



# Water Applied Research Center



# Applied Research by Design



Aging infrastructure, stringent water quality and discharge requirements, and emerging constituents are driving water and wastewater agencies, municipalities, and private companies to seek out different and better solutions for dealing with the impacts of these challenges. Carollo operates the 8,900-square-foot Water Applied Research Center (Water ARC®) dedicated to the strategic planning needs of both our municipal and private sector clients.

This state-of-the-art R&D hub offers laboratory-based bench treatability testing and full-service support for field, pilot, and demonstration studies. Its facilities also support equipment testing, staff and operator training, troubleshooting, and quality control review. From single-sample tests to multi-treatment processes, Water ARC® can scale up or down to meet any request.



**RAPID**  
short-term testing



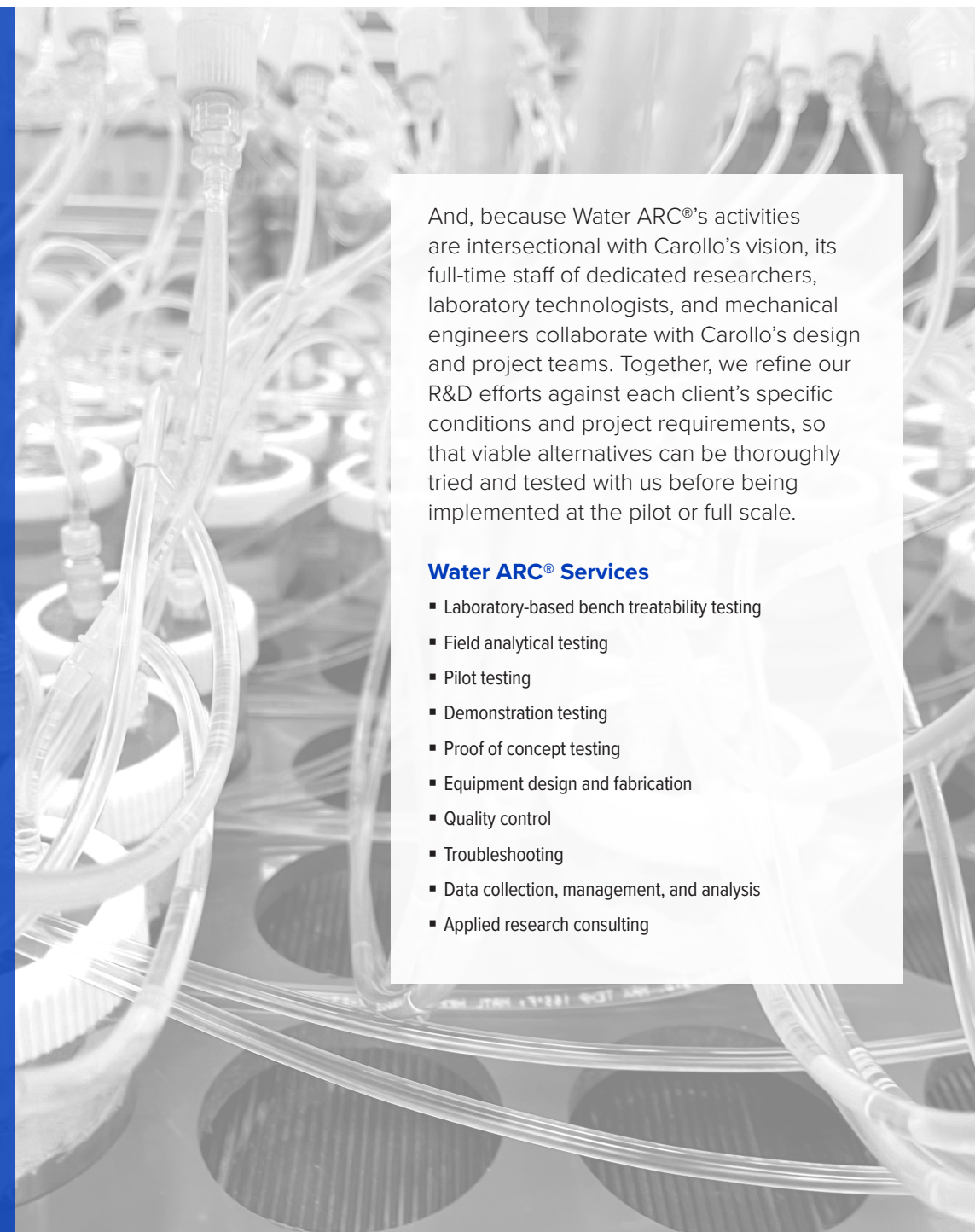
**EXTENDED**  
studies and  
complex analysis



**CUSTOM**  
and condition-specific  
studies, including  
equipment and tool  
fabrication



**EMERGENCY**  
and rapid-response  
diagnostics and  
solutions



And, because Water ARC®'s activities are intersectional with Carollo's vision, its full-time staff of dedicated researchers, laboratory technologists, and mechanical engineers collaborate with Carollo's design and project teams. Together, we refine our R&D efforts against each client's specific conditions and project requirements, so that viable alternatives can be thoroughly tried and tested with us before being implemented at the pilot or full scale.

