1. Wednesday, August 28, 2024
Room 201/202
8:30 AM - 9:00 AM

Title: Exploring Wet-Weather Solutions Amidst Strict NPDES Discharge Limits

Presenter(s):
Milad Ebrahimi, Enterprise Asset Strategy Manager
WSSC Water
Jimit Modi, Project Manager
Black and Veatch

Abstract:
Motivation Managing excessive wet-weather events at wastewater treatment plants (WWTPs) tends to be a challenge associated with combined sewer systems and lenient nutrient discharge limits. As such, solutions are traditionally focused on maintaining adequate hydraulic conditions as well as TSS, BOD, and pathogen removal. This work presents analysis of alternatives for managing large wet-weather flows in the unique context of separate sanitary sewer systems and achieving NPDES limits for total nitrogen (TN) and total phosphorus (TP). This work discusses key considerations for defining existing wet-weather capacity and associated process optimization opportunities; reviews available modern technologies for managing wet-weather flows; and presents an approach for developing and evaluating solutions using cost and non-cost criteria. In doing so, the work provides meaningful insight/guidance to attendees who may be facing a similar wet-weather challenges. Problem statement The Water Resource Recovery Facility (WRRF) is designed for 30.6 million gallons per day (MGD) with NPDES discharge limits for TN and TP at 4.0 and 0.3 mg/L, respectively. Numerous, large wet weather flows up to 117 MGD have occurred since 2015, making permit compliance for specific regulated parameters challenging. A project was initiated to define the existing treatment capacity and to conduct a technology screening to identify most-beneficial alternatives for managing peak flows. Selected alternatives are intended to be carried forward in a Business Case Evaluation (BCE). Methodology Process and hydraulic models of the WRRF were developed and calibrated in BioWIN™ and InfoWorks ICM, respectively. Both models were utilized to simulate wet-weather conditions and define the existing treatment capacity of each unit process as well as facility-wide bottlenecks limiting capacity. Process optimization opportunities and new standalone technologies were considered to increase treatment capacity. Expansion alternatives were developed and evaluated through the lens of weighted financial and non-financial criteria including Capital and annual O&M costs, Regulatory Impact / Permit Requirements, Treatment Process Impacts, Hydraulic Capacity Impacts, Constructability & Ease of Implementation, and Operations & Maintenance demand. Results The evaluation initiated with a total of eleven alternatives spanning preliminary, primary, secondary, and auxiliary treatment processes. Each alternative was scored utilizing weighted criteria developed based on Utility priorities. The SRT augmentation alternative was immediately implemented by plant staff at the conclusion of the project. The Densadeg, Compressible media filters, primary clarifiers, Combining NAS/DAS, and Biomass storage alternatives were eliminated. The following combinations were identified to be carry forward to the business case evaluation: Actiflo, Bioactiflo, Contact Stabilization + Pile cloth filtration, and Flow EQ + Bioactiflo. The presentation will discuss strengths and weakness of each alternative and key considerations driving costs and scores. The presentation will also discuss key considerations such as defining acceptable risk, maximizing the value of an investment through a

combination of options and associated dual use of technologies; and whether traditional planning criteria (e.g. 100-yr flood elevation) is adequate in the face of climate change.

Learning Objectives:
Review and discuss available modern technologies for managing wet-weather flows.
Present an approach for developing and evaluating solutions using cost and non-cost criteria.
Discuss key considerations such as defining acceptable risk and maximizing the value of an investment through a combination and dual use of technologies.

Biography:
Dr. Ebrahimi is an experienced program manager and environmental scientist with Doctoral degree in civil engineering and demonstrated history working in public utilities, private, and academia. He is skilled in developing innovation program initiatives, business and capital improvement programs, Asset Management, identifying areas of risk and enhancing performance of environmental systems including optimization of water resources facilities. Dr. Ebrahimi is a distinguished engineer in public sector with an extensive track record of publications, grant proposals, and patents.

