

City of Lake Elmo

Public Works Operational Assessment

DRAFT PROPOSAL / November 20, 2024



Who We Are

AFTELIS: HELPING LOCAL GOVERNMENTS AND UTILITIES THRIVE



Since our founding in 1993, local government and utility leaders have partnered with Raftelis to transform their organizations by enhancing performance, planning for the future, identifying top talent, improving their financial condition, and telling their story. We've helped more than 600 organizations in the last year alone. We provide trusted advice, and our experts include former municipal and utility leaders with decades of hands-on experience running successful organizations. People who lead local governments and utilities are innovators—constantly seeking ways to provide better service to the communities that rely on them. Raftelis provides management consulting expertise and insights that help bring about the change that our clients seek.

We believe that Raftelis is the *right fit* for this project. We provide several key factors that will benefit Lake Elmo and help to make this project a success.

RESOURCES & EXPERTISE: This project will require the resources necessary to effectively staff the project and the skillsets to complete all of the required components. With more than 160 consultants, Raftelis has one of the largest local government management and financial consulting practices in the nation. Our depth of resources will allow us to provide the City with the technical expertise necessary to meet your objectives. In addition to having many of the industry's leading management and financial consultants, we also have experts in key related areas, like stakeholder engagement and data analytics, to provide additional insights as needed.

DECADES OF COLLECTIVE EXPERIENCE: Our associates and subject matter experts have decades of experience in strengthening local municipalities and nonprofit organizations. They've served in a wide range of positions, from city manager to public works director to fire chief.

PERSONAL SERVICE FROM SENIOR-LEVEL CONSULTANTS: You appreciate it when deadlines are met, phone calls are returned, and your challenges are given in-depth, out-of-the-box thinking. While other firms may assign your business to junior-level people, our approach provides exceptional service from senior-level consultants.

NICHE EXPERTISE: Our expertise lies in strengthening public-sector organizations. We're consulting specialists rather than generalists, focusing our strengths to do a highly effective job for a specific group of clients.

RAFTELIS FIRM CAPABILITIES



FINANCE: Meet your goals while maintaining a financially sustainable organization

- Rate, charge, and fee studies
- Financial and capital planning
- Cost of service and cost allocation
- Customer assistance programs
- Affordability analysis
- Utility valuation
- Budget development
- Financial condition assessments
- Debt issuance support
- Economic feasibility and analysis



COMMUNICATION: Communicate strategically to build an informed, supportive community

- Strategic communication planning
- Public involvement and community outreach
- Public meeting facilitation
- Graphic design and marketing materials
- Media and spokesperson training
- Risk and crisis communication
- Social media strategy
- Visual facilitation
- Virtual engagement



STRATEGIC PLANNING: Set the direction for the future of your organization and community

- Organization, department, and community-based strategic planning
- Effective Board / Commission / Council governance
- Retreat planning and facilitation



ORGANIZATION: Plan for long-term sustainability and operate with maximum efficiency

- Organizational and operational assessments
- Stormwater utility development and implementation support
- Performance measurement
- Staffing analysis
- Organizational climate and culture
- Asset management and operations
- Regional collaboration and service sharing
- Process improvement



TECHNOLOGY: Use your data and technology to improve experience and gain valuable insights

- Billing, permitting, and customer information audits
- Business process development
- Data management, analytics, and visualization
- Performance measurement and dashboarding
- Software solutions
- Website development
- Information technology assessments and strategic planning
- Customer management assessments and optimization
- CIS selection and implementation
- AMR/AMI feasibility studies
- Mobile workforce management
- Meter data management
- CMMS selection and implementation
- GIS optimization services
- Fleet management systems



EXECUTIVE SERVICES: Identify and train top talent to lead local governments and utilities

- Executive recruitment services
- Organizational development and training
- Executive coaching services
- Facilitated executive performance evaluations



Leading the industry

Raftelis staff shape industry standards for water and wastewater utility finance and management through our active leadership in AMWA, AWWA, WEF, NACWA, and EPA. Leadership positions for these organizations include:

AWWA

- Past President
- Asset Management Committee - 2 members
- Benchmarking Committee - Vice Chair
- Finance, Accounting, and Management Controls Committee - 4 members
- Rates and Charges Committee - 6 members
- Strategic Management Practices Committee – Chair & 3 Past Chairs
- Public Affairs Council - 2 member

WEF

- Finance and Administration Subcommittee - Chair
- Government Affairs Committee - 1 member
- Technical Practices Committee - 1 member
- Utility Management Committee - 7 members
- WEFTEC Conference Planning Committee - 1 member

EPA

- Environment Financial Advisory Board - 1 member



We wrote the book

Raftelis staff have co-authored many of the industry's leading guidebooks regarding water and wastewater financial and management issues, including:

