



AQUARIUS RECOGNITION PROGRAM

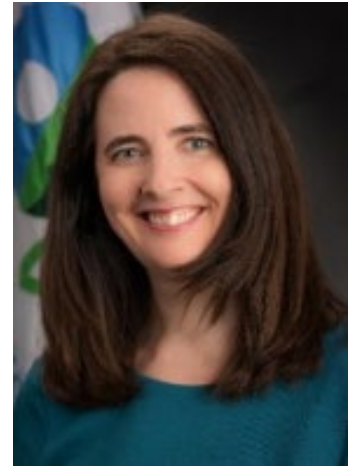
2021 PROJECT COMPENDIUM



A MESSAGE FROM THE OFFICE DIRECTOR

I am excited to share the project nominations for the 2021 Drinking Water State Revolving Fund (DWSRF) AQUARIUS Recognition Program. This year, we received nominations from 22 state DWSRF programs across the country.

The 2021 AQUARIUS nominations cover a wide variety of project types, including state-of-the-art treatment technology for emerging contaminants, lead service line replacement, regionalization and partnerships, resiliency to natural disasters, and aquifer storage and recovery. These projects demonstrate leadership in innovative financing, system partnerships, community engagement, public health protection, and problem solving.



Thank you to everyone who participated in planning, financing, constructing, nominating, and reviewing this year's projects. Most of all, thank you to the managers of the 51 state DWSRF programs for your continued commitment to public health protection.

I hope that you enjoy reading this compendium of 2021 AQUARIUS-nominated projects and that the projects inspire continued innovation in the DWSRF.

Sincerely,

A handwritten signature in blue ink that reads "Jennifer L. McLain". The signature is fluid and cursive.

Jennifer L. McLain, Director

Office of Ground Water and Drinking Water

ABOUT THE AQUARIUS RECOGNITION PROGRAM

The Drinking Water State Revolving Fund (DWSRF) AQUARIUS Recognition Program nationally recognizes DWSRF-funded projects for exceptional focus on sustainability and protection of public health. These projects are examples of the high level of innovation possible with the DWSRF.

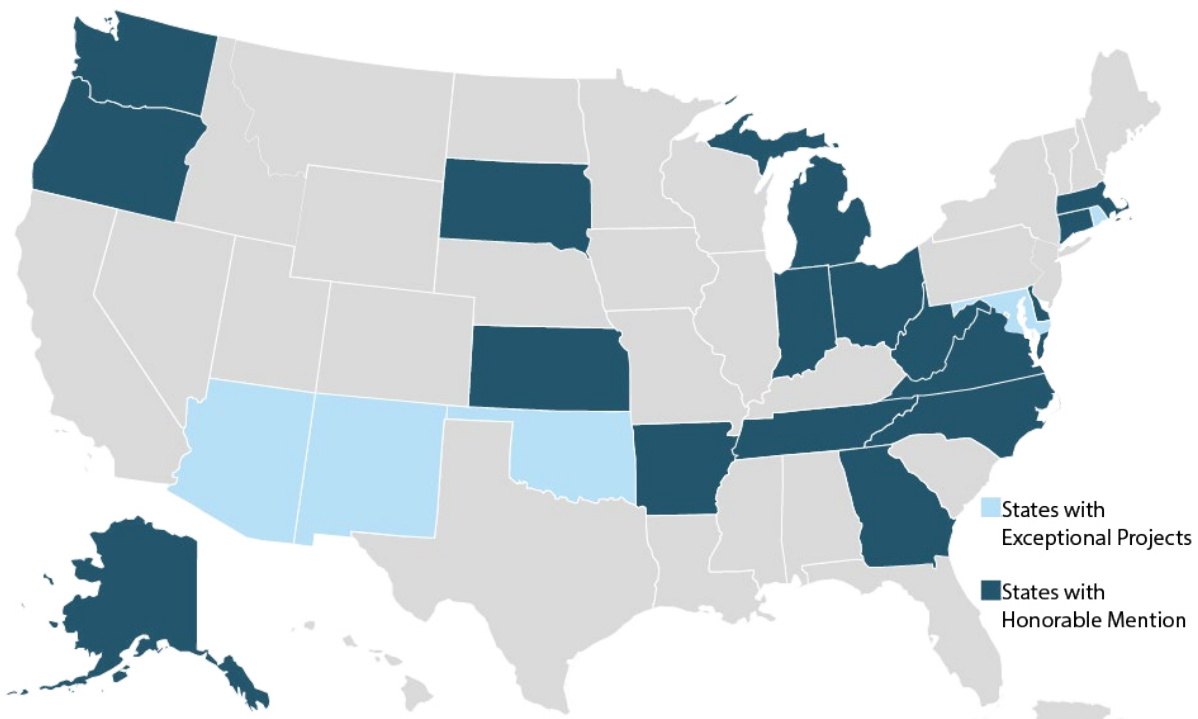
Participating states in this voluntary recognition program nominated one DWSRF project during the 2021 round. All DWSRF projects must meet three criteria outlined in the Safe Drinking Water Act (SDWA):

