Stormwater Management Advisory Commission Annual Report

FY 2021

Approved October 19, 2021

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Raleigh Stormwater

Using Innovation to Help Manage How Stormwater Flows Throughout Raleigh

The City of Raleigh's Stormwater Management Advisory Commission provided ongoing guidance and direction this fiscal year as the City implemented innovative, key initiatives that help protect people and the environment. These efforts improved how the Stormwater Management Division carries out programs and policies and completes stormwater projects like:

Community members who serve on the Stormwater Management Advisory Commission during a virtual meeting.

- Large infrastructure projects that upgrade the public stormwater system using forward-thinking designs;
- Smaller projects that address flooding and erosion issues on private property impacted by stormwater runoff coming from public streets; and,
- Voluntary, small-scale projects that help reduce water pollution through 'green' practices that soak up and clean stormwater before it reaches drains and streams.

Commission members also worked with Stormwater staff to enhance other stormwater services including fiscal analysis, billing, mapping, asset management, plan review, erosion and sediment control, stormwater system maintenance, reporting littering and water pollution, and community engagement.

This report gives an overview of the Commission's work from July 1, 2020 to June 30, 2021. Members continued to coordinate with staff to support services during the COVID-19 pandemic. This included meeting virtually each month and participating in sub-committee meetings online.

Mission and Vision Statements

SMAC Mission Statement: The Stormwater Management Advisory Commission will manage resources sufficiently to protect the public infrastructure, quality of life, environment, and property of the citizens of Raleigh through fair and equitable cost-effective means. SMAC recommendations will seek to improve, enhance, and protect the quality of the Neuse River and its tributaries.

Stormwater Management Division Vision Statement: Be the "Smartest" Stormwater Program possible to economically and equitably achieve our Mission.

Stormwater Infrastructure Projects

The Commission received updates and provided input on large stormwater infrastructure projects in FY2021. During this year, there were five major projects under construction and completed valuing $10 million in construction costs.

The Stormwater Management Division expects to finish about four more projects by the end of FY2021.

The Commission also reviewed and offered input on planned projects for the Stormwater Capital Improvement Program during fiscal years 2022 – 2031.

The tiered, reinforced concrete structure at Brockton Drive Lake during Tropical Storm Elsa in July 2021.

Infrastructure Highlights

Bragg Street Culvert Replacement

This project improved the stormwater system on Bragg Street to make it easier and safer for stormwater to flow through the city when it rains. The contractor installed a new stormwater culvert at the intersection of Bragg Street and S. State Street. There's now a 4.5 foot by 10 foot culvert on the road. Crews also realigned the pipe that carries stormwater from S. State Street. Construction for the stormwater portion of the project finished in June 2021.

North Ridge Drainage Improvements

This project upgraded the stormwater system on Lower Audubon Drive, Knights Way, and Rainwood Lane. The project helps reduce street, yard, and home flooding in the North Ridge community. Work included adding in new stormwater culverts and pipes, doing stream improvements, and adding new storm drains to reduce street flooding. Construction finished in June 2021.

Brockton Drive Dam Rehabilitation – Phase 2

During this project, the contractor replaced the structure at the lower dam for Brockton Drive Lake. It's now a tiered, reinforced concrete structure that'll allow water to safely flow out of the lake downstream. Improvements address safety concerns that the City had with the original dam structure. The new structure also includes overtopping protection and riprap (rock) that protects the slope of the dam. Construction finished in June 2021.

Dorothea Drive Stormwater Improvements (System Maintenance)

The City's Transportation Field Services upgraded the stormwater system on Dorothea Drive between Stokes Street and S. Boylan Avenue. The improvements help reduce flooding in the neighborhood. Work included adding storm drains to the road, replacing the stormwater pipe that goes across Dorothea Drive, and improving the pipe that runs along the road. Construction finished in December 2020.

Galahad Drive Stormwater Pipe Emergency Repair

Staff worked with a contractor to complete emergency repairs to a stormwater pipe that failed on Galahad Drive between Luther Road and West Campus Drive. Work included installing a new pipe, stabilizing the area around the pipe, and paving the road. Emergency repairs were finished in December 2020.

Drainage Assistance Program

Repaired streambank at a property on Doverton Drive.

Approved Projects

In FY2021, the Commission approved nine projects through the Drainage Assistance Program that are fully funded by the stormwater utility fee.

There are a few projects that were approved under the former Drainage Assistance Petition Policy that required a shared cost between the City and property owner. Staff continued to work on these projects during the fiscal year.

