Appendix C: Clean Water State Revolving Fund Case Studies

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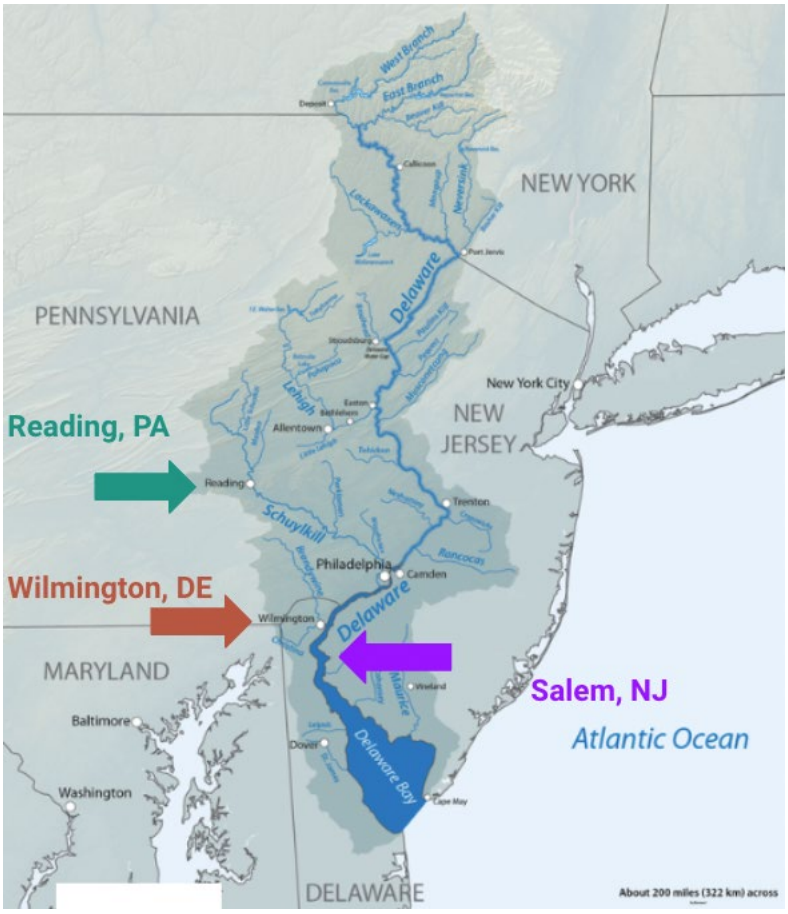
In 2022, American Rivers and the Water Center at the University of Pennsylvania began research focusing on how communities in New Jersey (NJ), Delaware (DE), and Pennsylvania (PA) within the Delaware River watershed are accessing and benefiting from state revolving fund (SRF) financing, with a specific focus on the extent to which these investments are distributed equitably and support green infrastructure. We also assessed the state programs' use of grants, principal forgiveness, or other forms of affordability assistance. As part of that assessment, the contributors developed case studies of three communities in the Delaware River watershed to understand whether and how they have been able to access Clean Water State Revolving Funds (CWSRF) to address their stormwater and wastewater challenges with an eye to identifying policy opportunities to more effectively leverage these funds for greater impact in the communities with the greatest need.

Most of the projects financed by the states' CWSRF programs involve gray infrastructure directly related to wastewater collection systems – both separate and combined – and treatment facilities. The ten projects at the top of each state's project priority list include sewer separation, septic elimination, pump station replacement, pipe lining, aeration systems, batch reactors, new digester pump valves and other similar projects. Most of the projects cost more than $1 million though several are in the $500,000 range. Green infrastructure projects are also represented and PENNVEST has a separate non-point source project priority list that includes several of these projects. Specifically, Philadelphia Water Department, Camden County Municipal Utility Authority and the Wyoming Valley Sanitary Authority all have green infrastructure projects on the priority lists. These projects actually include many smaller projects that are lumped together for total costs of more than $1 million and up to almost $14.5 million for one project. These green infrastructure projects are designed to reduce stormwater flows into combined systems or to reduce pollutant loads to meet municipal separate storm sewer system (MS4) permit obligations.

Focusing on three communities allowed for a more granular view of the effectiveness of current policies. The communities were selected based on several factors, including geographic distribution, social vulnerability, community size, regulatory interest, and municipal management of wastewater systems. With a goal of having one community from each state within the watershed, Wilmington was the only option in Delaware. Members of the project advisory

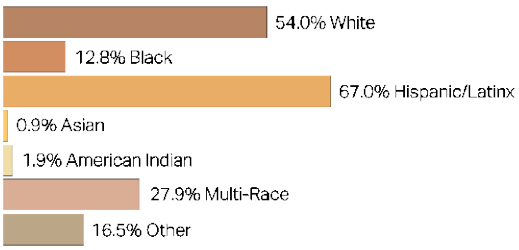
committee from the New Jersey Department of Environmental Protection helped select Salem for New Jersey. In Pennsylvania, Reading was selected because it is managed by the city as opposed to an authority and they have demonstrated an express interest in water equity through their engagement with the US Water Alliance Water Equity Network. More specific information about each community is shared in the case studies.



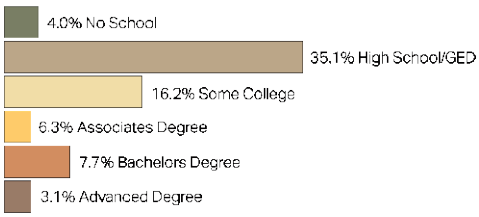
Reading, PA

Total Population			Change 2000 - 2020		pop/sq.mi.
2000	2010	2020	Total	%	
81,207	88,082	95,112	13,905	17.1	9,372