## Water ARC® Services

- Laboratory-based bench treatability testing
- Field analytical testing
- Pilot testing
- Demonstration testing
- Proof of concept testing
- Equipment design and fabrication
- Quality control
- Troubleshooting
- Data collection, management, and analysis
- Applied research consulting



# Innovation to Impact

Equipped with a robust inventory of pilot- and demonstration-scale equipment, and with the ability to design and fabricate custom equipment on-site, Water ARC® can simulate any number of client-specific conditions and processes, and, in turn, produce reliable high-quality results clients can depend on.

Water ARC® performs a full range of applied research services that allows our clients to explore viable solutions, confirm efficacy, and meet regulatory requirements, reducing risk and improving efficiency.



## Water Supply Confidence

In 2017, Carollo was hired to investigate increased nitrification levels within an extensive metropolitan drinking water distribution system. The project scope was subsequently expanded to include a comprehensive corrosion control study.

Pipe scale analyses revealed a widespread buildup of a magnesium silicate layer with some embedded rust particles on the inner wall of the pipe. The team determined that this buildup of magnesium silicate was a primary issue that could be exacerbating both the nitrification and water discoloration issues.

This resulted in the project pivoting from corrosion control to a magnesium silicate stabilization study. Bench testing, construction of 3 pipe loop systems, and design of the pipe loop testing facilities are being led by Water ARC®.



20+ demonstration, pipe loop, and instrumentation skids

120 bench treatability studies since 2018

8,900 square feet of space designed for applied research services

1 dedicated team of experts to support applied research

## Bench Treatment Capabilities

- Coagulation/Flocculation/Sedimentation
- Biological Filtration
- Adsorptive Media
- Reverse Osmosis
- Microfiltration/Ultrafiltration
- Ozone
- Ultraviolet Disinfection
- Advanced Oxidation
- Simulated Distribution System Tests

## Types of Studies

- Lead and Copper (bench or pipe loop corrosivity)
- PFAS media
- Nutrient removal studies
- Disinfectant dose response
- Organics characterization
- Cyanotoxin
- Biogas Generation



• WaterARC® Located in Boise, Idaho



# Full-Time Support

## Suspended Ion Exchange (SIX®) Pilot Project, David L. Tippin Water Treatment Facility

The City of Tampa and Carollo partnered with Water ARC® to provide full-time support for the design and implementation of a dynamic pilot study that evaluated the viability of suspended ion exchange (SIX®) technology, an organics-removal technology previously untested in the U.S. and never used under the current variable TOC conditions presented in the City's primary water source.

The integration of Water ARC® and our project team led to several benefits less typical of standard pilot studies, including:

- **Streamlined pilot supply, start-up, and operations:** Water ARC® provided Carollo-owned pilot equipment and customized pilot skids simulating the City's existing ozone and biofiltration train, both with flexible operation and monitoring capabilities. Water ARC® also supported the pilot's operator in configuring, integrating, optimizing, and troubleshooting this equipment and fabricated required new tools.
- **Quick, dynamic pivots fostered by reliable data:** Water ARC®'s quick delivery of reliable lab-based treatability data led to recommended adjustments in the study that were accomplished rapidly, improving the prospect of a positive outcome.
- **Flexibility of scope:** Transparency of Water ARC®'s testing protocols encouraged the City to expand the scope and test a range of alternate disinfection protocols to confirm the most effective option to be paired with SIX®.



The pilot resulted in confirmation of the efficacy of SIX® technology for TOC removal under the City's unique conditions, while also solving several other historical challenges the facility had faced that were outside the initial scope of the pilot.

The results have led to the preliminary design of a full-scale SIX® system to serve the facility, which will allow the City to cost-effectively improve finished water quality while simultaneously reducing chemical requirements.



SCAN TO SEE MORE.

## A new generation of **pilot testing**

The City of Tampa's David L. Tippin Water Treatment Facility (DLTWTF) produces an average of 76.7 million gallons of potable water per day to serve over 717,000 residents and visitors. In recent years, this plant has experienced operational challenges caused by high levels of organics in its primary water source.







*For more information about  
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