- Address the most serious risk to human health;
- Are necessary to ensure compliance with the SDWA; and
- Assist systems most in need, on a per household basis, according to State-determined affordability criteria.

The Environmental Protection Agency (EPA) received 22 nominations for projects across the country. Of these 22 projects, EPA chose one “Exceptional Project” for each of the five categories below:

- **Excellence in Innovative Financing:** project utilizes a variety of techniques to provide the best deal to the assistance recipient, including additional subsidy and co-financing with other state and federal agencies.
- **Excellence in System Partnerships:** project involves several stakeholders who work together and utilize DWSRF funding to solve various drinking water system challenges. Solutions include consolidation for public health reasons or creation of a regional drinking water system.
- **Excellence in Community Engagement:** project occurs because of active community participation, and the community is engaged in all aspects of the project.
- **Excellence in Environmental and Public Health Protection:** project addresses health-based violations with primary drinking water standards, emerging contaminants of concern, or public health threats to a non-regulated community (e.g., community on private wells).
- **Excellence in Problem Solving:** project utilizes DWSRF funding to accomplish goals and ultimately increase public health benefits for the community. This category is broad and may overlap with the other four categories above.

This compendium includes the descriptions of all 22 projects.



EXCEPTIONAL PROJECTS

Oklahoma - East Central Oklahoma Water Authority
New Mexico - Albuquerque Bernalillo County Water Utility Authority
Arizona - Town of Marana
Rhode Island - Town of North Smithfield
Maryland - Maryland American Water

Excellence in Innovative Financing
Excellence in System Partnerships
Excellence in Community Engagement
Excellence in Public Health Protection
Excellence in Problem Solving

HONORABLE MENTIONS

Alaska	Municipality and Borough of Skagway
Arkansas	City of Marshall
Connecticut	Town of Bethel
Delaware	Town of Milton
Georgia	City of Warrenton
Indiana	City of Delphi
Kansas	Public Wholesale Water Supply District No. 25
Massachusetts	Town of Eastham
Michigan	City of South Haven
North Carolina	City of Gastonia
Ohio	City of Painesville
Oregon	City of Cornelius
South Dakota	Clark Rural Water System
Tennessee	Town of Humboldt
Virginia	Town of Hillsboro
Washington	City of Richland
West Virginia	Central Hampshire Public Service District

EXCEPTIONAL PROJECTS

EXCELLENCE IN INNOVATIVE FINANCING

STATE: Oklahoma

RECIPIENT: East Central Oklahoma Water Authority

PROJECT: Water Main Under the Arkansas River

SUMMARY: The East Central Oklahoma Water Authority (ECOWA) received \$846,000 in “bridge funding” from the DWSRF and other entities to repair the water main connecting Webbers Falls to ECOWA, which was washed out by a 2019 flooding event. Once the project was complete, the Federal Emergency Management Agency (FEMA) reimbursed the project costs.

