

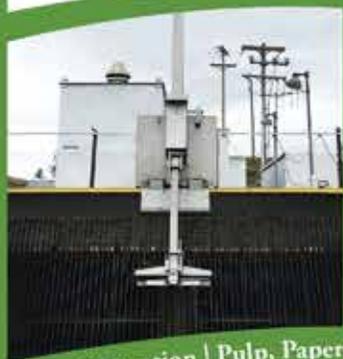
# Municipal Water Leader

Volume 3 Issue 9

October 2017



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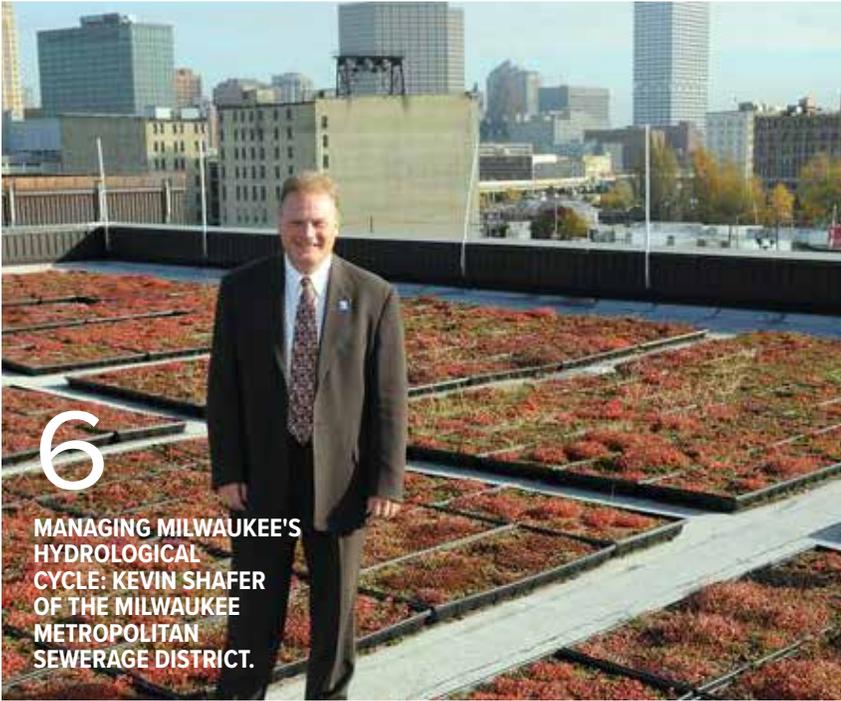
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**MANAGING MILWAUKEE'S  
HYDROLOGICAL  
CYCLE: KEVIN SHAFER  
OF THE MILWAUKEE  
METROPOLITAN  
SEWERAGE DISTRICT.**

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# Municipal Water Leader

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### COVER PHOTO:

*Milwaukee Metropolitan Sewerage  
District Executive Director Kevin Shafer  
in Milwaukee, Wisconsin.*

# Leading the Way in Milwaukee



By Kris Polly

In this issue of *Municipal Water Leader*, we speak to leaders who have helped to position the city of Milwaukee, Wisconsin, as a worldwide leader in water technology. Not only is the city situated near an abundance of fresh water in Lake Michigan, but the industries that historically served as catalysts for Milwaukee's growth—brewing, dairy, and forestry—relied heavily on water for production or transportation. Today, companies like Badger Meter, A.O. Smith, and Rexnord call Milwaukee home and have collaborated to foster new water technology innovations under the auspices of The Water Council.

Innovation in the city is not limited to water technology—it extends to management. Kevin Shafer manages the Milwaukee Metropolitan Sewerage District, which provides management and wastewater treatment services to 28 municipalities covering 1.1 million people. The district can treat between 120 and 630 million gallons of water per day. The Milwaukee Metropolitan Sewerage District was an early adopter of the public-private partnership model and has benefitted from it.

Mr. Shafer explained, “The private-sector approach to paying wages, benefits, and pensions is also beneficial. We estimate that we have saved over \$150 million over 10 years during the first private [operations and management] contract we signed. . . . and we will save millions more over the course of our current contract.”

Milwaukee fosters and harnesses water innovations through The Water Council, an organization formed to support water industry entrepreneurs. The Water Council furnishes water technology startups with office space, networking opportunities, and even some funding.

Dean Amhaus, The Water Council's president and chief executive officer, explained that utilities are a critical component in the development of technology. “The utilities are another critical factor in the success of the [water] cluster, both for drinking water and wastewater.

Our community is strong because we have faced some significant challenges over the past 20 years, but we have learned from them and improved how water is processed.”

The Water Council's enthusiasm and energy in the development of technology reflects that of one of its founders. Rich Meeusen is the chief executive officer of Badger Meter, the largest water meter maker in North America. Mr. Meeusen identifies partnerships like The Water Council as critical to success in business. “Smart companies in the future will take advantage of the opportunities that come out of collaboration among industry, academia, and government. No entity can do it alone.”

One of those smart companies is PaveDrain, led by owner Doug Buch. At the depths of the 2008–2009 economic downturn, Mr. Buch began the process of engineering a better way to address capturing and moving stormwater from once-nonpermeable surfaces. His creation, the PaveDrain, is now being used across the country to help individuals, businesses, and municipal entities efficiently move stormwater off streets and parking lots and back into the ground. The former farm boy and Rose Bowl captain's success is a testament to Milwaukee's spirit of innovation and entrepreneurship.

We hope you enjoy this issue and take a close look at Milwaukee. Its people are leading the way in water technology and management innovations. 

*Kris Polly is editor-in-chief of Municipal Water Leader magazine and president of Water Strategies LLC, a government relations firm he began in February 2009 for the purpose of representing and guiding water, power, and agricultural entities in their dealings with Congress, the U.S. Bureau of Reclamation, and other federal government agencies. He may be contacted at [Kris.Polly@waterstrategies.com](mailto:Kris.Polly@waterstrategies.com).*

# Managing Milwaukee's Hydrological Cycle

Kevin Shafer of the Milwaukee Metropolitan Sewerage District

*The Milwaukee Metropolitan Sewerage District (MMSD) is a regional sewer authority that provides flood management and wastewater treatment services to 28 municipalities with a total population of 1.1 million people. Its Jones Island and South Shore Water Reclamation Facilities treat 120 million gallons per day in dry conditions and up to 630 million in wet conditions.*

*Kevin Shafer has served as the district's executive director since 2002 and has enacted innovative programs to address MMSD's stormwater and wastewater infrastructure and management needs. Mr. Shafer spoke with Municipal Water Leader's editor-in-chief, Kris Polly, about the district's public-private partnership, the new projects that will enhance MMSD's capabilities, and the importance of community cooperation.*

**Kris Polly:** MMSD is a large regional authority. How many employees does it have?

**Kevin Shafer:** I oversee 232 total public employees, and in turn, I report to an 11-member commission. MMSD contracts an additional 220 employees through Veolia Water, which performs the maintenance and operation of our facilities. MMSD and Veolia are halfway through a 20-year contract. So the total number of people who report to me is approximately 450.

**Kris Polly:** What are some of the advantages of privatization for your ratepayers?

**Kevin Shafer:** We benefit from Veolia being an international company that brings international technology and perspective to the table. The private-sector approach to paying wages, benefits, and pensions is also beneficial. We estimate that we have saved over \$150 million over 10 years during the first private contract we signed with United Water [which maintained and operated MMSD facilities prior to Veolia], and we will save millions more over the course of our current contract with Veolia.

**Kris Polly:** How are the responsibility and funding divided between the public employees and the private Veolia contractors?

