

Using the NC Clean Water State Revolving Fund for Stormwater Projects: City of Greenville, North Carolina

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Background on Greenville, North Carolina

Greenville is situated in the coastal plain of North Carolina, approximately 85 miles east of Raleigh and is situated in the Tar-Pamlico River basin. The city is 35 square miles¹ with the Tar River and multiple streams running through it. As of 2019, the city's population was 93,400, making it the 10th largest city in the state.² The City of Greenville is also home to East Carolina University, a large, public university and a major employer in the area.³



Greenville on the map. Image from Google Maps.

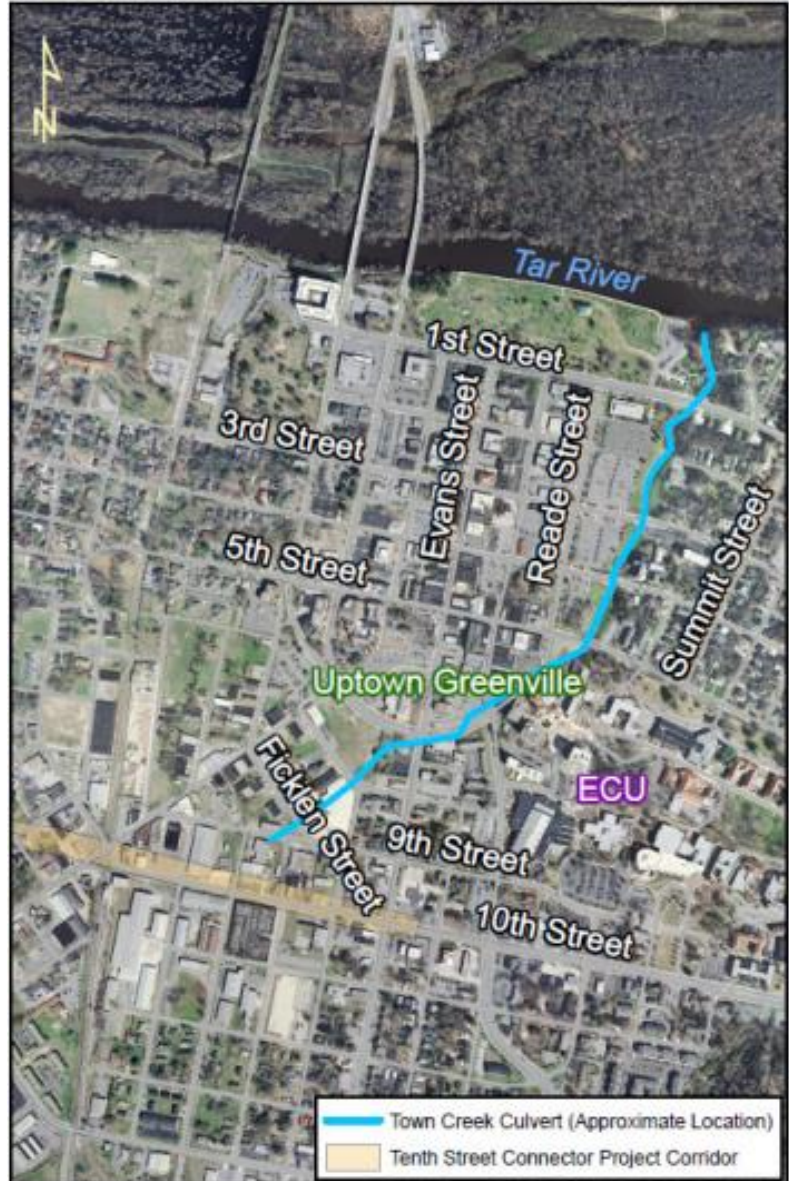
¹ From the [City of Greenville Website](#)

² *ibid.*

³ Obtained from [Data USA](#)

The stormwater utility was formed in 2003 to fund the city's Stormwater Management Program.⁴ Greenville's Stormwater Utility is run through the City, and is not associated with the Greenville Utilities Commission, which provides electric, water, and sewer services in the area.

