

The Journal for Water &
Wastewater Professionals

Q3 2023

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MANAGEMENT™

Mitigating the Climate Impact on Your Water Infrastructure

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Earmarks are helpful but given the huge water funding need they should be in addition to a fully funded SRF.”

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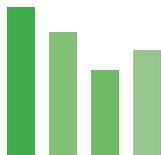
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Editor's Message



Proposed SRF Cuts Realistic or Political Posturing?

As I write this, some big news coming out of Washington, D.C. as it relates to water is the proposed \$1.8 billion spending cut for the EPA's State Revolving Loan Fund programs.

In July, the House Interior Subcommittee passed an appropriations bill for FY24 Interior, Environment and related agencies that proposes a massive spending reduction for the Clean and Drinking Water SRF programs. These programs had been previously designated for expansion in FY24 to \$3 billion apiece through the Bipartisan Infrastructure Law. But under the House proposal the CWSRF would be reduced from \$1.64 billion in FY23 to \$535 million in FY24 (67 percent reduction) and the DWSRF reduced from \$1.13 billion in FY23 to \$460.61 million in FY24 (59 percent reduction). The CWSRF figure is only 17 percent of the authorized level of funding under BIL, and the DWSRF figure only 15 percent. It's a total cut of \$1.8 billion from current levels. Industry groups like the National Association of Clean Water Agencies warned that the already underfunded water sector cannot absorb additional funding cuts at this level. Many have also suggested it could just be political posturing. It will be interesting to see the developments on this in the coming months.

Combating Climate Treats

In this issue, we feature a few stories that touch on climate change, what it means for the water sector and what utility systems can do to get more resilient to infrastructure threats. Someone recently told me that no matter your opinion on climate change, it's almost undeniable that we do have extreme weather at times. Flooding and drought are both issues, for instance, that can threaten

infrastructure and water utility operations. Check out our cover story from contributor Sandra DiMatteo in which she lays out five considerations for utilities as they navigate climate-related threats. I also sat down with Shawn Corrigan, risk and resilience principal at Carollo at AWWA's annual conference in June. Shawn shared some very interesting perspectives on how utilities can better incorporate risk and emergency response planning into business continuity plans. Check out our conversation on 26-27. And for a slightly different angle, I would direct you to a great commentary on page 32 contributed by Soren Rasmussen of Landia that discusses low bid and how can affect climate initiatives.

Help Keep Me Informed

I am looking to present more stories in *Water Finance & Management* that highlight specific utility challenges and successes. Some of the topics I'm looking to cover are workforce development, unique capital planning approaches, affordability, proactive asset management programs, proactive communication and utility outreach, smart water implementation, reducing non-revenue water, pressure management, treatment plant management, and more. If you can speak to these or any other topics, are interested in contributing to WF&M, or simply have some ideas for how we should be covering these areas, drop me a note at afarr@benjaminmedia.com. 🌟



Andrew Farr | Managing Editor

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Obituary: Water industry veteran Scott Haskins passes away



Haskins

Longtime water industry veteran Alan Scott Haskins, who spent much of his career working for the City of Seattle and later with CH2M/Jacobs and as an independent consultant, passed away on June 26 after a nearly three-year illness. He was 74.

Haskins was born in Eugene, Oregon, on Nov. 19, 1948, to Norma Jean (Gooding) Haskins and Dale Quinton Haskins. As a student at University of Washington, he met Kathleen Bloom (Kathi), who he married in April 1971. She was the love of his life. They had five children and were married for 51 years before her passing in January 2023. Haskins joined the U.S. Army Reserve in 1970 and was honorably discharged in 1976.

His professional calling was public service and Haskins spent more than 40 years working in the water utility sector. He was an industry leader in areas ranging from utility financial management, asset and risk management, alternative contracting, strategic planning and leadership development to performance management, benchmarking, environmental management, sustainability and much more.

Haskins began his career with the City of Renton, Wash., and later joined the City of Seattle in 1975, including more than 20 years with the Seattle Water Department. There, he held roles in finance, project development, operations and maintenance, community programs, planning and executive leadership over the full range of water functions of the utility.

In 2007 Haskins shifted to the private sector, joining Jacobs Engineering (then CH2M Hill). In recent years, he formed Haskins

Strategic LLC, working as an independent consultant.

Haskins actively participated in the industry, serving on many committees with various organizations and in several leadership roles, including on the advisory board for the Evans School of Public Policy & Governance at the University of Washington and on the advisory panel for Seattle's public power utility, Seattle City Light. Haskins was actively involved in AWWA, WEF and countless other water organizations throughout his career. He participated in numerous research projects for both national and international organizations, gave many presentations, authored numerous articles and was also the co-author of two books and contributed to three others.

Haskins served on the editorial advisory board to *Water Finance & Management*. He most recently spoke to WF&M for its December 2022 cover story on Santa Cruz Water Director Rosemary Menard, for whom Haskins helped get her start in the water industry at Seattle Water Department.

Many of Haskins' colleagues wrote heartfelt messages on LinkedIn responding to a post in June that shared the news of his passing. He was described as a "luminary in the water utility world" and an "outstanding mentor to many."

Haskins is survived by his five children and their spouses. In lieu of flowers, Scott requested that donations be made to Fred Hutchinson Cancer Center, or to Water For People, a nonprofit working to promote access to safe and reliable drinking water in developing countries. 🌹

Survey: Communication key in consumer perception of water safety

According to a recent survey conducted by Morning Consult on behalf of the American Water Works Association (AWWA), consumers who remember receiving a recent communication from their water utilities are more than three times as likely to report their water's safety has improved.

The May 2023 poll, called "Public Perceptions of Tap Water," included responses from 2,022 adults served by water utilities in the United States.

Seventy-one percent of respondents view their home's tap water as safe, which is consistent with the level measured in the June 2022 survey. Nineteen percent of all respondents indicated they felt their tap water is unsafe. The survey also breaks down responses by racial demographic. One-quarter of Black respondents (23%) and Hispanic respondents (25%) reported feeling their tap water is unsafe, compared to 18% percent of White respondents who reported feeling their tap water is unsafe.

Both Hispanic and White respondents expressed a four-percentage point increase from a year ago in reporting that the safety of their water has gotten better over the past five

years. However, Hispanic respondents also expressed a five-percentage point decline since last year and 17% since June 2020 in saying the water from the faucet is safe.

"The one thing that's clear year-over-year from the Public Perceptions of Tap Water survey is that a utility that communicates frequently will have greater trust from its customers and in its community," said AWWA CEO David LaFrance. "It's also clear that trust is not equal across all demographics, so there's still work to do to assure high levels of trust with all customers."

The survey reports that those who recall receiving communication are 36% more likely be aware of their water utility's efforts to improve water quality/clarity, as well as know their tap water meets or exceeds federal or state requirements.

Affordability remains a significant issue among respondents. Half of respondents ages 35-44 (51%) and two-in-five respondents ages 18-34 (41%), urban respondents (43%), Hispanic respondents (42%), and respondents who personally pay their water bill (39%) report they struggle to pay their water bill on time. 🌹



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Central Arkansas Water, York Region employees honored with AWWA awards



Stephen Shirley, Central Arkansas Water foreman (middle) receives the Heroism Award at ACE23 in Toronto from AWWA President Joe Jacangelo (left) and Executive Director David LaFrance (right). Photo courtesy of AWWA.



Ranin Nseir, M.Eng., P.Eng., project manager, inflow and infiltration strategy and analysis, York Region (right) accepts the AWWA Innovation Award from T.J. Stroebel (middle), chair of AWWA's Manufacturers/Associates Council. Photo courtesy of AWWA.

The American Water Works Association (AWWA) has recognized two Central Arkansas Water employees with its 2023 Heroism Award. The Regional Municipality of York was the recipient of the AWWA Innovation Award. Both were presented during AWWA's 2023 Annual Conference & Exposition (ACE23) in Toronto in June.

The Heroism Award recognizes an act of heroism performed by a water utility professional who puts himself in personal danger while doing so. Stephen Shirley, a Central Arkansas Water (CAW) foreman, and Chris Duncan, a water distribution specialist II, helped two injured gunshot victims who were involved in a three-vehicle car accident at an intersection in front of their crew truck.

At the scene, the two CAW employees provided life-saving measures until emergency responders arrived. They approached one vehicle and applied a tourniquet to a victim who was bleeding profusely from a gunshot wound to the leg. They also helped a woman in another vehicle who was bleeding and in shock.

AWWA also awarded its annual Innovation Award, recognizing a member who has inspired or implemented an innovative idea, best practice, or solution to benefit the water sector. This year it was awarded to the Regional Municipality of York (York Region) for developing a machine learning project for managing inflow and infiltration.

York Region designed a machine learning model as part of its Inflow and Infiltration Reduction Strategy. Inflow and infiltration occur when water, groundwater and stormwater enter the wastewater system through pipe misconnections and deteriorated infrastructure. This takes up sewer system capacity and may backup into the environment.

The model uses machine learning to process raw data into actionable information to help make proactive and better-informed decisions to manage infrastructure. Real-time and historical data are integrated to create a priority map that informs future operations and maintenance work. It can predict the way the system would respond to hypothetical precipitation events.

To date, the model has achieved over 90 percent confidence in the analysis based on pilots completed from 2018 through 2022. The York Region has also realized a 78 percent reduction in analysis time when compared to the two weeks it took to do the analysis manually. This amounts to approximately \$40,000 in labor costs per analysis of all nine of the municipalities that make up the York Region.

The tool helps ensure money is spent with the greatest impact, and the savings of staff time and resources allows the York Region to focus more on additional planning and finding efficiencies elsewhere in its system. 🌟

Water Research Foundation team publishes ‘game changer’ nutrient removal study

A team consisting of representatives from WSSC Water, Brown and Caldwell and Northwestern University has published research it says will revolutionize cost-effective, environment-safe nutrient removal at water resource recovery facilities (WRRFs).

The \$300,000 research project, Demonstration of Progressive Carbon Efficient Nitrogen with Biological Phosphorus Removal in a Conventional BNR Facility, funded by The Water Research Foundation (WRF), sought to study lowering operating costs of biological nutrient removal (BNR) systems while fully utilizing existing infrastructure.

Introduced in the 1970s, BNR techniques have been subject to scrutiny due to high energy demand, reliance on external chemicals, and economic and environmental sustainability concerns. Given these challenges, many utilities worldwide operating conventional BNR facilities are in dire need of innovative alternatives to meet stringent nutrient limits.

To this end, full-scale research at WSSC Water’s 26 million gallons per day Seneca WRRF in Montgomery County, Maryland, addressed this need by demonstrating how efficient management of influent carbon, coupled with simultaneous nitrification and denitrification and post-anoxic denitrification, can reduce both energy and chemical usage while still meeting nutrient standards.

“Implementing strategies to reduce our carbon footprint while saving money is a win-win,” said WSSC Water General Manager and CEO Kisha L. Powell. “This research project is a perfect example of the nexus of innovation and operations that our employees – Team H2O – display daily. I thank our partners for helping to advance this research and The Water Research Foundation for funding this pilot.”



WSSC Water’s 26 million gallons per day Seneca WRRF in Montgomery County, Maryland, conducted research and implemented a process to reduce energy and chemical usage while still meeting nutrient standards. Courtesy of Brown and Caldwell.

“We congratulate WSSC Water for their unwavering commitment to providing safe and reliable water to its customers and returning clean water to local waterways,” said Brown and Caldwell’s Dr. Pusker Regmi, a principal research investigator. “This study is a game changer for the water industry as we collaborate with utilities and academia to find the most effective, sustainable, and economical ways to enhance nutrient removal practices while protecting the environment.”

By utilizing ammonia-based aeration control to maximize influent carbon utilization rather than aerobic oxidation, the Seneca WRRF decreased its energy use by lowering the aeration demand and blower runtimes and reduced the need to purchase additional carbon for denitrification, thus lowering its carbon footprint.

Furthermore, the research revealed that low dissolved oxygen conditions

can effectively facilitate combined biological nitrogen and phosphorus removal, thereby reducing the need for high-volume mixed liquor recycling, usually as high as four times the WRRF’s flow.

Through this demonstration process and subsequent full-scale implementation, the Seneca WRRF is on track to save its annual energy and chemical costs by approximately \$575,000 as it continues to meet nutrient removal requirements.

WSSC Water is considering deploying the innovative, cost-saving strategies throughout its other five WRRFs to maintain affordable and sustainable service for its 1.9 million customers.

The findings of the research, combined with numerous international awards for wastewater excellence, continue to position WSSC Water at the forefront of science-based nutrient removal approaches. 🌟

USGS study estimates 45% of U.S. tap water contains PFAS

According to a study released in June by the U.S. Geological Survey (USGS), at least 45 percent of the nation's tap water is estimated to have one or more types of PFAS "present" in its system.

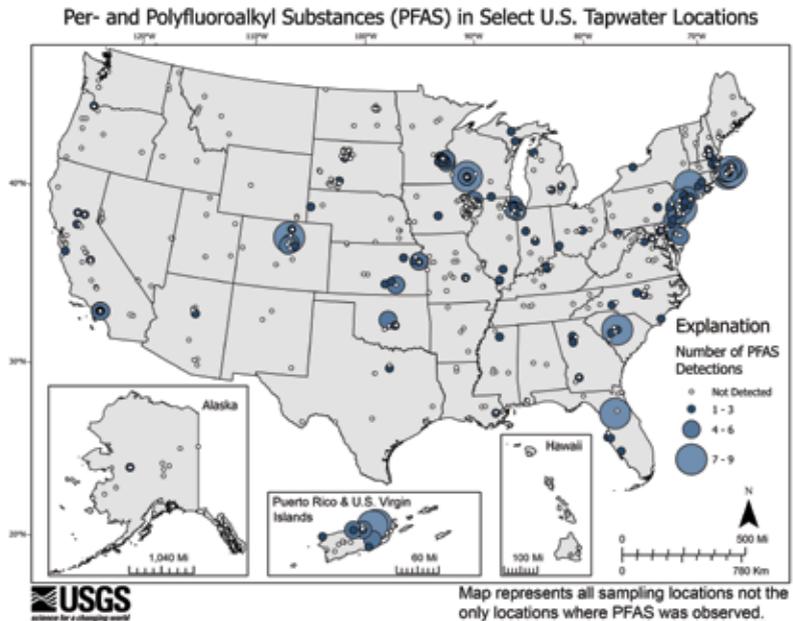
Not all PFAS (there are reportedly more 12,000 different types) can be detected through current testing. The USGS study tested for the presence of 32 types.

According to the USGS, this research marks the first time a study was conducted that tested for and compared PFAS in tap water from both private and government-regulated public water supplies on a broad scale throughout the country. The data was used to model and estimate PFAS contamination nationwide. The USGS says the study can help members of the public to understand their risk of exposure and inform policy and management decisions regarding testing and treatment options for drinking water.

