



Stormwater Management Advisory Commission Annual Report

FY2020

Approved

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**Raleigh
Stormwater**



Working Together to Manage Stormwater in Raleigh

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

- Large infrastructure projects that improve the public stormwater system;
- Smaller projects that address flooding and erosion issues on private property that's impacted by stormwater runoff coming from public streets; and,
- Voluntary, small-scale projects that help reduce water pollution.



Community members who serve on the Stormwater Management Advisory Commission.

Commission members also worked with 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, 2019 to June 30, 2020. While the Commission did not meet during the last quarter of the fiscal year, members coordinated with Stormwater staff to support services during the COVID-19 pandemic. Then, at the start of FY2021, the Commission held its first virtual meeting to ensure that they continued to carry out their mission safely and effectively.

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 Infrastructure Projects

The Commission received updates and provided input on [large stormwater infrastructure projects](#) in FY2020. During this year, there were:

- 5 major projects under construction at one time valuing \$13.7 million in construction costs.
- 5 projects completed valuing \$13.3 million.

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

The Commission also reviewed and offered input on the proposed Stormwater Capital Improvement Program for fiscal years 2021 – 2030.



A repaired streambank along Swift Drive in Raleigh.

Infrastructure Highlights

Simmons Branch Drainage Improvements – Phase 2

This \$5.6 million [stormwater infrastructure project](#) is the largest one constructed to date by the City of Raleigh. It is located in southwest Raleigh on Swift Drive and Pineview Drive. During construction, crews relocated more than 2,000 feet of water and sanitary sewer pipes in the project area; installed a larger stormwater concrete box culvert that carries runoff and streamflow along Swift Drive; and installed two 10' x 6' concrete box culverts on Pineview Drive that can handle eight inches of rain over 24 hours without causing water to flow over the road. The project also included stabilizing the stream channel to protect front yards along Swift Drive. This work will significantly reduce flood risk in this area. Improvements also allow water to flow more easily to Walnut Creek and the Neuse River, resulting in less erosion and water pollution. Construction for the project finished in Spring 2020.

Laurel Hills Area Projects

Laurel Hills Dam Rehabilitation – This [\\$2.5 million project](#) included installing a new spillway for the dam at Laurel Hills Lake and upgrading the sanitary sewer mains in the area. The new dam will help reduce flooding and prevent erosion to the road and lake. NC Dam Safety is in the process of approving the new dam and spillway.

Juniper Street Stormwater Project – This [project](#) finished in early 2020 after crews installed four new storm drains along Juniper Street and added new stormwater pipes that are 15-18 inches wide (instead of 12 inches wide). This work reduces flooding in the neighborhood and helps move water through the stormwater system to Crabtree Creek.

Swann Street

During the first phase of this [project](#), crews increased the size of the stormwater pipes along Swann Street from 48 to 72 inches in diameter. They also added storm drains along the road to capture water from yards



and streets. This work reduces flooding along the road. Construction for the first phase finished in December 2019. The contractor is now working on the second phase of the project.

Lake Dam Road Bridge Replacement

This [\\$2 million project](#) was done in partnership with the North Carolina Department of Transportation, the Federal Highway Administration, and the City’s Transportation Department. Crews replaced the bridge over Lake Dam Road that was built in 1966. The new bridge meets current design and regulatory requirements. Work also included repairing the streambank under the bridge and protecting this part of Walnut Creek that is below the dam at Lake Johnson.

Drainage Assistance Program



The stream stabilization on Gainsborough Drive after construction.

Approved Projects

In FY2020, the Commission approved 10 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. Stormwater 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 third consecutive year that the Stormwater Management Division completed at least \$1 million worth of projects in a year. Stormwater staff finished construction on eight projects.

Drainage Assistance Highlights

Everett Avenue Drainage Improvements

This [project](#) included installing new stormwater pipes on Everett Avenue between Brooks Avenue and Gardner Street. The new pipes bring the stormwater system up to current standards and reduce street and garage flooding to a property on Everett Avenue.

Gainsborough Drive Stream Stabilization

During this [project](#), contractors repaired an eroded streambank at a property on Gainsborough Drive. Erosion was within 18 feet of the home, which caused significant safety concerns. To improve the stream, crews added rock, fixed the stream’s slope, and added plants on the streambank to protect it.



Raleigh Rainwater Rewards

For the last three 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 22 projects. Raleigh City Council approved 11 projects. Stormwater staff approved 35 projects.

In FY2020, 25 total projects were approved valuing \$260,954 (Dollar amounts may vary slightly since reimbursement is provided after construction is finished). Also, 20 projects were completed through the program this fiscal year and have started their maintenance terms.

Notable projects include new cisterns at The Longleaf Hotel, four bioretention areas off Matt Drive, and impervious surface removal off Weathergreen Drive.



One of six cisterns at the Longleaf Hotel in downtown Raleigh. The system can collect about 5,500 gallons of water when it rains.