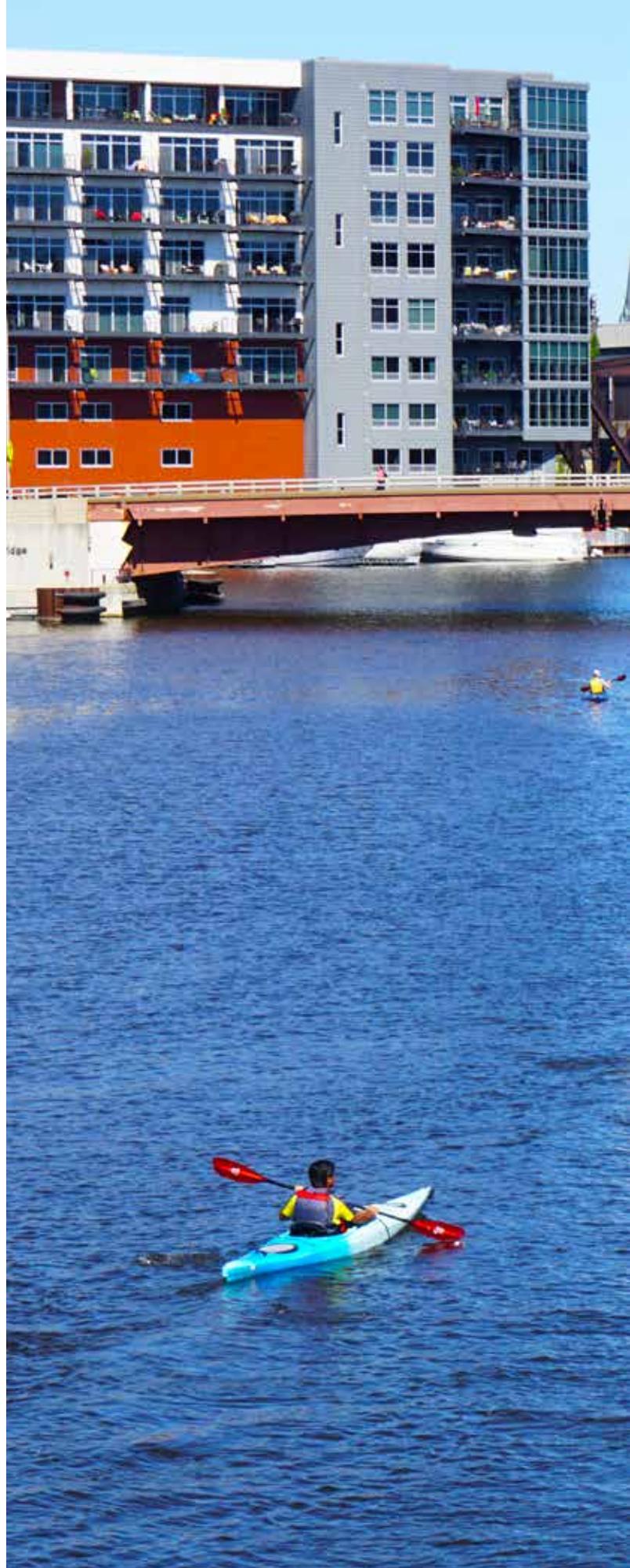


PHOTO COURTESY OF MILWAUKEE METROPOLITAN SEWERAGE DISTRICT



Hundreds of millions of dollars have been invested in condos, restaurants and stores since significant improvements were made to Milwaukee area rivers, which all flow to Lake Michigan.

**Kevin Shafer:** We own all the assets and the engineers, designers, and employees doing the work to expand or improve them are my public employees. Veolia operates the assets day to day, but there is a constant dialogue between Veolia and MMSD about capital improvement projects. This dialogue ensures that we can reduce costs and reach optimal efficiency once the improvements are complete.

**Kris Polly:** Please describe the on-the-ground interaction with Veolia from a manager's perspective.

**Kevin Shafer:** When I became executive director, there was still an us-versus-them mentality between the public employees and the Veolia employees. I told my staff that we needed to treat the contractors as if they were our own coworkers. I have a weekly meeting with my directors and the head of Veolia operations, who is as involved as he would be if he were one of my fellow public employees. I also have an office of contract compliance that ensures Veolia abides by the terms of the contract. The office meets every Monday afternoon to collaborate with Veolia on the operational issues and our ongoing capital improvement efforts. We have some disagreements, but overall, the partnership between MMSD and Veolia has been a successful one.

**Kris Polly:** What are some of the most important issues facing MMSD?



**Kevin Shafer:** One big issue is dealing with weather events and ensuring that the system catches as much water as possible. MMSD's deep tunnel system came online in 1993 and allows us to better handle higher flow levels. The tunnels are 300 feet below ground, and when we receive heavy rainfalls, any rainwater that spills into the system is stored in the tunnels until the storm passes. After the storm, the water is pumped out and treated. Since the tunnels have become operational, MMSD has captured and cleaned 98.4 percent of all the water that reaches our facilities, overflowing the remaining 1.6 percent.

The tunnels can hold 521 million gallons. When the capacity of the tunnels is combined with the 630 million gallons that our facilities can hold, we can treat and store over a billion gallons per day if necessary. However, we still have overflows into the waterways. We are seeing more intense storms that are happening more frequently, which require us to deal with even more excess water.

There is still a lack of sustainable funding in the water and wastewater world; it is one of the forgotten infrastructure systems. In addition, our rivers still have problems with nutrients that come from urban or agricultural storm runoff and contaminate the rivers as they drain into Lake Michigan. We need to do a better job of

managing Lake Michigan as a watershed. MMSD's service area measures 411 square miles, but the drainage basin is almost 1,200 square miles, which means we have a lot of water that is outside our jurisdiction but comes through our service area due to how the river flows.

**Kris Polly:** What kind of programs do you have in place to address the nutrient issue?

**Kevin Shafer:** One program, called Greenseams<sup>®</sup>, is a land-purchasing effort to acquire areas along the rivers to serve as buffers. A conservation easement is put on the riparian land, and it is then turned over to land trusts or municipalities to manage and keep in its natural form. Over 3,400 acres of land have been purchased through the program.

Under a second program, called Working Soils<sup>®</sup>, MMSD pays farmers to implement better practices on their property to reduce runoff of nutrients and other sediments into waterways. Working Soils is in its infancy, with one confirmed participant and two more who are considering signing up. We hope to be able to double the number of participants by the end of this year and continue the program's growth into next year.



Milwaukee Jones Island Water Reclamation Facility and Milwaukee city at night.

**Kris Polly:** How are the programs being financed?

**Kevin Shafer:** We use funds from two different budget accounts. The first is the capital improvement fund, which is used for pipelines, wastewater plants, and some of the green infrastructure. This account is funded by an equalized property tax. We also use our operations and maintenance budget to pay Veolia for its work. Those accounts spend \$55 million and \$110 million, respectively. Over 90 percent of our total funding is locally generated, with state and federal funds providing the rest.

**Kris Polly:** How have you been able to get the public to buy in and support your newer programs?

**Kevin Shafer:** We have made community buy-in a priority, and that has been a key component of all our green infrastructure efforts. Traditionally, our projects involved repairing a pipe under a street or repairing a wastewater facility behind a fence. Those projects required very little public involvement, if any. Our newer projects are less

After situations like Flint, Michigan, there is a real urgency to act quickly to address the deteriorating infrastructure that communities rely on.  
—KEVIN SHAFER

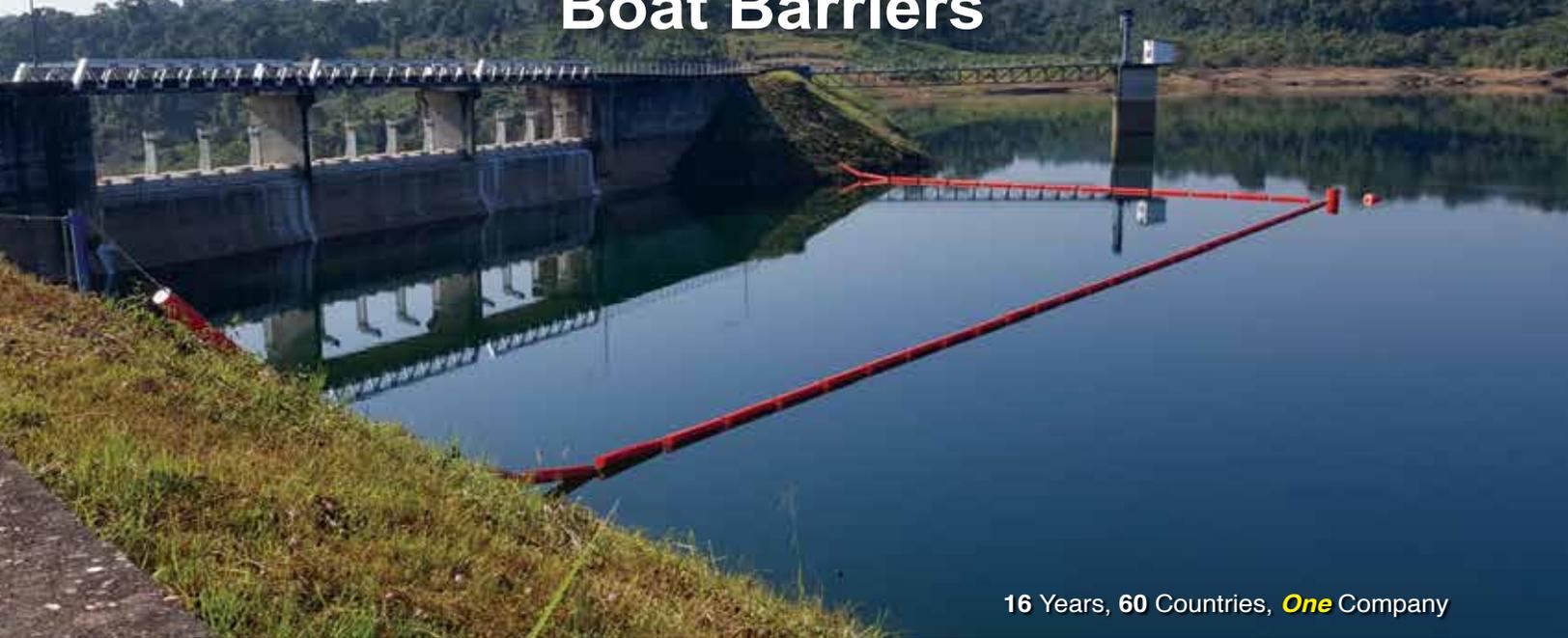
confined and thus require more public support. We have an ongoing extensive neighborhood outreach program to promote our green initiatives. A large storm in 2010 showed us that we were still behind in terms of getting the necessary support we needed, so we began focusing on more engagement at the community level and increasing our public outreach.