In 2012 and 2013, the City of Greenville experienced flooding in its Uptown District. The area was undergoing significant economic development, and the flooded business owners began to voice concerns over the level of stormwater service. As of 2013, most of the stormwater in the Uptown District flowed into the Town Creek Culvert: a 90-year-old system designed to withstand a two-year storm, meaning a low intensity storm that occurs bi-annually.⁵ To address the flooding, the City pursued the Town Creek Culvert and BMP Retrofit Project (henceforth called the Town Creek Culvert project), a mix of gray and green infrastructure to address flooding in the uptown area and expand the system to withstand a 25-year storm event, or a 4 percent annual chance storm event.⁶ Gray infrastructure includes culverts, pipes, and dams. Green infrastructure includes infiltration-based devices, such as bioretention areas, permeable pavers, regenerative stormwater conveyance systems, and wetlands.⁷



Map of the Town Creek Culvert Project. Image from the City of Greenville website.

⁴ From [Stormwater Management - Greenville, NC](#)

⁵ Obtained from [Town Creek Public Information Hearing Video](#) and Marc Horstman at WK Dickson

⁶ *ibid.*

⁷ From World Resources Institute's [Integrating Green and Gray: Creating Next Generation Infrastructure Synopsis](#).

Greenville Stormwater Debt-Financing

The Greenville Stormwater Utility was formed in 2003 as a result of water quantity issues (flooding) within the City. Greenville is located in the low-lying Coastal Plain and is subject to regular flooding. As such, the City needed to add conveyances to direct water away from the built environment. The Utility was formed as a general obligation bond was issued. The Utility, being brand new, had no fund balance at the time, making it impossible for it to issue a revenue bond or to use pay-as-you-go funding. So, the City issued a general obligation bond to fund stormwater conveyances, amongst other city capital projects. Before the Town Creek Culvert Project, this general obligation bond was the only example of stormwater debt-financing within Greenville.

The State Revolving Fund Process

The North Carolina Clean Water State Revolving Fund ([NC CWSRF](#)) program is run through the NC Division of Water Infrastructure ([DWI](#)). CWSRF funding occurs in two cycles each year, spring and fall, with approximately \$75 million available each round. DWI funds as many projects as possible depending on the application and funding pools. Currently, DWI funds an average of 15 projects, primarily wastewater projects, per CWSRF funding cycle. To encourage “green” projects, EPA created the [Green Project Reserve](#): a set-aside of funds dedicated to projects with green outcomes such as energy efficiency, water efficiency, and water quality. EPA’s goal for the Green Project Reserve is approximately 10 percent of CWSRF grant to the state, but the 10 percent goal is not always achieved. There are four types of green projects: reuse or harvesting, energy efficiency, stream/wetland buffer restoration, or stormwater BMPs. Green projects receive a 1 percent interest rate reduction. These projects compete against each other for funds until the green pool runs out. Then the green projects enter the general pool and compete against wastewater projects for funding. The SRF eligibility criteria focus on funding projects with water quality impacts, and indirectly may positively affect water quantity challenges, such as a culvert. Incorporating stormwater Best Management Practices ([BMPs](#)) into projects makes water quantity-oriented stormwater projects competitive as BMPs are a holistic approach addressing both water quality and water quantity issues. Examples of BMPs are retention ponds and regenerative stormwater conveyance, which can both address water quality and quantity. The Letter of Intent to Fund, which comes after a successful application, assigns a schedule to recipients that typically includes a two-year window to complete the engineering report, plans, and specifications, and begin construction.

Downtown Flooding and the Town Creek Culvert & BMP Retrofit Project

Greenville pursued the Town Creek Culvert project to address recurring flooding in the uptown area and to expand its stormwater system to withstand a 25-year storm event.⁸ The Town Creek Culvert project was more costly than any other stormwater project undertaken by the utility to date. Given the project size and cost, even with a built-up fund balance, the utility could not use pay-as-you-go funding.