Race/Ethnicity



Education



Median Household Income

$32,176

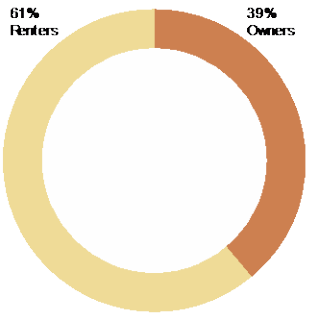
Population in Poverty

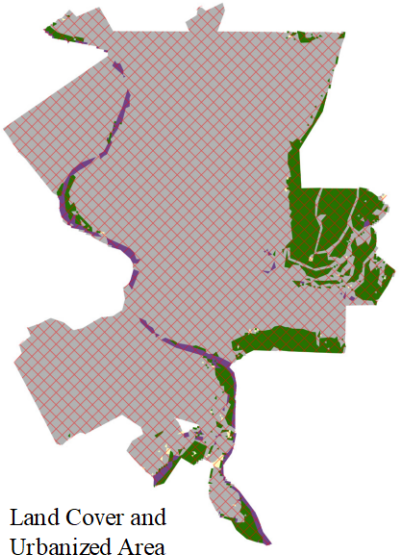
30.9 %

Unemployment Rate

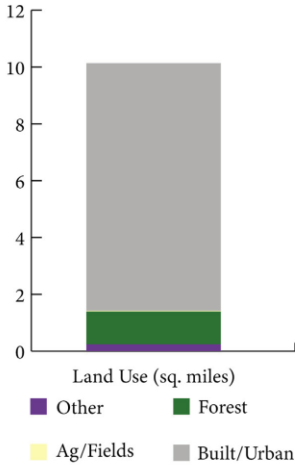
4.8 %

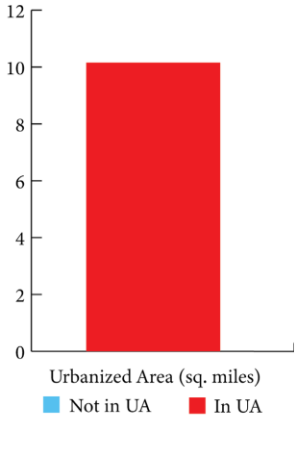
Housing Tenure





Land Cover and Urbanized Area





READING: A CITY, AND A SYSTEM, WITH TURNAROUND POTENTIAL

The City of Reading is the seat of Berks County and the fourth largest city in Pennsylvania at about 95,000 residents. Reading faces a poverty rate of 30.9%, significantly higher than the national average of 12.8%, with a median household income of approximately $32,000. This figure is nonetheless an improvement from 2011, when the poverty rate of 41.3% earned it the distinction of the "poorest small city in the nation."[1] Decades of financial struggles resulted in the City being subject to state oversight in 2009 pursuant to Act 47 in 2009; the City emerged from Act 47 controls in 2022.

Reading is extremely diverse. The five largest ethnic groups are Hispanic (White) (27.1%), Non-Hispanic (White) (20.4%), Hispanic (Other) (19.9%), Hispanic (Two+) (14.5%), and Black (Non-Hispanic) (9.19%). As of 2020, 18.6% of Reading residents were born outside of the United States (about 17,660 people)[2]. The largest employment sector in the region is manufacturing, followed by health care, retail, and education. In 2020, 35,341 people were employed in Reading itself. About 10% of the population has a bachelor's degree or higher, with 36% of the population attaining a high school diploma equivalent.[3]

Sanitary wastewater and stormwater services are provided by the City of Reading. Drinking water is provided by the Reading Area Water Authority (RAWA). RAWA also provides billing and fee collection services for multiple services on behalf of the city including sewer, trash and recycling. The City operates a centralized wastewater treatment plant at Fritz Island along the Schuylkill River with a permitted capacity of 20.5 million gallons per day as well as multiple pump stations and pretreatment facilities. The annual wastewater budget for the City of Reading in 2022 was $28.7 million.

Sanitary wastewater billing in the city is based on water consumption. For properties with a water meter, charges are divided into a fixed service charge based on the size of the property's water meter and a volumetric service charge. Sewer rates were last amended in 2013. Reading does not assess a separate stormwater fee. Although it considered a stormwater fee in recent years, the effort was shelved as it was considered politically infeasible. Stormwater activities are currently paid for through a mix of sewer funds and general funds. Given the size and age of the city, it is notable that the existing system is not a combined sewer like many older industrial cities in the northeast.

Approximately 40% of wastewater flows to the Fritz Island plant originate from municipalities outside Reading. Complex historical growth patterns have resulted in 15 metered connections with upstream municipalities, as well as several unmetered connections and interconnections.[4]

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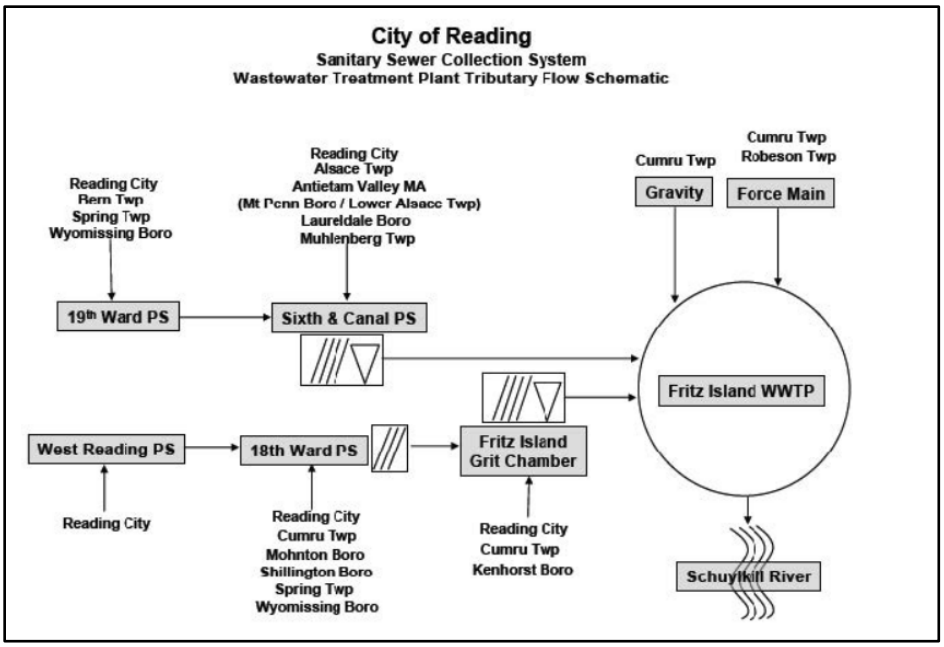
[1] https://www.commonwealthfoundation.org/2011/09/28/reading-is-poorest-city-in-u-s/
[2] https://datausa.io/profile/geo/reading-pa/
[3] https://www.towncharts.com/Pennsylvania/Education/Reading-city-PA-Education-data.html
[4] Deborah Hoag, City of Reading Utility Manager, personal communication January 5, 2023.

The City is compensated for these services pursuant to a number of inter-municipal agreements.



In the first half of the 20th century, Reading was considered a national leader in sewage treatment. However, as a result of underinvestment in the past several decades the treatment plant struggled to meet its permit obligations and faced odor complaints. In addition, limited pump station capacity and significant inflow and infiltration (I & I) into the collection system resulted in regular sanitary sewer overflows to the Schuylkill River and several tributaries. These culminated in a 2004 Federal Consent Decree whereby the city agreed to undertake necessary improvements to its system. These compliance issues have dominated the city's limited capacity for capital investment in the system for the past 18 years and continue to do so to a large extent.

