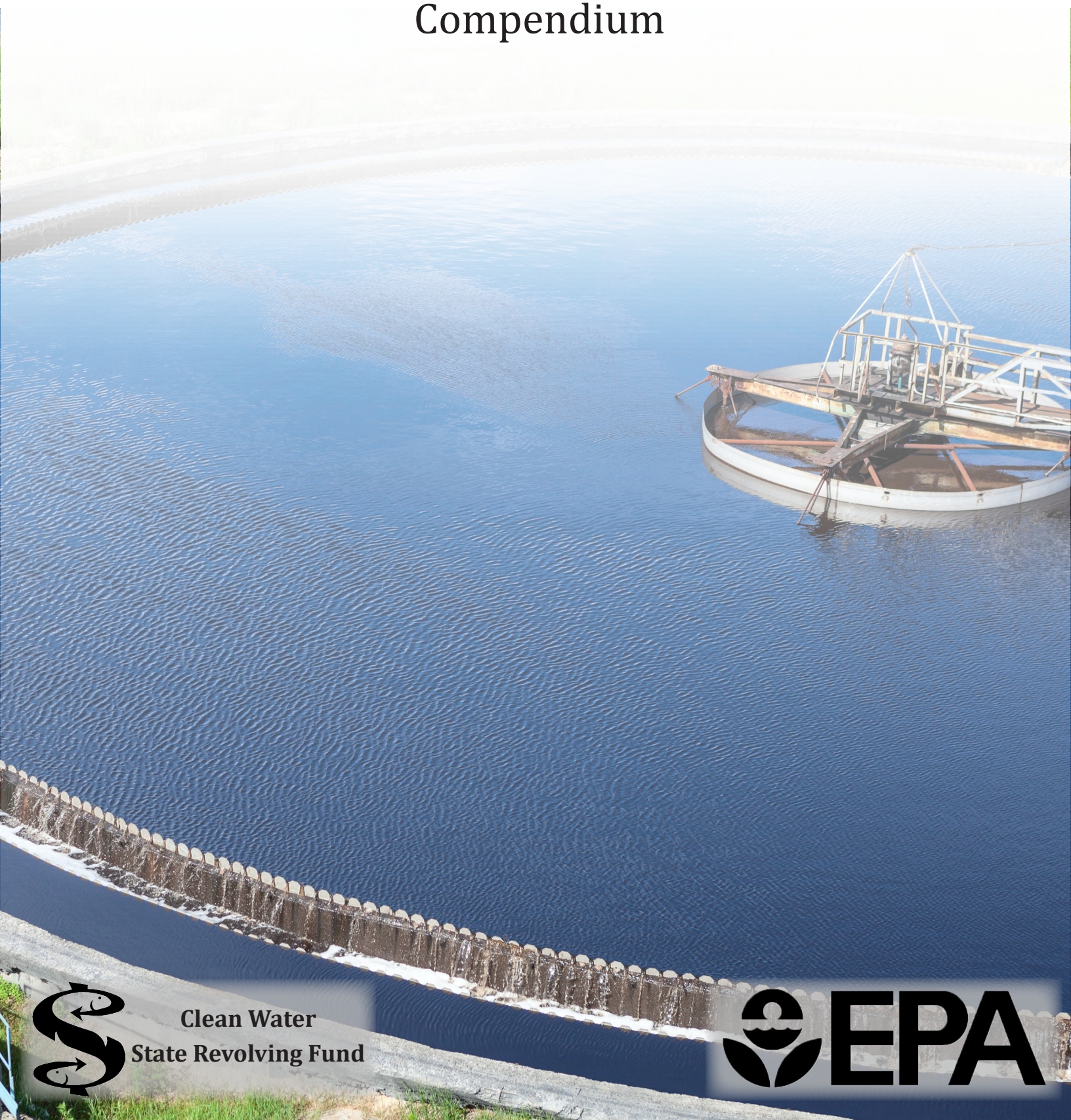
PISCES
Recognition Program

2018
Compendium



Clean Water
State Revolving Fund

EPA

Director's Address

Dear Colleagues,

Last year, we relaunched the Performance and Innovation in the SRF Creating Environmental Success (PISCES) program, and it was a huge success. This year is no different: our state partners demonstrated innovative and impressive projects. Project nominations from all 10 EPA Regions are represented in this year's PISCES recognition, and they cover a wide variety of technologies, financing methods, and creativity.

The scale and complexity of the recognized projects represent the determination, coordination, and imagination our partners put forth to achieve their water quality goals. These projects are a testament to the significant role the Clean Water State Revolving Fund (CWSRF) plays in building our nation's infrastructure while providing many benefits for public health, local economies, and the environment.

I want to thank all the people who participated in the development and financing of these recognized projects as well as those who nominated or reviewed the projects for this year's PISCES. Thank you.

Sincerely,

Andrew Sawyers, Ph.D., Director
Office of Wastewater Management

Recognizing Success

The CWSRF's Performance and Innovation in the SRF Creating Environmental Success (PISCES) program allows assistance recipients to gain national recognition for exceptional projects funded by the CWSRF. Participating state programs each nominated one project that demonstrates one or more of the evaluation criteria:

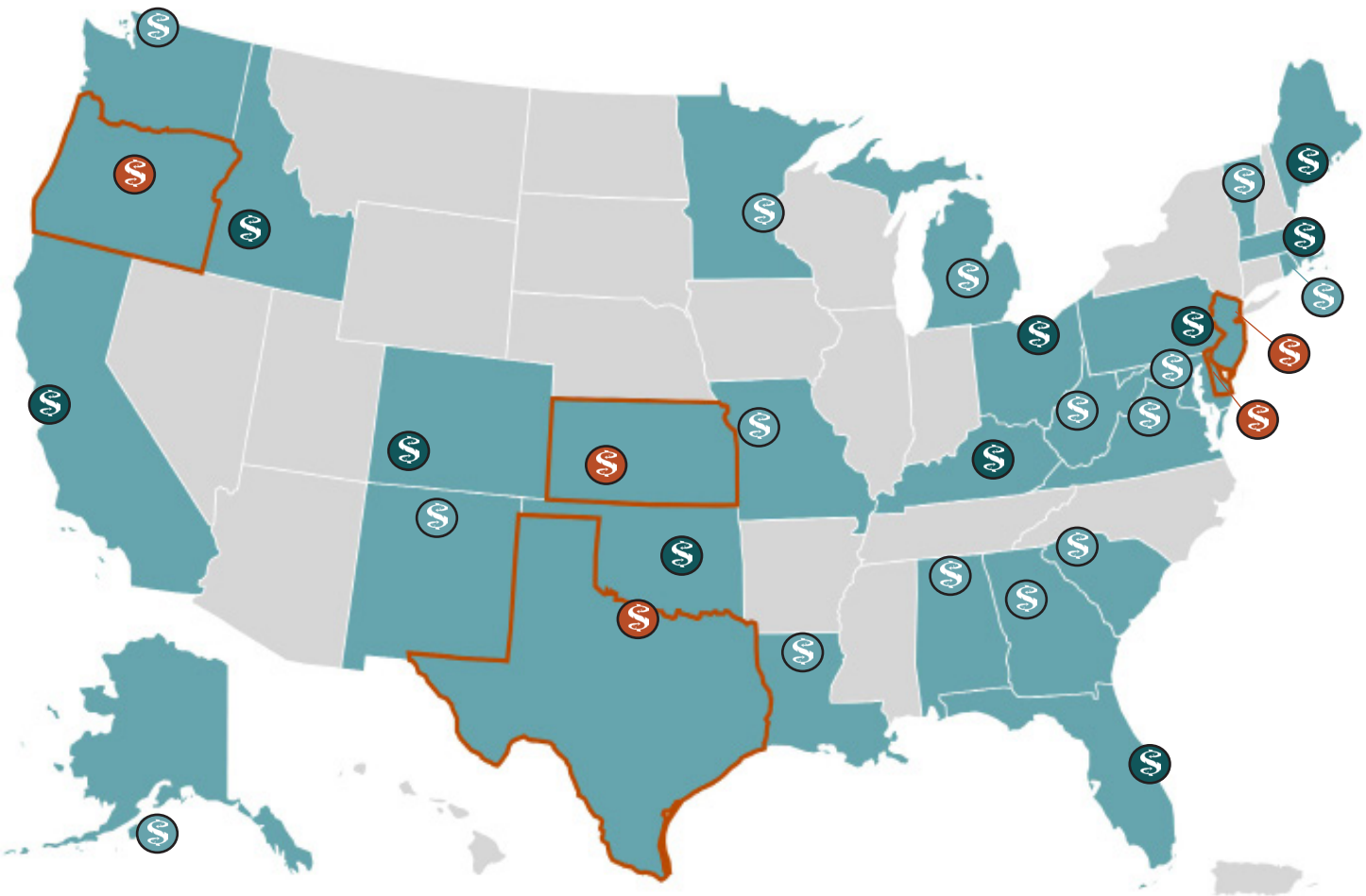
- Water quality, public health, or economic benefits
- Sustainability
- Innovation

Projects eligible for recognition must have an executed assistance agreement in place, but they may be any size and be operational or in the planning phase. After reviewing all project nominations, EPA selected five exceptional projects for further recognition. These five projects demonstrated excellence in matching the PISCES criteria and pushed the envelope of innovation in using the CWSRF to achieve clean water for their communities. Several additional projects closely demonstrated this level of innovation and are recognized as an Honorable Mention.

We hope that you will enjoy learning about this year's PISCES projects in this annual compendium and that they will inspire continued success in the CWSRF.

Table of Contents

2018 PISCES PROJECTS



Exceptional Projects

Delaware:	Wilmington Renewable Energy and Biosolids Facility
Kansas:	Dodge City Biogas Reuse to Motor Fuel Project
New Jersey:	South Monmouth Regional Sewerage Authority Pump Station Resiliency
Oregon:	Prineville Crooked River Wetlands Complex
Texas:	Wichita Falls Permanent Reuse Project

Honorable Mentions

California:	Lake Merced Green Infrastructure
Colorado:	Santa Rita Water Reclamation Facility
Florida:	Minuteman Causeway Stormwater/Streetscape Improvements
Idaho:	Nampa Wastewater Treatment Plant Upgrade
Kentucky:	Lincoln County Sanitation District Junction City to Hustonville Sewer
Maine:	Lewiston-Auburn Water Pollution Control Authority Anaerobic Digestion
Massachusetts:	Grafton Wastewater Treatment Plant Improvements
Ohio:	Avon Lake Lateral Loan Program
Oklahoma:	Atoka Reservoir Dam Rehabilitation
Pennsylvania:	Fritz Island Solids and Liquids Treatment Plant Upgrade

Recognized Projects

Alabama:	Cullman Wastewater Treatment Plant Improvements
Alaska:	Kodiak Compost Facility
Georgia:	Lake Peachtree Dam Spillway
Louisiana:	West Monroe Solar Panel Farm
Maryland:	Cumberland Combined Sewer Overflow Storage Facility
Michigan:	East Lansing Headworks Upgrades and Outfall Retrofit Into a Relief Interceptor
Minnesota:	Afton Stormwater Green Infrastructure and Advanced Wastewater Treatment
Missouri:	Liberty Design-Build Wastewater Treatment Facility
New Mexico:	Cuba Solids Handling and Effluent Reuse
Rhode Island:	Wellington Avenue CSO Treatment Facility Upgrade
South Carolina:	Reedy River Basin Sewer Tunnel
Vermont:	Waterbury Wastewater Treatment Facility Upgrade
Virginia:	Harrisonburg-Rockingham Regional Sewer Authority Biogas Recovery & Reuse
Washington:	Squalicum Creek Water Quality and Biotic Integrity Improvements
West Virginia:	Pennsboro Wastewater System Improvement Project