Projects through this program alleviate severe streambank erosion, repair stormwater systems, and reduce flood damage to structures on private property that are impacted by stormwater runoff coming from public streets. Property owners are required to dedicate easements used to maintain the stormwater system.

Completed Projects

This is the fourth consecutive year that the Stormwater Management Division completed at least $1.25 million worth of drainage assistance projects in a year. Staff finished construction on eight projects.

Drainage Assistance Highlights

Chapel Hill Road Drainage Improvements

There was a failing stormwater pipe going through the Raleigh-Cary Self Storage Center. It caused sinkholes and safety concerns for people visiting the site. To address these issues, the contractor filled in the sinkholes and replaced the old stormwater pipe with a new reinforced concrete pipe. This project finished construction in May 2021.

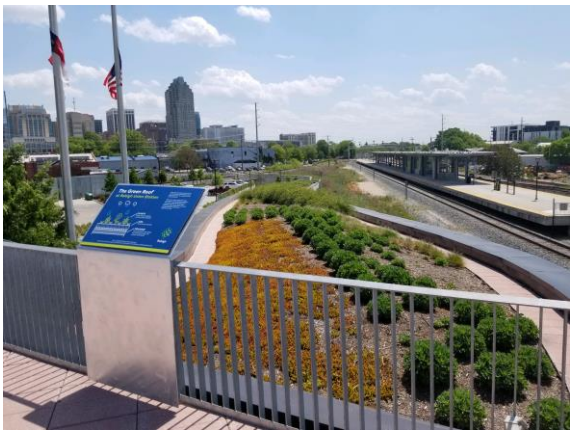
Doverton Court Stream Stabilization

During this project, the contractor repaired the eroded streambanks near an end townhome unit on Doverton Court. Given site constraints, the repair plan included a boulder toe and encapsulated fill to create a more vertical slope on the streambank. This provides a safe distance between the townhome foundation and the newly reconstructed top portion of the streambank.

Raleigh Rainwater Rewards

For the last four years, the Commission has approved projects under the updated Stormwater Quality Cost Share Policy for Raleigh Rainwater Rewards. The policy streamlines the approval process for smaller projects that are a shared cost between the City and program participants. During that time, the Commission approved 30 projects. Raleigh City Council approved 11 projects. Staff approved 61 projects.

In FY2021, 34 total projects were approved valuing $229,080 (Dollar amounts may vary slightly since reimbursement is provided after construction is finished). Also, 34 projects were completed through the program this fiscal year and have started their maintenance terms.



Educational experience on the observation deck at Raleigh Union Station. The sign shares how the green roof protects a tributary called Rocky Branch that flows to Walnut Creek.

Notable projects include a rain garden at William Peace University and a green roof off Penn Road. Staff also added educational signs to the green roof at Raleigh Union Station.

Stream Restoration & Water Quality Projects

In FY2021, the Stormwater Management Division continued designing stream restoration and water quality projects with support from the Commission and in partnership with various City departments and community organizations.

This includes preparing for and starting construction on Green Stormwater Infrastructure (GSI) projects in Raleigh. These projects are located on Glenwood Avenue, Peterson Street, and at the Walnut Creek Wetland Park and Glen Eden Pilot Park. They will help reduce water pollution to Crabtree Creek and Walnut Creek.

Projects in the design, study, or construction phase as of June 30 are listed below.

Plants blooming in the bioretention area at Raleigh Rose Garden.

LOCATION	TYPE	PARTNERS	STATUS
Durant Nature Preserve Upper Lake	Conversion of a lake to a wetland	Raleigh Parks, NC State University, and NC Land and Water Fund	Study completed: January 2020 Conversion to a wetland approved by City Council: April 2021 Design phase: Late 2021
Millbrook Exchange Park	Stream Restoration, Study and Repairs	Raleigh Parks, NC State University, NC Land and Water Fund	Construction and monitoring: completed 2020 Study for repairs and modifications: in progress, estimated completion late 2021
Wooten Meadows Park	Stream Daylighting and Riparian Wetlands	Raleigh Parks	Under construction; estimated completion late 2021
Glenwood, St. Mary's, and Wake	Bioretention	Raleigh Parks, NCDOT, Raleigh Transportation/Transit	Under construction; estimated completion late 2021
Glen Eden Pilot Park	Bioretention	Raleigh Parks	Under construction; estimated completion late 2021
Peterson Street	Linear Bioretention in Right-of-Way	Raleigh Parks	Under construction; estimated completion late 2021
Walnut Creek Wetland Park	Gravel Wetland	Raleigh Parks	Under construction; estimated completion late 2021
Rose Garden	Bioretention	Raleigh Parks	Complete July 2020

Bringing More GSI Projects to Raleigh

The Commission's sub-committee for the GSI initiative continued to work with staff on the plan for bringing more of these features to Raleigh. This year focused on using this type of infrastructure on City projects and properties. For example, bioretention areas are planned for the following roads: Blue Ridge Road, Marsh Creek Road, Atlantic Avenue, Six Forks Road, Barwell Road, Yonkers Road, New Bern Avenue, and Western Boulevard.