In addition to its wastewater permit obligations, the City is also subject to permit obligations for its stormwater outfalls under the municipal separate storm sewer system (MS4) program. Several waterways into which city stormwater outfalls discharge are subject to increased regulatory scrutiny due to impairments, with several Total Maximum Daily Load (TMDL) plans to manage all sources of potential pollution, including multiple municipalities and private MS4 permittees:

Waterway	**TMDL**	**Listed Impairments**
Schuylkill River	Y	PCB's
Wyomissing Creek	Y	Siltation
Tulpehocken Creek	Y	Nutrients
Unnamed Tributaries to the Schuylkill River	N	Habitat Alterations, Flow Variability, Dissolved Solids

The City appears to be substantially in compliance with its MS4 obligations. A Pollution Reduction Plan required under its permit was approved by the Pennsylvania Department of Environmental Protection (PA DEP) in 2021. While the City may not be currently engaged in a substantial number of green infrastructure projects in order to meet its MS4 permit, it has adopted a Climate Resiliency and Sustainable Development Plan as well as supporting tree planting and management through its Shade Tree Commission.[5]

To finance its capital projects, Reading historically relied upon its general bonding capacity and was not a regular user of CWSRF financing through PENNVEST. However, much of the more than $180 million investment required to address its obligations under its Consent Decree was financed largely with assistance from PENNVEST. Between 2012 and 2017 the City obtained financing totaling $157,356,451 from the CWSRF for the required treatment plant, pump station, and associated upgrades.

Interviews with current staff responsible for water infrastructure management identified the following challenges:

- The bulk of attention and resources over the past 20 years has been driven by enforcement actions. This has resulted in a dire need to redirect attention to the aging sewer and MS4 collection systems in the City. However, the long-term overhang from Consent Decree-associated debt service will severely limit the city's scope for additional debt-funded capital investment.

- The number and structure of intermunicipal agreements results in a multi-year lag in funding formulas, despite a rapid escalation of debt service and other costs.

- The sewer collection systems in the city operate on an unusual grid pattern, and are often more than 20 feet deep under all other utilities, resulting in significant maintenance challenges. The depth of the system relative to groundwater, challenging topography and bedrock geology, and latent structural defects result in significant inflow and infiltration to both the sanitary and MS4 systems.

- Both riverine and localized flooding are regular occurrences in the City, with large areas of transportation infrastructure and industrial areas requiring constant active dewatering. Vaults for other underground utilities are routinely dewatered into the sanitary and MS4 systems with little control or coordination. A single stormwater system in the northern portion of the city is rated to pump up to 360 million gallons per day.

- The City has over 2800 stormwater inlets and a collection system with over 100 miles of pipe undersized for typical storm flows. Trash and debris clogging the system are a colossal maintenance challenge.

[5] See https://www.readingpa.gov/sustainability, https://www.readingpa.gov/environmental-advisory-council and https://www.readingpa.gov/shade-tree-commission.

- The City continues to receive significant stormwater flows from upstream municipalities with no politically viable means of compensation

- Lack of a dedicated stormwater funding source creates a reliance on wastewater fees based on water usage. The lack of a connection between impervious area and funding creates no incentive for private investment in green infrastructure or other stormwater management techniques.

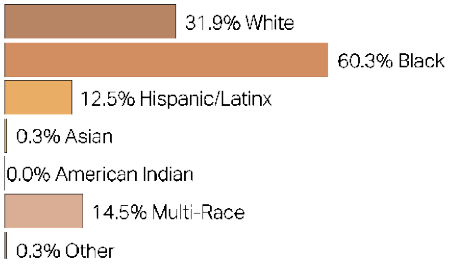
- Management turnover, overall staffing issues, and ongoing compliance challenges have kept the city in reactive mode. Interviewees feel that “crisis mode” is largely behind them, but a good deal of work on asset management, integrated long-term planning, and funding strategies is required to become fully proactive. While the city and its upstream municipalities are growing, affordability concerns will limit the ability to self-fund this necessary planning effort.

- The City admittedly has work to do in improving day-to-day interaction with PA DEP and PENNVEST on closing out its current capital projects.

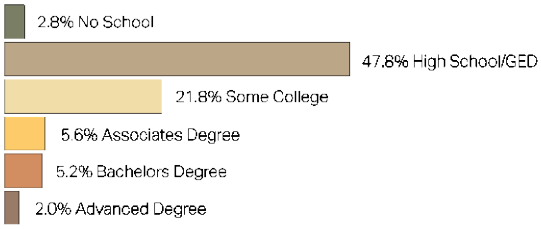
Salem, NJ

Total Population			Change 2000 - 2020		pop/sq.mi.
2000	2010	2020	Total	%	
5,857	5,146	5,296	-561	-9.6%	1,925

Race/Ethnicity



Education



Median Household Income

$22,125

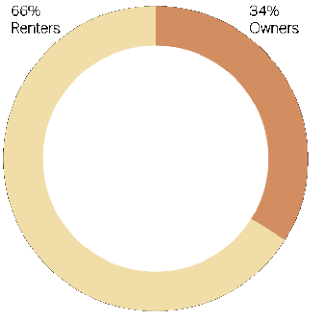
Population in Poverty

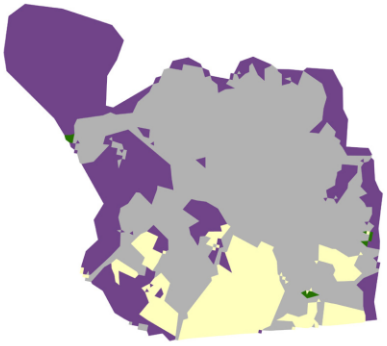
44.1 %

Unemployment Rate

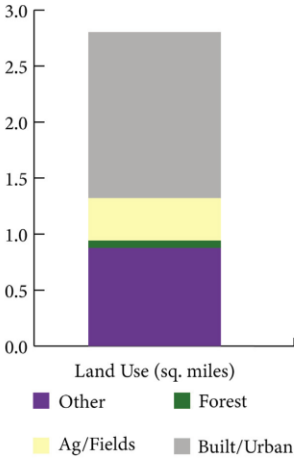
4.8 %

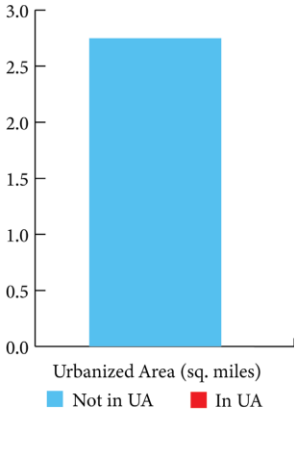
Housing Tenure





Land Cover and
Urbanized Area





SALEM: A DISTRESSED CITY CONSIDERING PRIVATIZATION

The City of Salem serves as the County Seat of Salem County, New Jersey. Covering approximately 2.8 square miles along the Salem River, it is one of the oldest municipalities in the state. With just under 5,300 residents, the City's population has been on the decline for several decades.

