



# NHWWA

NH WATER WORKS ASSOCIATION

## Journal

Volume 2, Fall 2021



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## **JOURNAL**

**Volume 2, Fall 2021**

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### **SAVE THE DATES**

**NH Drinking Water Expo & Trade Show**, October 20, Concord.

**Fall Technical Meeting**, November 18, Centennial Hotel, Concord.

For a complete list of our events please visit our website at [nhwwa.org](http://nhwwa.org).

**Go to [NHWWA.org/About Us](http://NHWWA.org/About Us) for the electronic version of the Journal with active links.**

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# Workforce Development, Education and Succession Planning – A Progress Report

by Boyd Smith, NH Water Works Association

With 32% of water Operators at or within five years of retirement, and another 32% more than halfway through their careers (Figure 1), recruiting, retaining, and training new workers is critical. “Workforce development” is the term we use to describe this important issue, and with your input we made workforce development one of our four core strategic priorities.

The NH Water Works Association represents roughly 2,500 regulated systems and 1,000 certified Operators. We currently certify approximately 50 Grade 1A and 35 Grade 1 Operators annually and provide continuing education to hundreds more. We estimate the need to increase new Operator certifications by 30% to 50% over the next 5-10 years to address retirements.

The Association is built on a foundation of information sharing and training, fostering career paths that bring new workers to the sector as well as advance the knowledge of employed professionals. Our strengths are the generosity of water workers, from Operators to regulators, engineers, and suppliers all willing to share their knowledge and expertise for the good of their colleagues.

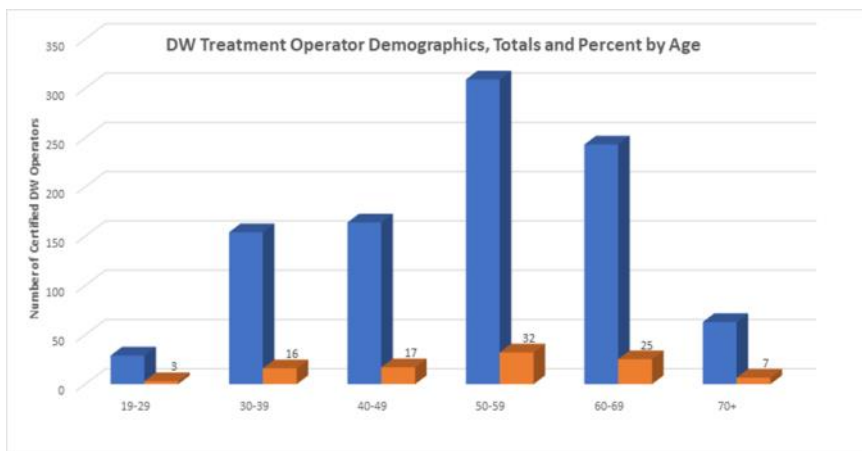
We are adding to our impact by forming partnerships with more Operators and systems, as well as education and employment organizations such as NH Community College System, NH Science Teachers Association, and NH Departments of Education and Employment Security. Our colleague Peter Goodwin of Tata & Howard is leading the State in ways to better connect with military veterans leaving service for civilian life, including working with members of our federal delegation and contacts in US Departments of Defense, Labor and the EPA. We work closely with NH Department of Environmental Services to stay abreast of regulatory requirements and drinking water policy.

With a low educational barrier to entry (about 50% of national water workforce has a high school education or equivalent) and a culture of internal training and advancement, high school technical-track

programs have high potential to provide new workers. In addition, people changing careers such as contractors and tradespeople, and women returning to the workforce, might find drinking water options highly attractive. By effectively coordinating education, training, and work experience, the right person could be prepared to start a career as a Grade I Operator in 12 months, perhaps even earning some income under an apprenticeship / intern program while meeting NHDES Operator-In-Training requirements.

A major challenge to recruiting new workers is low public awareness of drinking water systems. Most folks don't know where their water comes from or what it takes in skill, technology and cost to provide it, nor consciously recognize its importance to our economy and public health. We believe that an informed and engaged population will supply more workers interested in the field, as well as support funding required to maintain and operate our water infrastructure and objective, science-based regulatory policy. Please go to the Connect page of our web site at [www.NHWWA.org](http://www.NHWWA.org) for information and tools to help you communicate the value of water and career opportunities to your communities.

