



City of Durham South Ellerbe Stormwater Restoration Project Summary

The South Ellerbe Restoration Project in the Falls Lake basin will restore a 4.3-acre wetland and more than 2,000 linear feet of streams. The stream and wetland complex will treat runoff from 493 acres of urban landscape developed before the creation of stormwater rules. In addition to water quality benefits, the project will include recreational amenities and provide opportunities for education and civic engagement around conservation and water quality issues.

The City of Durham purchased the project site in 2015. In 2017, the City committed approximately \$1.7 million to design and permit the project. In 2018, demolition was completed of onsite structures. In 2022, preliminary grading removed two to three feet of soil. Construction of the stream and wetland complex and site amenities is expected to begin in 2024 and last 18 months. The City of Durham Public Works will undertake long-term operation and maintenance of the project and will prepare an Operations and Maintenance (O&M) Plan. The O&M Plan will consist of maintenance, inspection, and operational practices for each of the various project elements.

The main water quality objective of the project is to reduce nutrient levels leaving the site and entering Falls Lake. The goal is to achieve approximate annual reductions of 500 pounds of Total Nitrogen and 100 pounds of Total Phosphorus. Suspended sediment and heavy metals are also a concern, though no specific goals are set for those. This goal aligns with the purpose of the Falls Lake Rules, adopted in 2011.

The project also helps fulfill Falls Lake existing development rules now being implemented through the Interim Alternative Implementation Approach (IAIA). Funds expended for the project are included in the City's annual investment requirement set by the IAIA. The State is expected to re-adopt the IAIA, with the official process starting in the coming years.

Partnerships and community involvement are critical elements of the South Ellerbe Restoration. The [Project Website](#) lists outreach activities, including public meetings, press releases, etc. Grant funding totaling more than \$5 million was awarded from The City of Raleigh Watershed Protection Program, The North Carolina Department of Environmental Quality, and the North Carolina Land and Water Fund. Public Works also worked with internal City partners to engage Spanish-speaking residents in surrounding neighborhoods. Duke Nicholas School of the Environment students evaluated efforts to reach traditionally underserved populations and offered insights on improving outreach. The City partnered with the New Hope Audubon Society to document bird species at the site pre-restoration. Ellerbe Creek Watershed Association (ECWA) is an enthusiastic community partner that promotes and supports the project and has given in-depth input throughout the planning and design process.

This project's innovative design was developed to meet the nutrient reduction goals for the site. Stormwater wetlands and anabranching coastal stream and wetland systems inspired the design of the stream and wetland complex. Unlike a stormwater wetland, both of two tributary streams will be free flowing through the Site. The final project design involves restoring baseflow channels for both streams flowing downstream to Ellerbe Creek. During storm events, the site will temporarily retain runoff and draw down over time, like a stormwater wetland. This will be done with a multi-stage weir at the downstream end of the project.

Another important goal for the project is to create a community amenity. A new pedestrian plaza will contain seating areas and public art. A demonstration garden will highlight natural techniques to treat stormwater runoff. A half-mile recreational loop around the site will connect to the existing South Ellerbe Greenway Trail. An adjacent greenway project, the future Durham Rail Trail, has highlighted the project in its planning process and includes multiple options (e.g., stairs, sloped path) for residents to connect to the site.

The Site will contain educational signage regarding the watershed, native plant and animal species, and the function of the stream and wetland complex. All three nearby schools have expressed interest in integrating learning experiences about the restoration into their curriculum. The project team has also worked with local greenway enthusiasts and watershed groups to promote public understanding of the importance of the site to clean water and healthy habitat.

Effectiveness

This project will have a significant overall benefit to drinking water source quality. The main water quality objective of the project is for the stream and wetland complex to reduce nutrient levels leaving the site and entering Falls Lake. The goal is to reduce Total Nitrogen leaving the site annually by approximately 500 pounds and Total Phosphorus by approximately 100 pounds. This goal aligns with the purpose of the Falls Lake Rules, adopted in 2011.

The project has a plan proposed to evaluate progress and success of the project and adapt accordingly. The City of Durham Public Works Department will be responsible for long-term operation and maintenance of the project. The City will prepare an Operations and Maintenance Plan (O&M Plan). The O&M Plan will consist of maintenance, inspection, and operational practices that will be conducted for each of the various project elements.

The project demonstrates effective and efficient use of resources. The project transforms an urban site into a community amenity contributing to water quality and flood resilience. Approximately two acres of impervious area, including a parking lot and vacant building, were removed from the FEMA-regulated floodway. Two underground storage tanks and contaminated soil were also removed. As a result of the project, base flood elevations north of the site during the 100-year storm event are predicted to drop by up to 5.5 feet. This is expected to remove several adjacent streets, plus four multifamily and 24 single family structures, from the base flood plain elevation (FEMA Zone AE).

Collaboration

There are strong and appropriate project partnerships. Partnerships listed in Table 1 have resulted in more than \$5 million in grant funding for this project.