PISCES Exceptional Project: Delaware

Program: Delaware Clean Water State Revolving Fund

Assistance Recipient: City of Wilmington

Project Title: Renewable Energy and Biosolids Facility

The City of Wilmington's wastewater treatment facility received a $36 million CWSRF loan (largest in the program at the time) to construct a renewable energy and biosolids facility for its treatment plant. The project was designed and implemented under the State of Delaware's Energy Performance Contracting Act whereby energy and operational savings of the facility pay for the cost of the project through a guaranteed energy performance contract. This new facility now captures previously flared off methane gas from the plant's anaerobic digester and gas from a nearby landfill and uses it to power two reciprocating internal combustion engines that generate four megawatts of electricity. This offsets the treatment facility's electricity needs by 90 percent. The thermal energy from the engines is used to heat a sludge thermal dryer, which reduces 140 wet tons of daily biosolids by nearly 80 percent to reach about 30 dry tons of biosolids. These reductions in electricity and solid waste disposal costs are estimated to save the City $16.7 million over 20 years.

This project also sponsored a $3.4 million CWSRF loan for the permanent conservation of 22 acres of wetlands in the historic Southbridge region. This sponsored project was funded with the savings made from having the total loan interest rate reduced from three percent to two percent. The two loans have the same annual debt service of the original loan which means conserving the wetlands required no extra funds. This has led to an application from the City for an additional $15.2 million CWSRF loan to remediate the wetlands for flood control and stormwater management for the nearby Southbridge community.

PISCES Exceptional Project: Kansas

Program: Kansas Water Pollution Control Revolving Fund

Assistance Recipient: Dodge City

Project Title: Biogas Reuse to Motor Fuel

Dodge City adopted an innovative approach to processing their wastewater byproducts. In recent years, the Dodge City South Wastewater Treatment Plant received an EPA grant towards a project to reuse 100 percent of its 1.7 billion gallons a year of treated effluent as irrigation for over 3,000 acres of agricultural fields, conserving groundwater for the public water supply. This treatment process produced a significant amount of carbon dioxide and methane gas, which were then burned off in a flare.

This new project plans to clean and pressurize the biogas to high quality natural gas that can be used as fuel. This process will occur by removing water from the gas and using pressure swing adsorption molecular sieves to separate the gasses. A more purified methane biogas will then be pumped to a nearby gas line and entered into the commercial market as a renewal resource. The methane will be sold by the City as motor vehicle fuel across the Midwest. The project costs are expected to be less than $10 million and the City expects to receive about $2.5 million a year in revenue from methane sales. The annual amount of methane fuel produced is estimated to be the equivalent of 3.5 million gallons of gasoline per year.

PISCES Exceptional Project: New Jersey

Program: New Jersey Department of Environmental Protection

Assistance Recipient: South Monmouth Regional Sewerage Authority

Project Title: Pump Station Resiliency Initiative

The South Monmouth Regional Sewerage Authority (SMRSA) operates a sewage treatment plant and a conveyance system servicing several coastal communities that have recently experienced extreme weather events. Using the NJ Water Bank's Statewide Assistance Infrastructure Loan (SAIL) Program, SRF funds were used to provide short-term financing to SMRSA as an advance for Federal Emergency Management Agency (FEMA) assistance to build three resilient pump stations.

Two of these pump stations are fully operational mobile units that can be disconnected during a severe storm and hauled to a safe location. Once the storm subsides, the mobile stations are returned and reconnected. These mobile resilient pump stations (MRPS) contain main electrical components, computer equipment, and an emergency generator all located on a mobile trailer at the original pump station site. Older pump stations in coastal areas have received serious damage in recent years, costing millions of dollars to repair and left the community without sewer services. The MRPS limits the disruption in conveyance, minimizes sewer overflows, and saved SMRSA millions of dollars by preventing damage from future storms. The third pump station replaced an older station that was in a 100-year flood zone. This new pump station is a permanent fixture designed to look like the neighboring residential housing and was placed outside the floodplain. All three of these pump stations were made possible through the NJ Water Bank's SAIL Program which helped SMRSA save an estimated $1.9 million in short and long-term interest costs.

PISCES Exceptional Project: Oregon

Program: Oregon Department of Environmental Quality

Assistance Recipient: City of Prineville

Project Title: Crooked River Wetlands Complex

Several years ago, the City of Prineville needed to increase their wastewater treatment capacity to keep up with the City's growth. A new treatment plant was estimated to cost $62 million, so the City opted to look for a more cost-effective option. The City received a grant to fund a groundwater study and conduct a pilot using a constructed wetland for wastewater treatment. The results of the pilot were promising, so the 120-acre Crooked River Wetlands Complex was designed and constructed to reduce instream water temperature and augment stream flow to meet the effluent limits in the City's National Pollutant Discharge Elimination System (NPDES) wastewater permit.

The project has over 2 miles of riparian improvements and over 5.4 miles of new trails for recreational use – of which 3.25 miles are paved for use year-round. The complex also serves as an outdoor classroom, and to date approximately 500 school children have visited the complex for educational opportunities. The wetland wastewater treatment system cost $7.7 million to construct, saving the City $54 million by eliminating the need to build a traditional treatment plant. Overall, this innovative project expanded the City's wastewater capacity, lowered residential and business system development charges, stabilized monthly wastewater rates, created a new public hiking trail system with numerous educational opportunities, and improved riparian and instream conditions in the Crooked River.