- *Manual M5, Water Utility Management* (AWWA)
- *AWWA Utility Benchmarking: Performance Management for Water and Wastewater*
- *The Effective Water Professional* (WEF)
- *Affordability of Wastewater Service* (WEF)
- *Manual of Practice No. 27, Financing and Charges for Wastewater Systems* (WEF)
- *Manual M1, Principles of Water Rates, Fees and Charges* (AWWA)
- *Water and Wastewater Finance and Pricing: The Changing Landscape*
- *Water and Wastewater Rate Survey* (conducted and published in collaboration with AWWA)
- *INSIGHT* database and survey (conducted in collaboration with AMWA)
- *Water Rates, Fees, and the Legal Environment* (AWWA)

Project Plan

The City of Lake Elmo is seeking a professional consultant to assist with an operational review of its Department of Public Works. The goal of this engagement is to conduct an organizational assessment that evaluates staffing, identifies opportunities for improved efficiency and effectiveness of operations, and reviews organizational structure, technology, processes and policies in an effort to provide better service to your dynamic and fast-growing community.

Our team has extensive experience working with public infrastructure agencies across the country. Our focus is on providing solutions that work within the available resources and culture of the organizations we assist. The most innovative solutions in the world are valueless if they cannot be implemented or will not be accepted by the community. We pride ourselves on our ability to listen, analyze, and work with our clients to find not just a random selection of best practices taken from a manual, but real solutions that can be implemented effectively. We are pleased that our prior engagements have resulted in corresponding actions by our clients to implement the recommendations that we have jointly developed.

One of our strengths is the ability to build on existing capabilities and resources and to help organizations see things from a different perspective. We do this by listening to our clients and really understanding what they have to say. We do not operate with a pre-packaged set of recommendations, and we diligently work to avoid trying to fit our clients into a standard mold.

Our staff has substantial experience in all elements of public infrastructure management, and we are excited about the opportunity to assist the City proactively plan and prepare for the future. We understand the importance of respecting the staff who are in place to serve the public. We assume good intent and will work with the City to collaboratively develop recommendations for improvement. Without this, implementation of recommendations and lasting improvements are not typically successful. We believe this intentional approach, coupled with our extensive expertise in all facets of public operations, makes us uniquely qualified to assist the City on this project within the timeframe requested.

To complete this work, our team will apply a project approach, focusing on these specific objectives using our “Six R” approach. This involves soliciting and collecting information on City **Responsibilities**, **Resources**, **Requirements**, and **Results** in order to identify possible organizational and operational **Recommendations** with an associated **Roadmap** to implement positive change. This approach is depicted in the graphic to the right.



Responsibilities – What drives the need for your services? It might be the organization’s vision or mission, Federal, State, or local ordinance, or community service standards or expectations. We review these drivers to better understand service level constraints and opportunities for change.

Resources – What assets are available to achieve your responsibilities? These may include time, human resources, staffing, management capacity, financial position, contractual services, technology, and equipment and facilities. We assess the adequacy of these resources based on the service level expectations.

Requirements – What direction is provided to staff? The method by which staff approach service delivery is often guided by laws, codes, policies and procedures, or informal mechanisms like past practices or on-the-job training. These sources provided staff with direction on how they approach tasks and complete their work. We review these business processes to determine opportunities for improvement.

Results – What are the outcomes of your services? Our approach connects your responsibilities, resources, and requirements with the outcomes expected of your services. We assess measures of efficiency and effectiveness to assist in data-driven decision-making.

Recommendations – Are there opportunities for improvement? Based on our qualitative and quantitative analysis of your programs and services, we develop recommendations for improving organizational performance. These changes can range from high-level considerations (i.e., should we be in this business) to strategic issues (i.e., should we consider alternative service sources) to tactical issues (i.e., how can we improve the productivity, efficiency, and effectiveness of the activity or service).

Roadmap – How do we get there? We develop a plan that will guide the organization through the implementation of the recommendations for improvement. The Roadmap offers the recommended priority order of implementation, suggestions for phasing, and key milestones for success. The Roadmap also serves as a valuable tool for the organization as well as the community to promote accountability and communicate progress toward implementation.

THE FOLLOWING DETAILS OUR PROPOSED WORK PLAN FOR THE CITY.

Task 1: Project Administration and Kick-Off

Raftelis will hold a virtual kick-off meeting with City-designated staff to review the objectives of the project and schedule and to start developing a comprehensive understanding of the Public Works Department operations.

The kick-off meeting will be followed by a data gathering effort. We will provide a detailed data request and access to a shared electronic drive for the City to upload background information for both phases of the work including, but not limited to:

- Organizational charts (City overall and each utility if available, ideally with staff names)
- City and/or utility strategic plans
- Department/Utilities’ budgets for the past three years
- An annual City financial report for the past three years
- A complete set of Department job descriptions
- A list of appropriate peer utilities/entities for comparison

We will review and analyze these materials to provide context for the work to come.

