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Edward H. Chu

March 30, 2020

The Honorable Andrew R. Wheeler
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Dear Administrator Wheeler:

The Environmental Financial Advisory Board (EFAB) is pleased to submit our report, *Evaluating Stormwater Infrastructure Funding and Financing*, which was developed by an EFAB Task Force in response to Section 4101 of the 2018 America's Water Infrastructure Act (AWIA). Through extensive assessment and discussion, the EFAB has concluded that current stormwater funding mechanisms and public education initiatives are not sufficient to confront the significant needs across the nation. Federal investment is required to address the lack of state and local funding and to improve multi-jurisdictional stormwater management. Programs and investments similar to those that support the drinking water and wastewater sectors are needed for the stormwater sector to close the estimated \$7-10 billion annual funding gap.

Local stormwater management costs have been increasing steadily and many communities, particularly small or disadvantaged communities that are often subjected to the greatest impact from stormwater runoff, lack a sustainable source of funding for their stormwater programs. The inability of some communities to establish and maintain sustainable revenue sources (such as user fees) limits their access to low-cost debt financing to help them meet the challenge of paying for stormwater infrastructure and management. Further, communication programs are needed to inform local officials and the general public about the benefits of investment in stormwater infrastructure and the cost of inaction. Securing funding for stormwater management is a national problem that requires action now.

With this in mind, we offer the following recommendations:

- Increase federal investment in stormwater infrastructure, including additional grants and loans to local governments;
- Provide a new construction grant program specifically geared to stormwater and increase annual funding and make program modifications to the Clean Water Act section 319(h) grant program;
- Provide additional funds (with no offsets to other programs) for the State Revolving Loan Fund (SRF) and the Water Infrastructure Finance Innovation Act (WIFIA) programs;
- Create a federal funding program that will help address household water affordability issues, similar to the Low Income Home Energy Assistance Program (LIHEAP) for home energy costs;
- Prioritize the education of elected officials, professional administrative leaders and the public on the benefit of and need for sustainable local stormwater funding and the value of stormwater utilities as a way to lessen the stormwater funding gap;

- Provide technical assistance and funding to help communities create and maintain sustainable funding sources and increase operational efficiency;
- Develop a common application for stormwater grants across all federal agencies;
- Provide funding to build and maintain a compendium of stormwater case studies; and
- Promote innovative financing, such as pay-for-performance or nutrient trading, to help reduce costs and create efficiencies.

These action-oriented recommendations are meant to make better use of existing funding, increase accessibility to those funds, identify additional funding opportunities, and build awareness for communities and their leaders of the wide-ranging benefits associated with proactive and effective management of stormwater runoff. Several of the recommendations include direct engagement of the EPA with state and local agencies. This two-way exchange will help bridge the gap between the source of clean water regulations (federal) and the most important source of funding (primarily local). This, in turn, will serve the overall goals of the Clean Water Act and the interests of agencies and stakeholders. An in-depth discussion of the recommendations is provided in Section 3 of the enclosed report.

Under AWIA section 4101, the EPA was directed to establish a stormwater infrastructure funding task force “to conduct a study on, and develop recommendations to improve, the availability of public and private sources of funding for the construction, rehabilitation, and operation and maintenance of stormwater infrastructure” to meet the requirements of the Clean Water Act. To meet this charge, the Stormwater Infrastructure Finance Task Force was convened as a workgroup under the EFAB and the EFAB discussed and approved this report and accompanying recommendations at our public meeting on February 11-13, 2020.

The EPA is required to submit a report to Congress no later than 18 months after enactment of the 2018 AWIA (by April 2020) describing the results of the Task Force’s study and resulting recommendations. We hope this report is helpful to the EPA and we look forward to your report to Congress on this important matter.

Sincerely,



Joanne M. Throwe, Chair
Environmental Financial Advisory Board



Rudolph S. Chow, Co-Chair
EFAB Stormwater Infrastructure
Finance Task Force

Enclosure

cc: Edward H. Chu, Designated Federal Officer, Environmental Financial Advisory Board
David P. Ross, Assistant Administrator for Water

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Designated Federal Officer

Edward H. Chu

Evaluating Stormwater Infrastructure Funding and Financing

March 2020

This report has not been reviewed for approval by the U.S. Environmental Protection Agency; and hence, the views and opinions expressed in the report do not necessarily represent those of the Agency or any other agencies in the Federal Government.

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Evaluating Stormwater Infrastructure Funding and Financing

**A REPORT FROM THE STORMWATER INFRASTRUCTURE
FINANCE TASK FORCE WORKGROUP OF THE
ENVIRONMENTAL FINANCIAL ADVISORY BOARD**

March 2020

Environmental Financial Advisory Board Stormwater Infrastructure Finance Task Force

Co-Chairs

Joanne Throwe, President, Throwe Environmental LLC, Bristol, RI

Rudolph Chow, Director, Municipal Utilities and Engineering Department, City of Redlands, CA

EFAB Members

Lori Beary, Community Development Director, Iowa Finance Authority, Des Moines, IA

Theodore Chapman,[‡] Senior Director, U.S. Public Finance Department, S&P Global Ratings, Dallas, TX

Lisa Daniel, Managing Director, Public Financial Management, Memphis, TN

Yvette Downs, Chief Financial Officer, Sewerage & Water Board of New Orleans, New Orleans, LA

Edward (Ted) Henifin,[‡] General Manager, Hampton Roads Sanitation District, Virginia Beach, VA

Craig Holland, Senior Director of Urban Water, Global Cities, The Nature Conservancy, Arlington, VA

Pamela Lemoine,[‡] Principal Consultant, Black & Veatch Management Consulting, LLC, Chesterfield, MO

Christopher Meister, Executive Director, Illinois Finance Authority, Chicago, IL

Eric Rothstein, Principal, Galardi Rothstein Group, Chicago, IL

William Stannard, Chairman of the Board, RAFTELIS, Kansas City, MO

Angie Sanchez Virnoche, Vice President and Principal, FCS GROUP, Redmond, WA

Invited Consultants

Bethany Bezak, Director, Stormwater Implementation Strategy, Tetra Tech, Inc., San Diego, CA

Jerry Bradshaw, Senior Engineer, SCI Consulting Group, Fairfield, CA

David Bulova, Member, Virginia House of Delegates, 37th District

Janet Clements, Senior Economist, Corona Environmental Consulting, Louisville, CO

Carrie Evenson, Stormwater Program Manager, Stormwater Division, City of Norman Public Works,
Norman, OK

Matthew Fabry, Manager, San Mateo Countywide Water Pollution Prevention Program, City/County
Association of Governments of San Mateo County, Redwood City, CA

Carol Haddock, Director, Houston Public Works, City of Houston, Houston, TX

Laurie Hawks, Project Manager, Brown and Caldwell, Atlanta, GA

Lisa Kay, President, Alta Environmental, San Diego, CA

Drew Kleis, Deputy Director, Storm Water Division, Transportation & Storm Water Department, City of
San Diego, San Diego, CA

Prabha Kumar, Director, Water Advisory and Planning, Management Consulting, Black and Veatch, LLC,
New York, NY

Rebecca Losli, Program Manager, Program Planning Division, Metropolitan St. Louis Sewer District, St.
Louis, MO

John Lundell, Mayor, City of Coralville, Coralville, IA

Ewelina Mutkowska, County Stormwater Program Manager, Watershed Protection District, Ventura
County Public Works, Ventura, CA

Fernando Pasquel, Senior Vice President and National Director, Stormwater & Watershed Management,
Arcadis, Arlington, VA

[‡] Task Force Workgroup Section Leads

Mike Personett, Assistant Director, Watershed Protection Department, City of Austin, Austin, TX

Andrew Reese, Vice President, AMEC Earth and Environmental, Nashville, TN

Elizabeth Treadway, Principal Program Manager, Wood Environment & Infrastructure Solutions,
Johnson City, TN

Chuck Walter, Director, Stormwater Environmental Utility/Public Works Planning Manager, Sarasota
County, Sarasota County, FL

EPA Supporting Staff

Sonia Brubaker, Director, Water Infrastructure and Resiliency Finance Center

Tara Johnson, Water Infrastructure and Resiliency Finance Center

Ellen Tarquinio, Water Infrastructure and Resiliency Finance Center

Britney Vazquez, Water Infrastructure and Resiliency Finance Center

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Edward (Ted) Henifin, General Manager, Hampton Roads Sanitation District, Virginia Beach, VA

Craig Holland, Senior Director of Urban Water, Global Cities Program, The Nature Conservancy,
Arlington, VA

Daniel Kaplan, Financial Services Administrator, King County Department of Natural Resources and
Parks, Seattle, WA

Suzanne Kim, Founder and Managing Partner, Motivate Capital, Tiburon, CA

Pamela Lemoine, Principal Consultant, Black & Veatch Management Consulting, LLC, Chesterfield, MO

James McGoff,* Chief Operating Officer & Director of Environmental Programs, Indiana Finance
Authority, Indianapolis, IN

Christopher Meister, Executive Director, Illinois Finance Authority, Chicago, IL

James (Tony) Parrott,* Executive Director, Metropolitan Sewer District of Louisville, Louisville, KY

Eric Rothstein, Principal, Galardi Rothstein Group, Chicago, IL

William Stannard, Chairman of the Board, RAFTELIS, Kansas City, MO

Carl Thompson,* Vice President, Sales and Marketing, Infiltrator Water Technologies, Old Saybrook, CT

Angie Sanchez Virnoche, Vice President and Principal, FCS GROUP, Redmond, WA

Richard Weiss, Executive Director, Morgan Stanley, New York, NY

David Zimmer, Executive Director, New Jersey Infrastructure Bank, Lawrenceville, NJ

EPA Designated Federal Officer

Edward Chu, Deputy Regional Administrator, EPA Region 7

* Did not participate in finalization of this report

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Acronym List

Acronym	Definition
AWIA	America’s Water Infrastructure Act
BMP	Best Management Practice
CBP3	Community-Based Public-Private Partnerships
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
CWA	Clean Water Act
CWNS	Clean Watersheds Needs Survey
CWSRF	Clean Water State Revolving Fund
DWSRF	Drinking Water State Revolving Fund
EFAB	Environmental Financial Advisory Board
ERU	Equivalent Residential Unit
FCA	Financial Capability Assessment
FCI	Financial Capability Index
FEMA	Federal Emergency Management Agency
FSA	Florida Stormwater Association
LIHEAP	Low Income Home Energy Assistance Program
LTCP	Long Term Control Plan
MHI	Median Household Income
MS4	Municipal Separate Storm Sewer System
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
P3	Public-Private Partnerships
PRI	Program-Related Investment
RI	Residential Indicator
SRF	State Revolving Fund
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA or EPA	United States Environmental Protection Agency
WEF	Water Environment Federation
WKU	Western Kentucky University

1.0 Executive Summary

Stormwater Funding: A National Problem That Requires Action

Effective stormwater management is as integral to American quality of life as effective wastewater management and delivery of safe drinking water. Polluted rainwater and snowmelt run off U.S. roadways, streets, sidewalks and roofs into the nation's rivers, lakes and beaches. This polluted water is typically collected in municipal storm sewer systems consisting of drains, pipes, catch basins, outfalls, ditches and other facilities. Flood control and flood mitigation are also important aspects of stormwater management that challenge local towns and communities. Stormwater management needs to be recognized as a true utility service on par with drinking water and wastewater utility services—and it needs equitable and reliable funding, just like drinking water and wastewater utilities.

Stormwater management is a critical policy issue because failure to properly manage stormwater runoff creates significant impacts, including flooding and related property damage, degradation or destruction of fisheries and habitat, degradation of hydropower facilities, increased costs to downstream users for water treatment and potential adverse health impacts. Increasing rainfall and flooding events are exacerbating these challenges to effectively manage stormwater in communities around the country. Unmanaged or poorly managed stormwater has significant external costs that are borne by citizens, taxpayers and businesses.

Stormwater knows no jurisdictional boundaries and crosses state, county and municipal borders. And while stormwater pollution is a principal cause of water quality issues nationwide, adequate funding to manage its effects lags the investments made in wastewater management and delivery of safe drinking water by decades. Review of the available information indicates a significant funding gap (approximately \$7-10 billion annually based on the limited surveys that are described in Section 4.0.) for the operation and maintenance and capital expenditures needed to support stormwater management programs and infrastructure. However, a comprehensive assessment is needed to fully understand the total cost to construct and adequately maintain and operate stormwater infrastructure nationally. What is clear is that current stormwater funding sources are insufficient for currently known stormwater needs.

Federal investment will be required to address both the lack of state and local funding, and to address multi-jurisdictional stormwater management needs. Drinking water and wastewater management services in the United States, generally provided through the utility structure, have matured to become reliable and effective services to communities—with dedicated sources of funding that facilitate access to capital. Cumulatively, Clean Water State Revolving Fund (CWSRF) programs have provided \$138 billion in assistance for wastewater projects since 1985, mainly in the form of low-cost financing to a wide range of eligible borrowers. Unfortunately, only 1,600 of the 7,550 permitted stormwater entities in the United States have dedicated stormwater management revenue, including stormwater fees and taxes.

Current estimates point to a shortfall between identified needs and available state and local funding. As set forth in the recommendations below, and discussed more fully in the report, the nature of new federal investment could take a number of different forms that involve education, expansion of existing

programs and potentially new programs. The federal government can also help by allocating funding for stormwater programs from existing related programs to ensure that infrastructure is properly maintained, and that future infrastructure planning, design and capital expenditures are conducted using industry best practices. Finding funding sources is also a necessary activity for local governments and utilities that are charged with managing stormwater programs. This report outlines recommendations for potential sources of funding to deliver effective stormwater management.

1.1 Stormwater Infrastructure Finance Task Force Report and Charge

This report was developed in response to Section 4101 of the 2018 America’s Water Infrastructure Act (AWIA), which directed the Environmental Protection Agency (EPA) to establish a stormwater infrastructure funding task force “to conduct a study on, and develop recommendations to improve, the availability of public and private sources of funding for the construction, rehabilitation, and operation and maintenance of stormwater infrastructure” to meet the requirements of the Clean Water Act.

Specifically, the Task Force was charged with the following tasks:

- Identify existing federal, state and local public and private sources of funding and financing for stormwater infrastructure (addressed in Section 5.0).
- Assess how the source of funding and financing affects affordability, including costs associated with infrastructure finance (addressed in Section 6.0).
- Assess whether these sources of funding and financing are sufficient to support capital expenditures and long-term operational and maintenance costs required to meet the stormwater infrastructure needs of municipalities (addressed in Section 4.0).

1.2 Recommendations

Task Force recommendations are presented as items that are practical to implement, actionable at the federal level and understandable to the public. The recommendations present suggestions to use existing funding mechanisms, increase accessibility to those funding mechanisms, identify additional funding opportunities and enhance public education. Recommendations are summarized below; detailed descriptions of the recommendations can be found in Section 3 of the report. The Task Force’s recommendations are grouped into the following categories:

- **Allocate new federal stormwater funding.** Given the magnitude of the stormwater needs described in this report, there is a need for increased federal investment in stormwater infrastructure, with no off-sets to other programs. Federal grants, loans and new stormwater programs are needed to fund critical stormwater infrastructure in communities of all sizes across the country and support local funding sources.

Recommendation: Develop a new and enhanced construction grant program specifically for stormwater projects, similar to the federal Municipal Construction Grants Program that funded the construction of wastewater treatment plants.

Recommendation: Increase annual funding allocation for and modify the Clean Water Act section 319(h) grant program to allow and encourage local capacity building, utility fee study and implementation and asset management, and remove restrictions on use of grant funds for MS4 permit compliance.

Recommendation: Provide additional funds for the CWSRF and Water Infrastructure Finance and Innovation Act (WIFIA) programs specifically for stormwater. The CWSRF and WIFIA programs are integral tools among the many infrastructure financing options available to communities. Whether stormwater receives consideration of its own through a new SRF program or receives less restrictive eligibility considerations and larger appropriations within the existing CWSRF, it is the view of the Task Force that stormwater would benefit from a separate, additive, recurring financial commitment from EPA. This would provide communities an incentive to create dedicated funding sources to demonstrate financial capacity and capabilities, while still retaining the flexibility and local control as to the actual method for repayment. This could be achieved by the implementation of one or more of the following, each of which has associated risks and opportunities:

- I. Create a specific stormwater set-aside in the existing CWSRF framework and increase awareness/guidance on the CWSRF for stormwater projects, including the Green Project Reserve program.
- II. Create a “One Water” SRF with amounts allocated to drinking water, clean water and stormwater.
- III. Create a new SRF program exclusive to stormwater programs and projects.
- IV. Expand the existing WIFIA program (e.g., explicit references to stormwater project eligibility, priority points for stormwater projects, lower project minimums for bundled stormwater projects) to allow funding for more stormwater projects or fund the Army Corps of Engineers (USACE) Corps Water Infrastructure Financing Program (CWIFP), also established in 2014.

Recommendation: Create a federal funding program (similar to the Low Income Home Energy Assistance Program [LIHEAP]) to help address household affordability issues for customers who are economically challenged in paying their water related charges, including stormwater.

- **Provide stormwater funding education and technical assistance.** Educating the public and elected officials on the need for stormwater funding is critical to the successful implementation of and community support for funding solutions. In addition, many communities need technical assistance related to evaluating and securing funding and financing mechanisms.

Recommendation: Provide funding to educate elected officials, professional administrative leaders and the public on the benefit and need for sustainable local stormwater funding and organizational capacity through, for example, the creation of stormwater utilities or the expansion of existing utilities into the stormwater sector. Sustainable funding for stormwater infrastructure builds long-term financial capacity, improves operational performance and over time produces results for citizens and residents. For over two hundred years, this has been the experience with drinking water and wastewater utilities in this country. The educational goals for these three audiences are to demonstrate that stormwater management investment directly benefits the health, safety and economic opportunity for citizens and residents through the overall improvement of water quality and resiliency of communities.

Recommendation: Provide technical assistance and funding to help communities create and maintain sustainable and legally defensible funding sources and increase operational efficiency. This could include assistance with funding need assessments, organization analysis, grant applications, affordability assessments, integrated planning and/or establishing revenue instruments.

Recommendation: Provide for a common application for different federal grants applicable to stormwater across all federal agencies.

Recommendation: Provide funding to build and maintain a compendium of case studies and other resources to assist users to identify successful stormwater funding and financing approaches.

2.0 Introduction and Background

Stormwater management involves diverse activities that span both operation and maintenance (O&M) and capital programs. The O&M activities, to name a few, typically include the maintenance of stormwater conveyance infrastructure; good housekeeping practices; land use development and redevelopment permitting, monitoring, and inspections; public education and outreach; and management of various other stormwater programs. Capital program management typically includes asset management, capital projects planning and execution. Needless to say, holistic management of stormwater O&M and capital program services requires sustainable and dedicated funding.

Stormwater management is widely viewed as a key part of the solution to improving water quality in the nation's waterways, reducing local flooding/drainage problems and enhancing community resiliency. However, the challenges related to funding stormwater infrastructure are daunting. The stormwater sector is still maturing and has traditionally not been funded as a true "utility" operation like wastewater and drinking water utilities. Meanwhile, EPA has identified urban stormwater runoff as the only major growing source of water pollution across much of the country. Starting in the 1990s, EPA sought to reduce pollution in U.S. waterways through regulations and a permit program under the Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA). Communities with stormwater permits include more than 80 percent of the U.S. population—therefore, stormwater funding is a national problem that requires action.

There are no comprehensive assessments of the funding needed to construct, maintain and operate stormwater infrastructure nationally.

Recent regional or limited surveys estimate stormwater management and infrastructure funding needs in the billions of dollars, ranging from \$3.3 billion over the next 10 years in Florida alone¹ to \$7.5 billion per year for only municipal separate storm sewer system (MS4) permittee activities in the United States.²

While there are no comprehensive assessments of the funding needs for stormwater, recent regional or limited surveys estimate stormwater management and infrastructure funding needs in the billions of dollars.

EPA estimates that \$67.2 billion is needed for stormwater infrastructure and program investments (MS4s and combined sewer overflows) over the next 20 years.³ The needed investment in stormwater infrastructure is similar to the level of investment that federal funding programs have covered in the past to initiate construction of our interstate highway system or to upgrade wastewater treatment plants.

¹ Florida Stormwater Association. 2018. *Stormwater Utility Report*. <https://www.florida-stormwater.org/stormwater-utility-report1>

² WEF Stormwater Institute. 2019. National Municipal Separate Storm Sewer System (MS4) Needs Assessment Survey Results. <https://wefstormwaterinstitute.org/wp-content/uploads/2019/08/MS4-Survey-Report-2019.pdf>

³ U.S. EPA. 2016. Clean Watersheds Needs Survey 2012 Report to Congress EPA-830-R-15005. https://www.epa.gov/sites/production/files/2015-12/documents/cwns_2012_report_to_congress-508-opt.pdf

Funding needs continue to expand as the stormwater sector faces increasing challenges related to regulatory requirements, water quality degradation, increased flood risk, community resilience, aging infrastructure and more. The cost of inaction in these areas can often exceed the costs of the infrastructure. Many communities have no sustainable source of funding for stormwater programs. In

Stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. For the purposes of this Report, the Task Force looked at stormwater management activities that impacted communities, water quality and flooding/ flood control.

addition, increasing stormwater management costs at the local level exacerbate the affordability challenges that many communities face. While a more detailed analysis is needed to fully assess the funding need, it is widely acknowledged that the stormwater infrastructure sector cannot fully address these challenges at current funding levels. Perhaps the biggest obstacle to closing the stormwater funding gap is the lack of political will to increase revenues dedicated

to stormwater investment at the local, state and federal levels. Without leadership, stormwater infrastructure investment will continue to fall short of annual needs and future generations will be burdened with failing stormwater systems.

2.1 America's Water Infrastructure Act of 2018, Section 4101

This report was developed in response to Section 4101 of the 2018 AWIA, which directed EPA to establish a stormwater infrastructure funding task force “to conduct a study on, and develop recommendations to improve, the availability of public and private sources of funding for the construction, rehabilitation, and operation and maintenance of stormwater infrastructure” to meet the requirements of the CWA. AWIA stipulates that the task force comprise representatives of federal, state and local government and private entities (including nonprofit entities). Furthermore, EPA is required to submit a report to Congress no later than 18 months after AWIA enactment describing the results of the task force’s study and resulting recommendations.

The Stormwater Infrastructure Finance Task Force was convened under an existing Federal Advisory Committee, the Environmental Financial Advisory Board (EFAB). Thirteen members of the EFAB with experience and expertise in stormwater funding and financing were on the Task Force. EPA also initiated an open nomination process to identify additional experts to advise and support the Task Force. EPA invited 19 consultants to address gaps in the Task Force’s expertise and ensure the Task Force could complete the required study and recommendations within the stipulated timeframe. EFAB members, invited consultants and key EPA staff who supported the preparation of this report are presented at the beginning of this report.

Task Force members and consultants participated in two in-person meetings and in regular telephone conference meetings to conduct research, develop the study and identify associated recommendations for consideration by EPA. EPA also solicited public input on stormwater funding through seven public meetings held across the country in Florida, Massachusetts, Illinois, the District of Columbia, Virginia, Georgia and Washington; a summary of this public input was provided to the Task Force to assist in the development of the report. The Task Force report was considered and approved, with revisions, by the EFAB at a public meeting on February 11-13, 2020.

2.2 Stormwater Infrastructure Drivers—A New Paradigm

Before the 1990s, municipal stormwater management was driven mainly by one consideration: convey stormwater away from our built environment. While federal regulations have added a new focus on water quality, the Task Force recognizes the need to consider both water quality and water quantity when evaluating stormwater funding sources and needs. In fact, stormwater management is undergoing a significant paradigm shift (Figure 1): local programs often have multiple responsibilities, including water quality, water quantity, floodplain management, resilience planning and response, regulation of new and re-development, multi-objective planning, ecosystem health, increasing community expectations for environmental quality. These responsibilities are relevant to stormwater management in recognition of the broader public concern for infrastructure management and environmental stewardship.

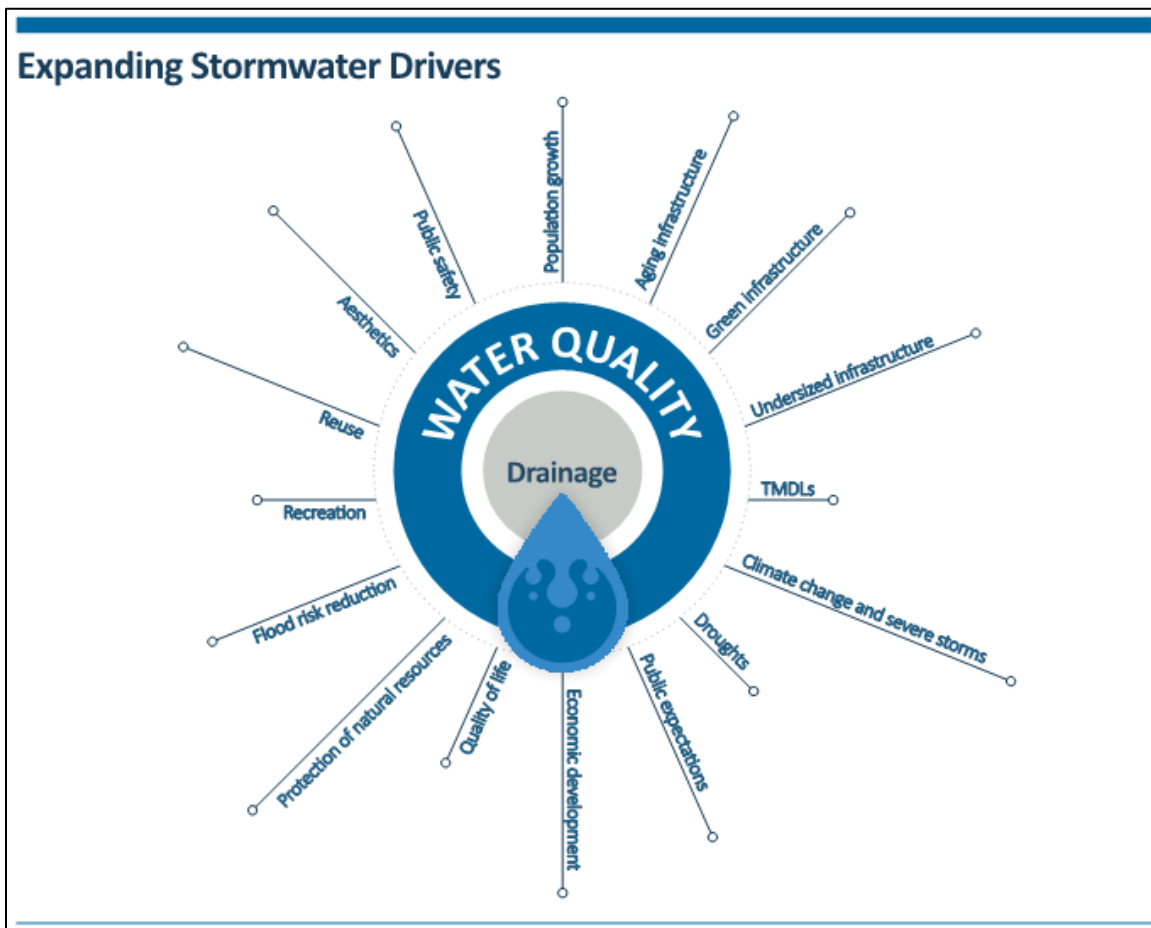


Figure 1. Graphic representing the growing number of environmental and societal factors that are shifting the focus of stormwater management.

2.3 Challenges and Opportunities

This report identifies potential sources of funding available to most municipalities (see Section 5.0). While the length of the list may imply that it is easy to fund stormwater management activities, the opposite is true; the number of options shows that there is no universal solution, and many types of

funding must be supplemented by a baseline revenue stream like that found in other municipal-level utilities. Establishing such a baseline revenue stream for stormwater management programs—programs that themselves are undergoing such a significant paradigm shift—is extremely challenging and faces legal obstacles in many places. Garnering community support for an expanding program is difficult enough. Asking a community to pay for it in the form of user fees or taxes is an even greater challenge.

A municipal stormwater program cannot be funded in a bureaucratic vacuum and in an environment in which the decision makers and the community are not fully aware of the benefits and challenges of stormwater management. It can only succeed with the support of the local community and its elected officials. One of the many barriers to gaining that support is the lack of public understanding about what a stormwater program is and how it affects quality of life for the average citizen. Municipal stormwater programs have focused on infrastructure and environmental stewardship but have not always done an effective job of explaining to the community and elected officials the goals of the programs and why they are important.

At the same time, the Task Force has observed that municipalities differ significantly with respect to the distribution of stormwater management and regulatory compliance responsibilities due to variations in local and state institutional frameworks. Under a new and evolving paradigm, institutional frameworks often lag behind the functional changes brought about by the new drivers. The distribution of responsibilities can affect cost-effectiveness, funding and affordability, creating situations with overlapping responsibilities and a shortage of accountability or leadership for program implementation. In addition, providing technical assistance and public outreach/education to such a dispersed community of stormwater managers and programs is a challenge.

While these challenges are daunting, they also represent opportunities to interact with and leverage other public investments such as transportation, flood protection, public safety, recreation and other cultural endeavors that fit within the new stormwater paradigm. Municipalities have made great strides to integrate stormwater projects and programs into these other areas through multi-benefit projects. But much more must be done to move the needle on the adequacy of stormwater funding.

In summary, the local government stormwater manager is faced with multiple, costly, sometimes conflicting responsibilities across a wide spectrum of stormwater-related demands—often with little dedicated funding to accomplish necessary tasks. About 60 percent of the stormwater permittees indicate that their major challenge is the *lack of funding or availability of capital* for implementation of stormwater programs and design, construction and maintenance of stormwater infrastructure.⁴

2.4 Report Overview

The Task Force was charged with the following tasks:

- Identify existing federal, state and local public and private sources of funding and financing for stormwater infrastructure (Section 5.0).
- Assess how the source of funding and financing affects affordability, including costs associated with infrastructure finance (Section 6.0).

⁴ WEF Stormwater Institute. 2019. National Municipal Separate Storm Sewer System (MS4) Needs Assessment Survey Results. <https://wefstormwaterinstitute.org/wp-content/uploads/2019/08/MS4-Survey-Report-2019.pdf>

- Assess whether these sources of funding and financing are sufficient to support the capital expenditures and long-term O&M costs required to meet municipalities' stormwater infrastructure needs (Section 4.0).

The report is organized based on the findings associated with these tasks, as described below.