**Kris Polly:** What should Congress and other decisionmakers know about your district and others like it?

**Kevin Shafer:** They should understand that water—be it wastewater or drinking water—is underfunded. Moreover, the funding we do have is not being directed to where it is most needed. The Clean Water Act did a very good job addressing a number of causes of pollution, but we need to see if current or future funds can be focused on the remaining sources of pollution. Drinking water and wastewater infrastructure need sustainable, dedicated funding sources. After situations like Flint, Michigan, there is a real urgency to act quickly to address the deteriorating infrastructure that communities rely on. 

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# Brewing Innovation in Wisconsin's Water Technology Cluster: The Water Council's Dean Amhaus



Hein Molenkamp, director of Water Alliance, and Dean Amhaus, president and CEO of The Water Council, in the Global Water Center.

*Common needs for local resources, transportation routes, information sources, or consumer markets bring companies together, creating unique opportunities for innovations within an industry. This has been the case in Milwaukee, Wisconsin, where proximity to favorable geography, markets, and resources combined to lead a number of water-related industries to call the city home.*

*The Water Council formed to harness that communal knowledge and innovation. Its Global Water Center supports water industry entrepreneurs, bringing small and large water entities together to solve complex water issues. The Water Council's accelerator programs provide opportunities for new, upstart water companies by furnishing them with office space and putting them in touch with other water experts who can help them develop their innovations.*

*The Water Council's president and chief executive officer, Dean Amhaus, recently spoke with Municipal Water Leader's editor-in-chief, Kris Polly, about the origins of The Water Council and the Global Water Center, the programs and services they offer, and how they are helping water entrepreneurs to grow and prosper.*

**Kris Polly:** Please give us a brief overview of your organization, its history, and its mission.

**Dean Amhaus:** The Water Council's roots go back to the brewing industry here in Milwaukee, which came into existence because of access to the water of the Great Lakes and close proximity to the farms and supplies necessary to make beer. There was also a need for suppliers who could produce the parts and components needed for the processing of water. Thus began the foundation of what is now referred to as the water technology cluster.

We believe that clusters are found rather than created. They tend to form out of necessity, and every community will have different clusters based on its needs. We happen to have a group of companies that are focused on solutions to improve the quality and quantity of water. The utilities are another critical factor in the success of the cluster, both for drinking water and wastewater. Our community is strong because we have faced some significant challenges over the past 20 years, but we have learned from them and improved how water is processed.



Outside the Global Water Center.

**Kris Polly:** How does The Water Council incubate new water technology?

**Dean Amhaus:** There was a two-fold process for our becoming involved in those efforts. First, large corporations put up the initial funding. The Water Council was approached by investors who were interested in what we were creating and wanted us to show them entrepreneurs they could invest in. We quickly realized we did not have many potential deals and needed to make changes. We started to bring in businesses that were working on a variety of water technology efforts that investors might be interested in.

Second, we realized that innovations throughout the larger region could be more valuable to

industry members if those members were brought geographically closer together.

These ideas were the genesis for the Global Water Center, which is a business accelerator building devoted completely to water technology. We emphasize small businesses and entrepreneurs, with some large corporations and universities mixed in. The small businesses may be the numerical majority of tenants in the building compared to large corporations, but each wants to know what the other is working on, which creates a synergy among the various companies.

We are now in the fifth cohort of our BREW Accelerator program, which 25 companies have completed. These companies came from places

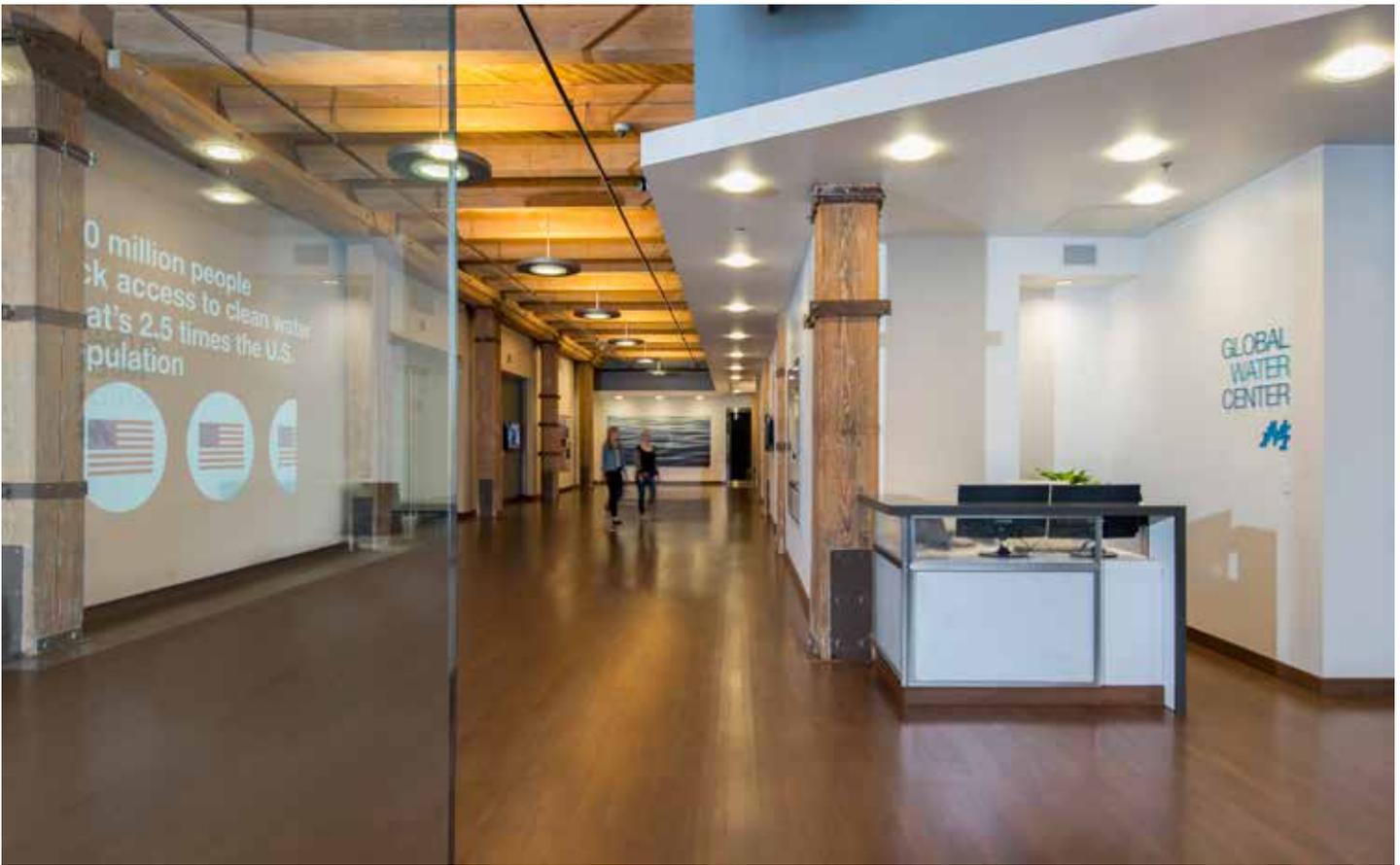
like France, Ireland, and Canada, and they are coming here solely to be in the middle of the water industry. In addition, the BREW Corporate program partners with corporations to find startups solving a specific technology they've issued a call for. We have seen tremendous growth in the past 5 years, from only 1 or 2 entrepreneurs to over 50 working with us. The concentration allows people to see multiple companies in one city rather than traveling to a different city to see each company.

**Kris Polly:** How large are the offices at the Global Water Center, and what kind of amenities are included?

**Dean Amhaus:** Each of the eight office suites for the startups is approximately 1,000 square feet and includes internet, phone service, and furniture. There are multiple businesses that share a suite, which is a change from when we first began the program. Each suite used to be occupied by a single company, but many of them began voluntarily sharing space to foster a sense of community and to save costs. Today, each suite holds two or three companies, and soon we'll be announcing the Oasis Coworking Community located in the Global Water Center.

We also have conference rooms, kitchen space, and laboratories in the center. The shared space also provides for interaction with the constant procession of important industry decisionmakers that are in and out of the building. Companies have a chance to organically meet those people, form relationships, exchange information, and possibly build business partnerships as well. Connections have been made in elevators or over coffee, and deals have been struck after as little as 15 minutes of such informal contact.

**Kris Polly:** Can you describe your process for selecting companies for the Accelerator program and how long the program lasts?



Global Water Center office.

**Dean Amhaus:** During the BREW Accelerator program's first year, we went to our partners and nominated companies to apply, but now we use our marketing department and business development team to solicit applications globally. That is done during the first quarter of the year. By the second quarter, we go through round one of our selection process, which is an initial evaluation based on set criteria. The second round requires applicants to pitch themselves to our panel of nine judges. Up to six candidates are selected based on the judges' qualitative and quantitative analyses. The process is open to any kind of water technology, regardless of its specific application.

If a company is accepted, it receives \$50,000 in a convertible note from us, as well as office space in the Global Water Center for 1 year. Once they are there, we go through 6 months of business training sessions with them. These sessions are spread out and not as boot camp-like as other accelerator programs, however, because the people running these companies are already busy and doing a lot of good work. We meet with them twice a week to connect them to media sources and help them network with other industry or investor contacts. That kind of exposure is one of the biggest benefits of the program.