Task 1 will also include standard, ongoing communications and quality assurance activities to ensure the project achieves the City's stated objectives on schedule and within budget. This includes monthly progress reports with a narrative discussion of all activities in progress and services anticipated to be performed during the next month.

TASK 1 DELIVERABLES

- Agenda and materials for project kick-off meeting
- Detailed data request and shared drive

Task 2: Organizational Assessment

The first phase of the work will focus on the organizational assessment to ensure Public Works operations have the appropriate staffing and structure to achieve its goals now and for the next several years. In order to prepare such a plan, it is critical to fully understand operations and initiatives so that current and future workload, and staffing, can be determined. Our project team is comprised of experts in operations and management with the knowledge of human resources to prepare an accurate and comprehensive understanding.

After the kick-off meeting, Raftelis will spend up to two days performing onsite and virtual data gathering, as appropriate, including interviews with key staff, site tours, and data discussions to understand department practices. Using the kick-off meeting and data gathered in Task 1 as a foundation, Raftelis will interview all managers, supervisors, and key staff in Public Works to gain a thorough understanding of activities. In addition, we will hold small group interviews with designees at all levels of the Department to ensure a more detailed understanding of daily operations and staff perceptions of staffing levels, workload and workload drivers, inter-relationships between workgroups, and potential ways to increase efficiency and effectiveness. We will conduct remote interviews as needed with staff who are unavailable while we are onsite. This helps manage the project schedule and allows us to meet with staff when it aligns with their schedules. Our team will identify themes from these interviews for follow-up research and analysis.

Based on data review and interview themes, we will compare current structure and staffing to industry best practices and recommend options to capitalize on potential efficiencies to meet current and future regulatory and strategic goals. Raftelis will likely request additional follow-up data as we delve into the organization and structure.

Raftelis will evaluate and compare desired level of service with staffing levels and identify areas in which the City can streamline resources to maximize efficiency as well as identify areas where it may consider additional resources to achieve stated levels of service and address workloads. Raftelis will benchmark Lake Elmo's utility organizational and staffing elements with both peer and

EUM's Ten Attributes of Effectively Managed Water Sector Utilities



national benchmarks for available data. Benchmarking and best practice information from industry-leading organizations¹ will be utilized as appropriate. By way of example, one model that could be used is the *Ten Attributes of Effectively Managed Water Sector Utilities*, as presented in the Effective Utility Management (EUM) framework. The EUM framework is a set of organizational, operational, and management guidelines for utilities universally endorsed by major industry associations.

Based upon this analysis, our team will create a current and recommended organizational structure that shows the positions and staffing required to accomplish the current and planned work and strategic goals of the City over the next five years, including specifics related to the type and number of staff positions necessary. We will also identify how to transition the current structure to the new structure over the next several years while minimizing disruptions and taking advantage of factors like attrition.

TASK 2 DELIVERABLES

- Current and recommended organizational structure

Task 3: Operational Efficiency Review

Raftelis is an industry thought leader in driving organizational and operational efficiency within utilities. Our project team understands the regulatory and resource challenges municipal utilities face, and we have the operational and tactical expertise to help utilities achieve their operational performance and strategic goals.

Using our industry expertise, our team will thoroughly review the operation of the City's Public Works functions, including the full suite of services provided out of the department (streets, water, wastewater, stormwater, parks and trails, etc.), as well as other key functions currently performed by Public Works staff. We will provide the City with a clear understanding of current performance and recommendations for enhancing it that are backed by industry benchmarks. We will formulate recommendations that consider the utilities' current resources with a goal to leverage existing resources to the maximum extent.

We will collaborate with the City to evaluate and recommend enhancements to the utilities' use and application of major utility software systems, such as Computerized Maintenance Management Systems (CMMS), and ensure that our review considers and incorporates industry standards and best practices for use of these types of systems. Our review of software systems will not stop at the operational application, it will reach into the cultural acceptance and use of preventative, predictive, and corrective maintenance programs. Modern infrastructure management organizations rely on both people and data to maintain systems, and our team has the specialized experience to ensure the utilities' people and data work together to achieve efficiency, while simultaneously achieving desired service levels and strategic objectives.

Our team will perform a review of customer service processes and practices. The processes and practices that govern an organization's customer experience must be efficient, effective, and provide value for customers. Our project team has deep expertise in evaluating the utility customer experience and will bring a wealth of industry knowledge to bear as we work with the City to ensure customer service functions achieve their desired impact.

Having completed interviews, data review, benchmarking, operational efficiency, and staffing level analysis, Raftelis will present its preliminary observations and recommendations to the City for review and discussion. Appropriate follow-up and revision will occur based upon the City's feedback.

TASK 3 DELIVERABLES

- Preliminary observations and recommendations presentation (virtual)

Task 4: Final Report and Presentation

Once recommendations have been finalized, Raftelis will prepare a draft report which includes our methodology, steps taken, analysis, findings, and recommendations for improvement, including staffing level projections.

