ARCADIS

Request for Qualifications

Town of Ledyard, CT

Lead and Copper Rules Revisions Compliance

October 2025

Section 01.

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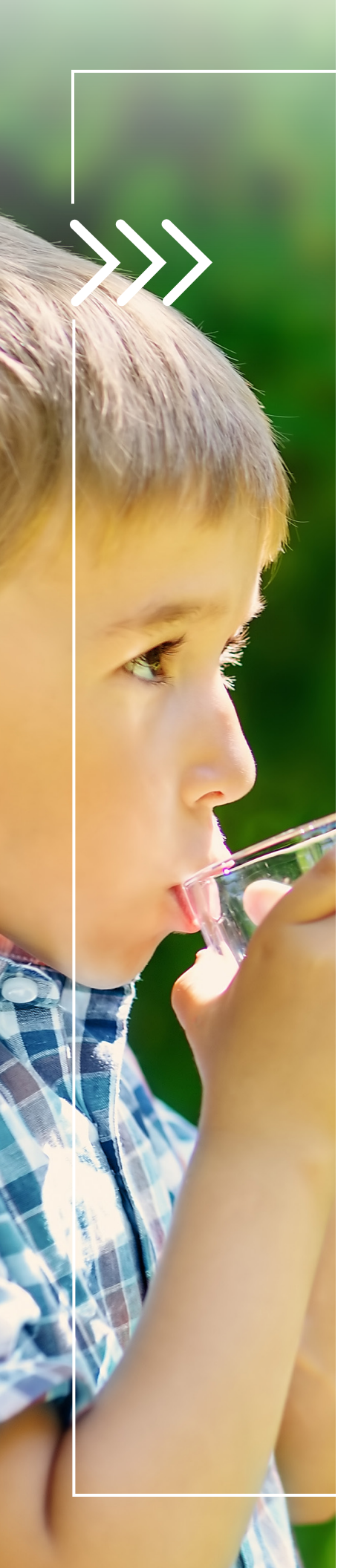

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Section 02.

Cover Letter

Matthew Bonin, CPA
Director of Finance
Town of Ledyard
741 Colonel Ledyard Highway
Ledyard, CT 06339

Arcadis U.S., Inc.
213 Court Street Suite 700
Middletown, CT 06457
Tel: 781.213.4923
www.arcadis.com

October 2, 2025

Re: Lead and Copper Rules Revisions Compliance RFQ2026-02

Dear Mr. Bonin,

Arcadis is excited to submit our qualifications for consideration to partner with the Town of Ledyard, CT, to provide engineering services for the Lead and Copper Rule (LCR) Revisions (LCRR) compliance. Arcadis U.S., Inc. provides the Town a nationally recognized teaming partner that specializes in consulting, design, engineering and management services as well as industry leadership in LCRR compliance. Our office, staff and team are close to the Town of Ledyard. As with our current Lead Service Line (LSL) Replacement (LSLR) work for nearby communities such as the City of Norwich, City of Meriden, City of New London, and Groton Utilities the Arcadis team differentiates ourselves in several key areas.

Expertise and Excellence in Delivering Cost Efficient Lead & Copper Compliance Plans. A significant factor in successfully delivering a comprehensive Lead and Copper Compliance Plan is how well the selected team understands existing and future regulatory requirements. Arcadis brings expertise on the current and revised Lead and Copper Rules (LCR, LCRR) and LSLR from planning through construction, combined with our local knowledge. We have also developed inventories for over 1,800 water systems and understand how to reduce unknown service line materials efficiently.

Nimble, Agile and Creative Solutions. Arcadis invests in digital tools which benefit our clients by providing more information at less cost. As such, we have several creative options for the public outreach efforts to keep everyone informed about the LSL program progress. Solutions like websites, pioneered by Arcadis, allow us to regularly update the public on this program, answers questions, and decreases the workload for Town of Ledyard. We also have cost saving ideas for project execution such as utilizing mathematical algorithms to decrease unknown service line materials in systems with little or no lead. This saves money by digging in the right locations the first time. We also have several tools for program management oversight such as Power BI Dashboards, which affords the Town real-time updates on program progress and aids in managing capital outlays and reporting.

Long-Standing Relationships Provide Trust and Early Insights to Engage Quickly. Arcadis has been serving Connecticut for more than 100 years. Since 2021, we have been working directly with Connecticut Department of Public Health (CT DPH) on LCRR and are trusted advisors for the state as they move forward with LCRR compliance. We consistently bring innovative solutions and project funding options to clients in Connecticut. Our program's organizational chart has long standing experience working together on Connecticut projects with over 50 years of combined experience, including Program Director Jennifer Kelly Lachmayr, Project Manager Amy Anderson George, Project Engineer Sydney Lewis, Public Outreach Specialist Kathryn Edwards, and Geographic Information System (GIS) and Data Management Leader James McCallon. Our team has assisted several communities in Connecticut on LCRR programs receiving State Revolving Funds (SRF) and DPH loan forgiveness of more than $14 million in the past four years.

Please reach out to me directly at 781.213.4923 or Jennifer.Lachmayr@arcadis.com should you have any questions or require additional information. We look forward to working with you.

Sincerely,
Arcadis U.S., Inc.

Jennifer Kelly Lachmayr, PE, BCEE
Program Director / Principal-in-Charge
✉ jennifer.lachmayr@arcadis.com

Amy Anderson George, CPM
Project Manager
✉ amy.anderson@arcadis.com

Section 03.

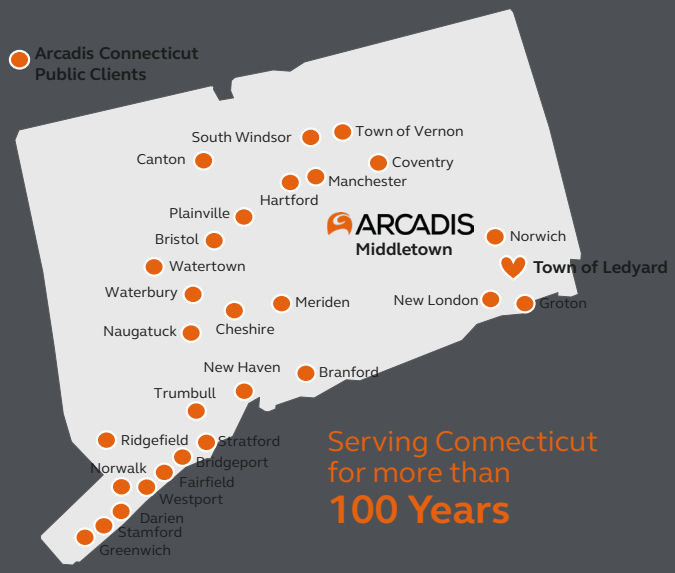
Company Information

03. Company Information

Expertise in LCR and Excellence in Delivering Lead Service Line Inventories

About Arcadis

Arcadis is a global company that has a strong local presence and a passion for improving the quality of life in the communities we serve. We have access to over 36,000 engineers, scientists, planners, management consultants, and support staff worldwide, including more than 7,000 personnel located in the United States. We have a network of more than 130 branch and field offices located around the U.S. and more than 350 offices around the world, enabling us to offer a global perspective combined with local knowledge. Currently, our organization is working on environmental and infrastructure projects in more than 30+ countries.



Arcadis offers a comprehensive range of water engineering and management consulting services—from investigations, planning and feasibility studies through design, permitting, instrumentation and controls, construction administration, resident inspection, O&M, and startup.

Arcadis was established in the U.S. in 1957. The firm expanded in response to water supply problems created by a major drought in the Northeast. Arcadis U.S., Inc., is now one of the world's leading engineering, consulting and program management firms. Arcadis U.S. Inc. is wholly owned by Arcadis North America, Inc., a Colorado Corporation, whose sole shareholder is Arcadis USA, B.V., a Dutch company.

The Arcadis team combines our local and national presence, familiarity with your requirements, national technical expertise and global resources to deliver superior professional engineering services for the Town of Ledyard. **Company information for our subconsultants are located in Section 6.**

Delivering Full-Service LCR Solutions That Connecticut Utilities Can Rely On

In addition to our strong national presence, we also have tremendous local resources. We have 19 offices in New England and New York State. All of our discipline leads and the majority of our senior engineers and critical staff are based out of Middletown, CT, East Greenwich, RI and Wakefield, MA offices, which makes our team easily accessible to the Town of Ledyard with a total of 165 staff members within the area.

Our sizable local delivery team led by Project Management team **Amy Anderson George** and **Sydney Lewis**, has the resources and bandwidth to deliver this important project. Supported by a suite of lead and copper specific digital tools for data collection and management, and established libraries of documentation for reporting, Arcadis will maximize efficiency in the development of your program, saving the Town of Ledyard time and money.

Arcadis at a Glance

Worldwide

- 36,000 + Staff
- 30+ Countries

North America

- 7,000 + Staff
- 130+ Offices

- Arcadis Generates Over 5 Billion in Revenues
- Founded in 1888 in the Netherlands

Section 04.

Experience

04. Experience

Relevant Experience

The Town of Ledyard can rely on our team's expertise and practical experience in lead service line programs encompassing regulatory and industry best practices around service line inventory development and improvements, lead service lines replacement planning, design and construction management, state and federal funding, data management and public education and outreach.

Arcadis has assisted multiple clients with similar programs, including Norwich, CT, New London, CT, Appleton, WI, Aqua America, Meriden, CT, Rochester, NY, NHDES, Trenton, NJ, Birmingham Water Works Board, and Groton Utilities. Arcadis has also provided construction management and support, public outreach support for the LSLR program for DC Water. Similarly, Arcadis has been assisting the Chicago Department of Water Management for over seven years beginning with development and implementation of a lead testing kit program and expanding into lead service line inventory (LSLI), replacement, and data management and integration support.

What do our clients think of Arcadis' LCRR support?

"Arcadis was hands down the best consultant for helping New London develop and execute a proactive LSLR program. Being the first utility to do this in the State of Connecticut, the Arcadis team has walked us and the state regulators through every step with a fully developed program, outreach materials and construction documents in just over six months. Their staff have also been able to fill every resource gap within the City to successfully and seamlessly execute this entire program in our community."

-Joe Lanzafame
City of New London Director of Public Utilities

Arcadis LCR Service Line Inventory Experience

- Inventory review and development
- Automated reports for state submittals and notifications to the customer
- Tap card digitization
- Dashboards for tracking and stakeholder updates
- Statistical analysis and predictive modeling
- Integration with GIS, CRM, EAM and LIMS applications and development of statewide portals
- Evaluation of conventional and emerging service line investigation techniques
- Funding applications and tracking

By The Numbers

30+
Years of Leadership in Regulatory Development

60+
National LCR/LSL Experts

1,800+
Public Water System (PWS) Inventories

3 Million Service Lines Modeled
Results submitted to regulators in 12 different states

>$125M
Obtained in Loans & Grants for LSLR/LSLI

Lead Service Line Replacement

Arcadis brings experience in planning, program management, design and construction management services for LSLR programs. Arcadis has also provided powerful dashboards to support ongoing projects with Chicago Department of Water Management, New London and others. These dashboards can pull from multiple data sources, including GIS or work order management systems, to deliver a one-stop, real-time update to project stakeholders on the entire program including participating rates, pitcher filter distribution, service line inventory, sample tracking and results, and schedule.

Corrosion Control Treatment (CCT)

Arcadis has experience developing and conducting CCT studies to address action level exceedances, optimize or evaluate alternate CCT strategies for all size systems, or evaluate changes in source water and/or treatment. Our team has performed desktop and demonstration studies (i.e., bench, coupon and pipe loop testing) for over 50 utilities across the U.S. We have the capabilities of planning and tailoring a study, depending upon the client's objectives, end goals, distribution system materials, sources and lead and copper levels. Upon completion of testing, we have supported dozens of utilities with recommended next steps, whether that be follow-up testing, design and implementation of CCT, and/or additional water quality analysis. We have also helped clients throughout the U.S. address some of the most challenging and infamous corrosion-related water quality challenges.

Sampling & Monitoring

Arcadis has designed, implemented and supported both compliance and residential sampling programs. In 2016, the City of Chicago allowed residents who were concerned about lead in their drinking water to request a free lead test, which resulted in thousands of sample requests. Arcadis was employed to develop and implement a lead kit testing program. This included a comprehensive analysis of lead testing protocols, created sampling, testing, reporting standard operating procedures (SOPs), and training for the Chicago Department of Water Management. Arcadis also provided assistance with water quality analysis and statistics, and based on results, has provided recommendations to improve data collection methods and improve asset management techniques.

Funding Support

Arcadis has developed an excellent working relationship with the authorities having jurisdiction in Connecticut, and we have assisted many Connecticut public authorities, municipalities, and industries in complying with the range of regulations governing safe drinking water and water quality. This familiarity with the Connecticut regulations, in combination with our extensive engineering experience has enabled Arcadis to develop practical, cost-effective and implementable solutions for our Connecticut clients. Over the last 10 years, we have successfully assisted in securing well over $100 million worth of state funding for projects in Connecticut.

In addition to state funding, the federal funding landscape is swiftly evolving and in the coming years we expect more dollars will be available for resilience, mitigation, infrastructure, and economic development than ever in history. Arcadis takes a proactive approach to assist our clients with funding needs. We have professional staff whose responsibility is to track and maintain current knowledge of the variety of available funding opportunities for our clients, including a working knowledge of eligibility criteria and positioning opportunities.

Public Education, Outreach and Training Materials

Arcadis has assisted multiple clients with lead in drinking water outreach programs, including the New London, CT, Meriden, CT, Norwich, CT and Groton Utilities. Drawing upon our deep understanding of LCR and LCRR compliance, Arcadis collaborates with in-house and external graphics and communication professionals to develop outreach messaging and materials (web pages, FAQs, door hangers, flyers, yard signs, etc.), and then partners with the water supplier and trusted community members in delivering messaging to the public through open houses, block events, social media, door knocks, and more. We combine unparalleled technical experience with proven consensus-building skills that allow for meaningful input resulting in inclusive, multilingual solutions that integrate the needs and interests of all stakeholders.

Arcadis has developed lead related education materials for every aspect of a lead and copper program from a high velocity flushing protocol developed as part of WRF 4713: Full Lead Service Line Replacement Guidance to homeowner guides to managing lead. We have also leveraged a variety of virtual, interactive tools to keep customers informed. As a creative alternative approach to stakeholder engagement and outreach, our team began preparing a customized website for the New London LSL Replacement Program. Website is a digital platform for a virtual, interactive and anytime-anywhere experience that integrates our subject matter expertise to offer an appropriate and enhanced platform built to meet stakeholder needs. A customized website can be created for the Town of Ledyard to be placed as a link

on the Town's webpage and allow for frequent updates performed by Arcadis, saving time and effort for your staff.

Data Management and Integration

Arcadis provides a wealth of expertise, resources and support services that transcend just software. In the past 20 years, our focus has been on providing public clients a data management solution that breaks down silos, allows various departments to work seamlessly together and provides their workforce accurate and reliable information. For example, our construction management software solution, Portfolio Insights, pioneered by Arcadis is a response to the evolving needs of our long-time public clients whose vision and mission are similar to the Public Works. These public agencies include the Chicago Department of Water Management, the New York City Mayor's Office of Recovery and Resiliency, the Army Corps of Engineers, and the City of Columbus. With Portfolio Insights, we help these clients focus on realizing their mission in the most transparent way.

Our experts have supported hundreds of clients in the U.S. and globally on all data management and integration needs including system implementation, configuration, hosting and platform services, integration, training and support and maintenance. In addition to information technology experts, our team is comprised of engineers, planners, project and construction managers who have strong qualifications, experience and leadership working on various compliance programs. Their extensive experience in management and delivery of these programs uniquely enables them to propose practical solutions.

Finally, we bring experience working with all types of data and systems necessary for a successful lead and copper compliance program including GIS, customer information systems (e.g., Oracle, Banner, SAP), work order management systems, laboratory information management systems, mobile applications (e.g., FieldMaps), and more.

Past Experience within Last 5 Years

Current Similar Project Experience within the last 5 years	Program Management	Public Outreach and Engagement	Funding	Planning and Procurement of LSLR Construction	Construction Management	Post Construction Water Quality Testing
Lead Service Line Replacement Program | City of New London, CT	●	●	●	●	●	●
Comprehensive LCRR Compliance Program | Norwich, CT	●	●	●	●	●	●
Engineering Services for LCRR Compliance | Meriden, CT	●	●	●	●		
Lead and Copper Rule Compliance | Groton, CT		●	●			
PWS LSLI & LSLRP Assistance | New Hampshire Department of Environmental Services, NH	●	●	●	●		
Lead Service Line Replacement Plan | City of Appleton, WI		●	●	●		
LSLR Program Management | DC Water, Washington, DC	●	●		●	●	●
Lead Service Line Replacement Project | Youngstown, OH		●	●	●	●	●
Program Management and LSLR Program Support | Chicago Department of Water, Management, Chicago, IL	●	●	●		●	●
Comprehensive Corrosion Control Optimization Study | Great Lakes Water Authority, Detroit, MI	●	●	●			
LCRR Compliance Assistance | Philadelphia Water Department, PA	●	●	●	●		
LCRR Compliance Assistance | SAWS, San Antonio, TX	●	●	●	●		
LCRR Program Management | Monroe County Water Authority, NY	●	●	●	●		
LCRR Program Management | Erie County Water Authority, NY	●	●	●	●		

Section 05.

References

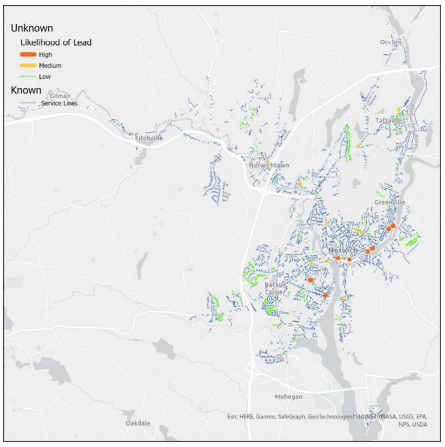
05. References

Comprehensive LCRR Compliance Program
Norwich Public Utilities

Norwich Public Utilities (NPU) provides drinking water to approximately 36,000 customers through roughly 12,800 water services. To reduce customer exposure to lead and proactively achieve compliance with the recently finalized LCRR, NPU is embarking on a comprehensive LCRR compliance program.

Arcadis is assisting NPU with development and execution of their Comprehensive LCRR Program. In addition, Arcadis is assisting NPU with the funding, design and construction of 180 lead service line replacements in high-vulnerability areas. A summary of services is as follows:

- Service line inventory development and validation
- Data and funding management
- Development of a lead service line replacement plan
- Desktop corrosion control assessment
- Lead and copper sampling plan program development
- Develop and execute a public education and outreach program
- Design and construction administration



Alisa Morrison, PE
Associate Utility Engineer
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Norwich, CT 06360
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Alisa.Morrison@npumail.com

Lead Service Line Replacement Program
City of New London Department of Public Utilities

The City of New London serves 60,000 customers through 14,000 water services and is aware that approximately 2,400 of these services contain lead. To reduce customer exposure to lead and proactively achieve compliance with the LCRR, the City acting through the leadership of the Water & Water Pollution Control Authority has embarked on a comprehensive full LSLR Program.