PISCES Exceptional Project: Texas

Program: Texas Water Development Board

Assistance Recipient: City of Wichita Falls

Project Title: Permanent Reuse Project

The increasingly drought prone City of Wichita Falls has proposed a permanent reuse project that will deliver indirect potable reuse water from the River Road Wastewater Treatment Plant to the City's raw water source, the Arrowhead Lake. This $33.5 million CWSRF loan is a green project reserve loan with over $252,000 of principal forgiveness. When complete, this project will allow the plant to meet stringent effluent limits that will allow up to 16 Million Gallons Per Day (MGD) of processed wastewater to be added to the lake.

Improvements will consist of a chemical coagulation, filtration, and reaeration system along with a new pump station and a 15-mile outfall pipeline that will run to the lake to make the City compliant with the newly established Texas Pollutant Discharge Elimination System (TPDES) discharge requirements. In recent years, Wichita Falls imposed strict water restrictions on the community, which have reduced the average MGD use by approximately 72 percent during the summer season. This reuse system will provide a long-term solution that will assist the City in meeting their source water needs.

Honorable Mentions

Program: California SRF
Recipient: San Francisco PUC
Project: Lake Merced Green Infrastructure

The San Francisco Public Utilities Commission (SFPUC) used CWSRF financing to install green infrastructure best management practices within the disadvantaged neighborhood of Ingleside in San Francisco to reduce the volume of stormwater entering the combined sewer collection system and the San Francisco Bay. The project converted nine blocks of Holloway Avenue, a two-acre drainage area that was nearly 100% paved, into a greener, more pedestrian- and bike-friendly corridor. The project includes multifunctional green infrastructure technologies, such as vegetated bioretention planters, pervious pavement, underdrains, and a solar powered irrigation system, which together will manage an estimated 950,000 gallons of stormwater each year. The complete retrofit of this corridor into a green street encourages pedestrian and bicycle traffic along this important linkage between San Francisco State University and the City College/Balboa Bay Area Regional Transit station. In addition to its water quality benefits, the project beautified an urban residential street within a disadvantaged community by creating new green spaces and a more pleasant streetscape.

Program: Colorado SRF
Recipient: City of Durango
Project: Water Reclamation Facility

In 2012, the State of Colorado set water quality standards in the State's waterways and numeric effluent limits for wastewater dischargers. The expanding City of Durango needed to upgrade its Santa Rita Water Reclamation Facility (SRWRF) to meet these new regulations for its 18,000 customers. The last time the plant was upgraded was 36 years ago, so the decision was made to upgrade the plant to a Johannesburg secondary treatment facility to enhance performance, operation, redundancy, and capacity deficiencies. Upgrades include a second anaerobic digester and micro turbine system that is expected to produce 80 kilowatts of power, doubling the plant's current power generation. A high-speed turbo secondary blower system will be installed, which will result in 30 percent in annual energy savings compared to the current blowers. A fats, oil, and grease receiving station will be built that will significantly increase the amount of renewable energy the anaerobic digesters produce. Primary clarifiers will now be active primary clarifiers, increasing the efficiency in primary sludge removal and enabling the anaerobic digesters to generate additional biogas. Finally, biosolids will be dewatered by a Fournier dewatering rotary press that will reduce the annual $250,000 cost for hauling and disposing biosolids.

Honorable Mentions

Program: Florida SRF
Recipient: City of Cocoa Beach
Project: Stormwater/Streetscape Improvements

The City of Cocoa Beach constructed an urban stormwater project that will reduce nutrients from entering into the Banana River Lagoon, which is part of the Indian River Lagoon system, a designated Estuary of National Significance. This project treats stormwater from an 8.34-acre watershed by using Low-Impact Design (LID) best management practices which include native landscape bioswales/tree filters, underground exfiltration, and pervious pavement. Sorption media was also used to further reduce nitrogen and phosphorous from seeping into the groundwater. The total construction costs for this project were $5.2 million of which the CWSRF financed $1.8 million that was used to match a 319 Nonpoint Source grant. This large green infrastructure project reduced nutrient loading for the Indian River Lagoon and has also added an aesthetic value along City streets which is said to have attracted new businesses to the area.

Program: Idaho DEQ
Recipient: City of Nampa
Project: Treatment Plant Upgrade

The City of Nampa, with its population of approximately 91,000, showed foresight and determination to address their wastewater quality needs by committing to $165 million in financing from the Idaho's Department of Environmental Quality's State Revolving Fund. These funds will be used to upgrade the existing wastewater treatment facility to meet the future standard phosphorus limit of 0.1 milligrams per liter by 2026 and to also meet summer seasonal temperature limits. With such a large project for a city of this size, a three-phase funding approach was adopted to fund the City's Capital Improvement Plan over a 30-year period with an interest rate of 1.68 percent. It is estimated that the City will save $38 million by using these flexible SRF terms and by avoiding the market's transaction costs and other various fees. For the three phase upgrades, Phase I will include a primary effluent pump station, a third aeration basin, an anaerobic digester, and a solids handling facility. Phase II will bring a fourth aeration basin, tertiary filtration, ultraviolet disinfection, side-stream phosphorus removal, a new primary thickening process, a fifth anaerobic digester, and expand the solids handling facility. Phase III will include individual pump stations and pipelines for irrigation and industrial conveyance, along with internal mixed liquor return pumps for the activated sludge process.

Honorable Mentions

Program: Kentucky SRF
Recipient: Lincoln County Sanitation District
Project: Junction City to Hustonville Sewer

Located in central Kentucky, Lincoln County constructed a sanitary sewage system to service 535 previously unsewered residential and 50 previously unsewered commercial customers. This new collection system was a critical upgrade because it replaced 223 failing septic tanks, 101 straight pipes, and 2 package treatment plants that resulted in the direct discharge of raw sewage. This raw sewage was a direct public health issue with documented findings of pathogens and E. coli contaminations in local waterbodies. Additionally, an elementary school in the area retired an inadequate sewage treatment package plant, which meant the school cafeteria's dishwashers could no longer be used due to the capacity overload. Instead, meals were served on styrofoam trays with plastic utensils at a large cost to the school district. These problems were mitigated with the new conveyance system, which was made possible through the collaboration of many supporting partners including the Kentucky Infrastructure Authority CWSRF who provided over $4 million in financing towards the overall project costs.