Raftelis will solicit feedback on the draft report. We will ask that the City provide one set of consolidated comments and edits within four weeks of the draft being issued. Raftelis is also available for a web meeting or conference call to review the draft document and answer any questions.

Once the City's feedback is received, Raftelis will produce a final deliverable document. Raftelis will provide the final report within 30 days of receiving consolidated comments and after any web meetings and conference calls. Our team will be available to make a presentation of the report to staff, City management, or policymakers.

TASK 4 DELIVERABLES

- Draft report for review and comment
- Final report
- Stakeholder Presentation

Personnel

WE HAVE DEVELOPED A TEAM OF CONSULTANTS WHO SPECIALIZE IN THE SPECIFIC ELEMENTS THAT WILL BE CRITICAL TO THE SUCCESS OF THE PROJECT.

Our project team is made up of senior-level consultants with direct utility and local government experience. We place a high priority on being responsive to our clients and, as we determine scope and staffing for each project, we carefully consider our workload and the availability of resources to meet client needs and project schedules.

An organizational chart of our project team is as follows, and resumes for each team member are on the following pages.

CITY OF Lake Elmo

```
graph TD; A[CITY OF Lake Elmo] --> B[PROJECT MANAGER, SUBJECT MATTER EXPERT Scott Parker]; B --> C[STAFF CONSULTANTS Brian Kirsch, PhD Cielo Sharkus, PhD];
```

**PROJECT MANAGER, SUBJECT MATTER
EXPERT
Scott Parker**

**STAFF CONSULTANTS
Brian Kirsch, PhD
Cielo Sharkus, PhD**

J. Scott Parker

PROJECT MANAGER AND SUBJECT MATTER EXPERT

Senior Manager

PROFILE

Scott has over 20 years of experience in local government, utility management, and private consulting. Prior to joining Raftelis, he served as the Asset Manager for KC Water in Kansas City, Missouri. Before KC Water, he served as the Assistant Director for Public Works in both Olathe and Lenexa, Kansas, where he led the finance, data management, solid waste, field operations (streets, utilities, traffic), and communications divisions, and managed multiple Police, Parks, and Fire Department capital projects. He also has private consultant experience providing capital planning, financial analysis, data system, asset management, and interim-executive services to Ft. Smith, Arkansas; Jackson, Mississippi; and Kansas City, Kansas, all of whom had signed Federal Consent Decrees with the Environmental Protection Agency (EPA).

Scott's wide range of experience has given him extensive leadership and technical expertise in the fields of asset management, information technology, general management, and operations in multiple domains. This has allowed him to design, develop, and implement asset management programs in three (3) communities based on capital optimization strategies and asset management best practices as defined in ISO 55000 and 55001 and ISO 31000 standards and other industry criteria. As an Asset Management practitioner, Scott has used his understanding of the field to design teams that combine the best theoretical concepts of asset management with the opportunities and cultural circumstances specific to the organizations for which he has worked. He has demonstrable experience working with multiple data technologies and systems in the asset management and utility space, including multiple Computer Maintenance Management System (CMMS) platforms; ESRI Geospatial Products; Autodesk GeoBIM; Innovyze hydraulic modeling and asset management software; and various Closed Circuit Television technologies utilized for Sanitary and Stormwater Assessments which utilize NASSCO Pipeline Assessment Certification Program (PACP) standards. In Kansas City, he developed the organization's first data management strategic plan as well as its Business Case Evaluation criteria for information technology purchases, which led to both optimization of existing systems and reductions in the cost for new tools utilized in the department.

Scott has developed business risk exposure (Consequence and Likelihood of Failure) models utilized for investment decisions across multiple asset classes, including streets, water, sewer, and stormwater. In Kansas City, he helped reconceptualize and reformulate



Specialties

- Asset Management for utilities and local governments
- Capital Planning, Budgeting, and Implementation
- Data Strategic Planning, Management and Governance
- Business Risk Exposure (BRE) and Decision Support System (DSS) methodologies for infrastructure
- Data Analytics and Business Intelligence standards
- Business Process Modeling
- Performance Management (measurement, dashboarding, etc.)
- Organizational Design and Capacity Building
- Utility Governance

Professional History

- Raftelis: Senior Manager (2022)
- KC Water: Utility Officer – Asset Manager (2018-2022)
- Burns and McDonnell: Engineering Manager (2015-2018)
- City of Olathe, KS: Assistant Director of Public Works (2011-2015)
- City of Lenexa, KS: Assistant Director of Public Works/Assistant to the City Manager (2006-2011)
- Budget and Finance Analyst, City of Kansas City, Missouri (2003-2006)
- L.P. Cookingham Management Fellow, City of Kansas City, Missouri (2002)

Education

- Master of Public Administration – University of Missouri (2004)
- Master of Arts, History – University of Arkansas-Fayetteville (2000)
- Bachelor of Arts in History - Graceland University (1997)

Professional Memberships

- Institute of Asset Management
- Water Environment Federation
- American Water Works Association
- Water Research Foundation

the criteria for the utility's Annual Sewer Rehabilitation and Water Main Replacement Programs (total value \$65m/year) to a truly risk-based model from a break and fix model. He also led multiple cross-functional teams in the development of software applications and dashboards, including one that integrated as-built project information from city staff, consultants, and contractors working on the Consent Decree (40+ projects; 80+ discrete users; 35,000 work orders; projects valued over \$100 million) at no extra cost to the utility.