Stream Restoration & Water Quality Projects

In FY2020, 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 several [green stormwater infrastructure](#) projects for construction. These projects are located on Glenwood Avenue, Peterson Street, and at the Walnut Creek Wetland Park and Glen Eden Pilot Park.

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



The bioretention area under construction at the Rose Garden in Raleigh.



LOCATION	TYPE	PARTNERS	STATUS
Durant Nature Preserve Upper Lake	Study	Raleigh Parks, NC State University, and NC Clean Water Management Trust Fund	Complete in February 2020
Millbrook Exchange Park	Stream Restoration; Study	Raleigh Parks, NC State University, NC Clean Water Management Trust Fund	Construction Complete; Monitoring through 2020
Wooten Meadows Park	Stream Daylighting and Riparian Wetlands	Raleigh Parks	Pending construction bid
Glenwood, St. Mary's, and Wake	Bioretention	Raleigh Parks, NCDOT, Raleigh Transportation/Transit	Construction Phase
Glen Eden Pilot Park	Bioretention	Raleigh Parks	Construction Phase
Peterson Street	Linear Bioretention in Right-of-Way	Raleigh Parks	Construction Phase
Walnut Creek Wetland Park	Gravel Wetland	Raleigh Parks	Construction Phase
Rose Garden	Bioretention	Raleigh Parks	Under Construction

Program and Policy Updates

Stormwater Fee Rate Change

During FY2020, the Commission reviewed three different [fee](#) rate options to increase the level of stormwater services provided to citizens. Rate options ranged from a 10 percent to 60 percent increase, all of which provide a variety of services that reduce hazardous flooding and protect streams and rivers. With consideration of the economic impacts from the COVID-19 pandemic, Raleigh City Council supported a 10 percent rate adjustment in early FY21. This will bring the average residential stormwater fee from \$5.00 a month to \$5.50 a month beginning September 1, 2020. Under the new rate, the stormwater budget will be about \$25.7 million with \$6.5 million available for upcoming capital improvement projects during the next fiscal year. The rate change will also pay for maintenance to hundreds of miles of City-owned stormwater pipes and improvements to storm drains, streams, and dams.

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, stormwater retention, and stormwater 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 getting community and stakeholder feedback on the manual. A final version 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 2021.



Rain gauge on Wake Forest Road that provides updates on creek levels every five minutes during

Flood Early Warning System

In line with their work plan, Commission members supported Stormwater staff in enhancing the City’s [storm and flood monitoring](#) efforts. In addition to using stream gauges, flood warning signs, and cameras, the City is developing a flood early warning system. The system provides advanced notification to first responders before flooding begins. This pilot program will prepare the city for extreme rainfall and help keep the community safe.

In 2019-2020, Stormwater staff worked with Vieux and Associates and US Geological Survey to make flooding predictions in the Crabtree Creek watershed. This includes using rain gauge equipment to receive updates every five minutes instead of every hour. This watershed was chosen first because of its quick flooding characteristics, which is

helpful in determining how fast the flood warning system can respond. The next phase will focus on areas in the Walnut Creek watershed.

Flood Hazard Mitigation

The Commission continues to support the Flood Hazard Mitigation Grant Program, which assists people who are impacted by major flooding because their property was built in the floodplain or in a floodprone location prior to current regulations. These properties – which can be single-family or commercial – are restored to green space allowing the floodplain to function more naturally reducing significant flooding to homes and buildings. Projects are both locally and federally funded.

The City did not complete any projects through the program this fiscal year due to budget constraints. However, Stormwater staff did continue to have



Flooding surrounding a Raleigh home on Winthrop Drive.



conversations with the Commission about the best path forward and ways to enhance the program while updating floodplain regulations.

The Commission also approved projects that were originally planned as stormwater system improvements and later switched to a property buy-out due to localized flooding at individual structures on Hillock Drive and Winthrop Drive. After coordinating with property owners, the Commission and Stormwater staff approved these property acquisitions. This process includes the property owners moving to other properties. The City will also remove the impacted structures and return each area to green space in FY21.

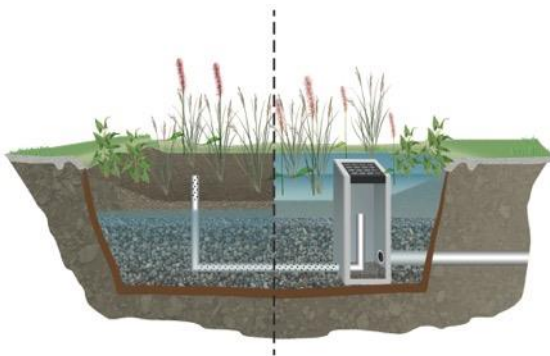
Removing the structures allows flood water to flow naturally and no longer put the property owners at risk.