Companies that are looking for new and innovative things now have a place to find them, and they are often amazed by how much we are able to offer them. Our sessions also feature coaches who help encourage the selected companies to follow through on what they learn

or are exposed to. Eventually, the program progresses to the point that the cohort members begin coaching each other, working together to strengthen business ties, and even entering into business with each other. We also organize events that bring the entire cohort together, so they can interact, meet, and share with each other.

We have used best practices to establish a Silicon Valley for water technology, where people want to be here to advance their innovation or find out what the latest and greatest ideas are. Mexico's Ministry of Water is planning to come to Milwaukee to meet with one of our BREW participants to see a pilot that they have done. We will be in China at the end of November to conduct two separate panels about China's Sponge Cities program, which is focused on infrastructure and water management ideas. We will feature many of our small companies and utilities there, to show the level of expertise across all sectors of the water industry that is concentrated in Milwaukee.

Industrial and manufacturing users are another potential market, and we are partnering with a group called the Alliance for Water Stewardship, which is an international program focused on developing voluntary water standards. We serve as the North American headquarters for that organization, and we are working with entities like Coca-Cola, General Mills, Nestle, McDonalds, and other large corporations that are looking for solutions to better use water in their facilities and operations. 

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# Make Yourself Heard: Communication Strategies for Successful Rates Outreach

Designing Effective Campaigns to Win Public Opinion and Overcome Political Sensitivities By Janet Zimmerman

All water providers are confronted with the prospect of a rate increase at some point, but whether the proposed increase will be successfully passed and implemented is never a sure thing.

That's where outreach comes in. Effective communication—the way a rate change message is explained and presented—is the key to garnering public support and, subsequently, board approval.

The secret to a successful public education campaign? Customization and consistency.

Communication should be ongoing, transparent, and audience specific. It is an opportunity to build relationships with customers so they understand and support the district's goals.

The best rates outreach and communications plans are tailored to the unique demographics, preferences, geography, and history of the community. For instance, outreach for the city of Needles, population 5,000, a rural desert city on the eastern California border, would look different than that of Eastern Municipal Water District in Perris, California, the largest water provider in Riverside County with 142,000, mostly suburban, connections.

Water districts must be mindful of their constituencies and how certain types of outreach will be received.

A small, agricultural district, or an agency with a large segment of customers who are price sensitive, tend to prefer

materials that are simple, right down to the paper they are printed on. Other agencies are known for materials that are sophisticated and visually appealing, and they do well with a rate notice that is more highly designed.

Effective outreach, however, is about more than just a single rate notice. Districts should be issuing regular communications, which will help ensure that the rate approval process runs smoothly.

“That consistent communication is what builds a bank of goodwill in the community so when rates have to go up, customers already understand what their district does and what its assets are,” said Tom Coleman, general manager at Rowland Water District in Rowland Heights, California, on the eastern edge of Los Angeles County. “That happens slowly and over time, and only when you continually communicate.”

## Communications Build Support

East Valley Water District in Highland, California, debuted an eight-page notice in 2015, in advance of proposed rate changes and a budget-based rate structure. In addition to legal language required under California's Proposition 218, which regulates property-related fees and charges, such as water service, the notice featured a unique tabbed layout, infographics, and photographs.

The District also formed a Rate Study Working Group



View of Rowland Heights, California.

made up of 10 customers of varying backgrounds to gather input, gauge concerns and understand the need for additional education during the process, instead of after the fact, said Kelly Malloy, EVWD's public affairs/conservation manager.

"Because of the Rate Study Working Group, the comprehensive mailer and website content, we received a higher level of credibility during the process than if we had only done the bare minimum," Ms. Malloy said. "This situation could have been a very stressful interaction with our customers and instead it opened the door for future communications and made it a positive experience."

The utility followed up last year with a series of short videos explaining budget-based rates and other topics that drive consumption and affect bills, including supply sources, how to read a meter, and how to use a weather-based irrigation controller. The videos were part of East Valley's broader conversation with customers about what the district is doing and why.

### Using a Personal Touch

Tom Coleman and his crew at Rowland Water District take a personalized approach to rates outreach.

It is not unusual to see a board member engaging with customers at a local coordinating council meeting or the entire district staff riding a float for the annual Buckboard Days parade and then staffing a booth and answering the public's questions.

"I think the personal touch helps. I think the people who do engage with Rowland Water District know we're very approachable and accommodating," Mr. Coleman said.

As an example, a married couple who volunteer

throughout the community, attend water district meetings, and sit on the school board, reached out to get a better understanding of proposed rates. Mr. Coleman and his staff sat down with them for an hour.

"If you can get community leaders to be supportive, then they're out there helping you with that messaging. They are your best advocates," he said.

"The district, which has 13,500 connections, emphasizes transparency and accessibility by using bill inserts, posting information to the district's website, and encouraging customers to speak to district representatives personally," said Rose Perea, director of administrative services.

Mr. Coleman has worked hard to change the perception that ratepayers do not have a say in the rate-setting process. "When we make ourselves available, when we're willing to sit down and do those one-on-ones, it makes a difference. For Rowland, if you want an audience with your general manager, he's willing to sit down with you. Not every agency can give that level of customer service, but it matters," he said.

### Encouraging Participation

When Elsinore Valley Municipal Water District (EVMWD) proposed moving from five rate tiers to four, the agency also wanted to upgrade from a letter-style notice to a larger brochure-style piece with color and infographics. The extra space allowed for the addition of information on district programs such as rebates, rate assistance, and state-mandated conservation requirements during the drought.

The district knew from formal and informal polling data that most of its customers prefer to receive information



John Mura, general manager of East Valley Water District, engages members of the community about the value of the district's services.

by direct mail. “When they pulled it out of the mailbox, it was something they would notice,” said Bonnie Woodrome, EVMWD’s community affairs supervisor. “This was the right style piece to capture the attention of our customers, to ensure that they would be aware of the rate proposal well ahead of time and be able to participate in the process.”

The district’s outreach didn’t stop there. EVMWD also sent eblasts, used social media and its smartphone app, attended community meetings, and published information in its quarterly Water Log newsletter.

“We use many different channels because we have audiences in different places,” Ms. Woodrome said. “If we always have the information available, then we’re reaching them to the best of our abilities.”

Another important tool, she said, was a bill estimator



Direct mail materials inviting the district’s customers to participate in the rates hearing process.



on the EVMWD website, so customers can get an idea of how the new rates would affect them. Combined with training for the customer service department, which is often customers’ first stop with questions, Ms. Woodrome said the effort was a homerun.

EVMWD was heaped with praise for its Prop 218 Public Hearing Notice, which won awards from the California

Association of Public Information Officials and Public Relations Society of American Inland Empire Chapter.

When your rates outreach campaign wins awards for customer engagement, you are on the right track. **M**

*Janet Zimmerman is director of client services at CV Strategies, a comprehensive communications firm with offices in Palm Desert, Los Angeles, and Sacramento. You can reach her at [janet@cvstrat.com](mailto:janet@cvstrat.com).*

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For more information, please contact Robert Boling, PE, [Robert.Boling@hdrinc.com](mailto:Robert.Boling@hdrinc.com)



HDR supported the USACE during the construction phase for the Joint Federal Project control structure and spillway.

HDR’s construction management helps the San Francisco Public Utilities Commission (SFPUC) meet state requirements for dam and spillway safety.

### FOLSOM DAM, CA

Services for USACE:

- Performed structural and mechanical engineering related tasks during construction
- Completed a study to evaluate the safe and efficient operation of Folsom Dam after the JFP auxiliary spillway construction, including detailed analysis of impacts to seasonal storage variations and how those impacts affect:
  - Water supply/power generation
  - Critical environmental factors such as temperature, sedimentation and water quality
- Developed a new Water Control Manual

### LOWER CRYSTAL SPRINGS DAM, CA

Services for SFPUC:

- Full spectrum of construction management services
  - Overseeing the successful spillway widening construction
  - Raising the parapet wall
  - Replacing the stilling basin with a larger new facility
- APWA 2013 Award for Lower Crystal Springs Dam CM



HDR provided monitoring, evaluation, inspection and design services in response to the Oroville Dam spillway failure and recovery in support of the California Department of Water Resources (DWR).

The proposed Centennial Dam for Nevada Irrigation District (NID) will create much needed new water supply options for the Sierra Nevada Foothills north of Sacramento, CA.