Scott has led the development of multi billion-dollar capital improvement plans in communities throughout the country as both an employee and consultant. He has extensive experience with all elements of utility capital planning, financing, and project delivery, particularly all fiduciary components related to enterprise funds (Water, Wastewater, Stormwater, Solid Waste); rate structure analysis and recommendations to governing bodies; bond sales and refinancing; long-term debt outlooks; and allocations of revenue and expense. At KC Water, he developed an alternative capital plan that was utilized for the Consent Decree renegotiations with the EPA and reduced the city's commitment by \$1.3 billion over the original program, while assuring more time to meet the tenants of the decree. He also created the Business Case Evaluation model for capital improvement projects, which has been recognized by the WEF Water Intrapreneurs for Successful Enterprises (WISE) program of industry leaders. He managed the successful selection (valued at \$100 million) of State Revolving Funds (SRF) for the \$160 million Blue River Treatment Plant Solids Handling project.

Scott has been a frequent presenter at multiple national and regional conferences on topics including general asset management, data management, and the application of asset management principles in specific operational and administrative environments. He has written or been featured in several articles focused on business process modeling, asset management, and water management and acts as a co-lead on the Water Environment Federation's WISE Data, Technology and Innovation team. He co-authored the white paper for WISE on the criteria and approach to Business Case Evaluations in capital planning.

PUBLICATIONS

[On asset management – A practitioner's perspective - Raftelis](#) by Scott Parker, July 2024.

"The Power of Business Process Modeling: Planning and Delivering Capital Improvements in Missouri" by Scott Parker and Daniel Ott, Water Environment and Technology (WE&T), September 2022.

"Asset Management Opens the Door to Wastewater Treatment Improvement," by Scott Parker and Brent Herring, September 2019.

"Reinventing Water Management," North America Outlook, Issue 1 (December 2020): 12-17.

NATIONAL AND REGIONAL PRESENTATIONS

2022 WEF Collections Systems Conference, Presenter

2022 AWWA/WEF Utility Manager's Conference, Presenter

2020 AWWA/WEF Utility Managers Conference, Presenter

2020 Kansas Asset Management User Group (KAMUG) Conference, Presenter

2019 Mid-America Regional Council Urban Stormwater Conference, Presenter

2015 American Water Works Association Utility Management Conference, Presenter

2015 Transforming Local Government (TLG) Conference, Presenter

2013 American Water Works Association 2013 Sustainable Water Management Conference, Presenter

Brian Kirsch PhD

STAFF CONSULTANT

Senior Consultant



PROFILE

Brian has a background in water resources management and possesses extensive analytical skills. His expertise lies in the areas of systems analysis and economic modeling. He has performed significant research in the field of water resources in which he has utilized aspects of engineering, policy analysis, risk management, economics, and market analysis.

KEY PROJECT EXPERIENCE

City of Oceanside (CA)

The City of Oceanside (City) requested that Raftelis conduct an organizational assessment of their water and wastewater utility. Brian is assisting in this effort by conducting interviews with staff and conducting a benchmarking exercise with the City's peers.

Montecito Water District (CA)

The Montecito Water District (District) asked Raftelis to conduct a salary benchmarking study in order to remain competitive in the recruitment and retention of staff. Brian served as the Lead Analyst, collecting and analyzing data from peer utilities, and state and national survey data. Based upon this analysis, Brian made recommendations for salary adjustments in several job positions.

City of Corona (CA)

As part of an Operational Assessment of the City of Corona's (City) water and wastewater utilities, Brian conducted an on-site facilities review and interviewed staff. The review showed that facilities were well-maintained, but interviews with staff indicated the potential for improvement in areas of maintenance and wastewater operations, as well as capital project delivery.

Southern California Edison (CA)

Southern California Edison (SCE) is primarily an electric utility, but they also own and operate a small water utility that serves Catalina Island. While most customers are located in the City of Avalon, SCE serves customers spread throughout the island. The water utility is beset with a limited rate base, aging infrastructure with difficult accessibility, scarcity of water supplies, high operating costs due to its island location, and a stringent regulatory environment. Raftelis conducted an Operational Assessment for them, which involved extensive staff interviews, document reviews, and an on-site assessment of their facilities. Brian was part of the team that made recommendations for improved asset management, capital project review and delivery, and dedicated resources within the larger SCE organization. In a follow-on project, Raftelis was asked to produce a memo in support of the water utility's general rate case. Brian analyzed a variety of alternative funding mechanisms that the water utility could use as revenue generation mechanisms.