When the utility engaged with consultants to plan the project, the consultant recommended

CWSRF loans from DWI as a potential funding option. Given that the Town Creek Culvert project plan had recently been revised to include green infrastructure (GI), the project was eligible for SRF funding based on DWI's criteria. The project included nine BMPs including permeable pavement, bioretention cells, sand filters, and a regenerative stormwater conveyance.⁹ Greenville Stormwater applied in the fall funding round of 2013 and the project eventually began construction in 2018. The Town Creek Culvert project was designed to coincide with Department of



Greenville Regenerative Stormwater Conveyance. Image courtesy of WK Dickson.

Transportation road improvements in the downtown area. Of the GI included in the project, the Regenerative Stormwater Conveyance (RSC), which treats stormwater and removes nutrients before depositing the water to the Tar River, made the application competitive. This RSC also reflected a partnership with Eastern Carolina University to evaluate nutrient removal after the project is completed.

As the Town Creek Culvert project design progressed, the design became more complicated and costly. Effectively conveying the amount of stormwater in the downtown area required more infrastructure and construction than initially estimated. Cost estimates changed significantly over time. The original estimate was approximately \$7.4 million, a price tag that DWI agreed to fund. After reviewing the project scope, DWI determined that the project lacked enough stormwater BMPs to be classified as a Green Project, thus requiring the scope and costs to change. After the

⁸ *ibid.*

⁹ Obtained from the Greenville updated Engineering Report, provided by DWI.

engineering report, plans, and specifications were adjusted to include more BMPs, the costs grew to \$13.5 million, and then to \$16 million. The first time the project went out to bid, bids came back at approximately \$30 million. The second time the project went out to bid it came back at \$22.5 million. The inflated bids raised some concerns at DWI because of the limited pool of SRF Green Project funding. In August 2017, the Uptown District flooded again, increasing the urgency to find a stormwater solution.¹⁰

A final bidding process resulted in a projected cost of \$32.6 million. When Greenville requested the final bid amount from DWI, DWI and SWIA initially declined to fund at that price. After some back-and-forth, the project was ultimately funded. The final loan package was \$32.6 million with \$16 million at 0 percent interest, and the other \$16.6 million at a low interest rate of 1.82 percent. This mix of interest rates reflected the limited pool of green funds, which required the use of other SRF funds to fill the funding gap. Greenville used a combination of funding and financing sources to cover the cost of the project, including financing from DWI and revenues from their stormwater fund. This resulted in a 0.9 percent effective interest rate for the entire \$32.6 million. The project was first submitted in the Fall 2013, fully funded in 2018, and passed final inspection by DWI in October 2020.

The Learning Curve

The complexity of an urban stormwater project should not be understated, and the Town Creek Culvert project is no exception. Many water and sewer lines had to be rerouted as the stormwater conveyances were added, resulting in rising costs. Some adjustments were made over time to reduce costs as well. Early on in the construction process, the contractor provided a value engineering proposal to save Greenville money, using an 8-foot by 10-foot culvert box in place of dual 84-inch pipes. Using a culvert instead of dual pipes saved a few million dollars in total, as each pipe would have cost \$40,000-\$50,000 per linear foot.

The Town Creek Culvert Project illustrated how quickly prices can change. Typically, DWI provides a 10 percent contingency for unforeseen conditions during design, but this project illustrates how that set-aside may not be sufficient in all cases.

Future Debt-Financing

Greenville Stormwater plans to debt-finance more stormwater infrastructure in the future, likely through revenue bonds given the strong financial position of the utility. Greenville Stormwater envisions these capital projects, including both gray and green infrastructure, which tend to happen in tandem in the city. The low upfront cost and ancillary benefits of green infrastructure

¹⁰ Obtained from [Town Creek Public Information Hearing Video](#).

tend to make it a selling point to the local constituents, but the low-lying nature of the area requires gray conveyances as well.¹¹

The stormwater utility has been engaging in watershed master planning, has three capital projects lined up, and the staff size has grown considerably since its inception. The utility has planned a stormwater fee increase for the next fiscal year (2022) to fund the revenue bond.¹² Given Greenville's location, the stormwater is not going away and the stormwater utility is leaning into addressing the city's challenges.