Salem is also a majority minority community with 60.3% of the population Black, 12.5% as Hispanic and 31.9% White. Over 14% of residents identify as multi-racial. The largest employment sector is Health Care & Social Assistance, followed by Retail and Manufacturing. Seven percent of the population holds a Bachelors' degree or higher, while almost 50% have a high school level education.

By state established metrics, the City of Salem is perennially one of the most, if not *the* most, distressed community in the state. Two-thirds of households are renters, and the poverty rate 44.1%, more than 4 times that of the state or the national average, and the median household income is $22,125.[6] The City has the second highest property tax rate in the state at 6.519%, which is nearly twice that of the County and nearly three times the state average.

Much of the City's water and sewer infrastructure dates back to its original installation in the 1800s. The system includes a collection of supply wells, a wastewater treatment plant and several other supply structures. The treatment plant includes 15 miles of gravity main and two miles of force main, primarily through 6" to 8" pipes. While the system is mapped, it is not in GIS form, does not include infrastructure such as manholes, laterals or lift stations, and does not include details regarding size and materials present. Portions of the system are running at capacity, but further modeling would be needed to better understand the distribution of this demand and its potential impacts.[7]

Recent investments in the system have been minimal, with little funding available for the repair and replacement of equipment and decades of deferred maintenance. While some improvements have been debt financed, and supplemental state dollars will support the replacement of a broken street sweeper and the purchase of a new jetter, the needs of the system far exceed the city's available financing capacity. The lack of certified operators to replace a retiring and resigning workforce compounds all of these challenges.

City Water & Sewer Department has a dedicated budget of approximately $3.8 million annually which includes debt service on $16 million in previous repairs, as well as a $20,000 annual line item for capital improvements, maintenance and repairs. The current water and sewer rate structure was adopted by Mayor and Council in 2014. The structure has experienced no subsequent rate increases and is largely insufficient to cover necessary expenses just to sustain the existing level of service.

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[6] https://datausa.io/profile/geo/salem-nj?compare=new-jersey

[7] *Description of Existing Water & Sanitary Municipal Utility Facilities and Water & Sanitary Utility Rate Study* prepared by Remington & Verick Engineers, October 2020.

Waterway	TMDL	Listed Impairments
Keasbeys Creek	Y	PCBs
Fenwick Creek	Y	PCBs
Salem River	Y	PCBs

In 2020, the City commissioned an engineering firm to conduct an assessment of the condition and needs of the system, as well as a rate study. The system assessment focused on the present and future needs to sustain the existing level of service and did not take into account improvements that may be needed to modernize infrastructure or address additional needs related to the recent detection of slight levels of PFOS in one of the wells or state mandated lead service line replacement.

The system assessment and rate study considered current and projected costs over a 20-year time horizon, inclusive of existing debt service and improvements and operations and maintenance needs identified in the 20 Year Utility Capital Improvement plan developed by the firm. Conservative estimates indicate nearly $1 million is needed annually for the next 20 years for capital improvements and upgrades to the distribution and conveyance systems. This is not inclusive of operational expenses such as salaries or debt service and could necessitate a 100% increase to ratepayers.[8]

The City is familiar with the SRF programs and has qualified for funding as well as for principal forgiveness in the past. In 2010, Salem accessed approximately $11.6 million from the Drinking Water SRF for a small system water treatment plant with $5 million (43.13%) in principal forgiveness, as well as a $1.4 million loan from the Clean Water SRF for a surface water treatment facility with $684,126 (49.89%) in principal forgiveness. More recently, the city elected *not* to move forward with an SRF loan for a meter replacement project, due in part to the inequities that would be created when the taxpayers of the city would be responsible for repayment of a loan that benefits system users outside of the city limits.

Interviews with staff indicated that Salem has relied more on state grant dollars for the capital and operational needs of the water and sewer systems recently. Due to the intensity of the City's distress, Salem has been a frequent recipient of "Transitional Aid." These are discretionary dollars available to municipalities whose financial limitations make it difficult to service debt, meet contractual obligations, or make payroll, among other needs.

There has typically been $1.5 million annually in Transition Aid, some of which has been directed to water and sewer projects. This year, a one-time infusion of $9 million is expected, $750,000 of which will go toward a new filtration system, with other dollars supporting design services for certain projects including restoration of Town Bank and dam replacement needs.

[8] Description of Existing Water & Sanitary Municipal Utility Facilities and Water & Sanitary Utility Rate Study prepared by Remington & Verick Engineers, October 2020.

While this has proven an effective strategy for the city, the February edition of *Local Finance Notice* from the Department of Community Affairs' Division of Local Government Services indicated that current recipients can expect decreases in this funding moving forward as it is intended to be short-term gap financing in times of temporary fiscal crisis, rather than a long-term supplement to municipal budgets.[9]

Currently, Salem's contracted engineering firm is operating drinking and wastewater systems, and it is the City's intention to privatize water and sewer, essentially shifting the risk, expense and responsibility of providing these services from the City to a private sector service purveyor. This is a complex decision-making process many small municipal systems are facing that can have far reaching financial impacts to rate payers. An independent financial assessment of the system is currently under review at the New Jersey Comptroller's office, which if approved, would pave the way for sale of the system. No referendum would be required.

Salem officials believe that selling the system gives the new owners the opportunity to put an affordability rate structure in place as private firms can offer bill assistance that the City cannot. In addition, with the system is in private hands, the City is able to negotiate rate directives to ensure rates are manageable for users and are scaled appropriately over time. Privatization was also a factor in declining the SRF loan for meter upgrades, given the challenges of transferring debt to a private service provider and the likelihood that the new owner would prefer to install their own metering system. Regardless of the timing of the sale, due to the needs of the system, a significant rate increase is expected in January 2023.

The City also holds an MS4 permit, but with the vast needs of the water and sewer system, as well as the immense scale of broader needs throughout such a distressed community, stormwater has taken a backseat, and there is little maintenance of existing facilities and the system. In addition, Salem recently transitioned from a Tier B permit to a Tier A MS4 permit which comes with significantly more reporting requirements. New Jersey Department of Environmental Protection (NJ DEP) has offered a $45,000 grant to support putting the administrative framework and capacity in place for achieving MS4 permit activities and reporting requirements.