### OROVILLE DAM, CA

Ongoing dam safety services provided:

- Structural, hydraulic and geotechnical analyses
- Rope access radial gate, penstock and pipeline inspections; forensic investigations; and seepage and stability analyses
- Probable Maximum Precipitation (PMP) and Probably Maximum Flood (PMF) development and spillway routing

### CENTENNIAL DAM, CA

Services for NID:

- Leading the environmental permitting for the proposed dam since 2016
- Extensive FERC licensing support for other projects that include hydropower facilities

# The Engineer as Diplomat

Dan Duchniak of Waukesha Water on the First Approved Diversion Under the Great Lakes Compact

*When looking on a map at the city of Waukesha, which is located in southeastern Wisconsin just west of Milwaukee and Lake Michigan, you would never guess that it would have a water supply issue. However, the city, which is bisected by the Fox River, is actually located in the Mississippi River basin—1.5 miles outside the Great Lakes drainage basin—and relies exclusively on groundwater for its supplies.*

*Waukesha draws from a deep, confined sandstone aquifer with a limited recharge capacity, which has led to severe drawdown and water quality issues. Above the deep aquifer is a shale layer, which confines and prevents percolation below, and above that is a shallow aquifer that provides a relatively small amount of the city's supply. The deep aquifer has experienced significant drawdowns over the years, and shallow aquifer use results in significant environmental effects, causing a strain on the city's ability to provide its residents safe, reliable water.*

*The city's water utility, Waukesha Water, provides water and wastewater services to 22,000 customers, serving a population of 72,000. The utility operates seven deep aquifer wells, some of which run 2,000-feet deep, and three shallow aquifer wells to pump 6 million gallons of water a day. It treats much of its deep aquifer water for radium contamination.*

*In 2002, Waukesha Water began a process to solve its two biggest issues: radium contamination and declining groundwater supplies. That process began a journey for the city as it navigated the development of new laws in Wisconsin governing groundwater management, the development of the Great Lakes Compact, public sentiments in a politically tense environment, and the logistics and infrastructure of a Great Lakes diversion.*

*Leading the way on the diversion is Dan Duchniak, general manager of Waukesha Water. Mr. Duchniak's first wastewater job was a grit room upgrade—he started at the very (odorous) bottom and worked his way up. After working in another Milwaukee suburb, Oak Creek, for nearly a decade, he moved to Waukesha to help solve its water quality and supply issues. Now in his 14th year as general manager, Mr. Duchniak has led the utility in its effort to address his city's public health issue and solidify the mechanics of the Great Lakes Compact.*

*Municipal Water Leader's senior writer, John Crotty, spoke with Mr. Duchniak about securing water supplies from the Great Lakes, employing a campaign of facts to navigating a fraught political environment, and conducting face-to-face local and regional outreach.*



Dan Duchniak.

MUNICIPAL WATER LEADER



Well installation.

**John Crotty:** What were the first steps to solving the city’s supply issues?

**Dan Duchniak:** In 2002, the utility embarked on a water supply study looking at 14 different alternatives, including the treatment of the deep water aquifer, groundwater blending, aquifer storage and recovery, and riverbank filtration. We came up with two recommendations: (1) using Lake Michigan water and (2) using deep aquifer water blended with a new, shallow wellfield south of the city of Waukesha. All the solutions to our problem involved water outside city limits because within those limits, shallow groundwater is polluted due to urbanization issues.

The reason we put forth two recommendations is that we really didn’t understand what it was going to take to get water from the Great Lakes. At the time, the Great Lakes Charter, whose enforceability was suspect, governed the rules for withdrawals from the Great Lakes. There was concern that if anyone challenged those rules in a court of law, all the protections for the Great Lakes would be thrown out.

**John Crotty:** At the same time Waukesha Water was developing solutions to its supply and quality problems, there were significant legislative efforts affecting its potential water sources. Describe the legislative changes affecting your surface water and groundwater options.

**Dan Duchniak:** From 2003 to 2006, Wisconsin was developing rules under its Groundwater Quantity Act and, in addition, the proposed Great Lakes Compact. I was involved in both of those efforts—the Wisconsin legislature appointed me to serve on its Groundwater Advisory Committee and on the Special Committee on the Great Lakes Compact.

The Groundwater Protection Act, which passed in 2003, established groundwater management areas in fast-growing areas of the state where there had been large drawdowns. Ultimately, one was created in southeastern Wisconsin and another in the Green Bay area. This legislation would change the way groundwater was managed in these areas.

In 2008, the Great Lakes states and provinces signed the compact. President Bush signed it into law in 2008, and the states had to implement it. The compact banned diversions outside the Great Lakes basin with two exceptions: communities that straddle the surface water divide and communities that were in counties that straddled the surface water divide. Legally, the compact built a wall around the lakes.

Given the framework of the compact, Waukesha would fall under one of those diversion exceptions. It is important to note that although this is called a diversion, under the Great Lakes Compact, the water diverted must be returned to the Great Lakes.

**John Crotty:** Please help frame Waukesha’s supply issue for our readers. Why isn’t the Fox River a viable source of water for Waukesha?

**Dan Duchniak:** There is not enough volume in the Fox River to draw from it, especially in the summer. In addition, any diversion would create significant environmental effects. There is a dam in the river, so the volume looks bigger than it actually is. When you move downstream, you can see the difference. In the summer, the Fox can be up to 70 percent wastewater return flow. We have algae bloom problems as well as stormwater runoff into the river, which would require significant treatment.

Without a surface supply, both our deep and shallow aquifers have experienced significant drawdowns over the years. And not only does the deep aquifer have limited recharge capacity, but recharge with treated wastewater is not permitted under Wisconsin state law.

## MANAGER PROFILE

**John Crotty:** Within that legal framework, why did Waukesha Water decide to move ahead with the Great Lakes supply option?

**Dan Duchniak:** We wanted to implement a program in which water was sustainable for the long term and our residents would not have to worry about water again. Water from Lake Michigan would provide that. In addition, the Great Lakes option was the least expensive of the two alternatives. That being said, it was a complex process we had to go through to develop the water supply for the city of Waukesha.

**John Crotty:** What is the plan to develop the Lake Michigan supply?

**Dan Duchniak:** The plan is to send treated Lake Michigan water from Milwaukee or Oak Creek through 25 miles of water main to Waukesha. We'll put that water to use, and instead of returning it to the Fox River, we'll treat it and deliver it via another 25 miles of pipeline to the Root River, which drains into Lake Michigan.

Overall, there will be no water loss in the lake. In addition, the return flow water will actually improve the water quality in the Root River, diluting phosphorus and chloride levels and aiding the fisheries downstream. It is a huge success story for southeastern Wisconsin.

**John Crotty:** How did the utility generate support for the plan and undertake the application process?

**Dan Duchniak:** First, we needed to get the support of the city council and the water commission, and then the public. They needed to understand what our water supply options were and why we believed the Great Lakes option was the best alternative. We spent a lot of time educating the council and the commission on the process we went through to analyze the alternatives.

We also reached out to the public, conducting meetings in all 15

aldermanic districts in Waukesha—the average attendance in the meetings was 75–100 people. Every single meeting lasted at least 3 hours. I explained how we got to where we were and why we are going down that path. It was the beginning of the grassroots effort to build the momentum we needed to get the city of Waukesha behind us.

At the same time, we began working with the Wisconsin Department of Natural Resources (DNR) on the application process for the diversion. The best way for us to work through that process was to develop an environmental impact statement (EIS). We made our first submittal to the DNR in 2010.

The DNR took 3 years to review it, collect data, and request additional information. Waukesha Water conducted 20 additional technical memorandums and studies to justify its decision. When 2013 came around, the DNR asked us to update the public on the process. The resulting public meetings were intense and were attended by 100–200 people. All the mayors of all the affected cities came in, testified, and asked questions, as did the environmental groups, academia, and the residents.

After 5 years of review, the DNR issued the draft EIS and informed the Great Lakes Compact Council that it had an approvable application for a diversion under the Great Lakes Compact.

The 5 years of review was frustrating at the time, but the fact that the DNR thoroughly examined every potential issue was persuasive to the other Great Lakes states and provinces. We greatly appreciated all the DNR's hard work and the work of our staff and consultants to provide the DNR the information it needed.

**John Crotty:** Please describe the public outreach component of the project.

**Dan Duchniak:** The broader public perception of the diversion was that Waukesha was going to be stealing



Great Lakes water. We needed to change that perception, because we were committed to returning 100 percent of the water to the basin.

There was not one environmental group that supported us. Their message was simple: We want to save the Great Lakes, and Waukesha is a threat to them. Environmental groups were



Water tower at the University of Wisconsin--Waukesha.

“Getting eight governors and two premiers, all from different political parties, to come together and vote yes shows that the science and the facts won.”

—DAN DUCHNIAK

about our process. Once approved, we created a group, the Great Water Alliance, to bring the public into the solution to this public health crisis in the city of Waukesha.

**John Crotty:** Where does the project stand right now?

**Dan Duchniak:** Last year, all eight governors and the two premiers of the Great Lakes Compact Council unanimously approved Waukesha’s application for a diversion from Lake Michigan. I give them tremendous credit for looking at the scientific facts in our application and applying the compact law fairly. Their approval makes clear that we are not a threat to the Great Lakes. Granting the approval was not the easy political decision; it was a scientific decision that upheld the requirements of the compact.

Waukesha Water has hired a program manager to guide us through project implementation. We are obtaining the permits we need and designing the infrastructure. We anticipate that we will obtain our permits by the summer or fall of next year and begin construction in late 2018 or early 2019.

**John Crotty:** How is the project being financed?

**Dan Duchniak:** This is an approximately \$300 million project. The city of Waukesha has been working with us, designating general obligation debt for use on the project. In addition, we are using funds from the Safe Drinking Water and Clean Water State Revolving Funds. We are also looking at supplementing those funds

with federal grants and water revenue bonds.

Ultimately, we are going to have significant increases to our rates. We have been preparing our residents for that change. One of main messages is that doing nothing is not an option. We may have to pay more initially for this water, but in the long run, we will not have to ever address water supply issues again.

I believe that you get what you pay for. With this project, we are getting a long-term water supply. That is what we are paying for.

**John Crotty:** What is your advice to other water managers seeking to develop sustainable water supplies on a large scale?

**Dan Duchniak:** First, always stick to the science and the facts. Many people told me that the project would not be possible because of today’s political climate. We didn’t listen. We stuck to the facts and to the ultimate goal of protecting the Great Lakes.