Section 3.0: Task Force Recommendations

Section 3.0 presents the Task Force's overall recommendations. The recommendations present suggestions to enhance the use of existing funding mechanisms, increase accessibility to those funding mechanisms, identify additional funding opportunities and measures to enhance public education. The Task Force's recommendations are grouped into two categories:

- Allocate new federal stormwater funding assistance.
- Provide stormwater funding education and technical assistance.

Section 4.0: Sufficiency of Funding

Section 4.0 discusses the difficulty of assessing the capital and long-term O&M funding needed for municipal stormwater infrastructure in the United States. This section also presents information from several regional and national surveys that attempt to make these estimates and includes case studies of stormwater funding challenges in more than a dozen communities across the country. Finally, Section 4.0 describes the reasons why the funding gap exists and continues to grow, as well challenges associated with finding effective solutions to meeting stormwater funding needs.

Section 5.0: Existing Sources of Funding

Section 5.0 describes the various types of plausible funding sources such as recurring and sustainable sources, intermittent revenue sources, capital financing sources and one-time sources of funding for stormwater programs. Even though there are multiple types of funding sources, only a few can provide reliable, sustainable and dedicated revenue for holistic stormwater management. Perhaps more importantly, without support from elected officials to develop such dedicated sources of funding where they currently do not exist, the availability of funding will continue to be limited, leaving most programs without enough funds to meet all the stormwater community's needs.

Section 6.0: Infrastructure Affordability

Section 6.0 describes how available funding sources and financing options affect affordability of a municipality's stormwater management program in three key areas:

- Effective management of infrastructure.** Defined as industry best practices, such as adopting proactive asset management, leveraging resources and economies of scale, building resilience and engaging in risk mitigation, all of which can also improve affordability.
- Financial capability.** Defined as the adequacy of a municipality's funding to meet its annual stormwater O&M obligations and to manage its capital stormwater infrastructure needs, determined based on delivering adequate levels of service. This sub-section discusses the impact of different funding sources on building financial capacity and provides criteria for evaluating the affordability impacts of different recurring, intermittent and one-time funding sources to address capital and O&M requirements.

- **Customer household affordability.** Defined as the impact that the various types of financial resources have on the users of the system. This sub-section describes traditional and emerging concepts that are used to evaluate household affordability.

Affordability and willingness to pay can also be impacted by the public and elected officials' lack of understanding of the need for stormwater services and the benefits of stormwater programs. Therefore, the Task Force concludes that educating these stakeholders can facilitate the implementation and acceptance of reliable and sustainable funding sources.

2.5 Funding Needs Not Included in This Report

This report does not address funding needs related to the following programs or activities (which can complement the goals of local stormwater management programs, but are typically funded by other federal or local sources):

- **Addressing stormwater runoff that causes agricultural water pollution.** Most local stormwater programs focus on urban areas and the associated drainage, flooding, resilience and stormwater quality needs. These local programs typically do not have legislation that allows them to regulate agricultural activities. Soil and Water Conservation Districts and other U.S. Department of Agriculture programs under the Farm Bill, as well as CWA non-point source regulations, address this growing source of pollution.
- **Flood risk identification and mapping.** Costs associated with the Federal Emergency Management Agency (FEMA) flood risk identification and mapping program under the National Flood Insurance Program (NFIP) are not included in this report, since these federal activities are funded by the NFIP and flood insurance policy fees.
- **Large flood risk management and ecosystem restoration programs.** Large programs to address riverine flooding, navigation, and ecosystem restoration programs conducted by the U.S. Army Corps of Engineers (USACE) and funded through the Water Resources Development Act are not included in this report. In some instances, local stormwater revenue is used as the local match for these large projects, but the bulk of the costs are paid by federal sources.

2.6 Key Terms

To frame and further refine the scope of the required study, the Task Force first agreed on a definition for stormwater, as well as definitions of associated environmental, technical and other considerations and drivers for stormwater services.

The Task Force used the following key definitions related to stormwater, stormwater services and regulatory requirements for municipal stormwater services:

- **Municipal stormwater:** Surface water runoff, snow melt runoff and drainage from public and private lands in urban areas, typically collected in MS4s consisting of drains, pipes, catch basins, outfalls and ditches and conveyed to nearby streams, rivers, lakes, estuaries, basins, wetlands and oceans, carrying with it a variety of urban pollutants.⁵ Stormwater control measures (e.g.,

⁵ Adapted from National Association of Flood and Stormwater Management Agencies. 2006. *Guidance for Municipal Stormwater Funding*. https://www.epa.gov/sites/production/files/2015-10/documents/guidance-manual-version-2x-2_0.pdf

basins/ponds and green infrastructure—bioswales, filters, infiltrators, pollutant traps, etc.), also known as best management practices (BMPs), are used to “treat” municipal stormwater by capturing pollutants to improve water quality and reducing runoff to prevent flooding.

- **Municipal Separate Storm Sewer System (MS4):** A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, artificial channels or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association or other public body and is designed or used to collect or convey stormwater, but is not a combined sewer and is not part of a publicly owned treatment works (POTW).⁶ There are 7,550 MS4 stormwater permittees in the United States, including more than 6,500 cities. Communities with MS4 stormwater permits serve more than 80 percent of the U.S. population or approximately 263 million people.⁷
- **Stormwater Operation and Maintenance (O&M):** The O&M activities, to name a few, typically include the maintenance of stormwater conveyance infrastructure; good housekeeping practices; land use development and redevelopment permitting, monitoring, and inspections; public education and outreach; and management of various other stormwater programs.
- **Stormwater Capital Expenditures:** Capital program management typically includes asset management, capital projects planning and execution.
- **Phase I Municipal Stormwater Regulation** (hereafter Phase I): A 1990 regulation that requires medium-sized and large cities, or certain counties with populations of 100,000 or more, to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for their stormwater discharges. There are about 855 Phase I MS4s covered by 250 individual permits.⁷
- **Phase II Municipal Stormwater Regulation** (Phase II): A 1999 regulation that requires small MS4s in U.S. Census Bureau–defined urbanized areas, as well as MS4s designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. Phase II also includes non-traditional MS4s such as public universities, departments of transportation, hospitals and prisons. There are about 7,000 Phase II MS4s covered by statewide General Permits; some states instead use individual permits.⁸
- **Combined Sewer System (CSS):** A system of conveyance that carries and conveys both sanitary sewage and stormwater flows, in the same pipe, to a POTW. CSS’s serve about 43 million people in about 1,100 communities nationwide.⁹
- **Infrastructure efficiency:** The ability to effectively manage the stormwater system infrastructure and improve affordability through best management practices, including adopting proactive asset management, leveraging resources and economies of scale, building resilience and engaging in risk mitigation.
- **Integrated planning:** A voluntary approach to meeting multiple CWA requirements by identifying efficiencies from formerly distinct drinking water, wastewater and stormwater programs and

⁶ Definition from 40 CFR § 122.26.

⁷ U.S. EPA. 2019. *Stormwater Discharges from Municipal Sources*. <https://www.epa.gov/npdes/stormwater-discharges-municipal-sources>

⁸ Ibid.

⁹ U.S. EPA. 1997. *Combined Sewer Overflows—Guidance for Financial Capability Assessment and Schedule Development*. EPA 832-B-97-004. February 1997. <https://www3.epa.gov/npdes/pubs/csofc.pdf>

sequencing investments to address the highest priority projects first. Integrated planning also encourages multi-benefit, cross-sector sustainable and comprehensive solutions to water resource challenges.

- **Median Household Income (MHI):** The middle-income level earned by households in a given area, intended to represent the economic status of households in that area. Fifty percent of households in the specified area will earn above MHI, and 50 percent will earn below.

3.0 Task Force Recommendations

The Task Force offers recommendations on how existing funding can be used and made more accessible, as well as on identifying additional funding opportunities. They are intended to be actionable and understandable to the public. The recommendations are summarized in the Executive Summary and presented in detail below.

The Task Force's recommendations fall into the following categories:

- **Allocate new federal stormwater funding assistance.** Given the magnitude of the stormwater needs described in this report, there is a need for new federal investment similar to the investments that were made in the National Interstate Highway system and wastewater treatment plant upgrades. New and increased funding levels of federal grants, loans (e.g., from State Revolving Funds) and programmatic and technical assistance support to enhance affordability are needed to maintain sustainable local funding sources. These actions would provide communities an incentive to create dedicated funding sources to demonstrate financial capacity and capabilities, while still retaining the flexibility and local control as to the actual method for repayment.
- **Provide stormwater funding education and technical assistance.** Educating the public and elected officials on the benefit of and the need for stormwater funding is critical to the successful implementation of and community support for funding sources. In addition, many communities need technical assistance related to evaluating and securing funding and financing mechanisms.

Several of the recommendations include direct involvement and interaction by EPA with state and local agencies. The main goal is for federal actors to provide support to state and local agencies, while also learning about issues and barriers that confront local agencies. This two-way flow of information and experiences will help bridge the gap between the source of clean water regulations (federal) and the most important source of funding (primarily local). This, in turn, will also greatly benefit the overall goals of the CWA, the involved agencies and the public at large.

3.1 Allocate new federal stormwater funding

Given the magnitude of the stormwater needs described in this report, the Task Force recommends increased federal investment in stormwater infrastructure, with no off-sets to other programs. Federal grants, loans and new programs, similar to the Municipal Construction Grant Program, are needed to fund critical stormwater infrastructure in communities of all sizes across the country and support local funding sources.

***Recommendation:** Develop a new and enhanced construction grant program specifically for stormwater projects, similar to the federal Municipal Construction Grants Program that funded the construction of wastewater treatment plants.*

A Stormwater Construction Grants Program, similar to the Municipal Construction Grants program that funded the construction of wastewater treatment plants in the 1970s and 1980s, could be developed to serve as a much-needed jump start to investment in stormwater infrastructure/capital investment. Such a program could likely be managed through existing SRF programs if new funding sources are identified. However, funding stormwater management is less straightforward than funding construction of

wastewater treatment plants. The program components outlined below could help to avoid some of the challenges of the original Municipal Construction Grants Program and better tailor a program to stormwater management.

- The program could require participants to demonstrate capacity or secure financial assurances to show that they can fund ongoing O&M for grant-funded projects. The technical assistance model recommended by this Task Force could be used to help evaluate and provide these assurances.
- In many communities, the greatest capital investment need is related to the renewal and/or replacement of existing stormwater infrastructure. However, communities have indicated a need for help in prioritizing stormwater asset maintenance and replacement and estimating associated costs.¹⁰ To help meet this need, the construction grant program could fund development of an asset management plan (or require communities to have one in place that meets certain requirements) as a first tier of funding for renewal/replacement projects.
- The grant program could require, prioritize or set aside a separate “bucket” of funds for regional/watershed projects that result in cost savings and greater environmental benefits and help avoid conflicts associated with implementing different methods for stormwater management across communities. Similarly, the program could prioritize cross-sector opportunities, such as partnerships with transportation departments, that result in significant cost savings and/or bring additional matching funds.
- The program should not require “shovel-ready projects” and should fund design, feasibility studies and other upfront costs, particularly for small and medium-size communities.
- To further encourage participation of small and medium-size communities, particularly those that are economically disadvantaged, the program could waive or reduce matching fund requirements. It should also carefully evaluate the needs of these communities and set aside appropriate funds or tailor the program to better meet their needs.
- The program should fund a wide range of projects and prioritize projects that result in the greatest financial, environmental and social benefits. Water quantity projects (flood control and mitigation) should be eligible and be prioritized in consideration of all benefits—not subordinated to water quality projects.
- Many stormwater projects, particularly green infrastructure projects, result in multiple benefits. The grant program could be linked to other federal programs that provide funds for investment in projects or programs related to these co-benefits (e.g., public health, air quality, energy savings, economic development). For example, for projects that result in specific co-benefits, related federal grant programs could provide the required matching funds. This would incentivize these projects and stretch public dollars toward meeting multiple goals. It would require research and coordination across relevant programs. This could also be achieved, in part, through the common application for relevant federal grant programs/agencies, as recommended by this Task Force.

¹⁰ WEF Stormwater Institute. 2019. National Municipal Separate Storm Sewer System (MS4) Needs Assessment Survey Results. <https://wefstormwaterinstitute.org/wp-content/uploads/2019/08/MS4-Survey-Report-2019.pdf>

Recommendation: Increase annual funding allocation for and modify the Clean Water Act section 319(h) grant program to allow and encourage local capacity building, utility fee study and implementation and asset management, and remove restrictions on use of grant funds for MS4 permit compliance.

The 319(h) grant program is an important resource to many small and medium-sized local governments, but the overall limitations, for both funding and implementation, of the program affect the ability of local communities to effectively use these funds for sustainable stormwater infrastructure. There are several challenges that communities face using these funds, summarized as funding and implementation challenges below.

Funding Challenges:

- The overall funding levels of the program are not adequate to meet the large demand of local communities to meet their critical non-point source needs.
- The allocation, distributed to state non-point source pollution programs, varies from year to year based on budget authorizations. Therefore, there is no stable platform for grant awards at the local level.
- There is a need to provide more funding support in an entire watershed, prioritized on financial capacity.

Implementation Challenges:

- The use of funds for general operational program costs is limited to 10 percent. Effectively planning and implementing stormwater infrastructure projects often take significant funds that communities do not have without greater grant assistance. The limitation on the use of funds for regulatory purposes, and its limitation for operational costs, should be reconsidered.
- Investment in capacity building through technical, financial and managerial support, directly by consultation or through use of grant funds, is of critical importance. Expanding the programmatic criteria for use of Section 319 Grants to address technical, managerial and financial deficiencies, along with technical and funding support for comprehensive asset management, will advance local communities' ability to effectively carry out their role in partnership with federal permitting, state program guidance and local surface water system operation.
- The current program structure does not allow the use of these grant funds for MS4 permit compliance and consideration should be given to allow for such use, specifically targeted to allow an exception for communities with limited capacity to address water quality protection.

Recommendation: Provide additional funds for the CWSRF and WIFIA programs specifically for stormwater. The CWSRF and WIFIA programs are integral tools among the many infrastructure financing options available to communities. Whether stormwater receives consideration of its own through a new SRF program or receives less restrictive eligibility considerations and larger appropriations within the existing CWSRF, it is the view of the Task Force that stormwater would benefit from a separate, additive, recurring financial commitment from EPA. This would provide communities an incentive to create dedicated funding sources to demonstrate financial capacity and capabilities, while still retaining the flexibility and local control as to the actual method for repayment. Additional funding for stormwater projects could be achieved by the implementation of one or more of the following, each of which is outlined below with the associated risks and opportunities:

- I. Create a specific stormwater set-aside in the existing CWSRF framework and increase awareness and guidance on the CWSRF for stormwater projects, including the Green Project Reserve program (requires all CWSRF programs to use a portion of their federal grant for projects that address green infrastructure, water and energy efficiency, or other environmentally innovative activities)¹¹.
 - a. Advantages
 1. Would not require new federal legislation.
 2. Preserves each state’s ability to administer the program to maximize efficiencies and effectiveness specific to its needs.
 - b. Disadvantages
 1. Might not improve best management practices or capability of communities if the set-aside is viewed by them as an implicit high likelihood or guarantee of funding.
- II. Create a “One Water” SRF with amounts allocated to drinking water, clean water and stormwater.
 - a. Advantages
 1. Would encourage community creativity and holistic, multi-year master planning – including resilience and integrated planning – by way of multi-purpose projects that achieve goals aligned with the One Water principles.
 2. Might be more likely to attract private sector participation, especially if flood control and stormwater facilities are added as a private activity bond category as proposed by the Administration in the February 2018 infrastructure stimulus package.
 3. Would provide communities an incentive to create dedicated funding sources to demonstrate financial capacity and capabilities,

¹¹ EPA. 2012. https://www.epa.gov/sites/production/files/2019-05/documents/gpr_guidance_change_memo_2-21-17.pdf

while still retaining the flexibility and local control as to the actual method for repayment.

b. Disadvantages

- 1. Would require amending existing enabling SRF legislation.*
- 2. The CWSRF has been in place since 1987 and the DWSRF since 1997; therefore, decades of policy and administrative inertia could pose an implementation barrier.*

III. *Create a new SRF program exclusive to stormwater programs and projects.*

a. Advantages

- 1. Replicates programs that have been proven successful for decades.*
- 2. Would eliminate ‘competition’ with wastewater projects inherent within the current CWSRF program.*

b. Disadvantages

- 1. Would require the creation and passage of new enabling legislation to establish a new SRF program.*
- 2. Would create a new layer of bureaucracy with cross over and potential duplication with the CWSRF program, both of which are legislated through the same CWA.*

IV. *Expand the existing WIFIA program (e.g., explicit references to stormwater project eligibility, priority points for stormwater projects, lower project minimums for bundled stormwater projects) to allow funding for more stormwater projects or fund the USACE Corps Water Infrastructure Financing Program (CWIFP), also established in 2014.*

a. Advantages

- 1. Would not require new enabling legislation.*
- 2. WIFIA has already demonstrated the ability to leverage federal dollars many times over the initial appropriation.*
- 3. The CWIFP has a stated mission to “enable local investments in projects that enhance community resilience to flooding, promote economic prosperity and improving environmental quality” which is consistent with the general aim of stormwater infrastructure.*

b. Disadvantages

- 1. Bundling enough projects together to meet the scope of the WIFIA program.*
- 2. Administrative difficulty in successfully applying to the program.*

Recommendation: *Create a federal funding program (similar to the Low Income Home Energy Assistance Program, or LIHEAP) to help address household affordability issues for customers who are economically challenged in paying their water-related charges, including stormwater.*

One of the strengths of using utility fees to fund stormwater management is that the cost of services is distributed to properties in proportion to the stormwater that properties contribute to a public stormwater system. This type of industry-accepted fee for service approach is perceived to enable equitable cost recovery by establishing a reasonable nexus between the demand placed on the system and the charges that are assessed. However, the addition of a stormwater user fee, however small the fee maybe, could create an additional burden on low-income households, including the elderly on fixed incomes, that already struggle to pay the drinking water and sewer utility charges.

To address household affordability challenges, some local governments have established customer assistance programs to help with drinking water, sewer and stormwater utility fees, using general funds or other non-utility resources. However, at the local level, particularly in financially stressed communities, establishing fee assistance programs becomes burdensome, even if statutes allow such programs. Further, subject to varying state and local statutes, many utilities are unable to establish any low-income customer assistance programs because establishing utility fee assistance programs using utility enterprise funds is deemed to violate the fee for service concept. Due to these types of challenges, elected officials in many communities in the U.S. are reluctant to adopt a stormwater utility fee funding mechanism.

The federal Low Income Home Energy Assistance Program (LIHEAP),¹² in place since the 1980s, helps qualifying households offset a portion of their energy costs. Expanding LIHEAP — with additional funding to help offset drinking water, sewer and stormwater utility charges and/or establishing a similar distinct federal assistance program for drinking water and sewer utilities, including stormwater — could remove a major barrier to the creation of dedicated user fee-based stormwater funding, at the local level.

3.2 Provide stormwater funding education and technical assistance

Educating the public and elected officials on the need for stormwater funding is critical to the successful implementation of and community support for funding solutions. In addition, many communities need technical assistance related to evaluating and securing funding and financing mechanisms.

***Recommendation:** Provide funding to educate elected officials, professional administrative leaders and the public on the benefit and need for sustainable local stormwater funding and organizational capacity through, for example, the creation of stormwater utilities or the expansion of existing utilities into the stormwater sector. Sustainable funding for stormwater infrastructure builds long-term financial capacity, improves operational performance—and over time produces results for citizens and residents. For over two hundred years, this has been the experience with drinking water and wastewater utilities in this country. The educational goals for these three audiences will demonstrate that stormwater management investment directly benefits the health, safety and economic opportunity for citizens and residents through the overall improvement of water quality and resiliency of communities.*

Stormwater, along with drinking water and wastewater, must be approached as part of a comprehensive “One Water” solution. When stormwater management, sustainable drinking water

¹² Low Income Home Energy Assistance Program (LIHEAP). U.S. Department of Health and Human Services. More information available at: <https://www.acf.hhs.gov/ocs/programs/liheap>

supplies and wastewater treatment resources and goals are aligned, communities avoid costs, are financially sustainable, are safer, are better environmental stewards, and provide better economic opportunities and quality of life for their residents. FEMA's own hazard mitigation program generally notes that investments in key stormwater infrastructure alone improve a community's resilience; the return on investment is four times or even better, through cost avoidance and quicker return to normalcy after a flooding event than a do-nothing scenario.

Communities with successful water resource management strategies have generally identified financial needs over multi-year planning horizons. Implementation of "One Water" strategies supported by appropriate financial resources provide better management of public health, safety, economic and financial risks. Successful education will help reduce barriers, such as those that may exist under state law, and will build support to establish forward-looking and sustainable operational capability in stormwater management and responsible and long-term finance and capital planning. The Task Force recommends that EPA's Water Infrastructure and Resiliency Finance Center (also referred to as EPA's Water Finance Center) work with other EPA programs and federal agencies to address this recommendation.

Recommendation: *Provide technical assistance and funding to help communities create and maintain sustainable and legally defensible funding sources and increase operational efficiency. This could include assistance with funding need assessments, organization analysis, grant applications, affordability assessments, integrated planning and/or establishing revenue instruments.*

Many communities would be willing to work toward greater funding self-sufficiency but lack the support, expertise and initial resources to get started. Federal assistance can help overcome these hurdles through technical assistance and funding to support the initial activities necessary to create sustainable funding sources.

Technical assistance may include guidance documents, webinars, hands-on training and support. While technology should be leveraged to make this assistance accessible to all communities with stormwater issues, the technical assistance also needs to be proactive. Proactive programs should include reaching out to smaller communities through circuit-rider type programs with onsite assistance. This technical assistance program could be established under the EPA Office of the Municipal Ombudsman established by AWIA Section 5006.

EPA should provide funding in the form of grants or matching funds to support the utility capacity building, feasibility and needs assessment, grant applications and other activities needed to create sustainable funding sources. EPA also should provide a database of federal funding opportunities that can be easily accessed and used by local communities and stakeholders. This online database should be maintained and updated by EPA to stay current on funding options.

Recommendation: *Provide for a common application for different federal grants across all federal agencies.*

Most of the U.S. population lives in large urban or suburban areas, generally associated with governmental units that have relatively more financial, technological and human resources. However,

even larger municipalities do not always have sufficient resources to dedicate to securing necessary stormwater funding. In addition, most individual local governments are associated with small or very small populations (10,000 or fewer people). These communities are also often rural and often exhibit below-average income indicators. As such, they may face particular difficulty in accessing the requisite technical expertise and financial resources needed to prepare applications for federal grants.

The Task Force believes all communities, especially small, rural and otherwise disadvantaged ones, would greatly benefit from more uniformity to the federal grant application process—perhaps some baseline commonality to all applications across the federal government irrespective of the agency or department ultimately administering the grant program. A common application could lessen barriers for communities if as much of the actual application as possible were exactly the same and not specific to any particular federal agency or department. The Task Force notes that the federal Paperwork Reduction Act (44 U.S.C. §§ 3501–3521) was established in 1980 but has not been amended since 1995, during the infancy of the Information Age. For a comparable example, The Common App¹³, implemented almost a generation ago, is now used by nearly 900 colleges and universities across all 50 states, benefitting more than a million prospective college students. This streamlining and simplification saves both the applicant and the associated higher education institutions significant time while breaking down barriers of access and relieving burdens of redundancy.

***Recommendation:** Provide funding to build and maintain a compendium of case studies and other resources to assist users to identify successful stormwater funding and financing approaches.*

As part of the 2020 Clean Watersheds Needs Survey, EPA should create a state-level funding evaluation framework and request that states use that framework to identify barriers and gaps in state enabling legislation to create new stormwater user fees or restrictions on fee increases. Once information is received from states, EPA should post a compendium of findings from the evaluation in a publicly available forum and provide educational materials for local government officials and the public. Further, Congress should develop an incentive framework (e.g., matching 319 funds or other federal grant or funding mechanisms) to encourage removal of state-level funding barriers, where applicable.

¹³ The Common App is a college admissions application that applicants may use to apply to various universities. More information available at: <https://www.commonapp.org/>.

4.0 Sufficiency of Funding

Evaluate whether sources of funding are sufficient to support capital expenditures and long-term operation and maintenance costs necessary to meet the stormwater infrastructure needs of municipalities.

Determining the extent of capital and long-term O&M costs necessary to meet the stormwater infrastructure needs of municipalities in the United States is a challenging task. Many surveys and studies have been conducted over the past 30 years, each with its own limitations. The surveys and studies presented below were largely developed within the last four years and represent only a few resources from the pool. However, these resources collectively indicate the following:

- There are no large-scale, comprehensive, nationally representative numbers on total stormwater capital and O&M needs.
- While there is no comprehensive survey, it is widely accepted that the needs are great, and the funding gap is very wide — ranging between \$7-10 billion based on the limited surveys that have been conducted (described briefly below and in detail further in the Section, along with their limitations).
- The most recent attempt to estimate the need on a national scale was conducted by the Water Environment Federation (WEF) Stormwater Institute in 2018, with a survey of MS4 permittees that determined the total annual funding gap for stormwater programs (MS4 compliance activities only) to be \$7.5 billion nationally.
- Other existing surveys evaluated and summarized below have estimated needs ranging from:
 - A combined \$1.7 billion for the next five years and \$3.3 billion for the next 10 years for 137 stormwater utilities in Florida alone.¹⁴
 - An EPA-estimated total of \$67.2 billion for the nation over 20 years.¹⁵
 - \$9.7 billion for capital improvement over 20 years for 67 stormwater utilities in just the southeastern United States.¹⁶

The limitations of these and other surveys are discussed below and point to a potentially significant underrepresentation of total national need. Many communities have not been able to quantify their long-term needs or quantify existing spending/annual revenues, which limits the ability to fully capture funding needs.

- Needs specific to O&M are even less well captured and defined because O&M responsibilities in many communities are passed to property owners or homeowners associations where the

¹⁴ Florida Stormwater Association. 2018. *Stormwater Utility Report*. <https://www.florida-stormwater.org/stormwater-utility-report1>

¹⁵ U.S. EPA. 2016. Clean Watersheds Needs Survey 2012 Report to Congress EPA-830-R-15005. https://www.epa.gov/sites/production/files/2015-12/documents/cwns_2012_report_to_congress-508-opt.pdf

¹⁶ WEF Stormwater Institute. 2019. National Municipal Separate Storm Sewer System (MS4) Needs Assessment Survey Results. <https://wefstormwaterinstitute.org/wp-content/uploads/2019/08/MS4-Survey-Report-2019.pdf>

stormwater systems or treatment facilities (best management practices or stormwater control measures) are located.

- 💧 Revenue for established stormwater programs may be largely generated from taxes or user fees, which can vary significantly across the country, and capital improvements may be more commonly cash-financed than debt-financed.
- 💧 In some communities, there is a moderate to significant gap between annual revenue and capital and O&M needs, and lack of funding and financing is a significant concern and priority for stormwater programs/utilities.
- 💧 Public perception of water infrastructure, including stormwater infrastructure, varies widely across the country and in each community. In some communities there is widespread support for investing in the water infrastructure, even if this requires moderate increases in customer charges; other communities oppose any increase in charges.

The Task Force has clearly identified the need for a national survey of stormwater needs that includes all costs related to managing stormwater, from water quality to flood control. The American Society of Civil Engineers, in coordination with the WEF Stormwater Institute, has prepared report cards on the nation's infrastructure since 1998. The next report card will include stormwater infrastructure as a specific category.

The Task Force believes—based on the many existing surveys on stormwater funding needs—that the stormwater infrastructure funding gap is well into the billions of dollars per year and will continue to grow if things are left on the current course.

The Task Force believes—based on the many existing surveys on stormwater funding needs—that the funding gap is well into the billions of dollars per year and will continue to grow if things are left on the current course. Lack of action to build and maintain adequate stormwater infrastructure could lead to costs that far exceed initial costs.

In addition to a review of available surveys and estimates on a broad scale, Task Force members developed illustrative case studies of stormwater programs in 20 communities across the country (Appendix III). While not meant to be statistically representative of stormwater programs across the nation, these case studies highlight the funding challenges faced by large metropolitan communities like Atlanta, Chicago and San Diego, as well as smaller communities like Coralville, Iowa; Griffin, Georgia; and Washtenaw County, Michigan. In nearly all of these communities, significant gaps exist between current funding levels and the annual needs of O&M programs as well as capital investment needs. Stormwater programs align their level of service with available funding, not typically on the basis of an asset-management generated, data-supported program. This means programs may not be ensuring that adequate maintenance levels are achieved and adequate investment is being made in renewal and replacement of stormwater infrastructure. Some communities acknowledge that their current programs do not address the impact of more intense, more frequent storms and floods.

There are many reasons the funding gap for stormwater infrastructure exists. While there are many federal funding programs—including the revolving loan programs, WIFIA, the various USDA programs, and others—the total available funding falls well short of the need and access can be challenging, especially for small and disadvantaged communities. Attracting private capital continues to be

challenging, as the expected return for third-party capital is mismatched with the risk profile of most stormwater projects. Without low-cost concessionary debt, there is no compelling desire for outside, private capital to invest.

Communities across the nation have implemented local stormwater fees that, in isolation, do not create undue financial burdens on the majority of their customers. Affordability is, however, an issue for lower-income segments of the population across the nation. While the funding gap is not exclusively related to affordability, the impact to lower-income segments of the population for all water costs can limit rate increases and restrict a community's ability to cover costs with fees alone.

Perhaps the biggest obstacle to closing the stormwater funding gap is the lack of political will to increase revenues dedicated to stormwater investment at the local, state and federal levels. Without leadership, stormwater infrastructure investment will continue to fall short of annual needs and future generations will be burdened with failing stormwater systems.

A detailed summary of the resources and surveys evaluated to assess the funding gap is provided below.

4.1 American Support for Investments in Water Infrastructure (2019)

In February 2019, as part of the U.S. Water Alliance "Value of Water" campaign, public opinion researchers conducted a phone-based survey of 1,000 voters in 47 states (all but Hawaii, Oklahoma and West Virginia). The goal of the campaign was to raise awareness of the importance of water and water challenges facing the nation. This survey focused broadly on water infrastructure through the lens of drinking water and wastewater infrastructure and did not include an explicit stormwater component.