Funding Agency	Funding Amount
City of Raleigh Watershed Protection Program	\$265,000
North Carolina Land and Water Fund (Restoration Grant)	\$750,000
North Carolina Land and Water Fund (Flood Risk Reduction)	\$1,000,000
NC DEQ Local Assistance for Stormwater Infrastructure Investment-ARPA	\$3,000,000

Table 1 Grant Awards for the S Ellerbe Project

The project includes an element of community involvement. Please see the [Project Website](#) for full details on outreach efforts. Community outreach has included [Spanish-language outreach](#) (Figure 2).



Figure 1 Spanish-Language Outreach Explaining Wetland Function

Outreach has also included an [educational video explaining water quality benefits of wetlands](#) (Figure 3).



Figure 2 Video Explaining Water Quality Benefits of Wetlands

Another notable area of community involvement has been public art initiatives. [A video](#) produced for the Project explains a partnership with local artist-educator Lee Moore Crawford who worked with three schools within walking distance of the project. The student art project envisioned future habitat and animal species that would be present at the restoration site (Figure 3). Additionally, the project will include permanent public art installations by local artists as explained in another [project video](#).



Figure 3 Local Student Artwork

The City has also partnered with New Hope Audubon Society to document bird species present at the site pre-restoration. Ellerbe Creek Watershed Association board and staff members have been enthusiastic community partners that promote and support the project. They include the site on eco-tours and have given in-depth input throughout the planning and design process. Duke Nicholas School of the Environment students helped evaluate efforts to reach traditionally underserved populations and offered insights on improving outreach.

Relevance

The applicant has made the connection between their project and source water protection. Since 1998, Ellerbe Creek has been on the 303d list as impaired for biological integrity. Since 2008, Falls Lake has been listed as impaired for chlorophyll-a. Both 303d listings are indicative of a high nutrient load in the watershed. By reducing nutrient inputs to Ellerbe Creek and Falls Lake, the project will contribute to addressing the impaired status of these waterbodies.

The project addresses known issues. The Ellerbe Creek Watershed Improvement Plan (WIP) was developed by the City of Durham in 2010. The Plan is a comprehensive assessment of the watershed and makes recommendations for watershed improvements. The WIP recommends the Ellerbe Creek Restoration Project as a strategy to improve water quality and restore aquatic and terrestrial habitat.

Sustainability

There is a high likelihood of the project being implemented or completed. The City of Durham purchased the project site in 2015. In 2017, the City committed almost \$1.7 million to permit, design, and develop project manual and design drawings. Project implementation consists of three phases. Phase I, completed in 2018, included removal of an existing vacant building and parking lot. Phase II

was completed in 2022 and included preliminary grading and removal of 2-3 ft of soil. Phase III will include construction of the stream and wetland complex and site amenities. Phase III is expected to begin in 2024 and last 18 months.

The project goes above and beyond meeting existing regulations, guidelines, or practices. In addition to addressing the nitrogen and phosphorus reduction goals, the project addresses flood resiliency, removes impervious surfaces and contaminated materials from the floodway, increases biodiversity and reestablishes a historic stream and wetland ecosystem. The project will also implement trash collection devices (Figure 4) to prevent gross solids from entering Ellerbe Creek.

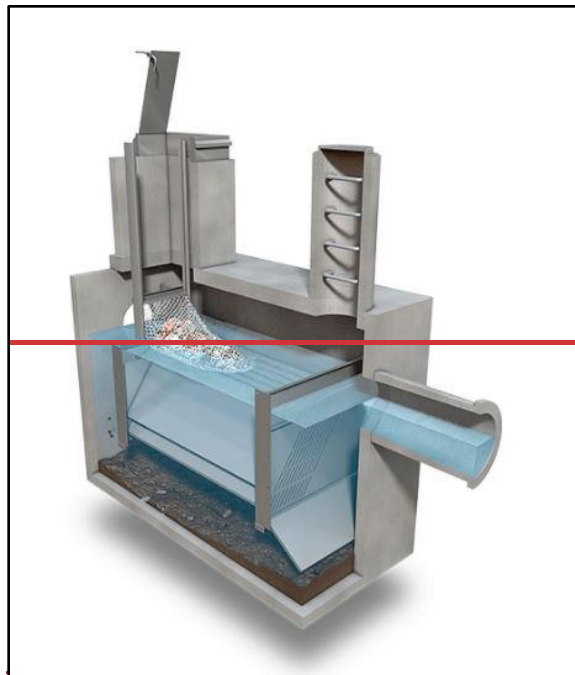


Figure 4 ParkUSA proprietary trash collection devices, or comparable devices, will be used for the project.

Innovation

The project is innovative and/or creative. This project has an innovative design developed specifically to meet the nutrient reduction goals for the site. Stormwater wetlands and anabranching coastal stream and wetland systems were used as an inspiration in developing the stream and wetland complex (Figure 5). Unlike a stormwater wetland, two tributary streams will be free-flowing through the Site. The final project design involves restoring baseflow channels for both streams flowing through the project area and downstream to Ellerbe Creek. During storm events, the stream and wetland complex will temporarily retain runoff and draw down over time, similar to a stormwater wetland. This will be done with a multi-stage weir at the downstream end of the project (Figure 6).