Jimit is an experienced project manager with over 16 years of experience in the DC metro area. Throughout his career, he has worked with a diverse group of clients, including WSSC, DC Water, the Town of Leesburg, and the City of Hagerstown, just to name a few. Jimit currently serves as a project manager at Black & Veatch, where he has successfully completed various projects both inside and outside of the fence.

2. Wednesday, August 28, 2024
Room 203/204
8:30 AM - 9:00 AM

Title: Knock Out, Drag Out Fight: Centrifuge vs. Belt Filter Press – Title for Best Dewatering Technology to Squeeze Poop at Dunn Water Reclamation Facility!

Presenter(s):
Manuel Moncholi, Senior Process Engineer
Stantec
Shyam Sivaprasad, Process Engineer
Stantec

Abstract:
Wastewater solids stream dewatering is a quintessential unit operation in all the treatment facilities irrespective of the location. The dewatering operation plays a crucial role in minimizing the volume of sludge to be disposed which greatly aids in hauling cost savings. This dewatering pilot study was conducted in William E. Dunn Water Reclamation Facility (WEDWRF) in Pinellas County, Florida. It is operated by Pinellas County Utilities and treats wastewater collected from the county's northern service area. WEDWRF is a 9.0-MGD capacity advanced 5-Stage Bardenpho process wastewater treatment facility that currently operates at an annual average flow of approximately 6.5 MGD. The existing solids management system for the WEDWRF includes two rotary drum thickeners (RDT) for thickening waste activated sludge (WAS), two open top sludge holding tanks, two belt filter presses

(BFP), and truck loading bay. The existing BFP are old and requires replacement. A pilot-scale dewatering study was conducted with the following objectives: 1. Evaluate the dewatering performance of new belt filter press and centrifuge. 2. Optimize the polymer dosage to maximize cake solids and solids capture. 3. Evaluate the efficacy of directly dewatering WAS vs TWAS using both centrifuge and proposed BFP technology 4. Analyze composite samples of centrate/filtrate stream for chemical oxygen demand (COD), ammonia, and phosphorous to determine the quality of the reject stream back to the headworks. 5. Perform life cycle cost analysis for dewatering operation and maintenance of BFP and centrifuge. The pilot testing results indicate that both BFP and centrifuge technology could be suitable for WEDWRF dewatering improvements. The BFP consistently achieved a cake solids concentration of 17.5 (%TS) for WAS. In the case of TWAS, the average percent cake solids were about 17.0 (%TS). Similarly, both the centrifuges performed better than BFP producing cake solids at an average of 22.0-23.0 (%TS) for WAS and 20.0 (%TS) for TWAS. However, the polymer consumption in the case of centrifuge was at least twice as much as BFP polymer consumption for both WAS and TWAS to achieve a 3-5% increase in percent cake solids. The centrate/filtrate composite analysis samples showed interesting observations with high concentrations of nutrients for TWAS. This could be attributed to the release of nutrients in the sludge holding tank. A determination of the exact duration and conditions that would cause this release of nutrients and soluble COD is something the pilot did not focus on. An understanding of the impacts of sludge degradation in sludge holding tanks especially in summer months is important for this and many other plants that use sludge holding tanks as buffers to limit plant dewatering operations schedules to only few days a week. This could also impact the dewaterability of TWAS, which was evident as the cake solids (%) obtained in TWAS was lower than WAS. Furthermore, higher nutrient and COD loading in the centrate stream recycled to the headworks of the plant could lead to increase in aeration demands to treat the increased ammonia load. Similarly, there could be an impact in disinfection chlorine demand. To conclude, the matchup of BFP against centrifuge based on the pilot study results in a tie. The final showdown to determine the winner would be dependent upon net present value and life cycle cost analysis. The presentation will cover the dewatering performance results for each equipment based on different operational and process parameters, life cycle cost analysis for each equipment alternative with both WAS and TWAS and the verdict will be presented at the 2024 Tri-Association Conference.