Of the 1,000 respondents, 79 percent ranked rebuilding America's infrastructure as "extremely to very important," which is consistent with information gathered during similar 2017 and 2018 surveys. In 2019, 83 percent of respondents rated the water infrastructure in their local communities as "very good" or "somewhat good" (on par with 2016 responses, accounting for reported margin of sampling error). However, only 49 percent of respondents rated the condition of the nation's water infrastructure as "very good" or "somewhat good," while 36 percent believe it is "somewhat bad" or "very bad."

While public opinion of the condition of water infrastructure in their own communities remains positive, nearly four in five respondents indicated that they support developing plans to rebuild America's water infrastructure and support an increase in federal investment to do so. Of note, 80 percent of respondents indicated that their drinking water and wastewater rates were affordable and would be willing to pay a modest amount more to improve local water infrastructure. Additionally, two-thirds of surveyed voters believe that investments in comprehensive upgrades, replacements and improvement should be made today, rather than addressed over time as the need arises. The survey did not distinguish between investments in capital improvements and O&M.

4.2 Black & Veatch Stormwater Utility Surveys (2016 and 2018)

National consulting firm Black & Veatch has been conducting biennial stormwater utility surveys for over 25 years. The 2016 online survey included 74 participants from 24 states. The 2018 online survey

included 75 participants from 21 states.¹⁷ Combined, the surveys included local utilities that served populations from 86 to 1.5 million people. Respondents to the 2018 survey have a median population served of 110,500 people and 33,000 accounts. In 2018, 28 percent of respondents indicated that their stormwater operations were governed as a stand-alone stormwater utility, while 23 percent were combined with a department of public works and 20 percent each with a drinking water and/or wastewater utility or other entities.

In the 2016 and 2018 surveys, as well as many previous surveys, respondents cited funding or availability of capital as the most important challenge to enhancing their utilities' stormwater management. In 2018, 94 percent of respondents reported that more than 75 percent of their revenue is derived from user fees. Additionally, survey results showed that the majority (87 percent, on par with 2016 and 2014 responses) of capital improvement projects are cash-financed, as opposed to debt-financed.

Respondents' 2018 annual stormwater capital improvement program budget ranged from \$1,800 to \$143.9 million, with an average of about \$7.6 million. According to the 2016 survey, 88 percent of respondents indicated that they do not have adequate funding to meet all their stormwater programs' needs, while 85 percent of 2018 respondents indicated that funding was not adequate. This aligns with survey responses to the same question from the 2010, 2012 and 2014 reports. Neither the 2016 nor the 2018 survey explicitly discussed funding and needs for O&M activities, although 2018 survey respondents indicated that stormwater utility budgets generally do capture costs for inlet and outfall maintenance and best management practice inspection and maintenance.

4.3 Clean Watersheds Needs Survey 2012 Report to Congress (2016)

The EPA conducted its most recent Clean Watersheds Needs Survey (CWNS) in 2012 and published the survey in 2016. The CWNS estimates the capital investment necessary to meet the nation's stormwater and wastewater treatment and collection needs, based on CWA requirements. Water quality improvement investments considered in the CWNS included stormwater management. This category captured costs associated with the planning and implementation of structural and non-structural measures to control runoff in Phase I, Phase II and non-traditional MS4s.

This voluntary survey captures needs across most states, Puerto Rico, the District of Columbia and U.S. Territories ("states"). The goal of the survey is to capture a 20-year need nationwide; however, many states had limited documentation to demonstrate needs over this timespan (most projects are completed within a 5-year period), so most of the needs captured in the 2016 report only reflect 2012 to 2017 needs.

Information provided by the states captured needs for over 27,000 wastewater facilities and water quality projects. Of the estimated \$271 billion required to meet documented needs, an estimated \$19.2 billion was for stormwater-related needs (\$67.2 billion for both CSO and stormwater management needs) over 20 years. This represents a 60 percent decrease from the 2008 CWNS, but this decrease is

¹⁷ The following states did not participate in the 2016 and 2018 surveys: AK, AL, AR, AZ, CT, HI, ID, IN, LA, MA, ME, MI, MS, ND, NH, NJ, NM, NV, NY, RI, SD, UT, VT, WI, WV, and WY. The following additional states did not participate in the 2018 survey: NE, OK, and MD. In 2018, 33 respondents represented three states, Florida (16), Texas (10) and Colorado (seven).

due in part to lower participation in the 2012 CWNS. Three fewer states participated in 2012, and seven states reported no needs in 2012, which accounted for \$7.2 billion of the 2008 survey's needs. Additionally, EPA's estimate only included projects that had a "storm water quality benefit" and thus did not include needs associated with flood control projects in the estimates. As a result, states reported that this modification made it difficult to meet EPA's documentation criteria for stormwater in 2012. Of the \$19.2 billion for stormwater management needs, 45 percent is attributed to conveyance systems, 32 percent for the treatment of stormwater runoff (e.g., ponds, manufactured devices), and the remaining 15 percent for low-impact development and green infrastructure projects (an additional \$45 billion in funding needs is associated with CSO projects).

Additionally, the CWNS only includes projects with site-specific solutions to known water quality problems and detailed cost information. Needs associated with water quality problems without known solutions and cost estimates were not captured.

4.4 Florida Stormwater Association Stormwater Utility Report (2016 and 2018)

In 1995, the Florida Stormwater Association (FSA) began performing biennial Stormwater Utilities Surveys to provide stormwater program information to state and local government managers and policy makers. The FSA provides questionnaires to the 67 counties and 410 cities in Florida. Of those 477 entities, FSA estimates, 165 local governments have established stormwater utilities. In 2016, 124 utilities responded to the questionnaire; in 2018 FSA received 137 responses. In 2016, 88 respondents (71 percent) cited user fees as their primary approach to revenue generation. In 2018, 91 respondents (66 percent) reported the same. In both surveys, about 70 percent of respondents indicated that fees were primarily based on impervious area.

Eighty-two entities in 2016 and 89 entities in 2018 reported that their stormwater operating budgets are funded solely by their stormwater fees. The rest (42 in 2016 and 47 in 2018) indicated their budgets were covered by fees and other "non-fees" including, but not limited to, ad valorem taxes, sales taxes and gas taxes. The 2016 survey indicated that 44 percent of stormwater capital construction programs were funded only by fees, while the remainder were funded by fees and non-fees. Responses were very similar in 2018.

In 2016, 66 percent of respondents reported that their operating budgets are funded only through fees. Of the 34 percent for which fees and other non-fee funds fund their operating budgets, 45 percent reported ad valorem taxes as the source of non-fee revenues. Responses to these questions were nearly identical in 2018.

The 2016 report identifies the annual average revenue generated by each entity's utility fee as \$3.6 million, whereas the 2018 report lists the annual average as \$3.9 million. Respondents reported a combined projected capital improvement need of \$1.7 billion for the next five years and \$3.3 billion for the next 10 years (per-utility average of \$14 million and \$35.1 million, respectively). This represents an increase from 2016 reported total respondent needs of \$1.4 billion (five-year need) and \$3.1 billion (10-year need). Respondents were also asked whether stormwater fee revenue was sufficient to meet administration, O&M and capital improvement needs. In 2018, 33 percent of respondents indicated that fees were sufficient to meet all or most needs, while 26 percent reported that fees were not adequate to meet urgent needs. In 2016, responses to the same questions were 39 percent and 37 percent,

respectively. Respondents were not given the option to indicate whether fees were not adequate to meet non-urgent needs.

4.5 Georgia Stormwater Utilities Report (2017)

From August 2016 to February 2017, the University of North Carolina Environmental Finance Center and the Georgia Environmental Finance Authority surveyed 48 stormwater utilities in 27 Georgia counties regarding stormwater fees. Of the 48 respondents, 23 reported collecting fees through utility bills, while 20 reported collecting fees through property tax bills and five through stand-alone bills. Of the participants, 31.2 percent indicated they apply unique multi-family residential fee structures. In Georgia, flat fee structures are commonly used to apply fees for multi-family and single-family residential properties. Lastly, 93.8 percent of respondents indicated that they charge an equivalent residential unit (ERU)-based fee for non-residential properties, which is based on the amount of impervious surfaces on a property.

4.6 Southeast Stormwater Association Utility Report (2019)

The Southeast Stormwater Association conducted its seventh biennial survey of stormwater utilities in 2019, capturing information from 103 respondents representing stormwater utilities from 136 jurisdictions in Georgia, South Carolina, North Carolina, Alabama, Tennessee, Florida and Kentucky. Ninety-four percent of respondents reported generating revenue from a user fee, largely based on the amount of impervious area on a property. Annual reported revenue generated by the stormwater utility fee ranged from \$32,000 to \$71.1 million, with an average of \$4 million. Average monthly utility rates ranged from \$0.62 in Alabama to \$5.36 in South Carolina.

Across 67 respondents, the estimated total 20-year capital improvement need is \$9.7 billion, with an average of \$144.8 million in need per respondent.

4.7 The Chesapeake Stormwater Network Select Results of the MS4 Needs Survey (2016)

In 2016 the Chesapeake Stormwater Network surveyed Phase I and Phase II MS4 permittees within the Chesapeake Bay watershed (Virginia, Maryland, Delaware, West Virginia, Pennsylvania, New York and Washington, D.C.) to identify funding needs. A total of 137 respondents provided input for the survey. Seventy-three percent of respondents indicated that their stormwater program is somewhat (45 percent) or very (28 percent) underfunded. Respondents also cited resource limitations and scale of permit requirements as the most significant challenges to permit implementation.

The majority (65 percent) of Phase I permittees responded that they have an approximate annual budget of over \$1 million. The remaining Phase I permittees indicated the following: 8 percent operating on a budget of less than \$25,000; another 8 percent operating on a budget between \$25,001 and \$100,000; 5.4 percent operating on a budget between \$500,000 and \$1 million; and 13 percent unsure of their operating budget.

The majority of Phase II permittees (36 percent) indicated that they have less than \$25,000 to implement their programs. The remaining Phase II permittees indicated the following: 21 percent operating on a budget between \$25,000 and \$100,000, 8 percent operating on a budget between \$500 and \$1 million, 7 percent operating on a budget between \$100,001 and \$500,000, and another 7

percent operating on a budget of more than \$1 million, and 18 percent not sure of their budget allotment.

4.8 Water Environment Federation MS4 Needs Assessment Survey Results (May 2019)

WEF's Stormwater Institute conducted a national survey of MS4 permittees in 2018 to identify permittees' information and technical resource needs and better understand the challenges facing MS4 permittees. A total of 622 respondents represented 48 states and Washington, D.C. The sample size was statistically significant and generally representative of the distribution of MS4 programs across the United States, including municipal, non-traditional and state department of transportation permittees. The survey determined the total annual funding gap for stormwater programs in the MS4 sector to be \$7.5 billion nationally.

Phase I and Phase II MS4 respondents cited lack of funding or availability of capital, aging infrastructure and increasing or expanding regulations as the most significant challenges to their stormwater programs. Close to 50 percent of Phase I and II municipal permittees indicated that they do not have enough money to meet program goals, and that a respective 52 percent and 136 percent annual budget increase is needed. Respondents also indicated a need for more information on methods for securing funding and financing. Specifically, respondents indicated needing additional information on "leveraging additional sources of funding based on co-benefits."

WEF indicates that the number of MS4s with inadequate annual budgets may be underrepresented due to unwillingness to answer questions that might only raise further questions about their budgeting process or regulatory compliance.

4.9 Western Kentucky University Stormwater Utility Surveys (2013, 2016, 2018 and 2019)

Western Kentucky University (WKU) has conducted a regular survey of stormwater utilities since 2007. The WKU team mines publicly available online data on stormwater utilities, in addition to conducting phone surveys. The survey aims to identify as many stormwater utilities as possible within the United States and Canada.

The number of identified stormwater utilities has been increasing in each survey. The 2013 survey identified 1,417 stormwater utilities in the United States, compared to 1,583 in 2016, 1,681 in 2018, and 1,716 in 2019. The 2019 survey reported that 800 of these utilities fund their programs with ERU-based user fees. These reported monthly fees have generally increased through the years from \$4.57 in 2013 to \$5.85 in 2019 (median of \$4.75), even though the average impervious area based on the ERU has varied. This is largely attributed to the application of tiered fees and the fee structure that is applied to residential and non-residential properties.

The Task Force believes, based on the many existing surveys on stormwater funding needs, that a significant gap exists that is well into the billions of dollars per year. If left on the current course, this gap will continue to grow.

5.0 Existing Sources of Funding

Identify existing federal, state and local public and private sources of funding for stormwater infrastructure and how funding for stormwater infrastructure from such sources has been made available, and utilized, in each state to address stormwater infrastructure needs.

Stormwater management at the local municipal level has changed significantly within the last 20 years. The following are some of the factors that have raised the average cost of stormwater programs (adjusted for inflation) over what it was 20 years ago:

- The need for more green stormwater infrastructure projects to balance impervious surface within a watershed for stormwater management.
- The maturation of many water quality programs and the increase in infrastructure maintenance needs.
- The impacts of more intense rainfall.
- The necessity for resilience planning and implementation of initiatives.
- The realization that underground stormwater systems were reaching the end of their functional lives, requiring massive rehabilitation and replacement programs.

This cost increase necessitates an evaluation of existing sources of stormwater funding, as well as ways to either further leverage existing funding sources or identify potential new sources of funding.

5.1 The Role of the Federal Government in Funding Stormwater Programs

To date, the role of the federal government has been to provide minimal funding for selected stormwater capital projects that are geared toward targeted and limited programs, often with a significant match required. Availability is further limited by annual appropriations. For example, for flood resiliency support, federal programs include U.S. Housing and Urban Development Hazard Mitigation Grants, Community Development Block Grants, FEMA Pre-Disaster Mitigation Programs and Flood Mitigation Assistance, USACE flood risk management studies and projects, EPA loan programs, etc. Even though these programs provide small contributions to the construction of capital projects, they do not provide funding for the bulk of the stormwater needs, i.e., compliance requirements, infrastructure operations and maintenance, and additional capital expenditures. In addition, most USACE flood risk management funding is for large projects that typically do not address the stormwater needs of small communities.

Existing funding has proven inadequate for current and anticipated future costs associated with proper stormwater management. Certainly, it is not expected that the federal government should meet all funding needs—but it has opportunities to provide leadership and increased funding to allow local communities to better address stormwater management needs. The needed federal investment in stormwater infrastructure is similar to federal funding programs used in the past to begin construction of our interstate highway system and to upgrade wastewater treatment plants.

Some local communities may be able to address stormwater management costs by implementing realistic stormwater user fees or other dedicated funding sources, in concert with the ability to repurpose existing federal programs. However, communities still will need to confront very real funding challenges associated with the following:

- Extreme events and large system flooding issues.
- Lack of resources to meet compliance requirements, environmental standards or consent decrees that go beyond typical water quality issues.
- O&M needs for stormwater infrastructure (treatment and collection).
- Vast sections of very old and inadequate stormwater piped drainage systems. In many of these cases sources of the problem exist outside the boundaries of the community.

5.2 Stormwater Funding and Financing—Types and Uses of Funds

In the face of increasing costs, communities across the United States have implemented a wide range of approaches to fund stormwater programs and related capital projects—but few have the revenue capacity or one-time influx of funds to support anything beyond small capital projects or ancillary programs. Stormwater funding tends to fall into three categories:

- **Revenue**—an ongoing stable and meaningful flow of funds, including taxes of various types, franchise fees and stormwater user fees, as well as intermittent revenue from various special fees and charges.
- **Capital financing**—targeted capital financing for a specific project, such as state and federal grants, state and federal loan programs, general obligation or revenue bonds and other short or long-term loans.
- **Other resources/approaches for funding stormwater management, including development by others**—new development and redevelopment creating stormwater infrastructure or partnership approaches, other in-kind services or volunteer programs, approaches that can shift risk or delay payment such as public-private partnerships, market-based solutions and other innovative approaches.

Table I-1 (Appendix I) provides a stormwater funding matrix that further outlines examples of stormwater funding currently used by communities, along with advantages and disadvantages of each. Most communities use more than one source of funding. The following sections further explain the sources and uses of each type of funding.

5.2.1 Revenue-Based Funding Sources Used to Pay Ongoing Operation and Maintenance and Debt Service of the Stormwater System

The majority of ongoing stormwater program costs must be funded with revenue from dedicated recurring sources, making revenue-based funding the “backbone” of stormwater funding. Revenue-based funding tends to fall into two broad categories: recurring, sustainable revenue sources and intermittent funding.

5.2.1.1 *Recurring, Sustainable Revenue Sources*

Almost all activities undertaken in a stormwater program are ongoing (excluding capital costs such as construction) and therefore must have ongoing, stable, dependable sources of revenue. Activities that require recurring, sustainable revenue include ongoing services to plan, rehabilitate and maintain the stormwater system, conduct programs to meet regulatory requirements and accomplish a variety of ancillary responsibilities related to stormwater management.

5.2.1.1.1 *Taxes/General Funds*

Taxes (of several types) are by far the largest source of revenue for local governments. Such taxes, unless dedicated, are placed into a local government’s “general fund.” While the types of taxes assessed and the proportion of revenue generated from each vary from state to state, the bulk of local government revenue most commonly comes from property tax and income tax assessments. This is true even though communities are increasingly looking to other revenue sources such as stormwater utility user fees.

- 💧 **Real estate/property taxes**, also called ad valorem taxes, are charged to property owners as a percentage of the assessed value of real estate or personal property. They are administered by local governments and require voter approval. Property taxes are an important form of revenue for local governments; they are often used as a funding mechanism for parks and open space measures.
- 💧 **Individual income taxes**, also called personal income taxes, are assessed at the state and federal levels (and, in some places, also at the county or municipal levels).
- 💧 **Specialized taxes** can be levied on a large number of activities, including property transfer, occupancy, gambling, estate, motor vehicle sales and licensing, etc.

The primary advantage of using general fund taxes to fund stormwater programs is that they can provide a reliable (but fluctuating) revenue stream. They are also common and well understood. However, there is significant competition for such funds, with most communities finding it difficult to cover all general fund activities (e.g., police, fire, streets, general government) with available funding. As a result, communities often find that stormwater programs are prioritized lower than other municipal needs, and thus risk losing funding from year to year unless there is a dedicated source of funding for the stormwater program. Another disadvantage is that the use of general fund tax revenue as a stormwater funding source raises equity issues, as system revenue recovery generally bears no relation to use of, or benefit from, a stormwater system. This causes an inequity between the level of service provided and the cost property owners incur. In addition, tax-exempt properties do not pay general fund taxes, causing further inequity as the costs they incur must be recovered with revenue from other properties.

5.2.1.1.2 Taxes/Dedicated

Beyond general fund taxes, many communities use dedicated taxes to fund stormwater program costs. These may take the form of dedicated sales taxes, motor fuel taxes or special assessments.

- **Local sales taxes** are often add-ons to state general sales and use taxes. They may also exist where there is no state sales tax. Depending on state constitutions, statutes and home rule traditions, most local governments must seek voter approval to levy local sales taxes. State authorization processes vary. States may give approval to all counties or communities or limit authorization to specific localities. Local taxes are usually limited to a specified time period (i.e., a sunset provision) or a dollar collection total, and are generally dedicated to a specific use. The dedicated revenue stream may be used for operation and maintenance costs, to back local general obligation or revenue bonds or to pay for a specific stormwater program directly.
- **Motor fuel taxes** are imposed at the state and federal levels and are levied on gasoline and other fuels. All 50 U.S. states and the District of Columbia assess gasoline taxes. State gasoline tax rates generally range from 14.65 cents to 58.7 cents per gallon.¹⁸ State and federal motor fuel tax revenues are typically dedicated to highway construction and maintenance. Revenues from state and federal motor fuel taxes could be earmarked to fund stormwater infrastructure related to roadways, though competition for such funds is fierce; roadway resurfacing and repair are normally the top priority.
- **Special assessments or special taxing districts or service/drainage districts** are recurring surcharges levied by local jurisdictions on subgroups of the population or even the entire population, in the case of districts that cover the entire community. Some localities levy them in the form of taxes dedicated to stormwater management; others levy them as fees. The group paying the recurring charges receives benefits from a stormwater service or improvement not enjoyed by others in the area. For example, if a community wants to finance regional stormwater improvements, residents within the protected area or the contributing area could be charged a special assessment. Special assessments are generally charged by local governments and authorized by local ordinance. Although some states bar special assessments, where allowed these surcharges generally are charged by local government and authorized by local ordinance. Special assessments are used to fund water works systems, sanitary sewer systems, installation or repair of water and sewer service lines, flood protection projects and other purposes.

5.2.1.1.3 Stormwater Utility User Fees

Stormwater management resembles drinking water and wastewater utilities far more closely than municipal responsibilities such as police, schools and roadway maintenance, in that the cost recovery for utility services provided can be closely aligned with the service demands of the users.

This has led to the concept of a stormwater utility user fee. A stormwater user fee is similar to a wastewater user fee in that it is developed to recover the costs of the stormwater program based on each property's estimated use of the stormwater system. The first user stormwater fee systems appeared in the United States in the mid-1970s. Their apparent success in generating significant, sustainable revenue while keeping the typical homeowner's fee below a critical reactionary level led many other communities to follow suit. Local water quality and flood control agencies/districts or

¹⁸ As of 2018; excludes the federal excise tax of 18.4 cents per gallon (<https://taxfoundation.org/state-gas-tax-rates-july-2018/>).

utilities are typically responsible for designing, assessing and collecting user fees (or taxes, as noted above) based on a property's contribution to the stormwater management system. Today there are about 1,716 stormwater enterprise funds (stormwater utilities) employing user fees to fund their programs and to fund revenue bonds for capital construction. Stormwater user fees provide the greatest opportunity to provide communities with local sustainable, recurring revenue to fund stormwater needs.

A stormwater user fee falls into the municipal revenue generation mechanism called a "service charge." Service charges are not established simply to generate general fund revenue but must be tied to the objectives of a specific program to

which they are associated. A stormwater utility generates its revenue through user fees, and the revenues generated from the stormwater user fees is placed in a separate fund—called an enterprise

Stormwater user fees provide the greatest opportunity to provide communities with local sustainable, recurring revenue to fund stormwater needs.

fund—that can normally be used only for stormwater services. Stormwater user charges are designed to provide a nexus between the user fee and the service provided. As such they differ from taxes.

The amount each rate payer is charged must be related to the "use" of the system (rational nexus), which can be interpreted as either direct use through runoff contributions or use through protection from flooding of the property and streets by local stormwater program efforts. When a forested or grassy area is paved, a greater flow of water (runoff) is placed on the drainage system. This is the demand. The greater the demand (i.e., the more the parcel of land is paved or otherwise covered with an impervious surface), the greater the user fee should be.

While there are similarities between a stormwater utility and drinking water/wastewater utilities, a stormwater utility differs from drinking water and wastewater utilities in several key ways:

- There is no way to remove or discontinue services for non-payment, as long as the physical property exists.
- The stormwater management service is provided within the entire jurisdiction regardless of whether one or more property deems it necessary or not. This is because stormwater management is performed as a community-wide level of service and not distinctly as an individual property level service (though mandatory drinking water and wastewater service makes this difference less of a distinction).
- The demand placed on the system can only be roughly measured or approximated, as it is not possible to directly measure stormwater flow.
- The actual service rendered to a particular property is often difficult to quantify without the use of a reasonable and consistent approximation approach.

Despite these differences, the utility concept can be a viable and flexible revenue generation approach to stormwater funding. According to the 2019 version of an annual survey by Western Kentucky University, at least 1,716 stormwater utilities currently exist across 40 states and the District of

Columbia, serving a total population of nearly 115 million (35 percent of the U.S. population).¹⁹ The authority (enabling legislation) to implement such an approach varies from state to state, and even from municipality to municipality, depending on the details of state-granted authority and/or home rule requirements. Of the 10 states that do not have utilities, three are either conducting feasibility studies or exploring changes in state law to allow implementation of stormwater utilities.²⁰

Even for utilities that have a dedicated user fee, which can be used to support debt service associated with capital program financing, many utilities rely only on annual revenues to support any capital investment. A Black & Veatch 2018 biennial survey reports that most responding stormwater utilities (87 percent) use cash financing instead of long-term debt financing for funding their capital program investments.²¹ This indicates that stormwater utilities seldom use the capital markets to augment their financial capacity, which can delay needed upgrades and/or affect the pace of compliance programs. Further, only 15 percent of respondents indicated that utility revenue is adequate to meet all needs. The median annual revenue per capita reported in Black & Veatch's survey was \$54, with the maximum annual per capita revenue reported being \$200. The Western Kentucky University survey does not provide annual revenue details for all utilities surveyed, but found roughly \$1.7 billion in annual utility fees, for those 677 utilities reporting annual revenues. More research is needed to provide a full accounting of all public revenue that is raised toward stormwater management and compliance.

Despite their value as a local source of dedicated revenue for stormwater management, state statutes may prevent the creation of a stormwater user fee without a ballot measure or enabling state legislation. This is discussed in detail later in the report.

5.2.1.2 Intermittent Funding

It is imperative that communities have in place recurring, sustainable funding sources. However, some types of intermittent funding can provide additional benefit and help recover certain costs of stormwater management.

5.2.1.2.1 Special Fees

An increasingly common practice is the use of fees and specific charges to help fund services by local and state government. Special fees tend to focus on specific government services, while charges are defined more broadly in terms of receiving special benefit or service. "When certain services provided especially benefit a particular group, then governments charge fees on the direct recipients of those that receive benefits from such services." Often the size or level of the fee is derived from the actual cost of such provision. "However, many governments provide subsidies to various users for policy

¹⁹ Campbell, C. W. 2019. *Western Kentucky University Stormwater Utility Survey 2019*. https://digitalcommons.wku.edu/seas_faculty_pubs/1

²⁰ Campbell, C. W. 2019. *Western Kentucky University Stormwater Utility Survey 2019*. https://digitalcommons.wku.edu/seas_faculty_pubs/1

²¹ Black & Veatch. 2018. "Stormwater Rate Structure and Billing." In *2018 Stormwater Utility Survey*. https://www.bv.com/sites/default/files/2019-10/18%20Stormwater%20Utility%20Survey%20Report%20WEB_0.pdf

reasons, including the ability of residents or businesses to pay. Well-designed charges and fees not only reduce the need for additional revenue sources but promote service efficiency.”²²

Special fees tend to fall into several categories:

- Fees for development-related services such as plan review, inspection, environmental permit fees, septic system inspections and other similar types of services.
- Fees to defray the cost of specific government services such as specialized disposal (e.g., oil), recycling, tolls, certification, bond issuance, licenses, etc.
- Fees for government services or land, such as franchise fees, or indirect cost allocations from other enterprise funds for general governmental purposes.

Such fees focus costs on recipients of special services and not the general public, and they address potential stormwater impacts during the critical construction phase. On the other hand, it is often difficult to set such fees at a level that recovers the full cost of the activity necessitating the fee. In addition, revenues from such fees are intermittent; when that activity does not occur, no funds are received even though local government costs (such as personnel) may be stable and ongoing.

5.2.1.2.2 Special Charges

Special charges are often not distinguished from fees in that they tend to be associated with specific government services or benefits. They do tend to be more complex or related to higher government functions. Examples include connection fees, impact fees, special assessment or improvement districts, tax increment funding, developer extension fees, in-lieu fees, latecomer charges and other exactions.

Connection Fees

Connection fees, also called hookup fees, are typically charged to property owners when they connect with existing municipal drinking water and wastewater treatment facilities. But they could be used for stormwater as well. Connection fees are generally levied by local governments or county governments.

Impact Fees

Impact fees are often assessed on the construction of new buildings. Local governments and county governments levy impact fees. The revenues are used to pay for improvements to services and amenities for the occupants of new development (including expansions of police and fire stations, wastewater and water supply systems, parks, libraries and schools) and the building of new roads. In addition, impact fees are often assessed based on the projected environmental impacts of a construction project, with their revenues used to mitigate those impacts. The drawback of impact fees is that they can only be used to improve an adequate stormwater system in the face of increased demand, and many systems cannot be shown to be adequate. They typically have sunset provisions as well.

²² Government Finance Officers Association. 2018. “Establishing Government Charges and Fees.” <https://www.gfoa.org/establishing-government-charges-and-fees>

Exactions

Exactions, also called proffers, are conditions or financial obligations imposed on developers to aid local governments in providing public services needed to support new developments. They are administered by local governments. Exactions can take a number of different forms. They can include financing of existing infrastructure facilities or infrastructure improvements; donations of in-kind services; and donations of land, drinking water and wastewater lines, and road and parking facilities. Exactions can also take the form of impact fees paid in lieu of the types of donations described above. Exactions allow more flexibility than strict impact fees because they are not required to be financial contributions. They may be offered voluntarily by developers; local governments often negotiate them with each developer. Most localities use exactions in some form. Some localities assign building permits competitively based on the level of exactions offered by different developers.

Special Assessments

Special assessments are recurring surcharges levied by local jurisdictions on subgroups of the population. Some localities levy them in the form of taxes; others levy them in the form of fees. The sub-group paying the recurring charges receives benefits from a stormwater service or improvement not enjoyed by others in the area. For example, if a community wants to finance stormwater quality improvements that contribute to lake cleanup, residents with waterfront property could be charged a special assessment. Special assessments are generally charged by local governments and authorized by local ordinance. Special assessments are used to fund water works systems, wastewater systems, installation or repair of drinking water and wastewater service lines, stormwater and flood protection projects, and other purposes, and are sometimes used in conjunction with a neighborhood development projects to fund the construction and ongoing maintenance of a stormwater detention pond or water quality feature.

Special Assessment or Improvement Districts

Another form of local fee comes from the creation of a special assessment or improvement district. In this case, a district is designated to need stormwater management upgrades—typically green infrastructure or low-impact development—as part of a broader economic development strategy. The district then creates a special tax assessment that is paid by the property owners within the district’s geographic boundary. State and local laws differ on how these districts are created and voted into existence, what funds are acceptable to be assessed, and how often assessments can be billed. These assessments may be a one-time or ongoing assessment depending on their purpose. One-time assessments tend to be raised for capital construction simultaneous to a broader economic development process. Ongoing assessments may pay for capital construction, administration of the

Case Study: Five San Francisco Bay Area Voter-Approved Fee Measures

Five small- to mid-sized municipalities in the San Francisco Bay Area put new stormwater fee structures out for voter approval in 2018 and 2019 (with mixed results). Each municipality followed a similar approach including developing a comprehensive needs study or master plan, conducting a scientific survey of the community’s priorities and willingness-to-pay, and executing a community outreach and education process aimed at increasing awareness regarding local flooding; storm drainage infrastructure operations, maintenance and capital improvements; and water quality.

entity in charge of governing the district, and operations and maintenance of district-owned projects. Most special assessment districts are subject to periodic renewal based on a vote by their members; some are mandated by state law to have a sunset clause (e.g., 5, 10, or 20 years).