"USGS scientists tested water collected directly from people's kitchen sinks across the nation, providing the most comprehensive study to date on PFAS in tap water from both private wells and public supplies," said USGS research hydrologist Kelly Smalling, the study's lead author. "The study estimates that at least one type of PFAS – of those that were monitored – could be present in nearly half of the tap water in the United States. Furthermore, PFAS concentrations were similar between public supplies and private wells."

PFAS has dominated conversations in the water sector recently. Because they break down very slowly, PFAS are commonly called "forever chemicals." Their persistence in the environment and prevalence across the country make them a unique water quality concern.

In March, the U.S. Environmental Protection Agency (EPA) announced



its proposal for the first-ever national drinking water standard for six PFAS. If finalized, the standard would regulate PFOA and PFOS in drinking water as individual contaminants to 4 parts per trillion (ppt), and will regulate four other PFAS – PFNA, PFHxS, PFBS and HFPO-DA (also known as GenX chemicals) – as a mixture. All six of these PFAS were included in the USGS analysis.

But industry associations representing drinking water systems have suggested EPA may have gone too far in the rulemaking, citing the proposed maximum contaminant levels being too low, as well the high cost of remediation and compliance challenges.

The USGS study tested for 32 individual PFAS compounds using a method developed by its National Water Quality Laboratory. The most frequently detected compounds in the study were PFBS, PFHxS and PFOA. The interim health advisories released by the EPA in 2022 for PFOS and PFOA were exceeded in every sample in which they were detected in this study.

Scientists collected tap water samples from 716 locations representing a range of low, medium and high human-impacted areas. The low category includes protected lands; medium includes residential and rural areas with no known PFAS sources; and high includes urban areas and locations with reported PFAS sources such as industry or waste sites.

According to USGS, most of the exposure was observed near urban areas and potential PFAS sources. This included the Great Plains, Great Lakes, Eastern Seaboard and Central/Southern California regions. The study's results are in line with previous research concluding that people in urban areas have a higher likelihood of PFAS exposure. USGS scientists estimate that the probability of PFAS not being observed in tap water is about 75 percent in rural areas and around 25 percent in urban areas.

The new study builds upon previous research by the USGS and partners regarding human-derived contaminants, including PFAS, in drinking water and PFAS in groundwater. 🌟

Biden administration announces more than \$278 million for Tribes, Alaska Native Villages

At an event in June with Lummi Nation in Bellingham, Wash., U.S. EPA Assistant Administrator for Water Radhika Fox announced more than \$278 million in funding to improve access to safe and reliable drinking water and wastewater services for American Indian Tribes and Alaska Native Villages.

According to EPA it's the largest ever annual investment of water infrastructure funding to Tribes, and will help Tribes and Alaska Native Villages make significant investments in water infrastructure improvements to advance public health protections by improving compliance with existing water regulations, identifying and replacing lead service lines, and addressing harmful contaminants in drinking water and wastewater.

"This funding opportunity isn't just a great opportunity for our Nation, but a great opportunity for all Tribal Nations that are looking for assistance with tribal water systems," said Lummi Vice Chairman Terrence Adams. "Tribal people have an important relationship with the water, and we believe that it is our inherent responsibility to take care of the water as it cares for us."

Some of the funding will come from the new Emerging Contaminants in Small or Disadvantaged Communities

(EC-SDC) Tribal Grant Program. For the first time, EPA will provide \$38.6 million to address emerging contaminants, including PFAS, in drinking water systems serving Tribal populations. The announcement also includes an implementation manual for the new program that focuses on assisting small tribal public water systems in identifying and/or remediating challenges related to PFAS and other emerging contaminants.

Approximately \$5.6 million will come from the Small, Underserved and Disadvantaged Communities Tribal Grant Program. This tribal grant program is designed to help public water systems in underserved and small tribal communities gain access to drinking water services and comply with Safe Drinking Water Act requirements.

Also included is funding for the Alaska Rural and Native Villages (ANV) Grant Program, a program that has been in place since 1996. This \$39.6 million in funding will support Alaska Native Villages with the construction of high priority drinking water and wastewater facilities in rural Alaska as well as training, technical assistance, and educational programs in support of sustainable water systems. 🌟



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Houston Public Works transmission line project earns statewide recognition



The 72-in. Water Line from Emancipation to Tuam was selected as 2023 TX-APWA Project of the Year for Environment (\$25M-\$75M category). Photo courtesy of LAN.

Houston Public Works (HPW), Lockwood, Andrews and Newnam, Inc. (LAN), and Harper Brothers Construction, LLC (HBC) have received the Texas Chapter of the American Public Works Association (TX-APWA) 2023 Project of the Year Award for Environment, \$25M-\$75M category, for the SWTP 72-in. Water Line from Emancipation to Tuam.

The 72-in. waterline is part of HPW's Surface Water Transmission Program (SWTP). The overall goal of the SWTP is to reduce ground subsidence in the Houston area by increasing surface water usage, decreasing groundwater use, and improving the reliability of the water supply system. In addition to the 72-in. diameter water line, the project included full roadway reconstruction, drainage improvements, traffic signalization improvements, street lighting improvements, sidewalk improvements, and small diameter water line replacements. This segment, the first in a series of four such projects, began in East Downtown and ended in Midtown.

The project was presented with the TX-APWA award in June at the Waco Convention Center during the Mammoth TX-APWA Public Works Conference and Exhibition.

Carol Haddock, Director of Houston Public Works, said, "This project created resilience in the drinking water transmission system and replaced nearly 8,000 ft of distribution lines to

upgrade some of Houston's older infrastructure. Crews made improvements to drainage, sidewalks, and streetlights to benefit communities in two council districts. These changes will lay a foundation to improve the quality of life for generations to come."

The construction work, which began in the spring of 2020 and was completed in the summer of 2022, overcame numerous challenges including pandemic-related supply chain issues and the record-breaking Winter Storm Uri.

Christine Kirby, PE, ENV SP, LAN's project manager, said, "There was nothing ordinary about this multi-faceted, multi-discipline project. Inherent challenges included working in a dense urban environment with mature trees and crowded utilities. In addition to the large-scale underground construction and rehabilitation work, special care and attention was given to enhance above-ground features and aesthetics of the local community. A team-oriented approach between the city, the engineering team and the contractor was key to the success of the project," said Kirby.

Overall, the active collaboration between HPW, the contractor, and the engineering team led to the project's success. Thanks to HPW's ongoing water system expansion projects, Houston's drinking water system maintains a "Superior Water Supply System" rating, the highest rating for water quality issued by the Texas Commission on Environmental Quality. 🌟

Sensus releasing new ultrasonic meter

Sensus, a Xylem brand, announced in June the release of Cordonel, a new ultrasonic water meter designed for commercial and industrial accounts to better control water loss and keep costs affordable.

Cordonel uses a patented technology that Sensus said can accurately measure low-to-high-volume flow. The unique flow tube has three measurement channels to capture every drop and seamlessly integrate with the Sensus FlexNet communication network to provide accurate readings in real time.

“Customer expectations are shifting as people become accustomed to living their lives online and obtaining information in real time,” said Mike McGann, senior vice president and president XylemAmericas, Measurement and Control Solutions. “With Cordonel C&I meters and a reliable communication network, utilities and their largest customers can keep a precise pulse on each and every drop of water being used.”

According to Sensus, Cordonel acts as a sensor that can enable temperature and pressure data. Transferred securely, the actionable information can help utilities maintain water quality,

balance pressure levels and gain visibility into operations. The Cordonel meter can accommodate virtually all commercial, industrial and agricultural needs, including horizontal or vertical pipe orientations with no straight upstream or downstream pipe required for ease of installation. With no moving parts, the solid-state device can provide a maintenance-free solution over its 20-year life, according to Sensus.

“Water utilities are at a moment of opportunity,” said McGann. “Digital solutions — such as the remotely-managed Cordonel meter — have the potential to transform water systems and the communities they serve.”

The Cordonel C&I meter enables a range of applications, including: AMI and AMR data; precise high and low water flow measurement; leak detection; control of industrial processes using a pulse output; rich data for district metered area (DMA) applications; and pressure and temperature monitoring.

The Cordonel will be available in a 2-in. version this summer, and additional sizes of 1.5 in., 3 in. and 4 in. will follow later in 2023. 🌟



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NACWA warns against proposed ‘radical spending cuts’ to SRFs in FY24

The National Association of Clean Water Agencies (NACWA) in July expressed deep concern about the potential for Congress to move forward on massive spending cuts being proposed for the Clean and Drinking Water State Revolving Fund (SRF) programs.

These programs had been previously designated for expansion in FY24 to \$3 billion apiece through the Bipartisan Infrastructure Law. But now, the House Appropriations Committee is proposing cutting water funding by more than half in its Interior, Environment, and Related Agencies Spending Bill.

According to NACWA, the committee’s proposed legislation to rein in what it called “wasteful spending” for “low priority programs” would cut appropriations for State Revolving Funds to a terminal level, effectively killing these vital programs supporting public water utilities.

The Clean Water State Revolving Fund (CWSRF) would be reduced from \$1.64 billion in FY23 to \$535 million in FY24 (67 percent reduction), and the Drinking Water State Revolving Fund (DWSRF) reduced from \$1.13 billion in FY23 to \$460.61 million in FY24 (59 percent reduction). The CWSRF figure is only 17 percent of the authorized level of funding under BIL, and the DWSRF figure only 15 percent. NACWA warned that the already underfunded water sector cannot absorb additional funding cuts at this level.

“The House Appropriations Committee is asking Congress to cut funding for key water programs at the worst time possible,” said NACWA CEO Adam Krantz. “What we need to do is increase the State Revolving Funds to their fully authorized levels to close the water investment gap and help address the growing, low-income water affordability challenge. Water experts on both sides of the aisle are watching extreme rain and flooding events ravage New York and Vermont [in July], and every corner of the country is at greater risk from climate impacts. So, no responsible lawmakers who are listening closely to their constituents can deny the public outcry for adequately funding water infrastructure at this critical juncture. Congress needs to put a stop to political posturing. Proposing radical spending cuts like this is a waste of time. We need to get down to business and fix our clean water infrastructure. Earmarks are helpful but given the huge water funding need, should be in addition to a fully funded SRF.”

NACWA has said in recent reports that costs of providing basic water services are growing for a variety of factors, including the need for communities to update aging infrastructure, comply with new regulatory mandates, address increasingly complex water quality challenges related to nutrients and emerging contaminants like PFAS, and improve system resilience to climate change and extreme weather.

NACWA Chief Advocacy & Policy Officer Nathan Gardner-Andrews added: “Although the current proposal just represents the Committee’s starting point for negotiations with the Senate, draconian spending cuts like this to the State Revolving Funds endanger the health and safety of American families by underfunding clean water services to an unsustainable level. It is vital that Congress appropriates the full authorized funding levels for water, wastewater, stormwater, and water recycling programs in FY24 so that local utilities and their customers have the resources to affordably invest in water infrastructure and meet their federal regulatory obligations.”

Overall, it’s a 39 percent cut that House Republicans are proposing to EPA’s budget, and it could set up a clash later this year when lawmakers must negotiate a final FY24 spending plan for EPA and the rest of the federal government.

On the Senate side, in July, the Senate Appropriations Committee unanimously approved a FY24 appropriations bill that would largely hold EPA’s water infrastructure funding programs level next year, while slightly trimming overall EPA spending by \$200 million, to \$9.9 billion.

Separately, Senate appropriators also approved a FY24 spending bill for the Department of Health and Human Services that omits any funding for the Low-Income Household Water Assistance Program (LIHWAP) that is scheduled to expire in September. Water sector associations like the Association of Metropolitan Water Agencies, representing large drinking water systems, said it intends to keep pressure on lawmakers to take steps to continue that program. 🌸



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Revisiting WIFIA Sub-UST Interest Rates for SRFs

By John Ryan

The WIFIA loan program offers an interest rate derived from current U.S. Treasury (UST) yields at loan closing. Other large-scale federal infrastructure loan programs like TIFIA and CIFIA do the same. The underlying idea is that the loan should cover the government's interest cost of funding it. The program's appropriations can then be devoted primarily to offset expected credit losses. Since very few losses are expected from investment-grade loans to infrastructure projects, WIFIA's surprisingly small annual appropriations can go a long way. It's not a bad approach to federal infrastructure lending in general.

For most borrowers, a rate based on the federal government's own cost of borrowing should be attractive. It's a little more complicated for WIFIA because nearly

all the program's borrowers so far are highly rated water agencies that can issue very cost-effectively in the tax-exempt municipal bond market where yields are often close to (or even below) the UST curve. Still, if a WIFIA loan's interest rate is at least roughly comparable to a borrower's muni bond alternatives, the loan's other features (term, flexibility, construction rate lock and reset, etc.) are highly beneficial for financing large-scale, long-lived infrastructure projects. For this class of WIFIA borrower, a sub-UST rate isn't necessary.

SRF-WIN Sub-UST Proposals

WIFIA's base UST rate has worked well so far, but it's not intrinsic to the program's mission. In 2018, the proposed SRF-WIN Act included a 20 percent discount to WIFIA's base UST rate (subject to certain adjustments and limitations) for those SRFs which receive less than 2 percent of annual

federal grant funding. This is a significant discount, amounting to about 10 percent of loan principal on an NPV basis. As you'd expect, there was a lot of support for the proposal among qualifying SRFs and related stakeholders. But two serious objections were raised by advocacy groups representing WIFIA's water agencies, which as noted above are by far the largest component of program borrowers to date:

- The proposed specific eligibility requirement appears to be arbitrary and unrelated to underlying water infrastructure policy objectives.
- Loans with sub-UST rates inevitably require significant budget authority, regardless of an SRF's typically high credit rating. This would be a dramatic shift in WIFIA's current modus operandi.

These two objections raise substantive points. My own opinion is that both could have been adequately answered or addressed, and I assume that the Act's proponents thought the same. But in the end, the opponents prevailed and although some parts of the SRF-WIN Act were incorporated and passed in the American Water Infrastructure Act of 2018 (AWIA), the sub-UST provisions were not.

A Different Approach

Regardless of the outcome for the SRF-WIN Act, sub-UST WIFIA lending to SRFs is potentially too valuable a tool to be dismissed. However, I think a different approach is required, both to pre-emptively answer the objections raised in 2018 and (more importantly) to clarify the purpose and expected policy outcomes of such lending.