Second, face-to-face meetings and contacts are critical. The key to this whole thing was a road trip. The mayor of Waukesha and I drove to every Great Lakes Compact state—except Minnesota and New York, to which we flew—and met with every governor’s office and every regulatory agency. We had 2- to 3-hour meetings with every state, and multiple meetings with some states. Each of those in-person meetings put a face on Waukesha and helped build trust among the parties.

Getting eight governors and two premiers, all from different political parties, to come together and vote yes shows that the science and the facts won. **M**

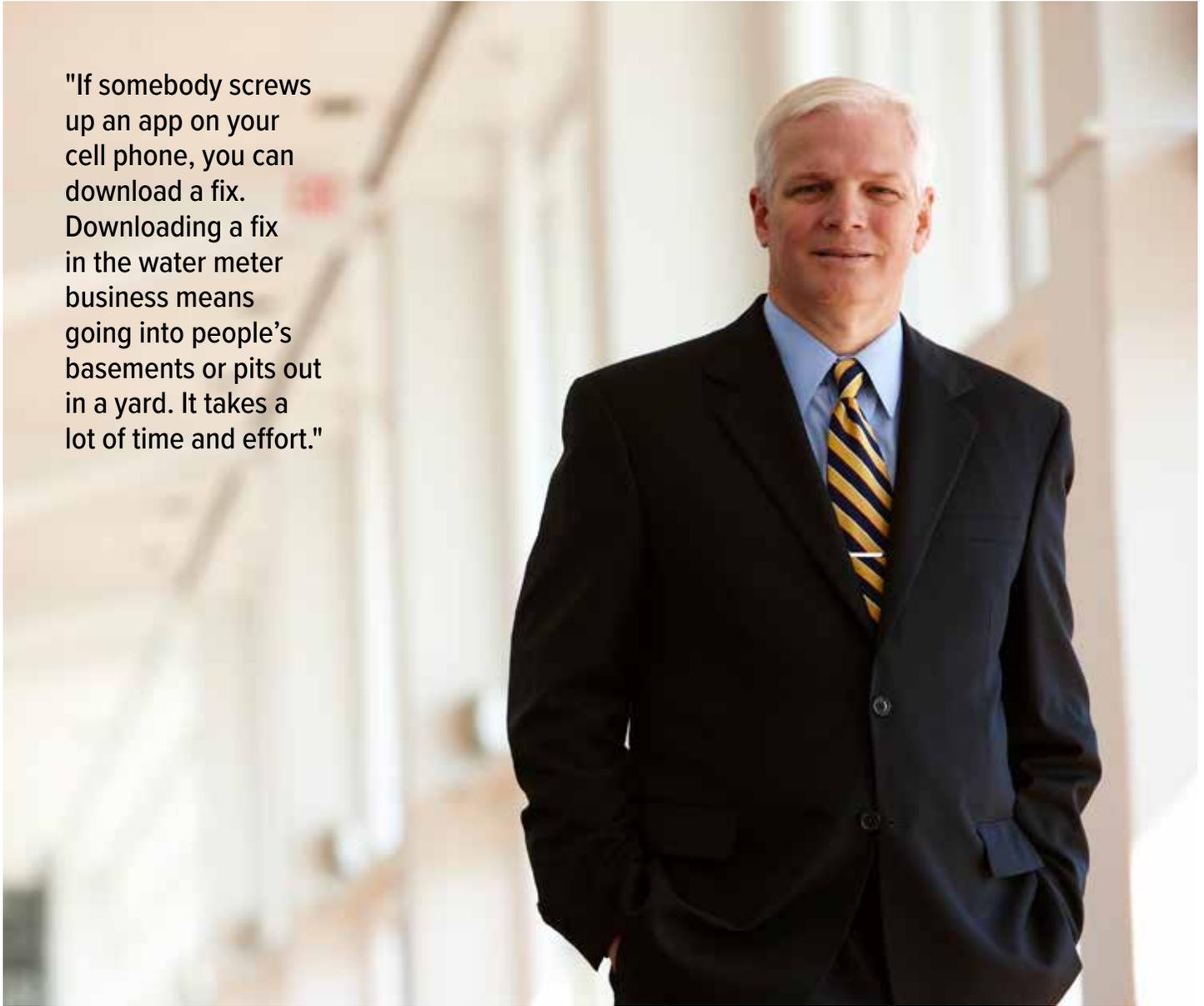
spending millions of dollars opposing the proposal. Unfortunately, we did not have millions of dollars to spend to take them on.

This is a complex, scientific issue that required a great deal of data behind the decisions we made. So we hired public relations consultants to assist us in communicating the facts

# Rich Meeusen

Chief Executive Officer of Badger Meter

"If somebody screws up an app on your cell phone, you can download a fix. Downloading a fix in the water meter business means going into people's basements or pits out in a yard. It takes a lot of time and effort."



Rich Meeusen.

*As Rich Meeusen tells it, while other kids were playing sports, he was reading water meters. Joking aside, Mr. Meeusen was born and raised in the city he has helped to become a leader in the incubation and development of water technology: Milwaukee. He came to Badger Meter 21 years ago as its chief financial officer and went on to become the fifth chief executive officer in the 112-year history of the company. Since that time, the company has generated an average annual shareholder return of over 20 percent.*

*Badger Meter, a public company traded on the New York Stock Exchange, is the largest water meter maker in North America. With 1,600 employees worldwide, the company manufactures meters for anything that flows—from water to*

*milk to beer. It has also invested heavily in water technology, producing the connectivity and analytics that support those meters and the utilities that use them.*

*While helping to position his company as a leader in the water technology industry, Mr. Meeusen saw an opportunity to do the same for his city. In 2007, he cofounded The Water Council to support water technology entrepreneurs and startups and to facilitate collaboration in the industry. He is now the cochair of the council.*

*Municipal Water Leader's senior writer, John Crotty, spoke with Mr. Meeusen about the technology needs of municipal water providers, fostering water technology innovations, and the value of collaboration.*

**John Crotty:** How has Badger Meter has been at the forefront of water technology?

**Rich Meeusen:** Badger Meter was the first company to put a radio on a water meter so it could be read by cars driving down the street. It was the first to introduce cellular radios on water meters. It was the first to introduce household ultrasonic metering instead of mechanical. Those are some of our big innovations over the decades.

That is how Badger Meter competes with the other four water meter companies in North America, which together comprise 95 percent of the market. We spend a lot of money on research and development to develop new technologies. For example, we recently began offering a smartphone app, Eye on Water, which can be downloaded by homeowners to track their daily water use. I use that app regularly, and with it I detected a leak in my home before it became a problem. If the utility system uses Badger Meters, their customers can use Eye on Water.

**John Crotty:** What have you learned about water utilities having worked closely with them over the years?

**Rich Meeusen:** Water utility managers are slow to adapt new technologies. They tend to be risk averse. You have to make a very compelling argument as to why they should adapt a new technology. It is one of the real challenges in our industry. Many utility managers will show interest in a new product but take years to field test before they make a purchase.

There is a good reason for this. If a water utility manager screws up, people could get sick or even die. You are talking about the water supply into the house. If somebody screws up an app on your cell phone, you can download a fix. Downloading a fix in the water meter business means going into people's basements or pits out in a yard. It takes a lot of time and effort.

Naturally, water managers are conservative and risk averse because they are dealing with a resource that affects people's lives. That is what makes water utilities different from all others. They do not run their businesses to optimize earnings; they are running their business to optimize customer service and safety.

**John Crotty:** How has Badger Meter adapted to the needs and philosophy of the industry?

**Rich Meeusen:** First, we accept the fact that you have a much longer sales cycle. Second, you have to spend a lot of money on education and marketing to get your message out and to teach people about the products. Third, you have to protect your brand. In our industry, if your brand gets tarnished, it takes a long time to recover.

We sell long-term products to a long-term industry. We sell mostly to cities, which are around for a long time, and

we sell to city employees, who tend to have longevity in their jobs. That means you better not screw up your brand—no product recalls, no product failures. Our products have to be bulletproof before we send them out.

**John Crotty:** What is Badger Meter's, and your, involvement in The Water Council? What is value of having large water companies involved with smaller-scale technology startups?

**Rich Meeusen:** I cofounded The Water Council 7 years ago with Paul Jones, who at the time was the chief executive officer of A.O. Smith—the largest water heater manufacturing company in the world and also located in Milwaukee. We founded The Water Council around the concept that Milwaukee has an inordinate number of water technology companies, more so than anywhere else in the world. GE Water and Pentair have operations here. Kohler and Rexnord have their headquarters here. There are a lot of water technology companies located here, mainly because 150 years ago, this was the center for beer brewing and other wet industries. And, although traditional business thinking had each of our companies pegged to different areas—instrumentation or manufacturing—what united us was water technology. We help people use and properly conserve water.

The Water Council has been very successful. We are doing cooperative research. We are jointly funding water technology companies and water technology research, and we are working with the universities, which will benefit the entire industry. We have been working with the universities and local tech schools here to start teaching water technology development to the engineers and scientists. The Water Council is also attracting or growing water technology startups. We fund these startups to our benefit, because we get the first look at cutting-edge technology.

**John Crotty:** Please provide an example.

**Rich Meeusen:** We have made several acquisitions in the past because of my Water Council connections. About 4 years ago, we acquired a water technology startup called AquaCUE that we initially met at a Water Council meeting. They came to Milwaukee to meet other water technology companies and develop opportunities to license their technology. We talked, I visited them in California, and we ended up buying the entire company.

