and roads. There have been 42 projects constructed to provide long-term improvements to neighborhoods.

# storm water

## fast facts:

At the start of operations, Storm Water Services began prioritizing and processing the most critical problems awaiting service. The backlog list was purged of problems within the county and towns in three years, but the aging infrastructure and the increased amount of runoff from urban areas made the demand greater in the city. With an average of 22 construction crews working to eliminate the high priority backlog, the top ranking problems were cleared in May 2001 – 18 months ahead of the projected schedule.

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## fast facts:

All owners of developed property are charged a storm water fee to address the community's flooding, erosion and pollution problems.

The monthly fee amount is based on the amount of impervious area on a property; the more impervious space, the more runoff created. Increased runoff means greater risk of drainage problems and additional storm water pollution. If storm water programs were funded with property taxes instead of the fee structure, single-family homes' share of the cost would increase from 31 percent to over half the total cost.



To report storm drainage, erosion or flooding problems:  
Call 704-336-RAIN

# modern technology



## MODERN TIMES, MODERN TECHNOLOGY

Today, with 580,000 residents within the city limits and more than 750,000 citizens throughout the county it is no easy task to compute the number of impervious surfaces – rooftops, thoroughfares (2,100 miles of city-maintained streets alone), driveways and parking lots – from which water will run off into the drainage systems. Fortunately, new technologies have emerged to tackle this challenge.

### WISE

Geographic Information Systems (GIS) play an important role in managing the daily operations and planning activities of Storm Water Services. GIS is technology that involves converting data and other information into computer-generated maps that can identify creeks, floodplain boundaries, building locations and project components. The Watershed Information SystEm (WISE) is a computer system for community-based storm water and floodplain management. WISE uniquely integrates GIS technology with programming capability, data management techniques and standard storm water analysis programs. This comprehensive tool manages data collection, storage and

analysis for storm water management and hydrological and hydraulic studies.

### GAGES & ALERTS

Record amounts of rainfall saturated the ground for the better part of 2003, making the likelihood of flooding much greater than during the previous years of drought conditions. While all the rain made for a soggy spring and summer, it put a newly installed flood warning system to the test.

The Flood Information & Notification System was launched in January 2003, with four sensor sites near creeks in highly flood-prone areas. Heavy rains during the system's initiation period prompted notifications dozens of times. Since the initial phase, six new sites have been added.

The system alerts floodplain officials and emergency personnel when rising waters trigger its sensors. The sensors are linked to a data-collection network of 70 rain gages and 33 stream gages operated and maintained by the U.S. Geological Survey (USGS) and cooperatively supported by

Storm Water Services. The gages measure rainfall and water levels and transmit data via radio or satellite telemetry. Using protocol developed by the National Weather Service, data such as water depth and water flow are transmitted in real time to base stations located at the local USGS office and the Charlotte-Mecklenburg Government Center. When there is a deluge of storm water, public safety is a top priority. Advance notice of imminent flooding conditions enables a faster response and improves communication and coordination among the agencies involved. When warranted, responders from the Charlotte Fire Department close streets and evacuate residents.





# storm water

## fast facts:

“The Flood Notification and Information System provides emergency services with real time and accurate information regarding the possibility, potential severity, and location of a flood event. As a result, we can better prepare ourselves, develop strategies sooner, and manage resources more effectively long before the event reaches the emergency stage. In essence, we are now proactive and more finite with our response, while using a smaller number of resources. Furthermore, we now have a record of events by which we can further develop our response plan and conduct response training with our command staff.”

— Battalion Chief Tim Rogers,  
Charlotte Fire Department



## do your part:

### PRACTICE FLOOD SAFETY

- Do not walk or drive through flood waters.
- Do not cross street barriers where there is flooding or potential for flooding.
- Obey the direction of firefighters or the police during flooding conditions.
- Protect yourself from floodwaters, which are polluted with human waste, motor oil, chemicals and other pollutants.
- Stay away from power lines and electrical wires.

# seeing green

## SEEING GREEN

To hear the words “storm water,” you might think only of rain that results from torrential downpours; but drainage of floodwaters is only a portion of the job. Both agencies are staffed with environmentalists who share the responsibility of rehabilitating, maintaining and ensuring safe aquatic environments which in turn creates a healthy, natural habitat for plant and animal life.

Mecklenburg County maintains the major portion of the network of “named” large creeks (e.g. McMullen Creek, Little Sugar Creek, Briar Creek) that drain areas larger than one square mile. The City of Charlotte is responsible for maintaining the 2,400 miles of smaller creeks and tributaries as well as rehabilitating ponds within its jurisdiction that provide significant water quality benefits.

Correcting excessive erosion of stream banks is accomplished through environmentally friendly approaches. A technique aptly called soil bio-engineering – uses plant materials to stabilize banks, create tree canopy, improve aquatic and

terrestrial habitat and improve water quality. To date, more than 10 miles of streams have been restored with the use of soil bioengineering. Rock structures, such as weirs and jetties, also are placed in the stream to create aquatic habitat and divert flows away from the banks.

In the past, eroding banks were “fixed” by removing all vegetation, grading the banks back and lining the channel with large rocks. Although this technique did prevent further erosion, it miscalculated the environmental impacts and created new problems: a sterile and unnatural stream with little aquatic life. Today, the “green technology” is used to foster healthy habitats by stabilizing stream banks, processing pollutants, providing better support for plants and attracting species that depend on the creek corridor for their survival. The raised environmental consciousness has also shifted creek maintenance from cutting down vegetation to enhancing landscapes by planting trees and plants along the stream banks, which not only make for healthier waters, but help clean the air as well.