Program: Maine SRF
Recipient: Lewiston-Auburn WPC Authority
Project: Anaerobic Digestion & Cogeneration

The Lewiston-Auburn Water Pollution Control Authority (LAWPCA) needed new options for disposal of their biosolids due to rising costs for application to farm fields. LAWPCA received a one percent interest SRF loan to construct an anaerobic digestion facility to reduce their biosolids capacity. The project had the added benefit of producing significant amounts of electricity, which is used to power the water reclamation facility. The project's two 230-kilowatt biogas cogeneration engines produce an average of 200,000-kilowatt hours per month and have gone as high 380,000-kilowatt hours in some months. This self-generated power significantly reduces the facility's energy costs, and the low interest rate financing made this project affordable. LAWPCA turned a problem into a success by converting their biosolid disposal issue into a process that now produces energy for the facility without raising rates for their community.

Honorable Mentions

Program: Massachusetts SRF
Recipient: Town of Grafton
Project: Treatment Plant Upgrade

In keeping up with new nitrogen and phosphorus effluent limit standards, the town of Grafton implemented a series of treatment plant upgrades to improve nutrient loading for the Blackstone River. Grafton uses both decentralized wastewater treatment as well as a sewer system that is serviced by a secondary treatment facility to service its population of 15,000. Their loan financed 14 projects, which include upgrades to the treatment facility that address nutrient removal, water efficiency, energy efficiency, and green infrastructure. These upgrades included the installation of a 300-kilowatt solar photovoltaic system, a green roof, a new UV system to replace a sodium hypochlorite system, installation of pervious walkways, upgrades to aeration tanks, a new grit separator, new daylighting windows, lighting conversion to LEDs, and Energy Star domestic hot water heaters. These improvements will significantly reduce electricity costs and produce a higher effluent quality for Grafton's treatment facility.

Program: Ohio EPA
Recipient: Avon Lake
Project: Lateral Loan Program

Lake Erie is the drinking water source for over 11 million people. To help reduce harmful bacteria and fecal matter from entering the lake from combined sewer overflows, the Avon Lake Regional Water Utility (ALRWU) received an Ohio Water Pollution Control Loan Fund (WPCLF) loan for $5 million at zero percent interest to finance the creation of a revolving loan fund that will help private property owners address separation of stormwater discharges from sanitary sewers. ALRWU realized that infiltration and inflow from private property was a major component leading to sewer overflows and basement backups and required that all homeowners remove clean water sources from their adjacent sanitary laterals. This new loan program helps homeowners not only remove clean water from sanitary laterals, but also supports directing the clean water through a new storm lateral to the storm sewer. In the first two years of the program, approximately 300 customers of ALRWU had applied for loans resulting in more than $1 million in assistance. Customers will pay the loan back over a ten-year period as part of their water and wastewater bills.

Honorable Mentions

Program: Oklahoma Water Resource Board
Recipient: Oklahoma City Water Utilities Trust
Project: Atoka Reservoir Dam Rehabilitation

The Atoka Reservoir is a major drinking water supply for the residents of Oklahoma City. Past flooding has damaged the reservoir's dam and spillway chute, creating safety concerns for the City's pump stations and transmission lines. These critical components serve approximately 1.2 million people within the City and surrounding communities and were left vulnerable during high-risk conditions. The City responded to this concern by financing $34 million through the CWSRF for the repair of the spillway chute and to increase the height of the reservoir embankment to allow for greater flood storage capacity. Improved flood resilience allows the reservoir to hold more stormwater, which provides a nonpoint source benefit by reducing sediment and nutrients from flowing into the neighboring North Boggy Creek. Overall, these repairs reduce the risk of a dam breach while improving the water quality of the lake which is on Oklahoma's 303(d) Impaired Waters List.

Program: Pennsylvania PENNVEST
Recipient: City of Reading
Project: Solids & Liquids Treatment Upgrade

EPA Region 3's largest CWSRF project undertaken to date is a complete upgrade of the sludge handling facility for the City of Reading's wastewater treatment plant. With a service population of 137,800 residents, Reading is Pennsylvania's fifth largest city and a financially distressed municipality. PENNVEST, Pennsylvania's infrastructure investment authority, financed this CWSRF project for $149 million at 1 percent interest for 20 years, which produced a calculated subsidy value of more than $21 million. The existing trickling filter plant is being upgraded to an extended aeration activated sludge plant that will use energy efficient variable speed motors and linear Motion Mixers in the digesters that use 70 percent less power than conventional mixers. This project will replace the previously overloaded system and will improve the water quality for the Schuylkill River and the Delaware Estuary which are both important culturally, economically, and recreationally for the distressed area.

Recognized Projects

Program: Alabama Water Pollution Control
Recipient: City of Cullman
Project: Treatment Plant Improvements

The City of Cullman Wastewater Treatment Plant operates a two-stage anaerobic digestion system for reduction of sludge. For many years, the system operated with only one heat exchanger because the other heat exchanger was worn and inoperable, which caused biogas collection inefficiencies. An SRF loan was used to replace the existing heat exchangers with two new units that are capable of being fueled with either natural gas or biogas from the digestion process. Additional upgrades included a new biogas collection system, a new waste gas burner system, new pressure relief valves for each digester basin, new plastic cross-flow filter media, and recirculation pumps. A mixing system was also installed within the primary digester basin to maintain a homogeneous sludge matrix and increase the efficiency of the digestion process. Prior to the project, the City spent approximately $2,300 a month to power the single heat exchanger unit. With the new biogas system in operation and powering the system, those costs are now $330 a month—a monthly savings of $1,970 for the City.