It's well-known that the vast majority of SRFs are not optimally leveraged. The problem is not a lack of access to cost-effective debt. As very highly rated public-sector entities, SRFs can issue tax-exempt bonds at near-UST rates, just like WIFIA's typical water agency borrowers. Unlike those borrowers, however, SRFs aren't financing their own infrastructure projects, but on-lending to smaller entities that do. The WIFIA loan features for large projects noted above may be compelling for water agencies, but they're of limited value for SRF leveraging. In contrast, a sub-UST rate would be central to the economics of leveraging and may be exactly the feature required to encourage SRFs to consider doing more of it.

Encouraging SRF leverage is clearly a WIFIA goal, and the program's SWIFIA provisions effectively acknowledge that SRFs are a distinct class of borrowers. If sub-UST rates

Expanded WIFIA leverage would be a cost-effective option to maintain lending capacity growth in this critical resource for smaller water projects.

are a feature that could help achieve WIFIA's goals for this class, they should be considered a valid policy option even if not particularly important to other borrower classes or consistent with WIFIA's (relatively short) operational history. In this context, the availability of sub-UST rates specifically to those unleveraged or under leveraged SRFs that would benefit most by expanding their capacity with a WIFIA loan would appear to be directly related to the goal. Eligibility provisions related to maximizing the marginal benefit would be anything but arbitrary.

The additional appropriations required for sub-UST lending to SRFs should not interfere with continued funding for WIFIA's water agency borrowers. SRF funding can be separately proposed and segregated for the purpose, as was done for SWIFIA's \$5 million budget authority in 2022. Perhaps more importantly, the relatively high budgetary cost of sub-UST lending should be specifically evaluated in terms of the potential positive impact of increased SRF leverage, not what works for a different borrower class which can utilize other WIFIA loan features. Since SRF leverage can dramatically improve the utilization of annual federal grants, the overall net benefit-cost numbers for federal taxpayers might be surprisingly positive.

WIFIA's ability to encourage SRF leverage and a correct evaluation of the net federal cost of the tools required to do so are especially important in a landscape of increasing federal fiscal constraints. Despite the U.S. water sector's obvious and ever-growing infrastructure needs, annual federal grant funding for SRFs might not keep pace - or could even be cut, as was recently proposed. Expanded WIFIA leverage would be a cost-effective option to maintain lending capacity growth in this critical resource for smaller water projects.

WIFIA's success is largely due to the innovative ways that the program used its initial capabilities to create value for its original class of borrowers. Why not add to those capabilities - and that success - by permitting the program to consider sub-UST rates for another class of borrowers, the SRFs? 🌟

John Ryan is principal of InRecap LLC and a frequent contributor to *Water Finance & Management*.



Court Pauses Cybersecurity Rule Following Legal Challenge



In July the U.S. Court of Appeals for the Eighth Circuit granted a request from the American Water Works Association (AWWA) and the National Rural Water Association (NRWA) to stop the U.S. Environmental Protection Agency's Cybersecurity Rule from going into effect until a current case challenging the rule has been decided.

The court's decision applies to all AWWA and NRWA members across the United States. AWWA and NRWA requested that the court stay (pause) the rule during a legal challenge from three states so that their members would not have to undertake costly changes to their operations until the court decides if the rule is legally valid. The stay applies until further notice from the court.

"AWWA is pleased the court recognized the importance of halting the Cybersecurity Rule for our utility members as it reviews the legality of the rulemaking process," said AWWA CEO David LaFrance. "AWWA strongly supports efforts to strengthen cybersecurity in the water sector, but the Sanitary Survey Program is not the right tool for the job. We are grateful our viewpoint will be heard by the court and look forward to working together with EPA and others on a smart path forward."

"NRWA commends the court for issuing this stay preventing EPA from enforcing the Cybersecurity Rule until it is determined if it has been lawfully implemented," added NRWA CEO Matthew Holmes. "While NRWA fully supports efforts to strengthen cybersecurity in small communities across the country, enforcing this regulation is not the best way to help small and rural systems, and could have costly and unnecessary consequences."

EPA's intention to incorporate cyber audits as part of utility sanitary surveys was first announced in 2021 in the agency's FY22 budget request. Following the announcement, AWWA and NRWA, along with other associations representing drinking water systems including the Association of Metropolitan Water Agencies and National Association of Water Companies, said they had heard "near-universal objections" to the approach, including from the primacy agencies that would be mandated to implement the new requirement. Among the associations' rationale at the time:

- The planned program is legally unjustifiable, as interpretive rules like those governing sanitary surveys may not create new legal standards or requirements;
- Sensitive information shared with states would not be protected from public disclosure; and
- State primacy agencies are not qualified to assess the cyber readiness of a water system, which could lead to unmerited significant deficiencies and misinformed advice to utilities.

In March 2023, EPA released a memorandum to require states to survey cybersecurity best practices at public water systems (PWSs). "Cyber-attacks against critical infrastructure facilities, including drinking water systems, are increasing, and public water systems are vulnerable," said EPA Assistant Administrator for Water Radhika Fox. "Cyber-attacks have the potential to contaminate drinking water, which threatens public health. EPA is taking action to protect our public water systems by issuing this memorandum requiring states to audit the cybersecurity practices of local water systems."

But AWWA and NRWA have joined the States of Missouri, Arkansas and Iowa in a legal challenge to the rule because of concerns about the legal process and legality of the rule.

According to AWWA, there are concerns that the rule may create additional cybersecurity vulnerabilities for members, as well as concerns that states do not have appropriate resources, laws, rules or procedures in place to adhere to the rule requirements.

Specifically, in the absence of a viable primacy agency implementation framework, water systems were at risk of violations for which they are unable to prepare. There is also the risk that the cybersecurity vulnerabilities of these systems would be publicly available because they are being done through sanitary surveys, which could be accessed by malicious actors.

The public wasn't given the opportunity to comment about EPA's proposed approach before the rule was issued. By granting a stay, AWWA says the court has prevented these risks to members while it reviews the legality of EPA's rulemaking process. 🌟



Major PFAS Settlement Reached as 3M to Pay At Least \$10.3 Billion; Bipartisan Coalition Opposes

In June, chemical manufacturing company 3M announced it will agree to pay at least \$10.3 billion in lawsuit settlements over contamination of water systems from PFAS, harmful chemical compounds the water sector has been cracking down on.

If approved by the court, it would be the largest water contamination settlement in U.S. history, according to law firm SL Environmental Law Group, and another step toward ensuring drinking water is safe from PFAS. The class-action suit would pay between \$10.3 and \$12.5 billion over 13 years to water providers in the multidistrict litigation in response to cases over PFAS contamination from aqueous film-forming foam (AFFF).

The 3M settlement came on the heels of a similar settlement in June on behalf of DuPont and two of its spinoff companies that would create a separate \$1.185 billion fund for PFAS impacts to water systems.

According to the Associated Press, the 3M settlement would also settle a case scheduled for trial earlier this month involving a claim by Stuart, Florida. The City of Stuart is one of about 300 communities that have filed similar suits against companies that produced firefighting foam or the PFAS it contained, said the AP.

In 2021, the U.S. Environmental Protection Agency (EPA) released the fifth Unregulated Contaminant Monitoring Rule (UCMR 5), which added 29 per- and polyfluoroalkyl substances (PFAS) compounds to the list of regulated contaminants. Public water systems serving between 3,300 and 10,000 people are required to complete sampling no later than 2025, and systems with detectable levels of PFAS in at least one supply source would be eligible for a share of the up to \$12.5 billion in funds provided in the proposed class action settlement.

“The 3M settlement is incredibly significant, as it represents a huge stride toward securing funds for water systems across the country to offset the high costs of PFAS contamination,” said Ken Sansone, partner at SL Environmental Law, one in a small group of firms leading the AFFF multi-district litigation efforts. “We are dedicated to ensuring taxpayers are not bearing the burden of costly remediation efforts and that those who polluted are held accountable.”

“This is an important step forward for 3M, which builds on our actions that include our announced exit of PFOA



Water suppliers trace water contamination by PFAS to the extensive use of AFFF by firefighters at training facilities, airports, etc.

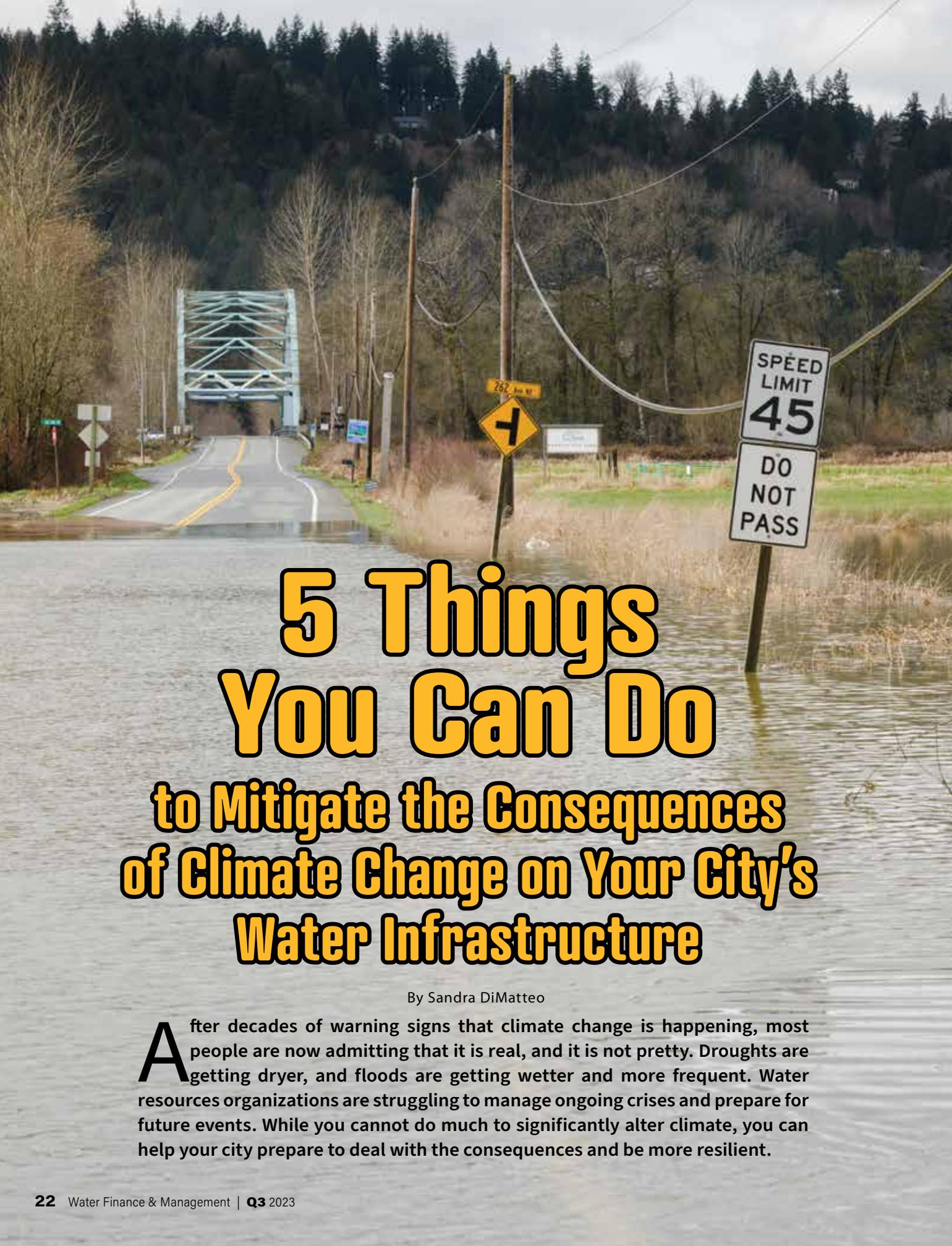
and PFOS manufacturing more than 20 years ago, our more recent investments in state-of-the-art water filtration technology in our chemical manufacturing operations, and our announcement that we will exit all PFAS manufacturing by the end of 2025,” added 3M chairman and CEO Mike Roman.

California Attorney General Leads Coalition Opposing Settlement

But in July, California Attorney General Rob Bonta led a bipartisan coalition of 22 attorneys general in announcing the state’s opposition to the proposed class action settlement, saying it fails to adequately hold 3M accountable.

The proposed 3M settlement is subject to court approval and would apply to nearly every public water provider in the United States, even those that have not sued and even those that have yet to test for the presence of PFAS in their water. In return for waiving their claims, 3M would allegedly pay out \$10.5 to \$12.5 billion to water providers, an amount that Bonta and other states say is worth far less because of certain provisions that could ultimately force water providers to reimburse 3M for many costs.

Joining Attorney General Bonta in opposing the proposed settlement were the AGs of Arizona, Colorado, Connecticut, Hawaii, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New Mexico, New York, Pennsylvania, Rhode Island, Tennessee, Texas, Vermont, Wisconsin, as well as the District of Columbia, the Commonwealth of the Northern Mariana Islands, and the Commonwealth of Puerto Rico. 🌟



5 Things You Can Do to Mitigate the Consequences of Climate Change on Your City's Water Infrastructure

By Sandra DiMatteo

After decades of warning signs that climate change is happening, most people are now admitting that it is real, and it is not pretty. Droughts are getting dryer, and floods are getting wetter and more frequent. Water resources organizations are struggling to manage ongoing crises and prepare for future events. While you cannot do much to significantly alter climate, you can help your city prepare to deal with the consequences and be more resilient.

Infrastructure remains one of the least technologically advanced sectors in the entire economy. A technological transformation of the industry has the potential to, among other things, help achieve sustainability and resilience goals against climate change, as well as improve the efficiency, safety, and quality of water infrastructure projects. Through new methods and new technologies, leading utilities are advancing the infrastructure on which society depends.

Here are five things that you can do now to mitigate the consequences of climate change on your city's water infrastructure.



Companhia Águas de Joinville developed a contingency plan for droughts, recognizing that access to water means dignity for the people in the community. Image courtesy of BBC StoryWorks.

1. Develop a Contingency Plan for Droughts

Seasonal droughts are worsening each year. Amid constant demand to optimize water resources, you strive to maintain quality service and safe water supply to your community. One way to optimize investments and operations is to initiate a strategic hydraulic modeling project to understand how the supply system works and how to proactively address distribution network issues. During dry periods, your teams can develop a water contingency plan to reduce water production on the fragile source without affecting the people in the area.

With advanced modeling and simulation, you can essentially create the foundation for a true digital twin of the municipality's macro water distribution and supply system. It is important to have a digital representation that accurately reflects the physical network operation so that in times of trouble, your teams can be prepared and in control. An open modeling application provides a crucial feedback loop between the operations and engineering teams. The operations team brings field problems that engineering teams can dynamically assess through digital models. Both teams can collaborate and decide on optimal solutions, bringing a quick response with minimal impact to customers, ensuring sustainable water supply and improving the environment and quality of life for the city's residents.