## VOLUNTEERS LEAVE THEIR MARK!

Rallying community involvement through public education programs and volunteer activities plays a vital part in improving water quality:



◀ **Adopt-A-Stream** encourages volunteers to remove trash and debris from stream banks and channels and report potential water pollution problems. The program has grown to nearly 70 groups, families and individuals adopting more than 80 miles of streams, keeping them free from trash and debris.

To volunteer or report  
water pollution problems:  
Call 704-336-5500

storm  
water



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▶ **Big Sweep** is an annual, statewide event that invites citizens to pick up trash from creeks and waterways. In September 2002, more than 40,000 pounds of trash were removed from surface waters in Mecklenburg County by 1,000 volunteers – a state record for participation.



▲ **Storm Drain Marking** encourages volunteers to affix decals reading “Do not dump, drains to creek” onto storm drains in neighborhoods and around businesses and industrial sites. Since the inception of the program, volunteers have marked, an average of 1,000 storm drains each year.

# mapping out the future

## PLANNING AND MAPPING OUT THE FUTURE

Under certain conditions, any stream or pipe can swell with water and spill onto surrounding property. Experience has shown that lives can be saved and damage to property significantly reduced by enforcing tighter floodplain development restrictions and preparing for the next flood. Planning is paramount to dealing with the inevitability of flooding. In 1997, local elected officials adopted the Floodplain Guidance Document to specify floodplain management objectives and formally outline strategies for managing the floodplains.

### HAZARD MITIGATION PLANS

In an effort to reduce future flood damages, Hazard Mitigation Plans were developed for the 10 largest watersheds. These plans provide the framework for reducing future flood losses along major streams, while striving to enhance the natural and beneficial functions of the floodplains. By incorporating an environmental component with its flood hazard recommendations, the plans serve as valuable decision-making tools for prioritizing projects and allocating resources. Moreover, the adoption of the plans by local governing bodies helps Charlotte-Mecklenburg earn top

consideration when federal or state mitigation funds become available.

The foundation for the plans is a database that includes photographs and floor, ground and flood elevations for 5,000 buildings in or near the county's floodplains. The Hazard Mitigation Plans help determine viable measures for addressing flooding problems in a particular area – with alternatives ranging from drainage system improvements, to constructing floodwalls and even removing buildings from the floodplain. In recent years, the county has had the opportunity to buy and demolish flood-prone houses through a \$17 million voluntary buyout program funded with federal, state and local money. Just four years into the buyout program, 140 families were relocated and 35 acres of floodplain land were restored to open space.

### FLOODPLAIN MAPPING

When tropical storms swept through Charlotte in 1995 and 1997, it was clear flood maps were out-of-date. Before getting doused by another round of severe weather, local government decided to invest its own money into updating its flood maps.

The flood hazards shown on the maps were based on the best information available at the time the maps were prepared. Flood maps for Charlotte-Mecklenburg were last updated by the Federal Emergency Management Agency (FEMA) in the mid-1970s and did not reflect an accurate picture of the development boom the area had experienced. To reduce future flood losses, a \$2 million re-mapping project was initiated in 1999. Local funding covered 75 percent of the total project costs, with federal and state funding accounting for the remainder. The revised flood maps are the first in the nation to represent both the existing and “ultimate” development floodplain on the same map. Further, the community has the distinction of being one of FEMA's first Cooperating Technical Partners, meaning the local community maintains its own flood maps. This sharing of responsibility has resulted in more accurate and faster updates as changes in land use occur. In addition, mapping based on future conditions has instituted stiffer local regulations for new development in or adjacent to floodplains to help reduce future flooding damage.





do your part:

## ELIMINATE YOUR CONTRIBUTION TO WATER POLLUTION

- Do not dump anything down storm drains or in creeks.
- Properly dispose of yard waste by bagging leaves and grass clippings in clear plastic bags and pile small limbs for curbside pick-up.
- Learn to compost or take unbagged leaves, brush and clippings to a recycling center with a yard waste facility.
- Read application instructions for all yard chemicals and use them sparingly.
- Never pour paints and other household hazardous waste into storm drains. Take unused paints and leftover household hazardous waste to a recycling center.
- Recycle motor oil and antifreeze at participating recycling centers and service stations.
- Consider alternatives to chemical pest control, including natural and biological controls.

# storm water

## fast facts:

**Over 1,000 homes and businesses were prevented from being built in harm's way** by creating flood maps based on future conditions. This translates to an estimated \$330 million in flood losses avoided in just one major flood.

**Find out if your property is in the floodplain. Log onto [www.stormwaterservices.com](http://www.stormwaterservices.com) or call 704-336-2831.** If you are in the floodplain, know how to protect your family and property in the event of a flood.



## **STORM WATER MANAGEMENT – EVERYBODY’S JOB**

**STORM WATER MANAGEMENT; ADVANCING INITIATIVES USING SCIENCE**

**AND THE LATEST TECHNOLOGIES; COMPREHENSIVE,**

**LONG-TERM AND PROGRAMMATIC SOLUTIONS; DEVELOPING AGGRESSIVE REGULATIONS;**

**INSTITUTING ALERT SYSTEMS; PROTECTING THE ENVIRONMENT; SAVING LIVES...**

**WE’VE MADE GREAT STRIDES IN THE LAST TEN YEARS AND WITH YOUR HELP,**

**WE CAN ACCOMPLISH EVEN MORE.**