The sub-committee also worked with staff to create a plan for advancing the use of GSI. There are six different action items outlined in the plan to reach this goal.

Program and Policy Updates

Stormwater Fee Rate Change

In FY2021, the Commission reviewed different stormwater fee rate options to increase the level of service provided to customers. The fee covers a variety of services that reduce hazardous flooding and protect streams and rivers from pollution. Following approval from Raleigh City Council, the stormwater fee rate was changed from an average residential monthly fee of $5.50 to $7.00 beginning July 2021.

Under the new rate, the stormwater budget is about $32.8 million with $10.5 million available for upcoming capital improvement projects during the next fiscal year. The rate change also helps staff get a better understanding of the stormwater needs across the city; invest in innovative, green stormwater projects that help offset impacts from development and reduce water pollution; and coordinate with property owners and renters to return floodprone, developed land to green space.

Stormwater Design Manual

The Commission provided ongoing feedback for the rewrite of the City's stormwater design manual, which was last updated in 2002 to include expanded requirements during construction for stormwater quality, retention, and conveyance (the flow of stormwater runoff on developed sites and streets). The most recent update will include additional requirements and guidance that are not in the current manual, including riparian buffers, green stormwater infrastructure, and downstream impact assessments.

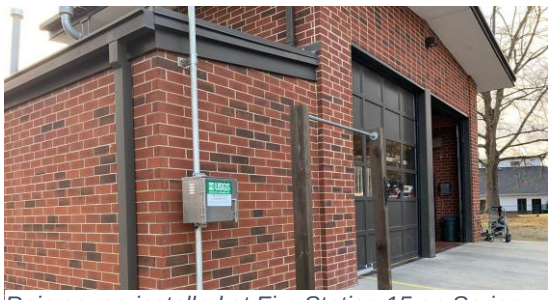
The goal is to help the development community and homeowners design and submit plans that are consistent with:

- Correct policies, methods, and requirements to navigate shifting development trends;
- Local, state, and federal regulations;
- Meeting or exceeding what is required during construction; and,
- Protecting the environment.

The City is in the process of completing the final version of the manual, which will be reviewed by the Commission and the Planning Commission. Raleigh City Council must adopt the changes before they go into effect. The new manual is expected to be available in mid-2022.

Flood Early Warning System

Commission members continued to support staff in enhancing the City's storm and flood monitoring efforts. This included working with Vieux and Associates to add the Crabtree Creek and Walnut Creek watersheds to the Flood Early Warning System (FEWS) software. Staff also added four areas or 'hotspots' that are known to flood to monitor them in the system.



Rain gauge installed at Fire Station 15 on Spring Forest Road in Raleigh.

In addition, staff has continued to work closely with US Geological Survey. After extending the agreement with

USGS, the City installed rain gauges at four fire stations in Raleigh. Stations are located on Spring Forest Road, Morgan's Way, Pinecrest Road, and Barwell Road.

Having rain gauges in these areas allows the City to use the flooding monitoring system to more effectively predict rainfall amounts and flooding. These tools work together to identify flooding impacts and provide early notification to first responders for road closures.

Updating Floodplain Regulations

The Commission worked with staff on final recommendations for changes to floodplain regulations. These recommendations were approved by Raleigh City Council in April 2021. The new regulations will go into effect in Spring 2022 to align with the release of updated floodplain maps.

The new regulations will extend building restrictions for new development to the entire floodplain. This means new structures cannot be built on vacant lots in any part of the floodplain. New development is also required to have roads with dry access during major rainstorms. Exemptions include developed properties already in the floodplain and properties that are 0.5 acres or less. If a property is no longer in the floodplain according to the new floodplain maps, property owners will not be required to follow these regulations.

Flood Hazard Mitigation Program

As a result of the recently approved floodplain regulations, Raleigh City Council asked staff to set up a new prioritization system to rank potential property acquisitions in the floodplain through the Flood Hazard Mitigation Program. Staff will be contracting with a consultant that has extensive experience in this area to assist in setting up a prioritization model for Raleigh. City staff will share results and ask for feedback from the Commission.