Arcadis is providing inventory development, LCRR compliance, design, construction administration, and resident engineering support in development and execution of that program. As the program manager, Arcadis is responsible for developing the LSLR program and overseeing the replacements (including pre- and post-construction activities) at each property.

Work under the program began in early 2022 and includes execution of the public outreach plan, construction management for the replacement of up to 600 lead service lines, capital improvement program (CIP) updates and progress tracking.

Construction Contracts Phase 1A and 1B for removal and replacement of 250 lead services lines began in November of 2023 and are ongoing. Phase 2, which will address an additional 350 replacements and over 1500 test pits is anticipated to be awarded in December of 2025. All of these construction contracts received federal and state grand monies.

Joseph Lanzafame, PE
Director of Public Utilities
15 Masonic Street
New London, CT 06320
860.437.6365
jlanzafame@newlondonct.org

Lead and Copper Rule Compliance
City of Meriden

Meriden Water Division (MWD) serves approximately 17,630 customers in the municipalities of Meriden, Berlin, Cheshire, Southington, and Wallingford. The drinking water system includes four water treatment facilities, four surface water reservoirs, six groundwater wells, and 228 miles of distribution and transmission lines. To achieve compliance ahead of the new requirements under the LCRR, Lead and Copper Rule Improvements (LCRI) MWD is proactively advancing a program to develop a LSLI and LSLR Plan, updated sampling plan, corrosion control assessment, and educate their customers with public outreach resources.

Arcadis is providing lead and copper rule compliance, including inventory development, development of a lead service line replacement plan, corrosion control, strategies for reducing the number of unknowns throughout the City, and development and execution of a public outreach and education program.

Bill Norton
Former Director of Public Utilities Meriden, CT
203.410.8569
wnorton@cityofglensfalls.com

Lead and Copper Rule Compliance
Groton Utilities

Arcadis provides technical support and expertise as needed assistance with lead and copper rule compliance. Work includes development of public outreach materials, interpretation of LCRR/LCRI and ongoing compliance support.

Kelsey Odell, PMP
Project Manager, Projects & Planning
295 Meridian Street
Groton, CT 06340
Office: 860.629.7007
Cellphone: 860.941.8187
odellk@grotonutilities.com

Community Water Systems LSLI & LSLRP Assistance
New Hampshire Department of Environmental Services

Arcadis is working with 220 New Hampshire Community Water Systems (CWSs) to assist them with meeting the requirements of the LCRR. Work includes completing lead service line inventories, replacement and sampling plans as well as public outreach and training.

The purpose of this project is to assist New Hampshire CWSs with LCRR compliance including development of a lead service line inventory, replacement, and sampling plans. This effort is in response to the Environmental Protection Agency published regulatory revisions to the National Primary Drinking Water Regulation for Lead and Copper Rule Revisions under the authority of the Safe Drinking Water Act.

The project involves coordination with and assisting the 220 CWSs with their lead service line inventory preparation. This includes program sign-up for the CWSs, a detailed inventory survey and data gathering with each CWS, assisting each CWS to draft their lead service line inventories, advising the PWS on strategies to reduce unknowns and developing a verification plan, assistance with updating each CWSs sampling plan to align with new requirements, and the final lead service line inventory to be submitted to New Hampshire Department of Environmental Services.

Jennifer Mates
Project Manager
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Concord, NH 03302
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Section 06.

Project Team/Organization

06. Project Team/Organization

Organization Chart

Arcadis will leverage our national expertise in Lead Service Line Replacement through our local team who has demonstrated our capabilities with these programs throughout New England. **Resumes for staff indicated on the organization chart can be found in Appendix A.**

The Town of Ledyard Connecticut

Lead and Copper Subject Matter Experts

Erica Walker
Hannah Rockwell, PE, CDT

Program Director/PIC

Jennifer Kelly Lachmayr, PE, BCEE*

Project Manager

Amy Anderson George, CPM

Project Engineer

Sydney Lewis

Key Staff

LCR Compliance
Karen Casteloes, PE, CDT

Reporting and Dashboard
Ashis Kumar Pal, IAM

GIS and Data Management
James McCallon, GISP
Whitney Campbell

Predictive Modeling
Robert Tuttle, PhD
Rebecca Ventura, PhD

Inventory
Alyssa Gouveia
Mikayla Billiter

Public Education and Outreach
Alyssa Gouveia
Kathryn Edwards, PE

Funding
Jennifer Kelly Lachmayr, PE, BCEE*
Amy Anderson George, CPM

Construction Manager
Sofia Lee, EIT

Construction Contract Documents
Sofia Lee, EIT
Sean Mitchell, PE*

Inspectors
Alyssa Gouveia
Hector Salazar
Mikayla Billiter

Additional Support

Pereira Engineering, LLC **(MBE)**

JKMuir, LLC **(WBE)**

JKB Consulting, LLC **(WBE)**

* Connecticut PE

Relevant Experience Overview

Arcadis experts closely follow funding opportunities for Comprehensive Lead & Copper Compliance Planning and Replacement, including Drinking Water State Revolving Funds, Community Development Block Grants, and Federal loan programs.

We partner with our clients to enhance sustainability and currently, we are working on several LCRR Compliance Programs including Lead Service Line Replacement Programs as outlined throughout our response – a key step toward improving the standard of living for both the residents and the commercial spaces they rely upon.

Demonstrated by our successful record of accomplishment nationally (Chicago, Washington DC), you can rely on our Team's proven commitment to deliver quality work and provide practical and cost-effective solutions that meet local and national regulatory requirements. Based on the significance and complexity of this Program, we invited local and specialty subconsultants to enhance the outcomes of this project.

Arcadis' expertise relative to lead and copper corrosion control is recognized by United States Environmental Protection Agency (USEPA) and American Water Works Association (AWWA) due to our advisory status

on rule making and development of guidance manuals for utilities across the country.

We have helped major utilities deal with recent lead and copper crises including Tucson Water, Washington Aqueduct and City of Flint. Currently we are working with the City of New London providing engineering support in development and execution of their comprehensive LSLR Program. As the program manager, Arcadis is responsible for developing the LSLR program and overseeing the replacements (including pre- and post-construction activities) at each property. Our work on this assignment includes:

- Program Management
- Lead Service Line Inventory
- Lead Service Line Replacement Plan
- Public Education and Outreach Assistance
- Funding Assistance
- Technical Implementation and support
- Pitchers and Filters/Cartridges

Our Team is comprised of local and national experts who are actively entrenched in LCRR compliance planning and lead service line replacement Plans and processes in the New England region and across the U.S., partnered with the best subconsultants working in Connecticut.

Arcadis has successfully supported our clients in securing project eligibility for the Drinking Water State Revolving Fund (DWSRF) program.

We have close relationships with local MBE/WBE subconsultants who will be engaged in our work for the Town. From years of working together, we understand their strengths, recognize their value, and are able to thoughtfully apply their talents.

Project Management

Project management is critical to compliance with the LCRR and the overall success of the Town of Ledyard's program. We will initiate the work with a Kickoff Meeting to introduce key team members, establish lines of communication, confirm objectives, and review the proposed scope and schedule. Our key team includes:

Amy Anderson George, CPM is a proven project manager who is adept at meeting project deadlines and building consensus among many different stakeholders. Amy will host progress calls with the Town of Ledyard to provide regular updates on completed and upcoming activities and coordinate on any additional information needs or scheduling.

Jennifer Kelly Lachmayr, PE, BCEE, our Program Director, together with Amy will be involved through all phases of work and will report directly to the Town of Ledyard with project administration, scheduling, budget, communication and project metrics for success. Jenn will assure that Arcadis brings its best tools to deliver outstanding technical cost-effective outcomes for this program. Both Jenn and Amy have direct experience working with CT DPH and CWSRF funding programs on LCRR Compliance Programs.

Sydney Lewis is a passionate civil engineer within the New England Resilience Water Business Area, looking to improve water quality through engineering. Her professional experience includes over 2 years working on wastewater and water resources design, engineering, and construction responsibilities. Sydney has direct relevant experience assisting CT communities with LCRR compliance.

Erica Walker is Arcadis' National Lead and Copper Rule Practice Leader and brings over 12-years' experience in the areas of water quality analytics, training, regulatory compliance, asset inventory, replacement planning and implementation, data management, funding, and technical management of programs. She specializes in helping water utilities and state agencies prepare for federal and state regulations targeting lead and in locating and remediating sources of lead in distribution and premise plumbing systems.

Hannah Rockwell, PE, CDT is a senior water engineer with more than ten years of experience. She serves on Arcadis' National Lead and Copper team, collaborating on LCRR / LCRI compliance with communities around the country. She has experience with a wide range of drinking water quality, and her current work includes LSLI inventory and replacement plans, predictive modeling, LSL replacements and the development of comprehensive LCR public education and outreach programming.

Subconsultant Utilization

Arcadis actively supports all programs relating to small, disadvantaged, emerging business, woman-owned, and minority-owned businesses enterprises. While Arcadis is not a DVBE/SLBE/ELBE/SBE/WBE/DBE/MBE firm, we frequently seek out these firms to augment the services we provide.

We have worked with a broad range of firms certified in these specific areas and have become familiar with their internal structures and areas of technical

expertise. Such diversity not only improves our ability to provide high-value services for a broad range of clients and projects, but strengthens our communities and the society in which we live.

Arcadis is committed to equal opportunity and employment diversity and that commitment is reflected in the composition of our staff and management. We are also committed to using diverse and local subcontractors and consultants, and promoting equal opportunity through our business transactions.

Minority/Women Business Enterprise Relationships

Arcadis is one of the world's largest engineering firms active in the fields of water, infrastructure, environment and buildings and is a nationally recognized consulting, design, engineering and management services firm. The Town of Ledyard can look to many of our projects across the country and the globe as examples of the breadth of LCRR Compliance and LSLR Programs that we have led.

We leverage world-class experience with local presence and understanding to engineer optimal water management solutions in every community we serve. We have deep roots in the Northeastern United States, and a long history of helping New England communities improve their quality of life – hundreds of Arcadis professionals live and work in the New England area and over 6,000 professionals in North America.

JKMuir, LLC (WBE)

Role: Energy Efficiency Reviews

JKMuir is a Connecticut-based environmental and energy consulting firm specializing in the water and wastewater industry. The firm's services focus on providing practical energy management strategies that lower costs, decrease greenhouse gas emissions, reduce carbon footprint, and allow for greater control of pumping systems, power consumption, and treatment processes. JKMuir has worked closely with various state and utility rebate and incentive programs to submit project applications, calculate potential energy savings and obtain significant funding. With experience in the planning, detailed design, and construction of water and wastewater infrastructure projects, JKMuir provides technical and engineering services for the development of energy projects and other facility improvements.

JKB CONSULTING, LLC
Environmental Permitting, Planning & Compliance

JKB Consulting, LLC (WBE)

Role: Permitting

Julie K. Bjorkman, PE, is the principal, owner and sole member of JKB Consulting, LLC. Ms. Bjorkman handles all aspects of business for JKB Consulting, LLC, including but not limited to all accounting, project management, report and deliverable preparation, and administrative functions. JKB Consulting, LLC maintains one office location in Connecticut. Ms. Bjorkman, a civil engineer, has over 30 years of professional experience in environmental consulting, specializing in handling various Connecticut Department of Energy & Environmental Protection (CTDEEP), Army Corps of Engineers and local wetlands and planning and zoning permitting, wastewater and industrial wastewater discharge permitting, facility pollution prevention planning, and regulatory compliance.

PE PEREIRA ENGINEERING, LLC
Civil • Environmental • Land Surveying

Pereira Engineering, LLC (MBE)

Role: Civil, Site, Survey

Pereira Engineering, LLC is a privately owned Civil & Environmental Engineering and Land Surveying firm located in Shelton, Connecticut. Pereira Engineering (PE) is also certified as a Minority Business Enterprise in Connecticut and Rhode Island and a Disadvantaged Business Enterprise in Connecticut, Massachusetts, New Jersey, New York State, Rhode Island, and Vermont. PE takes a hands-on approach to each phase of the design, construction, and inspection process. PE offers everything you would expect from a top-notch consulting firm. We have a strong vision of commitment and strive to provide our clients with personalized engineering solutions.

Section 07.

Project Approach

07. Project Approach

System Background

The Town of Ledyard serves approximately 1,320 metered service connections in the Gales Ferry and Ledyard Center areas of Ledyard. The Town has contracted with Groton Utilities since 2010 to operate and maintain the Town's water system through two interconnections, one on Route 12 and one on Route 117.

There are two separate distribution systems with the Route 12 interconnection supplying the Gales Ferry and Avery Hill areas, and the Route 117 interconnection supplying the Ledyard Center area.

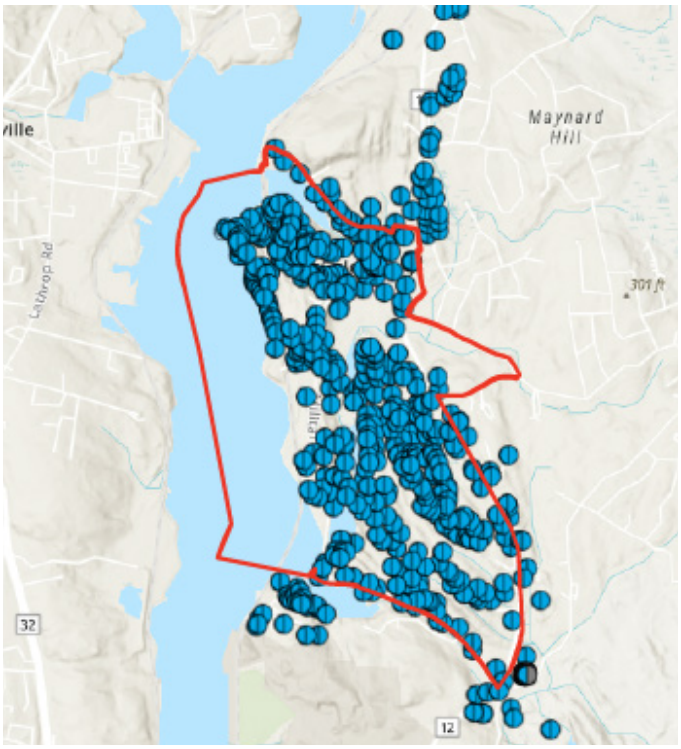
The Town has been in compliance with lead and copper limits under the Lead and Copper Rule as demonstrated through periodic water sampling and reporting in the Annual Water Quality Reports and the Town utilizes sodium hydroxide and phosphate as corrosion control inhibitors as part of the lead and copper control program.

Approach to Program Implementation

We understand the relationship that the Town of Ledyard has with Groton Utilities and recognize the need to reduce the number of unknowns in the LSLI. The Town wishes to prepare for new LCRR through the development of a compliance program in accordance with the revised USEPA LCRR as administered by the CT DPH that makes certain that all requirements are met in accordance with the required timeframe.

The Town also wants to take advantage of available funding mechanisms, including funds available under the CT DPH (loan forgiveness) and Drinking Water State Revolving Fund Loans to lower the burden of cost on their customers.

Successful development of LCRR compliance plans requires in depth knowledge of the regulations and available funding, as well as flexibility and a continuous improvement mindset to adapt to changing conditions and information. Our experience covers each key component of a lead and copper compliance program, ensuring all your needs are met and work is successfully planned and executed throughout the entire life of the program. Additional details on several of these components is provided in the following tasks.



Unknown service lines in Gales Ferry

Task A. Service Line Material (SLM) Inventory

The Town has limited historical records on the utility side of the service and some records on the customer side. The Town has worked closely with Groton Utilities to develop an initial inventory, however 1,200 unknown service lines still exist within the Ledyard Center and Gales Ferry portion of the system.

Arcadis proposes a three-step process to cost effectively validate the full LSL inventory – on both the Town's and customers portions – such that the Town can enhance communication to their customer and execute a cost-effective successful replacement program.

STEP 1: Review of Existing Information

The Arcadis team will review available Town service line records to establish a documented common understanding of all available data sources and how those records were or were not used to develop the existing inventory.

Step 1 will begin with a thorough review of existing information, followed by a meeting with key Town staff conducted by core members of our team to discuss/ confirm the following:

- Available records/information
  - Historical records
  - Tap/service cards
  - Permits for new services
  - Publicly available information (i.e., tax records for home age, plumbing codes or ordinances)
- Current inventory
  - Format: Scanned versus digital information, GIS compatible, availability of unique premise identification number, etc.
  - Documented data fields: Fields that are available for data input and the percentage of information known.
  - Assumptions: Understanding which assumptions have been applied to current inventory (i.e., all homes built after 1988 have been designated as non-lead on the customer side of the service line).
  - Workflows: General procedure for collecting information and storing in central database.

As part of our work with Norwich Public Utilities, Arcadis collected service line materials by visiting resident's homes and identifying materials using lead swabs (example shown in photo), magnets, scratch tests and photo verification. Arcadis also developed procedures for field confirmation including configuration of a tablet app that was used to collect and track field data results, which could easily be integrated into their existing database.

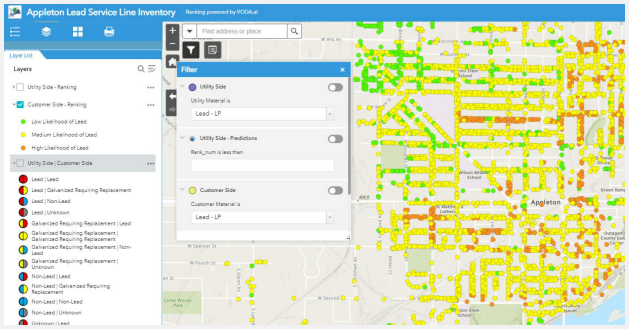
- Ongoing practices to verify unknown materials, such as:
  - Identification of the material on city-portion as part of capital improvement projects
  - Identification of the material on private-portion as part of any in-home water quality investigations, meter replacements/repairs, or proactive in- home identification
  - Customer self-identification/feedback
  - Development of self-reporting portal

TABLE 1. SERVICE LINE MATERIAL INVENTORY IDENTIFICATION STRATEGIES

Strategy	Public	Private	Considerations
Inspection by utility staff during water main or service line replacements or breaks	✓	✓	• While the staff is already in the field, service line material information can be collected through forms or mobile applications
Verification inside the customer's home near the meter through visual observation, scratch tests, magnetic tests, and/or lead swabs and self-reporting by the customer		✓	• Self-identification websites are an easy way for the customer to self-report service line material. Customer surveys could also be used. • Self-reporting by the customer may not be reliable unless clear photos are attached
Inspection inside the customer's home near the meter by the utility staff or contractor service line sampling	✓	✓	• Can be conducted by system staff during meter readings, replacements/repairs, water quality concerns, and other similar situations or by Arcadis staff • Sampling methods and training must be conducted
Traditional excavation methods such as testpits	✓	✓	• Field technique • Perform at curb stop to understand both public and private side materials • Contingent on available funding
Predictive models that determine the probability of a given material	✓	✓	• Great tool for understanding extent and approximate location of LSLs in system
Emerging techniques like electrical resistance measurement, acoustic wave, eddy current	✓	✓	• Field technique • Need access to the curb stop and requires specialized equipment and calibration

Significant Experience with Modeling Techniques to Reduce Unknowns

Our team has deployed service line predictive models for over 30 water systems including systems in Connecticut and will help you drive down overall inventory costs. We regularly partner with the major predictive modeling experts in the U.S., including the EPA's Office of Research and Development and understand the challenges and trade-offs of various modeling strategies. We have used modeling to help several systems reduce unknowns by over 90%. **We are currently using models in Norwich, Meriden, and New London, CT to identify unknowns in the SL Inventory.**



STEP 2: Opportunities for Tracking and Updating Service Line Materials

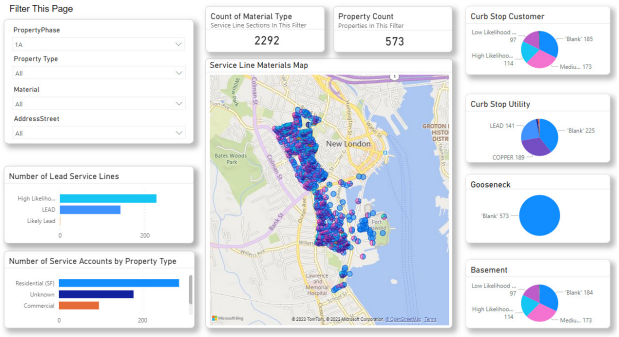
Arcadis will work with Town's staff to identify feasible methods to determine service line material for unknown services, which may include, but are not limited to those outlined in Table 1 on the previous page. Our team will also review or develop relevant procedures and workflows including methods for tracking and updating materials as part of any LSLR work.