Learning Objectives:

Significance of biosolids dewatering operation
Belt filter press and centrifuge operation and process performance for dewatering biosolids
Nutrient and COD impacts of dewatering recycle streams and their potential impacts on plant effluent limits

Biography:

Manny is a Senior Process Engineer at Stantec, Coral Gables, Florida. Manny received his bachelor's in Chemical Engineering from Stevens Institute of Technology, Master's and PhD in Civil and Environmental Engineering from Florida International University. Manny is a registered Professional Engineer in Florida and Texas.

Manny specializes in research and project development for the treatment of wastewater. His particular focus is on the combination of treatment of biosolids and organic diversion to produce beneficial nutrient and energy resources. Manny also uses his process engineering background to support water and wastewater treatment projects in the municipal and industrial water sectors throughout our South and Gulf regions. He has always been hands-on, needing to delve into the theory, science, and essence of the thing at hand. This nature and his years in the public sector

have helped Manny relate to utility employees. He is most excited about taking technologies from university labs and the drafting table or computer monitor into the reality of full-scale facilities.

Shyam is a Process Engineer- EIT at Stantec. Shyam received his bachelor's degree in Chemical Engineering from Anna University, India, and his Master's degree in Agricultural and Biological Engineering from The Ohio State University with research focus on thermochemical conversion and wastewater treatment. He is a certified LEED Green Associate and an EIT in the Environmental discipline. Shyam's experience includes wastewater treatment, biosolids processing, solids dewatering, anaerobic digesters start-up performance evaluation, and wastewater pump station design. Shyam also conducts research on understanding sewage sludge rheology and investigating emerging contaminants such as PFAS, and microplastics in water/wastewater. Presenter 2 - Pooja works as a project engineer on wastewater and water-related design and planning projects. Her technical expertise is focused on water and wastewater treatment, where she performs alternative analysis, feasibility studies, design, and project management activities. Curious about anything to do with resource recovery from wastewater, Pooja believes it's an underrated resource that can benefit sustainability in a circular economy. Currently, she conducts research for our Stantec Institute for Water Technology & Policy, investigating research gaps and literature review in the field of water reuse and wastewater process intensification.

3. Wednesday, August 28, 2024
Room 207/208
8:30 AM - 9:00 AM

Title: AlexRenew's Interest in Loans to Deliver Alexandria's Largest Infrastructure Project

Presenter(s):
Bridget Kocot, Quality Manager
Brown and Caldwell
Caitlin Feehan, Interim – Chief Administraive Officer
AlexRenew
Lake Akinkugbe, Director of Finance
AlexRenew

Abstract:
Like many older cities in the United States, the City of Alexandria is served by combined sewers, which during periods of intense rainfall, discharge excess flows into local waterways via permitted combined sewer overflow outfall structures. In April 2017, the Virginia General Assembly passed a new law requiring an accelerated schedule mandating remediation of the four existing combined sewer overflow (CSO) outfalls within the City of Alexandria. In response to the legislation, AlexRenew, the wastewater treatment authority for Alexandria, developed the RiverRenew Program to meet the new regulatory requirements. In June 2018, AlexRenew and the City of Alexandria executed an Outfall Transfer Agreement that transferred the existing combined sewer system outfall assets from the City to AlexRenew. When AlexRenew assumed responsibility from the City of Alexandria to address the combined sewer problem, AlexRenew not only faced a huge technical challenge, but a financial one as well. AlexRenew's Water Resource Recovery Facility (WRRF) processes approximately 13 billion gallons of wastewater each year and serves over 300,000 customers in Alexandria and Fairfax County. AlexRenew's vital operations and infrastructure are