We also fund research that I believe will pay great dividends. Most water quality detection is done by taking a sample and bringing it back to a lab. We think there is a real future in finding ways to do real-time, inline water quality detection. There is cutting-edge technology, and it is being developed in Milwaukee.

Badger Meter, in conjunction with other major water technology companies, is funding research on instream water quality detection. A scientist from one of our

universities has patented a device that will detect lead in the water right in the field, so you don't have to send it to a lab. We believe there is an opportunity to use that in our products.

**John Crotty:** What initially got you interested in the water industry?

**Rich Meeusen:** Twenty-one years ago, when I first came to Badger Meter, water—as an issue of the future—was not on people's radar. We always thought of water as an issue in deserts and developing nations, but not as an issue in Flint, Michigan, or elsewhere in the Midwest. Since that time, the world has turned its focus on water.

I originally came to work for a manufacturing company—we really didn't focus on being in the water industry. I came to the company to help position Badger as a leader in the water industry. Now our business is helping people conserve water, not just building water meters. We do that by providing water utilities with the technology they need to help understand their water use.

The longer I have been here, the more excited I have become about the potential for this industry. When I speak to young people, I tell them that water technology is a great career, whether it be marketing, engineering, or manufacturing.

**John Crotty:** What is your message to companies and cities seeking to develop and improve water technology?

**Rich Meeusen:** First, they should all join The Water Council. We aren't just a local organization; we are global and have members from around the world. There are opportunities for everybody.

Smart companies in the future will take advantage of the opportunities that come out of collaboration among industry, academia, and government. In the past, those three areas were viewed as separate. But now, there is a real hunger in academia to work with industry. We have universities asking us how to make their students better employees for the future and what type of research should be done. I have found the same thing in government, especially in Wisconsin. State and local government wanted to be a part of The Water Council from the beginning as a way to develop the economy and attract new business.

No entity can do it alone. If there is a mayor who wants to make his or her city a center for water technology, they have to have the support and participation of the universities and companies. In the case of Milwaukee, industry led the way and partnered successfully with academia and government. 

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# PaveDrain

## Permeable Articulating Concrete Blocks

*Managing stormwater runoff is a significant challenge for municipal water entities. Large areas of impermeable concrete inhibit the absorption of stormwater into the ground, causing water to pool and increasing the potential for flooding. Permeable blocks provide a solution to that problem by allowing water to flow under the surface. The articulated and arched design of PaveDrain bricks allow water to filter into the rock bedding beneath them and eventually back into the water table.*

*Doug Buch is the president of PaveDrain, LLC, and has spent the past several years growing his business; his company's products are now used in projects across the country. Mr. Buch spoke with Municipal Water Leader's editor-in-chief, Kris Polly, about how he developed the PaveDrain system, the value of the product, and how it is improving the stormwater runoff management of municipalities that have put it to use.*

**Kris Polly:** Please tell us about your upbringing, education, and early professional career.

**Doug Buch:** I grew up on a farm in eastern Iowa as the eldest of three boys. I was the prototypical farm kid who played sports to get out of doing chores, and I left school in spring and fall to help in the fields. After high school, I received a scholarship to play football for the University of Iowa, where I lettered all 4 years and was able to start in the 1991 Rose Bowl. I graduated with a degree in communications and got into construction and technical sales while working for a distribution company.

After that, I began working on manufacturing, which is what I really wanted to do. I moved to Wisconsin and began working for a manufacturer of wet cast and dry cast concrete products. That job taught me a lot about the simple, yet complicated, processes for making precast

products. I eventually started a division within that company that focused on articulating blocks designed for erosion control. That product line showed so much upside that it grew to a level that my company's franchise was bought out. They liked what we had done, and I became a regional manager and then a national sales manager.

That company was later acquired by a corporate entity, which was not a good fit for me. So I did some consulting before coming up with the PaveDrain idea and starting PaveDrain, LLC.

**Kris Polly:** Please tell us about your product and its purpose.

**Doug Buch:** PaveDrain is a permeable articulating concrete block paving system. The blocks themselves are not permeable, but the joints between them are. Our blocks weigh nearly 50 pounds and do not require any material between the joints, which allows for very high and fast infiltration. Therefore, we are able to use less of our product while facilitating more stormwater runoff from a parking lot or other municipal project. PaveDrain is like an LED light bulb; it may be slightly more expensive, but over its life cycle the owner will see savings due to lower maintenance costs.

**Kris Polly:** What is the history of your company and the services it provides?

**Doug Buch:** PaveDrain started in 2008, just as the recession started. We initially supplied our product as a mat, which was effective but was only used on a limited scale. We had hoped to bounce up as soon as the larger economy did, but that did not prove to be the case. Our first installation was

in fall 2010, for the city of Bladensburg, Maryland, city hall. Although the civil engineering sector generally is hesitant about adopting something new, Bladensburg viewed being the first to use our product as a badge of honor rather than a risk. That decision helped us break through.

In 2011, we obtained a large contract to install 86,000 square feet for the Ford Motor Company in Louisville, Kentucky. The reviews from Ford have been positive and are helping draw interest from others in the region.

PaveDrain owns the technology and molds that we ship around the country to manufacturing facilities that produce the blocks under contract. PaveDrain sells through its national network of distribution partners.

**Kris Polly:** How is the product applied?

**Doug Buch:** In the beginning, it was employed like a giant mat because the general contractors did not want to install PaveDrain by hand. They asked for a way to keep their workers busy, while not become physically drained.

Now, most PaveDrain is installed by hand or by a miniexcavator with a large clamp that holds 11 blocks covering 11 square feet and swings it into place before dropping it in place—the miniexcavator process is completed in a matter of seconds. That work is often subcontracted out to more specialized installers.

**Kris Polly:** What holds the blocks together once they are in place?

**Doug Buch:** Once the blocks are installed, we do not do anything to them. The blocks interlock naturally due to their shape. We only put something through the cable slots if we are using the mats or are trying to heat the blocks. In the case of a mat, we use a series of polyester cables wrapped with a nylon sheath. That technology has been in articulating concrete blocks for over 60 years. The tubing allows us to have a heating element close to the surface.

**Kris Polly:** What is the advantage to having an arch shape cut into the bottom of the blocks?

**Doug Buch:** There is an Occupational Safety and Health Administration rule that anything weighing more than 50 pounds requires two laborers to install. Our solid block weighs about 65 pounds, but manufacturing the arch shape into it brings the weight down to 49 pounds per block.

The area under the arch creates additional storage space for stormwater that is above the aggregate base that the system is sitting on. Many municipalities have regulations that require the ability to store a level of stormwater runoff equivalent to a 2-inch storm event, and 6 inches of open-graded rock beneath the PaveDrain will store 1 inch of water. Those 6 inches, combined with the space provided by the arches, allow facilities to be in compliance with regulations with a minimal amount of rock.

**Kris Polly:** How are the bricks molded into their complex shape?

**Doug Buch:** The molds themselves and the core pullers that create the arch cost a total of \$75,000 and have been shipped all over the country. The mix of materials we use is common throughout the masonry industry—it is called dry mix. Unlike poured cement, these mixes require very little water. We take the dry mix and press it into shape using special machinery. The blocks are relatively hard, but they also go to a kiln and are cooked overnight. This method allows us to make more blocks faster than the wet cast mold methods we had used in the beginning.

The PaveDrain form required a lot of adjustments along the way. But over the course of our 7 years, our manufacturers have improved block fabrication and can produce two blocks every 10–11 seconds.

**Kris Polly:** How many construction projects have your products been used in?

**Doug Buch:** We have been involved in over 400 projects so far across the country. This is particularly noteworthy, given that we were not fully underway on a large scale until 2015.

**Kris Polly:** How did you become affiliated with The Water Council, and what has been your involvement with it?

**Doug Buch:** My affiliation with The Water Council was based on the need to get my name out there as the owner of a startup. I was looking for any way to market the company and the products, and The Water Council was a good place to start. When I was introduced to Dean Amhaus, the executive director, he had a very impressive vision of what he wanted the council to be, and it has proven to be everything I could have hoped for. Becoming involved with the council was fortuitous. <sup>M</sup>



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## Great Lakes Governors Approve Water Diversion to Waukesha, Wisconsin

By Professor David A. Striffling, PE

**G**reat Lakes water has long been the subject of unusual (and so far, unsuccessful) proposals for use in faraway thirsty places: in the arid Southwest, as a public water supply; in the Great Plains, to replenish the declining Ogallala aquifer; in the Powder River basin, for slurring coal; and even in Asia, via tanker shipments. In 2005, the Great Lakes states and Canadian provinces attempted to forestall such possibilities by entering into the Great Lakes Compact, a legally binding agreement based on sound science and collaborative decisionmaking. The compact generally prohibits new and increased diversions of Great Lakes water outside the Great Lakes basin, with certain limited exceptions. One of those exceptions allows communities located outside the basin, but within counties that straddle the basin line, to apply for a diversion to be used as public water supply. Over the past few years, that exception has been put to the test.