Specialties

- Rate studies
- Financial planning
- Risk management
- Economic analysis
- Water resources management
- Data analysis

Professional History

- Raftelis: Senior Consultant (2018-present); Consultant (2014-2017)
- Colorado School of Mines: Postdoctoral Research Fellow (2011-2014)
- University of North Carolina - Chapel Hill: Research Assistant (2001-2010)

Education

- Master of Science & Doctorate - University of North Carolina at Chapel Hill (2004 & 2010, respectively)
- Bachelor of Science in Chemical Engineering & Bachelor of Arts in Environmental Engineering - Rice University (2001)

Incline Village General Improvement District (NV)

The Incline Village General Improvement District (IVGID) provides water, wastewater, and recreational services to an area in the Lake Tahoe region. The IVGID is anticipating significant capital costs due to aging infrastructure and has experienced sizable staff turnover recently. Brian is part of the team that will be conducting an Operational Review of the water and wastewater components of the IVGID and will be conducting staff interviews and performing an on-site evaluation. In particular, this study is intended to provide IVGID with recommendations to improve their asset management.

American Water Works Association

At the onset of the Covid-19 pandemic, the American Water Works Association (AWWA) was concerned with the potential financial impacts that the shutdowns may have on the water industry. Brian was part of a team at Raftelis that made estimates of potential impacts through changes in usage, construction, and delayed capital projects. The analysis and report were turned around to AWWA in less than two weeks.

City of Dayton (OH)

The City of Dayton (City) is receiving pressure from wholesale customers as to their overall headcount and rates. Raftelis has been asked to conduct an Operational Assessment that is expected to address the efficiency of their operations and their staffing. Brian assisted in this initial effort. In a second phase, Brian is helping to conduct a workforce assessment for one of the water utility's divisions that will help the division most efficiently deploy their workforce assets.

Anchorage Water and Wastewater Utility (AK)

The Anchorage Water and Wastewater Utility (AWWU) operates in a challenging environment. It has asked Raftelis to conduct an Organizational Structure Review. AWWU is unique, among other reasons, for the number of services they provide in-house, as opposed to outsourcing. Comparisons to other utilities are difficult without placing their operations in context. Brian is leading the effort to conduct benchmarking on the process level, in order to better contextualize AWWU's operations.

National Association of Clean Water Agencies

In anticipation of the 50th anniversaries of the National Association of Clean Water Agencies (NACWA) and the Clean Water Act, Raftelis was asked to produce a deliverable to serve as the definitive record of success of NACWA and the Clean Water Act. As part of this effort, Brian is researching, collecting, and organizing environmental, economic, and social data related to clean water in the United States in order to present a narrative supported by quantitative information.

Metro Water Recovery (CO)

Metro Water Recovery (Metro) is the wastewater treatment authority for much of metropolitan Denver. Metro conducts an annual operations and budget review in which external consultants are brought in to examine operating metrics, hear presentations on aspects of Metro's operations, and question senior leadership as to Metro's recent performance. Brian is one of the consultants that conducts this review and produces a report detailing our findings.

Cielo Sharkus PhD

STAFF CONSULTANT

Associate Consultant



PROFILE

Cielo has a doctorate in water resource engineering with a background in systems engineering and community-engaged science communication. She has extensive research and analytical experience as a fellow at the National Science Foundation, the U.S. Geological Survey, and the U.S. Department of Agriculture. Her expertise lies in the areas of strategic planning, organizational assessment, stakeholder engagement, science communication, qualitative and quantitative data analysis, and community resilience planning. Cielo has led several community-engaged projects for water use, stormwater management, water quality, and environmental risk management. She has also led statewide and national projects on environmental justice and federal compliance with environmental justice regulations. Cielo is an active member of the water and wastewater utility industry, having presented at several industry and academic conferences. She has co-authored three articles on flood risk, exposure, and community resilience to environmental hazards. Cielo recently was the lead author of a textbook chapter, "Understanding Unequal & Cumulative Risks in Our Daily Environment," for the first edition of Environmental Health: Foundations for Public Health. Prior to working at Raftelis, Cielo worked as a fellow at the National Climate Adaptation Science Center.

KEY PROJECT EXPERIENCE

U.S. Geological Survey National Climate Adaptation Science Center: Organizational Assessment (2023-2024)

This project involved a USGS bureau-wide equity service assessment by directing an evaluation of the CASCs' current climate justice-related projects, programs, and efforts as they relate to Executive Orders 12898, 13985, and 14008 and Title VI of the Civil Rights Act of 1964 statutory requirements. Primary project objectives included the assessment of allocated personnel, the content of proposed and funded projects, operations within project groups, and funding allocated to EJ/DEIA projects to determine organizational effectiveness in management, completion, and compliance of projects to statutory requirements. Cielo conducted individual interviews and focus group observations with executive management and project personnel, created a project-based management plan for improving efficiency, and implemented a series of organizational and policy improvements designed to optimize the allocation of human and financial capital toward the completion of objectives aligned with the EJ/DEIA strategic plan.