Joinville, Brazil, is a city that experiences seasonal droughts, but in recent years it has been experiencing some of the worst droughts in 30 years. Drought and water scarcity have a huge social impact on people's lives. Access to water means dignity for the people in the community. A hydraulic model and a digital twin helped Companhia Águas de Joinville to evaluate how well the system was working, as well as simulate what could be done within the system to figure out the optimal solution. BBC StoryWorks produced a mini documentary film about the Joinville experience.

2. Reduce Non-Revenue Water Losses and Waste to Mitigate the Effects of Water Scarcity

Water scarcity has the potential to affect more than half of the world's population by 2025. With a few simple steps, your organization can gain better visibility of their water distribution network assets, reduce waste in processes, and save millions of gallons of water annually.

First, optimize operational activities to prevent pipe bursts. By monitoring operations of the water supply system by leveraging a digital twin of the network, you can find and fix leaks faster and extend the operating life of infrastructure. This process saves resources required to keep the assets running safely and reliably. Including remote monitoring capabilities means fewer site visits and reduced fuel and labor costs.

Water digital twins bring together SCADA, GIS, hydraulic modeling and customer information into a connected data environment to deliver cost-effective operations and maintenance strategies in real time. For the first time, engineering and operations can collaborate using the digital twin. While hydraulic models in the past were mainly used by the engineering department, they can now be used easily for daily operations and maintenance. The advantage here is that with a cloud-based digital twin, real-time simulations of network events, such as pipe breaks, pump shutdowns, valves operations, water flows, and fires, can help to better understand and anticipate the impacts on service levels. With real-time hydraulic analysis of the network on-hand, operators can fill in the gaps between sensor data.

With visibility to the system's sensor data, boundary conditions, billing, and hydraulic modeling information in real-time, this living digital twin continuously monitors all infrastructure assets, including tanks, pumps, pipes and valves. It provides at-a-glance visibility to key data points, including

Infrastructure remains one of the least technologically advanced sectors in the entire economy.

valve operational status, tank level, and input flow for each district metered area. This scalable environment provides utilities with access to critical system and individual asset performance to empower operations and maintenance with improved decision-making. The digital twin provides visibility into non-performing assets and anomalous network conditions. In addition, utilities gain visibility into present, historic, and forecasted analysis of the performance of assets to uncover leaks in the network before they turn into a problem, and to proactively identify areas of improvement.

In Manaus, Brazil, AEGEA integrated key data that was previously stored across different siloed systems into a single platform to improve leak detection, asset management decisions, and operational processes.

In Washington, D.C., a digital twin helps to reduce operational and capital expenditures and reduce nonrevenue water loss with improved visibility of data and analytics. With the sheer size of DC Water's network, the dynamic nature of operational unknowns and, at times, the physical unknowns can have a cascading effect on the delivery of reliable drinking water in a safe and resilient fashion. With an implemented digital twin, DC Water easily replicated data from their enterprise systems in a secure managed cloud application where they could organize and scrub the data in near real time. As a forward-looking utility that considers implementing a digital twin an essential business priority, DC Water knows that while data is crucial to the implementation, collaboration among stakeholders is key to success.

3. Conduct Flood Risk Assessments to Mitigate Effects from Climate Events on Urban Drainage Systems

When flooding poses risks to residents, damages property and infrastructure, and disrupts urban services, hydraulic simulations can help engineers and operators to predict and better understand problems and create efficient solutions that increase the resilience of urban drainage systems. With a better understanding of surface flooding depth and velocity, flood hazards and inundation times, it means proactive communication can be made to stakeholders.

Powerful tools for flood modeling and hydraulic analysis of overflowing stormwater systems are important to prepare

for new challenges in water retention in both urban and city environments. With comprehensive visualizations, both engineers and non-engineers can make more informed decisions aimed at assuring service levels and improving stormwater collection network and asset performance.

Wastewater and stormwater condition assessment is a costly and constant activity for city workers. Intelligent and automated rapid condition assessments use machine learning to improve defect detection and labeling, improve data quality, accelerate inspection work, and reduce costs. Integration with the digital twin makes this data part of a systematic process that water and wastewater professionals use every day. The digital twin provides a federated source of actionable insights, including sewer condition assessment results. It puts valuable analytics and timely decision support at the fingertips of operations and maintenance to help them understand and proactively mitigate the impact on flows based on forecasted weather patterns, especially crucial during extreme weather events.

Urban drainage networks are intended to safely collect and convey sewage and stormwater, but the reality is that many existing systems have problem areas where the flow is not effectively contained. Digital tools help engineers to determine the extent to which undesirable overflows will spill, and also to understand the root causes of the problem. Paired with the automatic design algorithms that engineers have trusted for decades and the efficiency gains with the digital twin, these tools can be more effective than ever at helping to prioritize and fix systems to make them more resilient in the face of increasing extreme weather events.

In 2020, significant flooding along the Yangtze River in China killed 141 people and displaced 38 million more. For the City of Jiujiang, the disaster was the latest in a string of overflow and waterlogging incidents caused by accelerated urbanization, and officials initially could not determine how to prevent them. To better prepare for future flooding events and minimize disruption to city life, China Three Gorges Corporation directed Shanghai Investigation, Design & Research Institute (SIDRI) to create a hydraulic analysis system that can simulate a variety of water conditions in the city. To provide the information, the hydraulic analysis system would need to clearly display detailed

data, plan flood control tasks, and pinpoint emergency events. Frequently updated hydraulic data needed to be easily accessible to shorten the time to dispatch emergency services. With the ability to predict potential waterlogging, officials can now identify and address critical drainage problems in advance.

Real-time data overlaid onto the reality model allows the city to make emergency responses to flooding in a timely manner.

4. Prepare for Rapid Response with Dam Safety Monitoring

Dam failures can be catastrophic, so it is essential for dam owners and inspectors to implement tools that effectively and proactively reduce these risks to people and the environment. Unplanned rainfall events can wreak havoc with water resources and utility operations, leaving residents vulnerable to water supply disruption or worse. Dam safety programs supported by state-of-the-art monitoring systems are imperative to reduce risk imposed by storms. A self-sustaining dam safety monitoring system uses a network of sensors to monitor conditions including rainfall, pore pressure, deformation, reservoir lake level, and other metrics to provide automated site-specific insight into the performance of the dam and the water distribution system.

Real-time monitoring provides the right information at the right time for proactive risk management, safety, and predictive maintenance applications. Real-time monitoring of utilities can include environmental groundwater monitoring to improve the water quality of catchment areas, rivers, wetlands, and groundwater systems to assure a safe level of flood protection. Dam safety programs often include real-time condition monitoring applications that can include groundwater, flow, seepage, and slope stability during and after construction, or even rainfall and weather monitoring to minimize adverse environment impacts during and after construction.

In the case of Hurricane Ida, such data was used to establish alerts that triggered notifications that were autonomously sent to key engineers and authorities when thresholds or predefined warning limits were exceeded. A dam safety engineer on duty at the time was able to alert affected counties to conduct evacuations in a timely matter when multiple dam sites lost power. Through the use of real-time automated monitoring, the dam safety officer was able to react to rapidly deteriorating conditions that nearly reached overtopping conditions and maintain an enhanced safety response for the surrounding areas.

5. Reduce Carbon Footprint and Aim for Net Zero

One way to become carbon neutral by 2030 is to reduce energy consumption and carbon emissions. Energy use at a water or wastewater utility can be as much as 50% of the organization's total electricity consumption, second only to labor costs in most utilities' operating budgets. Water utilities are some of the largest users of electricity. Energy potentially represents the largest controllable operational expenditure in a utility, making it a perfect target to help minimize environmental impact. Digitizing the water supply network and implementing smart, energy-efficient pumping operations helps to achieve sustainability and eco-friendly goals without impacting service quality, such as water pressure or water quality, for their customers. Hydraulic models can be used to instantiate energy savings by reducing energy waste and promote better efficiencies in operating a pumping system.

By optimizing the operation of pumping stations, you can lower fuel needs and reduce electricity usage. For example, you can automate operating times of your pumping stations while still guaranteeing consumer satisfaction in terms of water demands. The best way to automate the on/off pump switches is through a digital model, calibrated and simulated to accurately represent the water supply operations in real time.

Evides supplies the Netherlands' City of Rotterdam with clean and safe drinking water. They coupled the hydraulic model with an optimization algorithm using dynamic control scripting. They used the model to test, evaluate energy cost calculation, and automate the on/off switch points to optimize usage of the pumping stations for 110 million cubic meters of pumped water. Evides was able to save 33% in energy costs and reduce their carbon dioxide footprint by 942 tons. Energy costs savings of EUR 300,000 annually was achieved, reducing the carbon footprint and contributing towards sustainability company goals.

Advancing Utilities – It's About Time

Leading utilities are advancing their digitization to help achieve sustainability and resilience goals against climate change, as well as improve the efficiency, safety and quality of water. Through new methods and new technologies, you can mitigate the consequences of climate change on your city's water infrastructure. 🌱

Sandra DiMatteo is the industry marketing director for water infrastructure at Bentley Systems.

Risk, Resilience, Response



Utility Preparedness Q&A with Shawn Corrigan, Carollo

This past June at AWWA's Annual Conference and Exposition (ACE23) in Toronto, we caught up with Shawn Corrigan, CEM, vice president and risk and resilience principal at Carollo. Corrigan walked us through some trends in how utilities are approaching risk assessment, resilience planning and emergency response to combat some of the most pressing challenges facing water system operations and security. We touch on adapting business continuity plans to account for emergencies, cybersecurity risks, customer communication and disaster recovery.

Water Finance & Management:

America's Water Infrastructure Act (AWIA) of 2018 required water utilities to assess vulnerabilities and develop risk and resilience assessments and emergency response plans. Has AWIA impacted how utilities approach resilience and preparedness?

Shawn Corrigan: I think it has, and a lot of that started with risk management. The overall intent is to build a consistent approach to emergency management for all utilities in America. In response to AWIA, utilities had to rewrite or revise their emergency response plans to a certain standard. The first task for any emergency program is to understand what your risk exposure is, taking into account natural hazards, physical security and cybersecurity. A piece of that includes looking closely at business continuity plans and how that can impact the flow of the business side as opposed to just the crisis management side. When people now talk about business continuity plans, they're thinking about cyber breaches, security vulnerabilities, potential media/social media backlash



and trust issues. I think more utilities are realizing that the managerial skills required for those areas are a big piece of this.

WF&M: Even though emergency planning and risk and resilience initiatives vary by region, are there any common threads you're seeing as far as challenges or things water systems could do better?

Corrigan: The one thing I would say utilities could do more of is training their staff to execute the plan. I see a lot of systems write an emergency response or security plan and they put it on the shelf and when it's time to use it, they're like, "What page is this on?" Different sectors and different industries are required to do a lot of full-scale validation of plan exercises to show regulators they can respond beyond just having it written down. There are definitely these types of exercises happening for water, don't get me wrong. But trying to get [utilities] a little more sophisticated and trying to get more of a culture of preparedness within the organization is where I see

operational resilience moving in the water sector.

WF&M: Are there any other problems you think utilities could improve in their planning process?

Corrigan: One thing I might recommend for the industry is making sure each person involved in executing all elements of the plan clearly understands their specific role and responsibilities. For example, if I'm an operator at a particular asset, it's critical that I'm clear about what I need to know in a given situation and how I might need to interact in a real-world scenario. I don't need to know what the command structure is, how they're tracking situational awareness, I don't need to know response times. I need to know, if there's an emergency, what my specific role is.

There's a lot of room for utility systems to embrace emergency preparedness. You're only as strong as your weakest link. So, having a certain level of innate resilience allows these organizations to strengthen their whole system.

WF&M: What about dealing with emergency situations in real time?

Corrigan: I am seeing a lot of systems, particularly in the Northwest, developing emergency drinking water plans aimed at determining what to do when water is out of service during a crisis and how to distribute emergency drinking water to the public if a system is down for days or weeks. Carollo is working with clients to conceive emergency supply plans that are multi-jurisdictional. For example, providing emergency water more than just providing safe sources of water – it’s providing sites and properly coordinating and communicating with the public. In that sense, the water utility isn’t acting and can’t act alone – these types of responses require coordination between multiple groups and units.

WF&M: In terms of risk and preparedness, are you seeing a need on the wastewater side in addition to drinking water?

Corrigan: AWIA was focused exclusively on drinking water, and certainly I think a lot of good work has been done with AWIA to bring a higher standard of emergency preparedness. I would love to see that move more into the wastewater side and I would advocate for building those plans out. For systems that handle both water and wastewater, we are seeing some clients working both sides of that equation as far as emergency response.

WF&M: Let’s talk cybersecurity. In the United States, the U.S. EPA is trying to require cyber audits as part of utility sanitary surveys, a move that was recently paused by a U.S. circuit court while it is determined if such a rule would be legally valid.

Corrigan: As far as adding cybersecurity to sanitary surveys, some people think it’s a good idea, others not so much. It seems like that’s the

direction the regulators are moving toward, though. I’ve always advocated for an all-hazards approach to crisis or business continuity management where you don’t have these siloed plans. The goal is to have a consistent management structure that can deal with any type of incident, whether its a cyber incident, natural hazard or something human-induced. If I were running crisis management, I want my technical experts at the utility system trained on emergency management and organized in such a way that the system is more flexible and can adapt in the event of a cyber incident.

WF&M: Do utilities have a high level of vulnerability when it comes to potential cyber attacks?

Corrigan: I wouldn’t say that. But there’s a high level of awareness and people are very sensitive to this issue. Sometimes these attacks are just an accident – somebody clicks on the wrong thing in an email and a hack occurs. But there’s a level of awareness around things like that.

WF&M: What lessons learned from the COVID-19 pandemic come to mind as far as emergency or crisis management?