DESCRIPTION OF PROJECT

The water main connecting the Town of Webbers Falls to the ECOWA water treatment plant was washed out in 2019 by flooding in the Arkansas River. Webbers Falls temporarily connected to neighboring water systems through emergency connections, but the systems could not provide an adequate water supply at an appropriate pressure, causing Webbers Falls to undergo a boil water advisory. The best long-term solution was for Webbers Falls to reconnect with ECOWA.

Webbers Falls utilized \$846,000 in assistance from the DWSRF, Oklahoma Water Resources Board, Indian Health Services, and Cherokee Nation to rebuild the water line connecting the town with ECOWA. Financing for this project was completed using the flexibilities outlined in a [memorandum of understanding](#) between EPA and FEMA. The DWSRF provided the initial financing as a “bridge loan”, and upon project completion, FEMA reimbursed the project costs. This innovative financing mechanism allowed ECOWA and the town to restore their connection as quickly and efficiently as possible.

This project was completed in February 2020, and FEMA provided the reimbursement in October 2020. Webbers Falls, a disadvantaged community with 616 residents, lifted the boil water advisory and is once again receiving safe drinking water from ECOWA.



EXCELLENCE IN SYSTEM PARTNERSHIPS

STATE: New Mexico

RECIPIENT: Albuquerque Bernalillo County Water Utility Authority

PROJECT: Carnuel Water System Improvements, Phase I

SUMMARY: The Albuquerque Bernalillo County Water Utility Authority (ABCWUA) received \$5 million in funding, including \$1 million in DWSRF assistance, to extend drinking water service to the nearby community of Carnuel.

DESCRIPTION OF PROJECT

Carnuel is a historic community with homes on small lots with private wells, septic tanks, and cesspools that do not meet current wastewater ordinances. The private wells were aging and poorly functioning; many of the wells also have nitrite contamination from leaking septic tanks at higher elevations.

To address this public health concern, Carnuel entered into an agreement with ABCWUA in 2008 to extend water and wastewater services to the community. This has been a decades-long project, and in addition to \$1 million DWSRF assistance, ABCWUA received assistance for earlier phases from EPA, U.S. Department of Agriculture (USDA), and various state programs, totaling over \$5 million. The DWSRF-funded phase consisted of connecting the Carnuel water system to ABCWUA's system and providing distribution to customers with nitrite contamination in their private wells. ABCWUA also intends to extend wastewater mains to Carnuel, to eliminate the need for the aging and leaking septic tanks. This project ensures that Carnuel's 1,305 residents no longer need to use nitrite-contaminated private wells and have access to safe drinking water.



EXCELLENCE IN COMMUNITY ENGAGEMENT

STATE: Arizona

RECIPIENT: Town of Marana

PROJECT: Picture Rocks and Airline/Lambert Water Treatment Campuses

SUMMARY: The Town of Marana received \$16.1 million in DWSRF funding to construct two large treatment systems for per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane contamination in six groundwater wells.

DESCRIPTION OF PROJECT

Six of the Town of Marana's groundwater wells, which serve two systems and one-third of Marana's customers, had PFAS and 1,4-dioxane levels above EPA's health advisory levels. Residents served by these wells were drinking bottled water or using water filtration systems. To address the contamination, Marana constructed two large treatment systems to remove the PFAS and 1,4-dioxane to below the health advisory limits. Marana received \$16.1 million in DWSRF funding for this project, and construction was completed in March 2021.

In 2016, after Marana discovered the PFAS and 1,4-dioxane contamination, they began a voluntary water sampling program to test for these unregulated compounds. Marana's public outreach included notification to all customers from the voluntary sampling program and web content creation. The regularly updated website explains the health risks associated with PFAS and 1,4-dioxane and allows users to look up their addresses and view neighborhood results. The website was later expanded to include detailed and frequent updates of the project and increase community awareness through photographs, timelines, and videos.