U.S. Geological Survey National Climate Adaptation Science Center: Strategic Plan Update (2023-2024)

In June 2020, as a part of compliance with Executive Orders 12898, 13985, and 14008 and Title VI of the Civil Rights Act of 1964 statutory requirements, the U.S. Geological Survey National Climate Adaptation Science Center created the

Specialties

- Community and stakeholder engagement
- Organizational assessment
- Science communication
- Strategic planning
- Environmental risk assessment

Professional History

- Raftelis: Associate Consultant (2024-present)
- United States Geological Survey: Environmental Justice, Equity, Inclusion Coordinator (2023-2024)
- Northeast Climate Adaptation Science Center: Research Fellow (2021-2023)
- The Energy Transition Institute of UMass Amherst: NSF Research Trainee (2021-2024)
- University of Massachusetts Amherst: Research Fellow (2019-2024)
- Fitchburg Massachusetts Department of Public Works: Research Partner (2018)

Education

- Doctor of Philosophy in Water Resource Engineering - University of Massachusetts Amherst (2024)
- Master of Environmental Engineering - University of Massachusetts Amherst (2021)
- Bachelor of Science in Chemistry/Biochemistry, Environmental and Sustainability Studies - Worcester Polytechnic Institute (2019)

Certifications

- Human Subjects Research Certification - CITI
- Water Cyber Infrastructure Training - CUAHSI

Professional Memberships

- AWWA: NE section
- American Society of Civil and Environmental Engineers
- American Geophysical Union
- American Water Resources Association

Environmental Justice, Diversity, Equity, Inclusion, And Accessibility Strategic Plan. Cielo served as the lead investigator conducting and analyzing individual, working group, and executive management interviews regarding the effectiveness of the strategic plan from 2020-2023. Cielo led the investigation and development of documentation detailing the evolution of the strategic plan throughout leadership turnover, daylighting key metrics and goals that had been previously obscured. Cielo assisted in developing new metrics for evaluating the success associated with each goal and revising the strategic plan to align with the top goals identified by personnel.

U.S. Geological Survey: Community Outreach and Science Communication Fellowship (2022-2024)

Since 2019, Cielo has been a principal investigator involved in numerous environmental risk management projects with stakeholders and community members in Holyoke, which aimed at increasing community resilience to hydrologic hazards. As a fellow of the U.S Geological Survey, Cielo developed a multi-stage sampling approach to understand knowledge systems, perception of environmental risk, and factors driving water use decisions in the Holyoke community, contributing to the preparation of National Environmental Policy Act (NEPA) documents and a climate resilience strategic plan for a community NGO. Cielo designed and analyzed bilingual surveys administered to individual stakeholders, focus group participants, and NGO executive management. Cielo led a series of science communication workshops to increase community engagement and awareness of environmental risk to 100 participants. Cielo also served as an on-call scientist for community NGOs, performing water quality and quantity analysis using field investigations and hydrological modeling software.

City of Fitchburg (MA): Community Outreach Campaign for NPDES & MS4 Compliance (2018)

In 2012, after receiving a consent decree from the U.S. Environmental Protection Agency, the City of Fitchburg sought to address deficiencies in the City's combined sewer overflow system (CSO). Cielo worked with the Fitchburg Department of Public Works to identify methods to reduce stormwater runoff volume in the North Nashua River and maintain compliance with U.S. EPA's Public Education and Outreach minimum control measure through a community outreach campaign with the Fitchburg Public Schools. Cielo led the design of an educational workbook and educator resource guide to support hands-on engagement in stormwater awareness. Cielo supported the City of Fitchburg DPW in compliance with the Clean Water Act, National Pollutant Discharge Elimination System (NPDES), and Massachusetts Municipal Separate Storm Sewer Systems (MS4) through internal and external stakeholder interviews, field research and investigation, and the community outreach campaign.

RELEVANT PROFESSIONAL EXPERIENCE

Energy Transition Institute: National Science Foundation Research Trainee (2021-2024)

Heavier, more intense summer storms have increased annual precipitation in the Northeast, leading to increased concern over large-scale contaminant transport in surface and groundwater. Cielo served as a lead scientist responsible for designing, constructing, and evaluating watershed-scale hydrodynamic models (HEC-HMS, HEC-RAS, MODFLOW) to assess the impact of climate change, extreme rainfall, and severe weather events on ecosystems. Since extreme weather can cause economic effects on local governments, utilities, and businesses, Cielo designed a case study simulating future changes in river discharges, reservoir storage, and sediment load under several extreme rainfall scenarios. Cielo utilized the results of this study to determine the downstream economic costs of climate change on hydropower capacity and generation on the New England Independent System Operator (ISO-NE). Cielo collaborated with community groups, interdisciplinary technical experts, and federal agency representatives to develop a comprehensive climate resilience plan.