Following are some of the advantages and disadvantages of Special Assessment or Improvement Districts:

💧 *Advantages:*

- Improve cost causation equity match.
- Allow special services to be paid for by recipients.
- Provide additional funding in a manner acceptable to the general public.
- Recover the cost of negative impacts of other activities on the stormwater system.

💧 *Disadvantages:*

- Funds flow is not generally predictable and steady.
- Can be hard to administer.
- May be seen as discouraging development or other desirable activities.
- May be difficult to price accurately.
- Typically, cover staff time only—not funding for O&M or capital improvements.
- Typically, cannot be used as leverage for raising debt capital.

5.2.2 One-Time Funding Sources for Financing of Capital Projects and/or Other One-Time Initiatives

The use of one (or more) recurring funding sources such as user fees and charges is necessary for any sustainable stormwater program. However, there are other types of funding sources including debt financing, grants and other sources that are available to communities and are more conducive to funding of capital projects and/or help fund special capital program initiatives.

Repository of Funding Sources: The Task Force worked with the EPA to develop a compendium of existing funding sources. Sources of funding at the federal, state and local levels as well as private funding were compiled, to the extent possible. The database is described in Appendix IV. While the database should not be construed to be comprehensive, it is an extensive database and the Task Force feels it is mostly complete as it relates to federal funding sources. The sources identified at the state, local and private level should be considered representative of the types of funding that may be available. This database includes multiple federal grant programs that may be available to stormwater programs, through EPA, the U.S. Department of Housing and Urban Development (HUD), USDA Rural Utility Service (RUS) and other agencies.

This funding sources database is available as a starting point for communities that are interested in examining potential sources of funding primarily for their stormwater capital programs.

5.2.2.1 Capital Financing Sources (Financing Vehicles, Require Repayment)

Debt financing, with either short-term or long-term amortization, is an important capital financing instrument that is available for stormwater capital programs just as it is for the drinking water and wastewater sectors.

Use of debt financing instruments for capital program funding requires dedicated, recurring and sustainable revenue source(s) for the repayment of principal and interest. Therefore, it is important to recognize that capital program debt financing is not just an alternative for recurring sources of revenue but rather a valuable complement to one-time sources of capital for funding infrastructure projects.

Debt financing mechanisms can greatly enhance a community's ability to complete large capital projects that would not otherwise be possible.

Debt financing mechanisms can greatly enhance a community's ability to complete large capital projects that would not otherwise be possible with just limited cash resources (whether generated through user fees, taxes or other sources), and enable a community to plan and execute a larger capital program. Long-term financing of capital projects provides the additional benefit of spreading the costs of projects over the life of the asset, with the principal and interest paid by those who benefit from the project.

Following are the primary types of capital financing available to communities for stormwater capital program management.

5.2.2.1.1 Bonds

"Municipal bonds are debt securities issued by states, cities, counties and other governmental entities to fund day-to-day obligations and to finance capital projects"²³ including stormwater projects. Municipal bonds in the U.S. are tax-exempt, meaning that interest is exempt from federal income tax. Interest generated from these bonds may also be exempt from state and local taxes in some states. General obligation bonds and revenue bonds are the most common types of municipal bonds. "General obligation bonds are issued by states, cities or counties and not secured by any assets. Instead, [they] are backed by the 'full faith and credit' of the issuer, which has the power to tax residents to pay bondholders. Revenue bonds are not backed by government's taxing power but by revenues from a specific project or source," which could include a stormwater enterprise fee. "Some revenue bonds are 'non-recourse,' meaning that if the revenue stream dries up, the bondholders do not have a claim on the underlying revenue

Green Bonds A1

"A green bond is a bond whose proceeds are used to fund environment-friendly projects...Green bonds provide investors with a way to earn tax-exempt income with the benefit of personal satisfaction, knowing that the proceeds of their investment are being used in a responsible, positive manner. The issuers of green bonds also benefit, since the green angle can help attract a new subset of investors, namely younger investors, whom the issuers can profit from over an extended period vs. a base of older investors..."

source.”²³ “A ‘double barreled’ bond is a municipal bond in which the interest and principal payments are pledged by two distinct entities—revenue from a defined project and the issuer and its taxing power.”²⁴

An advantage of bonding is that projects can be constructed earlier and more rapidly; as well, the payment for the capital project better matches the life of the project, with newer residents participating in the payment according to their longevity within the municipality. Disadvantages include the potential to build up a large debt balance (limiting investment to meet other stormwater needs), the technical and legal requirements to obtain bonds, the limitations on bond capacity within a local government, the potential need for voter approval and often the limitations on the use of the funds to capital construction but not the full suite of life-cycle costs.

There are many variations on the two general types of bonding, including anticipation notes, asset-backed securities, moral obligation bonds, special assessment bonds and tax increment bonds.

5.2.2.1.2 Loans

There are a few federal, state and private loan-type funding mechanisms—many of them originally targeted toward drinking water and wastewater programs—that can be leveraged for local stormwater programs. Relative to borrowing in the bond market, loans can often provide lower cost debt financing, as under special circumstances loans can be structured to include features such as zero interest, very low interest or even in some cases principal forgiveness. Some of the loan programs are targeted at “green” objectives and programs.

This section provides an overview of the following loan programs.

- 💧 CWSRF and Drinking Water State Revolving Fund (DWSRF)
- 💧 USDA Water and Waste Disposal Loan and Grant Program
- 💧 WIFIA Loan Program
- 💧 State-Based Loan Programs
- 💧 Private Investments
- 💧 **CWSRF:** One of the most commonly used loan programs in the wastewater sector is the CWSRF. Under Title VI of the CWA, states receive federal monies to capitalize CWSRF loan programs. Through CWSRF programs, loans are made to communities to provide low-cost financing for a wide range of different projects to protect water quality. Examples of activities funded with these loans include non-point source pollution control, watershed protection and restoration, estuary management, wetlands restoration, brownfields remediation and improvements to municipal wastewater treatment

All 50 U.S. States and Puerto Rico operate CWSRF Programs.

²³ U.S. Securities and Exchange Commission. n.d. “Municipal Bonds.” <https://www.investor.gov/introduction-investing/basics/investment-products/municipal-bonds>

²⁴ Chen, J. 2019. “Municipal Bond.” *Investopedia*. <https://www.investopedia.com/terms/m/municipalbonds.asp>

^{A1} Kenny, T. 2020. “How Green Bonds are a Cornerstone of Responsible Investing”. *The Balance*. <https://www.thebalance.com/what-are-green-bonds-417154>

infrastructure. Loans are made at low interest rates (0 percent to market rate) for terms of up to 20 years. In addition, states use CWSRF money to repurchase debt to get these loans to 30 years. States may set the criteria for determining which municipalities can access the loans each year. All 50 U.S. states and Puerto Rico operate CWSRF programs. Some CWSRF and Drinking Water State Revolving Fund (DWSRF) loan programs make short-term loans for planning, design and initial construction in localities that may later receive long-term CWSRF and DWSRF loans. In addition, state revolving fund loans may be used to pre-finance other federal or state drinking water loans or grants.²⁵

- 💧 **USDA Water and Waste Disposal Loan and Grant Program:** This program “provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas...Funds may be used to finance the acquisition, construction or improvement of: drinking water sourcing, treatment, storage and distribution; sewer collection, transmission, treatment and disposal; solid waste collection, disposal and closure; and stormwater collection, transmission and disposal.”²⁶
- 💧 **WIFIA:** WIFIA is the latest federal loan program administered by EPA for eligible drinking water, sewer and stormwater infrastructure projects. The program funds development phase activities, construction/reconstruction/rehabilitation/replacement, acquisition of real property or interest in real property, environmental mitigation, construction contingencies and equipment acquisition; capitalized interest necessary to meet market requirements, reasonably required reserve funds, capital issuance expenses and other carrying costs during construction. Applicants must submit a letter of interest, and based upon several criteria, EPA invites qualified projects to apply for the WIFIA loans.
- 💧 **State Based Loan Programs:** There are also many state-based loan programs with a variety of objectives and requirements. For example, the Georgia Fund Loan Program currently “supports water, wastewater, and solid waste infrastructure improvements...[with] loans available at a low-interest rate for a maximum of 20 years.”²⁷
- 💧 **Private Investments:** Private investment can take the form of loans or other financial assistance originating from private sources other than commercial banks or finance companies. Sources of private investment can include, but are not limited to, insurance companies, pension funds, venture capital funds, individual venture capitalists, corporation partners and general capital investors. Private investment funds billions of dollars’ worth of new business start-ups in the United States each year. The potential uses of private investment for supporting environmentally related businesses and/or activities are only limited by the degree of profit associated with them; if it can be shown that an idea or activity will make money, then private investment can be found to support it. Applying for private investment is typically much faster than for government loan programs. Private investors usually have no set eligibility criteria and may have no predetermined limits on the total amount of loan capital available. Private investors tend to demand a significantly higher rate of

²⁵ U.S. EPA. 2019. “Learn About the Clean Water State Revolving Fund (CWSRF).” <https://www.epa.gov/cwsrf/learn-about-clean-water-state-revolving-fund-cwsrf>

²⁶ U.S. Department of Agriculture. n.d. “Water & Waste Disposal Loan & Grant Program.” <https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program>

²⁷ GeorgiaGov. n.d. “Environmental Loans & Tax Credits.” <https://georgia.gov/popular-topic/environmental-loans-tax-credits>

return on their money, though, than other sources of capital. Note that a private investment can develop into a public-private partnership if an operational component is added to the mix.

5.2.2.1.3 Grant Type Funding

A variety of one-time grants are available for supporting specific initiatives of capital projects from government and private foundation sources. The advantage of such grants is that there is no repayment requirement and the amounts can be substantial. The disadvantages include the competitive nature of the grants, the requirement for pre-positioned matching in-kind or funds for some grants, the limitations on the use of some grant funds, the effort required to file the applications and the need to harmonize the grant requirements with the needs of the local government.

There are several federal and state grant programs, including both ongoing programs and one-time opportunities. Several websites provide a good source for learning about federal grants. Sites for agencies that participate in the water world will present many opportunities, as will <http://grants.gov>. For example, the 1987 amendments to the CWA established the Section 319 Nonpoint Source Management Program. Under Section 319, states, territories and tribes receive grant money that supports a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific non-point source implementation projects. Grantees must use these funds to implement EPA-approved non-point source pollution management programs. A 40 percent non-federal match, in the form of supplies, equipment and/or funding, must be provided by grantees. Regulatory and nonregulatory programs assessing the success of specific non-point source pollution control projects also may be eligible for these grants. Grant totals for the last few years were in the \$170 million range.²⁸

Many foundations and charitable organizations have begun supporting various aspects of stormwater-related needs through grant-making. Foundation and corporate grants are a significant and growing source of funding for environmental protection projects. Most grants of this type fund well-defined projects with specified time frames and costs and deliverables that meet the immediate priorities of the funding source and are not funded by governments. Foundation and corporate grant programs tend to favor the most innovative environmental projects. Funding such things as green infrastructure strictly through grants generally is not a sustainable financing strategy, but may be a way to fund some high-profile demonstration projects that will attract subsequent sustainable government or property-owner financial support.

5.2.2.1.4 Other Resources/Approaches for Funding Stormwater Management

In addition to more traditional funding sources discussed previously, there are new and evolving approaches to funding stormwater management that could be leveraged in many cases. These include public/private partnerships, private site stormwater development and volunteer programs. The ability to utilize such approaches, and the impact to the stormwater program vary but these are important options to evaluate in developing a comprehensive funding strategy.

²⁸ U.S. EPA. 2019. "319 Grant Program for States and Territories." <https://www.epa.gov/nps/319-grant-program-states-and-territories>

5.2.2.2 *One-Time Sources*

One-time funding and financing sources are sometimes used for specific stormwater infrastructure projects or for certain aspects of the projects. Many of these one-time sources are described throughout this section (i.e., they can be grants, private investments, charitable donations, bonds, etc.). While these one-time sources are critical in the current funding implementation for many communities, they lack the security to create sustainable infrastructure investment and long-term watershed planning.

5.2.3 Other Resources/Approaches for Funding Stormwater Management

In addition to more traditional funding sources discussed previously, there are new and evolving approaches to funding stormwater management that could be leveraged in many cases. These include public-private partnerships, private site stormwater development, and volunteer programs. The ability to utilize such approaches, and the impact to the stormwater program vary but are important options to evaluate in developing a comprehensive funding strategy.

5.2.3.1 *Public-Private Partnerships*

Public-private partnerships (P3s) are receiving increasing attention in the United States and internationally as an innovative way of financing a wide range of environmental protection initiatives. The point of P3s is that partnering with private enterprise can expand access to resources and capital and offer better economies of scale. There are many types of P3s: design/build, design/build/operate/maintain, pay-for-performance (similar to pay-for-success), community-based P3s, etc. They may include private financing or a combination of public and private financing. Community-based P3s have a “commitment to social goals through setting robust requirements for local jobs, and providing a platform for economic growth and revitalization associated with large-scale GI investments. Additionally, in this framework (based upon the military housing private investment model), the community benefits through the structure of the community-based public-private partnerships (CBP3) to reinvest savings through efficiencies in implementation back into more ‘greened’ acres rather than simply taking the savings as profits realized. Interest in CBP3s has been growing across the country, as there is recognition of the universal applicability of this approach.”²⁹

²⁹ California Stormwater Quality Association. 2019. “The Community-Based Public-Private Partnership Approach: A Revolution in Funding and Financing Green Infrastructure.” <https://www.casqa.org/asca/community-based-public-private-partnership-approach-revolution-funding-and-financing-green>

In some cases, it is possible to capitalize on specific private sector resources through the use of P3s. The availability of those resources depends upon the nature of the partnership arrangements, the resources available to the private partners, the circumstances in the locations where they are set up and other factors. Access to sophisticated technologies and specialized expertise often allows the private sector to provide specific types of services that the public sector may be unable to provide. In addition, private financing can reduce the burden on public debt capacity. Private sector procurement and construction methods sometimes save time and provide significant cost savings. Though P3s involving ownership transfers from government entities to private companies, responsibilities for financial risk can be transferred from the government entity to the private company.

P3s have some important limitations. Local governments may not always have the legal authority to enter into contracts with private parties. A government joining a P3 might lose oversight opportunities—a major concern. When government officials cease to be involved with the day-to-day operations of a facility, they may have to give up opportunities to monitor things such as compliance with environmental standards and permits. In addition, public employees and unions may oppose the use of P3s due to concerns about the loss of jobs. Finally, tax-exempt and/or other low-cost financing that is available for (federal and state) government-run projects may not be available for P3s.

Thus, the appropriateness of a particular type of P3 for a given environmental protection initiative and location depends on many factors, such as the type of environmental media being protected, availability of public funding for the partnership, demographics and the tax code.

5.2.3.2 *Volunteer Programs*

Volunteers can provide free labor for a variety of local stormwater program efforts. Examples include education, technical assistance to homeowners, inspections, cleanups, adoptions of various stormwater systems and rivers, grant writing, watchdogs and more. Volunteers and volunteer organizations can bolster support for stormwater programs or funding approaches. Citizen groups can assist in decision-making and in selling decisions to the public. Riverkeeper-type groups can provide a sense of

Clean Water Partnership (CWP)

A Water Quality P3 Approach in Prince George's County, Maryland

Prince George's County, Maryland adopted the Clean Water Partnership initiative which began March 26, 2015 as a P3 delivery approach to modernize and retrofit its stormwater infrastructure and meet total maximum daily load (TMDL) goals by 2025 in a cost-effective way. This program is a community based P3 that strives to meet MS4 goals, engage the community, provide jobs and spur business growth. After three years of program implementation, the county goal was met to retrofit 2,000 acres, in half the time, for half the price, while increasing outreach to community stakeholders and investing in small, local minority and disadvantaged businesses according to their third annual progress report. The County reports that as of the end of May 2019, there are 100 sites over 2,165 acres, no growth in the number of County employees needed for the program, \$100.4 million spent on local/minority business participation with 53% of county resident workforce utilization and significant investment in youth and educational programs.

stewardship of precious water resources and can serve as great allies with local governments. Some can help run and manage programs such as rain gardens, citizen monitoring and stream cleanups.

Some volunteer groups require significant supervision and training for the perceived return on investment, and there can be safety and liability concerns when volunteers partner with local governments for activities.

While volunteer programs do not mitigate a substantial cost of the overall stormwater program, they do provide valuable services and also help to engage the community and can be helpful in gaining public understanding of stormwater management needs in the community.

5.2.3.3 *Coordination with Other Community Departments*

Synergies can be gained among agencies that influence some aspect of stormwater management when they cooperate and when a better-funded department or agency provides funding or services to a stormwater program. Examples include:

- A solid waste agency providing household hazardous waste assistance in lieu of households dumping hazardous waste into stormwater systems.
- A wastewater agency working to eliminate seepage of wastewater into the stormwater system as part of an inflow and infiltration (I&I) program.
- A public affairs office helping the stormwater program implement certain activities.
- An agency that bills for service providing inserts explaining some aspect of the stormwater program.

A public works or transportation department can add stormwater components or green infrastructure features as a small part of a construction project. This can even work with different agencies or at different levels of government.

Outside programs or organizations can incentivize such partnerships (e.g., watershed groups spanning several local governments or transportation departments) through coordination and funding efforts.

5.2.3.4 *Market-Based Solutions*

Local and state agencies, often in collaboration with the EPA, have created market-based solutions to tackle various water quality challenges—including nutrient reduction, volume control and wetland mitigation, among others. These markets are designed to attract private capital, take advantage of efficiencies gained from private delivery of projects and/or direct solutions geographically to where they are needed most. An EPA memo from February 6, 2019 reiterated the Agency's support for market-based solutions, particularly for nonpoint-source pollution (i.e., stormwater), and provided clarity to state and local regulators and policymakers on best practices to implement locally appropriate solutions.³⁰ The most common form of market-based solution is through the creation of a credit or unit of measure that denominates and quantifies an environmental outcome against a specific regulatory mandate (e.g., Total Maximum Daily Load). The supplier of a credit is typically a non-regulated private or public entity that has the financial wherewithal to build a project or a regulated entity that can go

³⁰ U.S. EPA. 2019. *Updating the Environmental Protection Agency's (EPA) Water Quality Trading Policy to Promote Market-Based Mechanisms for Improving Water Quality*. <https://www.epa.gov/sites/production/files/2019-02/documents/trading-policy-memo-2019.pdf>

beyond what is required of it. In both cases, this supplier generates additional environmental capacity that can be sold to offset a regulated private or public entity's regulatory requirements. A functioning market will have many buyers and sellers and a dynamic price based on what the market will bear.

Examples include wetland mitigation banking, nutrient trading and stormwater volume trading. The last of these, stormwater volume trading, is an emerging local solution pioneered by the District of Columbia's Department of Energy and the Environment and profiled in a case study in Appendix III. It involves purchase of "Stormwater Retention Credits," seen as more cost effective for regulated property owners or developers but equally effective in attainment of the District's regulatory standard.

💧 **Advantages:**

- Create cost efficiencies in placement of stormwater controls.
- Can allow for aggregation for better overall control and treatment.
- Can shift and target controls to more critical locations and be combined with other public incentives (e.g., grant programs) to further incentivize credit suppliers to develop projects in specific places.

💧 **Disadvantages:**

- Can be complex to administer.
- Require clear and enforceable policies on ownership and maintenance.
- Markets may not be initially viable and may need to be jumpstarted with local funding.

5.2.3.5 *Newer Innovative Approaches*

Market-based solutions are just one of many new approaches that can attract new forms of funding and financing. A wide variety of approaches that seek to exploit unique or unusual funding sources are being explored in the stormwater space. Examples include:

- 💧 Sponsorship of stormwater or green infrastructure sites by private and/or public organizations, similar to adopt-a-road advertising.
- 💧 Tax increment financing that can be leveraged if a new green infrastructure facility is designed to increase surrounding property values, owners of those properties agree to a new tax levy, and an agency is designated legally to issue tax increment bonds.

Case Study: Washington, D.C. Stormwater Retention Credit Training

The U.S.' First Stormwater Retention Trading Market in the Nation's Capital

In 2013 Washington, D.C. promulgated stormwater retention regulations for new development or substantial improvement projects. Part of these new regulations was the introduction of the Stormwater Retention Credit Trading market, which allows regulated projects to purchase up to 50% of their stormwater management requirements offsite, in the form of Stormwater Retention Credits (SRCs). This allows regulated properties to pursue more cost-effective compliance methods and provides financial incentives for properties to voluntarily install stormwater management practices.

- 💧 Use of private land for public infrastructure through various partnership and payment mechanisms between public agencies and private landowners.
 - 💧 “Complete” or “green” street policies that mandate road repairs and include stormwater management, often combined with vegetative practices or other aesthetic improvements.
 - 💧 User fee credits that incentivize reduction in impervious area.
 - 💧 Green ratio ordinances that require developers in certain zoning districts to dedicate a percentage of their property to natural area, which can manage stormwater runoff.
 - 💧 Various development incentives, including floor-area-ratio bonuses, expedited permitting, and others in exchange for voluntary construction of stormwater management practices.
 - 💧 Strategic partnerships between communities and philanthropic sources to enhance public spending.
- 💧 *Advantages:*
 - Can provide funds at little cost.
 - Can motivate the private sector through name recognition.
 - Can provide good return on seed money investment when paired with private actions.
 - 💧 *Disadvantages:*
 - Can be complex to administer and explain.
 - May require opinions and analysis on legality.

5.3 Availability of Funding

The previous section describes the different types of funding sources for stormwater programs. Even though there are several sources of funding, it is important to recognize challenges that exist when evaluating the overall stormwater funding aspect of stormwater management. In addition, only a few funding sources can provide reliable, sustainable and dedicated revenue for stormwater programs. In fact, about 60 percent of the respondents to a recent survey indicate that their top challenge is the lack of funding or availability of capital for their programs.³¹

5.3.1 Key Funding Challenges by Types of Funding

- 💧 **User Fees:** User fees, as discussed earlier, can provide a reliable, sustainable and dedicated revenue mechanism for stormwater programs. However, many communities need expertise, resources and financial assistance to even plan for, develop and launch a user fee program. Perhaps more importantly, any public initiative to enhance stormwater funding cannot succeed without the engagement and acceptance of citizens within a local community and the support of local elected officials.

³¹ WEF Stormwater Institute. 2019. National Municipal Separate Storm Sewer System (MS4) Needs Assessment Survey Results. <https://wefstormwaterinstitute.org/wp-content/uploads/2019/08/MS4-Survey-Report-2019.pdf>

In addition, the level of funding that utilities with dedicated user fees or dedicated stormwater tax type fees generate is not adequate to meet all of the stormwater community needs.

- **Debt Financing:** Despite the benefits of debt financing discussed earlier, the challenge that a majority of communities currently face in leveraging debt financing is that they simply do not have the annual financial capacity to repay the debt service.

Consequently, stormwater programs have not leveraged capital financing sources to the extent available. This is primarily due to the lack of a sustainable, recurring funding source to provide the funding necessary for repayment. According to the 2018 Black & Veatch Stormwater Survey, only 13 percent of stormwater utilities responding to the survey indicated that the majority of their capital program is debt-financed. Eighty-seven percent indicated that the majority of the capital program was cash-funded. Therefore, it seems that even where stormwater utilities (with user fees) are in place, communities are not leveraging capital financing vehicles to the extent available.

- **Grants:** Many of the grant programs are predominantly focused on specific regions (e.g., Appalachian Regional Commission, Region 1 Healthy Communities Grant Program); specific demographic group (e.g., Special Evaluation Assistance for Rural Communities and Households, Clean Water Act Indian Set-Aside Grant Program); or specific activity (e.g., Beaches Environmental Assessment and Coastal Health Act Grants). Hence, not all communities nation-wide have access to grants.

Further, in most cases, grant allocations are much smaller in magnitude and are limited to a certain percentage of the overall project, with matching funds required. The qualifications for each program vary, depending upon the requirements of the specific program. In addition, grants typically have a window of opportunity to apply for funding each year, with the total amount available dependent upon the level of appropriation for the year.

- **P3s & Market-Based Solutions:** Many of the capital financing sources such as P3s, Market-Based Solutions, and other such programs are still in their infancy or just emerging, and may not be a viable option especially for smaller and rural communities.
- **Volunteer Programs:** While volunteer programs are a beneficial tool in the overall stormwater management toolbox, they unlikely to contribute in any material manner to bridging the significant funding adequacy issues that many communities face.

5.3.2 Estimate of Current Dedicated Stormwater Recurring Revenue Generation

Currently, there is no robust tracking of the annual revenue that is generated in the United States from even the annually recurring and dedicated stormwater revenues sources discussed earlier in this section. However, there are several national level surveys that have gathered information on annual revenues generated by stormwater utilities that have a dedicated stormwater user fee. Therefore, the Task Force attempted to leverage the annual revenue information available from (i) the 2019 Western Kentucky University survey on stormwater utilities, and (ii) the 2018 Black & Veatch Stormwater Survey of utilities that have stormwater user fees.

Out of the more than 1,700 stormwater utilities from which Western Kentucky University gathered user fee, population and annual revenue information, the annual revenue data were available only for 678

utilities. Based on this available information, the median annual stormwater user fee revenue per capita was determined to be \$32.00. To the contrary, based on the annual revenue information that survey participants reported in its survey, Black & Veatch reported a median annual stormwater user fee revenue per capita of \$54.00.

Given the two sources of information available, the Task Force chose to extrapolate the potential annual revenue generation from the more than 1,700 stormwater utilities identified in the Western Kentucky University survey. These utilities encompass a total population of roughly 114,850,631. Using the median annual revenue per capita figures determined from the two surveys, applied to the population covered by the utilities in the Western University survey, the following low end and high-end range of annual revenue generation is *estimated*, at the current time, from the more than 1,700 stormwater utilities nationwide:

- ◆ Low end annual revenue generation estimate: $114,850,631 * \$32 = \3.675 Billion (rounded)
- ◆ High end annual revenue generation estimate: $114,850,631 * \$54 = \6.202 Billion (rounded)

This annual revenue generation range off \$3.675 to \$6.202 billion is based on the extrapolation done on a per capita basis from the 1,700+ stormwater utilities.

However, the annual stormwater revenue generated from dedicated recurring funding sources will be higher as there are also a few utilities nationwide that have dedicated stormwater taxes and other stormwater special assessments discussed earlier in this section. Currently, there is no readily available information on the revenues generated from these other dedicated stormwater revenue sources, and hence it is not feasible to estimate the aggregate annual stormwater revenues that are generated overall from the existing revenue sources that are explicitly dedicated to stormwater management.

However, it is important to note that the revenue from dedicated stormwater funding sources such as taxes, special assessments, etc. is not likely to be significant as few utilities in the country have these types of dedicated stormwater revenue generation mechanisms.

Based on the annual stormwater revenues estimated just from the user fee revenues of over 1,700 stormwater utilities, it is evident that there is an enormous “funding gap” between the overall stormwater management funding needs and the level of funding that appears to be currently generated in the United States. As described in Section 4.0 of this report, the funding gap is estimated to be approximately \$7 to \$10 billion annually. This range is based on limited surveys described in that Section.

To address this funding gap, diverse types of proactive measures including federal, state and local legislative actions and policies; enhanced technical and financial assistance; significant public education and engagement; and a drive towards establishing dedicated sources of stormwater funding at the local level, are necessary.

5.4 Barriers to Obtaining Funding

Previous sections summarize the plethora of funding opportunities for stormwater programs. However, this discussion would not be complete without mention of the many barriers to funding stormwater programs in any meaningful way. As with most public funding schemes, there is a tension between the need for funding and the access to funding—as well there should be in a public arena. Blank checks do

not exist, nor should they. But the barriers are often substantial, and thus stormwater programs across the country are experiencing a huge gap between needs and available funding.

This section focuses on barriers to funding from recurring, sustainable sources (such as taxes and user fees), because they form the backbone of any funding portfolio and can be the most difficult to secure at required levels.

5.4.1 Political Decision Making

A key principle in public governance is that it is done with the permission of those governed. Financial support for publicly funded programs and services cannot be effectively established without substantial buy-in from the members of the community and, equally important, without the legislative action of local elected officials.

The most common political decision-making barrier stems from each community's local political environment. Members of local governing bodies face a wide range of competing needs and are hesitant to increase taxes and fees due to various political, economic and constituent obligations concerns (not least, the desire to be re-elected). The local decision makers typically refrain from proactive stewardship for establishing a new source of funding such as a new stormwater user fee or for enhancing existing stormwater fees and charges, even when the community has significant stormwater management needs and the associated need for significant funding. There are many drivers for political barriers including public perception, historical context of stormwater management and funding, competition from other public programs and a general cynicism for any new proposal for taxes or fees.

To garner support from local decision makers, stormwater program managers must engage in extensive and timely education of their public and elected officials, and thoughtfully plan and prioritize O&M and capital program investments to maximize benefits community-wide over the planning horizon. To help create buy-in, community members and elected officials should contribute to the overall running of programs as well as establishing funding structures.

5.4.2 Public Perception

Across the United States, there is general fatigue from taxes, fees and charges, particularly for utility bills when drinking water and sewer bills seem to increase much faster than other household costs. This often translates to public cynicism and limits the ability to generate stakeholder support for a new user fee or tax. The lack of support intensifies when the population is not familiar with stormwater programs and funding needs and does not have a clear understanding of the potential and tangible community-wide benefits.

In addition, stormwater management often is not seen as an essential service. As with drinking water and sewer utilities, the average citizen may not be aware of the complex network of stormwater drainage systems or how it enhances their quality of life, safety, and potentially, property values. In many communities, chronic system failures may only be evident as a minor nuisance such as intersection flooding. In contrast, other common property services such as drinking water, sewer and garbage collection have been historically seen as essential public health services. The average citizen turns on the kitchen sink faucet and flushes toilets multiple times each day and puts the garbage out at the curb once a week; stormwater services are much less visible. So, it is not surprising to find a general lack of understanding about stormwater systems.

This is the setting in which a municipality or utility may ask for a new stormwater user fee or some other source of funding (e.g., a sales tax dedicated to stormwater). When the issue of stormwater funding and a user fee is initiated in such an environment of limited public awareness and perception, the road to successful funding becomes challenging.