While our Association's current focus is training Operators, there are many career opportunities in water, from administration to engineering, construction, laboratory analysis, communications and more. With technology becoming increasingly important and complex,



**Figure 1 – Drinking Water Operator Demographics (data courtesy NHDES, August 2021)**



higher levels of training and continuing education are needed for the entire sector. The NH Community College System has trained staff dedicated to meeting this broader need for higher and continuing education.

There are a lot of pieces in place to build our drinking water workforce. Our goal is to have a successful and sustainable State-wide system up and running by the end of 2022. Association members are skilled and dedicated public servants, ready, willing and able to do their share introducing new workers to the wonders of water. We are proud to be your partner in this important endeavor!



Boyd Smith, Executive Director

Based on our records, the first meeting of NH Water Works Association was held in June 1939. The original Constitution and Articles of Agreement are from 1942 and state:

*“The purpose of this Association shall be the improvement of water supply service in New Hampshire: by discussion of all water supply problems, inspection of works, and action to improve the position of, as well as service rendered by, water works men.”*

While a lot has changed in the field, the original vision and mission of our forebears still rings true today!

## **Water Infrastructure Funding - A Generational Opportunity**

By all accounts, there is a flood of federal funds on the way, starting with the CARES Act and an initial ARPA commitment of \$50 million to the drinking and clean water State Revolving Loan Funds (SRFs). Ongoing discussions among the NH Joint Fiscal Committee, the Governor's office and NHDES indicate a shared understanding of the importance of water infrastructure investment, and an additional \$100 million to \$300 million ARPA disbursement is under consideration. Great credit is due to NHDES for requesting and compiling SRF preapplications that generated an objective estimate of the financial need.

Looking slightly farther down the road, this summer the US Senate passed a bipartisan bill that included \$55 billion for water infrastructure, including funds for SRFs, PFAS remediation and lead service line mitigation. This legislation is currently under negotiation in the House, where even broader definitions of infrastructure and larger budgets are being debated.

While CARES Act funding is essentially winding down, the impacts of pending ARPA funds are just beginning to be felt. These funds must be apportioned by December 2024 and spent by December 2026 – no small feat given the growing need for workers and construction materials across our sector. The NHHWA is working closely with State water Operators, organization partners, and our federal delegation to ensure that these funds go where they are most needed under a schedule that allows for their efficient use.

Federal funding is the long-awaited boost required to address decades of deferred maintenance, which has accumulated since many of our treatment plants were built in the 1970s and 1980s. While it seems that drinking water is finally established in the definition of our nation's critical infrastructure, our State and water ratepayers also have a critical role in building and maintaining safe and sustainable systems. To this end, our Association is continuing to support efforts to reasonably and consistently fund the legally-mandated State Aid Grant program and will work to provide tools that help local water systems communicate the value and cost of water to their constituents.

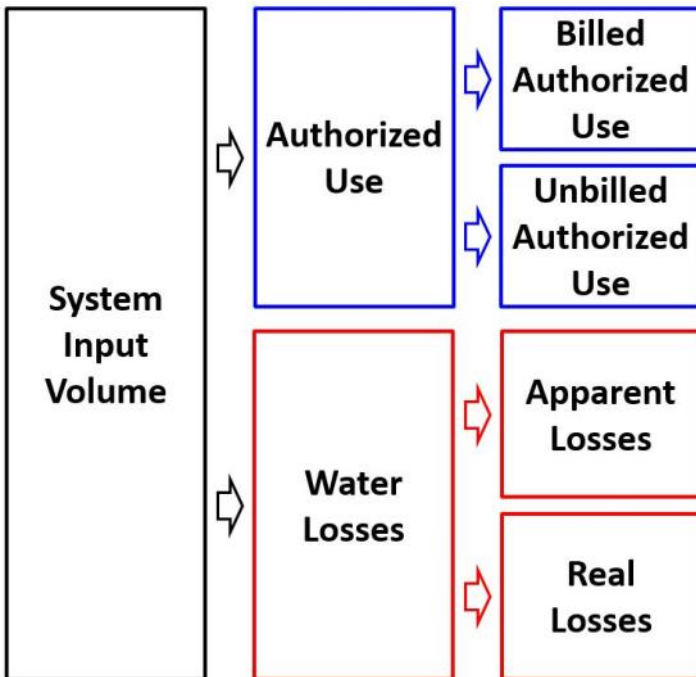
Please let us know how we can help you continue to provide safe, dependable and affordable drinking water.