For viable options, Arcadis will summarize the estimated costs, pros/cons and schedule impacts. If needed, Arcadis can assist with development and implementation of any of the proposed strategies, such as conducting in-home inspections and documentation of resulting using our ready to go field data collection template configured in ArcGIS Field Maps. Arcadis' previous and current experience working with similar projects in Connecticut provides the team with a clear understanding of the acceptable forms of verification of service line materials. Arcadis can work with the Town's staff to provide insight on the CT DPH's expectations around service line inventory verification forms.

STEP 3: Present Recommendations

As the next step, Arcadis will present the findings and recommendations from the earlier steps to the Town in a workshop. The recommendations developed as part of this task will take into consideration the existing inventory practices, the number of service lines that are unknown or likely lead as compared to the entirety of the system, staff resources, schedule, or other criteria identified during the kickoff meeting.

Currently for the Town, we anticipate a low number of lead service lines but a higher level of unknown SL materials. We will work with the Town on the best approach for moving forward to complete inventory.



The above PowerBI dashboard was created for the New London Lead Service Line Replacement Program

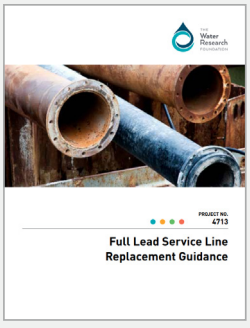
It is important to reduce the number of unknowns service line materials as quickly as possible as annual reporting to EACH address is required for any unknown service line materials. Our approach will work to succinctly reduce the number of unknown service lines as quickly and cost effectively as possible.

Task B. Lead Service Line Replacement Plan

Once the inventory has been solidified, we will develop a LSLR Plan that meets the requirements of the LCRR and CT DPH, the funding program(s) and the overall objectives of the Town. To do this, we will: (1) confirm existing practices around LSLs, including typical replacement costs, policies and procedures, (2) facilitate workshop(s) to discuss program goals, options, approaches, costs, (3) evaluate and select the appropriate option(s), and (4) develop the draft LSLR Plan. We will meet with your team and regulators to review comments on the plan and finalize potential solutions several key components of this phase are presented in the table below. Arcadis will work with staff to prepare the cost estimates that will be included in the CIP budget and potentially in SRF (and other funding program) requests.

TABLE 2: KEY COMPONENTS OF THE LSLR PROGRAM AND POTENTIAL SOLUTIONS

Category	Arcadis Solutions
Strategies for homeowner participation to achieve full LSLRs	• Develop a targeted education and outreach campaign • Develop mandatory ordinance requiring customers to replace their LSL • Use grant funding to cover a portion or all of the cost of the private-side replacement
Procedures to conduct full LSLRs	• Assist/oversee development and bidding a municipal contract and/or, • Assist/oversee issuing and reviewing received Request for Qualifications/Proposals for qualified plumbers and/or contractors to replace LSLs • Support development of the necessary authorization forms permitting the Town's staff or selected contractors to perform the work
Strategies for informing customers before a LSLR	• Develop and implement a multi-faceted communication approach that includes: a virtual, interactive web-based platform, written materials (such as post cards and/or door hangers), social media posts, block meetings, and door-to-door communication
Recommended LSLR goal rate in the event of a lead trigger level (TL) exceedance	• Develop a solid LSL inventory to minimize the number of service lines with unknown materials, as these would have to be counted in the overall replacement goals. • Identify the appropriate annual replacement goals given but not limited to various factors including available resources (i.e., human and financial), the overall time period for replacing all lead service lines, and other ongoing work in the system and communities
Procedure for customers to flush service lines and premise plumbing of particulate lead	• Utilize the flushing procedures and infographics developed by this team as part of the WRF Project #4713: Full Lead Service Line Replacement Guidance • Host training session(s) to review the appropriate flushing procedures and customer outreach materials
Procedure for pitcher filter distribution/ maintenance and tap sampling	• Hand delivery as part of the contractor pre-LSLR activities and/or establish select customer pick up centers; leverage mobile devices to allow real-time tracking • Monitor filter distribution and tap sampling results using PowerBI dashboards or existing cloud-based solutions
LSLR prioritization strategy	• Leveraging the results of the inventory in combination with other factors for prioritization such as low income / disadvantaged communities, homes with vulnerable populations, and alignment with other capital projects (replacement of aging watermains)
Funding strategy for public and private-portion LSL replacements, considering customers that are unable to pay for their portion	• Maximize State & Federal grants to help support private side replacements • Evaluate other sources like Community Development Block Grants, property tax assessments, or advertisement or cell tower space • Develop an application to prioritize funding for low-income families



Arcadis, as a subconsultant to Cornwell Engineering Group, assisted with the development of guidance for PWSs when planning and conducting full lead service line replacements (FLSLR) to reduce lead exposure. This study included three main components: (1) evaluating the effectiveness of whole-house high velocity flushing (HFV) to reduce particulate levels of lead and other metal at customer tap after LSLRs through field studies conducted at over 100 single family homes with LSLs and 10 single family homes with lead goosenecks, (2) documenting experiences from 16 PWSs who have previously embarked on LSLR, to identify trends and best practices in addition to successes, challenges, and lessons learned, and (3) developing a FLSLR Guidance Toolbox for water systems to use to plan and conduct FLSLRs, including communication with customers before, during, and after these efforts.

Task C. Development of Sampling Program

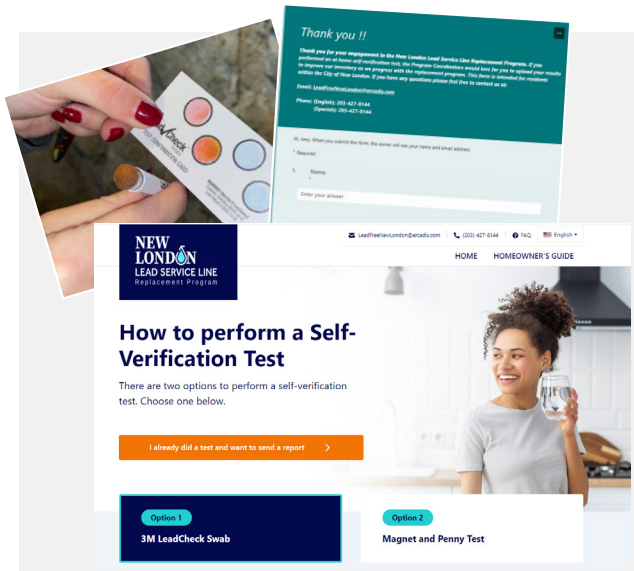
One of the continual challenges in assessing the effectiveness of lead and copper corrosion control efforts is where and how to sample. The LCRR established new sampling tiers (shifting from three tiers to five tiers) and modified the sampling protocol for LSL sites (i.e., LCRR Tier 1 and 2 sites), requiring a 1st liter sample for copper and a 5th liter sample for lead for those homes served by a LSL. Our team has assisted utilities in reviewing LCR sampling pools, sample collection procedures, chain-of-custody, sample collection forms, and regulatory reporting as well as developing monitoring programs for assessing CCT effectiveness and regulatory compliance.

Under this task, Arcadis will:

- Review the existing sampling pool, and if needed, recommend modified locations for compliance monitoring based on the final inventory to align with the new LCRR and provide a robust and representative set of sites
- Provide an updated sampling protocol for conducting 5th liter sampling sites served by an LSL and conduct training for key staff
- Review any existing water quality parameter sites, and if needed, recommend modified locations to support any likely find-and-fix assessments
- Update the existing LCRR sampling plan
- Provide regular updates to the sampling plan as LSLs are replaced

Arcadis can also help develop and implement a comprehensive approach to monitoring in schools and childcare facilities through the following activities:

- Define program goals, scope, schedule, budget, resources/responsible parties
- Provide clear, simple instructions for sample collection and remediation through infographics and templates for each school/building type to be sampled (note these are based on the USEPA Guidance Document: 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities, but are streamlined to improve understanding and reduce collection errors)
- Conduct a recorded, training session on sampling (e.g., locations, collection protocol to sample, reporting)
- Create integrated dashboards for tracking lead sample results and remedial activities



In Home Inspections/Swab Kits

Arcadis can provide best practices and recommendations for in-person inspection or swab kits.

Similar to residential customers, schools and childcare facilities are often reluctant or unable to participate in sampling. To increase participation, Arcadis recommends and can support the following activities:

- Identify key partners (e.g., department of education, childcare licensing agency, parent-teacher associations) for sampling and communication of results
- Conduct walkthroughs at select facilities to understand water use and identify targeted faucets
- Investigate funding sources including sources to support remediation
- Create a recognition program

Task D. Corrosion Control Treatment

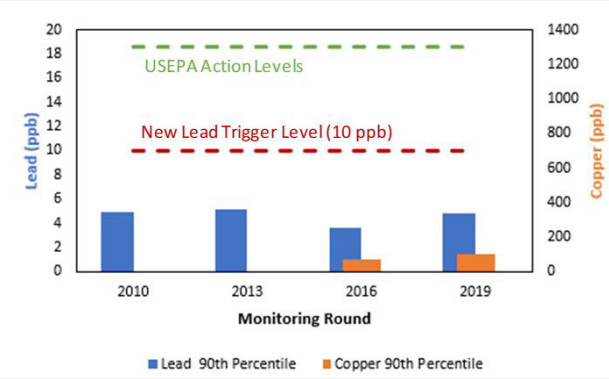
Corrosion control is complex and influenced by system specific factors including water quality and treatment, system materials, distribution system operations and maintenance practices as well as residential plumbing configurations and usage. As such, we would begin with a desktop study to assess CCT current performance and identify opportunities for improvement or additional study. Each major task is described further below.

Desktop Evaluation

The Arcadis team will begin with a review of available data and information to establish a documented common understanding of the system's history and current CCT practices and performance.

Changes in water quality and operations such as a change in pH or decrease in chlorine residual can directly impact corrosion related water quality parameters, existing scale structures and stability or cause physical disturbances or increased microbial growth which can lead to increased metals release. As such, we will conduct a comprehensive review of your treatment systems and historical water quality and operational data, provided as part of the initial RFI, including treatment plant processes, chemical usage, and raw and finished water quality data. In addition to your historical 90th percentiles for lead and copper, we will examine min., max, 25th, 50th and 75th percentile and site-specific trends to assess current CCT performance and potential compliance concerns with the lead action or trigger levels, if sufficient data are available.

Our team will analyze the data by examining trends in various percentiles including 10th, 25th, 50th, 75th, and 90th as well as minimum and maximum values both system- wide and by site. Seasonal and diurnal variations, particularly leaving the reservoirs, will also be examined. For lead and copper, we will also take a deeper dive into samples above the lead and copper action levels, and any sites where frequent elevated levels have been observed. Finally, where 5th liter data are available, we will evaluate impacts to the 90th percentile to determine if there is an increased potential for exceeding the action or new trigger level for lead, both of which could trigger a CCT evaluation.



In addition to your historical 90th percentiles for lead and copper (shown here), we will examine min., max, 25th, 50th and 75th percentile and site-specific trends to assess current CCT performance and potential compliance concerns with the lead action or trigger levels, if sufficient data are available.

Recommendations for Improvement

CCT is not a "one-size-fits-all", and as such, neither are the methods with which it can or should be studied. There are a number of tools that can be used to (re) evaluate CCT should it be determined that there is room for further optimization or for compliance with the LCRR or forthcoming LCRI requirements.

The next step in the process is to identify and describe in detail the appropriate methods to study, which will be documented as part of the CCT Study Plan and may include recommendations for enhanced monitoring (e.g., sequential sampling scale analysis, total and dissolved lead analysis, or additional water quality parameter monitoring, bench (e.g., coupon) testing, or pipe loop testing. The appropriate corrosion control studies will be refined based on the findings of materials review and through collaborative workshops with all parties. As such, we will follow a thorough, step-wise approach to evaluate alternative CCT strategies.

Task E. Public Education and Outreach Assistance

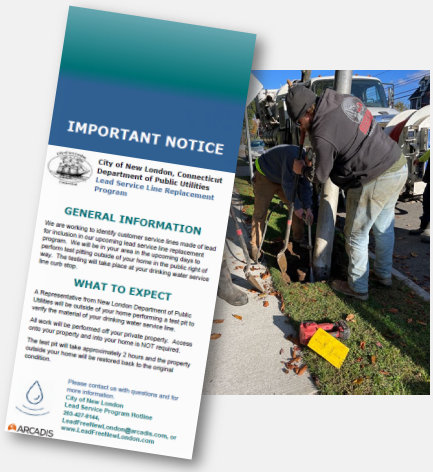
Our team will assist the Town with all communications associated with the LCRR compliance plan to encourage customer participation in the program as well as enhance education and outreach around lead in drinking water as a whole.

We will host workshop(s) to discuss the key building blocks of a robust communications program, including the specific regulatory compliance and policy goals to be supported by the communications program, target audiences, key messages, call-to-action, and methods for measuring success. Once these basic parameters have been established, we will review the existing website, printed information and any social media presence in detail and make recommendations for enhancement, leveraging available information developed by Arcadis as well as materials from the USEPA, AWWA, the Lead Service Line Collaborative, and best practices from other cities. Working closely with the Town, our team will develop an education and outreach plan that will:

- Document key messages and establish expectations to maintain consistency among key parties that may be interacting with the public
- Describe each communication tools/activities, frequency of and lead person responsible for distribution
- Identify partnering organizations, such as neighborhood associations or plumbers, and their roles in the program
- Identify and prioritize materials, processes and resources necessary to successfully address LCRR communication gaps

City of New London Lead Service Line Replacement Program - Public Outreach

Because property owners in New London own their water service lines from the curbstop into the house, there is a shared responsibility to manage lead exposure. Arcadis works with the community to replace lead service lines and answer the communities questions about water quality to help reduce lead exposure.



Our team will also work with Town staff to develop customized outreach content, procedures/workflows and/ or implement selected components of the plan, which could include:

- Systemwide (i.e., Tier 1 Public Notice) and individual notices where lead levels are measured above 15 ppb
- Letters to inform customers of their service line material
- Website instructing customers how to determine and report their service line material
- Postcard or door hanger to notify customers of the planned replacement work
- Educational videos and infographics that explain how to identify if you have a LSL, conduct high-velocity flushing, and properly use and maintain filters
- Facebook posts to educate customers about lead in drinking water and LSL

Task F. Funding Assistance

Our prior experience and familiarity with the unique requirements for state and federally funded projects has allowed Arcadis to develop an established approach to securing and ensuring compliance and funding eligibility. Arcadis has developed an excellent working relationship with the authorities having jurisdiction in Connecticut, and we have assisted many Connecticut public authorities, municipalities, and industries in complying with the range of regulations governing safe drinking water and water quality. We supported several communities throughout Connecticut in their grant applications to CT DPH for their LSLR programs, resulting in over $14,000,000 of loan forgiveness.

Under this task, Arcadis will continuously review and summarize available funding sources, including eligibility requirements, for various components of the program including school and childcare sampling, inventory development or private side LSLR. We can help complete the necessary applications for submittal as well as any customer applications, should funding need to be prioritized to select customers. Arcadis will also continue to track alternative funding sources and/ or ways to administer or structure the LCRR program to benefit both the Town and its customers.

Task G. Additional LCRR Support Services

Although we currently do not anticipate Ledyard needing LSL replacement services, our team is well-equipped to support any additional needs to achieve full compliance with the LCRR. Potential activities are those outlined below.

Design and Construction Support

Our team is experienced in Connecticut preparing design details, specifications and contract documents for LSLRs, pitcher filters and more. We also provide bidding assistance and construction management services, including, but not limited to:

- Attend pre-bid meetings
- Prepare and distribute addenda
- Review and analyze bid results and make recommendations on the award of contract
- Review contractor submittals
- Furnish construction inspection
- Schedule and attend progress meetings
- Report on contractor progress
- Review contractor invoices

Our LSLR programs, for example, are guided by the following key objectives (in parenthesis are the steps that Arcadis will take to achieve them):

- Minimize disturbance to private properties. (Use of alternative construction technologies (e.g., pull method) to reduce impact to private and public space where possible.)
- Restore construction impacts to private properties without issue. (Documented pre-construction survey program and use of standardized restoration details.)

- Streamlined payment of contractors. (Use of unit price payment items that cover 95% of all situations.)
- Uniform field implementation. (Creation of “play book”)

Key design activities could include:

- Initial property surveys to define the various property restoration needs and assess house setbacks and
- Surveys, where possible, of the house basements to understand if piping, meter, etc. is accessible and conditions affecting replacement.
- Develop schematic diagrams and standardized installation and restoration details (as opposed to plans and profiles) to define work scopes.

Additional Consulting Services

Our support services may include activities such as:

- Develop procedures and reporting templates for follow up find-n-fix efforts in the event that the lead level exceeds 15 ppb at a compliance sampling site
- Develop water quality monitoring dashboards to monitor and improve consistency with corrosion control/water quality targets
- Develop communication materials to encourage participation in school sampling program including sampling protocols, education materials and templates for rapid reporting to facilities, health departments and primary agency
- Develop and maintain web portal/dashboard for sampling and/ or replacement scheduling and reporting
- On-call support for any questions surrounding LCRR and compliance
- Develop or review the Town’s LCRR compliance plan
- Develop an information management framework to improve program operations and communications

Reviewing existing workflows, data management processes, and providing recommendations for improvement

“Best in Class” Specifications and Details

Arcadis has developed best in class specifications and details through performance of similar programs and review of materials used by some of the largest LSLR programs throughout the country. These design elements have a tremendous impact on the success of any LSLR program. Arcadis would recommend an upfront meeting to review the Town’s current specifications and details being used and discuss any lessons learned on past projects recently completed. Alternative strategies could be discussed and considered to address any concerns from past projects or the recent construction challenges with escalation and supply chain delays. Additionally, an annual review would be recommended as more experience with the expansion program is gained to maintain a best-in-class designation which will yield efficient and cost-effective program results.