Program: Alaska SRF
Recipient: City of Kodiak
Project: Compost Facility

The City of Kodiak is located on Alaska's largest island and home to the largest U.S. Coast Guard base in the United States. Kodiak traditionally disposed of sewage solids in the Kodiak Island Borough's landfill until capacity was reached. Located 30 miles off the mainland and accessible only by ferry and airline for commercial transportation, no other disposal options were viable. In response, the City collaborated with local partners and the CWSRF to build a $4.5 million composting facility capable of producing Class A Exceptional Quality biosolids that can be used as a soil amendment without restriction. The project included an asphalt base pad designed to manage runoff, an enclosed mixing building with an air handling system to control odors and reduce buildup of unwanted gasses, a roofed mixing bunker, and six covered curing cells with air circulation units to maintain the oxygen and temperature of the compost. The facility successfully processes tons of wet solids from the City's wastewater treatment facility into Class A Exceptional Quality compost while fully meeting Alaska Department of Environmental Conservation permit requirements and saving the community over $100,000 in landfill fees.

Recognized Projects

Program: Georgia SRF
Recipient: Lake Peachtree Dam Spillway
Project: Peachtree City

Built approximately 50 years ago, the Peachtree Dam is located along the Flat Creek in Peachtree City. It is classified as a Category II Dam, which means that there is a probable loss-of-life situation if breached. Exploratory borings were drilled to evaluate the condition of the existing spillway, and voids were discovered beneath the concrete spillway. Based on these findings, the City Council elected to upgrade the spillway to promote long-term operation of the lake and to mitigate the risk of a dam failure. A piano-key weir (PK weir) was chosen as a replacement for the spillway because this design is capable of both maintaining current flooding levels during higher frequency storm events while also providing the discharge capacity needed to pass the runoff associated with the State-required design storm event. The PK weir crest will consist of three different elevations, which will control flood releases during 2- to 100-year storm events while still providing adequate spillway capacity to safely discharge runoff. This PK weir will also provide aesthetic value for the community and is the first one built in North America.

Program: Louisiana SRF
Recipient: City of West Monroe
Project: Solar Panel Farm

The City of West Monroe is located in the central part of Ouachita Parish in Northern Louisiana. With a population of approximately 13,000 people, this City currently owns and operates the Wastewater Re-Use Treatment Plant, which treats wastewater to drinking water standards and reuses it for industrial use to reduce clean water withdrawals from the Sparta Aquifer. To lower the energy costs for the facility, the City installed a solar farm using 880 solar panels installed on the south side of the facility. This was done using approximately $1.5 million in financing from the CWSRF. The power offset created by the solar panels will reduce the facility's electric consumption by more than 20 percent. These solar panels are both environmentally friendly and financially feasible for the City and with a standard 20-year limited manufacturer's warranty, these savings will carry through for the foreseeable future.

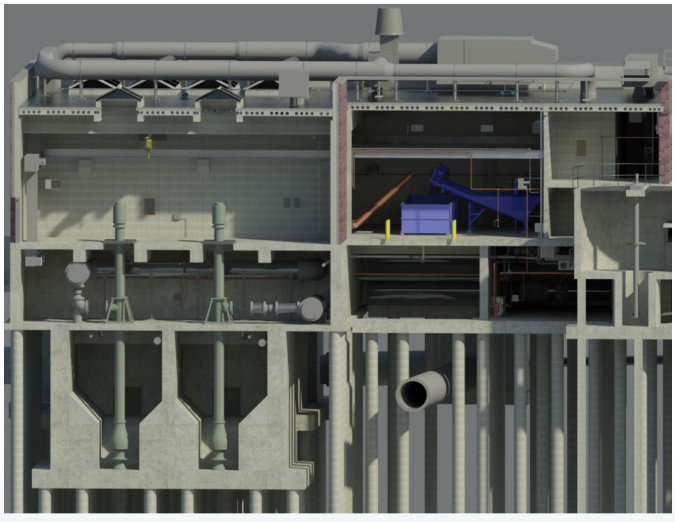
Recognized Projects

Program: Maryland Dept. of Environment
Recipient: City of Cumberland
Project: Combined Sewer Overflow Storage

The Cumberland Wastewater Treatment Plant is constructing a CSO storage system. This stored CSO wastewater will then be released in a controlled manner and treated by the facility's Enhanced Nutrient Removal System. The facility, which serves over 35,000 customers, is building this storage system to implement a Long Term Control Plan (LTCP), so that by the year 2025, at least 85 percent of the CSO is eliminated or captured during rain events. The Maryland Water Quality SRF provided a loan for approximately $3 million toward the total cost of $31.5 million for this project. To be completed in late 2019, this storage system will be located beneath recreational fields and basketball courts and will use gravity to direct excess influent past the treatment plant and into a five-chamber concrete tank that can hold a total of five million gallons. The CSO storage system will also capture 55 percent of the overflow volume at the treatment plant to help with continuous high flows and reduce nutrient loading to the Potomac River.

Program: Michigan SRF
Recipient: City of East Lansing
Project: Headworks Upgrade & Outfall Retrofit

The City of East Lansing's collection system was installed almost 100 years ago and includes three interceptor sewers that convey flows to the water resource recovery facility. During high rain events, this collection system experienced overflows in the interceptor sewer immediately upstream of the water resource recovery facility. To reduce this overflow issue, CWSRF financing was used to convert an existing outfall sewer into a relief interceptor. The project also included the construction of a new Headworks Facility including fine mechanical bar screens, raw sewage pumps with variable frequency drives, influent flow monitoring, and a grit removal system. Also included in the project were modifications to the process flow routing, installation of a gravity drain from the equalization basin to influent sewer interceptor, and modifications to the existing raw sewage pump station. These upgrades created an energy efficient collection system which reduced the plant's energy use for this system by an impressive 99.2 percent.