EXCELLENCE IN PUBLIC HEALTH PROTECTION

STATE: Rhode Island

RECIPIENT: Town of North Smithfield

PROJECT: Mechanic Street Water Main Extension

SUMMARY: The Town of North Smithfield received \$1.4 million in DWSRF assistance to extend water mains to 40 residences in the Village of Slatersville.

DESCRIPTION OF PROJECT

The Village of Slatersville discovered a contamination plume leaking into the groundwater wells of private homeowners. The source of the contamination is suspected to be from a nearby Superfund site. The groundwater wells were contaminated with Perchloroethylene and Trichloroethylene, known respectively as PCE and TCE, and Freon-113. The Rhode Island Department of Environmental Management (RIDEM) provided Slatersville homeowners with in-house treatment systems, but because of cost and maintenance burdens, this was only a short-term solution. Slatersville and RIDEM collaborated with the nearby Town of North Smithfield to find a sustainable long-term solution.

North Smithfield received \$1.4 million in DWSRF assistance for the installation of 4,400 linear feet (LF) of ductile iron water main to extend service into Slatersville and serve the 40 residences that had contaminated drinking water. This project was completed in August 2020 and provided residents of Slatersville with a safe and reliable source of drinking water.



EXCELLENCE IN PROBLEM SOLVING

STATE: Maryland

RECIPIENT: Maryland American Water

PROJECT: Winters Run Water Treatment Plant Intake Improvements

SUMMARY: Maryland American Water utilized \$3.8 million in DWSRF assistance for source water intake and pumping stations replacement to meet State requirements and provide adequate water supply to customers.

DESCRIPTION OF PROJECT

Maryland American Water (MAW) was prompted by the State of Maryland (through a Consent Agreement) to provide long-term solutions concerning water supply deficit during drought. MAW is required to regulate withdrawal, so the stream flow does not drop below a certain level. This requirement prevented the water treatment plant from withdrawing enough water to meet customer average and maximum demand.

To address these challenges, MAW used \$3.8 million in DWSRF funding to replace the existing source water intake structures, pumping stations, and installed a two-way transfer pipe to the new self-funded impoundment. When stream flows are high, water is pumped into the impoundment; when flows are low, MAW uses water from the impoundment instead of withdrawing from the stream. Unlike a traditional dam and reservoir, this method does not alter the waterway. This DWSRF project addressed competing goals: meeting flow-by requirements and protecting downstream aquatic life, while also ensuring there is enough water to meet customer needs.



HONORABLE MENTIONS

HONORABLE MENTIONS

STATE: Alaska

RECIPIENT: Municipality and Borough of Skagway

PROJECT: Skagway Redwood Tank Construction

SUMMARY: The Municipality and Borough of Skagway received \$1.2 million in DWSRF funding to construct a 200,000-gallon redwood water tank and the supporting foundation.

DESCRIPTION OF PROJECT

Skagway, a small community of 1,000 residents, receives as many as 1 million seasonal visitors and needed additional water storage capacity to meet this large demand. The community decided to construct a redwood tank, based on the advantages anticipated throughout the life of the tank: corrosion resistance without deterioration or scale build-up, natural insulation, decay resistance, and longevity. To be sustainable, the community purchased and refurbished an existing redwood tank. The community utilized approximately \$1.2 million and was completed in December 2018.



STATE: Arkansas

RECIPIENT: City of Marshall

PROJECT: Historic Marshall Water Main Rehabilitation

SUMMARY: The City of Marshall received \$2.1 million in DWSRF funding to replace approximately 11,458 LF of aged water mains.

DESCRIPTION OF PROJECT

The City of Marshall experienced low water pressure and significant water loss, caused by aging and deteriorated water mains. To address this problem, the city received \$2 million in DWSRF assistance to replace approximately 11,458 LF of aged water mains. The city worked closely with historic preservation programs and Arkansas Highway and Transportation Department to alleviate damage to historic structures and minimize interruptions to upcoming road work. This project was completed in November 2020 and provided safe drinking water to the city's 934 customers.