Pitcher Filter Support

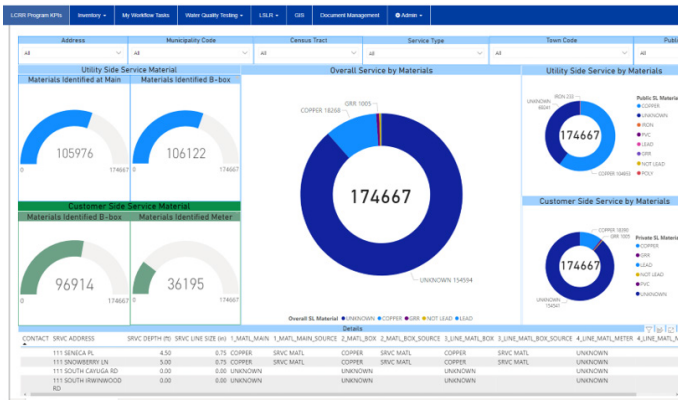
As part of the LCRR, systems are now required to provide pitcher filters or point of use devices to customers following disturbances and replacements of LSLs. Arcadis will work with the Town to develop a strategy for pitcher filter distribution that will allow tracking and monitoring of this important aspect of compliance.

This will include selection of an appropriate filter(s) that are NSF certified (or equivalent) for lead removal along with the appropriate number of replacement cartridges based on the manufacturers estimated filter life. We have experience providing such solutions, designed to ease the compliance burden and improve the customer experience.

Data Management, Dashboards and Reporting

LCRR compliance programs generate incredible amounts of data for tracking, analysis, reporting and notification. Arcadis offers several ready to go tools and applications (such as ArcadisGEN’s Data Quality Repair) to support data cleaning, visualization and reporting. Several critical tools include:

ArcGIS Field Maps. Field maps can be used to collect data in the field as part of the inventory, replacement and sampling efforts by the Arcadis team and selected contractors. Automated workflows can be setup to manage the review process of the collected data.



Client Dashboard

Data Management

Arcadis proposes to leverage digital solutions for LCR compliance to manage the Town’s LSLR program efficiently and effectively from start to finish. Our technology is a collaboration between water industry

experts who are managing lead service line projects every day and industry-leading software developers with decades of experience designing technology for the water sector.

Digital Tools for Compliance

- Unlimited users across this project, including the Town's staff, LSLR contractors, Arcadis staff, and subcontractors to support efficient collaboration.
- Custom workflows which allow users to assign activities to teammates and monitor the progress of those activities.
- Ability to collect data in the field with tablets and mobile devices, such as photos of the service line and site restoration work.
- Comprehensive data tracking capabilities where documents, communications tracking, and post LSLR sampling results are linked to each LSLR property.

Dashboards to Monitor Key Performance Indicators

We will also customize dashboard visualizations and reports within Lead Insights to support an at-a-glance understanding of key performance indicators such as:

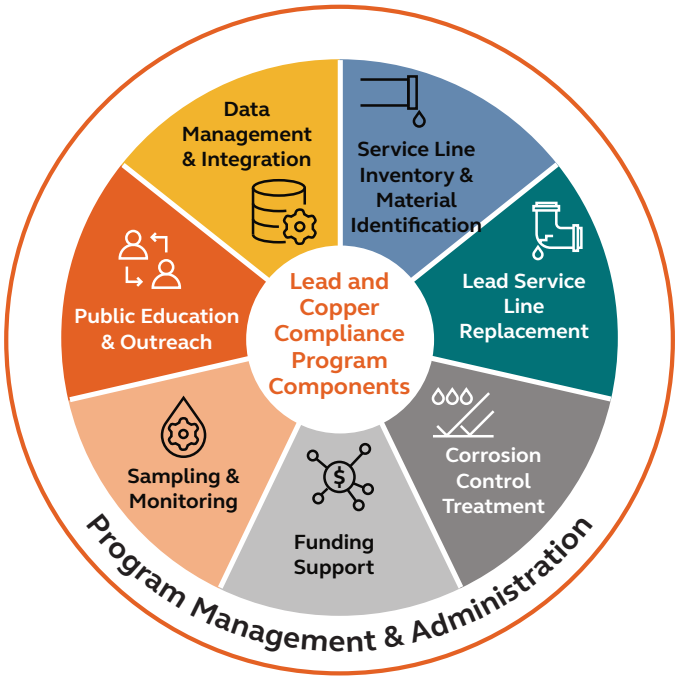
- Number of consent forms completed
- Number of LSLs replaced
- Post-replacement samples collected

Project Management

Project management is critical to compliance with the LCRR and the overall success of the Town's program. We will initiate the work with a kickoff meeting to introduce key team members, establish lines of communication, confirm objectives, and review the proposed scope and schedule. Arcadis will use the project kickoff workshop as a key time to establish clear expectations for the project, while also providing an open forum for Town staff to provide input on the project, such as individual staff member's goals, objectives, concerns, and questions.

Our project initiation /management phase provides the foundation for a collaborative approach to achieve buy-in to recommend lead service line inventory and replacement strategies and results in the most effective plan to achieve the Town's objectives. The project kickoff workshop will review the following items:

- **Communication protocols.** Arcadis will provide a monthly update format that will be used for the project duration. This will include work completed, work planned, budget/schedule status (% complete), and information needs. In addition, regular communication will occur throughout the month.
- **Task goals and objectives.** This project is inherently dynamic with multiple activities occurring in parallel. Fully understanding the Town's priorities will help the Arcadis team proceed efficiently and provide the most value to your staff. This discussion will identify opportunities to optimize and align our technical approach and schedule with your priorities.
- **Major areas of concern.** At the onset of the project, we want to understand what concerns you most, and find measures to mitigate the concerns and risks. For example, large numbers of service lines of unknown material may be a concern as these increase challenges with public communication and the required lead service line replacement counts if triggered into replacement. Delivering filters before the water is turned back on where a major disturbance has occurred requires field staff to have these on hand and be knowledgeable of the mitigation strategies and LCRR requirements. These and other concerns will be discussed in detail so we are on the same page from the beginning.



Appendix A.
Resumes

Jennifer Kelly Lachmayr, PE, BCEE

Program Director/Principal In Charge; Funding

Ms. Lachmayr serves as project principal for numerous municipal clients in Connecticut. She has a strong background in all phases of municipal engineering projects from planning and design through construction. She has over 38 years' experience in managing and conducting large, multi-phased water, wastewater, and stormwater projects in New England. Ms Lachmayr has assisted several communities in Connecticut on LCRR programs with receiving SRF funds and DPH loan forgiveness of more than $14 million dollars in the past four years.

Education/Qualifications

- BS, Mechanical Engineer, Cornell University, 1985

Years of Experience

Total – 38
With Arcadis – 21

Professional Registration/ Certifications

- Professional Engineer – CT, MA, ME, NH, RI
- Board Certified Environmental Engineer – US

Professional Associations

- American Water Works Assoc
- New England Water Environment Assoc, Vice President, WEF Delegate, Executive Committee
- Water Environment Federation, Member, Government Affairs Committee
- American Public Works Assoc
- New England Water Works Assoc, Sponsors Committee

Awards

- WEF Fellow
- Golden Manhole – WEF Collection Systems Committee
- Golden Shovel -Secret Society of Sludge

Office Location

Wakefield, MA

Relevant Experience

Lead Service Line Replacement Program
City of New London, CT

Program director / principal-in-charge for full lead service line (LSL) replacement program. Work includes LSL inventory development levering machine learning, design and bidding services, public outreach and communication, program development, and stakeholder communication and funding assistance.

Lead and Copper Rule Compliance Program
Norwich Public Utilities, Norwich, CT

Technical advisor for a comprehensive lead and copper rule revisions compliance program covering inventory development, basement inspections, predictive modeling, sampling updates, development updates, development of detailed design documents for lead service line replacement, and development of a test pit program.

Lead and Copper Rule Compliance
City of Meriden, CT

Serves as the project director providing lead and copper rule compliance, including inventory development, development of a lead service line replacement plan, corrosion control, and development and execution of a public outreach and education program. Work includes development of strategies to reduce the number of unknowns ahead of the LCRI compliance date.

Lead and Copper Rule Compliance
Groton Utilities, Groton, CT

Serves as the project director and technical resource for as-needed assistance with lead and copper rule compliance. Work includes development of public outreach materials, interpretation of LCRR/LCRI and ongoing compliance support.

PWS LSLI & LSLRP Assistance
New Hampshire Dept of Environmental Services, NH

Project director for the state of New Hampshire to assist 220 public water suppliers in developing lead service line inventory, replacement, and sampling plans. Project involves coordination with and assisting the 220 PWSs with their lead service line inventory preparation. This includes program sign-up for the PWSs, a detailed inventory survey and data gathering from each PWS, assisting each PWS to draft their lead service line inventories, advising the PWS on strategies to reduce unknowns and developing a verification plan, assistance with updating each PWSs sampling plan to align with new requirements, and the final lead service line inventory to be submitted to NHDES.

Lake Konomoc Influent Pump Station (IPS)
City of New London, CT

Arcadis provided services from preliminary design through construction oversight for 2,100 feet of new 36-inch HDPE intake pipe and a new pump station. The pump station has two 12-mgd split-case centrifugal pumps, a vacuum prime system, variable frequency drives, and associated valves and piping. The pump station is designed to operate under flow conditions equal to those of the water treatment plant, which was designed for an average flow rate of 9 mgd and a peak flow of 12 mgd. She served as the project principal for this assignment.

Watershed Management Plan
City of New London, CT

Project director to develop a Watershed Management Plan —an important step toward mapping out the city's environmental resources, identifying sources of water pollution, and addressing TMDLs and water quality impairments through prioritized improvements. The City recognizes the urgent need to evaluate hydrology, soils, flora, and fauna as they currently exist as a more reliable and research-based tool for developing a Natural Resource and Watershed Plan. Arcadis guided the process, engaged stakeholders and the general public in the planning, and developed a plan with recommendations on how the City can move forward to protect and manage its natural resources most effectively.

Fishtown Road Pump Station Rehabilitation
Town of Groton, CT

Project director for replacement of existing three pump dry-pit configuration with two submersible pumps utilizing the existing wet well. Services included hydraulic analysis of existing force main, pump selection, production of contract drawings and specifications, preparing project for public bid, services during bidding engineering services during construction.

Utility Replacement Design through Construction Administration and Resident Engineering
Town of Saugus, MA

Project director for the utility replacement project, which involves the replacement and/or upsizing of water, sanitary sewer, and drain in five different locations throughout the Town of Saugus. Infrastructure required replacement due to either being undersized or at the end of its useful life. Approximately 2,000 linear feet of buried infrastructure will be replaced. Due to most of the utilities being in the roadway, traffic design and pavement design were also completed. As part of the project, Arcadis also added streetscape features by designing new sidewalk complete with granite curbing and ADA compliant curb ramps.

Baxter Roadway Utility Relocation
Town of Nantucket, MA

Project director. The relocation of Baxter Road involves relocating utilities and roadway away from the 2030 and 2050 erosion hazard areas. Work also involves abandoning the existing utilities. The ongoing scope of work will provide for 'shovel ready' Bid Contract Documents for relocated of a portion of Baxter Road.

SCADA System Upgrade, Phases 1 & 2
City of Fitchburg, MA

Phase 1: Project director for evaluation of existing SCADA and telemetry equipment at the City's two water treatment facilities and remote sites. The controls and communication equipment at the plants and remote sites were inventoried. Alternatives evaluations were performed for SCADA software, the plant PLCs and the remote site PLCs. Webinars were held with SCADA software vendors to demonstrate features and functions to City personnel. A final draft version of the Phase 1 Feasibility study was submitted, and the details along with the engineer's opinion of probable cost were presented to the Water & Wastewater Commission.

Phase 2: Project director for design of new SCADA and telemetry equipment at the City's two water filtration facilities and remote sites. The design includes physical and network security, staging replacement of main control panels, and creating new standards across all the sites.

Amy Anderson George, CPM

Project Manager; Funding

Ms. Anderson George is a project manager for various projects in the New England area. She has vast knowledge and experience with planning stage projects analyzing flow data and SSES findings and developing recommendations for long-term infiltration and inflow (I/I) identification and removal programs. Ms. Anderson George provided program management for the City of New London's lead service line replacement program. She provided project management services for the City of East Providence contract operations negotiations between the City and the private contract operations firm. She is a proven project manager who is adept at meeting project deadlines and building consensus among many different stakeholders. She manages large teams of staff and subcontractors to deliver and present high quality results to our clients.

Education/Qualifications

- BS, Environmental Engineering, Roger Williams University, 2005

Years of Experience

Total – 20
With Arcadis – 20

Professional Registration/ Certifications

- Certified Project Manager (CPM)

Professional Associations

- Water Environment Federation
- New England Water Environment Association, Member
- Rhode Island Clean Water Association

Office Location

East Greenwich, RI

Relevant Experience

Lead and Copper Rule Compliance
City of Meriden, CT

Serves as the project manager providing lead and copper rule compliance, including inventory development, development of a lead service line replacement plan, corrosion control, and development and execution of a public outreach and education program. Work includes development of strategies to reduce the number of unknowns ahead of the LCRI compliance date.

Lead and Copper Rule Compliance
Groton Utilities, Groton, CT

Serves as the project manager and technical resource for as needed assistance with lead and copper rule compliance. Work includes development of public outreach materials, interpretation of LCRR/LCRI and ongoing compliance support.

Lead Service Line Replacement Program
City of New London, CT

Serves as the program manager for the design and construction of New London's Lead Service Line Replacement Program, assuring the Water and Wastewater Pollution Control Authority and other stakeholders are informed on all aspects of the program throughout the duration of both the design and construction phases. Responsibilities include coordination between the various aspects of the project for continued, smooth progression and that milestones are met on schedule. Responsibilities include holding all program progress meetings, all public outreach, development of construction documents, coordination of all construction related activities, compliance with the Lead and Cooper Rule Revisions, site visits, schedule, costs and funding.

Beaver Street Interceptor Replacement and New Pump Station

Town of Franklin Department of Public Work (DPW), Franklin, MA

Project manager for a sewer interceptor replacement project with new force main and pump station. Work includes rehabilitation of 7,000 LF of existing pipes, replacement/upsizing, and realignment of approximately 7,000 linear feet of gravity sewer, installation of new sewer under existing railroad tracks by jack and bore pipe installation at 3 locations, abandonment of existing pipes and manholes in place, and construction of a new wastewater pump station and associated 4,000 linear foot force main. Work includes extensive temporary bypass operations, environmental permitting, coordination with the DPW, residents, and businesses, acquisition of new temporary construction and permanent sewer easements, and relocation/replacement of several adjacent utilities, including 1,000 linear feet of water main.

East Central Street Force Main Replacement

Town of Franklin, MA

Served as the project engineer and resident engineer for the inspection, design, bidding and construction phase services for the design for the horizontal directional drill (HDD) a new 1,400 LF, 8-inch HDPE force main, 25-feet below all existing utilities, minimizing costs, construction schedule and impacts to numerous commercial businesses and the new State Highway. Construction took place Spring 2016 with a completion time of less than 2 months. Project included coordination with all utilities and stakeholders to minimize disturbance to all homeowners and businesses. Major work items included: drilling and installing 1,400 LF of 8-inch HDPE, installation of a new discharge manhole and connection to the existing sanitary sewer system, a new bypass vault chamber at the pump station.

Citywide Infiltration and Inflow Program

City of Portland, ME

Serves as the project engineer on the City-Wide Infiltration and Inflow Program for the City of Portland. Responsibilities include analyzing and preparing the GIS Data Gap Analysis, management of the flow monitoring program and SSES activities, and rehabilitation recommendations and coordination with the City on all project deliverables. Work included a series of project workshops to ensure all client goals and needs were met on time in accordance with the City's consent decree deadlines.

Townwide Infiltration and Inflow Program

Darien, CT

Facilitated workshop with Town to gather historical information on the system for I/I study planning and GIS updates. Implemented a flow monitoring program, including study area prioritization; selection, field verification, and installation of flow meters and groundwater and rainfall gauges; and data collection and maintenance of flow monitoring equipment. Utilized flow monitoring results to perform an infiltration and inflow analysis and identified follow-on priority SSES investigations. Performed visual condition assessment at all 14 of the Town's pump stations and conducted operation and maintenance interviews.

MDC SSO Elimination Program - SSES

The Metropolitan District, Hartford, CT

Engineer for the MDC's Sanitary Sewer Overflow Elimination Program for the communities of Rocky Hill, Wethersfield and Windsor, CT. This project includes a Sewer System Evaluation Survey, consisting of flow isolation of 550,000 LF of sewers, 280,000 LF of closed-circuit television inspection, 3,200 manhole inspections, 640,000 LF of smoke testing, dye water testing and flooding and 10,000 building inspections. The goal of the project is to eliminate SSO's in accordance with the EPA and CT DEP Consent Decree by eliminating sources of I/I.

Chelsea Creek Remote Headworks Facility Upgrades

Massachusetts Water Resources Authority, Chelsea, MA

Project engineer for the design and construction administration services improvements to the Chelsea Creek Headworks, 160-mgd average flow and 182- to 350-mgd maximum flow. The upgrade will include replacement and automation of all solids handling equipment including screens, grit collector systems and solids conveyance systems; odor control and HVAC systems will be replaced and redundancy added ancillary systems, including emergency generators and fuel oil tanks, will be replaced; and instrumentation and control systems will be upgraded.

Sydney Lewis

Project Engineer

Ms. Lewis is a passionate civil engineer within the New England Resilience Water Business Area, looking to improve water quality through engineering. Her professional experience includes over 3 years working on wastewater and water resources design, engineering, and construction responsibilities.

Education/Qualifications

- BS, Civil Engineering with Environmental Engineering, University of Hartford, 2022

Years of Experience

Total – 3
With Arcadis – <1

Professional Registration/ Certifications

- Engineer in Training – CT #EIT.0013288
- 10-Hour OSHA Construction Safety & Health Training
- 30-Hour OSHA Construction Safety & Health Training

Professional Associations

- New England Water Environment Association (NEWEA)
- American Water Works Association Connecticut Section (CTAWWA)
- Society of Women Engineers (SWE)

Office Location

Middletown, CT

Relevant Experience

Lead Service Line Replacement Phase 1A
New London, CT

Assisted as a project engineer, responsible for leading bid phase administration, construction administration, and assisting with field work for the mandated lead service line replacement efforts to comply with the EPA's LCRI. Construction administration includes managing customer outreach for inspections, replacements and tap sampling, as well as issuing balancing change orders, submitting monthly payment applications to the state for inventory and replacement program support. Field work includes inventory development by observing test pits and service line verification through basement inspections. Additionally, the role includes researching and developing a school and childcare program and a master meter inventory by working with the City's utility company and customers directly.