5.4.3 Competing Needs

Municipalities are one of our most potent forms of government, providing the widest array of public services to their citizens. These typically include police, fire, parks and recreation, roads, utilities, libraries, other facilities and other general social services. Stormwater programs and facilities compete for public funds in this crowded field. Whether through strategic planning, annual budget requests or electoral politics, stormwater service is often prioritized much lower than other municipal services.

5.4.4 Legal Barriers and Enabling Legislation

Funding for public programs must comply with a variety of legal requirements, many of which are noted in previous sections of this report. In some cases, these legal requirements can be barriers to developing funding for stormwater programs.

5.4.4.1 Legal Requirements

Many states have legal restrictions that supersede a local governing body's authority to impose a stormwater fee. For instance, until March 2019 the State of New Jersey prohibited forming a stormwater utility or imposing fees^{A2}. The NJ Department of Environmental Protection will now provide technical assistance, rate setting guidance, asset management and public education to help municipalities establish stormwater utilities. In California, voters in 1996 approved Proposition 218, a constitutional amendment making it more difficult for local government to impose taxes, fees and assessments. One provision (clarified in a 2002 court ruling³²) requires stormwater fees to be submitted to a ballot measure requiring either a 50 percent majority of affected property owners or two-thirds majority of registered voters to impose (or increase) a stormwater fee. Since 2002 only 31 stormwater ballot measures have been pursued statewide (among more than 500 municipalities); voters have approved about two-thirds of them.

Overall, 41 states and the District of Columbia have at least one stormwater utility each. The other nine states have none, and legal barriers may play a part in that.

5.4.4.2 Legal Challenges

Legal challenges of new stormwater fees are a concern to many municipalities, particularly small ones that are limited in the resources needed to sort through complex and sometimes ambiguous enabling legislation. "Such is the case in Pennsylvania where regional approaches are being pursued in the counties of Blair, York, Lancaster and Montgomery, but, even there, one of the major barriers to

³² California Sixth Appellate District, *Howard Jarvis Taxpayers Association versus the City of Salinas*, 2002. That decision acknowledged that Proposition 218's text is ambiguous as to whether stormwater falls under the definition of "sewer," which did not have the ballot requirement. In 2017, the California Governor signed SB-231, clarifying that definition to also exempt stormwater fees from the ballot requirement. The Salinas plaintiff has vowed to sue any municipality that sets fees accordingly. However, the threat of litigation alone has caused most cities to continue to take fees to the ballot.

implementation is concern about the confusing details of the enabling legislation and fear that implementation won't confirm and will be mired in legal challenges.”³³

Legal challenges do occur. Previously mentioned was the *Salinas* case in California, which significantly changed the stormwater funding landscape in that state. The 2013 Western Kentucky University survey summarized legal challenges across the country. “We have now identified 76 legal or political challenges to stormwater utilities in the U.S. ... Of the 76 challenges, 44 were decided in favor of the utility, while in 16 cases the utilities received unfavorable decisions or were struck down. Twelve of the cases are still pending or we were unable to find whether or not a court decision had been reached. Five challenges were successful political challenges. Stormwater utilities in Birmingham, Alabama; Colorado Springs, Colorado; Nampa, Idaho; Manitowoc, Wisconsin; and in Cumberland County, North Carolina were repealed.”³⁴

The 2018 edition of the Black & Veatch Stormwater Utility Survey³⁵ asked the 75 participating agencies whether their stormwater user fees ever faced legal challenges. They found that 27 percent of the respondents said “yes.” The basis of challenge varied as follows:

- 💧 Tax and not a user fee (38 percent)
- 💧 Lack of authority to assess stormwater fees (24 percent)
- 💧 Equity and fairness (17 percent)
- 💧 Rate methodology (14 percent)
- 💧 Rational nexus between costs and user fees (3 percent)
- 💧 Constitutionality (3 percent)

5.4.5 Equity Issues

As many as 92 percent of stormwater utilities base their fees on relative impervious surface area.³⁶ This is a well-accepted method to ensure fair distribution of costs to customers, one of the distinguishing features of a user fee (as opposed to a tax). An unintended consequence of that fee basis is the potential of a disproportionate financial burden placed on properties in disadvantaged areas. Residential densities tend to be higher, which is often accompanied by a much higher percentage of impervious surfaces (and thus a higher proportion of the fee base).

Low-income areas also are more likely to be in low-lying, flood-prone areas where insufficient stormwater capacity is first felt. These neighborhoods also tend to be rental properties where landlords have little incentive to invest in green spaces or low-impact development.

³³ Environmental Financial Advisory Board. 2016. *Developing Dedicated Stormwater Revenues*.

^{A2} NJ DEP. Stormwater Utility Guidance and Information. <https://www.nj.gov/dep/dwg/stormwaterutility.html>

³⁴ Campbell, C. W. 2013. *Western Kentucky University Stormwater Utility Survey 2013*.
https://www.wku.edu/seas/documents/western_kentucky_university_swu_survey_2013.pdf

³⁵ Black & Veatch. 2018. “Stormwater Rate Structure and Billing.” In *2018 Stormwater Utility Survey*.
https://www.bv.com/sites/default/files/2019-10/18%20Stormwater%20Utility%20Survey%20Report%20WEB_0.pdf

³⁶ Ibid.

Rate discounts or exemptions for low-income residents or seniors are sometimes difficult to provide. With no rational basis for reducing rates based on impervious surface, some states do not permit such discounts unless subsidized by non-stormwater funds (such as a city's general fund).

5.4.6 Administrative

Sometimes the greatest barrier to forming a stormwater utility is the agency's internal administrative structure. This is particularly true for local municipalities where various stormwater functions have evolved within different departments or divisions. For example, infrastructure maintenance may reside in the streets or sewer departments, NPDES compliance in the environmental group, capital planning in the engineering division, and financial services in the finance department. In other words, it is all too common to find these functional units distributed throughout a municipal organization without unified leadership or cohesive functionality.

Without such leadership, it can be very difficult to champion a cause such as initiating a stormwater user fee. Support for change must often come from senior management in order to be implemented.

5.4.7 Limited Resources

Managing a complex municipal utility requires significant resources that are often lacking—particularly in small/mid-size municipalities or ones that are attempting to launch a stormwater utility structure for the first time. These resources may include:

- ◆ Strategic and financial planning
- ◆ Asset management
- ◆ Technology (GIS, data)
- ◆ Public engagement (branding, outreach)

The path to a dedicated and sustainable revenue stream includes all of the above (needs analyses, financial planning, fee study, community engagement). These activities can cost \$300,000 to \$1 million or more and take two or more years to implement. In addition, competing in the grant funding arena demands that a stormwater agency possess expertise in grant writing and grant administration.

Finally, basic NPDES permit compliance is a complex and time-consuming endeavor to which an MS4 must devote resources to keep abreast of changing regulations and implementing NPDES programs, public education and enforcement.

5.4.8 Lack of Public/ Policymaker Awareness and Understanding of Needs

The first step in establishing a stormwater utility is determining the needs and calculating the associated costs. Once done, the bigger challenge may be communicating this need to the municipality's policymakers and the community at large in a compelling way. "The most effective stormwater business plans recognize community expectations. In some cases, expectations must be elevated by convincing demonstrations that stormwater problems exist and can be solved. Stormwater management rarely captures public support unless problems impact the daily lives of citizens. Many drainage systems are underground and essentially invisible to the public. If they are designed, constructed, and maintained properly, most people are unaware of them. More visible problems such as potholes in roadways consistently rate higher than drainage problems. The most effective programs identify and publicize the

problems they must address, seek public participation and support, and orchestrate the use of various tools and resources over time.”³⁷

This can be accomplished from the technical side with engineering and financial analyses. But moving public opinion is much more difficult and requires expertise not often found in the ranks of stormwater managers. A successful utility would employ public information personnel and develop an early branding effort from which is built a full public engagement program that can begin to move the opinion of both policymakers and the public at large.

5.5 Summary Conclusions

Stormwater programs face many challenges to developing the resources needed to deliver programs, as well as the projects that will achieve the goals of flood protection and clean water. Progress has been made on many stormwater funding fronts, including federal and state grant programs. While primary funding remains a local municipal responsibility, it is widely recommended that any stormwater program or utility develop a portfolio approach to funding. A solid foundation for that portfolio should be a *dedicated, sustainable revenue stream* such as user fees, supplemented with a robust array of other funding and financing mechanisms such as loans and other debt tools, grants, partnerships and multiple creative approaches using the resources of other like developers and private interests.

The role of the federal government may be limited by comparison, but its presence is invaluable in helping provide much needed capital funding for large projects, as well as in providing education, offering training and making all opportunities to meet the challenges of funding available to all local programs.

³⁷ National Association of Flood and Stormwater Management Agencies. 2006. *Guidance for Municipal Stormwater Funding*.

6.0 Infrastructure Affordability

Identify how the source of funding affects the affordability of the infrastructure, including consideration of the costs associated with financing the infrastructure.

Section 5.0 of this report details the types of funding sources and financial resources that are used to manage stormwater operations and infrastructure. It also presents an overview of the key barriers that municipalities face in obtaining the requisite ongoing funding for effective stormwater management. This section of the report focuses on how the funding sources affect three aspects of a municipality's stormwater management capabilities and household affordability: efficient management of infrastructure, financial capability and customer household affordability.

6.1 Infrastructure Efficiency

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An integral and critical aspect of stormwater infrastructure management is how efficiently utilities manage stormwater infrastructure. Generally, infrastructure efficiency pertains to a deliberate focus on best practices such as proactive asset management, effective use and leveraging of resources, strategies that help achieve economies of scale, and risk mitigation and resiliency building efforts. An area of opportunity identified by the Task Force is the highly decentralized nature of stormwater service provision.

The types of stormwater systems in the U.S. and the organization of responsibilities both significantly influence infrastructure efficiency. The following subsections discuss these two issues.

6.1.1 Types of Stormwater Systems and Implications

Stormwater is discharged not only through MS4 conveyance infrastructure but also via Combined Sewer System (CSS) conveyance infrastructure. MS4s and CSS's have similar obligations under the CWA and its related amendments. However, the two systems impose unique levels of service and infrastructure management burdens and obligations, and consequently exert differing levels of impact on infrastructure efficiency, financial capability and customer affordability.

Excessive wet weather (stormwater) flows in a CSS could trigger Combined Sewer Overflows (CSOs), where the untreated combined stormwater and sanitary sewage is discharged directly to surface receiving waters without even primary treatment. Consequently, the environmental responsibilities and exposure to regulatory mandates such as the Long Term Control Plan (LTCP) requirements for CSS can be vastly more expensive, as measured in both operating expenses and capital commitments necessary to eliminate CSOs. Further, stormwater inflow into non-CSS wastewater collection systems can cause similar overflow conditions.

Excessive wet weather flows also affect MS4s in a number of ways, including flooding, habitat degradation, stream and channel erosion, and other significant water quality issues such as sedimentation and pollution resulting from stormwater runoff. These, in turn, create the need for stormwater treatment facilities.

Both CSS's and MS4s involve significant financial investment in the treatment and management of wet weather flows. Typically, funding for CSS management is covered by wastewater fees. Funding for MS4 management, the subject of this Task Force, is covered by a variety of sources as described in Section 5.0; however, many municipalities have no dedicated, consistent or reliable funding mechanisms in place.

Regardless of the types of systems and funding mechanisms, customer affordability and the public's understanding of the need for these services are critical.

6.1.2 Delineation of Stormwater Responsibilities

The Task Force has observed significant differences among municipalities with respect to the distribution of stormwater management and regulatory compliance responsibilities. Some of these can be attributed to the types of stormwater management systems that exist within a jurisdictional area (discussed above); largely, though, they can be attributed to the institutional framework established by the state in which the municipality is located, as well as local and regional stormwater needs. The distribution of responsibilities can affect affordability by creating situations where there are overlapping responsibilities and limited accountability for program implementation.

In some municipalities (e.g., Philadelphia or Newark, New Jersey), the drinking water/sewer utility—a city department—is responsible for managing all aspects of stormwater management including LTCP/NPDES and MS4 regulatory compliance; both CSS and MS4 types of stormwater infrastructure; and all associated O&M requirements, including green infrastructure initiatives. In these cases, the management of the entire stormwater infrastructure rests within a single entity with a single point of accountability.

Responsibility is divided in other municipalities. In Washington, D.C., for example, an independent authority (DC Water) manages the CSS and separate sanitary sewer systems while the municipality (specifically, the Department of Energy and Environment) is responsible for all MS4 requirements. Even in a municipality that has only an MS4 system and a separate sanitary sewer system, the stormwater management responsibilities may be distributed between a drinking water/sewer utility, a department of public works, and for example a department of transportation. In addition, in many communities, the MS4 responsibilities for developing and implementing specific permit requirements such as stormwater pollution prevention plans or nutrient management plans are given to school districts or fire, police or parks departments. In these cases, holistic management of stormwater infrastructure requires a clear understanding of roles and responsibilities, delineation of ownership of stormwater assets, and effective coordination among the various entities to enhance infrastructure efficiency. An integrated planning framework could especially enhance efficient management of infrastructure in these situations where multi-entity coordination is critical. Such a framework would put municipalities in a position to optimize capital investments—making this a concept worth the investment of grant dollars.

Such significant differences in the distribution of stormwater service responsibilities among municipal jurisdictions also directly influence the overall financial capability aspects of stormwater management (discussed in Section 5.0), as funding and cost recovery mechanisms differ significantly. Note also that, in some municipal jurisdictions, USACE may support the implementation of stormwater management-related projects (mainly large flood risk management projects) by providing partial funding and technical assistance.

6.2 Financial Capability

Stormwater capital infrastructure investments are driven by the need to enhance and/or maintain existing drainage capacity, flood mitigation, repair and rehabilitation of aging infrastructure, coastal resilience, climate resilience and other community needs. In CSS communities with consent decree requirements to mitigate CSOs, the pressure on stormwater infrastructure investments such as tunnel or gray infrastructure, and/or the need to enhance pumping and wastewater treatment capacities, can be significant. The critical challenges for a municipal entity managing stormwater infrastructure (for CCS's or MS4s), are funding availability, funding adequacy and timeliness of funding.

Municipalities tend not to have enough funding for stormwater infrastructure, though they range on a spectrum from “no dedicated funding” to “adequate funding.” For example, the national WEF Stormwater Institute and Black & Veatch stormwater surveys³⁸ and other state-level stormwater, drinking water and clean water surveys indicate that utilities cite “lack of funding availability” as their highest-ranked challenge with respect to timely infrastructure investments. While there are many funding sources for stormwater, as described in Section 5.0, the Task Force believes the funding is inadequate and that there are significant barriers to accessing the available funding sources.

The following subsections present four factors affecting financial capability for effective stormwater management:

- Stormwater financial reporting
- Impact of various funding sources on building financial capacity
- Implications of the financial capability assessment methodology
- Customer household affordability

6.2.1 Stormwater Financial Reporting

Stormwater infrastructure is, generally, an entirely municipal proposition. The footprint of publicly traded investor-owned utilities and private companies that own and operate stormwater systems is small—not a material share of the total infrastructure universe. Therein lies a major area of opportunity: there are roughly 42,158 units of local government,³⁹ and while not all are directly responsible for every category of municipal asset, they are very diverse in management and governance structures as well as financial reporting. This makes summary observations of financial capabilities as well as affordability to households more difficult. Municipalities generally do not produce independently audited financial statements with the same timeliness as publicly traded companies, nor do most publish intra-year unaudited statements such as quarterly financials.

³⁸ WEF Stormwater Institute. 2019. *National Municipal Separate Storm Sewer System (MS4) Needs Assessment Survey Results*. <https://wefstormwaterinstitute.org/wp-content/uploads/2019/08/MS4-Survey-Report-2019.pdf>; Black & Veatch. 2018. *2018 Stormwater Utility Survey*. https://www.bv.com/sites/default/files/2019-10/18%20Stormwater%20Utility%20Survey%20Report%20WEB_0.pdf

³⁹ Hogue, C. 2013. *Government Organization Summary Report: 2012*. <https://www.census.gov/content/dam/Census/library/publications/2013/econ/g12-cg-org.pdf>. (This Census summary identifies 38,910 general purpose governments. It excludes special and school districts but does include 3,248 special districts categorized as “drainage and flood control.”)

Specifically, the differences in management and governance have direct implications for stormwater funding and financial reporting, as follows:

- **General government** (most common). When stormwater management responsibilities lie with a general government (e.g., with its public works or streets and transportation department), the primary source of funding is typically general tax revenues. There may not be any dedicated source of funding for stormwater management. This governance and funding structure is usually associated with a modified accrual basis of accounting or, worse, a cash basis. Neither includes a balance sheet with assets and liabilities. Similarly, the statement of revenues over expenditures does not have an explicit line item for depreciation for those assets that are even depreciable. The Task Force believes that without a clear correlation between dedicated funding and revenue requirements, sufficient funding for stormwater cannot be allocated through such governance structures.
- **Utility department** (varies by state, but generally less common). Some municipalities have stand-alone stormwater enterprise funds. However, not all local governments have state statutory authority to establish separate and discrete stormwater utilities, meaning stormwater management responsibilities lie within the purview of a larger drinking water and sanitary sewer utility department within the municipality. The primary source of ongoing funding is typically user rates and user charges. However, the way rates and charges are levied varies from municipality to municipality. Some utilities (e.g., Philadelphia, Pennsylvania; Portland, Oregon; Wilmington, Delaware; and Chesterfield County, Virginia) levy a fee based on the property's actual or estimated impervious surface area to recover the costs associated with stormwater management. Other communities levy a flat recurring charge based on type of land use (residential, commercial, etc.). Still other municipalities—such as New York City, where the Department of Environmental Protection is responsible for drinking water, sewer and stormwater management—recover costs through sanitary sewer user charges. Still, for transparency purposes, a rate-based funding structure typically is associated with traditional enterprise financial reporting, using an accrual basis of accounting that does include an income statement, balance sheet and depreciation. This makes it less difficult to assess whether ongoing funding is sufficient to cover stormwater needs, even without uniform reporting standards.
- **Independent authority** (least common). If stormwater management responsibility lies with an independent municipal authority or separate political subdivision, stormwater funding may have to rely on either the taxing authority or its own rates and charges. Comparability and assessment of financial capacity and affordability to the household is therefore subject to financial accounting and transparency.

6.2.2 Impact of Various Funding Sources on Building Financial Capacity

The Task Force reviewed the key funding sources discussed in Section 5.0, evaluating most of those sources' potential impact on a municipal entity's overall ability to build financial capacity, for O&M and capital infrastructure investment.

In the summary below, the Task Force describes the criteria for this review, summarizes the findings and presents a case study example.

6.2.2.1 *Assessment Criteria*

The Task Force defined the following key criteria for evaluating the ability of various funding sources to help build a municipality's overall financial capacity:

- ◆ **Sufficiency**—measures the total annual revenue that a municipality can generate from one or more funding sources.
- ◆ **Stability/sustainability**—assesses the ability of the combination of funding sources to provide consistent and reliable levels of dedicated funding to support immediate and long-term sustained infrastructure management, including capacity expansion and to meet O&M service obligations. These criteria also measure the sustainability of the revenue source.
- ◆ **Scalability**—measures the flexibility of the utility to increase funding commensurate with increases in revenue requirements.
- ◆ **Legislative requirements**—funding options such as user fees, impact fees and debt issuance often require internal approval from boards, councils or commission, and/or potentially voter approval/referenda through ballot measures. These legislative requirements and challenges can influence the ability to generate timely funding.
- ◆ **Acceptability**—evaluates the benefits and risks of the various funding sources as judged by elected officials, utility management and external stakeholders.
- ◆ **Customer equity**—evaluates the measure of equity, which can be defined in a variety of ways, in cost recovery from the customer base within the jurisdiction.

6.2.2.2 *Summary Assessment of Funding Sources on O&M and Capital Infrastructure Investments Financial Capacity*

Section 5.0 summarized the various types of funding sources, along with their advantages and disadvantages. It broke those sources into three categories:

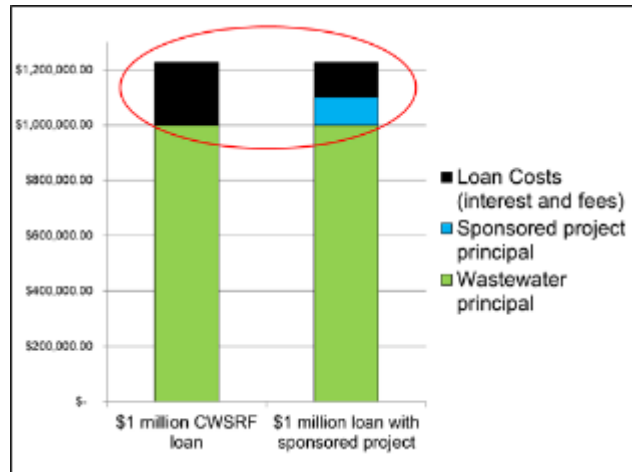
- ◆ Recurring and/or intermittent revenue funding
- ◆ One-time funding sources for capital projects and/or one-time initiatives
- ◆ Other resources/approaches

This section further examines the impact of the first two of those categories in building a utility's financial capacity for stormwater management.

- ◆ Figure I-1 (Appendix I) summarizes the impact of recurring and/or intermittent funding sources on a utility's ability to effectively fund O&M operations. All of the sources listed in Figure I-2 and Table I-2 are applicable to a municipal entity's stormwater O&M revenue requirements.
- ◆ Figure I-2 (Appendix I) summarizes the impact of the one-time sources/initiatives on a utility's ability to adequately fund capital infrastructure investments.

6.2.2.3 Case Study Example: Flexibility in the Use of CWSRF

The Iowa SRF program has funded stormwater projects, without affecting user fees, through the Water Resource Restoration Sponsored Projects program. A CWSRF project can carve out 1 percent of the interest that would have otherwise been paid to the CWSRF program on its infrastructure loan, using that money for a non-point source project (see Figure 2). The SRF program allows about \$100,000 per \$1 million CWSRF loan to be used for water quality projects. Through this overall interest rate reduction, the utility's ratepayers do not pay any more than they would have for just the wastewater improvements.



DR Figure 2. Graphic illustrating the use of sponsored projects through the CWSRF program.

Stormwater projects— including permeable paving, bioswales, rain gardens, streambank restoration and soil conservation projects on agricultural lands— have been funded in this manner. About \$50 million for these projects have been approved for nationwide funding.

6.2.3 Implications of Financial Capability Assessment Methodology

Financial capability assessments (FCAs) are distinct from various measures of household or individual customer affordability (discussed below) in that an FCA relates to the ability of a community (or permittee) to finance infrastructure investments. For a broad array of purposes, EPA has used a static, two-phase methodology to conduct FCAs. Phase I involves calculation of a residential indicator (RI), which examines the average per household cost of services relative to a benchmark of 2 percent of service-area-wide median household income (MHI).

Phase II involves the calculation of a financial capability index (FCI), a simple arithmetic average of scores for six economic indicators:

- ◆ Bond rating
- ◆ Net debt as a percentage of full market property value
- ◆ MHI
- ◆ Local unemployment
- ◆ Property tax revenues as a percent of full market property value
- ◆ Property tax collection rate within a service area

A higher FCI score suggests relative economic strength; a lower FCI indicates weak economic conditions and relatively lower financial capability. EPA's existing FCA guidance⁴⁰ has been subject to extensive review and critique for a variety of reasons that are particularly resonant for application to stormwater-related infrastructure financing. For example, the diversity of governance structures and financial

⁴⁰ U.S. EPA. 1997. *Combined Sewer Overflows—Guidance for Financial Capability Assessment and Schedule Development*. EPA 832-B-97-004. February 1997. <https://www3.epa.gov/npdes/pubs/csofc.pdf>

reporting protocols noted above makes even baseline evaluation of current funding complicated. Financing stormwater infrastructure is often less straightforward than issuance of the revenue bonds assumed to be available in EPA guidance. And profound complexities may be involved in assigning the residential vs. non-residential flow contribution responsibilities required in EPA's matrix methodology.

Emerging concepts to address the limitations of EPA's current FCA methodology could also improve evaluation of community financial capabilities to fund stormwater infrastructure (though the diversity of governance configurations will continue to impose complexities). For FCAs, these concepts call for a direct evaluation of a community's (or communities', in cases where stormwater services involve multiple jurisdictions) financing capacity through cash-flow analyses. Current and potential new methods for funding stormwater infrastructure would require explicit recognition (rather than being subsumed within general government financial reporting). Projected tax or fee cost impacts on individual households and non-residential entities may be calculated and gauged in relation to various income metrics (e.g., median and lowest quintile, gross and disposable). Financial capabilities would be assessed in terms of the community's ability to fund O&M expenses and capital spending given tenable annual adjustments to stormwater-dedicated tax and fees. The pace and magnitude of these tax or fee increases would be established by reference to new measures of household or individual customer affordability as discussed below.

6.3 Customer Household Affordability

In the context of drinking water and wastewater services, customers' hardships include various costs associated with challenges in paying service bills, including even service interruptions. For stormwater services, such customer affordability issues may manifest less explicitly or dramatically, but they nevertheless are important considerations for stormwater finance policy development. And, as with FCA, both how household affordability is measured and what constitutes burdensome levels of cost are being reconsidered as concerns rise about water affordability across all water-resource-related services (i.e., drinking water, wastewater and stormwater).

Historically, EPA has measured drinking water and wastewater service cost affordability largely in terms of how estimates of annual household costs compared to MHI as reported in U.S. Census data. EPA's historically used FCA matrix methodology may render a determination of "High Burden" for communities where household costs are above 2 percent of MHI. Logically, though rarely done, the same methodology can be applied to evaluation of stormwater service costs—especially (or at least more easily) if such costs are explicitly calculable by reference to stormwater utility rates or fees rather than subsumed within general government funding sources. The historical underfunding of stormwater management costs (even if recovered through separately established fees and charges) means that stormwater management costs are unlikely to be deemed as currently imposing an undue burden using historically applied metrics referencing MHI. In addition, the use of MHI as an affordability metric has been widely criticized.⁴¹

Emerging concepts related to household water affordability measures (like those for FCAs) offer new measures and methodologies for assessing water resource management costs beyond reference to MHI. Cost as a percentage of lowest quintile income is advocated for its focus on the economically

⁴¹ AWWA. 2013. *Affordability Assessment Tool for Federal Water Mandates*.
<https://www.awwa.org/Portals/0/AWWA/ETS/Resources/AffordabilityAssessmentTool.pdf>

disadvantaged; cost as a percentage of a measure of disposable incomes is advanced as a means to gauge whether households will face undue substitutions of health care, food or other essential services. Most importantly, these concepts call for inclusion of stormwater-management-related costs (incurred via separate charges or through general taxes and fees) in the pantheon of claims imposed on households for water resource management services.

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Appendix I: Tables and Figures

Table I-1. Funding Type Matrix, including a Description of the Funding Source and Associated Advantages and Disadvantages.