Figure 5 Rendering of Innovative Stream and Wetland Complex

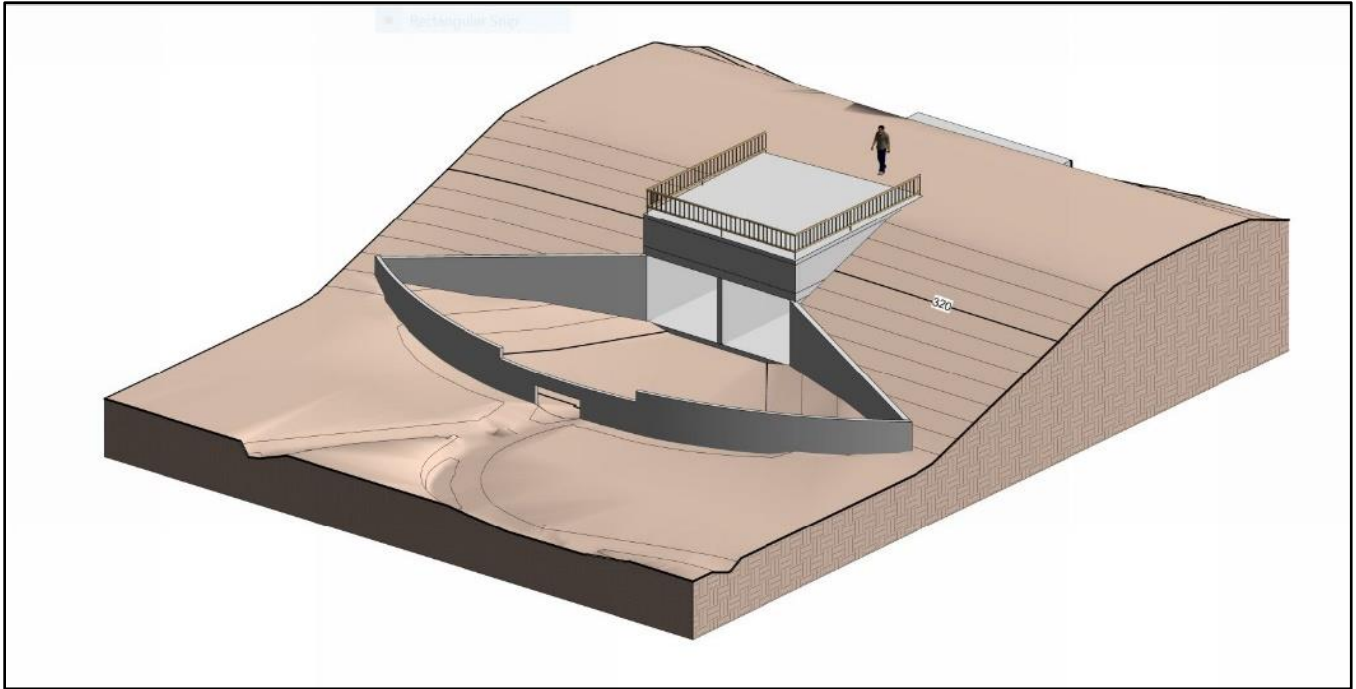


Figure 6 Rendering of Multi-stage Wier at Downstream End of Project

The project addresses multiple interests or objectives. Another important goal for the South Ellerbe Restoration Project is to create a community amenity for Durham residents. This will be achieved by several project elements (Figure 8). A new pedestrian plaza will be installed that will contain seating areas. A half-mile recreational loop around the site will be created by connecting the maintenance path to the existing South Ellerbe Greenway Trail. Site-appropriate plantings will foster healthy habitat. Educational signage will be installed throughout the project site to inform the public on various aspects of the project.



A Wetland Outlet



OUTLET STRUCTURE

B Shallow Marsh



SWAMP ROSE MALLOW VIRGINIA SWEETSPIRE CYPRIPEDIUM FLOUZE PICKERBERRY SNOWY MILKWEED

C Deep Marsh



BUTTONBUSH PICKEREL WEED WOOLGRASS LORDSBURG BLUE FLAG IRIS COWARDIN RUSH

Figure 8 A Community Amenity will be Achieved by Several Elements (2012 Concept Plan)

Transferability

The project sponsor or nominee has performed outreach activities or has a plan in place to perform outreach activities. The Site will contain educational signage regarding the watershed, native plant and animal species, and the function of the stream and wetland complex and stormwater features along the perimeter of the site. All three nearby schools have expressed interest in continuing to integrate learning experiences about the restoration into their curriculum. The project team has also worked with local birders, greenway enthusiasts, and watershed groups to promote public understanding of the importance of the site to clean water and healthy habitat (Figure 9).



Figure 9 The Project will be Important to Healthy Habitat