Lead Service Line Replacement Phase 1B
New London, CT

Assisted as a project engineer, responsible for leading bid phase administration, construction administration, and assisting with field work for the mandated lead service line replacement efforts to comply with the EPA's LCRI. Bid phase administration includes developing conformed bid documents, performing contractor evaluations, and leading contract issuance to the lowest bidder. Construction administration includes managing customer outreach for inspections, replacements and tap sampling, issuing balancing change orders and submitting monthly payment applications to the state for inventory and replacement program support. Field work includes inventory development by observing test pits and service line verification through basement inspections.

Lead Service Line Replacement Phase 2
New London, CT

Assisted as a project engineer responsible for leading bid phase administration to comply with the EPA's LCRI. Bid phase administration includes developing conformed bid documents, performing contractor evaluations, and leading contract issuance to the lowest bidder. Other responsibilities include working with subcontractors to review and research flood management certificates and National Diversity Data Base determination.

East Hartford Water Pollution Control Facility Aeration, DO Control and SCADA Upgrades – Phase 3B

The Metropolitan District, Hartford, CT

Assisted in construction administration as well as client and contractor correspondence for the Metropolitan District's East Hartford WPCF improvements project. Responsibilities include submittals and RFIs coordination and review, memorandum drafting, punchlist development, as-builts review, eOM drafting, and other closeout documentation and coordination with the client.

Richards Corner Dam Diversion Conduit Outlet Channel and Embankment Repairs

The Metropolitan District, Hartford, CT

Assisted in construction administration as well as client and contractor correspondence for the Metropolitan District's dam stabilization and rehabilitation project. Responsibilities include submittals and RFI's coordination and review, and punchlist development and coordination with the client.

South Hartford Conveyance and Storage Tunnel Pump Station

The Metropolitan District, Hartford, CT

Assisted in construction administration and management as well as client and contractor correspondence for the Metropolitan District's tunnel pump station project. Major items for work include a new control building, grit/screening facility, odor control facility, head tank, valve vault, and 54-inch force main to the Hartford Water Pollution Control Facility. Responsibilities include submittals and RFI's review and distribution as well as witnessing field testing, memorandum drafting, and weekly and monthly report drafting.

Annual Sanitary Sewer Cleaning & CCTV Inspection Program

Department of Public Works, Darien, CT

Assisted in construction oversight for the annual sanitary sewer cleaning and close-circuit television inspections. Responsibilities include field coordination and part-time oversight of CCTV contractor

Erica Walker

Lead and Copper Subject Matter Expert

Ms. Walker brings over 12 years of experience in the areas of regulatory compliance, funding management, water quality analytics, training, asset inventories, service line replacement planning, data management, and technical management of programs. She helps water utilities and state agencies respond to federal and state regulatory changes and specializes in locating and remediating sources of lead in distribution and premise plumbing systems. At Arcadis, Ms. Walker leads Arcadis' Lead & Copper Rule compliance practice with over 60 team members across the United States.

Education/Qualifications

- MSES, Water Resources, Indiana University 2015
- MPA, Policy Analysis, Indiana University 2015

Years of Experience

Total – 12
With Arcadis – 2

Professional Registration/ Certifications

- American Water Works Association (AWWA)
- Council of Infrastructure Financing Authorities (CIFA)

Office Location

Indianapolis, IN

Relevant Experience

LCR Data Management
Erie County Water Authority, NY
Task leadership and advisor for the development and implementation of a compliance program for the LCRR with a focus on data management and tap sampling. Program covers all aspects of the LCRR including the lead service line inventory, predictive modeling, lead service line replacement, school and childcare sampling, tap and water quality parameter monitoring, and public education and outreach.

Inventory Database & Predictive Modeling
NYC Department of Environment, New York, NY
Quality control and quality assurance manager on a project to develop a new service line inventory database with a customer-facing portal, support in scanning and utilizing over 2 million tap cards, as well as the development and utilization of a predictive model to reduce unknown service lines.

Service Line Inventory & Compliance Planning
City of Fort Lauderdale, FL
Technical advisor on an LCRR compliance program including the development of a service line inventory, field inspections, predictive modeling, public outreach materials, and strategic planning. The project resulted in reducing unknowns by over 90% in the first year.

Predictive Modeling & Field Service Line Inspections
Central Alabama Water, AL
Program advisor for multi-phase compliance project for a system with over 178,000 customer accounts. The project includes over 1,000 service line inspections, the use of predictive modeling, state revolving fund applications, database management tool development, LSLR plan development, and public outreach and education support.

LCRR Program Management
San Antonio Water System, San Antonio, TX

Technical advisor providing guidance and QA/QC of a compliance program for the LCRR with a special focus on Lead Service Line Inventories, School & Childcare Sampling, and Data Management. SAWS serves 2 million people or over half a million water customers (over 600,000 service connections). Program involves developing their service line inventory, data management dashboards and reporting system, predictive modeling outreach and education plan, school/day care sampling plan, compliance sampling plan, and LSLR Plan which will also include funding opportunities to fund replacements.

LCRR Program Management & Workforce Development
Philadelphia Water Department, Philadelphia, PA

Technical advisor providing guidance on a compliance program for LCRR, with a special focus on public communications and school/Childcare sampling. The program expands upon PWD's existing Lead Service Line Replacement effort to cover all areas of LCRR and involves management of and collaboration with numerous subconsultants. Arcadis collaboratively built a school and childcare sampling program with PWD and trained existing staff to conduct sampling and support registered facilities.

LCRR Program Management
Fairfax Water Authority, Fairfax, VA

Technical advisor providing LCRR compliance guidance for Fairfax Water Authority, serving 1.5 million customers in the D.C. area. Program covers lead service line inventory, lead service line replacement planning, school, and childcare sampling, tap and water quality parameter monitoring, and public education and outreach. The project team is currently working with state regulators to apply various modeling strategies across this very large distribution system to reduce unknowns in areas with and without a histories and evidence of lead service lines.

State-Wide LCR Compliance Support
Ohio Environmental Protection Agency, OH

Technical advisor on a state-wide technical assistance program offering support to over 150 water systems serving less than 10,000 customers. Arcadis assists water systems in the program in developing inventories, building LSLR plans, communicating with customers, and reducing unknowns through thousands of field inspections and the use of predictive modeling.

Prior Experience

Lead & Copper Rule Compliance Assessment
Suez North America, Paramus, NJ

Conducted a holistic review regulatory compliance needs for over 90 water systems owned and operated by Suez North America with respect to Lead Service Line Inventories, Lead Service Line Replacement planning, Tier Site Sampling, School & Childcare Sampling, Customer Notifications and Corrosion Control Treatment approaches. This project provided the company with an understanding of resource needs across the country.

WIIN Grant Management & Lead Service Line Funding Programs
Indiana Finance Authority, Indiana, IN

Program manager for IFA's Lead Sampling in School and Childcare program, which sampled over 1,500 facilities and was funded by an EPA WIIN Grant. Erica also developed programs to assist over 1,300 water systems across Indiana with access to funds and technical assistance for Lead Service Line inventory and replacement projects.

State Water Infrastructure Improvement Program
Indiana Finance Authority, Indianapolis, IN

Managed over 70 projects totaling $150 Million in infrastructure improvements across the state of Indiana to improve drinking, wastewater and stormwater quality for water utilities and communities

Hannah Rockwell, PE, CDT

Lead and Copper Subject Matter Expert

Ms. Rockwell is a senior water engineer for Arcadis in the Rochester, NY office with more than ten years of experience. She serves on Arcadis' National Lead and Copper team, collaborating on LCRR / LCRI compliance with communities around the country. She has experience with a wide range of drinking water quality, and her current work includes LSLI inventory and replacement plans, predictive modeling, LSL replacements and the development of comprehensive LCR public education and outreach programming. Additionally, Ms. Rockwell has been responsible for securing and oversight of over $40 million in state grants and more than $290 million in hardship, subsidized, and market rate SRF loans for critical infrastructure projects.

Education/Qualifications

- BS, Environmental Engineering, The University of Michigan, 2015

Years of Experience

Total – 10
With Arcadis – 10

Professional Registration/ Certifications

- Professional Engineer – NY
- Certified Construction Documents Technologist (CDT)

Professional Associations

- American Water Works Association
  - Lead in Water Subcommittee Member and Contributor to Schools and Childcare Sampling Guidance

Office Location

Rochester, NY

Relevant Experience

LCRR Program Management
Erie County Water Authority, Buffalo, NY

Program manager overseeing the development and implementation of a compliance program for the LCRR. Program includes lead service line inventory improvements, predictive modeling, test pits for service line inspections, lead service line replacement planning, design and funding support, data management strategy and implementation, school and childcare monitoring program development, tap and water quality parameter monitoring, and public education and outreach.

LCRR and LSLR Support
Hammond Water Works, Hammond, IN

Project manager and lead engineer for development and execution of an LCRR compliance program and a pilot lead service line replacement program for the City of Hammond Indiana. Work includes inventory development and investigations, LSLR construction documents, funding application and management support, and stakeholder coordination along with support for other components of the LCRR.

Service Line Material Inventory
Monroe County Water Authority, Rochester, NY

Project manager and lead engineer for development of a comprehensive service line inventory for LCRR compliance. Work includes development of initial inventory, determination of lead status and unknown service lines, created customer-interactive inventory, LSL replacement program, LSL inventory improvements in Oracle database, predictive modeling, design and bidding services for potholing, public outreach and notification for inspections, and public facing inventory.

SRF Funded Lead Service Line Replacements – City of Rochester, NY

City of Rochester Water Bureau, NY

Program manager and engineer of record for the design and construction of more than 2,000 lead service line replacements for the City of Rochester including implementation of all state revolving fund requirements. Work includes management of onsite resident project representative and ongoing construction administration and data management for regulatory and funding compliance through a mobile application.

LCRR Support – Communications and Outreach Materials

City of Appleton, WI

Leading development of public outreach strategy, messaging, branding and materials for the City's new mandatory lead service line replacement program including a program pamphlet, post cards notifying the customer of the service line material, letter to customers with lead service lines and more.

Lead and Copper Rule Revisions Support

Mishawaka, IN

Providing engineering support for compliance with the LCRR. Work includes a review of existing practices and identification of areas for improvement for compliance, largely focusing around the lead service line inventory in GIS and methods for identifying the service line material.

Lead Service Line Replacement (Communications and Outreach)

New London, CT

The project includes the development of a LSLR plan, construction documents for lead service line replacement, field inspection of service line materials, and the creation of outreach and communications materials to meet the requirements of the Lead and Copper Rule Revisions. Responsibilities include creation of targeted communications and outreach materials on the topics of LSLR program information and best practices following lead service line replacement.

Optimal CCT Study

Erie County Water Authority (ECWA), Buffalo, NY

Provided project engineering support for an evaluation of existing ECWA corrosion control practices and to provide an updated corrosion control desktop study to address current water quality. Work used several databases, including geospatial and historic sampling data using ArcGIS Pro, Power Business Intelligence and Rothberg, Tamburini and Winsor modelling.

Guidance for Using Pipe Loops to Inform Lead and Copper CCT Decisions (WRF #5081)

Water Research Foundation, Denver, CO

Project engineer assisting with the development of a "fit-for-purpose" guidance document for using pipe loops to inform lead and copper CCT decisions. Responsible for the review of historical pipe loop studies and documenting the most common operational parameters for pipe loop operations that will be summarized in the guidance document used to develop practical standard operating procedures for utilities.

Genesee County Expansion – Water Quality and LCRR Compliance Evaluation

Genesee County, NY

Project includes an initial risk and compliance assessment of operations and practices related to corrosion control treatment, lead service line inventory, and lead service line replacement strategies relative to the LCRR and a potential source water change. Following an intensive information review and desktop analyses, a series of workshops will be conducted to identify areas for improvement to comply with the LCRR. Project deliverables include a roadmap and budgetary estimates for recommended next steps to support capital planning and funding decisions related to LCRR compliance.

Initial LCRR Compliance and Risk Assessment

Town of Tonawanda Water Department, NY

Project includes an initial risk and compliance assessment of the Town's operations and practices related to corrosion control treatment, lead service line inventory, and lead service line replacement strategies relative to the LCRR. Following an intensive information review and desktop analyses, a series of workshops were conducted to identify areas for improvement to comply with the LCRR. Project deliverables included a roadmap and budgetary estimates for recommended next steps to support capital planning and funding decisions.

LCR Sampling and Compliance Support

City of Geneva, NY

Manage City's LCR tap sampling program to achieve and maintain compliance following an order on consent. Develop improved customer communications to build and maintain a sampling pool, perform exploratory 5th L testing, and develop / update service line inventory.

Karen Casteloes, PE, CDT

LCR Compliance

Ms. Casteloes is a water quality engineer with Arcadis and brings experience with high-profile drinking water projects, including drinking water treatment selection and optimization and regulatory compliance. She supports systems in developing lead service line inventories, service line materials identification, lead sampling programs, and demonstration studies. Ms. Casteloes is proficient in data management and analysis for water contaminants, such as lead.

Education/Qualifications

- MS, Civil & Environmental Engineering, Purdue University, 2016
- BS, Environmental Engineering, San Diego State University, 2014

Years of Experience

Total – 9
With Arcadis – 9

Professional Registration/ Certifications

- Professional Engineer – IN
- Construction Documents Technologist (CDT)

Professional Associations

- American Water Works Association (AWWA)

Office Location

Indianapolis, IN

Relevant Experience

Lead Service Line Replacement Program
City of New London, CT

Project engineer for full LSL replacement program. As part of this program, developed a complete service line materials inventory leveraging machine learning. Additionally, drafted a lead service line replacement plan, reviewed, and assisted in public outreach and communication, program development, and stakeholder communication.

Full Lead Service Line Replacement Guidance (#4713)
Water Research Foundation, Denver, CO

Currently assisting with a research project to evaluate strategies to reduce lead exposure after conducting full lead service line replacements. The study will determine how LSLR effectiveness, both short- and long-term, is impacted by several different characteristics, including size and source water type, corrosion control treatment method, LCR compliance history, demographics, and geographic location.

LCRR Program Management
Philadelphia Water Department (PWD), Philadelphia, PA

Task lead for the pitcher filters and schools and childcare facilities monitoring tasks. Program includes lead service line inventory improvements, and testing of emerging technologies, lead service line replacement planning, data management strategy and implementation, workflow development, school and childcare monitoring program development and pilot, corrosion control treatment scenario planning, tap and water quality parameter monitoring, pitcher filter evaluation, and public education and outreach plan and materials.

Service Line Inventory and LSL Replacement Project
Aqua America, Inc., IL, OH, NJ, PA

Reviewed 53 systems with suspected LSLs to improve their existing service line material inventories by identifying and locating LSLs and to bring consistency across the company. Developed work plans to improve the existing inventories that considered system size, available data regulatory requirements, and system practices. As a project engineer, she created a data dictionary,

performed a gap analysis, facilitated state regulator discussions, and presented service line material identification alternatives.

Small Public Water System (PWS) Lead Service Line Inventory and Replacement Assistance
New Hampshire Department of Environmental Services (NHDES), NH (Statewide)

Assisted and coordinated 220 New Hampshire public water systems (PWSs) to develop a LSL inventory, LSL replacement plan, and update their LCR tap sampling plan. As technical expert, assisted the PWSs in drafting their lead service line inventories, advising the PWS on strategies to reduce unknowns and developing a verification plan, assisted with updating each PWSs sampling plan to align with new requirements, and submitting the final lead service line inventory to NHDES. Created workflows, action plans, and a project management dashboard to track progress through the program.

Lead Program Management and Support
Chicago Department of Water Management (CDWM), Chicago, IL

Implemented a large, city-wide lead testing program with Chicago DWM. Performed data analysis on lab results and applied Geographic Information System (GIS) to improve process efficiency. Assisted the GIS team to create or improve mobile applications for both Water Quality and other groups within Department of Watershed Management. Worked to improve workflows and processes within the Water Quality department. Interfaced on a daily basis with client stakeholders for planning, goal setting, expectation management, and problem resolution. Developed Water Quality and other reports as well as organized and maintained historical information.

Lead and Copper Rule Revisions Impacts Evaluation
Pasco County, FL

Assisted the County in understanding changes in the LCR requirements and how they may impact the county will help with aligning system and practices with the LCRR. As project engineer, developed a service line inventory through a thorough review of existing data and practices as well as identified areas for improvement. Evaluated the current sampling plan, “find-and-fix” protocol, and developed a Tier 1 notification procedure and notice.

Lead and Copper Rule Revisions Program Support
Louisville Water Company, Louisville, KY

Given the complexity of the LCRR, the wide range of required activities, the number of stakeholders involved, and the sheer volume of information to be collected, managed, and analyzed, developing an action plan is a daunting task. As project engineer, providing on-call support to the LCRR team through monthly meetings with focused on utility questions and topics of interest, review of draft content and methodologies developed by the utility, relevant resources, and direct support for development and implementation of program elements.

LCRR Program Management
Monroe County Water Authority (MCWA), Rochester, NY

As a task leader, developed the lead service line replacement plan as well as reviewed service line inventory and predictive modeling results. Includes lead service line inventory improvements, lead service line replacement planning, data management strategy and implementation, workflow development, and public education/outreach plan and materials.

LCRR Program Management
Erie County Water Authority (ECWA), Buffalo, NY

Task lead focused on the sampling and monitoring and lead service line replacement tasks. Program includes lead service line inventory improvements, predictive modeling, test pits for service line inspections, lead service line replacement planning, design and funding support, data management strategy and implementation, school and childcare monitoring program development, tap and water quality parameter monitoring, and public education and outreach.

Ordinance Review and Updates
City of New London, CT

As project engineer, reviewed the current content and structure of the existing water ordinance and made recommendations for updates in accordance with best practices. As part of this work, identified which content should remain in the Ordinances, and which should be referenced in the Ordinance but moved to a regulations document(s). Included a review and addition of lead service line replacement requirements and regulations.

Ashis Kumar Pal, IAM

Reporting and Dashboard

Mr. Ashis Pal is a management consultant with expertise in data visualization, asset management, and geospatial analysis. At Arcadis, he has successfully contributed to various projects by combining his technical knowledge in Power BI, ArcGIS, and SQL with an understanding of environmental engineering principles. His work includes developing dashboards, optimizing inventory processes, conducting field inspections, and creating GIS-based maps that directly influenced project outcomes and decision-making. With a background in industrial and civil & environmental engineering, he focuses on delivering innovative and efficient solutions for complex challenges in water resources, stormwater management, and infrastructure systems.