HONORABLE MENTIONS

STATE: Connecticut

RECIPIENT: Town of Bethel

PROJECT: Chestnut Ridge Water Storage Tank

SUMMARY: The Town of Bethel received \$2.2 million in DWSRF funding for the design and construction of the Chestnut Ridge Water Storage Tank.

DESCRIPTION OF PROJECT

The Town of Bethel had an aging water system that needed major rehabilitation. As part of the water system upgrades, the town received \$2.2 million in DWSRF funding for planning and design, and construction of a booster pump station and the Chestnut Ridge Water Storage Tank. This project, completed in December 2020, was necessary to provide adequate system pressures and redundant storage volume, reduce disinfection byproducts, and improve drinking water for customers.



STATE: Delaware

RECIPIENT: Town of Milton

PROJECT: Wagamons Water Main Extension and Shipbuilders Well and Treatment

SUMMARY: The Town of Milton received \$895,000 in DWSRF assistance to install a water main extension, a new well and treatment facility, a new storage facility, new water mains, and to improve low flow hydrants.

DESCRIPTION OF PROJECT

In 2016, the Town of Milton conducted a study of sea level rise and public facilities risk and determined that a Category 4 hurricane with a high tide surge would put the water treatment plants at risk. To address this risk, the town received \$895,000 in DWSRF assistance for water main extension, well and treatment facility construction, and failing water main replacements. The town held several educational sessions for community members to explain why this project was necessary and answer questions. This DWSRF project created a “loop” in the water system, which increases resiliency and improves water quality for the town’s 200 households.



HONORABLE MENTIONS

STATE: Georgia

RECIPIENT: City of Warrenton

PROJECT: Warrenton Water System Improvements

SUMMARY: The City of Warrenton utilized \$337,000 in DWSRF assistance to install water treatment equipment at the existing raw water pump station and the elevated water storage tank.

DESCRIPTION OF PROJECT

The City of Warrenton struggled with violations of the state drinking water standards for total trihalomethanes (TTHM). To address this issue, the city received \$337,000 in DWSRF assistance to install new water treatment equipment at the raw water pump station and elevated water storage tank. The city has been in compliance with the TTHM drinking water standard since project completion in June 2020, and now all 1,200 customers are receiving safe, reliable drinking water.



STATE: Indiana

RECIPIENT: City of Delphi

PROJECT: Capital Drinking Water Improvements

SUMMARY: The City of Delphi received \$7.4 million in DWSRF funding for a new well, storage tank, booster station, water mains, and hydrogen sulfide removal equipment.

DESCRIPTION OF PROJECT

The City of Delphi experienced decreasing water levels and high concentrations of hydrogen sulfide. The city is also home to a large meat production company and needs to be able to provide enough water for this large area employer. To address these challenges, the city received \$7.4 million in DWSRF funding to construct a new well, storage tank, booster station, water mains, and hydrogen sulfide removal equipment. This DWSRF project, completed in February 2021, allowed the community to provide reliable and safe drinking water to its 3,200 customers.



HONORABLE MENTIONS

STATE: Kansas

RECIPIENT: Public Wholesale Water Supply District No. 25

PROJECT: New Regional Water Supply System Creation

SUMMARY: The Public Wholesale Water Supply District No. 25 (PWWSD) received \$22.4 million in DWSRF funding for three well fields, a softening treatment plant, transmission mains, pump station, and storage.

DESCRIPTION OF PROJECT

In 2015, the PWWSD determined they would need a new drinking water supply to meet existing demands because their current water purchase contracts were set to expire. Furthermore, the area reservoir showed limited ability to be a long-term supply for the residents. The PWWSD received \$22.4 million in DWSRF assistance for three well fields, a softening treatment plant, transmission mains, pump station, and storage. This project was completed in December 2019 and benefitted 6,300 individuals.