funded through wastewater bills and direct payments by customers in the City of Alexandria and parts of Fairfax County. Only three cities in Virginia have CSO remediation mandates: Richmond, Lynchburg, and Alexandria. Richmond and Lynchburg have received considerable State support over the decades with Richmond receiving $69 million or 9% of CSO project cost and Lynchburg receiving $51 million or 17% of CSO project cost. At a capital cost of $615 million, RiverRenew is the largest infrastructure initiative in the history of Alexandria. The CSO remediation would result in the RiverRenew being largely funded by sewer rate increases imposed on Alexandria residents. In addition, the aggressive mandated schedule deadline didn't allow AlexRenew the ability to spread reasonable rate adjustments over a long period of time, subjecting ratepayers to "rate shock." To fund RiverRenew and offset the significant sewer rate increases, AlexRenew developed a funding strategy that included a mix of state and federal loans with record low-interest rates, state and federal grants, and a rate-setting process to manage rate affordability for all Alexandrians. The first piece of AlexRenew's funding strategy was securing low-interest Federal and state water loan to secure debt financing for RiverRenew. In 2021, AlexRenew secured a $186 million loan with an interest rate of 1.35% through the Virginia Clean Water Revolving Loan Fund (VCWRLF). The VCWRLF is a program administered by the Virginia Department of Environmental Quality (VDEQ) and provides low-interest financing options to Virginia cities, towns, and wastewater authorities for the improvements to public wastewater collection and treatment facilities. Also in 2021, AlexRenew secured a $321 million loan through the Environmental Protection Agency's (EPA) Water Infrastructure and Finance Act (WIFIA), a federal loan program designed to accelerate investment in water infrastructure by providing long-term, low-cost assistance for significant water projects nationwide. To further alleviate this financial burden, AlexRenew, with the City of Alexandria, moved forward with the second piece of the funding strategy, soliciting funding from the Governor and the General Assembly for the program, similar to what has been provided for other Virginia communities with combined sewer systems. AlexRenew has received a $50 million grant through the Virginia Public Building Authority (VPBA) to support the Program to reduce the financial burden on AlexRenew's customers. Additionally in 2023, AlexRenew worked with VDEQ to execute a $90 million American Rescue Plan grant in support of the Tunnel Project. The state and federal loans and state grants have helped to reduce AlexRenew's debt capacity associated with the Program, which assists in offsetting rate increases to customers. To further mitigate "rate shock" to AlexRenew's customers, the AlexRenew Board of Directors adopted an approach in 2019 to recover RiverRenew costs through combined base and flow charges of their customers. The Board of Directors used AlexRenew's fiscal principals as a guide in the tiered two-year rate setting process to ensure rate consistency and predictability to customers in the City of Alexandria and parts of Fairfax County. The Program is now in its third two-year rate adjustment to meet the funding needs of RiverRenew. Future rate increases are anticipated in 2026 to help pay for RiverRenew. As a result of the coordinated efforts between AlexRenew and the City of Alexandria with support from the VDEQ, the EPA, and the Commonwealth of Virginia, AlexRenew has successfully reduced the impact to the ratepayers throughout the life of the RiverRenew Tunnel Project and years to come.

Learning Objectives:

How to navigate through funding challenges of a state mandated CSO Program on an accelerated schedule.

How AlexRenew's rate setting process ensured rate consistency and predictability to customers in the City of Alexandria and parts of Fairfax County.

Understand Owner and Lead Contractor requirements as part of loan agreements in a Design-Build project.

Biography:
Bridget Kocot has a Bachelors degree in Civil Engineering from The Catholic University of America and is a licensed professional engineer in the Commonwealth of Virginia. Ms. Kocot has over 15 years of experience in development and infrastructure projects and is presently the Quality Manager for the RiverRenew Program in Alexandria, Virginia. She is a member of the American Society of Civil Engineers and the American Society of Quality.
Caitlin Feehan currently serves as AlexRenew's Chief Administrative Officer, responsible for the utility's finance, procurement, and communications departments and the $615 million RiverRenew program. She holds a bachelors in environmental engineering from Northwestern University and a masters of environmental management from Yale University. She is a licensed professional engineer in the Commonwealth of Virginia and the District of Columbia, and a LEED-accredited professional.