# Keep Your Water Losses under Control: The Value of Water Audits

by Kelsey Vaughn, New Hampshire Department of Environmental Services,  
Drinking Water and Groundwater Bureau, Water Conservation Program,  
[waterconservation@des.nh.gov](mailto:waterconservation@des.nh.gov)

If you were asked what your system's water losses were, would you know the answer? If so, that is great to hear. If not, the good news is that there are lots of helpful resources to help you understand, manage, and reduce your system's water losses.

According to the American Water Works Association (AWWA) *M36 Manual*<sup>1</sup>, water loss is the difference between the volume of water distributed to the system and authorized use by either the customer or water system. Water loss consists of apparent losses and real losses (see image 1).



*Table depicting the ways water is used once it's added to the distribution system, adapted from Figure 3-1 in the AWWA M36 Manual.*

Apparent losses are non-physical losses or paper losses. Water reaches a user but isn't properly measured or recorded. Examples of apparent losses include unauthorized use, data handling errors, and customer meter inaccuracy.

Real losses are physical losses or wet losses. They are what most people think of when they think of water losses. Examples of real losses include storage tank overflows, service line leakage, and main line leakage of pipes, joints, and fittings.

Every system has water losses. Some systems will have greater losses than others, and the major types of losses will also differ. For instance, a water system that was built in the 1970s might have more leaks than a system built in the 2010s, if the pipes and fittings have never been replaced. A system may have brand new service meters, but there might be an issue in the upload of the meter data to the billing software that causes errors.

You might be thinking that water loss control sounds useful, but you're already being asked to do a lot to manage your water system. Why should you put the time into this too? Two major reasons are capacity and money.

By no longer pumping water to feed leaks, the overall system demand decreases. As a result, less strain is put on the current water sources. Consequently, resiliency to climate change impacts, such as drought, increases.

By pumping less water, there are also monetary savings, including saving money on the electric bill, on chemicals used for treatment, and on asset replacement due to excessive wear and tear.

Not only can your system save money by addressing real losses, but your system can also potentially bring in more revenue by addressing apparent losses. The increased revenue commonly comes from having more accurate service meters that capture more of the water

delivered to customers. The correction of billing errors can also bring in more revenue.



### *Water meter register*

Now that you know all of the great benefits of addressing water losses, you might be tempted to jump right into fixing leaks and replacing service meters. While those efforts are valid and will reduce your water losses, like most management decisions, data should be the driver. One of the best tools for providing that data is a water audit.

### **Water Audits**

The *AWWA M36 Manual* is a comprehensive resource for water loss control programs and water audits. It provides all of the information that you need to complete a water audit. In order to make the water audit process easier for systems, the AWWA has also released the Free Water Audit Software (FWAS).

The FWAS is a companion tool to the *AWWA M36 Manual* and incorporates the water audit approach that is summarized in the

manual. Although it's called "software," it's actually just a formatted Excel spreadsheet, which can be downloaded for free from the [AWWA website](https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control/Free-Water-Audit-Software) (<https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control/Free-Water-Audit-Software>).