Education/Qualifications

- MS, Civil and Environmental Engineering, Northeastern University 2024
- BS Industrial and Production Engineering, Bangladesh University of Engineering and Technology, 2017

Years of Experience

Total – 8
With Arcadis – 1

Professional Registration/ Certifications

- IAM Certificate – Institute of Asset Management

Office Location

Wakefield, MA

Relevant Experience

Lead Service Line Replacement Program
City of New London Department of Public Utilities, CT

Performed basement inspections to identify service line materials, contributing to the creation of accurate lead service line inventories. Also developed Power BI dashboards to track project progress, ensuring effective visualization of key metrics for better decision-making. These efforts supported compliance with regulatory requirements and informed strategies for the successful implementation of lead service line replacements.

Lead Service Line Inventory and Replacement Program
New Hampshire Department of Environmental Services (NHDES)

Served as a technical advisor, providing critical guidance on project workflows and compliance strategies. Developed a Power BI dashboard accessed and updated daily by clients, offering real-time insights into project metrics and enhancing decision-making processes. The contributions also included maintaining datasets to confirm accuracy and reliability, as well as supporting project management activities to streamline operations and achieve program goals effectively.

Municipal Separate Storm Sewer System (MS4) Management Program
City of Fitchburg and Town of Saugus, MA

Performed comprehensive fieldwork activities, including dry and wet weather inspections, to identify and address potential environmental compliance issues within the MS4. Contributed to the Stormwater Pollution Prevention Plan inspections, maintaining compliance with environmental regulations. The work also included supporting illicit discharge detection through outfall screenings and inspections, contributing to improved water quality management strategies.

Inventory Management Program

City of Virginia Beach Department of Public Works, VA

Supported the optimization of supply room and inventory management processes by aligning workflows with Lean principles. Contributed to documenting and improving inventory management practices, identifying gaps in existing systems, and recommending performance metrics to enhance accountability. Also identified non-moving and slow-moving items, providing recommendations for unstocking underutilized inventory. Additionally, developed a strengths and weaknesses matrix and proposed areas for improvement by leveraging data from Cartegraph, driving more efficient inventory management and operational effectiveness.

Electronic Operations and Maintenance (eOM) Support Project

Metropolitan District, Hartford, CT

Contributed to the development of an electronic library for storing critical documents such as vehicle repair manuals, maintenance guides, and inspection forms. Played a key role in designing prototype configurations for the eOM system, enhancing its usability and efficiency.

Sewer Line Rapid Assessment Tool (SL-RAT) Power BI Technical Support

New Castle County, DE

Supporting the Sewer Line Rapid Assessment Tool (SL-RAT) tracking system through advanced Power BI solutions. He troubleshot and optimized the Power BI semantic model, ensuring accuracy and reliability in data visualization. Dashboards were deployed on Power BI Services, enabling seamless access for stakeholders to track sewer line assessment progress. Additionally, he managed data integration and transformation from SQL Server, ensuring efficient workflows and real-time insights. Contributions enhanced the usability and performance of the SL-RAT tracker, facilitating data-driven decision-making and operational efficiency for the county.

Wastewater On-Call Engineer Project

New Hampshire Department of Environmental Services, Portsmouth, NH

An ArcGIS map of wastewater facilities across the state of New Hampshire was developed using tabular data from online sources. The map provided a clear and detailed visualization of facility locations and served as a critical component of the client presentation.

Green Infrastructure Research and Development (OGIRAD) Program

New York City Department of Environmental Protection (NYC DEP), NY

Ashis Supported NYC DEP’s green infrastructure efforts by developing a digital monitoring system using Power BI for asset condition assessment. Key dashboards include rain garden and infiltration basin maintenance, porous concrete pavement performance tracking, and an experiment index summarizing 12 GI studies across 100+ assets.

James McCallon, GISP

GIS and Data Management

Mr. McCallon brings over 11 years of experience in developing and implementing innovative digital solutions to support regulatory compliance and utility asset management and operations. He has led the effort to implement data management solutions for LCRR and LCRI compliance across several water systems to ensure proper data collection and reporting. With expertise spanning all phases of digital solution development and deployment, he ensures tailored results that meet the unique needs of his clients.

Education/Qualifications

- BS, Geosciences, Murray State University, 2013

Years of Experience

Total – 11
With Arcadis – 7

Professional Registration/ Certifications

- Geographic Information System Professional (GISP) – US

Office Location

Louisville, KY

Relevant Experience

Lead Service Line Replacement Program Management
City of New London, CT

Mr. McCallon served as the data management/GIS advisor overseeing the development and implementation of a data management solution for their replacement program. His efforts on this program include developing GIS based field applications for service line material identification, implementation of Lead Insights, and data integrations between GIS and Lead Insights.

LCRR Compliance Management
Erie County Water Authority, Buffalo, NY

Mr. McCallon served as the data management and GIS lead, overseeing the development and implementation of a comprehensive data management solution to support LCRR and LCRI compliance. His efforts included the creation of a detailed service line inventory, coordination of field verification activities, and the development of a public-facing inventory to enhance transparency. Additionally, he designed and implemented digital workflows to streamline sampling compliance, communication processes, and field operations, ensuring efficiency and alignment with regulatory requirements.

LCRR Compliance Management
Monroe County Water Authority, Rochester, NY

Mr. McCallon served as the data management and GIS lead, advising on the a comprehensive data management plan to support LCRR and LCRI compliance. His efforts included the support of a detailed service line inventory and the digital workflows to maintain it, the development of field tools for verification activities, and the development of a public-facing inventory to enhance transparency.

LCRR Compliance Management
City of Ft. Lauderdale, FL

Mr. McCallon served as the data management/GIS lead overseeing the development a service line inventory and field verification efforts His efforts include developing and implementing GIS based field applications for service line material identification and inspection management. He also developed a

Data Management Plan which outlined recommendations and procedures for overall data management with respect to LCRR compliance.

Asset Management Advisor
New York State Department of Environmental Conservation, New York, NY

Mr. McCallon served as the GIS lead overseeing implementation of ArcGIS Online, developing data standards, building QC scripts, and developing a data integration with Maximo. He built out a template geodatabase for participating communities to input linear assets. This geodatabase was run through the developed QC scripts before being published to ArcGIS Online. From there, ArcGIS Online was integrated bidirectionally with the state's Maximo deployment to have a complete asset management solution.

LCRR Program Management
Philadelphia Water Department, Philadelphia, PA

Mr. McCallon served as the data management and GIS lead, overseeing the development and implementation of a comprehensive data management solution to support LCRR and LCRI compliance, including service line replacements, inventory, sampling, and communication activities. His contributions to the program included the creation of a fully integrated service line inventory database, the development of a data management strategy, the implementation of a commercial data management solution, and the design of digital workflows to streamline operations. These efforts involved significant system integrations and the development of strategies to ensure long-term sustainability. Additionally, Mr. McCallon led the development and deployment of GIS-based field applications to support service line material identification and inspection management, enhancing field operations and data accuracy.

LCRR Compliance Management
San Antonio Water System, San Antonio, TX

Mr. McCallon served as the data management and GIS quality control lead, supporting the development of a comprehensive service line inventory, field verification efforts, and a data management strategy to ensure compliance with LCRR and LCRI regulations. His contributions included designing and implementing GIS-based field applications to facilitate service line material identification and inspection management, streamlining data collection and field operations. In addition, Mr. McCallon conducted quality control reviews of the Data Management Plan, ensuring alignment with LCRR and LCRI compliance requirements.

LCRR Compliance Management
City of Hollywood, FL

Mr. McCallon served as the data management/GIS lead overseeing the development a service line inventory and field verification efforts. His efforts include developing and implementing GIS based field applications for service line material identification and inspection management.

PWCSA Lead Service Line Inventory
Prince William County Service Authority, VA

Mr. McCallon served as the data management/GIS lead overseeing the development a service line inventory and public facing GIS applications. This development effort resulted in a SQL database solution that pulls together both static and living datasets to create internal, regulatory, and publishable inventories. This solution was designed to be repeatable, expandable, and modifiable as input datasets or regulatory requirements change.

Capital Program Management – Digital Solutions
Chicago Department of Water Management, Chicago, IL

As the GIS and digital team lead for a multi-year program, Mr. McCallon oversaw the deployment and management of digital solutions designed to support all aspects of the department's operations. This effort encompassed the development of applications, databases, and dashboards for a variety of critical programs, including CSO and MS4 permitting, service line inventory compliance, and the department's Capital Improvement Programs for both water and sewer systems. He also led the road mapping and implementation of a robust ArcGIS Enterprise platform, providing a web-based interface for over 800 internal users and enabling public access to GIS data. Additionally, he led the design and deployment of a fully integrated mobile solution that allowed the department to view and close 311 tickets in real time. This solution significantly improved response times for most department work orders, enhancing operational efficiency, reporting metrics, and customer service.

Whitney Campbell

GIS and Data Management

Ms. Campbell is a recent Western Kentucky University graduate, where she studied Political Science and International Affairs with a certificate in GIS. During her time at Western Kentucky University, she took courses focused on GIS, spatial data analysis, voting and environmental demographics, programming/modeling, and cartography. Since joining Arcadis as a GIS specialist, she applies her GIS experience to conduct application development, data analysis, and visualization for clients.

Education/Qualifications

- BA, Political Science, Western Kentucky University, 2023
- BA, International Affairs, Western Kentucky University, 2023
- Certification, Geographic Information Systems, Western Kentucky University, 2023

Years of Experience

Total – 2
With Arcadis – 2

Office Location

Louisville, KY

Relevant Experience

FFY22 LSLR Project
City of Rochester, NY

Arcadis was retained to provide engineering design, bidding, construction and administration services for a lead service line replacement program that includes three projects totaling more than 3,000 lead service lines. The first project is currently in the design phase, consisting of approximately 1,000 service line replacements. Assisting with developing design drawings, utilizing both CAD and ArcGIS to prepare quality plans.

Commonwealth of Kentucky Catastrophic Urban Flood Plan
Louisville Metropolitan Sewer District, Louisville, KY

GIS specialist for the development of a GIS-based, integrated web solution. This web solution serves in support of the Catastrophic Urban Flood Plan and as a template for other communities in their resilience efforts. It is designed to take in data sources with information related to possible flooding scenarios and display it in an interactive way to support users in planning and real time response activities.

Lead Inventory Technical Assistance Program
Indiana Department of Environmental Management, IN

Consultant for various Community Water and Non-Transient Non-Community Water Systems. This task included traveling on-site to provide service line identification assistance as well developing service line inventories that were in compliance of IDEM and USEPA guidelines.

Data Analyst
San Antonio Water System, San Antonio, TX

Data Management and GIS specialist for San Antonio Water System field inspections. This task has included building a field map application for field inspection data collection and monitorization of service line inspection results while conducing quality control on the data that is being submitted. The purpose of this task is to collect data to meet LCRR compliance requirements for San Antonio's service line inventories.

LCRR Data Management
Philadelphia Water Department, Philadelphia, PA

Consultant and GIS specialist assisting the development and implementation of a data management solution for LCRR compliance, including a field maps application. This field data collection, data management strategy and implementation, and quality control and quality assurance of the data being collected.

Lead Service Line Inventory Task Lead
Columbus City Utilities, Columbus, IN

Consultant responsible with developing and enhancing CCU's service line inventory to align with LCRR regulations. This includes compiling data from historical records, field data from potholing efforts, and asset management records.

Columbus City Utilities Data Analyst
Columbus City Utilities, Columbus, IN

GIS Specialist for development of field map applications for potholing efforts. This task includes monitorization of pothole material identification results while conducing quality control on the data that is being submitted. The purpose of this task is to collect data to meet LCRR compliance requirements for Columbus's service line inventory.

Get the Lead Out Initiative (GLO)
United States Environmental Protection Agency (USEPA)

Analyst assisting in evaluating and verifying lead service line (LSL) materials, supporting the development and maintenance of accurate LSL inventories through data collection and analysis. The role involves collaborating with communities to facilitate outreach initiatives and promote public awareness of LSL identification and replacement efforts, ensuring adherence to EPA guidelines and contributing to the advancement of the GLO initiative.

Education/Qualifications

- MS, Data Analytics, Georgia Tech, 2023-present
- PhD, Marine Microbiology, SIO - UCSD, 2018

Years of Experience

Total – 11
With Arcadis – 1

Technical Skills

- Numerous coding languages including: R, Python, SQL

Office Location

Philadelphia, PA

Robert Tuttle, PhD

Predictive Modeling

Dr. Tuttle is a specialist in predictive modeling and regulatory compliance for lead service line identification under the LCRR and LCRI. At Arcadis, he is a core member of the National Lead and Copper Team, where he develops and applies advanced predictive modeling solutions to help utilities identify lead and non-lead service lines, prioritize field investigations, and build defensible inventories. He has worked with dozens of utilities across the U.S. to design modeling strategies that meet local and state regulatory requirements, and has collaborated with over 12 state regulators to secure approval of modeling and thresholding approaches.

Prior to Arcadis, Dr. Tuttle spent five years in the Applied Research Program at the Philadelphia Water Department, where he led the drinking water lead group and managed the development of their lead service line inventory. His work included evaluating emerging technologies, improving data quality, and partnering with modeling vendors to build and validate predictive models. Dr. Tuttle holds a PhD in marine microbiology and analytical chemistry from Scripps Institution of Oceanography – UCSD and is currently completing a Master of Science in Data Analytics at Georgia Tech, where his studies focus on machine learning applications for the water sector.

Relevant Experience

Development of Lead Likelihood Model
Ohio Environmental Protection Agency, OH

Dr. Tuttle serves as the task lead for the development and application of predictive modeling solutions to identify lead service lines across more than 60 public water systems throughout Ohio. In this role, he coordinates closely with field teams to ensure statistically representative sampling and data quality for model calibration and validation. He leads the integration of public records, GIS datasets, and field inspection results, overseeing feature engineering and the application of advanced machine learning algorithms to generate reliable lead likelihood predictions.

Dr. Tuttle is responsible for guiding the modeling workflow—from data aggregation and model development through to prioritizing field verification and producing actionable outputs for inventory updates. His work supports compliance with the LCRR and LCRI, providing utilities and Ohio Environmental Protection Agency with defensible, data-driven strategies for reducing unknown service lines and planning lead service line replacements.

Development of Lead Likelihood Model
Mishawaka, IN

Dr. Tuttle serves as the technical lead overseeing the development of a predictive model to assess the likelihood of lead service lines in Mishawaka's water system. His role includes managing the project team and guiding the end-

to-end process—from initial data collection and preparation through to model delivery and client engagement. He ensures the modeling effort supports the utility's regulatory goals under the LCRR, and facilitates the translation of technical results into actionable strategies for field validation and inventory development.

Design of Lead Likelihood Model

New Hampshire Department of Environmental Services, NH

As a technical lead for a project with the New Hampshire Department of Environmental Services, Dr. Tuttle is working on helping the state implement a process for selecting and verifying emerging technologies capable of detecting in ground service line materials non-invasively. The work involves both vetting new technologies and developing sampling procedures to help states issue informed guidance on the use of these technologies.

Project Manager / Technical Lead

Fairfax County Water Authority, VA

Dr. Tuttle is currently serving as project manager and technical lead for Fairfax Water's lead service line predictive modeling and statistical analysis initiative. He is responsible for coordinating the development of the predictive model—led by a subcontractor—and ensuring alignment with Virginia Department of Health requirements. His role includes securing regulatory approval for the modeling and statistical approach, guiding how field investigation results are used to support the model, and managing the delivery of final outputs to the client for use in inventory and compliance planning.

Regulatory Coordination for Predictive Modeling Approvals

Multi-State / National Scope

Dr. Tuttle has led cross-jurisdictional efforts to gain regulatory approval for predictive modeling and statistical analysis approaches used to support service line inventories and compliance strategies under the LCRR and LCRI. He has worked directly with over 12 state regulatory agencies to review, refine, and validate modeling methodologies on behalf of multiple utility clients. These efforts have played a critical role in reducing uncertainty in service line inventories—helping utilities collectively identify and eliminate hundreds of thousands of unknown service lines across the country.

LCRR Program Management

San Antonio Water System, San Antonio Tx

Dr. Tuttle is currently serving as a technical lead on several tasks vital to San Antonio Water System's successful role out of their LCRR program. His work involves aiding in the development of the service line inventory, developing laboratory sampling plans to meet regulatory compliance, and designing workflows to help establish protocols related to service line disturbances are required in the LCRR.

Technical Lead

Prince William County Service Authority, VA

Dr. Tuttle is currently serving as a technical advisor for implementation of statistical methodology to rule out lead service lines at their authority. Part of his role is overseeing the development of a field maps application to be used by the utility and subcontractors as they complete required field sampling.

Design of Lead Likelihood Model

New Hampshire Department of Environmental Services, NH

As technical lead, Mr. Tuttle is working on determining the feasibility of developing a statewide lead likelihood model for over 200 primary water systems in New Hampshire. This work includes leading a team of Arcadians through the process of data collection, QA/QC, and build out of a machine learning model.

Technical Advisor

Monroe County Water Authority (MCWA), NY

Dr. Tuttle is currently serving as a technical advisor for MCWA's lead service line predictive modelling task. He is working with Voda.AI to help ensure the development of a statistically sound service line prediction model that meets both client and regulatory requirements.

Technical Advisor

Erie County Water Authority (ECWA), NY

Dr. Tuttle is currently serving as a technical advisor for ECWA's lead service line predictive modelling task. He is working with Blue Conduit and ECWA staff to help ensure the development of a statistically sound service line prediction model. The goal is to both reduce unknowns in the system as well as prioritize areas that may have higher chances of lead for targeted replacement strategies.

Rebecca Ventura, PhD

Predictive Modeling

Dr. Ventura is a dynamic and detail-oriented civil engineer and data scientist specializing in predictive modeling with a strong foundation in statistical analysis and machine learning. She has a proven track record of developing innovative solutions to complex drinking water and sanitation system challenges, leveraging state-of-the-art algorithms and data engineering skills. She is adept at transforming raw data into actionable insights, driving decision-making and strategic planning in research and municipal engineering environments. Dr. Ventura is committed to advancing public infrastructure systems through the integration of data science and civil engineering expertise.

Education/Qualifications

- PhD, Civil Engineering, Concentration in Civil Systems University of Colorado Boulder, 2023
- MSc, Civil Engineering, University of Colorado Boulder Concentration in Civil Systems & Graduate Certificate in Global Engineering, 2022
- BSc, Civil Engineering, University of Illinois at Urbana-Champaign, Concentration in Sustainable Resilient Infrastructure Systems & Environmental Engineering, 2017

Years of Experience

Total – 5
With Arcadis – >1

Office Location

Chicago, IL

Relevant Experience

Ohio Lead Service Line Inventory Modeling
Ohio Environmental Protection Agency (OEPA)
Machine learning modeling expert leading the development of a state-wide model for classifying unknown service lines as lead or non-lead. This work includes reviewing and cleaning data, feature engineering, and employing multiple machine learning models to identify the best methods for predicting lead service lines.