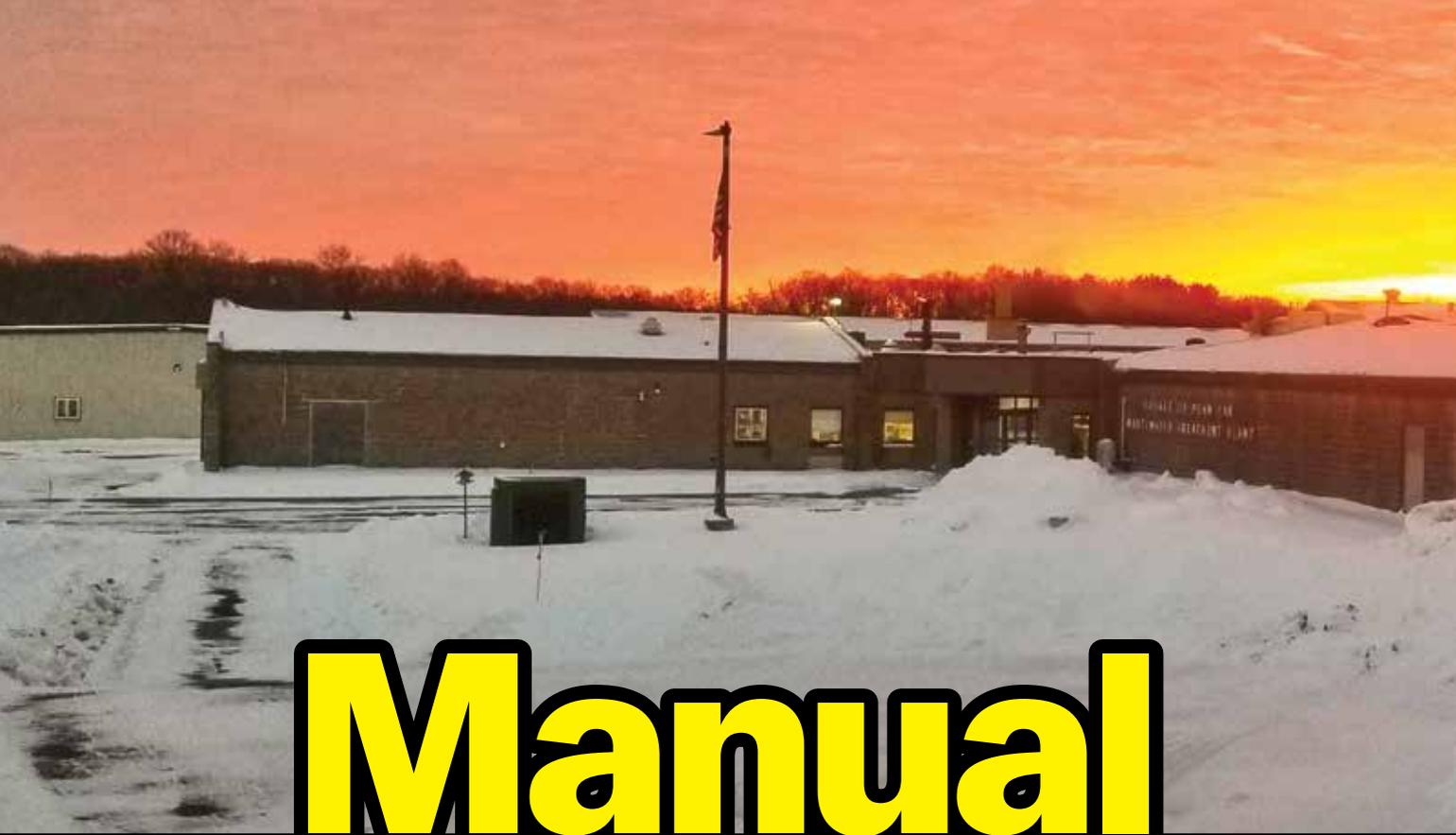
Corrigan: This I think COVID was managed as a public health event as opposed to an emergency. There were a lot of reasons for that, but I think a well-built business continuity plan should include illnesses, disease, or other reasons people can’t be in the office. From a business sense, it was an emergency, and it changed the way the world works. All of a sudden everyone was doing virtual meetings, for instance, and so people found ways to adapt. I think it’s changed the way utility systems plan for emergencies, as well. We have a different level of awareness about how to adapt. In many ways disaster is an agent of change, and COVID was a disaster and has changed the way we manage things.

WF&M: Are there any other water quality issues that can be improved with better business continuity and crisis management plans?

Corrigan: There are several ways water quality can be impacted. One utility I worked with had a source water issue at a surface water facility that had debris clogging the intake after flooding. They had water coming into the facility from the intake, but not as much as they wanted. This system had not written well-crafted crisis communication messaging. They had typical boil water advisory-type messages that they tried to adjust to communicate reduced usage to the public, and it caused confusion. So, thinking through messages like that, whether water use, lead and copper issues or whatever, is very important. Thinking about what the message is that needs to go out, the means for transmitting it and how it will be received by the target audience, these are all things that can be planned for and also practiced.

WF&M: What else are you and Carollo working on to help change the business model for utilities?

Corrigan: I would note that a big piece of crisis or emergency management is the recovery process – the idea being that if there were some sort of calamity and you return everything to the state it was in prior, you’re still exposed to the same risks. If a utility system has had some sort of incident and then does an after-action analysis and goes through the proper recovery phase, it really should then be looking at the management structure, the financial structure and how the business of the utility can be changed and create a more streamlined approach. With AWIA, it was “Let’s build an emergency response plan.” We’re now seeing clients come to us looking for a disaster response plan. 🌟



Manual *to Modern*

How the Move to a Centralized Data Platform Heightened Operations at a Small New York Wastewater Treatment Plant

By Scott Dorner

Located on the north end of Keuka Lake in the State of New York, is the Village of Penn Yan which is home to approximately 5,000 people. The Keuka Lake Outlet carries water from the lake's outlet through the village along with flow from two small creeks to Seneca Lake, the largest lake in the Finger Lakes chain. These waterways and

the power they generated were a principal reason for the establishment of the village on this site in 1799. Today, residents and summer vacationers enjoy many recreational activities along the lakes and outlet. Protecting these waterways is a top priority for the Penn Yan Wastewater Treatment Plant Operations team and Chief Operator Yvonne Tucker.



The Penn Yan wastewater treatment plant was built in 1983 with a design flow capacity of 1.8 MGD.

The village wastewater treatment plant was built in 1983 with a design flow capacity of 1.8 MGD. For the most part, the plant runs well, however during heavy rain events, flows can increase from the average 1.2 MGD daily flow to 5.6 MGD in less than 30 minutes causing inflow/infiltration issues. The secondary treatment process is comprised of 16 rotating biological contactors (RBC), 2-stage anaerobic digestion, mechanical screw press dewatering and biosolids compost production. Nitrification takes place on the last 10 RBCs, and polyaluminum chloride is utilized for total phosphate reduction to less than 1 mg/L. While industry accounts for about 10 percent of the plant's flow, periodic dumping can cause overloading that upsets conditions resulting in the need for an increase in phosphorus removal.

Monitoring the treatment of Penn Yan's wastewater from influent to effluent involves the collection of a lot of data as pollutants are removed and water quality is restored. Operators receive some data such as pH, dissolved oxygen, suspended solids, temperature, etc. from instruments, and also receive water quality results from samples sent to laboratories. In addition, plant operators used paper bench sheets that were later entered into an Excel spreadsheet for performance

tracking. Prior to continual monitoring, all the lab results, instrument readings and bench sheets were manually entered into different spreadsheets for different tracking purposes. The problem with entering data manually is that it is very time consuming and is prone to human error.

Having data stored in different spreadsheets for different reasons is not optimal when it comes to understanding the dynamic performance of a system as a whole. "We were chasing data all over the place in multiple spreadsheets which made it very hard to troubleshoot issues and difficult to see long-term trends," says Tucker.

Moving to an Automated Centralized Data Platform

Penn Yan moved from paper to digital in 2022 with Rio, a software program by Aquatic Informatics that helps manage treatment plant operations by collecting and organizing data into actionable insights. The new software can integrate with electronic lab transfers, pull data from instruments, and allow personnel to capture field data on-site with a connected mobile device. Alerts can be set to notify operators with in-app notifications and email if a parameter setpoint has been exceeded.

Having all this data securely stored in the cloud improves operational visibility. Preceding and following weekends and holidays, operators will let their co-workers know if something is amiss or a little unusual, but sometimes circumstances don't allow for the conversation to happen. Having information from the previous shift at the fingertips of the new crew ensures they can have a quick glance at the previous eight hours.



Penn Yan's population swells in the summer, increasing in organic loading which often results in an alert that clarifier sludge blanket heights are too high. Operators can now look at historical data to see when this usually happens and what they did to accommodate the change.

Troubleshooting with Data

Like most wastewater treatment plants, Penn Yan has redundancy at their pump stations. Equalling out pump run-times is important to ensure maintenance is performed when it should. If there is a deviation in pump run times, it can indicate a problem.

"We recently installed a new pump station and began to notice that one of the pumps was accumulating more hours than the other," says Tucker. "On investigation, our team determined that the T-joint on the pipe had come apart so that when that pump was on, water was coming back into the wet well, so it had to pump longer than the other one. By monitoring and trending pump hours in Rio, we were able to identify there was a problem."

Having all this information live in one platform gives operators a much better understanding of performance and if any changes need to be made to the system to keep wastewater flowing through the treatment process efficiently.

For example, if the load cells for the rotating biological contactors (RBCs) on one train indicates a trending increase in weight, and the other train load cells do not show an increase, this type of one-sided increase would indicate an uneven flow

or loading condition. This would require an adjustment to the splitter box ahead of the RBC process to even out or balance the distribution between the two trains. If left uneven, this could result in reduced treatment efficiency, or possibly increased stress on the mechanical equipment due to an overweight condition which could result in catastrophic failure.

A leading indicator of a healthy digester is the ratio of volatile acids to alkalinity (VFA/TA). The Penn Yan treatment plant operates around 0.12. The anaerobic digestion process can be finicky, if the pH has changed, then it's too late, and the bacteria have stopped functioning. This can result in a sour digester, and possibly foaming issues. "Using Rio we can watch this ratio trend closely and adjust how much we are feeding the digester or add alkalinity to buffer the acid if needed," says Tucker.

Ensuring equipment is operating within its capacity and that operational processes are running efficiently impacts both short-term costs (maintenance and repair) and long-term capital budgets.

Garnering Insights with Visual Analysis

Being a relatively small treatment plant, Penn Yan monitors around 100 parameters from regulatory influent/effluent parameters to process control data. The new platform allows Tucker to select and analyze any number of these parameters, over any period. Prior to using Rio, she had to pull data from multiple spreadsheets to compile reports, which was time-consuming. Now with a few clicks, she can create graphs and dashboards to visualize trends or identify relationships between any number of parameters.

"We can create the graphs we need, on-demand, 10 times faster now – it's a huge time-saving feature," Tucker says.

As summer approaches, Penn Yan's population swells, resulting in an increase in organic loading, often resulting in an alert that clarifier sludge blanket heights are too high. Operators can now look at historical data to see when this usually happens and what they did to accommodate the change.

Tucker adds: "We can now be more predictive – we can avoid some problems and investigate others quickly and easily, so we can improve our response time to fix them in the future."

Reporting, Compliance & Transparency

Tucker uses Rio to produce the monthly NetDMR discharge reports and other quarterly reports for stakeholders. As most data is automatically fed into the system, compliance reporting takes a lot less time, and without additional, repetitive data entry, there is less chance for human error. Having all the derived data in one place adds a layer of defensibility to reporting, but it is also helpful when a permit exceedance occurs.

When a permit violation occurs, the village needs to follow protocols which starts with notifying the Department of Environmental Conservation (DEC). Tucker explains, "The next

“We were chasing data all over the place in multiple spreadsheets which made it very hard to troubleshoot issues and difficult to see long-term trends.”

— Penn Yan Chief Operator Yvonne Tucker on data management prior to the move to continual monitoring.

step is to understand why we had a violation, so we go through the plant looking for problems. We check the operation of chemical metering pumps, make sure we are adding enough chemicals to help with settling, compare the industry flow to see if their contribution is causing a negative impact, look at what is in the influent, and check to ensure that the flow did not exceed the design parameters of the tank, and so on. Having all this data in one place, allows us to easily and visually see the whole process. We can overlap data to compare time periods and determine what happened so we can get back in compliance.”

Prior to the new software, if a stakeholder asked to see the last year of flow data, it would involve pulling data from 12

different spreadsheets and copying and pasting it into one. This was time-consuming work that may, or may not, garner any valuable insight. Today, Tucker can select and organize the data she needs for just about any request, providing a new level of transparency for stakeholders and the ability to provide reports that visually showcase pertinent results.

Capturing History for Future Hires

Small communities with small budgets are held to the same standards and regulations as larger water utilities. “It’s vital for small teams like us to use every tool we can to streamline operations and work processes, as our roles and responsibilities often encompass a more diverse spectrum than our colleagues in larger utilities,” says Tucker.

As new hires join the team, they need to quickly get up to speed on plant operations. Having all its wastewater treatment information stored in one place will really help with this. As things change over time, operators will have a reliable historical baseline to help with decision making.. 🌟

Scott Dornier is data management product manager for Aquatic Informatics.

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By Soren Rasmussen

Climate Initiatives Stifle with Stuck-in-the-Past Equipment Purchasing

Protecting the environment has never been so high on the agenda. So, isn't it peculiar that in the wastewater industry, almost everything is still archaically structured to purchasing the cheapest possible equipment, which can all too soon end up as waste that in many cases can't be recycled?

Peculiar indeed, and very wrong when you consider that, ideally, everyone from consulting engineer to contractor to equipment supplier wants the best possible solution - one they can be proud of with a happy treatment plant customer.

But hands are tied by bidding laws, which when trying to secure capital such as State Revolving Fund (SRF) loans, they are only about the price tag on a piece of new equipment. There is almost nothing about longevity; the total cost of ownership; maintaining and then replacing, for example, a pump or a mixer that has barely lasted a couple of years before it becomes a financial and process burden. That cost is going to be on the customer's shoulders - and those paying their sewer bills.

Why aren't the capital and operating costs integrated?

The recently passed Infrastructure Investment and Jobs Act (IIJA) is sending billions of dollars into infrastructure investments - and it may well be its intention to support climate-friendly investments. However, there's no evidence yet that this will carry through to actual project documents that would promote the benefits of long-lasting, climate-friendly wastewater treatment solutions over cheap, throw-away equipment.

Is there a state that might want to become the first to change the current situation so that they get the best value for money? Contractors need to be competitive of course, and they don't want to price themselves out of a job. But this can all too often result in equipment that meets budget, but is cheap - and cheap for a reason.

As a manufacturer whose mixers and pumps can typically last for two decades or more, our stainless steel propellers (that have a lifetime guarantee), can't possibly compete on the purchase price with propellers made from plastic. Over time, when plastic inevitably breaks and needs replacing, we will prove by far the most economical solution. And by the way, all that failed, non-recyclable plastic gets buried in the ground, which rather flies in the face of all the considerable green environmental credentials that so many claim are part of their 'caring' ethos.

More than ever, we hear from frustrated operators at a treatment plant. A typical scenario is that the \$15,000 mixer they purchased less than two years ago has broken down - again - and that last time it cost \$12,000 to fix it. And they know that it is likely to let them down again. The bidding structure didn't really allow them to buy our \$25,000 mixer, even though it's reliability and total cost of ownership will be drastically lower, aside from removing so much hassle.