STATE: Massachusetts

RECIPIENT: Town of Eastham

PROJECT: Eastham Water System, Phase I

SUMMARY: The Town of Eastham received \$39.4 million in DWSRF funding for the construction of two well fields, a storage tank, and over 45 miles of water distribution mains.

DESCRIPTION OF PROJECT

In 2015, the Town of Eastham did not have a municipal drinking water system; residents relied on water from non-community systems and private wells. Furthermore, evaluations determined that the drinking water was contaminated with nitrogen and phosphorus from nearby septic systems, and 1,4-dioxane was also discovered in several private wells. Because of the contamination, 43 residences relied on bottled water. To address these concerns, the town utilized \$39.4 million in DWSRF funding for Phase I of creating a new public water system. Phase I was completed in November 2020 and included the construction of two well fields, a storage tank, and over 45 miles of water distribution mains.



HONORABLE MENTIONS

STATE: Michigan

RECIPIENT: City of South Haven

PROJECT: Center Street Reconstruction

SUMMARY: The City of South Haven received approximately \$1 million in DWSRF funding to replace 1,700 feet of undersized cast iron pipe, improve water accessibility, and replace lead or galvanized service lines.

DESCRIPTION OF PROJECT

The City of South Haven utilized various federal, state, and local funding sources, including approximately \$1 million in DWSRF funding, for drinking water system improvements. The city replaced 1,700 feet of undersized cast iron pipe, replaced lead or galvanized service lines, and improved water accessibility. This project, completed in May 2020, was part of a larger initiative to revitalize the downtown area of South Haven. As a result, the city's 4,300 residents now have access to safe drinking water.



STATE: North Carolina

RECIPIENT: City of Gastonia

PROJECT: Two Rivers Utilities Water Treatment Plant Improvements

SUMMARY: The City of Gastonia received \$30 million in DWSRF funding to replace failing sedimentation basins.

DESCRIPTION OF PROJECT

The City of Gastonia utilized \$30 million in DWSRF funding to replace failing sedimentation basins with new sedimentation basins and a membrane filtration system. The city's existing sedimentation basins and their adjoining filters had structurally failed, which decreased the treatment capacity at the city's main water treatment plant. Additionally, the new membrane filtration system will allow the plant to return to its original treatment capacity while occupying less space. The project was completed in December 2018 and ensures safe, reliable drinking water for the service area of 90,000 people.



HONORABLE MENTIONS

STATE: Ohio

RECIPIENT: City of Painesville

PROJECT: New Raw Water Intake

SUMMARY: The City of Painesville received \$17.4 million in DWSRF assistance to replace their damaged primary water intake.

DESCRIPTION OF PROJECT

The City of Painesville's water treatment plant receives raw water from Lake Erie through an intake pipe and crib. However, existing intake pipes have experienced issues, including blockage from sand and zebra mussels and limited ability to draw water. To address these issues, the city used \$17.4 million in DWSRF assistance to replace the aging and damaged primary water intake structures. This new intake pipe extends further into the lake, limiting impacts from turbidity, sand, debris, and algal blooms. Replacement of the intake structures was completed in September 2020 and ensures the water treatment plant has sufficient capacity to supply drinking water to 32,000 people.



STATE: Oregon

RECIPIENT: City of Cornelius

PROJECT: Aquifer Storage and Recovery

SUMMARY: The City of Cornelius received \$2.8 million in DWSRF funding to construct an aquifer storage and recovery system and a pump house facility.

DESCRIPTION OF PROJECT

Cornelius, a city of 9,800 people, needed additional drinking water storage to provide safe and reliable drinking water to customers. The city's above ground storage reservoir was inadequate to meet peak demand and emergency needs. The city received \$2.8 million from the DWSRF to construct an aquifer storage and recovery system and a pump house facility. This new below-ground storage supply, completed in December 2018, also increases the city's resiliency for any future natural disasters or other emergencies.