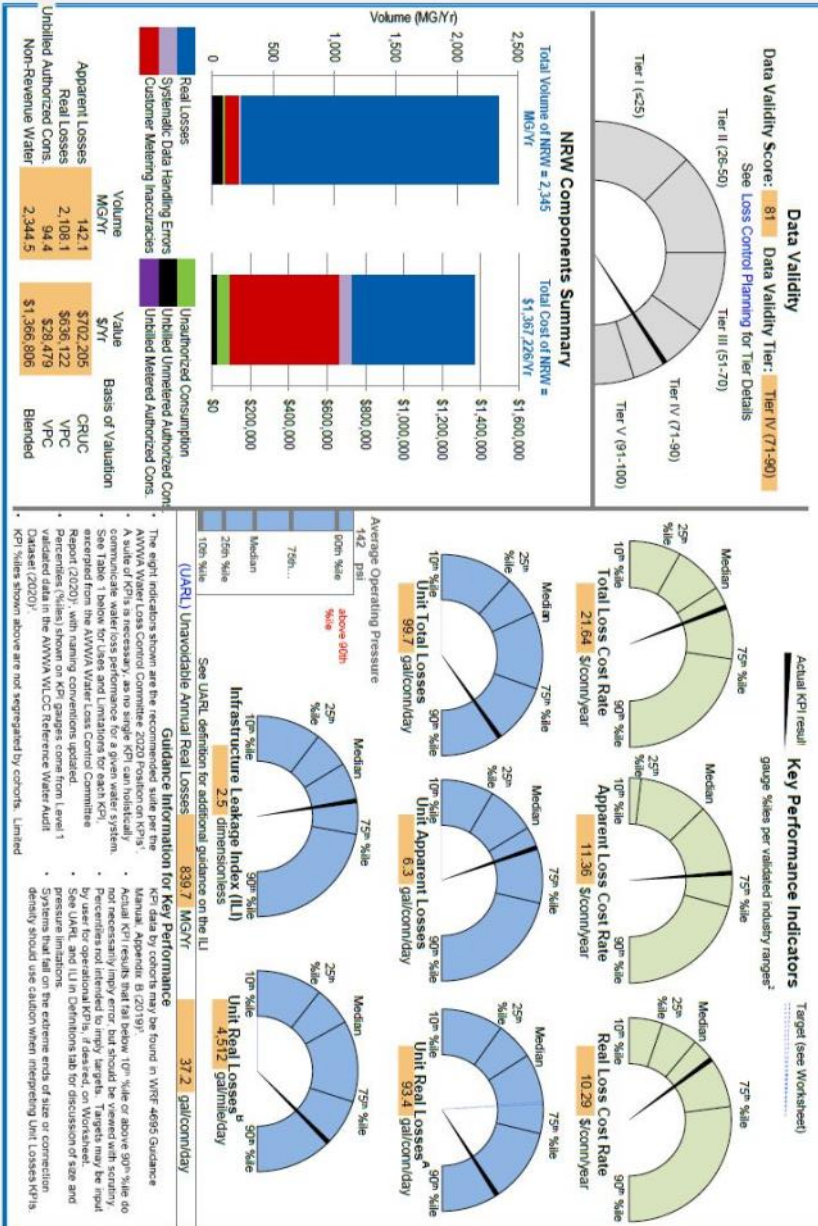
The theory behind the FWAS is that all water can be accounted for. In the past, you might have heard the term "unaccounted for water" to describe water that was distributed to the system but wasn't measured or estimated. The industry has moved away from this term, because as Photo 1 shows, all water distributed to the water system goes to either authorized uses or water losses. Rather than using the term "unaccounted for water," we now use the terms "water losses" and "non-revenue water." The FWAS also uses those terms.

The FWAS is a desktop process that uses a top-down approach. You start with the system input volume and enter the volumes for all of the uses. You also include some basic information about your system, such as the number of service connections, miles of main, and production costs. You only need to enter about a dozen inputs and assign a data grade to each of the inputs.

Version 6 of the FWAS was recently released and incorporates many helpful updates, making it more user-friendly. One of those updates improved the data grading approach. The main reason for the grading is to understand the quality of the data. In the old version of the FWAS, it was challenging to determine the most accurate grade for each input based on the metrics that were provided in the software. In the new version, the data grading is interactive, which improves consistency, transparency, and objectivity.

Don't let the data grading intimidate you from starting the water audit. The data grades and overall data validity score may be lower for the first year that you complete a water audit. That's okay. Use the best available numbers and information. To explain the numbers, you can add notes in the "Notes" tab of the spreadsheet for future reference.

The FWAS will also show the priority areas to improve your data quality and grades for future water audits.



Dashboard from the AWWA Free Water Audit Software.

Another major improvement with the new version of the FWAS is that key performance indicators are displayed in a clearer format. After the data have been entered and assigned grades, the software will complete calculations and display the results in a dashboard (see Photo 3). The dashboard shows the volumes, values, and validity of the data via various key performance indicators in graphs and visuals. For instance, apparent losses are depicted as two key performance indicators and shown on a gauge of percentiles based on validated industry ranges. The dashboard is a great asset for your system, because you can use the graphs to help communicate with your system's decision-makers.

It's recommended that water systems complete a water audit annually. That way, you get a fuller understanding of your system's current water loss status, and you can compare your results among years to see the impact of your water loss control strategies.

If you're wondering how to download the FWAS and get started on your water audit, NHDES developed the [Water Audit Resources Guide](https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/water-audit-guide.pdf) (<https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/water-audit-guide.pdf>). In the guide, there are tips, information, and links to websites, webinar recordings, and manuals.