Updating Floodplain Regulations

The Commission reviewed and updated recommendations for [changes to floodplain regulations](#) that were provided after an in-depth community stakeholder group process and seeking input from residents who live in or near the floodplain.

The goal with making these changes is to reduce flooding impacts and safety concerns in areas near streams and creeks that are expected to flood during large rainstorms. Recommendations included changing regulations to restrict new development in the floodplain and to require all new public roads to have dry access so that emergency vehicles can safely reach properties.

The Commission will present these recommendations to Raleigh City Council in the first half of FY21. If approved, recommendations will go through the ordinance change process.



A rendering of the design for the gravel wetland at the Walnut Creek Wetland Park.

Green Stormwater Infrastructure

The Commission's sub-committee for the [Green Stormwater Infrastructure](#) initiative continued to work with Stormwater 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, City staff included bioretention areas with road improvement projects on Milburnie Road and Fox Road. There also will be bioretention areas on Blue Ridge Road, Marsh Creek Road, Atlantic Avenue, Six Forks Road, Barwell Road, Yonkers Road, New Bern Avenue, and Western Boulevard in the future.

Stormwater staff also worked with consultants to design five major green stormwater infrastructure projects on City property and public streets that will reduce water pollution to Crabtree Creek and Walnut Creek. These projects include a:

- 1,700-square-foot bioretention area at the intersection of Glenwood Avenue, St. Marys Street, and Wake Drive;
- 5,300-square-foot gravel wetland at the Walnut Creek Wetland Park;
- 2,000-square-foot bioretention area at Glen Eden Pilot Park;
- 500-square-foot bioretention area along Peterson Street; and,
- 2,100-square-foot bioretention area next to the Raleigh Rose Garden.



Asset Management

The Commission provided feedback on the Stormwater Management Division's MS4 Asset Management Program during this year's budget process. The program is in addition to the asset management work already dedicated to stormwater devices and dams.

The first phase of the program focuses on:

- Assessing the City's pipes, outlets, drains, culverts, and manholes that carry stormwater to nearby streams;
- Prioritizing what projects need to be done and when by looking at an asset's physical characteristics, age, condition, and performance;
- Determining short- and long-term costs to maintain and improve the stormwater system; and,
- Implementing a plan to address critical data gaps, technology needs, and the best way to proactively complete projects.

Watershed Planning

The Commission continued to provide input on the Stormwater Management Division's [watershed master plan](#), which will allow the City to take a wholistic approach in improving the stormwater system and preserving natural resources in watersheds throughout Raleigh.

Commission members reviewed the most recent work in the plan during this year's budget process. For this plan, an engineering consultant created a tool that calculates pollutant loading and reductions. The tool will estimate water quality impacts to streams in Raleigh and help Stormwater staff better understand how stormwater devices and other practices benefit the stormwater system and receiving streams.



Flooding on Rose Lane in Raleigh.

In addition, the Commission received updates on the first study connected to the watershed master plan. The South Raleigh Drainage Studies focus on addressing major flooding in three priority areas in the Walnut Creek watershed: Rose Lane, Glenbrook Drive and Dacian Road, and Dana Drive. The studies will provide recommendations on the best way to reduce hazardous flooding. While studying these areas, the consultant and staff learned about ongoing flooding issues; developed hydrologic and hydraulic models; and recommended improvements. The consultant's final report will be reviewed by Stormwater staff and the Commission in FY21 to determine next steps that will lead towards constructed improvements.

Lake Preservation

The Commission worked closely with Stormwater staff to recommend changes to the City's Lake Preservation Policy, which manages lakes for public safety, flood control, water quality, and regulatory compliance. Policy revisions would benefit lake preservation and provide flexible solutions to protect or improve these areas by:



- Preserving constructed lake;
- Doing stream restorations;
- Creating wetlands; and,
- Using green stormwater infrastructure, which offers ‘closer to the source’ controls when managing the flow of stormwater in the city.

These recommendations were initially shared with Raleigh City Council in FY20. The Commission will continue to review the policy this fiscal year in order to provide future recommendations.

Rain Barrel Program

Halfway through the fiscal year, the Commission received an update on the City’s [Rain Barrel Program](#). Stormwater staff has continued to work with vendors, EPOCH Rain Barrels and Rain Water Solutions, to offer online rain barrels sales that coincide with educational information on the City’s website. There were about 112 rain barrels purchased from the vendors in FY2020 – a significant jump from last year. Stormwater staff also hosted a rain barrel/rain garden workshop in February 2020. 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 engagement strategies for various stormwater initiatives throughout the year to improve communication and reach to communities across the city. In addition to that, Stormwater staff completed 28 school visits and reached nearly 3,175 students this year. This is 1,000 more students than last year, which is a big accomplishment considering the changes made to [outreach and education](#) during the COVID-19 pandemic. Education includes stormwater-themed storytime, demos, board games, and presentations as well as an at-home activity to make your own watershed.