The Town Bank Pumping Station is the focus of initial efforts to address stormwater management and flooding challenges. This pumping station was constructed in the 1960s to provide stormwater drainage and flood protection for roadways, residential and commercial structures and widespread agricultural operations in the 3.75 square mile watershed, a fair portion of which is outside the city limits. While little has been done to the pumping station since its construction, increased development throughout the watershed, aging infrastructure, and an increased severity in storm events routinely overwhelm the system, requiring a patchwork of temporary and expensive workarounds during storm events. In 2020 alone, the city spent $71,000 on pump repairs and rental of an auxiliary pump to provide the extra capacity needed during storm events.

[9] https://www.nj.gov/dca/divisions/dlgs/lfns/22/2022-03.pdf

The City currently has a $350,000 grant proposal under review with the state for a two-year project that would build on a 2011 study of the system and watershed. This project would update that study, conduct an environmental assessment, evaluate green infrastructure options, develop a long-term maintenance and monitoring plan, and create schematic designs and cost estimates for potential solutions. Of particular interest is expanding tree canopy to increase local resilience in a place where 90% of the community currently lacks tree canopy. This would contribute to better stormwater and flooding management while also delivering benefits related to urban heat island mitigation and habitat development.

The City also intends to pursue the stormwater utility feasibility study funding NJ DEP has made available. While not necessarily looking to establish a utility in the near-term, city officials are hopeful that this exercise will demonstrate that many of the needed infrastructure projects, both for permit compliance as well as flood mitigation, such as the Town Bank restoration, will benefit county residents and surrounding municipalities and that this might spur discussion on how these other jurisdictions might contribute to the investments that are needed.

Interviews with staff, literature review and research resulted in the following takeaways:

- The City can and has accessed the Clean Water and Drinking Water SRF programs, but there are significant complexities to doing so. The lack of capacity to apply for or pay back these funds proves unnecessarily burdensome when there are ample state grant and supplemental funds available. This is particularly the case when these state funds have fewer restrictions or costly up-front prerequisite activities. As a result, the city has recently relied on state grant funding to address water infrastructure needs.

- Privatizing water and sewer services may significantly reduce municipal risk and responsibility and can offer greater flexibility in establishing affordable rate structures. However, in many cases, the shift from public good to private service has resulted in significantly and often unaffordable rate increases for users.

- NJ DEP is eager to better understand the challenges communities face in accessing SRF funding and identifying pathways that facilitate increased use of these funds.

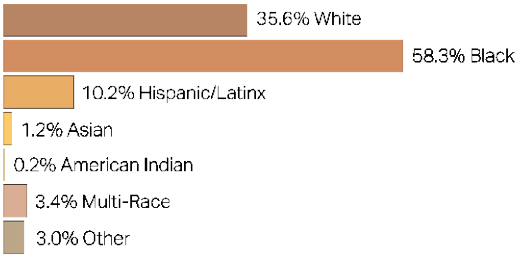
- Improving uptake of SRF program dollars, particularly given the scale of the need in distressed and underserved communities, may require that state programs look beyond traditional project-scale applications and consider the full suite of project *and* capacity needs in a community, inclusive of up-front planning, design and engineering activities.

- Ensuring this unprecedented investment can achieve the goal of truly transforming long underserved and overburdened communities may require a shift in how these funds hit the ground, either within the SRF programs or through other federal funding vehicles, that allow for greater flexibility and less administrative burden and financial risk.

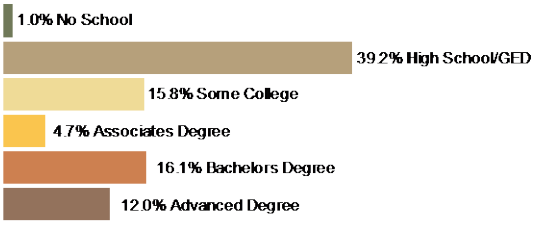
Wilmington, DE

Total Population			Change 2000 - 2020		pop/sq.mi.
2000	2010	2020	Total	%	
72,715	70,851	70,875	-1,840	-2.5%	5,979

Race/Ethnicity



Education



Median Household Income

$55,136

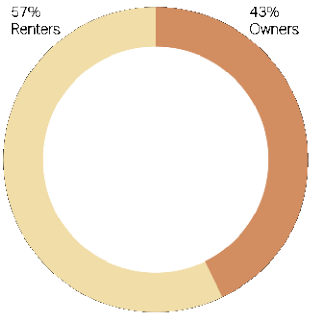
Population in Poverty

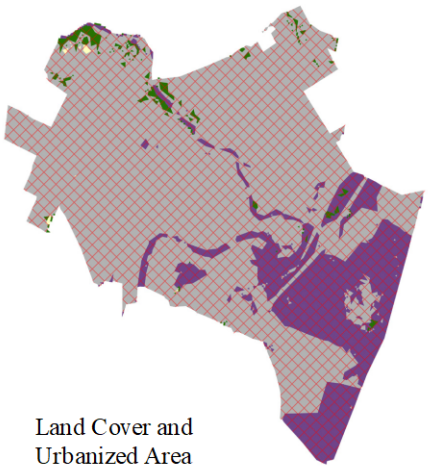
21.7 %

Unemployment Rate

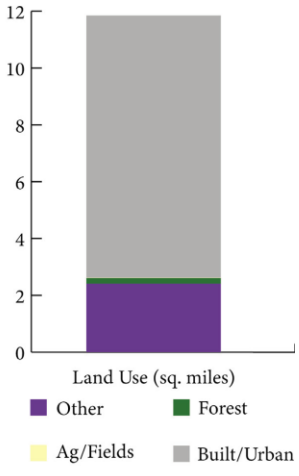
4.5 %

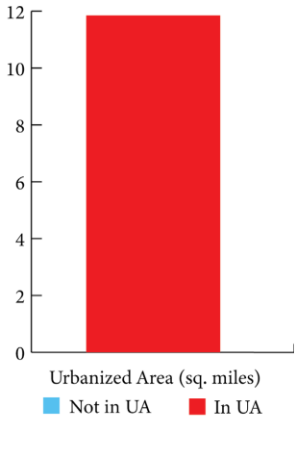
Housing Tenure





Land Cover and Urbanized Area





WILMINGTON: CONTRASTING CITY CUSTOMERS AND COUNTY CUSTOMERS

Wilmington is the seat of New Castle County and the largest city in Delaware and covers almost 11 square miles. The population in 2021 was 70,750. Wilmington has poverty rate of 22% significantly higher than the national average of 13%, with a median household income of $55,136 in 2020. Wilmington has a majority of Black residents with under 10% foreign born. There are more renters than owner-occupied residences. While most of the city's population has at least some college education, associate's degree, bachelor's degree or an advanced degree, just under 40% has a high school education.[10]