## **Audit to Action**

Like any tool, the data from the water audit are a starting point. The dashboard and results show you what your system's total, real, and apparent water losses are in terms of volumes and monetary values. They also show you the volumes and monetary values associated with the components of your non-revenue water. You can use those results to determine your system's priorities for managing your water losses, which can also potentially increase revenue.

You might be wondering what specific actions you can take to reduce your apparent and real losses. To provide ideas and resources, NHDES developed the [Water Loss Reduction Resources Guide](https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/water-loss-reduction-resources-guide.pdf) ([https://](https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/water-loss-reduction-resources-guide.pdf)



[www.des.nh.gov/sites/g/files/ehbemt341/files/documents/water-loss-guide.pdf](http://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/water-loss-guide.pdf)). The guide has several pages of recommendations, but here are a few key ways you can address water losses:

#### Apparent Losses:

- Look at the service meter reading and data handling processes for potential errors
- Implement a service meter replacement or testing program
- Evaluate service meter sizes and downsize as needed

#### Real Losses:

- Analyze break data to see if there are any patterns in the causes or locations
- Complete proactive, ongoing leak detection activities, such as
  - Utilizing correlators and leak loggers
  - Completing night flow analyses using distribution or zone meters
  - Conducting acoustic leak detection surveys
  - Listening to hydrants when performing flushing activities
  - Analyzing water use data for trends
- Assess and decrease leak isolation and repair times
- Establish a plan for main and service pipe rehabilitation or replacement
- Analyze and reduce system pressures
- Develop an asset management plan and replacement schedule
  - Map and inventory the system

The actions that your system takes to control water losses should be routinely reassessed for their effectiveness and adjusted as needed.



*Plastic pipe with water exiting it through a break*

## **Upcoming Learning Opportunities**

If you're interested in learning more about water loss control and water audits, there are two upcoming opportunities, with more to follow:

- October 20: Kelsey Vaughn, with the NHDES Water Conservation Program, will present at NHWWA's Drinking Water Expo and Trade Show.
- November 16: NHDES is partnering with the Environmental Finance Center (EFC) to provide a workshop. The current plan is for an in-person workshop at the Concord NHDES office, but it may shift to a virtual format, depending on recommendations from health officials. Either way, TCH's will be provided. There will be a registration website available soon, but in the meantime, please contact the NHDES Water Conservation Program at [waterconservation@des.nh.gov](mailto:waterconservation@des.nh.gov) if you're interested in attending.

## Closing Thoughts

Water loss control is an integral part of responsible resource and system management. An important tool for understanding your system's water losses is an annual water audit. You can use the results from the audit to make operational and management decisions to reduce those losses and potentially bring in more revenue as a result.

If your system is doing anything interesting for water loss control or has examples of effective water loss control efforts, the NHDES Water Conservation Program would love to hear about them. That way, we can help other systems on their water loss control journeys. Please feel free to send any stories or information to [waterconservation@des.nh.gov](mailto:waterconservation@des.nh.gov).

### THANK YOU NH FISHER CATS EVENT SPONSORS!

Thank you to the sponsors that made this fun night possible. With your support we were able to offer reduced rate tickets to deserving water workers. Thank you for supporting a special event for our water works friends and families!

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# Construction Day

August 4, 2021

## Manchester Water Works



*Construction Day attendees at Manchester Water Works' Cohas Avenue Pump Station.*

With roughly 60 attendees, there was a full house for our 23<sup>rd</sup> Construction Day event on August 4 at Manchester Water Works (MWW). We gathered on the shores of Lake Massabesic in a 19<sup>th</sup> century pump station that is being converted into training space. Starting the day with coffee and pastries in the high-ceilinged room with fresh breezes and a view to the lake, Dave Miller, Deputy Director of Water Supply provided an overview of MWW before we formed groups to visit three system components.

One group traveled to the Cohas Avenue pump station on the Cohas Brook to see recent pump replacements and electric system upgrades in the 1874 structure. The architecture alone is worth the visit, while the modern equipment inside shows how MWW keeps its millions of GPD flowing.

The second stop was the Oak Hill Pump Station where a new structure was installed to house the electric upgrades and create space in the



*Inside the Cohas Avenue Pump Station.*

original structure for new pumps. This was a tight location where engineering creativity was required to meet operational needs and space restrictions.