Recommendations

Consider how dire the needs are and the timeline of improvements.

SRFs can provide a low cost of capital, but the Town Creek Culvert project illustrates the potential for unpredictable funding timelines. In Greenville, the level of service (prior to the Town Creek Culvert project) was not sufficient to prevent flash floods from impacting businesses in the Uptown District, thus driving an immediate need within the City to address the issue.

If the utility has a bond rating or can easily attain one, consider the cost of capital in the municipal bond market relative to the CWSRF.

As the Greenville Stormwater Utility grows in customer base and total revenue, there is an easier path to debt-financing large projects without using SRF funds. More fee payers, more revenue, and better financial indicators typically facilitate higher bond ratings and thus a lower cost of capital in the municipal bond market. As of the end of 2020, Greenville Stormwater had not yet been bond rated. By attaining a bond rating, the stormwater utility could access the municipal bond market and borrow funds for their gray/green hybrid infrastructure projects at low interest rates without needing to meet certain criteria to qualify.

For those utilities without the same ability to become bond-rated, SRF loans provide access to large amounts of capital at low interest rates. As a result, they remain a desirable option for many utilities.

When applying for Green Reserve funds, consider the amount of gray infrastructure and green infrastructure in your proposal.

The Town Creek Culvert Project remains the largest and most complicated stormwater project DWI has funded. From DWI's perspective, the Town Creek Culvert Project did not impact the Green Reserve program process, but brought awareness to the challenges of tackling such complex stormwater projects with SRF funds. DWI recommends emphasizing BMPs in a project proposal as BMPs are a major part of the eligibility criteria.

¹¹ Obtained via personal communication with Lisa Kirby, City of Greenville Stormwater.

¹² *ibid.*

With that said, if the project is “green,” apply!

DWI’s biggest suggestion to other municipalities looking to use SRF loans to finance stormwater projects is to apply for the loans, especially if the project is small. DWI receives only about 1 or 2 stormwater projects per cycle and the typical stormwater project is less than \$1 million. The most recent SRF-funded stormwater project was a \$3 million streambank restoration in Hendersonville. The project includes armoring of an urban stream in areas where wastewater infrastructure is at risk, and making it appear more natural in other areas to slow the velocity of water conveyed. Caswell Beach did not apply for CWSRF funding for the Town’s rapid dune infiltration stormwater installment, but this type of project is another example of a project that could qualify for green reserve funding.

Consider the full picture of improvements associated with large stormwater projects, not just those that directly address stormwater.

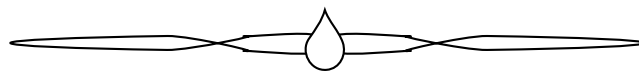
SRF dollars can only fund project components that meet the eligibility criteria and approved project purpose and scope. Applying with a flexible yet comprehensive plan can avoid complications with DWI having to reevaluate funding later in the project process as adding new aspects after the plan has been approved is non-advisable because it can cause funding delays.

Be wary of cost estimates that seem low, especially for urban stormwater projects.

There was a steep learning curve for all parties involved. As municipalities, consulting engineers, and DWI process larger stormwater projects, lessons learned can be applied from earlier projects, aiming to streamline processes and reduce complications. Be aware that changes in scope and technology will increase costs.

Consider adapting capital project timelines to align with large influxes of federal funding.

With \$100 million in grants potentially coming to NC DWI for stormwater projects from the American Rescue Plan Act (ARPA), SRF demand may decrease as systems will want grant money instead of loans. SRF funds could be used for ARPA funds requiring matches.



Acknowledgments

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Written by Austin Thompson and Catherine Otero

Editorial Assistance by Elsemarie Mullins

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