Many specifications that we receive were written 20 years ago or more (you can see the cobwebs), and apart from some clever people who were largely ignored, concern for the future of our planet was barely part of any conversation. At Landia Inc., we still receive paperwork that includes certain features and brand names that have not been applicable for more than 20 years! It's the same old document, pulled from the shelf. The wording will very generically describe the need for pumps and mixers, but not a word about long-term costs. I don't know about you, but when I buy a car, I don't just ask for four wheels and four seats and then jump straight in with a purchase because it's some super low price. I want to make an educated decision. I might want to know some pros and cons, like how many miles it does to the gallon and how reliable it's going to be. Otherwise, it's probably cheap for a reason, because it is going to be a pain in the butt and probably won't last me very long.

There are some very good consulting engineers out there, and I'm not for one second saying that they don't make educated decisions. Just like us in the supply chain, they want to win work, but the whole structure - based solely on capital cost-only price tags, in 2023 - is crazy.

As is the case in other countries, we should start working towards a process whereby maintenance costs, including the price of spares, are built into quotes. It's laughable, really, to see those who say they "stand by their equipment" offering a whole 12-month warranty! Wow! If you really believe in what you're selling (and perhaps I can't ask you to take the environment into consideration), how about five years, 10 years or 15 years? Then we'll know the true cost. But for now, the financing and purchasing of wastewater equipment remains firmly stuck in the past. 🌟

Soren Rasmussen is the director of Landia, Inc., the U.S. subsidiary of Landia A/S in Denmark.



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Thinking
Twice about
AMI?

By Peter Mayer

Customer metering is fundamental to the successful function of a modern water utility. The introduction of expensive Advanced Metering Infrastructure (AMI) systems with fixed data transmission networks and battery powered “smart” water meters has confronted many utilities with the challenging and consequential decision: To buy AMI or not to buy? Today, the alternatives to AMI are making this decision more difficult than ever, and they have utilities considering options beyond fixed communication networks.

ON THE FENCE ABOUT AMI?

Purchasing an AMI system is a significant commitment for a utility to make. For starters, it commits the utility to a long-term relationship with a single meter company, when previously utilities could use different brands of water meters across their system.

As part of the long-term commitment, AMI requires installation and maintenance of a fixed wireless communication network across the utility system for communicating meter read data back to the water provider. Operating and maintaining a wireless network presents an unfamiliar infrastructure challenge for many water providers.

Then, there is the financial commitment. Cost-benefit analysis conducted for WSSC Water in suburban Maryland by a consultant

estimated the cost of their AMI system to be \$200 million. It is worth noting that these costs do not include the ongoing maintenance and operational expenses of the network, which can also be significant.

The cost of AMI systems is ultimately borne by utility customers, and increased water bills for all customer classes will accompany AMI. AMI systems require such significant investment that many water utilities opt to start work with a consultant to develop the “business case” for AMI, which is then used to promote the concept with decision makers.

What can be forgotten in the AMI cost-benefit analysis is the financial commitment for the customer-facing portal. If customer-side water savings are a goal of the smart metering



There are Alternatives and Complementary Systems to Consider

program, a portal and a way to communicate quickly and directly with customers is required and should be prioritized by utilities undertaking AMI projects.

According to research from the American Water Works Association (AWWA) on customer portals, a reasonable range of water savings associated with AMI-based programs with a customer portal falls within a range of 2 to 10 percent. Without a portal, there are no customer-side water savings from AMI.

The level of savings is determined by several factors, most significantly the level of customer enrollment in an AMI portal and the design and efficacy of the portal itself. AWWA researchers conducted 10 interviews with U.S. utility managers and found AMI portal registration rates ranged from 4 to 71 percent, with the majority of utilities at the lower end of this range.

ONCE BITTEN, TWICE SHY

Missteps with AMI implementation can delay metering projects for years. In 2023, San Diego is considering restarting an AMI rollout that began in 2012 and came to a screeching halt after “billing irregularities” resulted in more than 20,000 San Diegans being collectively overcharged millions of dollars for water usage. Initially, the city publicly denied the existence of widespread problems with the new smart meters, but eventually had to admit and correct the errors. In 2018, the city shuttered the program after installing smart meters on only 6 percent of

water customers, but this year San Diego is finally restarting the program.

In news reports from NBC San Diego, a city spokesperson acknowledged that five years ago, the city didn’t know how to handle smart meter and grid infrastructure installation glitches, which piled up and became overwhelming. This time around, the city expects to spend up to \$33 million over the next five years on implementation of the AMI system and consulting fees.

ALTERNATIVES & COMPLEMENTS TO AMI

Two key functions of AMI are (1) meter reading for billing purposes; and (2) improved water management and reduced water use through customer communication and data.

Water utilities are very familiar with meter reading for billing purposes. It is a core utility function that has been implemented by every retail water provider in America in some capacity. AMI represents a new generation of water metering technology, which utilities may choose to adopt or not or may adopt in a hybrid form.

Many utilities have chosen to extend the life of existing metering systems without AMI or with partial AMI, implementing a hybrid system using a combination of meter reading methods. Extending the life of existing meter systems while strategically deploying remote meter reading capabilities at certain locations can be a



least-cost, no-regrets approach for providers that for any reason are unable to move forward with an AMI system.

If improved customer-side management and water savings are a significant desired outcome, customer information portals can be an effective tool. Importantly, customer portals can be implemented even if smart meters are not installed. Working to provide customers with access to their own monthly or bi-monthly billing data is still useful, and it begins the process of enrolling customers in the portal. Companies like WaterSmart Software offer customer water use reports that can be based on monthly billing data or on hourly AMI data.

Customer-side smart metering technology like Flume provides a solution for providing customers with that real-time water use data that AMI has promised but seldom delivered. Flume straps onto existing metering infrastructure, including AMI and non-AMI systems. Once installed, Flume reads water use every 5 seconds and transmits this online through a hub the customer installs and an app, all connected to the Internet.

The rate at which Flume reads water use allows its machine learning techniques to analyze where water is going in real time, including leaks and identification of indoor and outdoor applications. Flume and other smart home technologies are not used for billing purposes. Customers with Flume-equipped homes have access to their water use information in real time through a smartphone and desktop application. Flume also provides this analysis to utilities with detailed water data dashboards.

Access to real-time water use data helps customers reduce water use, particularly leaks. Flume has found that within four weeks of installation, its customers reduce indoor water use by 14 percent (more than 17 gallons per household per day). The indoor reductions are then maintained over time, saving these Flume users an average of 6,280 gallons per year.

IS AMI INEVITABLE?

AMI has been presented to the water industry as a future certainty, but as Yogi Berra said, “Predictions are tough, especially about the future.” Rapid changes in public wireless communications networks and new technologies are producing less expensive options that could eventually render the “I” in AMI (the wireless infrastructure) as obsolete. For anyone who has ever pondered the hefty investment required by AMI, there are sound reasons to think twice about it and some viable alternatives to consider.

The fundamental advance represented by AMI is the ability to read meters remotely and more frequently, and to provide that information promptly back to customers. Along with expense, concern about installing and maintaining a fixed network to communicate with water meters across a service area with accuracy have been barriers to adoption, as seen in San Diego.

What if an alternative, existing wireless network could be used to communicate meter data? Eliminating the need for a separate, fixed communication network could reduce upfront and long-term operating costs and rapidly increase adoption of smart meters. The Internet of Things (IoT) could be a game-changer for water metering. Amazon leverages Subeca technology to create a smart meter system that uses long range wide area networks (LoRaWAN) reserved for IoT devices to communicate meter data. In the coming years, a new wave of smart meters that don’t require a fixed network and associated ongoing maintenance, could make the decision to install smart meters easier for water providers.

Water meters that read more frequently and provide real-time data to customers do seem inevitable because they offer so many advantages. But smart metering in the future could look different than it does today. In the coming years, the method used to communicate meter data back to the utility will evolve and could alter the financial equation for cost-conscious water providers and increase adoption of smart meter technology.

METERS MATTER

Metering is fundamental, and each water utility must choose the metering system that best fits their unique situation. The fact that water is accurately measured in a timely fashion by the water utility engenders consumer confidence and enables reliable revenue collection, a win-win situation. Utilities cannot afford missteps when it comes to meters, revenue, and the interconnection between customers and the water system.

AMI and real-time metering solutions can provide valuable information to water providers and customers alike, especially for conservation efforts.

For many water providers, the path to AMI may look very different than what was presented 10 years ago. Fixed network AMI may not be the best path forward when seeking better data. Today, utilities are finding innovative approaches to implementing AMI and hybrid systems that have them thinking beyond expensive fixed communication networks.. 🌟

Peter Mayer, P.E., is principal of Water Demand Management, LLC in Boulder, Colo.

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Improving Performance of the Long Tail of the Water Industry:

The Digital Transformation of Small Utilities

By Doug Hatler

According to the U.S. Environmental Protection Agency (EPA), there are more than 50,000 drinking water and wastewater utilities in operation in the United States serving a population of less than 10,000. These utilities face the same challenges of their larger counterparts and more, including lack of financial resources, economies of scale, and long-term planning; management limitations; aging infrastructure and workforce; ineffective treatment technologies for modern day pollutants (e.g., PFAS); partial digital transformation; difficulty keeping up with current and future regulations; achieving service levels; and meeting customer expectations.

One challenge of specific interest is “partial digital transformation,” because completing such a transformation could help overcome several other challenges. Unfortunately, according to Eric Bindler, senior research director at Bluefield Research overseeing its digital and municipal water research, “small utilities are in much earlier stages of their digital journeys than their larger peers.”

The Digital Transformation

For perspective, the digital transformation began with the start of third phase of the industrial revolution (“Industry 3.0”) in 1969. The transformation rapidly accelerated in the 1980s and thereafter with personal computing, networking and connectivity, the Internet, mobile devices, robotics, data storage and management, etc. Industry 3.0 introduced electronics and information technology (“IT”) to automate production and data management, and to perform human tasks.

- Automating systems and processes, remotely monitoring equipment, and optimizing resource allocation leads to more efficient operations, reduced labor and overall cost savings.
- Digital data management collects, stores, analyzes and reports on vast amounts of data and information empowering drive data-driven decisions that eliminate the time consuming and costly uncertainty associated with intuition and trial-and-error.
- Real-time monitoring and control facilitate can prevent, or provide early detection of, leaks, faults or unusual behavior, allowing utilities to take prompt action and minimize disruptions in service and potential safety issues.
- Predictive maintenance using asset information, data analytics, and machine learning algorithms can predict equipment faults and failures, and better prioritize maintenance needs preventing costly breakdowns, optimizing maintenance schedules and ensuring the longevity of infrastructure.
- On-demand training, content management, knowledge management and skills development systems and tools are cost effective means to onboard, educate, inform and develop new and existing employees, reducing off-site travel and third-party training costs.
- Online portals, social media, mobile applications, email notifications and smart meters allow customers to track their water usage, receive timely alerts, access billing information, keep abreast of utility news and events, and report issues conveniently, improving customer service levels and satisfaction.

- Advanced digital technologies and artificial intelligence can monitor and detect water losses; optimize the energy efficiency of water distribution, wastewater collection and treatment equipment and processes to help achieve sustainability goals and ensure long-term availability of clean water.

What are the Barriers to Digital Transformation?

Small water utilities encounter both internal and external barriers to full digital transformation. These include limited resources, infrastructure limitations, technical expertise, cost considerations, data management, regulatory compliance and resistance to change. Collaborations and partnerships between larger utilities, government agencies, industry associations, consultancies and technology providers can help overcome barriers.

- **Financial Support:** Larger utilities and government agencies can provide funding and grants. Large utilities and industry associations could act as purchasing aggregators grouping together small utility demand for digital products and services to obtain economies of scale unavailable to individual utilities.
- **Technical Assistance:** Sharing technical expertise and knowledge through training programs, workshops and mentorship.
- **Collaborative Partnerships:** Forming partnerships with larger utilities can facilitate knowledge sharing, resource pooling and joint technology adoption.
- **Shared Services:** Large utilities could offer shared services such as centralized data management platforms, remote monitoring, cybersecurity and technical support, which can be accessed by small utilities at a reduced cost.
- **Regulatory Support:** Government agencies could better incentivize and support digitization efforts by offering grants and funding, providing clear guidelines on compliance, and streamlining any required approval processes.
- **Technology Solutions Tailored for Small Utilities:** Technology providers and implementation consultancies could provide pre-designed, cost-effective and scalable solutions to specifically address the requirements of small utilities, considering factors like affordability, ease of use and compatibility with existing infrastructure.
- **Knowledge Exchange Platforms:** Establishing platforms where utilities, agencies, and technology providers can share success stories, best practices and lessons learned can inspire and guide small utilities in their digitization journey.

What Does the Digital Transformation Cost?

The cost of digitizing a small utility varies based on the size of the utility, the level of digitization, existing infrastructure, and specific business, operational and regulatory requirements. The first consideration is the current infrastructure including reliable networking and internet connectivity as well as the cost of hardware components (computers, servers, sensors, etc.) and software systems (financial management, asset management, SCADA, GIS, etc.) IT infrastructure can vary depending on the scale

and complexity of the utility's operations and the chosen vendors. Data management and security is a critical component for data storage, backup systems, cybersecurity measures, and compliance with relevant regulations.

The infrastructure, systems, and tools require implementation and integration. These include set up, configuration, data migration, any desired customizations, report development, employee training, and organizational change management. Integration requires establishing secure connections and exchange of data between systems and tools. The cost of these activities can vary based on the scope and scale of the systems and tools, availability and quality of data, and the amount of participation by utility resources.

Another critical component is training and change management. It's likely a digital transformation will change how management, staff and contractors conduct business and operate the utility. In some cases, job roles and responsibilities change. Training and organizational change management will require additional investment in revised job descriptions, policies and standard operating procedures, workshops, role-based training, and skills development.

Once the infrastructure, systems and tools are fully implemented and integrated, just like any other asset, there is maintenance and support. The ongoing costs will be for software and firmware updates, technical support, licensing and subscription fees and data storage for cloud/SaaS systems.

The Future is Now

As mentioned in a previous article, the first three industrial revolutions have passed. The fourth industrial revolution, or "Industry 4.0," is now upon us. Industry 4.0 is transforming modern society and economies through innovation brought about by advancements in digitization, interconnectivity, data analysis and automation. The elements of Industry 4.0 integrate physical production and operations with smart digital technology, machine learning and big data to create a more holistic and connected world. The result is productivity far beyond what has been seen in the past three industrial revolutions.