Funding Source	Description	Advantages	Disadvantages
1.0 “Revenue-Based” Funding Sources used to pay on-going Operation & Maintenance and Debt Service of the Stormwater System			
1.A Recurring, Sustainable Revenue Sources for On-going Stormwater Program Funding <ul style="list-style-type: none"> Provide regular, recurring revenues to fund both operating and capital related costs 			
Taxes/ General Funds	Funds raised through taxes such as property, income, and sales that are paid into a general fund.	<ul style="list-style-type: none"> Consistent from year-to-year Utilizes an existing funding system 	<ul style="list-style-type: none"> There can be significant competition for funds; Tax-exempt properties do not contribute; System is not equitable (does not fully reflect contribution of stormwater runoff)
Taxes/ Dedicated (e.g., local option sales tax, Gas Tax, drainage or special assessment district)	Funds raised through taxes such as property, income, and sales that are restricted, in part or in whole, for funding stormwater costs.	<ul style="list-style-type: none"> Consistent from year-to-year but can vary (e.g., changes in property values or rise and fall with economic cycles) Utilizes an existing funding system Can be targeted for a specific purpose (ongoing maintenance, capital, etc.) 	<ul style="list-style-type: none"> May be competition for funds if not exclusively restricted to stormwater; May require approval by vote of the local legislative body and public if a new tax Often have a “sunset” clause resulting in stable funding only for a specified period of time (e.g., 10 years) Tax-exempt properties do not contribute; System is not equitable (does not fully reflect contribution of stormwater runoff)

Funding Source	Description	Advantages	Disadvantages
Stormwater Utility User Fee (Enterprise Fund)	A stormwater utility generates its revenue through user fees and the revenues from the stormwater charges will go into a separate fund (e.g., enterprise fund) that can be used only for stormwater services.	<ul style="list-style-type: none"> • Dedicated funding source • Directly related to stormwater impacts • Sustainable, stable revenue • Shared cost • Equitable apportionment of costs • Improved watershed stewardship • Addresses existing stormwater issues • All properties served pay fee 	<ul style="list-style-type: none"> • Feasibility study required for implementation, fee structure, and administration of utility • Requires approval by vote of the local legislative body, in some cases public vote required • Perception by the public of a “tax on rain” • Public acceptance for a first-time fee is difficult • Some states have not yet allowed SW Utilities
<p>1.B Intermittent Revenue</p> <ul style="list-style-type: none"> • To recover a portion of costs related to which fee or charge is assessed 			
Fees	<p>Revenue raised through charges for services such as inspections and permits.</p> <p>Revenue raised through developer related fees are one-time charges linked with new development.</p>	<ul style="list-style-type: none"> • Specific permit and inspection fees allow for more direct allocation of costs for services provided • Fees can be set to fully recover cost • Certain kinds of fees can provide funding for long-term maintenance • Addresses potential stormwater impacts related to new construction 	<ul style="list-style-type: none"> • Not available for larger projects or system-wide improvements • Developer impact fees may be an unreliable source when development slows (due to market downturns/contractions) • Requires administrative framework to assess and manage • Legal limitations may constrict or restrict usage
Special Charges (e.g., impact fees, latecomer fees, system development charges, special assessments, surcharges on other utilities)	A number of different fees that attempt to shift certain program costs to provide a better cost causation match. Payees might be other local programs, development interests, or parties requiring a myriad of special services or penalties.	<ul style="list-style-type: none"> • Improves cost causation equity match • Allows special services to be paid for by recipients • Provides additional funding in a manner acceptable to the general public • Recovers the cost of negative impacts of other activities on the stormwater system 	<ul style="list-style-type: none"> • Level of funding is unpredictable and can vary significantly year to year • Can be hard to administer • May be seen as discouraging development or other desirable activities • May be difficult to price accurately • While some sources may fund certain O&M (e.g., staff time), others, such as impact fees and SDCs are generally restricted to capital funding only

1.C Capital Financing Sources (Financing Vehicles, require repayment)			
<ul style="list-style-type: none"> Borrowing for capital projects 			
Bonds (Debt Obligations)	<p>Bonds are not a true revenue source, but are a means of borrowing money to finance capital projects. Bonds are generally issued with a term less than the expected useful life of the assets financed. Bonds may be general obligation (GO) bonds backed by taxes, or revenue bonds, backed by a secure revenue source (most commonly a stormwater user fee). “Green” bonds are a designation of bonds dedicated to environmentally friendly projects, including clean water projects.</p>	<ul style="list-style-type: none"> Existing sources available for stormwater-related funding Can support construction-ready projects Allows a community to complete large projects sooner than revenue cashflows become available, or a significant stormwater capital program more quickly Spreads the cost of the capital project over time, allowing beneficiaries of the improvements to pay over the life of the bonds, rather than current property owners paying up front. Mitigates the risk of construction cost escalation Accelerates ability to address important health and environmental issues 	<ul style="list-style-type: none"> May require approval for each issuance, in some cases, voter approval Requires access to funding for full repayment of principal borrowed Interest costs can vary but will add to total project cost Requires dedicated repayment revenue stream May require design-level documents to be prepared in advance of debt funding Cannot be used to fund O&M if they are tax exempt bonds. Will require additional funding for costs of issuance May require significant administrative preparation to issue and for post-issuance compliance activities and disclosures.
Loans (Debt Obligation)	<p>Low-interest loans, for example the SRF loans, may be secured, and are generally used for planning and capital projects.</p>	<ul style="list-style-type: none"> Existing sources available for stormwater-related funding Offers low- or no-interest financing Low interest loan programs may offer ease of issuance relative to public offerings 	<ul style="list-style-type: none"> One-time source of funds Requires full repayment of principal borrowed Administrative requirements can be time-consuming Low loan programs may come with inflexible mandates and restrictions
1.D One-time Sources			
<ul style="list-style-type: none"> Generally used for capital projects 			
Grants	<p>State, federal, local and non-profit grants provide additional funding for water quality improvements.</p>	<ul style="list-style-type: none"> Existing sources available for stormwater-related funding Does not require repayment 	<ul style="list-style-type: none"> Competitive Typically, one-time, project- specific, or time-constrained funds Often requires a funding match Does not fund post-project O&M Grant requirements may not correspond with project needs

2.0 Other Resources/Approaches for Funding Stormwater Management

<p>Public-Private Partnerships (P3)/ Alternative Service Delivery (ASD)</p>	<p>Contractual agreement between a public agency and a private sector entity—generally used for capital projects. Partnering with private enterprise can expand access to resources and capital and offer better economies of scale. P3/ASD shifts both risks and duties from the traditional procurement and project management context. Examples include: Design/Build, Design/Build/Operate/Maintain/Finance, and Pay-for-Performance (also sometimes referred to as Pay-for-Success). May include private financing, or a combination of public and private financing.</p>	<ul style="list-style-type: none"> • May be structured to require minimal to no initial cash outlay for public sector, assuming the private sector partner is providing financing • Efficiency through bypassing bureaucracy or economies of scale • Flexibility & creativity of project approach, new technology adoption and contracting/procurement • Access to flexible & creative private sector financing • Significantly leverages public resources • Draws on private sector expertise • Enables transfer of compliance from one development to another • Partnerships can be with not-for-profit entities • Considers a project’s full lifecycle, potentially including O&M • Risk is shared with or passed entirely to private entity 	<ul style="list-style-type: none"> • A local revenue source is needed to fund the partnership • May be structured so as not to require new funding; may rely on underlying public revenue stream (e.g., user fees, taxes) • May require enabling legislation • Substantial education and socialization required to manage public perceptions related to loss of control and escalated costs • Initial financing costs inherent within P3/ASD may be higher than municipal debt. • A lack of public agency experience may necessitate the need for additional resources to complete a successful contract negotiation
<p>Private Development Sites</p>	<p>Private sites build distributed stormwater infrastructure (Low Impact Development, BMP’s, conveyance, etc.) that contributes to the overall municipal goals OR contribute funding in lieu of construction. Usually required by local ordinance or conditions of approval OR set up as a development impact fee. The proper construction and ongoing maintenance of these sites constitutes a major stormwater expenditure of significant importance.</p>	<ul style="list-style-type: none"> • When well-regulated and inspected these structures and systems are the first, and most important line of defense against flooding, erosion and pollution • Inspection and enforcement costs are comparably low but with significant return on investment • Capital expenditure and permitting costs are borne by private development • Often required by regional NPDES permits and enforced by municipalities 	<ul style="list-style-type: none"> • Political will, budget, and legal capability to enforce long-term maintenance, and sometimes initial construction standards may be lacking • Funding is only triggered when regulated development occurs, which can be hard to plan around and predict – particularly in a low investment environment or with regulations that do not capture the majority of development and redevelopment activities • Development may not happen in areas of greatest need in watershed/community • Additional education may be required to build public knowledge • Impact of such programs is hard to measure unless a high percentage of the watershed has been constructed with modern requirements • Distributed infrastructure may not be efficient in

			<p>treating and managing stormwater flows</p> <ul style="list-style-type: none"> • Ensuring O&M is difficult and requires municipal resources • Development impact fees require robust needs analysis and nexus findings (although a strong finding could be an advantage)
Volunteer Programs	In-kind initiatives that can help support stormwater priorities	<ul style="list-style-type: none"> • No cost to stormwater program • Can help increase public awareness • Some not-for-profits come trained and ready to work • Can bolster public support for a user fee 	<ul style="list-style-type: none"> • Limited impact from overall revenue perspective • Requires coordination, training and supervision
Coordination with other Municipal Departments and State Agencies	Creating synergies with other city departments, agencies, etc. to leverage available community funds for stormwater needs	<ul style="list-style-type: none"> • Eliminate duplication of effort • Move toward a “water agency” that can integrate water as a single resource • Allows easier/quicker response for emergencies • Multiple funding or resources may be harmonized; the “whole being greater the sum of the parts” • Transportation projects can add stormwater elements for marginal costs (sometimes) • State DOTs right of way limitations often compel them to partner with municipalities to achieve stormwater goals 	<ul style="list-style-type: none"> • Stormwater may be seen as a secondary priority behind water and wastewater or public works focus on roads • Can lose ability to react to stormwater needs if equipment and manpower are not dedicated • May require additional education of personnel or additional resources with stormwater expertise to make stormwater decisions • Disparate-agency partnerships can be difficult to manage • Mixing funding sources (particularly with grants) can be challenging
Market-Based Solutions	The off-site provision of required stormwater controls on another site, or in another way, that is seen as more cost effective to a property owner or developer, but equally effective in attainment of the regulatory standard.	<ul style="list-style-type: none"> • Creates cost efficiencies in placement of stormwater controls • Can allow for aggregation for better overall control and treatment • Can shift and target controls to more critical locations 	<ul style="list-style-type: none"> • Can be complex to administer • Requires clear and enforceable policies on ownership and maintenance • Markets may not be initially viable and may need to be jumpstarted with local funding

<p>Newer Innovative Approaches</p>	<p>A wide variety of approaches that seek to exploit unique or unusual funding sources: sponsorship of stormwater or green infrastructure sites, adopt-a-road advertising, tax increment funding, use of private land for public infrastructure, shared right-of-way, seed money and expertise, leveraging user fee credits, philanthropy, etc.</p>	<ul style="list-style-type: none"> • Can provide funds at little cost • Can motivate the private sector through name recognition • Can provide good return on seed money investment when paired with private actions 	<ul style="list-style-type: none"> • Can be hard to administer and explain • May require opinions and analysis on legality
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Table I-2. Financial Capacity Impact of Recurring/Intermittent Funding Sources—O&M Operations.

Evaluation Criteria	Recurring or Intermittent “Revenue Based” Funding Sources				
	Taxes/General Funds	Stormwater Dedicated Taxes	Stormwater Utility User Fee	Other O&M Fees	Surcharges or Special Assessments
Revenue Sufficiency	Low: general funds typically have different priorities such as public safety	Moderate: better transparency via correlation between revenues and revenue requirements	Moderate to high: generally, the rates and charges are objectively aligned with the revenue requirements of the stormwater system	Low: don’t always have a clear correlation or justification to annual revenue requirements and may be fungible with other general government needs	Moderate: generally, have somewhat limited revenue-raising ability
Stability of Revenues	Volatile: property and sales tax bases can rise and fall with economic cycles	Volatile: property and sales tax bases can rise and fall with economic cycles	Strong: revenues are tied to either the size of the property’s impervious surface area or the category of the property, not to economic cycles	Variable: very low volatility if tied to a per-parcel fee and not subject to property valuation, very high volatility if tied to non-recurring cash flows like development	Low to moderate: special assessments often are tied to property valuation and surcharges sometimes are related to water consumption
Scalability to Meet Increasing Needs	Low: major line item increases are generally subject to political scrutiny	Very low: dedicated taxes are typically voter-approved and may not even exist in perpetuity	High: a dedicated funding source allows the user fees to be leveraged to address both O&M and capital expenditure; however, fee increases are typically not well received by elected officials or the public	Low: would mostly likely need some kind of authorization to scale up the fee structure, from a municipality or even a homeowners’ association	Moderate: limited ability to increase revenues creates finite financial capacity
Legislative Requirements	High: subject to annual appropriation, sometimes even voter approval	Very high: subject to voter approval and annual appropriation	Low: usually only requires a one-time authorization via either state general assembly or municipal ordinance	Very high: subject to voter approval and annual appropriation, perhaps public education to get buy-in from the developer community	High: likely subject to some kind of initial legal authorization
Community Acceptability	High: aside from politicization of where in the municipality to fund projects, usually not controversial	Moderately high: establishing a new tax may not be politically palatable unless a recent flood event is driving the measure	High: aside from politicization of where in the municipality to fund projects, usually not controversial	Moderately high: establishing a new tax may not be politically palatable unless a recent flood event is driving the measure, but possibly offset by a user-pay	Moderately high: establishing a new tax or fee may not be politically palatable unless a recent flood event is driving the measure
Community Financial Capability Barriers	High: many states have established and/or municipalities have self-imposed limitations related to taxation	Moderate: comparably easier to assess financial capacity and assign resources even if that capacity may be statutorily limited	Low: a dedicated, user-based, non-tax revenue stream creates dedicated financial capabilities and improves ability to do multi-year planning	Moderate: if there is a high degree of revenue fluctuation, it may be difficult to appropriate funding to retain dedicated full-time equivalent staffing; municipality could lose institutional knowledge	Moderate: comparably easier to assess financial capacity and assign resources even if that capacity may be statutorily limited
Household Affordability Impact	High: property taxes are generally deemed as regressive	High: property taxes are generally deemed as regressive	Low: User fees are still somewhat regressive but usually much smaller in actual dollars compared to water and sewer charges	Low: if tied to a “user pay” levy, would mostly likely be borne by those directly benefitting from the infrastructure	Moderate: not as regressive as a pure tax but still correlated to property valuation without explicit income recognition

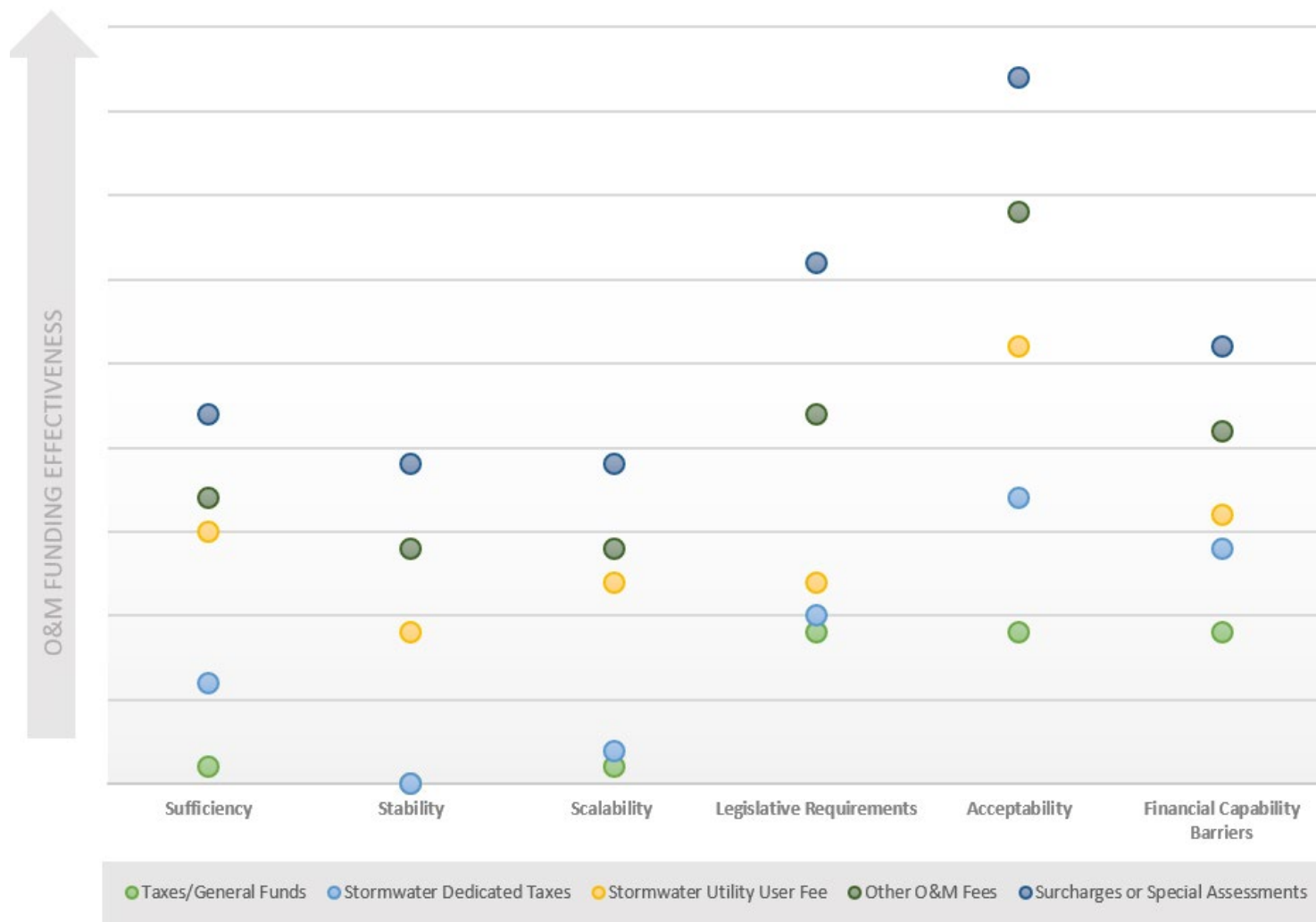


Figure I-1. Impact of recurring and/or intermittent funding sources on a utility's ability to effectively fund O&M operations.



Figure I-2. Impact of one-time sources/initiatives on a utility's ability to adequately fund capital infrastructure investments.

Table I-3. Financial Capacity Impact of One-Time Financing Sources—Capital Infrastructure.

Evaluation Criteria	One-Time Financing Sources for Capital Projects/Initiatives				
	Grants	Bonds	Low-Interest Loans	Capital Revenue Fees	Developer Contribution
Revenue Sufficiency	Moderate: will usually be sufficient for a single project but rarely for an entire system on a recurring basis	Strong: allows for payment over extended period, creating ability to pay for larger projects and still have cash flow for ongoing O&M; however, a dedicated funding source is needed to pay the bond commitments	Strong: allows for payment over extended period of time, creating ability to pay for larger projects and still cash flow for ongoing O&M; however, a dedicated funding source is needed to pay the loan	Low: generally, municipalities earmark this revenue stream for pay-as-you-go infrastructure investments, and capital plan needs in any given year may exceed that	Low: generally tied to economic development or redevelopment, which can be very volatile
Cost of Borrowing Impacts	Moderate: typically requires some financial commitment or cost share by the municipality, which is sometimes itself a barrier	High: interest expense, ongoing disclosure requirements and debt and financial management obligations recur through the life of the bonds	Moderately high: typically rates are subsidized and below market; has fewer disclosure and other recurring requirements, but still requires good debt and financial management practices	None: generally municipalities earmark this revenue stream for pay-as-you-go infrastructure investments	None: one-time cash inflow, against which municipalities generally do not borrow or pledge toward debt
Flexibility in the Use of Funds	Low: federal and maybe even state grants require single audit and related verification	High: if the bonds are tax exempt, the main restrictions are those related to IRS requirements	High: generally the only restriction is that the project must be associated with the lender agency's mission	Very high: local, internally generated revenues generally do not have restrictions	High: only restriction might be that contributions be used for growth-driven investments in the immediate area of development
Legislative Requirements	Almost none: grants are well-established tools that may only require formal approval and acceptance by the municipality	Low: while some states and many municipalities impose some guidelines or limits, generally local governments are not restricted to use bonds	Low to moderate: some lending agencies require more collateral or a pledge of a supplemental revenue stream, which may require further authorization by the municipality	Low: there may in some states be a requirement to justify based on cost of service	Low: political willingness to implement impact fees (or equivalent) is generally the only barrier
Community Acceptability	High: assuming the local match is not a barrier, municipalities generally welcome grants	Moderate to high: there may be some aversion to debt in the community but generally this does not preclude bond issuance	High: federal or state agencies may also be more willing to work with a financially distressed community than the capital market creditors	Moderate: introduction of fees may be more politically palatable than taxes	Moderate: may galvanize resistance among the developer community as being disruptive to their business model
Community Financial Capability Barriers	High: many communities lack the institutional knowledge or funding for grant application writers and grant administrators	High: generally bonding relies on access to credit markets, which can be a barrier to poor or small municipalities and requires good financial management	Moderate: still requires good financial management practices but federal and especially state agencies often can provide technical and administrative assistance that small, poor or rural communities might not otherwise be able to access	Moderate: recommended best practices include segregated financial accounting and reporting to show citizens revenues are being deployed as represented—a potential barrier for small, poor or rural communities without the requisite staff	Moderate: requires financial and technical expertise to properly track and account for these non-recurring revenues

Evaluation Criteria	One-Time Financing Sources for Capital Projects/Initiatives				
	Grants	Bonds	Low-Interest Loans	Capital Revenue Fees	Developer Contribution
Household Affordability Impact	Low: one of the most favorable weighted cost of capital options	High: borrowing, even at favorable interest rates, is still the highest cost of capital	Moderately high: few programs offer pure “zero interest” borrowing	Low: capital-related fees are often small in absolute dollars	None: in most cases, developers typically bear the upfront costs, and many cities require “growth pays for growth” so that costs are not subsidized by the general rate base

Appendix II: Municipal Financial Reporting and Asset Management

In 1999, in a document known as Statement 34,⁴² the Governmental Accounting Standards Board paved the way for a fairly large shift in the way public sector entities produce financial reports.

Statement 34 discussed infrastructure assets: “long-lived capital assets that are normally stationary in nature and normally can be preserved for a significantly greater number of years than most capital assets. Examples of infrastructure assets include roads, bridges, tunnels, **drainage systems** [emphasis added], water and sewer systems, dams, and lighting systems. Buildings, except those that are an ancillary part of a network of infrastructure assets, should not be considered infrastructure assets for purposes of this statement.”

In the excerpt below, Statement 34 encourages asset management:

[Depreciation expense] may be calculated for (a) a class of assets, (b) a network of assets,ⁱ (c) a subsystem of a network,ⁱⁱ or (d) individual assets...

Infrastructure assets that are part of a network or subsystem of a networkⁱⁱⁱ (hereafter, eligible infrastructure assets) are not required to be depreciated as long as two requirements are met. First, the government manages the eligible infrastructure assets using an asset management system that has the characteristics set forth below; second, the government documents that the eligible infrastructure assets are being preserved approximately at (or above) a condition level established and disclosed by the government.^{iv} To meet the first requirement, the asset management system should:

- a. Have an up-to-date inventory of eligible infrastructure assets
- b. Perform condition assessments^v of the eligible infrastructure assets and summarize the results using a measurement scale
- c. Estimate each year the annual amount to maintain and preserve the eligible infrastructure assets at the condition level established and disclosed by the government.

ⁱ A network of assets is composed of all assets that provide a particular type of service for a government. A network of infrastructure assets may be only one infrastructure asset that is composed of many components. For example, a network of infrastructure assets may be a dam composed of a concrete dam, a concrete spillway, and a series of locks. [This footnote

ⁱⁱ A subsystem of a network of assets is composed of all assets that make up a similar portion or segment of a network of assets. For example, all the roads of a government could be considered a network of infrastructure assets. Interstate highways, state highways, and rural roads could each be considered a subsystem of that network.

ⁱⁱⁱ If a government chooses not to depreciate a subsystem of infrastructure assets based on the provisions of this paragraph, the characteristics of the asset management system required by this paragraph and the documentary evidence required by paragraph 24 [which leaves documentation to professional judgment] should be for that subsystem of infrastructure assets.

⁴² Governmental Accounting Standards Board. 1999. *Basic Financial Statements—and Management’s Discussion and Analysis—for State and Local Governments*.

http://www.gasb.org/cs/ContentServer?site=GASB&c=Document_C&pagename=GASB%2FDocument_C%2FGASBDocumentPage&cid=1176160029121

- iv The condition level should be established and documented by administrative or executive policy, or by legislative action.
- v Condition assessments should be documented in such a manner that they can be replicated. Replicable condition assessments are those that are based on sufficiently understandable and complete measurement methods such that different measurers using the same methods would reach substantially similar results. Condition assessments may be performed by the government itself or by contract.

The Louisiana Division of Administration spoke for the vast majority of public sector entities across the U.S. when it recommended in 1999 that the state "...choose the alternative, to depreciate the capitalized infrastructure assets. We feel that this is the most cost-effective approach for reporting since there would not be any significant burden involved in depreciating the infrastructure assets once they have been identified and capitalized. The schedules of capitalized infrastructure assets would simply include a column to compute the amount of annual depreciation. Under the modified approach, the capitalization requirements are the same as under the depreciation alternative. However, the cost and effort to follow the requirements of the modified approach would be significant and therefore more of a burden than depreciating the infrastructure assets. In addition, with the uncertainty of state funding to cover the additional costs of maintaining the state's infrastructure at specified condition levels as prescribed in the modified approach, it is possible that the state would have to revert to the depreciation alternative at some point in the future and face a qualification in the year we fail to maintain at the designated level."⁴³

To date, less than 10 percent of the roughly 42,158⁴⁴ units of government are estimated to be using the modified approach. Municipal finance officials already face burdensome reporting and financial statement preparation requirements that greatly inhibit their ability to produce independently audited financial statements much before 120 to 180 days from the end of the previous fiscal year. Assuming infrastructure assets have an expected useful life of 10 to 30 years, this completely ignores changes over time in inflation, labor, building materials and technology and potentially introduces a very material gap between "book value" and replacement cost. In a 2017 piece of research, RBC Capital Markets noted, "A comprehensive inventory of public assets is a critical prerequisite to identifying opportunities to create new value."⁴⁵ Reliance instead on a depreciation-based, historical cost reckoning of infrastructure assets rather than an assessment that explicitly correlates asset condition to financial value not only introduces public policy-making risk but also makes it more challenging to establish a baseline FCA.

⁴³ Louisiana Division of Administration. n.d. "GASB Statement 34 Implementation Issues: Infrastructure Reporting—Modified Approach vs. Depreciation."

<http://www.doa.la.gov/osrap/library/gasb34/infrastructure%20reporting.pdf>

⁴⁴ Hogue, C. 2013. *Government Organization Summary Report: 2012*.

<https://www.census.gov/content/dam/Census/library/publications/2013/econ/g12-cg-org.pdf>. (This Census summary identifies 38,910 general purpose governments. It excludes special and school districts but does include 3,248 special districts categorized as "drainage and flood control.")

⁴⁵ RBC Capital Markets and HR&A Advisors. 2017. "Unlocking Value from Public Assets: Leveraging Private-Sector Expertise to Generate New Public Benefits." p. 46.

Appendix III: Case Studies

1. Washington, D.C. Stormwater Retention Credit Trading:
The U.S.'s First Stormwater Retention Trading Market in the Nation's Capital
2. Five San Francisco Bay Area Voter-Approved Fee Measures:
Stormwater Infrastructure User Fees
3. Stormwater Utility, Goodlettsville, TN:
Watershed Protection through Stormwater Management
4. Los Angeles Parcel Tax Approved by Voters in 2018 (Measure W):
Stormwater Infrastructure User Fees
5. How Operation and Maintenance Costs Effect Resiliency in Coralville, IA:
Managing Flooding and Quality of Life
6. Stormwater Utility, Downers Grove, IL:
Flood Risk Reduction, Erosion Control, Water Quality Protection, and Drainage Infrastructure Management
7. Watershed Protection in Austin, TX:
Flood Risk Reduction, Erosion Control, Water Quality Protection, and Drainage Infrastructure Management
8. Stormwater Program Implementation in Atlanta, GA:
Water Quantity (Aging Infrastructure, Flood Management, Drainage) Water Quality (Regulatory Compliance, TMDLs), Expanding Expectations (public outreach, multi-use areas)
9. Washtenaw County, MI:
Summary Report of Stormwater Program Needs
10. City of Raleigh, NC:
Basin Master Planning
11. City of Bellevue, WA Storm and Surface Water System Plan 2015:
WQ, Flood, Infrastructure, WIPs, Drainage
12. City of San Diego, CA:
Watershed Asset Management Plan (2013)
13. City of Grand Rapids, MI:
Flood Protection, Sediment Reduction, and Stormwater Quality Compliance in Water Quantity (MS4 Permit and TMDLs Compliance)
14. City of Griffin, GA:
Stormwater Pipe Assessment: Water Quantity (Infrastructure, Drainage)
15. Ventura County, CA:
Flood Protection and Stormwater Quality Compliance
Water Quantity (Flood Protection) and Water Quality (MS4 Permit and TMDLs Compliance)

16. Stormwater Utility, Lawrence, KS:
Flood Risk Reduction, Erosion Control, Water Quality Protection, and Drainage Infrastructure Management
17. Metropolitan Water Reclamation District of Greater Chicago:
Working hard to manage stormwater, clean wastewater and recover valuable resources.
18. Stormwater Environmental Utility, Sarasota, FL:
Control water quantity, enhance water quality, effectively manage stormwater
19. Gentilly Resilience District, Orleans Parish, LA
A unique pilot program to finance reduced flood risk, slow land subsidence and improve energy reliability
20. Clean Water Partnership (CWP)
A Water Quality P3 approach in Prince George's County, Maryland

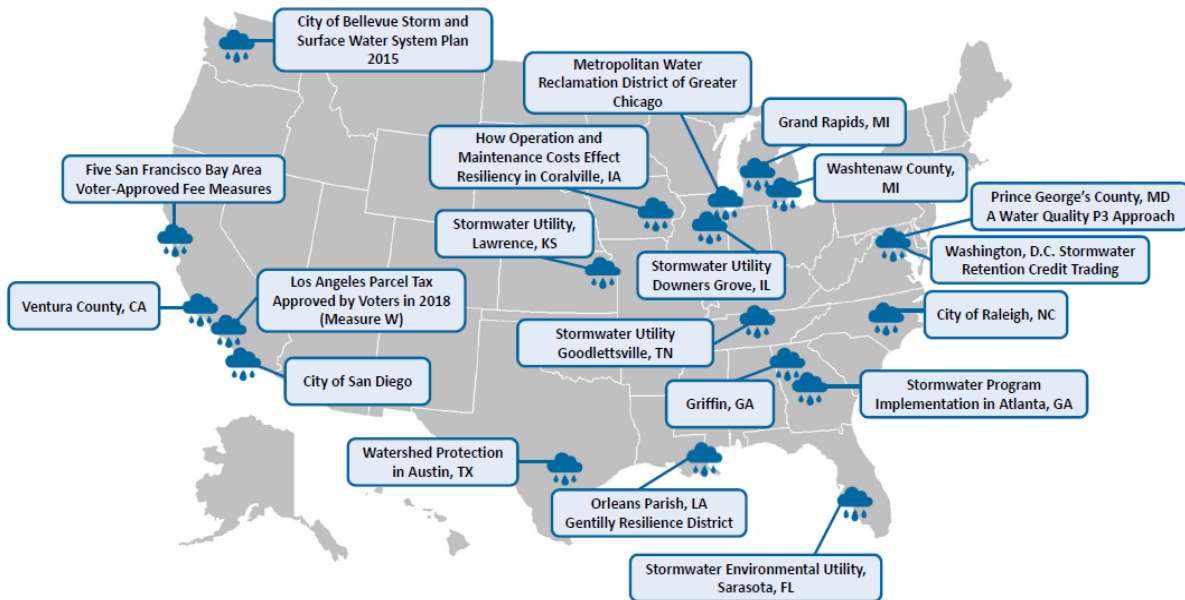


Figure III-1. Map depicting the location of various utilities included in the case studies.

Washington, D.C. Stormwater Retention Credit Trading



The U.S.’s First Stormwater Retention Trading Market in the Nation’s Capital

In 2013 Washington, D.C. promulgated new stormwater retention regulations for new development or substantial improvement projects. Part of these new regulations was the introduction of the Stormwater Retention Credit Trading market, which allows these regulated projects to purchase up to 50% of their stormwater management requirements offsite, in the form of Stormwater Retention Credits (SRCs). This allows regulated properties to pursue more cost-effective compliance methods and provides financial incentives for properties to voluntarily install stormwater management practices. The underlying regulation and the new market are designed to help the District meet its MS4 permit requirements and 2025 TMDL goals in a cost-effective way, using private investment and private property.

Challenges

Polluted stormwater runoff is a primary threat to water quality nationwide and is one of the biggest threats to the Chesapeake Bay. The Chesapeake Bay is the largest and most productive estuary in North America. Economists value fishing and hunting, tourism, and shipping activities along with increased property values in the Bay at over \$1 trillion per year. Stormwater runoff represents the second largest source of nutrient and sediment pollution and is the only sector in the Chesapeake watershed growing in its impact, due to population growth and land development. At the same time, many cities are struggling to finance the water infrastructure improvements needed to prevent stormwater runoff.

Washington, D.C. is 43% impervious and is a major source of this stormwater runoff, which impacts the local Anacostia River, Potomac River and Rock Creek as the water flows out to the Chesapeake Bay. However, getting retrofits installed to serve the 43% of D.C.’s land area that is impervious is a difficult challenge. The majority of this impervious surface achieves little or no retention, is not required to retrofit, and does not have financing available to support a retrofit.