4. Wednesday, August 28, 2024
Room 215
8:30 AM - 9:00 AM

Title: SAFETY FIRST: Fire Protection Assessments for WWTPs

Presenter(s):
Jason Vernooy, Project Manager
GHD

Abstract:
Most wastewater treatment plants (WWTPs) consist of structures with various usages, built through multiple upgrades over several decades. This can result in a patchwork of fire protection systems and other life safety devices with limited compatibility, serviceability, and functionality. Despite their critical role in reducing risks to valuable personnel and physical assets, these elements are often overshadowed by a focus on the wastewater treatment process, permit compliance, and routine operations – an increasingly common issue in the face of aging utility infrastructure and constrained budgets. As such, fire protection may only be addressed on a case-by-case basis when updated Code provisions are occasionally triggered by proposed construction involving major alterations or changes in occupancy. This presentation will highlight the importance and benefits of performing a facility-wide fire protection assessment to survey existing conditions, document applicable Code requirements along with other relevant industry standards and best practices for owner consideration, identify possible deficiencies, develop recommended improvements, and establish a prioritized implementation plan based on factors such as relative risk reduction and associated costs. Two case studies of recent campus-wide fire protection assessments at local WWTPs will be incorporated to illustrate example procedures, alternatives, and outcomes. The two reference projects cover many of the types of issues that are typical for fire protection assessments at existing WWTPs, as well as how the process can be tailored to address project-specific details and challenges. Distinct fire protection considerations for WWTPs will also be discussed, including determination of hazardous location classifications in accordance with National Fire Protection Association (NFPA) 70 (National Electrical Code) and 820 including situations where applicable requirements may have changed over time, integration of new and existing components from different manufacturers, protocols for conducting regular inspections and testing, and remote

monitoring and alarming through plant process control system (PCS) or supervisory control and data acquisition (SCADA) system features already in place. This information can help facility owners evaluate the need for further safety improvements and plan future investments.

Learning Objectives:
When a fire protection assessment would be useful for a WWTP.
What a fire protection assessment for a WWTP might consist of.
What are some typical results and recommendations from a fire protection assessment for a WWTP.

Biography:
Jason has over 15 years of experience (all with GHD) in the design and construction of municipal water and wastewater treatment facilities in the Mid-Atlantic region and beyond. He has served as Project Manager or Lead Design Engineer in several facility-wide upgrades at wastewater pumping stations and treatment plants with rated capacities ranging from 0.25-30 mgd, including advanced facilities designed to achieve discharge limits of 4.0 mg/L total nitrogen and 0.3 mg/L total phosphorus or less.

5. Wednesday, August 28, 2024
Room 217
8:30 AM - 9:00 AM

Title: From Catastrophe Crisis to Resilient Renewal: Leveraging Innovation to Accelerate the Emergency Design and Construction of a Failed 48-inch Force Main

Presenter(s):
Paul Longo, Regional Insfrastructure Lead
Dewberry
Richard Kincheloe, Regional Market Segment Lead
Dewberry

Abstract:
Goochland County is a suburban and rural County west of Richmond. In summer of 2021, one of the County's most critical pieces of infrastructure, the Eastern Goochland Force Main, ruptured. The 10-mile 48-inch diameter fiberglass reinforced plastic sewer force main conveys raw sewage originating from Goochland and Henrico Counties to the City of Richmond for treatment. The rupture caused the unauthorized discharge of approximately 300,000 gallons of wastewater, the recreational closure of a portion of the James River, and a Consent Order with DEQ. As a result, Goochland County requested an accelerated rehabilitation design to replace the failing system. The main goals of the sewer rehabilitation project were to determine potential causes of past ruptures, design a system to address the identified issues, and rehabilitate the first 2.5 miles of the existing force main. To accomplish these goals, several rehabilitation alternatives were developed to determine the optimum approach that met the hydraulic requirements and ultimate capacity needs of the system. The rehabilitation of the force main was ultimately completed using a combination of traditional open-cut installation and large diameter sliplining techniques totaling 12,000 LF of new 42-inch HDPE pipe. The presentation will summarize the history of the pipeline, design and construction phase challenges associated with rehabilitation of large diameter pressure

pipelines, the innovative design approach to minimize public impact and meet project goals, the process to meet the emergency project's accelerated design schedule and demonstrate why detailed design and construction inspection of complex pipe systems is critical to the long-term success of a system.