The Commission also helped support an increase in funding for the Flood Hazard Mitigation Program. City staff is in the process of identifying additional funding sources and a plan for the program moving forward.

Asset Management

The Commission provided feedback on the Municipal Separate Storm Sewer System (MS4) Asset Management Program during this year's budget process. This program is in addition to the asset management work for stormwater devices and dams already in place.

The first phase of the program focuses on::

- Establishing a process to determine when the following assets in the stormwater system are at risk and need to be repaired or replaced: pipes, outlets, drains, culverts, and manholes;
- Prioritizing and assessing areas of the stormwater system to look at condition, performance, and how immediate improvements are needed;
- Determining what inspections and rehabilitation work needs to be done to maintain or improve the stormwater system; and,
- Developing a plan that addresses various needs for effectively maintaining the stormwater system, like identifying data gaps, technology needs, as well as proactively completing repair, rehabilitation, and improvement projects before assets fail.

Watershed Planning

The Commission continued to provide input on Stormwater's watershed master plan, which allows the City to take a holistic approach in improving the stormwater system while preserving natural resources in watersheds throughout Raleigh.

A consultant studying stream flow in Hare Snipe watershed.

Commission members provided feedback on the Hare Snipe watershed study which focuses on:

- Developing ways to incorporate equity in community engagement as well as project selection, prioritization and development when studying an area;
- Doing public outreach and engagement using surveys, meetings, and interactive mapping tools;
- Creating water quality modeling showing how the City can address flooding and improve conditions in the watershed;
- Assessing streams to identify where erosion is occurring;
- Recommending rehabilitation work for priority stormwater assets; and,
- Identifying and planning for projects that'll improve the stormwater system.

Managing Lakes in Raleigh

Based on Commission recommendations and with approval from City Council, staff updated the City's Lake Preservation Policy. The new policy is now known as the Lake Management Evaluation Program. It provides flexible solutions to protect and improve lakes. Options include reconstructing dams that hold water in lakes; restoring more natural stream conditions; creating wetlands; and using green stormwater infrastructure in these areas.

The first project initiated under the new policy is improvements to the upper lake at Durant Nature Preserve. City staff, the Commission, and City Council approved moving forward with converting the lake area to a tiered wetland. This was approved in April 2021 and will be an ongoing project as staff coordinates design and construction. The wetland will improve water quality and wildlife habitat at the preserve. It'll also help enhance community experience at the preserve.

Stormwater Management Plan

Staff worked with the Commission to update the Stormwater Management Plan to ensure that the City is meeting state and federal requirements for the National Pollutant Discharge Elimination System permit. The goal is to effectively manage stormwater runoff as it flows through the city to protect waterways. The plan is available online and will be updated every five years for the North Carolina Department of Environmental Quality.

Rain Barrel Program

Stormwater staff continued to work with vendors, EPOCH Rain Barrels and Rain Water Solutions, for the Rain Barrel Program. This program offers online rain barrel sales that coincide with educational information on the City's website. In addition to these resources, stormwater staff hosted two rain barrel/rain garden workshops for the community on October 10, 2020 and March 27, 2021. The workshop taught participants how these features work and how to install/use them.

Education and Outreach

The Commission was actively involved in outreach and education strategies for various stormwater initiatives throughout the year to improve communication and reach to communities across the city. In addition to that, staff completed four school visits and reached more than 1,300 students this year. Education includes stormwater-themed storytime, demos, board games, and presentations as well as an at-home activity to make your own watershed.

Staff also developed new ways to reach students and other community members. The first is a StoryWalk® at Lake Johnson that features "All the Way to the Ocean" by Joel Harper. The book is a good way to teach people about the importance of preventing water pollution. Through this campaign, the City has reached a minimum of 30,000 – 40,000 park visitors during the fiscal year. Also, staff created several virtual learning resources that are available on the City's website and shared through other digital platforms.

Internship Program

In Spring 2021, staff worked with four interns from a local high school and colleges/universities. Two interns were associated with the Partnership Raleigh Community Climate Internship Program. The other two were from NC State University and Broughton High School. Each intern provided an overview of their work to the Commission in June 2021. Efforts included supporting flood early warning initiatives; studying equitable approaches to reducing flooding impacts; coming up with ideas to encourage more use of green stormwater infrastructure; and, identifying ways to make Raleigh Rainwater Rewards and the illicit discharge program more equitable.