Given its history, Waukesha, Wisconsin, was an unlikely first applicant for a diversion under the compact's straddling county provisions. A Milwaukee suburb of about 70,000 people, Waukesha is located just under 20 miles west of Lake Michigan, and about 1.5 miles west of the subcontinental divide between the Great Lakes and Mississippi River watersheds. In the late

19th century, Waukesha became known nationwide as Spring City and the Saratoga of the West for the superb quality of its natural spring water, believed by some to have healing properties. Waukesha spring water was featured prominently at the 1893 World's Fair in Chicago.

But as Waukesha grew, so did the demand on its famous springs, and underground water levels began to plummet. Suddenly, Spring City faced a deepening water crisis. Today, most of its springs have vanished, and the city draws its public water supply from deep wells that extend 2,000 feet below ground. The water the wells provide is laced with unsafe levels of radium, a naturally occurring carcinogen. Faced with a court order to comply with pollutant limits imposed under federal and state law, Waukesha turned to the comparatively abundant freshwater resource about 20 miles to its east—the Great Lakes.

What came next can only be described as an odyssey. Under the compact, Waukesha had to conclusively demonstrate, among other things, that it had “no reasonable water supply alternative,” that its need could not be “reasonably avoided through the efficient use and conservation of existing water supplies,” that its use would be limited to a reasonable quantity, and that the diversion would cause “no significant individual or cumulative



Lake Michigan.

impact” to the quantity or quality of the basin waters.

Over more than a decade, Waukesha spent millions of dollars on technical and legal studies attempting to prove that it met the exception standards, ultimately deciding that a Great Lakes diversion was the only reasonable option for the city to pursue. The Wisconsin Department of Natural Resources studied the city’s initial application for 5 years and reached the same conclusion, and then forwarded the application to the other Great Lakes states for review. In the meantime, the city reached a preliminary water supply agreement with the city of Oak Creek, Wisconsin, which lies within the Great Lakes basin. After using the water, Waukesha proposed to treat it and then return it to Lake Michigan via the Root River, which runs through Racine County.

The application drew national attention and launched a heated controversy: Did Waukesha’s proposal represent the only reasonable option to provide its residents with clean, safe, and sustainable drinking water, or would it cause adverse environmental effects and set a negative precedent leading to dozens more straws in the lake? Environmental groups vigorously opposed the application, arguing that Waukesha had reasonable alternatives to a diversion, and submitted their own engineering analyses. Racine leaders expressed concerns related to the return flow, including flooding and increased pollutants such as phosphorus and pharmaceuticals. The diversion would adversely affect recreational activities in Racine, they asserted.

Under the terms of the compact, all eight Great Lakes states, meeting together as the Compact Council, had the opportunity to review the application under a common, consistent decisionmaking standard, and to veto the request if they found it did not satisfy that standard. During that review, the council decreased the amount of water to be diverted by about 20 percent and imposed numerous

conditions on the approval. But fortunately for Waukesha, none vetoed the application. The council formally approved the diversion in June 2016, and the decision survived a subsequent challenge by the Great Lakes and St. Lawrence Cities Initiative.

The question of the application’s precedential effect remains unsettled. In its approval decision, the council took pains to explain why Waukesha’s case was so unusual that the decision did not set a precedent. The long years and millions of dollars Waukesha spent on its application shows would-be followers that the process is not an easy one. And in no circumstances can Great Lakes water be diverted beyond a county that straddles the basin line. On dropping its challenge to the approval, the Cities Initiative announced its intent to collaborate with the council in reviewing any future diversion applications.

Opponents and supporters alike can appreciate the peaceful resolution of this water dispute. For thousands of years, transboundary waters have been at the root of conflict and even war. The compact has provided an interesting counterexample to this trend, in large part because the signatories were able to agree on a common decisionmaking process. Among the many technological successes of Milwaukee’s worldwide water hub, this innovative legal and policy achievement is also worth celebrating. <sup>M</sup>



*Professor David A. Strifling, PE, is the director of the Water Law and Policy Initiative at the Marquette University Law School. You can reach Professor Strifling at [david.strifling@marquette.edu](mailto:david.strifling@marquette.edu).*

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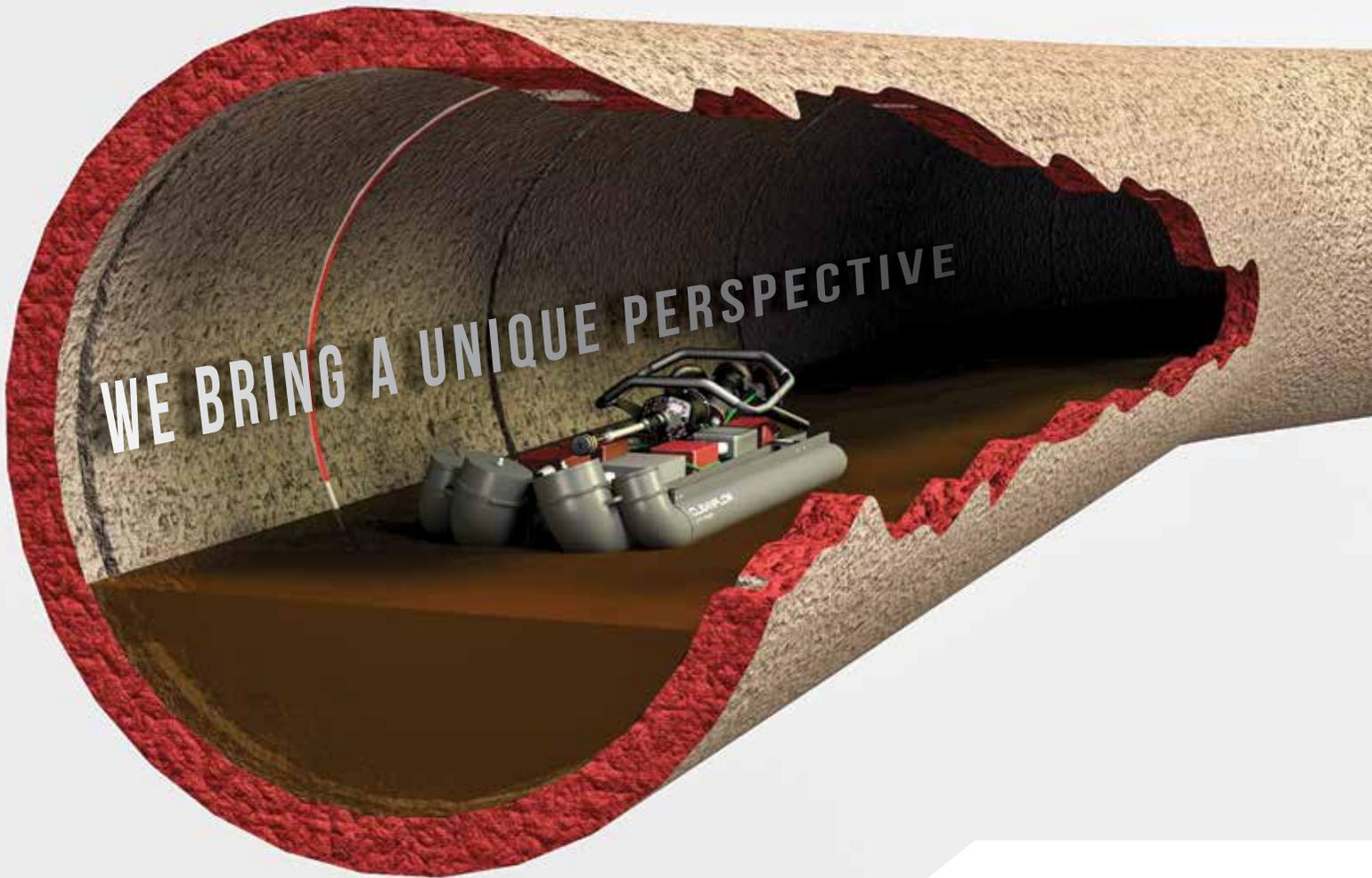
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October 15–18	Association of Metropolitan Water Agencies, 2017 Executive Management Conference, St. Simons, GA
October 17–19	Environmental Systems Research Institute, ESRI Health and Human Services Conference, Redlands, CA
October 19–20	National Water Research Institute, 2017 Clarke Prize Award Ceremony & Conference, Irvine, CA
October 24–27	Western Coalition of Arid States, WESTCAS Fall Conference, Tucson, AZ
October 30–November 2	American Water Works Association, Water Infrastructure Conference, Houston, TX
October 31–November 1	Oklahoma Water Resources Board, Oklahoma Governor's Water Conference, Norman, OK
October 31–November 2	Environmental Systems Research Institute, ESRI Ocean GIS Forum, Redlands, CA
November 2–3	National Association of Clean Water Agencies, World Water Tech North America 2017, Toronto, Canada
November 5–8	National Groundwater Resources Association, Emerging Leaders Alliance Conference, Falls Church, VA
November 5–9	American Water Resources Association, 2017 Annual AWRA Conference, Portland, OR
November 12–16	American Water Works Association, Water Quality Technology Conference and Exposition, Portland, OR
November 14–16	National Association of Clean Water Agencies, National Clean Water Law Seminar, Savannah, GA
November 15–17	National Water Resources Association, 86th Annual Conference, Tucson, AZ
November 24–26	Environmental Systems Research Institute, ESRI Developer Summit, Berlin, Germany
January 31–February 1, 2018	Irrigation Leader Magazine's 6th Annual Operations and Management Workshop, Phoenix, AZ
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