Northeast Climate Adaptation Science Center: Environmental Justice Research Fellow (2021-2022)

Following an expressed need from local stakeholders and community members, Cielo served as a research fellow at the Northeast Climate Adaptation Science Center, investigating the implications of legacy contaminants in brownfield sites along the Connecticut River in Holyoke, Massachusetts. Cielo conceptualized, designed, and deployed a MODFLOW 3D model of non-aqueous phase liquids in an unconfined aquifer, examining transport under extreme rainfall scenarios. Cielo used the results of this model to evaluate environmental risk for community members who used groundwater from artisanal wells, conducting geospatial risk assessment models at the census block group level. Cielo collaborated with local NGOs and community organizations to develop solutions to mitigate and manage environmental risk and exposure.

University of Massachusetts Amherst: Spaulding Smith Fellow (2019, 2023, 2024)

Climate change increases the frequency and severity of precipitation events in the Northeast United States. Severe precipitation events may impact communities disproportionately vulnerable to disturbances in water systems. To examine the impact of 100- and 500-year flooding, Cielo constructed spatially explicit geospatial models to investigate the distribution of flood risk from 2010 to 2020 across the 351 municipalities and 4,985 census block groups using the Environmental Justice Index (EJI) developed by the Massachusetts Executive Office of Energy and Environmental Affairs. Cielo worked closely with the Massachusetts Department of Conservation and Recreation Flood Hazard Management Program to build disaster and risk reduction mitigation discourse that supports community members exposed to flooding and supports MA DCR's efforts to comply with Executive Order 14008.

PROJECT LIST

- USGS/NCASC (National) – Organizational Assessment
- USGS/NCASC (National) – Strategic Plan Update
- USGS/NCASC (National) – Community Outreach Campaign for Water Use Study
- Fitchburg (MA) – Community Outreach Campaign for NPDES & MS4 Compliance
- Energy Transition Institute (MA) – Large-Scale Surface Water Quality Study
- USGS/NECASC (MA)– Groundwater Contaminant Transport and Exposure Study
- UMass Amherst (MA) – Flood Hazard Study
- UMass Amherst (MA) – Burned Watershed Contaminant Study
- ZHAW, Wädenswil (Switzerland) – Industrial Contaminant Study
- UMass Amherst (MA) – Classroom Engagement Study

PUBLICATIONS

- Spatial and Temporal Analysis of Flood Risk in Massachusetts Environmental Justice Communities. (In review, ASCE Journal of Water Resources Planning and Management) 2024.
- Understanding Perception of Risk and Adaptation Strategies to Climate Change Through Participatory Research with a Massachusetts Urban Farming Community. (In review, Environmental Research Letters) 2024.
- Understanding Unequal & Cumulative Risks in Our Daily Environment - Environmental Health: Foundations for Public Health. 2024.
- Flood risk behaviors of United States riverine metropolitan areas are driven by local hydrology and shaped by race. Proceedings of the National Academy of Sciences. 2021.

PRESENTATIONS

- “Understanding Knowledge Systems and Adaptation Practices in Response to Extreme Precipitation Events: Insights from Community Engaged Research in Massachusetts,” American Geophysical Union Annual Meeting, 2023

- “Diverse Knowledge Systems Drive Dynamic Adaptation to Watershed Hazards,” American Water Works Association – ACE, 2023
- “Spatial and Temporal Variation of Hydrological Risks in Urban and Rural Areas in Massachusetts,” Frontiers in Hydrology Meeting, 2023
- “Climate Change Amplifies Flood Hazards in Socially Vulnerable Areas,” European Geophysical Union, 2022
- “Developing Community-based Solutions to Environmental Hazards,” Energy Transition Institute, 2022
- “Using Self-Assembled Flood Maps for Risk Analysis and Social Deprivation,” American Association of Geographers Annual Meeting, 2022
- “Community-Focused Research for Environmental Risk Management,” National Climate Science Adaptation Center Annual Fall Symposium, 2021
- “The Art of Collective Action: Utilizing Science and Engineering for Community Hazard Resilience,” Northeast Climate Adaptation Science Summer Symposium, 2021
- “Understanding Socioenvironmental Risk Factors For 100- And 500-Year Flood Events,” NSBE National Convention, 2020
- Assessing Social Vulnerability and Hydrological Risk in Massachusetts,” American Geophysical Union Annual Conference, 2019

Cost Proposal

The total fixed fee for completion of the scope of work is \$52,350. This includes all professional fees and expenses.

The following is the cost by project activity.

Activity	Description	Cost
1	Project Administration and Kickoff	\$4,475
2	Organizational Assessment	\$24,100
3	Operational Efficiency Review	\$6,000
4	Final Report and Presentation	\$17,775
TOTAL		\$52,350

The City will be invoiced monthly as tasks are completed.