However, the water industry in general has been slow to adopt new technology. From a technology adoption perspective, water utilities are "laggards," meaning they are typically the last to adopt an innovation. Therefore, the industry is not fully realizing the benefits of digital transformation. Many large and innovative smaller utilities have completed the digital transformation of Industry 3.0 and are starting to adopt the technologies and innovations of Industry 4.0. However, thousands upon thousands of utilities are mired in past innovation cycles for reasons mentioned earlier, especially lack of resources and resistance to change.

The path forward to improving the performance of small utilities through digital transformation is collaboration and partnership with larger utilities who have completed the digital transformation and offer economies of scale and scope; with government agencies who can provide funding and streamline regulatory hurdles; with industry associations who can help align stakeholders behind a common vision along with the consultancies and technology providers who receive income from water utilities. A rising tide lifts all boats. 🚢

Doug Hatler is president of Environmental Business Ventures, LLC.

PRESSURE MANAGEMENT

How New Mexico's Largest Water Utility Is Enhancing Its Distribution System with Pressure Monitoring Tech

By Joseph Dryer

The dry desert heat of Albuquerque is relentless. However, the largest water utility in New Mexico provides relief with continuous water service, considering options beyond fixed communication networks.

The Albuquerque Bernalillo County Water Utility Authority (ABCWUA) proactively manages its water distribution system to avoid service interruptions with the help of smart digital solutions.

“The goal is to install 20,000 to 25,000 endpoints each year so that our entire system will rely fully on advanced metering infrastructure (AMI) within three to four years,” said Joel Berman, chief engineer at the water authority.

In 2011, the authority began utilizing smart water technology from Sensus, a Xylem brand. Most recently it has added water pressure monitoring that is remotely managed from ABCWUA's offices.

Optimization Made Easy

“When it comes to water pressure management, proactivity is key,” said Berman. “We keep our customers happy by remotely monitoring their water consumption and pressure to ensure any potential issues are identified before they experience them.”

The water provider's Sensus ally residential water meters report pressure data into the easily accessible, cloud-hosted Sensus Analytics Pressure Profile software application.

“This technology has taken many steps out of our typical pressure management process, including administrative tasks and truck rolls,” said Patrick Bayardo, an operations and maintenance superintendent at the water authority. “Now, we simply log into the website in the morning and the data is right at our fingertips. It's a big time-saver for us.”

The application works with the FlexNet communication network to provide seamless data collection from residential meters in the service territory. The data is then presented in easy-to-understand map-based graphs that show pressure zones and levels within the community at any given time. Utility personnel receive automated alerts when pressure deviations occur.

A shot of the Albuquerque Bernalillo County Water Utility Authority's customer service and operations center.



IT GOES DIGITAL

“A customer noticed his new irrigation system was experiencing lower pressure than usual and just stopped working,” said Berman. “Using Pressure Profile, we were able to identify, resolve and restore the system pressure quickly—in only a matter of hours. The customer was grateful, and it was a positive experience for everyone involved.”

Enhanced System = Enhanced Performance

The water authority also added Sensus’ battery-powered Smart Gateway Sensor Interface at pressure-reducing valve sites to monitor water distribution system performance. The sensors, ally meters and pressure management software work within the FlexNet system to locate the cause of ongoing pressure spikes.

“We discovered an open valve—not mapped on our system—that was overpressurizing pressure from one zone to another,” said Bayardo. “Pressure Profile brings us the data we need in the timeframe we need it to troubleshoot and optimize each pressure zone for optimal performance.”

Berman added, “The application is really a plug-and-play system. It’s a seamless solution that our technicians have adopted, installed and programmed without third-party assistance.”

Workflow Efficiency

The efficiency and convenience of smart water solutions have enhanced the Water Authority’s workflow. According to Bayardo, shifting from a “boots-on-the-ground” approach to digital technology where the data is readily available on their computers has saved the utility service calls and routine maintenance.

“Now we can pinpoint areas and resolve potential water pressure issues within hours in what used to take weeks,” said Bayardo.

The utility was an early adopter of smart water technology and hopes to continuously improve operations.

“I’m proud to say that in the last decade we’ve collectively transitioned from being reactive to highly proactive with regards to water distribution pressures,” said Berman. “These days, if we don’t identify an

“These days, if we don’t identify an issue before the customer, something is wrong. It’s not just about monitoring the pressure, it’s about changing the way we do business.”

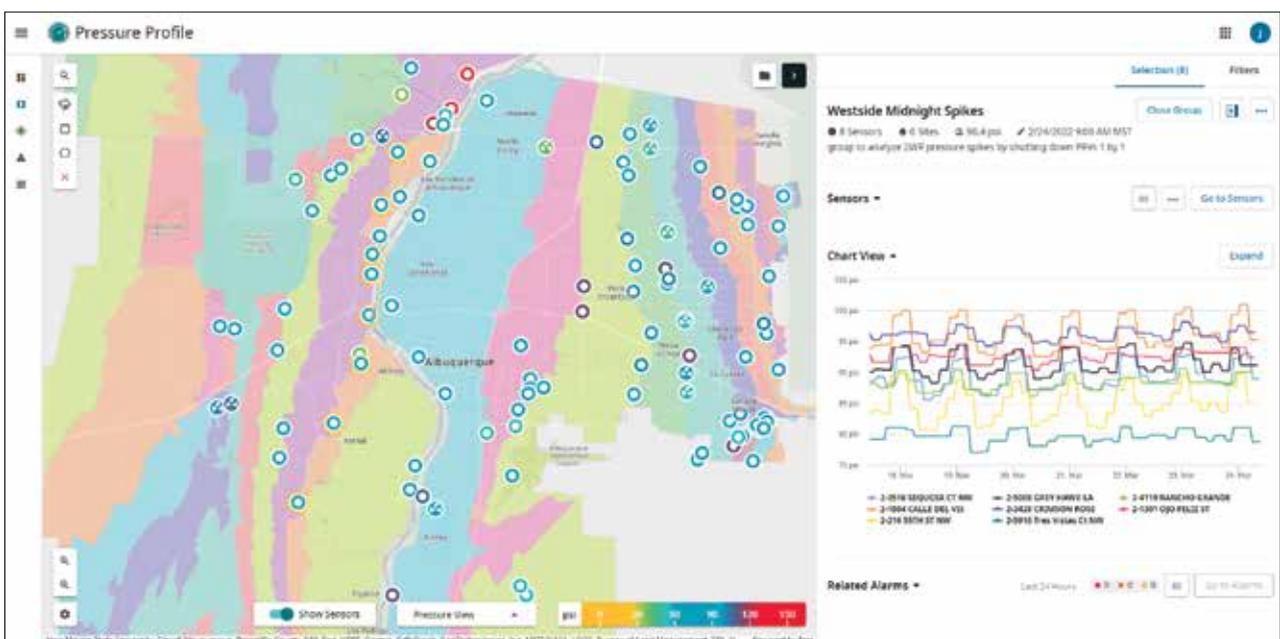
— Joel Berman, chief engineer, Albuquerque Bernalillo County Water Utility Authority

issue before the customer, something is wrong. It’s not just about monitoring the pressure, it’s about changing the way we do business.”

Not Finished Yet

The largest water service provider in New Mexico strives for continuous improvement of its water distribution system. The authority said it has plans to use advanced pressure management data for hydraulic model verification to further improve both water loss and quality. 🌟

Joseph Dryer is a technical solutions manager with Sensus, a Xylem brand.



ABCWUA can view the latest data from smart meters and sensors on a map-based interface to monitor and manage pressure anomalies.



Harnessing IoT Innovations in Intelligent Stormwater Management Systems

By Phil Beecher

Unforeseen amounts of precipitation in the winter of 2022-2023 replenished parched lakes and reservoirs but unleashed a staggering 78 trillion gallons of water on California alone, leading to extensive flooding and stormwater runoff. California experienced two significant atmospheric river events that pushed the Sacramento River at Red Bluff to within one foot of its highest recorded level. The Sierra Nevada mountains also received substantial snowfall, reaching the third-highest level at the Donner Pass since 1946.

How should communities evolve to handle these types of events, which will likely continue to proliferate? They need innovative stormwater management practices in place to mitigate the effects of such climatic extremes. Internet of Things (IoT) technology offers a promising avenue for developing more efficient tactics for managing stormwater capture and

runoff, identifying mechanical malfunctions, and curbing pollution.

Exploring Potential Through Smart Stormwater Management Pilot Programs

Pilot programs serve as catalysts in promoting smart stormwater management by providing a platform to experiment and optimize new technologies and approaches before large-scale execution.

A recent Wi-SUN study involving UK and U.S. IT decision makers revealed that 50 percent of organizations with smart utility strategies have successfully completed projects, an increase of more than 10 percent from five years ago. Yet, there's considerable room for growth as the industry evolves. Thus, pilot programs are crucial in fostering innovation and guaranteeing the successful implementation of smart stormwater management initiatives.

The same survey showed that of 250 utility companies, three-quarters recognized the importance of pilot projects in driving innovation. In the same survey, 70 percent agreed that government funding was a vital component for the expansion of smart utility development. With the passage of the Infrastructure Investment

and Jobs Act, more than \$50 billion was provided to the Environmental Protection Agency (EPA) to advance the nation's drinking, waste and stormwater infrastructure, which are primed for IoT pilot programs to prove out their value.

Leveraging IoT for Enhanced Collection, Conservation and Efficiency

The Clean and Safe Water Program puts nearly \$300 million forward every year to capture and clean stormwater in Los Angeles. Although this program demonstrates a strong commitment to harnessing stormwater in drought-prone regions, its progress has been slow. Right now, about 80 percent of rainfall is whisked away by concrete pathways, which helps with flooding but prevents the heat-parched state from capturing stormwater. Additionally, three years in and the program has generated only 30 acres of new green space, one of the key approaches for capturing stormwater.

Innovation is needed to solve these complex stormwater problems, and IoT is one way to get there. Advanced meter infrastructure is now identified as the third most probable application for IoT



A shot of the Sacramento River near Redding, Calif., just north of Red Bluff where the river came within a foot of its highest recorded level this past winter.

deployments, as stated by 80 percent of respondents in the Wi-SUN study. Smart IoT devices can measure water quality and provide data about the environmental impact of stormwater. Cities like Louisville, Ky. have IoT sensors in their sewers and other waterways that gather data about water quality, especially after a storm.

Furthermore, the utilization of Internet of Things (IoT) devices such as sensors and real-time monitoring systems can greatly support stormwater management initiatives by providing valuable insights into the status of collection systems, particularly when they are nearing or surpassing their limits. These advanced tools can also swiftly identify regions with excessive runoff and enable necessary adjustments to stormwater infrastructure to effectively accommodate changing volumes.

Why Open Standards Matter

The incorporation of IoT systems can present hurdles due to issues of security, complexity, and the necessity for proven ROI. Therefore, employing the appropriate IoT technology, grounded on open standards, is essential for ensuring dependability, resilience, and security.

Field area networks (FANs) predicated on wireless mesh topologies are an ideal option, as 5G communications can't provide the energy-efficiency or cost requirements needed. Choosing standards-based FAN technology provides access to a wider choice of device manufacturers, fostering cost efficiencies and reducing the risk of vendor lock-in. Additionally, a stormwater deployment that covers a large outdoor area requires a variety of IoT devices such as advanced metering and pressure sensors and standards-based FAN technology can provide this without interoperability concerns.

Costs are reduced further by cities like Dallas that have deployed smart street lighting installations. Integrating FAN networks to create a canopy network from which stormwater managers can attach leaf nodes for their edge devices can be viewed as an investment rather than an expenditure. This opens up commercial opportunities with energy companies and local municipalities, too.

Most importantly, as devices must meet stringent standards, they offer added reliability, resilience, and security. With the nation's critical infrastructure

frequently targeted by cyber threats and the EPA's March 2023 requirement that states survey cybersecurity practices at public water systems, the importance of investing in devices certified to meet standards-based authentication and encryption is critical. Standards-based devices and networks are safeguarded from spoofing and data interception, thereby reducing the risk of sabotage, ransom attacks, or data theft. According to research, security and safety continue to be the most common technical challenges among IoT project managers.

The wet winter of 2022-2023 was another reminder that we need to make smart choices about how we manage stormwater. A multitude of choices, innovation, and opportunities await stormwater management programs that embrace IoT to address their urgent issues. Public funding, pilot programs, and open standards-based FANs are three pivotal components to managing stormwater in the most sophisticated ways. 🌟

Phil Beecher is the president and CEO of Wi-SUN Alliance.



AMR Helps Drive a Small but Growing Water Network in Illinois

By Osvaldo Zambrano

Located in the State of Illinois, Exeter-Merritt Water Cooperative delivers safe and high-quality drinking water to approximately 300 residents in the counties of Scott and Morgan. In 2011, the cooperative decided to do a phase 3 expansion and include additional homes in the rural area, resulting in connections increasing from 154 to 325. Exeter and Merritt are small rural towns built on hilly terrains and gravel roads, with most of the meters installed in the countryside.

Though the Exeter-Merritt pipeline stretches to approximately 80 miles long, manual reading took 12 to 16 hours, and occasionally, revisits were needed to verify or correct the reading. If business-as-usual had persisted despite the increase in new connections, manual reading would have become burdensome for the Water Co-op as many of the meters are in hard-to-reach

areas. Poor weather and tricky terrain can also quickly lead to unsafe conditions that prevent technicians from getting an accurate read.

In the quest for a more resource-efficient and sustainable solution, Exeter-Merritt Water Cooperative found its ideal solution in Automated Meter Reading (AMR).

Exeter-Merritt's First Step in the Right Direction

Exeter-Merritt first started using AMR technology in 2012 with Mueller's AMR endpoint. At the time, the endpoint was the perfect meter interface unit for the Water Co-op to transmit an encoded serial number, water consumption, leak detection information, and status data operated on 902 to 928MHz radio frequency. It did not take long before the Water Co-op was

fully capable of managing the expanding system on its own.

"Initially, we were presented with a number of AMR solutions from the market, but we decided to go with Mueller Systems," shared Barb Mathews, network manager and operator at Exeter-Merritt Water Cooperative. "What stood out for me was that the Mueller Systems AMR solution could address the impending needs and help us handle the influx of new customers."

Taking It Up a Notch with AMI Migratable Solution

Mueller Systems accelerated the next iteration of the endpoint by introducing the Mi.Net AMI Migratable solution. This AMR to Advanced Metering Infrastructure (AMI) migratable endpoint solution can be installed as a mobile AMR system, giv-

ing utilities the flexibility to migrate over to a fixed network in the future should the need arise. AMI empowers utilities to design certain areas with fixed metering and deploy mobile solutions throughout the remainder of the utility while maintaining the full two-way command and control capability that enables functionality such as remote disconnect on-demand data log retrieval and even over-the-air firmware upgrades. All Mi.Net migratable endpoints have a variety of mounting options to optimize system performance and ease of installation.