Lead Service Line Replacement Program*
Various Chicago, IL Suburbs
Led the design and application of machine learning modeling for LSLR and LSLI efforts for 14 client communities. Used modeled results to inform potholing plans, estimate quantities for upcoming LSLR projects, and submit updated inventories to the Illinois EPA (IEPA). Collaborated with the US EPA's Office of Research and Development (ORD) on the use of ensemble machine learning modeling to predict lead service lines in small communities (<10,000 service lines) and in communities with missing or limited data. Served as the lead community engagement expert for all resident outreach related to LSLR and LSLI programs. Developed bilingual LSLR program fliers, cover letters, open house invites, lead health risk fliers, post-replacement flushing instructions, and kid-friendly coloring pages. Updated and submitted LSLR Plans to IEPA. Budgeted and drafted Request for Proposals and amendments for potholing projects funded by inventory grants. Reviewed loan applications for submission to IEPA. Presented on LSLR programs at community Open House events. Designed a sequential water sampling protocol for lead service line inventorying. Reviewed potholing, inventory, and lead service line replacement data uploaded to ESRI ArcGIS by contractors.

Doctoral Researcher*
University of Colorado Boulder

Developed and executed multi-year, mixed-method research studies to investigate the social sustainability of international sanitation programs across community and regional-level scales. Designed and distributed a household-level survey in collaboration with a Peruvian non-profit organization. Led qualitative and statistical analyses of the survey data to characterize household sanitation preferences. Conducted and analyzed 24 semi-structured interviews with sanitation practitioners to identify 1) the benefits they believe drive positive sanitation programming outcomes and 2) the barriers they believe limit their program's impact. She systematically analyzed data for themes that spanned technical, psychosocial, and contextual factors.

Completed a case study analysis of seven international sanitation organizations to identify drivers of customer attrition and the strategies the organizations have employed to mitigate this attrition. Disseminated findings, including recommendations for improved collaboration between stakeholders, to practitioners and researchers alike through five conference presentations and two journal articles.

Water for People Practicum*
Water for People (Virtual)

Conducted a literature review and interviews to identify current methods and potential metrics to measure decentralized sanitation's impact on local and regional environmental health. Identified priority pathways to environmental contamination, with an emphasis on surface water sources. Developed a framework for a rapid assessment tool that would evaluate environmental contamination from sanitation systems at the community level.

Student Trainee Hydrology*
United States Geological Survey

Tested a storm water flood model for extreme rain events in DuPage County, IL, identified cases where the model was failing, and addressed those errors in the Fortran code to ensure the model ran smoothly.

Aided in the analysis of large agricultural runoff data sets for use in ESRI ArcMap and a model that tested the application of best management practices including cover crops and nutrient management plans.

Research Experience for Undergraduates (REU)*
University of Illinois-National Center for Supercomputing Applications (NCSA)

Supported the development of Python code using NumPy, math, and gdal modules for a genetic algorithm model. Researched regulations on rain garden placement in residential and commercial areas in the United States.

**Experience prior to Arcadis*

Alyssa Gouveia

Inventory; Public Education and Outreach; Inspector

Ms. Gouveia's undergraduate experience made her passionate about water resources and management. She has worked on various lead service line replacement and pump station upgrade projects for Arcadis to improve water quality services for respective clients for the last few months. Ms. Gouveia is currently pursuing her EIT Certification to further achieve her professional goals in engineering. Ms. Gouveia is currently working on public outreach material for clients to raise awareness of upcoming service line replacement and sampling events. She has worked on creating educational materials for school and childcare facilities.

Education/Qualifications

- BSE, Environmental Engineering, University of Connecticut, 2025

Years of Experience

Total – <1 year
With Arcadis – <1 year

Professional Registration/ Certifications

- Pursuing EIT Certification
- OSHA 10-hour Construction Safety and Health
- OSHA 40-hour HAZWOPER

Professional Associations

- Connecticut Water Environment Association (CTWEA)
- University of Connecticut Alumni Community

Office Location

Middletown, CT

Relevant Experience

Lead Service Line Replacement Plan
Norwich Public Utilities, Norwich, CT

The objective of this project is to identify, remove, and replace historically identified lead service lines. Assisted in public outreach to property owners included in the construction phase of replacement program. Responsibilities included compiling and distributing customer outreach materials. Assisted in the school and childcare facility required testing outreach. Responsibilities included creating school and childcare outreach materials for facility coordination and sampling guidance. Assisted in inventory management and Norwich GIS improvements. Responsibilities included manual review of original scanned town records against an AI model review. Assisted in putting together specification and Health and Safety packages. Responsibilities included document review. Current responsibilities will include leading field investigations, coordinating fieldwork, and managing ongoing project tasks. Fieldwork responsibilities include lead service line field work using various testing methods to determine the material of customer water service line at randomly selected sites. Recorded data in the field to be compiled into a model to best predict material of water service lines around the City of Norwich. Responsibilities will include multiple site visits to perform fieldwork and scheduling appointments with customers to test water service lines.

Lead Service Line Inventory
Meriden Water Department, Meriden, CT

The objective of this project is to identify, remove and replace historically identified lead services. Assisted in the school and childcare facility required testing outreach. Responsibilities included creating school and childcare outreach materials for facility coordination and sampling guidance. Current responsibilities will include field investigations to identify service line materials using various testing methods to determine the material of customer water service lines at customer reported lead sites.

Pump Station Upgrades

Town of Trumbull, CT

The objective of this project is to design pump station modifications to improve pump capacity. Assisted in compiling documents and data to be relayed back to the client. Responsibilities included creating client-ready AutoCAD drawings and Microsoft Excel graphs for design proposals. Current responsibilities include creating client-ready AutoCAD drawings for design proposals.

East Street Pump Station

Greater New Haven Water Pollution Control Authority, New Haven, CT

Assisted in putting together specification and Health and Safety packages. Responsibilities included document review. Assisted in creating documents for client and contractor use in the construction phase of the pump station upgrades. Responsibilities included creating conformed documents. Current responsibilities include assisting in the review of submittals for the construction phase of the project.

Wastewater Treatment Facility Improvements

York Sewer District, York, ME

Assisted in compiling data for the analysis of treatment efficiency. Responsibilities included compiling data and performing calculations from the treatment facility results in Microsoft Excel.

Sanitary Sewer Connection/Capacity Assessment

Town of Darien, CT

Assisted in putting together specification and Health and Safety packages. Responsibilities included document review.

Mikayla Billiter

Inventory; Inspector

Ms. Billiter has provided inspector services on multiple lead service line replacement projects at Arcadis, ensuring quality control, regulatory compliance, and safety at project sites. She has experience conducting on-site inspections, verifying installation methods, documenting field activities, and supporting clients in meeting Lead and Copper Rule requirements. As Task Lead, she has overseen project progress, coordinated with contractors and stakeholders, and ensured accurate reporting of field data. Ms. Billiter is currently pursuing her Engineer-in-Training (EIT) certification to further strengthen her technical expertise and professional growth in engineering inspection services.

Education/Qualifications

- BS, Civil Engineering, Concentration in Environmental Engineering, University of Maine, 2022

Years of Experience

Total – 2
With Arcadis – 2

Professional Registration/ Certifications

- OSHA 10-HR Certification
- Pursuing EIT Certification

Office Location

Middletown, CT

Relevant Experience

Engineering Services for LCRI Compliance
Meriden Water Division, Meriden, CT
Currently designated as the project engineer with responsibilities that include leading field investigations, coordinating field work, public outreach, and managing ongoing project tasks. The objective of this project is to provide consultant services to keep Meriden Water Division in compliance with EPA's Lead and Copper Rule Improvements.

Lead Service Line Replacement Program
Norwich Public Utilities, Norwich, CT
Conducted lead service line field work using various testing methods to determine the material of customer water service line at randomly selected sites. Recorded data in the field to be compiled into a model to best predict material of water service lines around the City of Norwich. Responsibilities included multiple site visits to perform field work and scheduling appointments with customers to test water service lines. The objective of this project is to identify, remove and replace historically identified lead service line.

Lead Service Line Replacement Program
City of New London, CT
Conducted service line material investigative field work and recorded field data. Assisted in public outreach to property owners for the first construction phase of the replacement program, including compiling and distributing outreach materials. Responsibilities included review of documents, gathered data into Microsoft Excel, and conducted research on trenchless water service line replacement methods and potential contractors in New England. Responsibilities included recording research findings, developing an understanding of replacement methods, and gathering contractor contact information. Additionally, gathered information on potential contractors for announcing upcoming construction.

Technical Assistance for Public Water Systems
New Hampshire Department of Environmental Services, NH

Assisted public water systems throughout New Hampshire in creating their service line inventories. Responsibilities involved maintaining records, ongoing communication with public water systems, and completing the lead service line inventory.

Engineering Services for LCRI Compliance
Meriden Water Division, Meriden, CT

Currently designated as the project engineer with responsibilities that include leading field investigations, coordinating field work, public outreach, and managing ongoing project tasks. The objective of this project is to provide consultant services to keep Meriden Water Division in compliance with EPA's Lead and Copper Rule Improvements.

Phase 2 Sewer Design and Rehabilitation
Town of Darien, CT

Assisted in putting together specification and Health and Safety packages. Responsibilities included document review. Future responsibilities include Closed Circuit Television Inspection (CCTV) training to review videos from the field. This project is a sanitary sewer project that will design and oversee contractors performing open-cut sanitary sewer rehabilitation.

Town-Wide Infiltration & Inflow and Sanitary Sewer Evaluation Survey
Town of Darien, CT

Assisted in reviewing CCTV sewer line inspection videos looking for defects, deformations, or obstructions to provide rehabilitation recommendations to the client. Responsibilities included reviewing NASSCO's Pipeline Assessment & Certification Program before CCTV review.

2023 Sanitary Sewer Rehabilitation
Town of Danvers, CT

Assisted in reviewing CCTV sewer line inspections videos looking for major defects and pipeline material to provide rehabilitation recommendations to the client. Future responsibilities include the review of more CCTV videos.

Preliminary Engineering Design Services for Relocation of Shipping Street Pump Station and Related Sewer Mains
Norwich Public Utilities, Norwich, CT

Currently designated as the project engineer. Conducted site visits and supervised the installation of flow monitoring devices. Analyzed flow results, prepared technical memos, participated in client meetings, and facilitated the development of subcontract agreements. This project is preliminary design options for the relocation of the Pump Station located in the regulatory floodway.

PFAS Sampling of Residential Drinking Water Supply Wells
Connecticut Department of Energy and Environmental Protection, Franklin, CT

Currently leading field investigations, tasked with creating subcontract documents, organizing a task list, and coordinating future fieldwork. This objective of this project is to sample and analyze potable well water for PFAS.

Franklin Phase 7 Rehabilitation
Town of Franklin, MA

Assisted in putting together Asset Management Plan documents and specification package. Responsibilities include document review and compilation of documents. This project is a sanitary sewer rehabilitation and design project.

Franklin 2023 Metering and SSE
Town of Franklin, MA

Analyzed flow meter data for high inflow/infiltration sites in Franklin, MA. Responsibilities include gathering and analyzing data using Microsoft Excel and Time Series Analyzer to report back to the client. This project analyzes and reports flow metering data to the client to determine if any rehabilitation steps are necessary. Flow metering is usually done on an annual basis.

Sandy Pond Road Sewer Rehabilitation Design
Town of Ayer, MA

Assisted in putting together specification package. Responsibilities included document review. This project is a sanitary sewer rehabilitation and design project.

Cooperative Extension and Diagnostic Research Laboratory
Orono, ME

Conducted field research in potato fields throughout Central Maine. Responsibilities included reporting of results and communication amongst clients. The purpose of this research was to report the conditions of the fields to the client.

Kathryn Edwards, PE

Public Education and Outreach

Ms. Edwards has more than 20 years' experience in water system, wastewater, stormwater, facilities, and water resources project planning, permitting, design, and construction. She has served as a public engagement specialist and facilitator for a variety of projects, notably climate resilience work and lead service line replacement programs. She works with many municipalities to achieve permitting and regulatory compliance and has assisted communities and state agencies in achieving measurable documented improvements, especially in their stormwater management programs. Ms. Edwards specializes in stormwater management, master planning, and resilience planning.

Education/Qualifications

- BS, Environmental Engineering, Roger Williams University, 2004

Years of Experience

Total – 20
With Arcadis – 20

Professional Registration/ Certifications

- Professional Engineer – MA
- Fundamentals of Engineering – RI
- Construction Documents Technologist – Construction Specifications Institute

Professional Associations

- New England Water Environment Association, Stormwater Committee
- Water Environment Federation

Office Location

Wakefield, MA

Relevant Experience

Lead Service Line Replacement Program
City of New London, CT

Serve as the public education and outreach lead to New London, assuring the public, W&WPCA, and other stakeholders are informed on all aspects of the program for the duration of both the design and construction phases. Responsible for the planning, implementation, and facilitation of all public meetings and stakeholder meetings. Work also includes collaborating with the USEPA on LPIPE Grant funding for implementation of portions of the outreach plan.

Lead and Copper Compliance Plan
Norwich Public Utilities, Norwich, CT

Serve as the public education and outreach lead for the lead and copper, compliance plan. Responsibilities include working with the client to identify public outreach and engagement needs and develop and implement a plan to address those needs. Work has included development of public outreach materials to keep the public and other stakeholders informed on all aspects of the program. Responsible for the planning, implementation, and facilitation of all public meetings and stakeholder meetings.

Watershed Management Plan
City of New London, CT

Project manager for the development of a Watershed Management Plan – an important step toward mapping out the City's environmental resources, identifying sources of water pollution, and addressing TMDLs and water quality impairments through prioritized improvements. We guided the process, engaged stakeholders and the general public in the planning, and developed a watershed plan with recommendations for structural and non-structural projects to assist the City to protect and manage its natural resources most effectively. This work included stakeholder engagement, watershed characterization, estimation of pollutant source loads and reductions, selection of management measures, and development of performance indicators.

MS4 Permit Assistance
City of Fitchburg, MA

Serve as project director for assisting with implementation of the City's MS4 Permit compliance program. Work includes Illicit Discharge Detection and Elimination program implementation including outfall inspections, GIS mapping updates using ESRI's ArcGIS online, operations and maintenance at municipal facilities, and annual reporting and recordkeeping assistance. The project also includes work to assess and develop potential rates for a sustainable funding source for stormwater. Previously served as project manager for the City's wastewater and stormwater ordinance updates and development of regulations, including working with City departmental stakeholders on key decisions throughout the
regulatory process.

Climate Ready South Boston, MA
City of Boston, MA

Seved as local lead for technical and policy solutions for design and implementation planning of coastal resiliency projects in the South Boston area. Heavily involved in stakeholder engagement bringing the City, business owners, developers, regulatory agencies, and residents together in strategic sessions to discuss the proposed plan, technical and regulatory solutions, and facilitate a plan for implementation of both near and long-term projects.

Stormwater Master Plan
Town of Saugus, MA

Served as project manager for the Town of Saugus on a comprehensive Stormwater Master Plan to address specific needs for a robust stormwater management program that meets regulatory MS4 permit requirements, provides conceptual solutions to known surface flooding problems, and explores funding frameworks for a more sustainable program. This project addresses several regulatory requirements, including a written plan, catchment area delineations, and outfall inspections and training for the Illicit Discharge Detection and Elimination Program, as well as some of the required operation and maintenance standard operating procedures for municipal facilities. As part of the plan, we reviewed 20 documented drainage problem areas and identified solutions for capacity improvements or additional infrastructure projects to minimize or eliminate surface flooding.

Climate Ready East Boston & Charlestown Phase II
City of Boston, MA

Served as project manager for design and implementation planning of coastal resiliency projects in the East Boston and Charlestown neighborhoods. Focused on implementable coastal resilience solutions for the near and long-term, and included a robust engagement program with community advisory boards formed for each neighborhood and public engagement.

Nantucket Coastal Resilience Plan
Town of Nantucket, MA

Project prioritization / implementation lead for a coastal resilience planning process for the Town and County of Nantucket. The plan addresses the entire island and involves a comprehensive assessment of coastal risks, including storm surge, tidal flooding with sea level rise, and erosion.

Flood Study & Green Infrastructure Planning
City of Newburyport, MA

Managed flood study analysis of the Little River and Industrial Park area of Newburyport including the development of a hydrologic/hydraulic model in XPSWMM. Coordinated and facilitated community stakeholder meetings to gain insight and feedback on watershed issues. Duties also included development of hydrologic and hydraulic parameters for input into the model, field investigations and inventory of critical culverts, coordination of survey and resource area delineation work, development of the Flood Study report, attendance and participation at public hearings, and preparation and filing of permits. Worked closely with the City, the public, Design Confirmation Report, MEMA, and Federal Emergency Management Agency during this project. Developed follow-on pilot program for green infrastructure initiatives. Facilitated consensus building meetings and workshops with City departments, community stakeholders, and conservation commissions in two towns. Developed a follow-on green infrastructure planning program to pilot realistic green solutions for stormwater management in this flood abatement area.

Education/Qualifications

- BS, Environmental Engineering, Renssalaer Polytechnic Institute, 2021

Years of Experience

Total – 4
With Arcadis – 2

Professional Registration/ Certifications

- Engineer-in-Training (EIT)
- OSHA 40-hour HAZWOPER
- OSHA 10-hour Construction Safety & Health Training
- OSHA 8-hour Refresher Training

Office Location

Middletown, CT

Sofia Lee, EIT

Construction Manager; Construction Contract Documents

Ms. Lee is a construction inspector with a focus on all aspects of lead service line replacement throughout Connecticut. In addition, she has performed construction inspection services on water main and service line installations. Ms. Lee is experienced with Phase I, II and III Environmental Site Assessments (ESAs), oversight of environmental drilling and remediation, inspection of construction activities, collection and characterization of environmental and geotechnical samples, and collection of hazardous building materials. She is familiar with various methods used in achieving compliance with the Connecticut Remediation Standard Regulations.

Relevant Experience

Lead Service Line Replacement Program
City of New London, CT

Serves as construction inspector for the City of New London's Lead Service Line Replacement Program. The program includes replacement of over 3,000 lead service lines throughout several phases of construction. Ms. Lee's role is to provide construction inspection of all test pits, customer and utility side lead service line replacements, sidewalk restoration, & paving. Responsibilities also include holding all construction progress meetings, performing basement inspections for service line verification, managing requests for information, involvement with public outreach and communication, preparation of construction contract documents for LSLR, coordination of all construction related activities and oversight, compliance with all LCRR construction requirements.

Environmental Site Assessments, Surveying, Evaluation, and Construction Inspection
Confidential Client, Rocky Hill, CT

Responsibilities include performing Phase I, II and III ESAs, Remedial Action Plans, and SEH Abatement. These entail site inspections, local and state file reviews, oversight of environmental drilling and monitoring well installation, characterization of environmental and geotechnical samples, generation of boring logs using gINT, sampling of soil, groundwater, and concrete, familiarity with achieving compliance with the Connecticut Remediation Standard Regulations and presenting findings in professional environmental reports. Surveying and GPS techniques to mark out explorations and site features and creating site plans and contour maps using AutoCAD. Evaluating the presence of hazardous building materials, such as those containing asbestos, lead, or PCBs, in site buildings. This entails sampling of various types of materials, testing, and reporting findings in technical reports. Construction inspection during water main installation. This entails tracking pay items, construction personnel, and equipment; overseeing water main installation, service line installation, milling,

trench restoration, lawn restoration, and CCTV inspection; and creating progress reports for clients.