Further, Washington, D.C.’s Department of Energy and the Environment (DOEE) estimates that to meet its permit requirements and achieve its water goals, \$10 billion in investment is necessary. However, DOEE only collects ~\$10 million in revenue per year.

Solution

DC’s Department of Energy and the Environment (DOEE) has developed a first-of-its-kind in the country stormwater retention credit trading program for new development and major renovations. This

County or Municipality

Washington, D.C.

Population

702,445

Annual Rainfall

40.78 inches

Land Area

68.34 square miles

Poverty Level

17.4%

Total Identified Need

\$10 billion

Annual Capital Budget

\$10 million

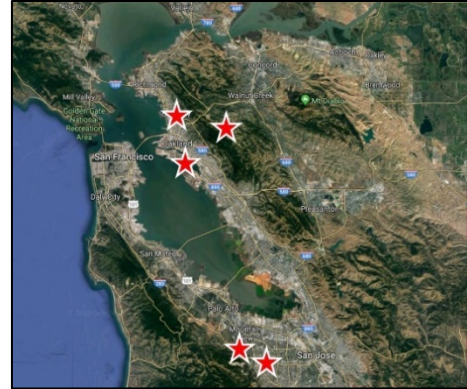
Annual O&M Budget

N/A

program requires new projects to retain the stormwater generated from their development. However, to help land-constrained property owners meet these requirements, the city instituted a credit market for stormwater, which allows these regulated projects to purchase up to 50% of their stormwater management requirements offsite, in the form of Stormwater Retention Credits (SRCs). The SRC market was designed with two goals in mind: i) provide a cost-effective solution for developers to meet their retention requirements, while achieving significant co-benefits for the city; and ii) allow the District to meet its own green infrastructure goals at a lower cost than it could using only public land and financing. Currently, SRCs are trading at close to half the cost of public delivery of equivalent infrastructure and it is estimated that the 2013 rule and subsequent SRC activity will increase spending on stormwater mitigation by 10x historic public investment. Further, DOEE recently introduced a public purchase program, Price Lock, whereby the District purchases projects at a market rate that best meet DOEE's clean water goals. These public purchases reduce the cost of compliance for the District and help bolster development of credit supply in parts of the District where stormwater mitigation is most needed.

Mitigating runoff at the cheapest cost possible is a major hurdle for jurisdictions in the Bay and around the country. Washington, DC is using the SRC market to prove that market forces can accelerate the deployment of green infrastructure through private investment and in doing so, obviate the need for future public gray infrastructure spending to reduce stormwater runoff.

Five San Francisco Bay Area Voter-Approved Fee Measures



Stormwater Infrastructure User Fees

Challenge 1:

In an effort to meet all NPDES permit requirements and provide adequate operating and capital funding for local aging stormwater infrastructure, five local municipalities needed to separately generate significant new revenue sources.

Challenge 2:

California’s 1996 Proposition 218 created a new category of user fee called a “property-related fee” that was subject to rate-payer approval in two steps: 1.) a noticed hearing where written protests from owners of a majority of the properties could stop a new or increased fee; and 2.) a ballot measure requiring a simple majority of property-owner voters. Although water, sewer and solid waste fees were exempted from the second step, stormwater was not, thereby severely limiting efforts to implement stormwater user fees over the past 23 years for most California municipalities. A common alternative is a parcel tax, subject to a typically more challenging two-thirds supermajority vote.

Challenge 3:

Municipalities needed to determine whether their communities would support this 2-step balloting process to implement a new local fee structure (or increase an existing one) to fund water quality and infrastructure needs.

Solution:

Five small- to mid-sized municipalities in the San Francisco Bay Area put new stormwater fee structures out for voter approval in 2018 and 2019 (with mixed results): Alameda, Berkeley, Cupertino, Los Altos and Moraga. Each municipality followed a similar approach including developing a comprehensive needs study or master plan, conducting a scientific survey of the community’s priorities and willingness-to-pay, and executing a community outreach and education process aimed at increasing awareness regarding local flooding; storm drainage infrastructure operations, maintenance and capital improvements; and water quality.

Table III-1 below compares the five municipalities including population, median income, stormwater needs and proposed rates. Notable is that the most affluent cities were the least supportive. Other trends included fee levels (higher fees had lower support) and the presence of an existing fee (more support if voters were accustomed to paying a fee).

County or Municipality

City of Alameda, City of Berkeley, City of Cupertino, City of Los Altos, Town of Moraga, CA

Population

307,000 (total over five cities)

Annual Rainfall

15.1 to 26.8 inches

Land Area

55.4 square miles

Poverty Level

3.25% to 19.80%

Total Identified Need

\$513 million

Annual Capital Budget

\$4.3 million

Annual O&M Budget

\$8.78 million

	<u>Alameda</u>	<u>Berkeley</u>	<u>Cupertino</u>	<u>Los Altos</u>	<u>Moraga</u>
Population	78,000	120,000	61,000	31,000	17,000
Capital Needs	\$170 m	\$208 m	\$79 m	\$29 m	\$27 m
O&M Needs (annual)	\$4,450,000	\$1,966,000	\$1,440,000	\$522,000	\$409,000
Annual Rev Req't	\$2,892,000	\$2,300,000	\$1,064,000	\$1,133,000	\$788,000
Existing Fee (\$/mo)	\$4.67	\$4.17	\$1.00	\$0.00	\$0.00
Proposed Fee (\$/mo)	\$6.50	\$3.57	\$3.70	\$7.33	\$10.03
Voter Support	57.0%	60.8%	51.2%	44.2%	48.0%
Result	Pass	Pass	Pass	Fail	Fail
Median Size Lot (sf)	4,792	4,792	7,405	10,454	7,405
Median Home Price	\$891,700	\$862,000	\$1,370,000	\$2,000,000	\$1,040,000
Median HH Income	\$89,979	\$76,000	\$153,000	\$208,000	\$139,000
Poverty Rate	8.10%	19.80%	4.70%	3.25%	3.90%

Table III-1. Comparison of five municipalities in California.

It should also be noted that all five of these fee mechanisms were property-related fees, which, under California law, is voted on by property owners – not registered voters – with one parcel equal to one vote. This balloting process excludes renters from voting, but includes owners of commercial, multi-family residential, schools and other public agencies; all of which are hit the hardest and are less likely to support such a fee.

Each municipality conducted a scientific survey ahead of time to help identify the most desired services and project, develop outreach messaging that resonated with the local community, and determine fee levels that would be supported. In the two communities that did not approve the fee, there was an effective, organized opposition campaign which generally focused on financial prudence, not stormwater issues – this type of opposition is particularly difficult to counter by a non-advocacy-bound public agency.

Statewide since 2002 (after a court decision that solidified the ballot requirement for stormwater fees), there have only been approximately 25 ballot measures for stormwater services funding in California, a state with over 500 cities, counties and towns – and about half have been approved by voters.

Stormwater Utility, Goodlettsville, TN

Watershed Protection through Stormwater Management



Overview

The City of Goodlettsville, TN is located in the North Central area of middle Tennessee. In 2013, the City completed a Stormwater Management Master Plan identifying the city’s drainage basins and recommended the enactment of a stormwater utility fee as a dedicated funding source.

History

The Stormwater Utility Ordinance, implemented in 2013, is organized into three main sections: Capital Improvements, Capital Maintenance, and Engineering review. The utility is responsible for all activities related to the operation and maintenance of the stormwater system, including master planning, the capital improvement program, and inspections.

As one of the first stormwater utilities created in middle Tennessee, the City of Goodlettsville has been a leader among local governments in developing such a program. The City of Goodlettsville assesses its residential customers on Equivalent Residential Units (ERU’s) which are based on the effective impervious area of the average single-family parcel of \$3.67 per month. The assessment of Commercial and Industrial properties is based on the actual impervious surface with on ERU equivalent to 2900 sq. ft. at \$5.50 ea. per month.

Flooding Level of Service is intended to protect habitable structures up to the 100-year, 24-hour rain event. Water quality requirements from regulatory ordinances include all new development or re-development of greater than one acre, or less than one acre if part of a larger common plan.

Capital Needs

To-date, the City has collected \$3,200,000 in stormwater utility fees and has spent \$1,400,000.00 in stormwater flood improvements, operations and maintenance throughout the city. Since implementation of the program, a rate increase has not occurred and the program has not taken out loans to fund projects. Future projects include Drainage Basin Area Study, Box Culvert Replacement and Upgrades, Major Roadway Drainage Study, and completion of a Flood Mitigation Program.

County or Municipality

City of Goodlettsville, TN

Population

16,859 (2018)

Annual Rainfall

62.3 inches

Land Area

14.1 square miles

Poverty Level

18.1%

Total Identified Need

\$1.25 million

Annual Capital Budget

\$400,000.00

Annual O&M Budget

\$850,000.00

Los Angeles Parcel Tax Approved by Voters in 2018 (Measure W)



Stormwater Infrastructure User Fees

Challenge 1:

In an effort to meet all the TMDLs for the Los Angeles basin area, the Los Angeles area municipalities needed to generate significant new revenue to pursue capital projects and other improvements.

Challenge 2:

California’s 1996 Proposition 218 created a new category of user fee called a “property-related fee” that was subject to rate-payer approval in two steps: a noticed hearing where written protests from owners of a majority of the properties could stop a new or increased fee; and a ballot measure requiring a simple majority of property-owner voters. Although water and sewer fees were exempted from the second step, stormwater was not, thereby stifling the move to a stormwater user fee mechanism over the past 23 years for most California municipalities. A common alternative is a parcel tax, subject to a two-thirds supermajority vote.

County or Municipality
Los Angeles County Flood Control District, CA

Population
9.5 million

Annual Rainfall
18.7 inches

Land Area
2,700 square miles

Challenge 3:

Municipalities needed to craft a measure(s) to please multiple constituencies:

Total Identified Need
\$20 billion

Annual Capital Budget
\$300 million

Annual O&M Budget
N/A

- Regulators, who would ultimately evaluate TMDL compliance under the NPDES Permit,
- LA County elected Officials who would need to put a ballot measure out;
- Local officials from nearly 80 cities within LA County who will be affected by any fee structure;
- Voters who would have the final say in whether a fee structure and attendant projects, programs and outcomes were acceptable; and
- Special interests who have significant influence with various voters in the Los Angeles area

Solution:

After a 2012 effort to create a county-wide property related fee mechanism was abandoned due to an inability to form necessary coalitions with local municipalities, school districts and the business community, the Los Angeles County Flood Control District (LACFCD) started again in 2017 to develop an expenditure plan to increase stormwater capture and reduce stormwater and urban runoff pollution under the auspices of the Safe, Clean Water Program. Specifically, the revenue would be allocated for regional multi-benefit projects, municipal projects, and District programs. The proposed tax, set at 2.5 cents per square foot of impervious surface, would bring in revenues of \$300 million per year in the Los

Angeles region. Forty percent would be allocated back to local municipalities within the District; fifty percent would be allocated to the nine watershed areas to fund regional watershed-based activities; and ten percent would be eligible for management and administration of the program.

The LACFCD contracted with Conservation and Natural Resources Group, LLC to provide ongoing and extensive water education and outreach.

On November 6, 2018 voters in Los Angeles County approved Measure W with a 69.5% majority (a two-thirds majority was required). The key to this success was the development of a robust and transparent expenditure plan and public outreach that focused on stormwater capture in a drought-prone region where up to 85% of storm flows went straight to the Pacific Ocean.

From the Safe, Clean Water Program website, their goals, “developed in collaboration with public health, environmental groups, cities, business, labor, and community-based organizations” are:

- Implement a new plan for L.A.’s water system to capture the billions of gallons of water we lose each year.
- Help protect our coastal waters and beaches from the trash and contaminants in stormwater that make people sick and threaten marine life.
- Modernize our 100 year-old water system infrastructure, using a combination of nature, science, and new technology.
- Help protect public health, ensuring safer, greener, healthier, and more livable spaces for all.
- Prepare our region for the effects of a changing climate — including recurring cycles of drought, wildfire, and flooding.
- Require strict community oversight and independent auditing to ensure local monies raised would stay local.

How Operation and Maintenance Costs Effect Resiliency in Coralville, IA

Managing Flooding and Quality of Life

The City of Coralville, IA funds the operation and maintenance of stormwater infrastructure through a local stormwater utility fee, property taxes, and federal/state road use tax.

Operation and maintenance activities related to local water quality include compliance of the City’s MS4 permit, which consists of staff time, training, and maintenance of water quality practices installed as part of public infrastructure projects (roadway projects); street sweeping; and catch basin cleaning.

Operation and maintenance activities related to flood control and water quantity include staff time and training, maintenance of the flood protection system (pump stations, permanent flood walls/barriers, earthen berms, and detention basins), and maintenance of the storm sewer system (catch basins, pipes, and outfalls).

In the last 25 years, Coralville has experienced two major flooding events on the Iowa River. In 1993, a flood described as a “100 year event” devastated homes and businesses, and caused millions of dollars in damage. Of the businesses affected, 20% chose to not rebuild. In 2008, the Iowa River flooded again. This time, it was a 500 year event with costs totaling \$21 million for commercial properties, \$4 million for residential properties, and \$7 million in damages to public infrastructure. After the 2008 flood, 40% of the businesses chose to not rebuild.

Following the 2008 flood, Coralville was awarded \$65 million in federal and state grants to create a flood control system, which the City implemented. This permanent flood control system is essential to protecting our community. Maintaining the floodwall and stormwater pump stations accounts for 40% of the total stormwater budget. The remaining budget covers staff and all other operations and maintenance-related activities mentioned above, leaving a deficiency in maintenance objectives and very little funding for capital improvement projects. One of the largest deficits can be seen in the maintenance of our regional detention ponds. These ponds protect residents from localized flooding events driven by heavy rainfall. This maintenance cost is estimated at 3 million now with an annual expense of \$50,000 in continuing unmet need.



County or Municipality

Coralville, IA

Population

21,664

Annual Rainfall

37 inches

Land Area

12 square miles

Poverty Level

14% of citizens are considered impoverished

Total Identified Need

\$3 million

Annual Capital Budget

\$0

One of the largest complaints Coralville receives from residents is related to localized flooding concerns on their property. Residents expect their municipality to protect them from flooding, whether it is from the Iowa River or stormwater in the roadway or behind their home. Maintaining regional detention ponds and the local storm sewer system is essential for reducing the risk of localized flooding. The maintenance of local detention ponds is not being completed due to the deficit in the stormwater budget.

Over the past five years, the Iowa Flood Center has observed a 40% increase in the precipitation amounts of large rain events. We see that data in action. We are experiencing an increased need to protect our community during these heavy rain events. We project that the ongoing maintenance requirements of our system will increase as our storm events become larger and more destructive. None of our stormwater systems are large enough to carry the rain events we have been experiencing. The oldest sections of town, where the storm systems tend to be the most undersized also coincide with our most impoverished and vulnerable populations.

Without additional funding to support the operation and maintenance cost of our stormwater system, we will continue to fall further behind. As storm events increase in size, these systems will be essential to protecting the quality of life of our residents.

Stormwater Utility, Downers Grove, IL

Flood Risk Reduction, Erosion Control, Water Quality Protection, and Drainage Infrastructure Management



Overview

The Village of Downers Grove, IL is located 22 miles west of Chicago. In 2006, the Village adopted a Stormwater Master Plan that provided information about the existing stormwater problems in the Village, the condition of the stormwater system, the adequacy of system components, and estimated costs for necessary maintenance, capital improvements and regulatory requirements at the time of publication.

A Stormwater Utility Fee was established in 2012 to provide a dedicated revenue for the identified stormwater management needs.

History

This 2006 Master Plan document provided the Village with information for establishing strategies for future infrastructure management, identifying preliminary budgetary needs, and identifying alternatives for financing an adequate stormwater program.

Prior to the Stormwater Utility, operating costs for the stormwater system were funded primarily through property taxes. Shifting the source of funding to a utility/fee-based system resulted in a reduction in the property tax levy by approximately \$2.48 million, beginning with the 2012 levy.

The Stormwater Utility Fee model represents an equitable method to collect revenue from those properties that place a demand on the system. Revenue is generated by charging all property owners a monthly stormwater fee, based on the property's impact to the stormwater system. The Village has created a plan that increases revenues over a 15-year period, allowing the Village to move from the current level of service to the recommended level within that time frame.

The plan calls for annual increases in the stormwater utility fee of approximately 8.5% per year, which

County or Municipality

Village of Downers Grove, IL

Population

49,649

Annual Rainfall

38 inches (Illinois)

System Attributes

- Approximately 7,000 drainage structures
- 315 stormwater detention facilities
- 130 miles of storm sewer pipes
 - 12 miles of streams
 - 140 miles of roadway ditches
- 47,000 feet of culverts

Poverty Level

5.39%

Total Identified Need

\$340 million

Annual Capital Budget

FY19 Budget includes \$7.08 million for stormwater capital projects.

Annual O&M Budget

\$2 million

would increase the annual revenue available for stormwater management fees from the level of \$4.6 million to about \$11.4 million in 2028.

Capital Needs & Funding Sources

The 2007 Watershed Infrastructure Improvement Plan identified estimated cost of \$340 million for stormwater management projects. The more recent 2014 Stormwater Project Analysis identified 17 non-floodplain and 3 floodplain projects to provide 95% protection for the 21 areas throughout the Village that were identified as significantly impacted by the April 2013 floods. The estimated cost to complete the 17 non-floodplain projects is \$11.6M and they are planned to be completed in 2020. The annual cost for stormwater maintenance activities are \$2.0M each year. However, it would cost about \$4 million per year to perform the recommended annual maintenance activities.

Watershed Protection in Austin, TX

Flood Risk Reduction, Erosion Control, Water Quality Protection, and Drainage Infrastructure Management



Overview

The mission of the City of Austin’s Watershed Protection Department (WPD) is to protect the lives, property, and environment of the community by reducing the impacts of flooding, erosion, and water pollution. The department provides services for the City of Austin and its extraterritorial jurisdiction through a combination of capital improvement projects, operating programs, and regulations. The department also serves as the City’s drainage utility—it is responsible for the operation, maintenance, renewal, and upgrade of the public stormwater infrastructure system. This includes the inspection and maintenance of assets that convey, store, and treat stormwater runoff while complying with state and federal regulatory requirements, such as the Municipal Separate Storm Sewer System (MS4) permit issued by the Texas Commission on Environmental Quality (TCEQ).

Over the years the City of Austin has received numerous awards for its watershed protection and management programs. In 2017, the Watershed Protection Department was the highest scoring Phase I MS4 program nationally among those submitting nominations for the annual Water Environment Federation / USEP MS4 awards program. Austin was also received gold-level recognition that year for innovation and for program management.

History

For more than three decades, WPD has been recognized as a national leader in watershed protection. The two most important events that helped shape the City’s watershed protection program were uncontrolled development in the late 1970s and the Memorial Day Flood of 1981. In the late 1970s, sediment from widespread construction visibly entered Lake Austin, the City’s water supply, and Barton Creek, a beloved community swimming and hiking area. Public concern led to calls for improved environmental protection through water quality and erosion controls for development. Around the same time, the Memorial Day Flood of 1981 underscored Austin’s geographic location in what is known as America’s

County or Municipality

City of Austin, TX Watershed Protection Department

Population (Jan 2019)

981,035

Average Annual Rainfall

34 inches

Estimated Rainfall in 24-hour Storm Event

25-year: Up to 9 inches
100-year: Up to 13+ inches

Land Area

326 square miles

Poverty Level (Jan 2018, U.S. Census)

15.4%

Total Identified Capital Need (10-Year Planning Estimate)

\$2 billion

Annual Capital Budget (FY19)

\$35 million annual transfer + developer mitigation fees + bonds

Annual O&M Budget (FY19)

\$104 million

Workforce (FY19)

349 full time employees
26 temporary employees

“Flash Flood Alley”—an area of unusually intense flooding events. In response to the storm’s devastating effects and loss of life, the City implemented a Drainage Charge in 1982 to provide funding for an expanded stormwater management program. In 1991, the City established a Drainage Utility to oversee and directly fund its stormwater management programs. The Watershed Protection Department (WPD) was created in 1996 through the merging of the flood and erosion programs in Public Works with the water quality protection programs of the Environmental and Conservation Services Department.

Capital Needs and Funding Sources

To fund its capital projects, WPD utilizes a combination of funding sources, including general obligation bonds, drainage fees, payment-in-lieu developer mitigation programs, and Certificates of Obligation from tax increment financing.

The department has identified more than \$2 billion in capital needs to address the City’s most severe flood, erosion, water quality, and infrastructure maintenance needs over the next 10 years. With an estimated capital budget of approximately \$700 million over that same timeframe, the department utilizes principles defined in the department’s Watershed Protection Master Plan, Strategic Asset Management Plan, and City of Austin Long-Range CIP Strategic Plan to prioritize solution implementation within its budget.

The department continues to evaluate and update its best practices for stormwater management and CIP prioritization by incorporating community priorities, policy decisions, and the latest technical data, such as the Atlas 14 historic rainfall study.

Stormwater Program Implementation in Atlanta, GA



Water Quantity (Aging Infrastructure, Flood Management, Drainage), Water Quality (Regulatory Compliance, TMDLs), Expanding Expectations (public outreach, multi-use areas)

The City of Atlanta is a regional center located in the Southeastern United States. Situated in the headwaters of two river basins, the City provides drinking water, wastewater, and watershed management services to nearly half a million people within the City’s jurisdictional boundaries and some areas outside the boundaries. The Department of Watershed Management (DWM) is responsible for the NPDES MS4 permit in addition to state and regional requirements. DWM stormwater functions include watershed improvement planning, drainage improvements, asset management, water quality improvements, regulatory compliance, and public education and outreach. The City has a combined sewer system (CSO), which has resulted in increased emphasis on stormwater infiltration practices to reduce the stormwater runoff load to the CSO.

Stormwater Program Funding

The City of Atlanta does not have a dedicated funding source for stormwater management activities and stormwater management is currently limited to meeting regulatory mandates and addressing emergency repairs. Much of the existing stormwater drainage infrastructure within the City is nearing the expected lifespan and will need to be repaired or replaced. In addition, many customer requests for stormwater infrastructure improvements have not been addressed due to the lack of adequate funding.

Increasing stormwater-related regulatory requirements, changing weather patterns, more frequent nuisance flooding issues, and aging infrastructure needs have prompted the DWM to consider a dedicated funding source and develop annual operating and capital funding needs. An evaluation of future resource needs identified 122 full time equivalent (FTE) employees, \$12 million in annual operating costs, and \$18 million in annual capital expenditures to meet stormwater program requirements and level of service. This is an approximately 50% increase over current resource and funding levels.

County or Municipality

City of Atlanta, GA

Population

498,044 (2018 US)

Average Annual Rainfall

49.71 inches (NOAA)

Land Area

136.7 square miles

Poverty Level

22.4% (U.S. Census)

Total Identified Needs

FTEs – 122

Annual Operating Costs - \$12 million

Annual Capital Costs - \$18 million

Annual Total Costs – \$30 million

Current Capital and O&M Budget

FTEs – 60.5

Annual Operating Costs - \$6.6 million

Annual Capital Costs - \$12.5 million

Annual Total Costs – \$19 million

Extent of Service Area

Stormwater services will be provided for the following areas:

- ◆ Municipally owned rights of way
- ◆ Municipally owned drainage easements
- ◆ Municipally owned ponds and structural stormwater control facilities
- ◆ Rivers and streams on municipally owned property or the ROW

The City's inventory within municipally owned property or within public Right of Way includes an estimated 150 miles of stormwater pipe; 9,500 catch basins; 10,000 headwall, manholes, outfalls, culverts, and other miscellaneous stormwater structures. A significant portion of this stormwater infrastructure is not maintained on a routine basis; is reaching the normal engineering lifespan and is in need of repair or replacement. Stormwater facilities on private property are excluded from the City's Extent of Service.

The City of Atlanta is a leader in implementing green infrastructure programs and developing creative funding solutions such as MOST, grants, and an Environmental Impact Bond. However, meeting the identified funding needs gap will take additional creative planning, coordination, and communication with local and national stakeholders.

Washtenaw County, MI

Summary Report of Stormwater Program Needs

We have completed Master Plans for some of our larger sub-systems (8 of some 550). We have an asset management plan (AMP), but no predictable means of planning capital work due our organizational structure as a special assessment agency by statute. Our current goal is to increase annual spending on minor, pro-active preventative maintenance where we have authority (we can spend \$0.97 per foot of drain without a petition). We are working to raise awareness of capital needs to achieve a goal of petitions that result in \$5-\$10M of capital projects annually. Information from our AMP suggests that we could proceed for 10-15 years in this fashion (working on whatever people are willing to ask us to work on at their expense) without compromising any logical sequence of capital improvements.

Our system replacement value is estimated at \$430M in today's dollars. Our data source is our Asset Management Plan which indicates that about 15% of our system is in immediate need of replacement due to complete lack of function. We are currently seeking to raise awareness of these and other poorly performing sections of infrastructure with those who would pay. Our only mechanism for capital project initiation is by petition, so long-range planning is a challenge. Because we can receive a petition from either a group of citizens or as a Resolution from a municipal agency, we have started a process of seeking regular approval of major maintenance on an annual basis with municipalities within our jurisdiction. We have currently done this with 6 of the 28 municipalities and hope to use this process for capital work also. We have currently done a 5-year plan with each. The idea is to annually have an approved one-year budget and acceptance of a rolling 5-year budget forecast – for most of our municipalities.

Due to having systems that pre-date current water quantity management design standards, all of our capital work focuses on improving water quality while striving to maintain the quantity management of the original system. In some cases, the water quality measures (such as extended storage) may provide an ancillary quantity benefit in smaller storms (85th percentile or smaller, so first flush to one-year storm sizes may have quantity benefit).

The County does include MS4 permittees, but not the entire system as our service area includes urbanized and rural census tracts. Generally, our enclosed pipes in our urbanized area are designated MS4s and open ditches are not. Our biggest problems are in the urbanized areas but those are generally not available for federal or state funding for improvements, because we are supposed to be responsible



County or Municipality
Washtenaw County, MI

Population
360,000

Annual Rainfall
35 inches

Land Area
446 square miles

Poverty Level
14.5% population below poverty level

Total Identified Need
\$64.5 million

Annual Capital Budget
Varies by petitions received

Annual O&M Budget
\$4.1 million

for those through the unfunded mandate of MS4. (Incidentally, the MI State Supreme Court ruled that MS4 regulations were NOT an unfunded mandate, stating that [paraphrased] “municipalities have never been mandated to provide drainage systems, so MS4 regulations only apply to those communities who have chosen to have stormwater systems.”).

City of Raleigh, NC

Basin Master Planning

The City of Raleigh, NC has performed and completed a number of past drainage basin and watershed-based studies. Approximately ¾ of the city area has been covered by basin studies, although some of these were completed more than twenty years ago. The studies have looked primarily at infrastructure hydraulic capacity and flood hazard reduction needs and projects. Some studies have also reviewed water quality-related needs with projects identified including lake restoration/retrofit and stream stabilization/restoration opportunities along with other water quality-oriented projects. Recently (earlier in 2019) the City completed the first phase of a multi-phase integrated watershed master planning project. As part of this recent work, the City asked its consultant to identify and summarize stormwater projects identified from past basin studies but not yet constructed. In this context, the total of stormwater projects identified from past basin studies is approximately \$280 million, escalated to 2019 dollars.

In addition to this, the City has approximately \$60 million of projects that are assumed to be beyond what has been identified from past studies. The current CIP plan includes master planning, water quality retrofits, flood hazard reduction, lake-related projects, stream restoration, and neighborhood and street drainage system repair projects.

We have developed a preliminary estimate of citywide needs related to stream stabilization/restoration, which has not been included in past studies. The preliminary estimate for citywide stream stabilization/restoration needs is approximately \$120 million, which is beyond stream-related projects identified in the basin studies. Within the past several years, the City's Stormwater Program has also expanded its scope and assumed responsibility for City owned/operated Stormwater Control Measures (SCMs) and Dams. Approximately \$10 million in capital repair needs has been identified for dams while assessment continues for both SCMs and Dams.

In summary based upon the above, a preliminary estimate of capital improvement program needs for the City's Stormwater Management Program is approximately \$470 million.

The planning period for this portfolio is assumed as 20 to 30 years, although implementation will be a function of future stormwater program revenues that may be available over time. (Note this preliminary planning level CIP total does not include the estimated annual needs for MS4 operation,



County or Municipality

Raleigh, NC

Population

458,862

Annual Rainfall

46 inches

Land Area

145.98 square miles

Poverty Level

16.8% households under \$25K income

Total Identified Need

\$470 million

Annual Capital Budget

\$11.1 million

Annual O&M Budget

\$14.3 million

maintenance, and MS4 repairs and rehab from a developing asset management perspective. The annual needs related to asset management are included within the response to Question #3.)



City of Bellevue, WA Storm and Surface Water System Plan 2015



WQ, Flood, Infrastructure, WIPs, Drainage

The City's Storm and Surface Water plan evaluates the operational management of the Utility, providing a "roadmap" for future planning. It is a tool to help the City meet federal, state, and regional regulations. Key focus areas include: control damage from storms (100 year, 24 hour storm event), protect surface water quality, support fish and wildlife habitat and protect the environment.

Primary challenges include **aging infrastructure, reduced forest cover, global climate change and a new class of pollutants** has emerged as a potential threat to aquatic and human health over the last decade. Pharmaceuticals and endocrine disrupters (found in some pesticides or other products applied to the landscape) are increasingly being detected in receiving water bodies. Stormwater has been identified by the Puget Sound Partnership as a primary pressure impacting the health of Puget Sound.

Bellevue does not have widespread flooding problems. The City is in 100% compliance with Phase II NPDES Municipal Permit

Rate Structure: Accounts are billed at different rates depending on the intensity of development (undeveloped, lightly developed (20%), moderately developed (40%), heavily developed (70%), very heavily developed (over 70%) and wetlands). 2019 rates include billing charge \$5.88, plus charge per 2,000 square feet depending on intensity of development noted previously, \$0 wetlands, \$.098 undeveloped, \$7.08 lightly developed, \$8.84 moderately developed, \$13.26 heavily developed and \$17.65 very heavily developed.

Bellevue has a successful and established asset management program.

The Renewal and Replacement (R&R) reserves were established by the City Council in 1995 to better position the City for the future by planning for the inevitable replacement of the utility system. The Utilities Department has assets with a replacement value of over \$3.5 billion in 2010 dollars, and about half of this aging infrastructure is past mid-life.