Recognized Projects

Program: Minnesota SRF
Recipient: City of Afton
Project: Stormwater Green Infrastructure

The City of Afton prides themselves on their historic river town charm. Located along the St. Croix River which is designated as a federal Natural Scenic River Way, Afton has for many years been dealing with flooding issues due to outdated stormwater infrastructure from a levee that has a variety of non-compliant septic systems built into it. For the U.S. Army Corps of Engineers to accredit the levee, the existing septic systems needed to be removed. In addition, Afton needed stormwater treatment best management practices to protect the St. Croix River, which is an Outstanding Resource Value Water, but which is also impaired for excessive nutrients. The solution for this was a levee upgrade, a sewer collection system project, the state's largest subsurface sewage treatment system, and stormwater green infrastructure. The stormwater treatment system was designed to mimic the natural hydrology and limit construction in the historic downtown area, so a dispersed best management practices approach was applied to target strategic locations around Afton. The Minnesota Public Facilities Authority provided CWSRF financing of $3 million towards the cost of the project, including $748,000 in principal forgiveness based on green infrastructure and affordability needs.

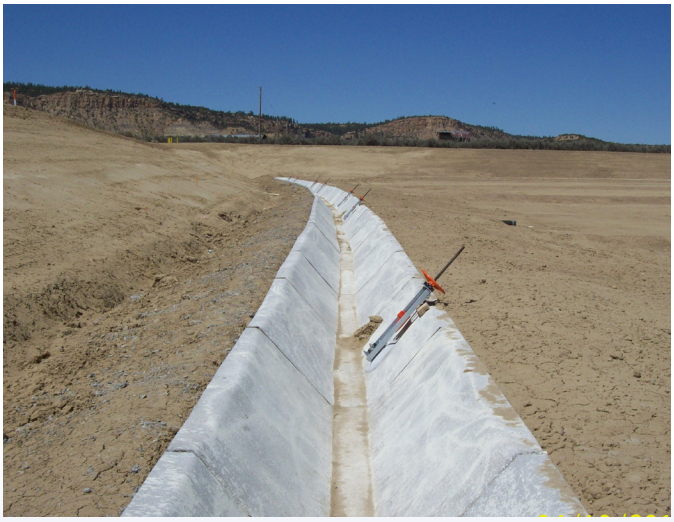
Program: Missouri DNR
Recipient: City of Liberty
Project: Design-Build Treatment Facility

The City of Liberty previously sent their wastewater to Kansas City to get treatment from another plant. However, when this facility had to respond to a consent decree to reduce CSOs, an increase in rates for Liberty would have been a result. Liberty decided to forgo transferring their wastewater and instead took out a $79 million CWSRF loan to build a new state of the art wastewater treatment facility of their own and perform conveyance system improvements. The new facility was the first Missouri CWSRF project to use a design-build approach. Under a design-build contract, the owner contracts with a single design and construction team. In a traditional design-bid-build project, the owner manages separate contracts for design and construction. Some of the potential advantages of design-build include quicker project delivery; fewer changes, claims, and litigation; enhanced project coordination; and firm costs. The new facility built using this design-build approach has a 5 MGD capacity and includes treatment processes for activated sludge, bio-phosphorus, and nitrogen reduction. This facility has received a Design-Build Institute of America 2017 National Award for Merit in water/wastewater and was named Project of the Year for 2017 by the Design-Build Institute of America-Mid-America Region.

Recognized Projects

Program: New Mexico SRF
Recipient: Village of Cuba
Project: Solids Handling & Effluent Reuse

The Village of Cuba needs facility upgrades to meet their NPDES discharge permit. To meet the requirements of the NPDES permit, the Village will construct a new effluent storage basin, effluent pump station, effluent distribution system, and effluent reuse site. During half of the year, the Village will land apply effluent to alfalfa or other non-food crop fields, managing the allowable nitrogen loading rate. The project also includes the conversion of the existing lagoon system into an aerobic digester for biosolids stabilization and the construction of a new solids handling chemical feed building, drying beds, and a biosolids storage pad. The disposal of the biosolids is a concern for the Village because the nearest landfill that accepts this type of material is 90 miles away. The Village will dry the solids on the new drying beds and then store the biosolids on the new pad until there is sufficient quantity to haul over to the effluent reuse site. The village has a population of 687 with a per capita income of $16,108. With the land application of the biosolids, the annual savings of $27,000 makes a big difference. The funding package is over $2.1 million of which $404,700 is a loan at zero percent interest and the remainder was funded as a grant.



Program: Rhode Island SRF
Recipient: City of Newport
Project: CSO Treatment Facility Upgrade

The Wellington Avenue Combined Sewage Overflow Treatment Facility (WACSOTF) lies along the edge of Newport Harbor next to Kings Park Beach. Since 1978, this facility has been in service reducing CSOs that would otherwise get discharged into the harbor. WACSOTF is situated at a location on the harbor that is vulnerable to flooding; a National Oceanic and Atmospheric Administration tide gage at the location has documented nearly a one-foot rise in sea level since 1930. Although elevated, the first floor of the WACSOTF would be a foot under a 100-year flood event. To mitigate these risks, the City of Newport received a $5.4 million CWSRF loan from the RI Infrastructure Bank to upgrade and fortify WACSOTF using a 20-year loan with an interest rate of 2.16 percent. These upgrades added flood protection and station resiliency due to threats of rising sea levels, increased the capacity of the sanitary pumps and force main to eliminate CSOs, added capacity and automation improvements to the chlorination system, performed a feasibility assessment for incorporating dechlorination as an interim measure, and made improvements to ancillary electrical, mechanical, and HVAC systems critical for increased reliability, worker safety, and energy efficiency.