Natural features have affected the city's residential development pattern. Wilmington lies at the fall line that separates the flat coastal plain from the hilly areas to the west. East of Market Street, and along both sides of the Christina River, the land is flat, low-lying, and marshy in places. The west side of Market Street is hilly and rises to a point that marks the watershed between the Brandywine and the Christina Rivers. Parts of the city in the coastal plain is more susceptible to flooding.[11]

More than half of all Fortune 500 companies call Wilmington their corporate home. The top three major employers include the State of Delaware, Christina Care Health Systems, and JP Morgan Chase. The number of jobs located within the city limits is more than 46,000. While many of the employers have not announced layoffs recently, many are adjusting to preferences for hybrid and remote work. This shift could have significant impacts on city revenues from wage taxes.[12] General fund budgeted revenues have ranged between $167 million to $186 million in recent years.[13]

The City of Wilmington manages drinking water, wastewater and stormwater utilities. The sewer collection system is 90% combined sanitary/stormwater consisting of approximately 300 miles of sewer main. The system has four sewage pumping stations and a regional wastewater treatment plant providing primary, secondary, and tertiary treatment to approximately 500,000 customers, with 24,200 connections within the City of Wilmington and the remainder in New Castle County served under a wholesale sewage treatment agreement. Average daily flow is 105 million gallons per day with peak wet weather flows of 340 million gallons per day.[14]

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[10] See discussion of city demographics in Wilmington 2028: A Comprehensive Plan for Our City and Communities at 15 - 19; https://www.wilmingtonde.gov/government/city-departments/planning-and-development/wilmington-2028

[11] Id. at 13.

[12] City of Wilmington Annual Budget, Fiscal Year 2023 at 10 - 12; https://www.wilmingtonde.gov/government/city-offices/the-city-s-annual-budget

[13] Id. at 32. See also Wilmington 2028 at 81 – 84.

[14] Wilmington 2028 at 133 and Vince Carroccia, Deputy Commissioner, Department of Public Works, City of Wilmington, personal communication December 6, 2022. Primary treatment by-pass limit is 200 MGD and secondary treatment by-pass limit is 168 MGD.

In early 2020, the City Council approved a twenty-year contract for the management, administration, operation, and maintenance of the Wilmington Wastewater Treatment Plant, Renewable Energy and Biosolids Facility, Main Pump Stations, and Storage and Control Structures. This agreement became effective on July 1, 2020 at an annual estimated price of $20 million per year. (Annual Comp Financial Report June 2021).[15] The City also provides drinking water to customers in the surrounding areas of New Castle County. The system includes two treatment plants and uses Brandywine Creek as its main source of water, with several reservoirs to draw from when water quality conditions in the creek make it more cost effective to use the reservoir sources. The City adopted a source water protection plan that outlines best management practices throughout entire watershed, stretching up into Pennsylvania. It has allocated funding to support specific source water protection projects.[16]

The City created a stormwater utility based on impervious land cover in 2007 that included financial incentives for private landowners and adopted an ordinance to require stormwater management in the combined sewer area above its drinking water intakes on Brandywine Creek. It has supported several green infrastructure projects. The City also created an urban forestry program and adopted a tree canopy goal.[17]

Wilmington has a Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP). Projects identified in the LTCP are underway to reduce CSOs, including sewer separations projects and the construction of a South Wilmington Wetland Park designed to minimize local flooding. The Public Works Department promotes the use of green infrastructure to address the management of stormwater at its source and as a way of minimizing CSOs. The City is currently in litigation against the US Army Corps of Engineers for unpaid stormwater utility fees.[18]

The wastewater collection system is managed separately from the wastewater treatment plant and it includes combined sewers. The City has spent over $30 million on the design and construction of CSO projects that, when all are completed, will achieve 92% wet weather capture. Implementation of its control plan has already achieved the 85% reduction under the presumptive approach. One of these projects was the installation of a 2.7-million-gallon storage tank under Canby Park. These actions have also resulted in the City meeting its nutrient and sediment TMDL obligations for the Christina Basin. There is also a PCB TMDL for the Christina

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[15] City of Wilmington Annual Comprehensive Financial Report June 2021 at 75; https://www.wilmingtonde.gov/government/city-departments/department-of-finance/financial-reports

[16] Wilmington 2028 at 131 and City of Wilmington Public Works, Source Water Protection Plan at https://www.wilmingtonde.gov/government/city-departments/department-of-public-works/source-water-protection-plan.

[17] See Wilmington 2028 at 133; Clean Waterways Wilmington at https://www.wilmingtonde.gov/government/city-departments/department-of-public-works/clean-waterways-wilmington; City of Wilmington Urban Forestry Program at https://www.wilmingtonde.gov/residents/urban-forestry-program

[18] See Wilmington 2028 at 133 and City of Wilmington FY 2023 Budget at 31. Long term control plan available at https://www.wilmingtonde.gov/government/city-departments/public-works/clean-waterways-wilmington/information-resources

Basin that requires a minimization plan.[19] In its most recent annual report, the City indicated that it would be focusing on a sewer separation project, installation of pump station, completion of the South Wilmington Wetlands Park, procurement for a green infrastructure project at 15th & Walnut Streets as well as identification of future green infrastructure projects that would reduce stormwater flows into the combined system.[20]

TABLE 1 – SUMMARY OF COST EXPENDITURES FOR KEY CSO PROJECTS FROM 2003 ELTCP

Key Project Name	Outfalls Affected	Design Cost	Construction Cost	Year Completed
RTC Phase I	4a, 4b, 27, 28, 29, 30, 31	$5,939,000	$1,200,000	2009
RTC Phase II			$4,800,000	2011
Canby Park Storage	28, 29	~ $2,000,000	$6,000,000	2004
CSO 27 Diversion to Canby	27	$710,000	$1,420,000	2007
WWTP Headworks Upgrade	system wide	$610,000	$2,914,000	2011
CSO 4a/4b	4a, 4b	$64,000	$235,000	2004
Rockford Road Street Separation	Rockford outfall	$1,725,000	$615,280	2009
Rockford Road Home Separation	Rockford outfall		$611,000	2010
Clean & Reconstruct Stormwater inlets	All	$150,000	$998,000	2010
TOTAL		**$11,198,000**	**$18,793,280**	**$29,991,280**

The City is a co-permittee on an MS4 permit that includes New Castle County and the Delaware Department of Transportation as principal permittees. It requires the co-permittees to develop and initiate implementation of two water quality improvement plans for two of the 14 watersheds in the permit area, with Wilmington participating if the watersheds fall within the city limits. The initial two watersheds selected by the permittees with Dragon Run and the Christina River. Plans have been developed for both watersheds.