In mobile or AMR mode, the Mi.Net migratable endpoint transmits data every few seconds utilizing LoRa (long-range) technology. LoRa is a radio frequency modulation technology for low-power, wide-area networks (LPWANs). It delivers significant distance improvements in communication over many AMR systems available in the market. The Water Co-op can also avoid driving down unsafe roads as the transceiver picks up the reading from at least a mile away.

“Having the AMR system saves me eight to 12 hours on meter reading. Now, it takes just four hours; saving the cooperative time and money,” exclaimed Mathews.

Mueller Systems’ lightweight mobile transceiver works in tandem with its software to provide reliable data directly into Exeter-Merritt’s billing system.

Use meter pit and closeup shots together with one caption: The co-op is in the process of updating meters to the Mueller Systems ME-8 encoder register with positive displacement meters to receive granular data that will help it maximize revenue and conservation, and reduce leaks.

Reliable Data-Driven Evidence for Leak or Tampering Investigations

The new solution also provides the Water Co-op with data-driven evidence of a suspected leak through a comprehensive and robust data logging feature called



The co-op is in the process of updating meters to the Mueller Systems ME-8 encoder register with positive displacement meters to receive granular data that will help it maximize revenue and conservation, and reduce leaks.

“Consumption Profiling.” This capability is built into the Mi.Net Migratable system, allowing over 100 days of hourly usage analysis to be retrieved from the meter, with graphically displayed alarms. This enables utilities to respond to customer questions quickly, and proactively approach customers about possible leaks or tampering.

“Now when we have customers who do not believe there is a possible leak or faulty issue with their side of the meter, we can provide them with detailed reports to show their daily consumption usage. The AMR solution has helped us gain our customers’ trust by showing their meter profiles on the spot, enabling them to view granular hourly data. This assists us in responding to billing questions and demonstrates when issues such as leaks or backflow conditions start and end.”

Today, Exeter-Merritt Water Co-Op continues to reap the benefits of the Mi.Net Migratable endpoints and mobile transceivers. They are also in the process of updating its meters to the Mueller Systems ME-8 encoded register with positive displacement meters to receive granular data, permitting them to capture maximum revenue and be proactive in leak detection and resource conservation.

Mathews’ passion for the industry stretches beyond her daily managerial, administrative, and maintenance responsibilities at the Water Co-op. She



also devotes time to training other water cooperatives and municipalities, helping them realize the true potential of an AMR system that goes beyond basic meter reading.

“At the Water Co-Op we have noticed a drop in customer complaints,” she explains. “When our customers see us, they know we are doing our job, reading and profiling their meters to give them accurate billing statements. If required, we would go to a specific meter, retrieve the data and print it out for customers to view their last 170 days of usage per hour; show them high usages and when it was dealt with.” 🌟

Oswaldo Zambrano is the metrology territory manager for Mueller covering part of the Midwest and Northeast regions of the United States.

The Future of Water: In the Challenges, Lie the Opportunities

By Steph Aldock

When we think about the water industry, many of the challenges are not new. It feels like every year, the American Society of Engineers gives U.S. water infrastructure a failing grade. These age-old issues are compounded by short-term pressures such as recessionary fears, high material prices, not to mention a retiring utility workforce.

With a growing focus on infrastructure, drinking water quality, and sustainability, water is in the spotlight more than ever. That's not necessarily a bad thing. In fact, some of our greatest achievements have centered on water, including the positive impact on health from centralized wastewater treatment and the Clean Water and Safe Drinking Water acts.

While there are many challenges facing the water sector today, it is these challenges that will continue to drive water market opportunities going forward.

Federal Funding Dedicated Specifically to Water

It may have taken a drinking water crisis in Flint, Michigan (among other U.S. cities) and multiple power outages in Texas, but the U.S. federal government is now investing in water infrastructure. The Infrastructure Investment and Jobs Act (IIJA) presents an historic opportunity which will influence water utility spend for years to come. The IIJA explicitly allocates US\$55 billion of new funding for

drinking water, wastewater, and stormwater infrastructure through 2026. This bipartisan law represents an overdue and much needed investment in the nation's infrastructure and will be the highest inflation-adjusted levels of federal funding directed at water infrastructure over a five-year period since the late 1970s.

Major water priorities outlined in the funding include lead service line replacement, per- and polyfluoroalkyl substances (PFAS) remediation, water reuse, Indian water rights and infrastructure improvements, and investments in water technology innovation, resiliency, and underserved communities. As of April 20, 2023, total announced funding for water infrastructure projects associated with the legislation had reached \$24.1 billion. This is approximately 44 percent of the funding for water infrastructure projects to be distributed through 2026.

While there are details to be worked out (i.e., delivery of funds, state definitions of a "disadvantaged community"), passage of a federal infrastructure bill and an influx of needed capital to the water sector is a significant catalyst for growth.

New Drinking Water Regulations Drive Opportunities for Water Providers

It seems like every day PFAS—also referred to as "forever chemicals" and emerging

Bluefield currently forecasts \$13.5 billion in drinking water remediation technology spend from 2023-2030 in the United States alone.

contaminants—and their impact on drinking water quality are featured in news headlines. Chemical companies 3M, DuPont, Corteva, Solvay, and Chemours all recently announced settlements with public water systems totaling more than \$14.1 billion, and regulators are now taking action.

To date, 45 states have legislated a range of policy mechanisms to limit PFAS contamination in drinking water. Twelve of those states have implemented or proposed drinking water standards, otherwise known as maximum contaminant levels (MCLs), and the state landscape continues to accelerate. In parallel, the EPA has proposed federal MCLs for six PFAS that will be finalized by the end of this year.

In response to this legislation, Bluefield currently forecasts \$13.5 billion in drinking water remediation technology spend from 2023–2030 in the United States, alone. The IIJA includes US\$10 billion devoted specifically to addressing PFAS and other emerging contaminants.

While drinking water has garnered the lion's share of attention by regulators, more complex wastewater and associated biosolid management strategies for PFAS are receiving increased regulatory scrutiny. Biosolids are often utilized for fertilizer, thereby propagating groundwater contamination. As such, an emerging group of water technology vendors are positioning to capitalize.

A Focus on Climate is Driving Water Investment Decisions

Corporations are now realizing that water will impact their bottom line and are adjusting their strategies accordingly. Nestlé announced plans to recycle wastewater at

its coffee creamer plant in Arizona, a state plagued by water scarcity, and Amazon plans to “return more water than it uses” from its water-intensive data centers. As corporations more pro-actively their water demand, water utilities will face less pressure to meet supply.

Awareness is the first step. We have already seen companies across water-intensive industries highlight their water usage to help quantify water risk. Of 11 industries evaluated by Bluefield — food and beverage, beauty, pharmaceutical, automotive, oil and gas, and semiconductors — six achieved 100 percent water use reporting among top companies.

From electric vehicles to semiconductors, no industry is immune to water risk. Sustainability targets and recent water-related investments signal the corporate sector's growing focus on water through M&A and more efficient water management. As industries like tech and food and beverage drive demand for industrial water, greenfield development (in the form of new facilities) will offer opportunities to meet ESG targets. Corporate strategies will continue to drive partnership opportunities for water management solution providers.

The Bottom Line

The mature water sector is an attractive opportunity for companies looking for less volatility. Investors and Wall Street are now paying attention. Let's seize on this time when water is in the spotlight to address these industry challenges and capitalize on water market opportunities. The challenges are many, but the time for water is now.” 🌟

Steph Aldock is senior marketing director at Bluefield Research.



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Water Infrastructure Needs Higher than Ever

Advocating Creative Solutions to Rebuild America



By Zack Perconti

The Infrastructure Investments and Job Act (IIJA) passed in late 2021 included authorizing \$35 billion in water infrastructure investments over the following five years, ending in 2027.

Investments were made to EPA's grant and loan programs, including the Drinking Water and Clean Water State Revolving Loan Funds, or SRFs, and the Water Infrastructure Finance and Innovation Act (WIFIA).

However, conditions have changed significantly from November 2021 when IIJA was signed into law. The rising cost of materials and labor, as well as general inflation, has led to significantly increased prices across the board – simply put, the funding approved by Congress and the White House will not stretch as far as originally envisioned.

For our industry's projects, this is of course a major problem by itself, but unfortunately Washington seems to be failing to uphold the goals they set forth by not providing full funding as authorized in IIJA. Even President Biden's budget request fell short, asking key programs be underfunded from IIJA levels. And Congress has done no better – since IIJA's passage, SRF appropriations have fallen short of expected levels, and – while Congress has supported several key water infrastructure projects directly through Community Project Fund appropriations ("earmarks") – these funds have been diverted from already allocated water funding, rather than adding to it.

At the same time, needs are higher than ever. According to the U.S. Environmental Protection Agency, the 20-year national drinking water infrastructure need for the United States as estimated by the 7th Drinking Water Infrastructure Needs Survey and Assessment is \$625 billion. This is a 32% increase over the 6th DWINSAs (\$472.6 billion) and an increase of \$152 billion in only five years. Those numbers are just for drinking water – we are currently awaiting the new estimated Clean Watersheds Needs Survey numbers for wastewater/stormwater. The previous analysis, conducted in 2012, found needs of \$271 billion.

Taken together, it is likely that there will be funding needs of over \$1 trillion over the next 20 years for upgrades and repairs to public water and wastewater systems. The funding gap is estimated in the hundreds of billions of dollars.

We're the experts, so how does the National Utility Contractors Association propose the problem be fixed?

Increased funding for water/wastewater programs. At a bare minimum, water infrastructure program funding levels from IIJA should be maintained at the framework authorized

in the legislation, and ideally increased to match current market conditions brought on by inflation. With inflation already cutting into value of investment a spending cut is unthinkable.

Start the legislative resource phases now. Congress should consider thinking ahead about reauthorization of the CWSRF and DWSRF, as well as other critical water programs, when the runway ends in FY2026. Our members do not want to be in position of continued uncertainty over water funding level. We cannot afford to let SRFs be uncertain as they were in past reauthorization phases.

Be realistic about the resources demanded by a nationwide program. Congress should also appropriate additional funding towards lead pipe replacement projects on top of funding for other drinking water projects – the only way to meet the commitment of replacing every line in use. 9.2 million lead service lines remain in use in U.S. cities, with 400,000 of those found at schools or child-care facilities. The IIJA allocated \$15 billion for lead pipe remediation. However, while this funding is a good start, industry experts and environmental advocates estimate the actual cost of fully replacing all lead pipes in the U.S. is at least \$43 billion and could be as high as \$60 billion.

Be creative about the resources demanded. Direct federal appropriations is a key part of the solution, but it is unlikely to close the gap on its own. Congress needs to be creative and look elsewhere for resources. Today, the federal tax code allows state and local governments to use tax-exempt bonds to finance certain projects that would be considered private activities. These bonds are known as Private Activity Bonds (PABs, or Exempt Facility Bonds). Congress uses an annual state volume cap to limit the amount of tax-exempt bond financing generally and restricts the types of qualified private activities that would qualify for tax-exempt financing to selected projects defined in the tax code.

Drinking water and sewer projects are eligible for these bonds, but there is currently a limit on how much can be financed annually using these bonds. The caps and restrictions artificially reduce the amount of resources available to states and municipalities for their local infrastructure needs. Lifting the cap on PABs will infuse hundreds of millions in private capital into water and wastewater projects.

Utility contractors will be responsible for carrying out the construction projects that will build and rebuild drinking water and clean water infrastructure. We need to take responsibility for advocating for the resources our communities need to complete the job. 🌟

Zack Perconti is vice president of government affairs for NUCA.

2023

Q3

Calendar

Please note that some live events are still being rescheduled or moving to virtual formats. Please be sure to double-check event websites for most up-to-date information.

9th Annual Water Finance Conference

Cleveland, Ohio

August 8-9

The annual Water Finance Conference, produced by Water Finance & Management journal, will return to Cleveland in 2023. Join water finance experts from across the water utility sector.

waterfinanceconference.com

Pipelines 2023

San Antonio, Texas

August 12-16

Enhance your project success at this leading industry event for practitioners covering current state-of-the-art engineering technologies for pipeline and utilities infrastructure.

pipelinesconference.org

Water Infrastructure Conference

Philadelphia, Pennsylvania

September 10-13

Learn about water infrastructure issues and discuss solutions to these challenges, including the latest strategies to manage aging infrastructure, control water loss, protect critical infrastructure and finance capital projects and operation and maintenance activities.

awwa.org

Great Lakes Water Infrastructure Conference 2023

Kalamazoo, Michigan

September 19-21

The Michigan Department of Environment, Great Lakes, and Energy will host the first in-person Great Lakes Water Infrastructure Conference Sept. 19-21, 2023, in Kalamazoo, Michigan.

The Utility Expo

Louisville, Kentucky

September 26-28

Covering more than 30 acres, The Utility Expo – formerly the ICUEE Show, is the largest event for utility professionals and construction contractors seeking the latest industry technologies, innovations and trends.

theutilityexpo.com

Global Buried Asset Management Congress

Tinley Park, Illinois

September 28-30

Advance the science and practice of asset management in the underground infrastructure industry, with a focus on the water and wastewater sector and other utilities that have buried assets.

bami-igbamc.com

WEFTEC 2023

Chicago, Illinois

September 30 – October 4

WEFTEC is returning to Chicago in 2023. At WEFTEC, the full breadth of the water sector comes together, in one place, for you to explore, learn, network, grow professionally and strengthen your connection to the water community.

weftec.org

No-Dig North

Edmonton, Alberta

October 23-25

At No-Dig North, the North American Society for Trenchless Technology brings the No-Dig experience to Canada, offering trenchless construction professionals all the latest in new techniques and approaches that will save money and improve infrastructure.

nodignorth.ca

Water Quality Technology Conference

Dallas, Texas

Nov. 5-9

This established and highly regarded conference from AWWA provides a practical forum for a wide range of water technology professionals to exchange the latest research and information. Visit awwa.org for more info.

One Water Summit 2023

Tucson, Arizona

November 14-16

The US Water Alliance's signature event, the One Water Summit gathers diverse water stakeholders for engaging plenaries, interactive workshops, dynamic institutes and site visits, and plenty of networking time.

uswateralliance.org

2023 CUIIC Safety Academy

Edmonton, Alberta

November 29-30

Academy experts will present a two-day course that is designed to equip attendees with knowledge related to underground construction safety, regulation, challenges and innovation.

academy.cuiic.ca

North American Water Loss Conference & Expo

Denver, Colorado

December 5-7

Learn approaches to reduce non-revenue water, regulatory developments and share processes, methods and techniques with peers. The conference will also feature an exhibit hall with leading technology and companies.

awwa.org

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