Learning Objectives:
Large Diameter HDPE Sliplining Lessons Learned
Expedited Design, Permitting and Construction
Large Diameter Force Main Rehabilitation

Biography:
Paul is a licensed professional engineer and is currently Dewberry's regional infrastructure lead, managing and executing complex linear infrastructure projects throughout the Country. He is a member of DBIA and has executed over $350M worth of linear infrastructure projects using alternative delivery methods. His experience covers condition assessment, asset management, repair, rehabilitation, and replacement of pipelines from 8-inch diameter to 150-inch diameter.

6. Wednesday, August 28, 2024
Room 201/202
9:00 AM - 9:30 AM

Title: Funding to Mitigate Disasters with "Fed Funds"

Presenter(s):
Karen Edwards-Lindsey, Environmental Protection Specialist
U.S. Environmental Protection Agency, Office of Water, Water Infrastructure and Cyber Resilience Division

Abstract:
Drinking water and wastewater systems across the country are at risk to many kinds of water emergencies, causing disruptions to service. The risks and threats range from floods, hurricanes, droughts, wildfires, earthquakes or cyber-attacks. The types of assets that need to be resilient to these hazards include treatment facilities, pipes, physical barriers, source water, water collection and intake, electronic, computer, or other automated systems and many more. To help to mitigate disasters, the United States Environmental Protection Agency (USEPA) developed tools and resources to help build resilience at water and wastewater systems. Our session will highlight free tools and guides available to assist drinking water and wastewater utilities in detecting, planning, responding, and recovering from water emergences. Lastly, participants will learn about Fed FUNDs. FedFUNDS provides tailored information to water and wastewater utilities about applicable federal disaster funding programs from FEMA, USDA, EPA, HUD, SBA, and USBR. The Fed Funds Web pages include new features including Search for the Right Funding, Successful Funding Examples across the nation, funding for tribes, and ways to combine funding from different federal agencies. A demonstration will be conducted on how to use Fed Funds and provide an overview of the newly available funding resources.

Learning Objectives:

Learning about free tools and guides available to assist drinking water and wastewater utilities in detecting, planning, responding, and recovering from water emergences.
Participants will learn about FedFUNDS that provides tailored information to water/wastewater utilities about applicable federal disaster funding programs from FEMA, USDA, EPA, HUD, SBA, and USBR.
A demonstration will be conducted on how to use Fed Funds and provide an overview of the newly available funding resources.

Biography:
Karen Edwards-Lindsey is an Environmental Protection Specialist who joined the U.S. Environmental Protection Agency in 1997. She currently works in the Water Infrastructure and Cyber Resilience Division, on the Communications and Interdependencies Team as the project lead on multimedia outreach to the Water Sector and key stakeholders. She also works on other projects to raise the awareness among other critical sectors, at local and state levels about the importance of water and its role as a lifeline sector. She has a Bachelor of Science in Business Management from Maryland University. (Edwards-lindsey.karen@epa.gov, 202-564-3797)

7. Wednesday, August 28, 2024
Room 203/204
9:00 AM - 9:30 AM

Title: Technology Spotlight: Updates from Ecoremedy Fluid Lift Gasification Projects in PA and WA

Presenter(s):
Dion Banks, Vice President of Marketing and Public Relations
Ecoremedy, LLC