The MS4 permit allows Wilmington to develop its own stormwater management program and to integrate wet weather management across its CSO (covering 90% of the City) and MS4 areas (covering 10%) through its Clean Waterways in Wilmington program. The intent of the program is to use a watershed-based management approach to maximize water quality outcomes. It also allows the City to integrate public education and outreach requirements across its CSO and MS4 permit requirements.[21]

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[19] LTCP at 1 – 3; https://www.wilmingtonde.gov/government/city-departments/public-works/clean-waterways-wilmington/information-resources. See also City of Wilmington Department of Public Works CSO Program 2020 Annual Report.
[20] City of Wilmington Department of Public Works CSO Program 2021 Annual Report at 6.
[21] City of Wilmington Municipal Separate Storm Sewer System Program 2021 Annual Report at 1 (June 30, 2022), Alison Quimby contact.

In its 2021 MS4 annual report, the City noted 101 stormwater best management practices (BMPs) and inspection of 2616 stormwater inlets in both the CSS and MS4 parts of the City, as well as 11 MS4 outfalls and 42 CSS outfalls. The City planned a stream restoration project at Porky Olivier Golf Course that would exceed the City's required effective impervious area reduction requirement for the Christina River watershed. The City contracted for over $1 million for MS4 services, with the more than half of that expenditure going to outfall inspection.[22]

Waterway	TMDL	Listed Impairments
Shellpot Creek	Y	Bacteria, Nutrients
Brandywine Creek	Y	Bacteria, Nutrients
Christina River	Y	Bacteria, Nutrients, PCBs

The City manages its water utilities through enterprise funds and finances water management activities primarily through user charges. It assumes that water and sewer assets have a lifespan of 50-60 years for budget purposes. The City reports more than $96 million in water infrastructure construction activities spent-to-date with more than $8 million remaining commitments. It has 28 outstanding SRF loans with the oldest dating to 2002 and the most recent dating to 2020 with a 22-year term. The interest rates on these loans range from 1.57% to 3.24%.[23] Annual debt service across all debt sources is more than $116 million. The city received more than $27 million in ARPA funding. The City has accessed Green Reserve funding for renewable energy projects at the wastewater treatment plant and for the South Wilmington Wetland project.[24]

The capital improvements budget includes $170 million in water and sewer investments through 2027, with $2 million of those costs being related to bond issuance. Acknowledging that the City uses as biennial budget cycle, the water and sewer capital improvement program budget includes about $50 million every two years for water and sewer projects including 16 projects ranging from the South Wilmington Wetlands and the urban forestry program to wastewater treatment plant system improvements and filtration plant upgrades.[25]

The water and sewer fund revenues are mostly from fees (61%) but contract services with New Castle County represent 28% of fund revenues. The 2023 budget includes $82 million in operating expenditures for the water and sewer fund, including accelerated CSO mitigation efforts and finished water filtration and supply improvements. The City budgets 42% for water system expenditures and 33% for sewer treatment as well at 9% for sewer maintenance and 7% for stormwater management. The 2023 budget reflects a decrease in revenue as compared to pre-COVID due to decreased direct user fees as a result of decreased commercial user fees.

[22] Id. at 8 – 11, 14.
[23] Wilmington Comp. Financial Statement 2021 at 64.
[24] Id. at 40.
[25] City of Wilmington FY 2023 Budget at 228, 235

Total debt service expenses for the water/sewer fund is budgeted at $5.7 million for FY 2023, almost 8% of all department expenses.[26]

According to Department of Public Works staff, the water utilities managed by the City of Wilmington have borrowed over $125 million in the last 15 years through the state revolving fund program to support their water infrastructure needs, the largest amount in the state. Despite the demographics of the city, the utilities have not received much in terms of principal forgiveness.

With this in mind, the City of Wilmington Department of Public Works decided to begin making the case around affordability before the federal infrastructure legislation was finalized in November 2021. They contracted with the engineering firm that is managing the wastewater treatment facility and another consultant who used to manage the water utilities to help them with this task. The City has 15 projects on the water infrastructure project priority lists. Despite having the lowest rates in the region and a good bond rating, the water utility service area includes neighborhoods with poverty levels in excess of 29%. With the support of these consultants, the city developed a fact sheet and had discussions with their Congressional representatives and the state's environmental finance office. The City has considered every funding and financing opportunity, including Water Infrastructure Finance and Innovation Act financing.

As a result of their efforts to identify their challenges, the City has secured $23 million in principal forgiveness through Delaware's drinking water state revolving fund program. These include funds from the lead service line subsidy program and the emerging contaminant subsidy program outlined in the Infrastructure Investment and Jobs Act.

The wastewater system serves almost the entire population of New Castle County, with 30% of its customers/service area outside of the city. The treatment plant is owned by the City and the County has reserved capacity through a contract. The facility management agreement sets out that a contractor will run the plant. The City has been frustrated by the lack of clarity about subsidies for projects on the priority list. The City has seven projects on the CWSRF project priority list and it heard in November 2022 that it will receive almost $2 million in principle forgiveness for its 11th Street pump station project. Another of the projects involves emerging contaminants so it will likely receive some subsidy. The projects range in cost from $3 million to $14.5 million and include investments in digester rehabilitation and outfall separation for example. The City also received an Environmental Protection Agency Sewer Overflow and Stormwater Reuse Municipal grant based on a recommendation from the Delaware Department of Natural Resources and Environmental Control and is also scheduled to receive several federal earmarks.[27]

[26] Id. at 41, 44, 189, 256.
[27] Greg Pope, Chief of Operations, Environmental Finance, Delaware Department of Natural Resources and Environmental Control, personal communication January 4, 2023

While the wastewater treatment plant serves both city and county residents, the demographics of those populations is vastly different. The City's Comprehensive Plan notes that the 2014 American Community Survey estimated

> the median household income reported in Wilmington was $38,979, 35% lower than the state median income of $60,231 and 40% lower than the county median income of $64,857. The poverty rate in the city was 23%, more than 2.5 times the statewide poverty rate, and has been rising each year since 2009. Poverty disproportionately impacts children in Wilmington. Nearly 40% of children in Wilmington live in poverty, which is more than double the rate for children in the region. In some census tracts within Wilmington, the poverty rate ranges from 40 to 69%. These high poverty neighborhoods overwhelmingly impact the City's largest minority populations. In Wilmington's census tracts where more than 1 in 5 residents live in poverty, 75% or more of residents are African-American or Hispanic.[28]

These demographic and income differences both within the city and between the city and county residents translate to different abilities to afford water bills. The City does have a utility payment assistance program but it applies to the owners of a property as their principal residence.[29] Given that the majority of residents are renters, this program provides a limited benefit.