Construction Inspection, Drinking Water Sampling
Confidential Client, Bennington, VT

Responsibilities include overseeing water main installation in neighborhoods with private wells affected by PFAS. This includes ensuring contractors were following the approved design specifications, tracking pay items, and writing daily reports on site progress. Collecting drinking water samples from households potentially contaminated by lead service lines, transporting samples to water treatment facilities for laboratory testing, and compiling the laboratory results in data tables.

Construction Inspection, Drinking Water Sampling
Confidential Client, Bennington, VT

Responsibilities include overseeing water main installation in neighborhoods with private wells affected by PFAS. This includes ensuring contractors were following the approved design specifications, tracking pay items, and writing daily reports on site progress. Collecting drinking water samples from households potentially contaminated by lead service lines, transporting samples to water treatment facilities for laboratory testing, and compiling the laboratory results in data tables.

Various Projects
Confidential Client, Vernon, CT

Identifying and removing invasive species on the Belding Wildlife Management Area by physical and chemical methods. Acting as a liaison and guide for school groups participating in outdoor experiments during field trips. Participated in various environmental groups, such as the Riffle Bioassessment By Volunteers, the CT Envirothon committee, and the Rivers Alliance of Connecticut.

Sean Mitchell, PE

Construction Contract Documents

Mr. Mitchell has broad experience in engineering consulting with a strong focus on infrastructure improvement projects. He has worked on projects in the study, design and construction phase, participating in fieldwork, evaluating data, as well as the design and bidding phases for projects throughout New England. He is familiar with the permitting process associated with working in roadways and easements and permitting issues that may arise when evaluating design options. He also has considerable experience designing and providing on-site inspection and oversight.

Education/Qualifications

- BS, Environmental Engineering, University of New Hampshire, 2012

Years of Experience

Total – 13
With Arcadis – 13

Professional Registration/ Certifications

- Professional Engineer – MA, CT

Office Location

Wakefield, MA

Relevant Experience

Lead Service Line Replacement Program
City of New London, CT
Construction contract documents specialist for full LSL replacement program. Work includes LSL inventory development levering machine learning, design and bidding services, public outreach and communication, program development, and stakeholder communication and funding assistance.

Sewer System Evaluation Survey in Woodbridge and East Haven
Greater New Haven WPCA, Woodbridge and East Haven, CT
Project engineer for the sewer system evaluation survey of five metered areas in Woodbridge and East Haven to identify excessive I/I sources. Work included evaluation of 73,000 linear feet of flow isolation data, development of a CCTV inspection program, 520 manhole inspections and 53,000 linear feet of CCTV inspections. A cost-effective analysis was utilized to develop cost effective rehabilitation recommendations.

I/I Rehabilitation Program State Street and Meter Area 10
Greater New Haven WPCA, East Haven and Hamden, CT
Resident engineer/project engineer for the sanitary sewer rehabilitation design/construction project to rehabilitate defective sewers in East Haven and Hamden. The project included design, permitting, bidding services, and construction oversight for the rehabilitation of approximately 35,000 linear feet of sanitary sewer pipe up to 27-inches in diameter with cured-in-place pipe lining and rehabilitation of over 200 manholes. Project included large-scale sewage bypass pumping during pipeline and lateral service rehabilitation along two major interceptors.

Sewer Improvements to Reduce I/I in East Haven and Hamden
Greater New Haven WPCA, East Haven and Hamden, CT
Project engineer for the sanitary sewer rehabilitation design contract to rehabilitate defective sewer assets in East Haven and Hamden. Work included design for rehabilitation of approximately 26,000 linear feet of sanitary sewer

pipe, ranging from 8-inch to 36-inch in diameter with cured-in-place pipe lining and rehabilitation of 260 manholes, development of local, state and federal permit applications for work in an environmentally sensitive area, coordination with residents, municipalities and permitting agencies, development of design plans, specifications, and cost estimate.

Utility Replacement Project
Town of Saugus, MA

Resident engineer for replacement of watermains and water services, sanitary sewers, and drain lines for five project sites in residential and commercial areas. Work also included full roadway reconstruction, including road reclamation, installation of new granite curbing, and construction of concrete sidewalks and ADA compliant ramps. Construction services included extensive coordination with various stakeholders, including dozens of residents, Town, and State entities.

Residential Water Main Extension and Water Treatment Plant Upgrades
Confidential Client, NH

Project engineer for design of a watermain extension to a residential subdivision, including 20+ new services. Work included coordination with stakeholders, development of bid ready design plans and specifications, and construction cost estimating. Served in a construction administration role, including coordination with the Contractor and Resident Engineer.

Beacon Street Interceptor Area Sewer Rehabilitation
City of Norwalk, CT

Construction administrator for the Beacon Street Interceptor Service Area Rehabilitation. Work included rehabilitation of 20,000 LF of 8-inch to 18-inch diameter pipe with cured-in-place lining , cured-in-place spot repairs, spot excavation repairs, manhole rehabilitation, and extensive temporary bypass operations.

Pilcher Drive Pump Station Wastewater Grinder
Town of Wilmington, MA

Project engineer for deign of a wastewater grinder unit at the Pilcher Drive Pump Station. Work included a condition assessment of the existing pump station facility, and development of plans and specifications for the installation of a new sewer manhole with a custom channel, installation of a wastewater grinder unit, and associated electrical work.

Reading Extension Sewer and Metropolitan Sewer Rehabilitation Design
Massachusetts Water Resources Authority, Stoneham, MA

Project engineer/resident engineer for the sanitary sewer rehabilitation design and construction contract to rehabilitate the Reading Extension Sewer and Metropolitan Sewer. Work included rehabilitation of approximately 14,000 linear feet of sanitary sewer pipe with cured-in-place pipe lining and inspection and rehabilitation of 64 manholes, coordination with residents, municipalities and permitting agencies, development of design plans and specifications, and development of construction sequencing and sewer bypass plans.

Beaver Street Interceptor Alternatives Analysis
Town of Franklin, MA

Project engineer for a condition assessment and an alternatives analysis of the Town's major sanitary sewer interceptor. The interceptor is in a railroad easement in a heavily wooded area with challenging accessibility. Work includes CCTV inspection and manhole inspections of the interceptor, a hydraulic model of the interceptor and tributary collector sewers, and development of in place and realignment alternatives to prolong the useful life and serviceability of the interceptor.

Sanitary Sewer I/I Reduction Program
Town of Stoneham, MA

Project engineer and resident engineer for Phases 5-7 of the sanitary sewer I/I reduction program. Work included development of a system-wide approach to identify and remove I/I, CCTV inspection 15,000 linear feet of pipe, inspection of 100 manholes, rehabilitation of approximately 6,000 linear feet of sanitary sewer pipe with cured-in-place pipe lining, cured-in-place spot repairs, testing and sealing of joints and services and manhole rehabilitation. This project also required close coordination with the Stoneham DPW and residents and businesses in the community.

Hector Salazar

Inspector

Mr. Salazar has 5 years' experience in the industry of environmental, health and safety (EHS) compliance. At Arcadis he has participated in environmental compliance projects, health and safety projects and consulting, environmental compliance and safety audits, spill prevention and inspections, hazardous waste contingency plan writing, hazardous materials inventory projects, ecological sampling and surveying projects, construction oversight projects, and coordination and task management for compliance auditing.

Mr. Salazar's additional certifications include HAZWOPER 40-hr, HAZWOPER 8-hr, National Registry of Emergency Medical Technicians, FEMA Certified Hazardous Materials Technician, CPR/AED, and Bloodborne Pathogen training.

Education/Qualifications

- B.S. Environmental Science and Anthropology: Archaeology Concentration, Connecticut College, 2020

Years of Experience

Total – 5
With Arcadis – 3

Training

- 40 Hour OSHA HAZWOPER OSHA 40 Hour Fall Protection
- 30-Hour OSHA CONSTRUCTION
- Smith Defensive Driving
- CPR/AED and First Aid
- Nationally Registered Emergency Medical Technician
- FEMA Certified Hazardous Materials Technician
- Pro-Board-Certified Structural Firefighter
- SDI certified open-water SCUBA diver

Office Location

Middletown, CT

Relevant Experience

Lead Service Line Inspections
City of New London, CT

Supported the execution of the lead service line replacement project to improve community water quality and regulatory compliance. This included conducting detailed field inspections of residential and commercial service lines to identify material, ensuring accurate assessment and prioritization for replacement. Tasks also included educating the residents about the risks of lead and the benefits of service line replacement.

Lead Service Line Inspections
Norwich Public Utilities, CT

Supported the planning and execution of the lead service line replacement project to improve community water quality and regulatory compliance. This included conducting detailed field inspections of residential and commercial service lines to identify material, ensuring accurate assessment and prioritization for replacement. Tasks also included educating the residents about the risks of lead and the benefits of service line replacement.

PFAS Sampling
North Franklin, CT

Conducted field sampling of residential well drinking water systems to assess PFAS contamination in accordance with EPA and state agency protocols. Tasks also included coordinating sampling logistics with homeowners, laboratory and regulatory agencies to ensure efficient and accurate collection of samples.

Stormwater Compliance
C&S Wholesale Grocers, Various Locations, USA

Assist in task managing client stormwater compliance through report preparation and permit assistance. Assist in the ongoing preparation, editing, and finalizing of discharge monitoring reports for various client facilities nationally. Additionally,

support client communications, coordination with analytical laboratory, and facility communications to ensure compliance with state and federal regulations related to stormwater permitting.

Stormwater Compliance
United Parcel Services, Various Location, CT

Conduct ongoing field-related project support, related to stormwater discharge monitoring in compliance with state and federal regulations related to stormwater discharge permits for multiple client facilities.

Hazardous Materials Inventory Project
The Harrington Group Inc, Various Location, USA

Assisted in the research, categorization, and preparation of hazardous materials inventory lists. Tasks included client product review, preparation, and categorization of inventory according to NFPA and IBC codes and regulations and verifying the accuracy and quality of final inventory deliverable.

Housatonic River Waterfowl Study
General Electric, Various Location, CT & MA

Assisted in the collection of Waterfowl Species in the Housatonic River ecosystem for the sampling of PCB contamination in Waterfowl tissue. Tasks included ecosystem evaluation, deployment of sampling equipment and supporting wildlife biology staff with data collection.

Hudson River Tunnel Project
Hudson Tunnel Project, Hoboken, NJ

Conducted oversight and monitoring of federally protected Atlantic Sturgeon in the Hudson River, during active pile driving construction operations. Task included daily river monitoring, construction oversight and documentation in the event of Sturgeon sightings.

Compactor Audit Coordinator/Task Manager
The Home Depot, Various Locations, CA

Support the coordination of client inspections of solid waste compactors for stored throughout the state of California. The client was monitoring compliance with policies for handling hazardous and other waste generated at store locations. The inspections focused on identifying the presence of potentially regulated waste stream items that could not be disposed of via conventional landfills. Tasks included client communication, hauler and disposal facility outreach and communication, allocation of Arcadis staff and resources, health and safety compliance and supporting all office related project functions.

Compactor Audit Coordinator/Task Manager
TJX Companies Inc., Various Locations, CA

Support the coordination of client inspections of solid waste compactors for stored throughout the state of California. The client was monitoring compliance with policies for handling hazardous and other waste generated at store locations. The inspections focused on identifying the presence of potentially regulated waste stream items that could not be disposed of via conventional landfills. Tasks included client communication, hauler and disposal facility outreach and communication, allocation of Arcadis staff and resources, health and safety compliance and supporting all office related project functions.

Waste Water Compliance
PCC Structurals Inc., Groton, CT

Conduct ongoing field-related project support, related to the collection of monthly and quarterly waste water samples to assure compliance with facilities Significant Industrial User General Permit and Pretreatment Permit. Assist in the ongoing preparation, editing, and finalizing of discharge monitoring reports for CT, Groton facility. Additionally, support client communications, coordination with analytical laboratory.

Emergency Planning and Community Right to Know Act (EPCRA) Tier II Plans
Panasonic, Olathe, KS, and Reno, NV

Prepared and submitted EPCRA Tier II for facilities nationwide and hazardous materials business plans for multiple sites within the state of California. Assisted client in gathering data to be reported and followed up on regulatory requests. Supported project management efforts to ensure timely submission of required reports.

Toxic Release Inventory (TRI) Program
H&T Group, Waterbury, CT

Prepared and submitted TRI Reports for facility withing the state of Connecticut. Assisted client in gathering and processing data related to report preparation.

Regulatory EHS Compliance Auditor
Pittsburgh Water and Sewer Authority (PWSA), Pittsburgh, PA

Conducted site visits to support the evaluation of client's compliance with state and federal health and safety obligations. This included evaluation of facility processes and procedures related to Occupational Health and Safety as well as PWSA's Company Policies and Best Management Practices.

Appendix B.

Statement of Equal Opportunity / Affirmative Action Policy of the Firm

ARCADIS

AFFIRMATIVE ACTION/EEO PLAN

DECLARATION OF POLICY: Arcadis U.S., Inc. affirms its commitment to the submittal of an Affirmative Action plan which has the purpose of maintaining equal employment and promotional opportunity, with particular emphasis on improving the Minority and/or Women work force population and utilization of Minority and/or Women owned professional firms, consultants and/or suppliers.

To make clear our commitment to this program, the intent of the plan and individual responsibility for its effective implementation will be discussed at management training programs and employee orientations. Special meetings may be conducted with executive management and supervisory personnel to further explain the affirmative action plan.

Outside sources such as recruiters, subcontractors, vendors and suppliers will be informed verbally and in writing about our affirmative action policies.

Dara Himes is Arcadis U.S., Inc.'s Affirmative Action Officer. She has the day to day responsibility for the implementation and monitoring of our plan.

The affirmative action plan is available for your review in the Human Resources Department during normal working hours. If you wish to review the plan or if you have any questions, please contact Dara Himes at 602.797.4504.

NARRATIVE OF PROGRAMMATICACTIVITIESAND/OR GOALS

In accordance with Executive Order 11246, Arcadis U.S., Inc. currently conducts the following programmatic activities and/or pursues the following goals in addressing critical areas of affirmative action in the employment and promotion of the diverse workforce.

RECRUITING AND ADVERTISING: Arcadis U.S., Inc. demonstrates its commitment to affirmative action in its recruiting and advertising efforts through the use of newspapers, trade journals and Professional journals. Arcadis U.S., Inc. identifies itself in printed advertising as an "Equal Opportunity Employer."

The employment application includes the following at the beginning of the form: "We are an

equal employment opportunity company. We are dedicated to a policy of non-discrimination in employment on any basis including race, creed, color, national origin, sex, age, disability, marital status, sexual orientation, citizenship status or any other basis prohibited by law."

When job postings are placed in minority colleges or universities, Arcadis U.S., Inc. identifies itself as an "Equal Employment Opportunity Employer". Arcadis U.S., Inc. is a member of the National Association of Colleges and Employers. Arcadis U.S., Inc. submits its job postings to the America's Job Exchange which is a nationwide job bank sponsored by an association of state departments of labor.

HIRING PROCEDURES: Arcadis U.S. Inc. strives to eliminate and minimize intentional or unintentional bias against applicants with regard to testing, interviewing and selection procedures. In accordance with its affirmative action plan, Arcadis U.S., Inc., recruits and hires in all job classifications without regard to race, color, religion, creed, gender, sexual orientation, citizenship status, gender identity or expression, national origin, age, disability, genetic information, marital status, amnesty, or status as a covered veteran in accordance with applicable federal, state and local laws. Employment decisions are made so as to further the principle of equal employment opportunity. The Company reviews its employment practices to determine whether members of the various protected groups are receiving fair consideration and to determine whether appropriate outreach and positive recruitment activities have been undertaken to remedy deficiencies.

PROMOTION PROCEDURES: Arcadis U.S., Inc. in accordance with its affirmative action plan, ensures that promotion and transfer decisions are made in accord with principles of equal employment opportunity by imposing only valid requirements for promotional opportunities. In all job classifications, the Company promotes individuals without regard to race, color, religion, creed, gender, sexual orientation, citizenship status, gender identity or expression, national origin, age, disability, genetic information, marital status, amnesty, or status as a covered veteran in accordance with applicable federal, state and local laws. Each employee's salary and position are reviewed annually through Arcadis U.S., Inc.'s merit program.

TRAINING PROCEDURES: Arcadis U.S., Inc. in executing its affirmative action plan ensures that company sponsored training, education and tuition assistance are administered without regard to race, color, religion, creed, gender, sexual orientation, citizenship status, gender identity or expression, national origin, age, disability, genetic information, marital status, amnesty, or status as a covered veteran in accordance with applicable federal, state and local laws. Tuition reimbursement is available

to employees enrolled in an accredited degree program and the course(s) must further the career of the individual at Arcadis U.S., Inc.

PUBLICITY (INTERNAL AND EXTERNAL): Internally, Arcadis U.S., Inc. maintains an affirmative action plan with which all employees must comply. This is described in the Employee Handbook: "It is Arcadis U.S., Inc.'s continuing policy to afford equal employment opportunity to qualified individuals regardless of their race, color, religion, creed, gender, citizenship status, sexual orientation, gender identity or expression, national origin, age, disability, genetic information, marital status, amnesty, or status as a covered veteran in accordance with applicable federal, state and local laws" and to conform to applicable employment laws and regulations. For further information or to report violations of the equal employment and sexual harassment policies, contact the Senior Vice President of Human Resources. Externally, the Company identifies itself as an affirmative action employer on recruiting materials.

PROCUREMENT POLICIES: Arcadis U.S., Inc. does not maintain company-wide procurement policies. However, the company does establish subcontracting plans for specific contracts when required by the governmental agency issuing the contract. As such, Arcadis U.S., Inc. shall follow the below procurement policy/plan when performing work under contracts issued by our client.

It is the policy of Arcadis U.S., Inc. that business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practical opportunity to participate in the performance of subcontracts awarded by Arcadis U.S., Inc. It is Arcadis U.S., Inc.'s intention to aggressively pursue, wherever possible, subcontracting opportunities with minority-owned, women-owned, veteran-owned and disabled veteran-owned small businesses and ell as Historically Black Colleges and Universities/Minority Institutions (HBCU/Mis).

SELF ANALYSIS AND GOAL SETTING

At the conclusion of every Affirmative Action plan year, goals are discussed at length with employment decisions makers within the organization. Discussion of these goals take place with Business Division leaders and their respective internal Recruitment Managers and it's through that process that our goals are approached and our corresponding strategy and action plans developed.

About Arcadis

Arcadis is the leading global design and consultancy firm for natural and built assets. Applying our deep market sector insights and collective design, consultancy, engineering, project and management services we work in partnership with our clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets. We are more than 36,000 people, active in over 30 countries that generate over $5 billion in revenues. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.

www.arcadis.com

Supporting our clients in their quest to become Fit-for-Future.

Utilities must plan for unprecedented scenarios while navigating a changing workforce, but where should leaders focus?

Use the QR code below to explore the five fundamentals of becoming a fit-for-future water utility and the common thread that unites them.

Arcadis. Improving quality of life