County or Municipality
City of Bellevue, WA

Population

147,599 (recent US census estimates)

Annual Rainfall

42 inches of rain, on average

Poverty Level

7.37% of overall population. Median household income 2019 \$105K

Total Identified Need

\$275 million next 20-years

Annual Capital Budget

\$13.5 million annual rate funded capital from operations and asset replacement account funding (average \$11.5 million 2016 – 2019).
No debt funding

Annual O&M Budget

\$13.4 million (average \$12.5 million 2016 – 2019)

Accumulating R&R reserves in a measured way to pay for the proactive replacement of aging systems before they fail. Managing reserves that fund the replacement of that infrastructure is critical to financial sustainability. R&R reserves ensure that the Utilities Department is financially prepared to respond to emergency events. Use of R&R reserves is governed by state law and the Utilities financial policies (established by City Council resolution in 1995; see Chapter 4 Policies).

R&R needs are projected using asset management data to determine the timing and estimated cost of replacing systems over time. Annual revenues set aside for infrastructure replacement are based on projected replacement cash flow needs over a 75-year forecast period less projected interest earnings. In 2015, the storm and surface water repair and replacement fund had a balance of \$43.8 million and projected to increase to \$70 million by 2044 (Figure III-2).

Recommendations include:

Continue investing in the Flood Control Capital Program to reduce or eliminate local flooding caused by insufficient public drainage system capacity. Continue to use King County Flood Control Zone District Sub-Regional Opportunity funds. Invest in cost-effective water quality projects. Consider emerging technologies and techniques that improve water quality for pilot projects. Continue to invest in the Fish Passage Improvement Program to remove fish passage barriers created by impassable culverts, debris jams, or accumulated sediment, which opens spawning and rearing habitat for salmon populations. Continue to invest in the Stream Channel Modification Program to construct habitat improvements on stream channels. Invest in the Stream Restoration for Mobility and Infrastructure. Continue to invest in the Stormwater System Conveyance Infrastructure Rehabilitation Program to rehabilitate or replace defective storm drainage pipelines and ditches identified in the condition assessment program. Continue to invest in Minor (Small) Storm and Surface Water Capital Improvement Projects, to resolve deficiencies, improve efficiencies, or resolve maintenance problems. When possible, complete in conjunction with other Bellevue programs such as the transportation overlay program.

Description	20-Year Total	% of Total
Minor Storm & Surface Water Capital Imp. Projects	\$ 2,052,000	0.75%
Storm Water System Conveyance Infrastructure Rehabilitation	\$ 10,457,000	3.80%
Replace Coal Creek Pkwy. Culvert at Coal Creek	\$ 26,000	0.01%
Replace NE 8th St Culvert at Kelsey Creek	\$ 136,000	0.05%
Stormwater Pipeline Video Inspection Enhancement	\$ 246,000	0.09%
Long-Term R&R - Mains	\$ 97,492,738	35.41%
Long-Term R&R - Facilities	\$ 348,166	0.13%
Long-Term R&R - Additional Costs	\$ 6,852,242	2.49%
Long-Term R&R - Contingency (40% of Aging Infrastructure)	\$ 39,136,362	14.21%
Fish Passage Improvement Program	\$ 2,533,000	0.92%
Stream Channel Modification Program	\$ 3,642,000	1.32%
Flood Control Program	\$ 5,790,000	2.10%
Stream Restoration for Mobility & Infrastructure Initiative	\$ 108,000	0.04%
Lower Coal Creek Flood Hazard Reduction	\$ 6,128,000	2.23%
Storm Water Quality Retrofit in Kelsey Creek	\$ 342,000	0.12%
Long-Term Environmental Preservation Projects	\$ 36,752,063	13.35%
Long-Term Mobility & Infrastructure Projects	\$ 63,295,219	22.99%
Long-Term Mandate Compliance Projects	\$ -	0.00%
Total	\$ 275,336,791	100.00%

Figure III-2. 2015 stormwater-related budget for the City of Bellevue, WA.

City of San Diego, CA

Watershed Asset Management Plan (2013)

In order to anticipate and justify current and projected costs of complying with federal, state, and local stormwater regulations, the City of San Diego developed an integrated Watershed Asset Management Plan (“WAMP”) for its stormwater management system. The WAMP was finalized in 2013 and aims to lay the groundwork for meeting regulatory requirements by ‘annualizing’ long-term compliance needs as well as documenting and communicating expectations of citizens regarding functions of the storm drain system and the quality of water and related services. The first element of the WAMP assesses the current inventory, costs, and condition of the City’s stormwater system. Assets are categorized as “hard,” “natural,” or “soft” and valued accordingly. After assessing the current state of City-managed assets, the WAMP goes on to quantify a long-range forecast of funding necessary to maintain a baseline level of service. The projections are calculated using a custom-built database which balances refurbishment and replacement costs to keep assets functionally above a minimum acceptable threshold. The result of this forecasting projected a 100 year need of nearly \$20 billion (in 2013 dollars); equating to about \$200 million per year, accounting for regulatory compliance, capital, and O&M costs. Lastly, the plan articulates various potential funding sources and scenarios for achieving targeted levels of service. Scenarios range from current budget to full funding attainment and lay out resulting backlog of needed infrastructure upgrades that would result from each scenario. Developing a WAMP is an iterative process requiring continual input from stakeholders, new or improved data, and updates to fiscal modelling efforts as awareness of costs becomes more sophisticated, particularly in accounting for effects of climate change. Currently, the City is undertaking a comprehensive update of its WAMP in order to reflect new regulations, assets, and cost estimates. The process of developing a WAMP can also serve to inform the regulatory process. In particular, an asset management perspective in context of a TMDL could substantiate reasonable compliance schedules for water quality attainment. In the context of stormwater permitting, an asset management plan could be used as a compliance mechanism alternative to meeting water quality-based limitations.



City of San Diego Watersheds

County or Municipality

San Diego, CA

Population

1,419,845 million¹

Annual Rainfall

10.13 inches²

Land Area

325 square miles³

Poverty Level

14.5%⁴

Total Identified Need

\$3,128,424,9385 (FY2019-35)

Annual Capital Budget

\$2,666,667 (FY2020)

Annual O&M Budget

\$51,967,670 (FY 2020)

¹ E-1 Population Estimates. Demographics. California Department of Finance website.

² Western Regional Climate Center website

³ 2018 Census Gazetteer Files-Places. United States Census Bureau website

⁴ United States Census Bureau website-QuickFacts City of San Diego.

City of Grand Rapids, MI

Flood Protection, Sediment Reduction, and Stormwater Quality Compliance Water Quantity (MS4 Permit and TMDLs Compliance)

The Environmental Services Division (ESD) is responsible for managing stormwater within the City of Grand Rapids. The primary goals of the City’s stormwater program are to reduce the impacts of flooding and erosion (water quantity) and to improve water quality in local rivers, lakes, and streams. This includes complying with the City’s MS4 permit and TMDL requirements for E. coli and biota. To help meet these goals, the City developed a stormwater master plan that incorporates a 20-year asset management plan and capital improvement plan (CIP), as well as other stormwater- and sustainability-related City initiatives.

The City’s asset management plan identifies four level of service scenarios for stormwater management, including three new levels of service (A, B, and C) and the existing level of service. The new levels of service were designed to meet regulatory requirements, goals for infrastructure renewal and replacement, and operations and maintenance. In addition, each scenario allocates a percentage of capital investment to green infrastructure practices. Under the City’s plan, level of service A represents the highest level of service, while B and C result in subsequently lower service requirements.

Based on an evaluation of existing stormwater assets and a comprehensive risk assessment, the City developed a 20-year CIP for level of service B, which represents the mid-range level of service from the asset management plan. The City estimated that total annual funding requirements for this desired level of service would amount to \$14.7 million per year (for 20-years). However, due to funding constraints, the City is now aiming to achieve the levels of service associated with scenario C of the asset management plan, which will require \$10.4 million in annual expenditures. This compares to annual funding requirements for maintaining existing levels of service of \$3.6 million.

In Michigan, it is difficult to establish a stormwater utility because of legal circumstances. Thus, the City’s stormwater program is funded from the City General Fund, as well as the Local and Major Streets, Refuse, and Vital Streets Funds. The Vital Streets program, which includes green infrastructure and other



County or Municipality
City of Grand Rapids, MI
Environmental Services Division

Population
198,829 (2017)

Annual Rainfall
37 inches

Land Area
45.3 square miles

Poverty Level
15.8% (persons in poverty, 2017 1-year estimate)
MHI \$48,521

Annual Revenue
\$599,986 (FY 2018) – from licenses and permits, state grants, charges for services

Annual Budget*
\$3,867,433

Total Identified Need
\$6,509,567 per year (through 2033)

stormwater components as part of comprehensive street improvement projects, has been funded for the last 15-years through a voter-approved income tax.

In FY 2018 the City's budget for stormwater management and maintenance was \$2.7 million, while the capital budget amounted to \$1.2 million (including approximately \$674,00 from the General Fund and \$536,000 from Vital Streets). The total \$3.87 million budget is below the funding needed to meet the City's level of service goals. While the City continues to make progress and has been recognized nationally for its excellence in service and innovation,⁴⁶ bridging this funding gap will require additional sources of funds and/or a longer timeline for achieving the City's goals.

⁴⁶ In 2017, the City of Grand Rapids received a gold recognition in program management award through the Water Environment Federations' National MS4 and Green Infrastructure Awards Program.

City of Griffin, GA

Stormwater Pipe Assessment: Water Quantity (Infrastructure, Drainage)

The City of Griffin lies on the continental divide with watersheds draining to two different basins. Located about an hour south of Atlanta, this small MS4 Phase 2 community created the first stormwater utility in the state of Georgia and has been on the forefront of stormwater management for many years.

The City prepared a condition and risk assessment of all stormwater infrastructure within the City boundaries in 2016. The assessment included 6,792 pipes and associated infrastructure. Condition assessment was developed using a standardized approach and defined criteria. Only infrastructure in the poor category were considered for replacement estimates as a capital expense. Not included in the estimate is on-going maintenance expense associated with clearing pipes blocked with debris. Up to 30% of the stormwater infrastructure is considered blocked in some areas, reducing the effectiveness of the conveyance system and increasing maintenance costs.

Risk assessment criteria included FEMA floodzones, proximity to buildings, and road classification. Infrastructure determined to be high risk and poor condition will be prioritized for maintenance and/or replacement.

As part of this study, a replacement cost estimate was developed based on comparable construction costs and included factors such as pipe material, pipe diameters, and replacement method. Only for stormwater infrastructure determined to be in poor condition, the replacement cost is estimated to be \$23 million.



County or Municipality

Griffin, GA

Population

22,878 (US Census 2018)

Annual Rainfall

49.7 inches (US Climate Data)

Land Area

14 square miles (US Census 2018)

Poverty Level

31.4% (US Census 2018)

Total Identified Need

\$23 million

Annual Capital Budget

\$443,000

Annual O&M Budget

N/A

Ventura County, CA

Flood Protection and Stormwater Quality Compliance

Water Quantity (Flood Protection) and Water Quality (MS4 Permit and TMDLs Compliance)



The Ventura County Public Works Agency’s Watershed Protection District (VC WPD) is the regional flood protection service provider in Ventura County in addition to local systems in ten incorporated Cities of Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Ventura, Santa Paula, Simi Valley and Thousand Oaks. VC WPD is also leading collaborative efforts by the County of Ventura and ten incorporated Cities to implement requirements of the Ventura 2010 Municipal Separate Storm Sewer System (MS4) Stormwater Permit No. CAS004002 since 1992, when Ventura County Board of Supervisors adopted a benefit assessment levy for stormwater and flood management in Ventura County. Since passage of Proposition 218 in 1996, the assessment rates have not changed, because voter approval is required. Consequently, annual revenue of approximately \$40,499,155 has not changed, while the recent annual budget for MS4 Permit/TMDLs compliance and VC WPD’s flood control was over \$74 Million* (this amount does not include Cities’ flood control budgets). The funding gap is supported by the County and Municipal General Funds, Grant funding, and fund balance, which are highly variable sources due to competing needs for General Fund funding, competitive nature of grant programs, and short-term availability of fund balance. In addition, fees for municipal services, e.g., inspections of businesses, industrial facilities, and construction sites, help fund MS4 compliance activities.

Flood protection needs in the County are driven by aging infrastructure and flood risk reduction. It is estimated that over 50% of facilities will need to be replaced or rehabilitated within the next 30 years at a significant cost not supported by current revenues.

The Ventura MS4 Permittees are subject to 16 Total Maximum Daily Loads (TMDLs), of which 13 TMDLs are enforceable after incorporation into the MS4 Permit in 2010. Compliance with the upcoming new Permit and approaching TMDL deadlines will require for planning and implementation of costly

County or Municipality
County of Ventura, Ventura County Watershed Protection District, and ten incorporated Cities of Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Ventura, Santa Paula, Simi Valley and Thousand Oaks, CA

Population
850,967

Annual Rainfall
18 inches

Land Area
2,208 square miles

Poverty Level
9.5% (persons in poverty)
MHI \$81,972

Annual Revenue
\$40,499,115

Annual Budget*
\$74,129,564

Total Identified Need
\$2,305,178,303 (2021-2050 CIP)
\$87,530,290/ year (O&M after 2050)

stormwater treatment structural best management practices (BMPs).

The roughly estimated structural BMP implementation cost for Ventura MS4s are driven by the three effective and assumed two future watershed-wide Bacteria TMDLs. In particular, the wet weather compliance is very expensive undertaking for each watershed in Ventura County. Significant new CIP funding is already needed to meet upcoming 2023, 2026, and 2029 deadlines for existing Bacteria TMDLs. Past the year of 2050, anticipated as final compliance deadline for future TMDLs and completion of flood control improvements, the annual operation and maintenance (O&M) cost was estimated at approximately 3% of the total estimated CIP costs. As discussed with regulatory agencies, the current and future funding gap continues to be a significant challenge for Ventura MS4s.

Stormwater Utility, City of Lawrence, KS

Flood Risk Reduction, Erosion Control, Water Quality Protection, and Drainage Infrastructure Management



Overview

The City of Lawrence, KS, is located 35 miles northwest of Kansas City. In 1996, the City adopted a Stormwater Management Master Plan that analyzed the performance capability of the existing drainage system, recommended improvements to the facilities, and recommended the creation of the Stormwater Utility and corresponding stormwater fee.

History

The 1996 master plan provided a framework for the City to create and operate a Stormwater Utility. The utility is responsible for all activities related to the operation of the stormwater system, including planning, capital facility construction, street sweeping, and educational programs.

The plan also recommended the implementation of a stormwater fee to provide a dedicated source of revenue. The impervious area fee is an equitable means of collecting revenue from users in proportion to their demands on the system. In 1996, the fee was set at \$2.00 per equivalent residential unit; this fee was increased to \$4.00 by 2003 and was not adjusted again until 2016. Currently the fee is \$4.37.

The City has recently begun a comprehensive stormwater rate study and financial plan in anticipation of increasing the size of the utility's capital program and completing the capital projects identified in 1996.

Capital Needs

The initial master plan identified 41 individual projects at a total cost of approximately \$62 million (2019 dollars), while implementing a stormwater fee that would generate approximately \$1.2 million per year. Average revenue has been \$2.9 million since 2003, which has been sufficient for annual operating costs and debt service but left little for new capital facilities. The current five-year capital improvements plan identifies projects totaling \$26 million, which the utility plans to meet after paying off its outstanding debt in 2018 and establishing a program of regular rate increases.

County or Municipality
City of Lawrence, KS

Population
97,286

Annual Rainfall
39.92 inches

Land Area
26.3 square miles
17 main watersheds

Poverty Level
21.8%

Total Identified Need
\$62 million

Annual Capital Budget
\$1.3 million

Annual O&M Budget
\$1.9 million

Annual Stormwater Revenue
\$3,233,000

Metropolitan Water Reclamation District of Greater Chicago

Working hard to manage stormwater, clean wastewater and recover valuable resources.



Overview

The Metropolitan Water Reclamation District of Greater Chicago (MWRD) serves approximately 10.35 million people each day, residents of Chicago and 128 suburban communities.

Through a variety of engineered solutions, both green and gray, and flood-prone property acquisitions, MWRD's Stormwater Management Program addresses both regional and local flooding problems throughout Cook County, IL.

In 2015, the MWRD adopted a Green Infrastructure Plan to increase the acceptance and investment of GI throughout Cook County. Since that time, the MWRD has partnered with dozens of agencies to fund GI projects such as rain gardens, bioswales/bioretention areas, permeable pavement systems, and rain water harvesting systems. These projects will provide up to 5 million gallons of stormwater runoff storage to over 1,400 benefiting structures.

History

For years, stormwater management in Cook County had been a patchwork of efforts by local, regional, state and federal agencies. In 2004, the Illinois General Assembly enacted Public Act 93-1049 allowing for the creation of a comprehensive stormwater management program in Cook County under the supervision of the Metropolitan Water Reclamation District of Greater Chicago (MWRD).

The Act required MWRD to develop the Cook County Stormwater Management Plan. The Cook County Stormwater Management Plan provides the framework for the stormwater management program, including its mission, goals, and program elements.

The MWRD's countywide Stormwater Management Program's mission is to provide Cook County with effective rules, regulations and capital improvement projects that will reduce the potential for stormwater damage to life, public health, safety, property and the environment.

Under the plan, the MWRD established Watershed Planning Councils and completed Detailed

County or Municipality
Metropolitan Water Reclamation
District of Greater Chicago,
Cook County, IL

Population
10.35 million (service area)

Annual Rainfall
38 inches (IL)

Land Area
822.1 square miles

Poverty Level
15.9% (Cook County)

Annual Capital Budget
\$34.5 million (FY19 Budget)

Watershed Plans for all six major watersheds in Cook County.

MWRD has made significant investments in developing over 140 capital stormwater projects since it assumed the authority for stormwater management in 2004. These projects, which range in both size and scope, provide flood protection for thousands of homes, businesses, and critical infrastructure.

Capital Needs & Funding Sources

Public Act 93-1049 gives MWRD the authority to levy a tax and to issue bonds for the development and administration of countywide stormwater management. Although the District's authority for the program applies to all of Cook County, the tax levy is only applicable to commercial and private property located within the District's corporate limits. The District's stormwater management program is currently funded by the stormwater tax levy.

The District utilizes the stormwater tax levy and additional funding mechanisms to finance the countywide program.

Stormwater Environmental Utility, Sarasota County, FL

Control water quantity, enhance water quality, effectively manage stormwater



Overview

The County of Sarasota, FL, is located in the coastal plain of southwest Florida. In 1987, the County completed a Stormwater Management Master Plan that identified the county's drainage basins and recommended the enactment of a stormwater utility fee as a dedicated funding source.

History

The Stormwater Environmental Utility (SEU) was established in 1989 and is organized into four main sections: Master planning, Capital improvements, Maintenance, and Development review. The utility is responsible for all activities related to the operation of the stormwater system, including master planning, the capital improvement program, inspection and maintenance of the stormwater management system, and the proper use, storage, disposal of sediments, herbicides and other materials.

The assessment methodology has gone through several legal challenges and changes since its inception in 1989. As one of the first stormwater utilities created in Florida, Sarasota County has been a leader among local governments in developing such a program. In contrast to the engineering practice of impervious and flow rate calculations, the rate structure was changed in 1994 to a system that considers the pervious and impervious areas of each parcel as the method of assessment (all lands act like impervious surfaces during 5-yr, 25-hr rain events). The Sarasota County SEU assesses its customers based on Equivalent Stormwater Units (ESU's) that are based on the effective impervious area of the average single-family parcel.

Flooding level of Service (LOS) is intended to protect habitable structures up to the 100-yr, 24-hr rain event. Water quality expectations from regulatory pressures are significant and reach beyond the Stormwater Environmental Utility to include wastewater treatment and reuse water for irrigation.

Capital Needs

To-date, the SEU has spent about \$600,000,000 in stormwater LOS flood improvements, operations and maintenance. Water quality expenditures for the SEU have been approximately \$20,000,000. Current Total Maximum Daily Load (TMDL) requirements are forecast to have an unmet need of \$400,000,000 that will be distributed to various sources of nutrient loading in the County over the next 20 years.

County or Municipality
Sarasota County, FL

Population
419,689

Annual Rainfall
52.99 inches

Land Area
725 square miles
6 main watersheds

Poverty Level
18.6%

Total Identified Need
\$400 million

Annual Capital Budget
Varies

Annual Stormwater Revenue
\$21 million

Various sources of local funding are being exercised in public dialog. All typical sources are under consideration to include sales tax, ad-valorum and special assessments.

Gentilly Resilience District, Orleans Parish, LA

A unique pilot program to finance reduced flood risk, slow land subsidence and improve energy reliability



The City of New Orleans participated in HUD’s National Disaster Resilience Competition (NDRC) and proposed the creation of the City’s first comprehensive resilience district in an area called Gentilly. The district includes projects that invest in innovative and creative solutions so that people, culture and infrastructure can thrive. A focus on Gentilly presents opportunities to leverage existing projects and investments, to reduce flood risk, and to support the area’s recovery and revitalization. New Orleans was awarded more than \$141 million through NDRC to implement elements of the Gentilly Resilience District Proposal, building on existing investments in urban water management funded through the FEMA Hazard Mitigation Grant Program (HMGP). Gentilly is an historic neighborhood that was designed to provide home ownership to middle class African Americans at a time when other housing developments barred people of color. The NDRC competition focused on homes in areas that are low-lying with low to moderate income residents. Gentilly was a perfect match for this funding source.

Challenges:

Flooding and Recovery from Hurricane Katrina: New Orleans receives on average 60 inches of rain per year. The drainage system can handle one inch of rain the first hour and one-half inch thereafter. Rainfall at greater rates causes flooding in the many low-lying areas. Further, these low-lying areas are former marshlands with organic (highly porous) soils that need water to remain stable. Pumping drains these soils of the water, causing them to shrink like a sponge and swell again when it rains. This leads to subsidence; damaging streets and building foundations. This area has seen a large number of flood insurance claims as identified by FEMA and reducing flood risks to the neighborhood would be beneficial for the residents and the economy. And of course, the rain runoff from the Gentilly neighborhood eventually drains into Lake Pontchartrain, carrying many pollutants with the runoff, reducing the water quality within the Lake.

Solution:

The Gentilly Resilience District is designed to be a model for how other neighborhoods in New Orleans,

County or Municipality

Orleans Parish, LA

Population

391,006

Annual Rainfall

60 inches

Land Area

349.85 square miles

Poverty Level

26%

Total Identified Need

\$141 million

Founding Source

HUD

Annual O&M Budget

N/A

Data Sources:

<https://www.nola.gov/resilience/resilience-projects/gentilly-resilience-district/>

across the region, and across the country, can adapt to thriving in a changing environment. The City is working with partners such as the New Orleans Redevelopment Authority (NORA) and the Sewerage & Water Board of New Orleans (SWBNO) to leverage existing investments in Gentilly and build on the experience of relevant pilot projects – from rain gardens, to street improvements/storage, to retrofit of existing wetlands to investments in micro-grids, to training and education programs – throughout the City. The program includes 12 projects in both public and private areas, schools, parks and a university (Dillard College campus). By leveraging the HUD funding with ongoing activities and investments from planned work from NORA and SWBNO, these projects are anticipated to reduce flood risk, slow land subsidence and encourage neighborhood revitalization.

The Sewerage and Water Board of New Orleans already has a few environmental projects planned within the neighborhood that help meet the requirements of an existing sewer consent decree. At the same time, NORA has a goal to enhance affordable housing through the City and abandoned housing still remains within the neighborhood due to Katrina damages. The HUD funding provided for this program can provide a match to already existing funding or enhance and hasten development by creating new community amenities.

Clean Water Partnership (CWP)

A Water Quality P3 approach in Prince George's County, MD



Prince George's County, MD adopted the Clean Water Partnership initiative which began March 26, 2015 as a public-private partnership (P3) delivery approach to modernize and retrofit its stormwater infrastructure and meet TMDL goals by 2025 in a cost-effective way. This program is a community based P3 that strives to meet MS4 goals, engage the community, provide jobs and spur business growth.

Challenges:

Water Quality: Under state and federal regulations, the County is working to improve water quality conditions in its streams and other local waterbodies. The water quality in the stream had degraded over the years due to excess pollutants such as Total Nitrogen (TN), Total Phosphorus (TP), Total Suspended Solids (TSS) and trash. The streams in the County flow into the Chesapeake Bay and transport these pollutants, thereby degrading the quality of the Bay. The 2014 MS4 permit for the County requires compliance to the EPA Regional 3 TMDL for the Chesapeake Bay, which includes working with other states in the watershed to meet TMDL reductions by 2025 with 60 percent of the reduction requirements to be met by 2017.

To reach the MS4 permit requirements, the County, under State guidance, developed a watershed implementation plan (WIP) that included the retrofit of approximately 8,000 acres of untreated impervious area by 2017 and an additional 7,000 acres by 2025 in order to meet the Chesapeake Bay TMDL goals.

Reaching the MS4 targets by 2025 would be difficult due to the large amount of impervious area to be treated within the timeframe, limited County resources and the inability of the County's CIP process to handle the increased work required. A fast-track, efficient and cost-effective solutions would be required.

Solution:

Prince George's County selected to engage in an aggressive Urban Watershed Restoration Impervious Area Treatment Plan that would enhance the County's traditional CIP to implement BMPs at a faster pace and, on a parallel track, adopt a P3 approach to implement and maintain best management practices that would treat up to 4,000 acres of untreated impervious area.

The CWP is a design-build-operate-maintain community-based public-private partnership (P3) business model between the County and a private partner. The CWP is a long-term arrangement and successful delivery of services are paid under a dedicated funding mechanism, the Clean Water Act Fee,

County or Municipality
Prince George's County, MD

Population
909,308

Annual Rainfall
41.69 inches

Land Area
500 square miles

Poverty Level
8.6%

Total Identified Need
\$1.2 billion

Annual Capital Budget
N/A

Annual O&M Budget
N/A

Program Scorecard

established by the County with new authorizing legislation in 2013. Collection of the fee began in FY 2014 and is collected through the property tax bill. Even though collected on the property tax bill, this fee is not a tax and applies to all property owners; including non-profits. The fee is used to pay the debt service on EPA State Revolving Loan funds, which are borrowed to fund the CWP activities.

The County established the performance goals and the private entity in the partnership is expected to meet the terms of the performance-based contract. Base and incentive fees for the services provided are paid through the Clean Water Act Fee.

County officials believed that streamlining with the CWP processes would reduce the cost by at least 30 percent. The estimated cost of treatment per acre was estimated to be \$100,000 vs \$70,000 for traditional CIP versus this P3 program. In addition, less County resources would be required for management, over 40 County-based minority business enterprises were projected to provide services within the first 3 years of the program, and 51 percent of the labor hours would be required to be contributed by County residents under CWP.

After three years of program implementation, the county goal was met to retrofit 2,000 acres, in half the time, for half the price, while increasing outreach to community stakeholders and investing in small, local minority and disadvantaged businesses according to their third annual progress report. More recently, the County reports that as of the end of May 2019, there are 100 sites over 2,165 acres, no growth in the number of County employees needed for the program, \$100.4 million spent on local/minority business participation with 53% of county resident workforce utilization and significant investment in youth and educational programs.

Appendix IV: Stormwater Funding Database

As part of its charge, the Task Force led the development of a database of funding and financing sources commonly used by communities and municipalities to fund their stormwater infrastructure. The database is not a comprehensive list of all sources; rather, it includes the most commonly used sources at the federal and state level. Local funding sources, which are often used by municipalities and communities, were not captured in this effort. It was decided by the Task Force that local sources vary so greatly from year to year and from community to community such that they could not be accurately captured. The complete database can be found on the EPA's Water Finance Infrastructure and Resiliency Finance Center webpage (<https://www.epa.gov/waterfinancecenter>) and has been uploaded to the Water Finance Clearinghouse.

Data Sources

This section summarizes the variety of sources used to populate the Stormwater Funding Database.

Water Finance Clearinghouse

The Water Finance Clearinghouse, which is a web-based portal that contains information and resources on drinking water, wastewater, stormwater infrastructure, and other areas within the water sector, was developed by EPA's Water Infrastructure and Resiliency Finance Center. Within the Water Finance Clearinghouse, funding sources were pulled by applying a "stormwater" filter to narrow the results to 377 sources, which were then uploaded to Microsoft Access. The data were reviewed for duplicates and all national federal programs were limited to one entry, since some federal grants were listed several times but in relation to only one state. The State Revolving Fund (SRF) grants, however, were broken down into several entries, one for each state/territory.

Federal Funding Programs – Stormwater and Green Infrastructure Projects

EPA had previously developed a table containing all known federal funding programs that involve stormwater and/or green infrastructure project components. The sources pulled from the Water Finance Clearinghouse were cross referenced to this table and any missing data were added.

Stormwater Infrastructure Finance Task Force

The Task Force provided recommendations and documentation of potential sources to include in the database.

Technical Approach

This section summarizes the different variables, or fields, that were used in the database as well as the procedure for entering and quantifying the data.

The Water Finance Clearinghouse provided many fields of data that were narrowed down to what was relevant to the charge, as seen in Table IV-1 below. A few fields were also added to directly provide information to help answer some of the charges. A few of the fields were limited to the options provided in bullets below to simplify filtering the data by source type, agency, funding use, etc. For the funding amounts, if the source does not have a range and only has a fixed amount allocated each year,

the amount was placed in the “max” field and the “min” field was left blank.

Table IV-1. Stormwater Funding Database Fields.

Program Name	Name or brief description of source
Source	Who is providing the funds?
Source Type	<ul style="list-style-type: none"> • Taxes/general funds • Fees • Stormwater utility • Grants • Bonds • Loans • Public-private partnerships
Agency	<ul style="list-style-type: none"> • Federal • State • Local • Private (including non-profit)
Website	URL
State	State or National
How Funds are Issued	<ul style="list-style-type: none"> • Application process • Fund allocation to states and localities • Competitive vs. non-competitive process • Long-term programs vs. one-time allocation • Grant vs. loan programs
How Funds are Used	<ul style="list-style-type: none"> • Capital • O&M • Compliance
How Funds are Utilized	How are funds coordinated with other sources of funding?
Funding Amount Min	What is the typical annual minimum amount of funding amount for this program?
Funding Amount Max	What is the typical annual maximum amount of funding amount for this program?
Funding Requirements	What are the requirements for receiving these funds?