Recognized Projects

Program: South Carolina SRF
Recipient: Renewable Water Resources
Project: Reedy River Basin Sewer Tunnel

The City of Greenville is considered the 4th fastest growing city in the country. Renewable Water Resources (ReWa), a public regional wastewater collection and treatment provider, has determined the need for additional sewer conveyance capacity for the City. The goal was to construct an overflow collection system for the 68-square mile service area while avoiding disturbance to downtown Greenville. The decision made was that the best option was to build a tunnel beneath the City. The Reedy River Basin Sewer Tunnel (Dig Greenville) will be 11 feet in diameter, 1.2 miles long, and is scheduled to be completed in 2020. The tunnel will be 100 feet below ground, and a tunnel boring machine will drill through solid rock to install it. This new collection system will operate by diverting excess peak wet-weather flow into a drop shaft with vortex piping that leads from the existing system to the deeper tunnel system. The tunnel will convey the influent downstream of the City and reconnect to a gravity interceptor line where it will be transported to the Mauldin Road Water Resource Recovery Facility for treatment. The ability to divert peak wet-weather flows to the sewer tunnel will lessen the potential for sanitary sewer overflows and reduce the potential for elevated bacteria levels in the water along this reach of the river.

Program: Vermont SRF
Recipient: Town of Waterbury
Project: Treatment Facility Upgrade

The Village of Waterbury's Wastewater Treatment Facility discharges its effluent in the Winooski River which then discharges to Lake Champlain. To meet the expected 0.2 mg/l Phosphorus TMDL for Lake Champlain, the Village installed an advanced phosphorus removal system that uses Co-Mag ballasted flocculation technology. Not only does this Co-Mag system achieve the desired flocculation and precipitation outputs, it also removes more organics than can be achieved with the previous aerated lagoon wastewater treatment process. This new system has shown a decrease in effluent concentrations of Biological Oxygen Demand, Total Suspended Solids, and Settleable Solids. A new processing building for the Co-Mag system was built along with a new sludge drying bed structure to dewater and store the chemical sludge prior to disposal in a landfill. This project cost over $7.3 million in total and was funded mostly by federal and State grants with a CWSRF loan to cover the remaining amount.

Recognized Projects

Program: Virginia DEQ
Recipient: Harrisonburg-Rockingham RSA
Project: Biogas Recovery and Reuse

The Harrisonburg Rockingham Regional Sewer Authority (HRRSA) conducted an evaluation of energy savings and energy recovery opportunities at the North River Wastewater Treatment Plant. The results showed that biogas from the anaerobic digester should be reused to power a sludge dryer to dewater biosolids to reduce disposal costs. In developing this project, the treatment facility wanted to dry enough sludge to have capacity for 100 days of onsite biosolids storage and decrease the dependence on the land application of Class B biosolids. A several-month pilot system was created that reviewed the facility's digester sludge and one food processing waste stream to quantify biogas generation rates, gas content, and to determine safe loading limits. The determination was made to use an indirect sludge drying alternative to achieve the highest amount of savings for handling their biosolids. The CWSRF funded the total project costs of $5.7 million and will produce energy savings worth an estimated $103,000 in the first year of operation.

Program: Washington Dept. of Ecology
Recipient: City of Bellingham
Project: Squalicum Creek Water Quality Project

During the 1960's when Interstate 5 was constructed, it left two large pits in the path of Squalicum Creek. These two water-filled pits absorb high amounts of solar heat, raising temperatures, lowering dissolved oxygen, and increasing fecal coliform concentrations in Squalicum Creek as it flows through it. The City of Bellingham initiated a multiphase project to re-route the creek and restore natural conditions. The CWSRF provided financing for $3.6 million towards the overall project cost. Phases One and Two re-routed nearly a mile of Squalicum Creek around one pit and into a newly created channel that reactivated remnant channels and reconnected the stream with its floodplain. The project restored 10 acres of riparian and wetland habitat with native trees and shrubs and removed a fish passage barrier that opened over 22 miles of upstream salmon habitat. The City installed temperature loggers, and will measure shade for ongoing monitoring. Phase Three continued re-routing the main-stem around the other pit, restoring riparian buffers, and the new channel. Phase Four will continue the re-routing around culverts, and a major traffic intersection. Phases One and Two of this project earned the American Public Works Association "Project of the Year" award (environmental projects under $5 million) in recognition of the City's excellent implementation practices.

Recognized Projects

Program: West Virginia SRF
Recipient: Town of Pennsboro
Project: Wastewater System Improvements

The Town of Pennsboro's Wastewater Treatment Plant, which serves around 600 customers, was routinely failing to meet the discharge limits outlined in its NPDES permit and had recurring issues exceeding the 90 percent flow threshold. The community was issued an order by the West Virginia Department of Environmental Protection to eliminate two sanitary sewer overflows (SSO) and to effectively address their excessive infiltration and inflow concerns. With the town's low median household income of $24,120 and small customer base, funding for the proposed $10.8 million plant upgrade needed to be affordable. For the first time at a wastewater treatment facility in West Virginia, a three-phased financing approach utilized potential grant funding while continuing to implement the necessary upgrades. Phase One consisted of a new influent lift station, preliminary treatment facility, UV disinfection system, metering flume and an outfall structure, and the removal of one SSO. Phase Two consisted of a new sludge dewatering building, belt press, control building, generator, and necessary site work. Phase Three consisted of a new sequencing batch reactor, equalization basin, blower building, splitter box, conversion of the existing treatment tank to a sludge holding tank, removal of the second SSO, and an increase in design flow to handle a peak of 2.10 MGD and an average daily flow of 0.35 MGD. CWSRF loans were used to fund a portion of Phases Two and Three.

For more information about the Clean Water State Revolving Fund, please contact us at:

United States Environmental Protection Agency
Office of Wastewater Management
Clean Water State Revolving Fund Branch
1200 Pennsylvania Avenue NW (4204M)
Washington, D.C. 20460

www.epa.gov/cwsrf

Office of Water • October 2018
EPA Publication: 830K18001
All images were provided at the courtesy of the participants.

Clean Water
State Revolving Fund