Interviews with City staff responsible for water infrastructure management and city contractors, literature review and public document research resulted in the following conclusions:

- Wilmington is the largest and most frequent applicant for SRF funds (including for a green infrastructure called South Wilmington Wetland Park) in Delaware but it hasn't benefited from subsidies over the last 15 years despite serving areas where customers experience significant affordability challenges.

- There are wide demographic variabilities between city. This variability becomes generalized across the entire service area, resulting in a perception of water rate affordability when some customers served by these systems are economically distressed and would likely find water rates unaffordable. Contracted areas in New Castle County are not considered in evaluating affordability.

- Despite being an essential partner to the state's revolving fund program to maximize the federal capitalization grant coming to the state for water infrastructure, the City felt it needed to hire contractors to assist with accessing federal water infrastructure subsidies and grant funding.

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[28] Wilmington 2028 at 18.

[29] For information about the program, see https://www.wilmingtonde.gov/government/city-departments/finance/utility-payment-assistance-program#:~:text=The%20Utility%20Payment%20Assistance%20Program,come%2C%20first%2Dserved%20basis.

- The City has a source water protection plan but it does not have a publicly-facing integrated water plan across water sectors and watersheds. This kind of planning might result in synergies across water sector investments resulting in cost savings.

- The Clean Water Intended Use Plan for Delaware now allows for consideration of project level metrics. It will be interesting to see if this benefits the City's ability to access SRF subsidies.

- While SRF funding is an essential element of the funding mix that helps the City address its water infrastructure needs, expanding other non-debt funding and financing mechanisms may be more important to overcoming its biggest water infrastructure challenges.

General Case Study Findings

- Equitable Access to Water Infrastructure Funding

All three communities have applied for and been offered state revolving fund financing. Over the course of the project, all three CWSRF programs changed their definitions of affordability. Under the new definitions, each one of the communities featured in the case studies would be considered to have water affordability challenges and should be able to access water infrastructure subsidies and/or reduced interest rates. The vast majority of the CWSRF funding is provided and will continue to be provided through loans even with the new influx of non-revolving subsidies through the Infrastructure Investment and Jobs Act. It is important to understand that for some communities, particularly those with a small rate payer base, debt financing may not ever be a viable option because distributing the loan burden among a small number of customers results in water bills that are not affordable. Other kinds of water infrastructure financing, particularly cost share and grant funding, remain essential for these smaller systems. While consolidation of smaller systems is often suggested as a solution, other alternatives could be explored such as shared service agreements and cooperative structures that could help meet smaller water systems' financing challenges.

The case studies made clear that communities still would benefit from greater clarity and predictability about what meeting these affordability criteria means in terms of the available subsidies and the timeline for accessing these financing resources. Predictability and timing are critical issues for these communities in meeting their water infrastructure needs.

- Green Infrastructure Projects

Of the three communities, only Wilmington used SRF funding for a green infrastructure project. While the lack of more projects may seem to indicate a problem that needs to be fixed, it is important to understand that many green infrastructure projects do not have large total costs and thus may not be good candidates for debt financing. In addition, it appears that municipal

officials are not as comfortable going into debt for stormwater management as they are for wastewater and drinking water management. Finally, for most non-CSO communities, consideration of green infrastructure projects is tied at least initially to their MS4 permits. The three communities addressed in the case studies have generally been able to comply with their MS4 permits without using debt financing.[30] Both Delaware and New Jersey have made recent changes to their MS4 permits that may result in greater financing need for green infrastructure projects.

Overall Recommendations

Based on the research and interviews across these three communities, below are recommendations to ease access for disadvantaged communities to leverage CWSRF support, particularly regarding subsidies, to ensure affordable long-term services to residents despite these cities' water infrastructure challenges.

- **Provide clarity on the application of equity and affordability metrics for a system that serves both a financially distressed urban core and relatively more stable outlying municipalities so that communities can better predict which projects will qualify for subsidies.**

While these cities likely meet any objective standard for economic distress or environmental justice, significant variation in the demographics and economic conditions of upstream municipalities within the sewer service area complicate the application of such metrics. The cities have recently amended internal budgeting and planning to segregate local collection and associated services within the city from larger scale pumping and treatment where it effectively acts as a regional provider to both Reading and the 11 other municipalities on the system. Recognition of this approach when applying equity metrics to finance options would encourage increased focus on projects impacting quality of life in the urban core.

- **Provide clarity around funding for project specific planning as well as long-term strategic planning for integrated asset management and capital planning for both stormwater and wastewater.**

Improving uptake of SRF program dollars, particularly given the scale of the need in distressed and underserved communities, may require that state programs look beyond traditional project-scale applications and consider the full suite of project *and* capacity needs in a community, inclusive of up-front planning, design and engineering activities.

Water infrastructure plans that integrate asset management, compliance, climate resilience, level-of-service, capital planning and finance are prerequisites for these cities to pivot into proactive management of their water systems. This will leverage possible economies of scale and ultimately ensure affordability. However, current budgetary pressures limit the cities' ability

[30] The South Wilmington Wetland Park project is referenced in the City of Wilmington's CSO LTCP.

to fund this kind of planning scope. Grant support for such planning would allow for a faster pivot.

- **Provide clarity around possible pre-qualification for grants programs or principal forgiveness.**

Uncertainty around the total long-term cost of potential projects can hamstring a city's fiscal planning and unnecessarily delays projects. Upfront clarity on the types and sizes of projects which would qualify for more flexible funding options – including grants and principle forgiveness - would allow for more ambition on the city's part. This is particularly important for distressed cities.

- **Provide flexibility in state SRF program delivery and/or identification of other state and federal funding programs to meet community needs to develop water infrastructure projects.**

Ensuring this unprecedented federal investment through the Infrastructure Investment and Jobs Act achieves the goal of truly transforming water infrastructure in long underserved and overburdened communities may require a shift in how these funds hit the ground, either within the SRF programs or through other federal funding vehicles, that allow for greater flexibility and less administrative burden and financial risk. Debt financing is not be a financially feasible approach for many community water systems. The question that must be answered is how many systems fall into this category, leading to an assessment of whether and how policies and programs should change to benefit these communities.