HONORABLE MENTIONS

STATE: South Dakota

RECIPIENT: Clark Rural Water System

PROJECT: Regionalization to Bradley and Willow Lake

SUMMARY: The Clark Rural Water System (RWS) received approximately \$3 million in DWSRF funding for booster service station improvements and connection to the nearby communities of Willow Lake and Bradley.

DESCRIPTION OF PROJECT

Clark RWS was nearing its distribution system capacity and was strained during peak demand times. Clark RWS received approximately \$3 million in DWSRF funding to improve the booster service station to improve pressure and capacity. Clark RWS also connected the nearby communities of Willow Lake and Bradley for water service. This project was completed in December 2020 and provided the Clark RWS's customers with safe, reliable drinking water.



STATE: Tennessee

RECIPIENT: Town of Humboldt

PROJECT: Water System Improvements

SUMMARY: The Town of Humboldt received \$6.5 million in DWSRF assistance for improvements to the water treatment plant and water distribution system.

DESCRIPTION OF PROJECT

The Town of Humboldt needed to complete various water system improvements so they could meet the demand of existing customers and a new industrial facility. The town received \$6.5 million in DWSRF assistance for the construction of a new raw water well, installation of higher efficiency pumps, replacement of the existing chemical feed pumps, and construction of approximately 17,500 feet of water mains, a new elevated water storage tank, and other improvements. This project, completed in December 2020, allows the town to meet the drinking water demand of existing customers and the new industrial facility, stimulating the local economy and benefitting residents.



HONORABLE MENTIONS

STATE: Virginia

RECIPIENT: Town of Hillsboro

PROJECT: Hillsboro Water System Improvements

SUMMARY: The Town of Hillsboro received \$737,000 in DWSRF assistance to connect their new well to the existing water system and other water system improvements.

DESCRIPTION OF PROJECT

Hillsboro, a town with only 29 residential water connections, discovered their spring water source was under the influence of surface water and was required to begin a boil water notice in 2000. The town worked for several years to secure approximately \$4 million in affordable financing from various sources, including \$737,000 in DWSRF assistance. Construction began in 2019 and consisted of connecting the town's new well to the existing water system and various other water system improvements. This project was completed in June 2020 and allowed the town to address a consent order and lift a 20-year boil water notice.



STATE: Washington

RECIPIENT: City of Richland

PROJECT: Richland Lorayne J Consolidation

SUMMARY: The City of Richland received \$1.8 million in DWSRF assistance to consolidate Lorayne J's water system into their water system.

DESCRIPTION OF PROJECT

Due to high nitrate concentrations in Lorayne J's wells, the City of Richland provided Lorayne J drinking water through an emergency intertie for several years. In 2018, the city received \$1.8 million in DWSRF assistance to consolidate the Lorayne J water system into its water system. The city installed a permanent intertie with Lorayne J, in addition to other system upgrades, allowing Lorayne J's 116 households to abandon their high nitrate wells. The previous owner of Lorayne J will continue to provide residents with landscape irrigation water, reducing demand for the city's water.



HONORABLE MENTIONS

STATE: West Virginia

RECIPIENT: Central Hampshire Public Service District

PROJECT: Water System Improvements, Phase I

SUMMARY: The Central Hampshire Public Service District (PSD) received \$1.3 million in DWSRF funding for Phase I of a project to upgrade the water treatment plant and distribution system.

DESCRIPTION OF PROJECT

Customers in the Central Hampshire PSD's Green Spring and Springfield systems encountered water service interruption at a higher rate than normal due to the high frequency of line failures in the system. To address this issue, the Central Hampshire PSD utilized approximately \$3 million in funding, including \$1.3 million in DWSRF assistance, to rehabilitate water mains in the Springfield system and upgrade Green Spring's water treatment plant. This project was completed in February 2020 and resulted in a more reliable system and improved drinking water quality for 3,500 residents.





United States Environmental Protection Agency
Office of Ground Water and Drinking Water

www.epa.gov/dwsrf

Office of Water, January 2022

EPA Publication: 816-R-22-001

All images were provided at the courtesy of the participants.