The third site was the future location of a radial collector well installed beneath the Merrimack River, designed to sustainably provide another 7 MGD to the MWW system. To treat this water – which already is of excellent quality - a new facility is being built less than half a mile down the road. This new system, which will add a much-needed factor of safety to MWW's production demands, will be



*Location of Manchester Water Works' radial collector wells on the Merrimack River.*



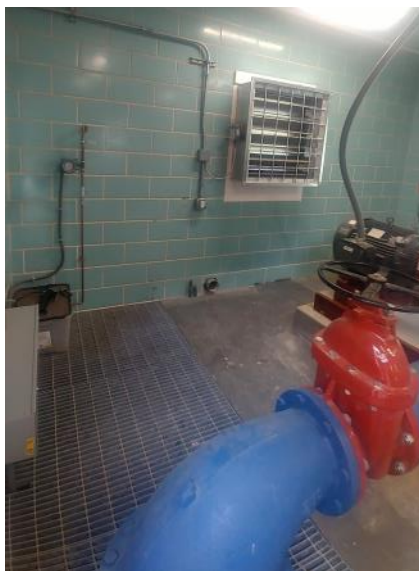
*Above: The Oak Hill Pump Station's new structure to house electrical components. Below: New pump inside the original structure.*

operational in 2023.

After each group had visited all three locations we returned to our lakeshore meeting space for lunch and a presentation by NHDES engineer Mike Unger for updates on the Southern NH Regional Water Project and the rapidly-changing world of water infrastructure funding.

Thanks to all who attended, with special thanks to Dave Miller and MWW staff for generously hosting our 2021 Construction Day. We also want to thank Sam Kenney and Ethan Beaulier of Weston and Sampson for their excellent presentations at the Cohas Brook and Oak Hill pump stations.

**Have a new and innovative construction project or upgrade that you would like to share? Please [contact us](#) about Construction Day 2022, typically held in late July or early August.**



# NH DRINKING WATER EXPO & TRADE SHOW

OCTOBER 20, 2021

8:00 AM - 4:00 PM

GRAPPONE CONFERENCE CENTER,  
70 CONSTITUTION AVE., CONCORD, NH

Our annual Expo & Trade Show is just around the corner. The Expo offers a total of SEVENTEEN SEMINARS on a variety of topics important to the drinking water industry. Seminars will be held throughout the day, scheduled around lunch and two breaks to allow time to connect with your colleagues. Earn up to five TCHs.

[Exhibitor](#) and [Sponsor](#) opportunities that raise your business profile also available.

**YOUR REGISTRATION INCLUDES: admission to seminars, access to the trade show floor with 50+ exhibitors, Coffee, Lunch, and Happy Hour Reception.**

**EARLY BIRD REGISTRATION 2:** August 18 - September 21 – 10% DISCOUNT

\$90 NHWWA MEMBER

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**REGISTRATION:** September 22 - October 20. Registration will be accepted at the door if pre-registration capacity has not been met. Cash, check and credit cards accepted.

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Visit our website, [www.nhwwa.org](http://www.nhwwa.org), under “Trainings & Careers” to register or to download the event brochure with a full list of seminars and schedule for the day.

**COVID PROTOCOLS**—We will follow the safety practices set or advised by the Grappone Center, the State of New Hampshire and the CDC at the time of the Expo.

# WELCOME TO OUR 2021 EXPO EXHIBITORS!

We are excited to welcome the following exhibitors to our 2021 Expo! As of our publication date we had one Prime Booth and nine Regular Booths still available. Check our webpage for more information [NH Drinking Water Expo & Trade Show - New Hampshire Water Works Association \(nhwwa.org\)](http://NHDrinkingWaterExpo.org).

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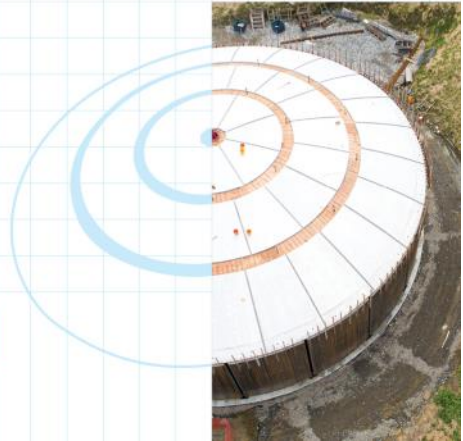




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