Abstract:
In 2023-2024, Ecoremedy is bringing online two commercial-scale autothermal gasification and drying facilities recently purchased by wastewater utilities. On the East Coast, the Derry Township Municipal Authority (DTMA) purchased the demonstration facility operated at the Morrisville, PA WWTP for installation at the Clearwater Road WWTF (5 MGD) in central Pennsylvania. In 2022, DTMA purchased a refurbished previously-demonstrated system, which operated for two years at the Morrisville Municipal Authority WWTF in Morrisville, PA. Leveraging past commercial successes with gasification and drying of manure-based feedstocks, Ecoremedy designed, built, owned, operated, and maintained the system during demonstration in Morrisville until the demonstration concluded in 2021. In 2022, the existing DTMA drying building was prepared for the refurbished gasification system through demolition of an indirect contact paddle dryer and tanks. The utility plans to complete installation of the Fluid Lift Gasification process within 2024, followed by commissioning and full-scale operations by the utility's existing staff. The WWTF already accepts organic waste from industrial and municipal sources, with a co-digestion and CHP project coming online soon. Once the drying and gasification system is operational, the utility plans to receive future additional waste streams, with up to 75 WT/D of digested sludge processed by the Ecoremedy system. Thermal treatment of PFAS is a major project driver. During demonstration in Morrisville, 36 PFAS compounds were each reduced to non-detect (<2 ppb) levels, from a cumulative sum of 100 ppb of PFAS in the incoming pressed sludge. PFAS is treated through 60-90

minute residence times at over 1,500 degrees F in the gasifier and combustion of syngas at over 2,000 degrees F in the thermal oxidizer. On the West Coast, the Edmonds Project was purchased by the City of Edmonds WWTF (11.8 MGD) under an energy services performance contract through Ameresco. Located near Seattle, the facility will can process up to 14,250 WT/Y of sludge into Fluid Lyft Gasification Sand (FLGS), with excess thermal energy used for plume abatement. All grit and screenings will be co-gasified. The project passed city council unanimously in Q2 2020. Engineering and fabrication were completed in Q2 2021. During the air permitting process with Puget Sound Clean Air Agency and US EPA, Ecoremedy received a technology-wide determination from US EPA that the patented process is not subject to the Sewage Sludge Incineration (SSI) Rule. Incinerator decommissioning and demolition was complete by the end of 2021. This was a challenging process given that the WWTF is located in an urban setting, the small incinerator room is below-grade (56' x 39' x 37' tall), and the only access is an opening in the wall facing a four-lane road, including a ferry terminal lane. Mechanical and electrical installation of the Fluid Lift Gasification process, including all gasification, thermal oxidation, drying, material handling, and air emission control, was largely completed in 2022. At the time of this writing, commissioning began August 2023, to be followed by full-scale operation by the City's former incinerator operators. Not only was Ecoremedy the only technology provider that could build within the existing space, it was cost-competitive with all other thermal treatment technologies evaluated by the city. Insight from the demonstration project informed the design of modular, pre-engineered, pre-wired, skid-mounted drying-and-gasification units capable of processing 15-30 WT/D of dewatered municipal sludge. These systems are now being evaluated by multiple wastewater utilities for rapid installation at their WWTF. The presentation will include an update to date on the commissioning and operations of the Edmonds facility to date and a status of the Project at Derry Township.

Learning Objectives:
Ecoremedy advanced gasification converts raw solids to highly marketable fertilizer with more than 95% volume reduction without fossil fuel cofiring
Non-detect < 2 PPB for 36 PFAS compounds - Testing procedures and data including clean air emissions
Design capacity of up to 25,000 wet tons per year (or 75 wet tons per day), including grit and screenings - scalability to meet the needs of different plants behind the fence

Biography:
Dion Banks serves as Vice President of Marketing and Public Relations for Ecoremedy® and brings more than two decades of international business experience to the Ecoremedy team.
Dion's passion for fairness and equality ensures all stakeholders are represented in every transaction. He hosted a White House Roundtable on Renewable Energy for U.S. Department of Agriculture, served as a member of the Maryland Thermal Energy Taskforce, and participated in Maryland Gov. Martin O'Malley's trade mission to Brazil. As an influencer for social and environmental issues, Dion elevates Ecoremedy's mission to treat local waste locally, thereby avoiding the social and environmental damage associated with long-haul treatment practices.
Dion endeavors to live a life of service, acting as a conduit for awareness, development, and empowerment. He completed his undergraduate studies at the University of Kentucky and earned a bachelor of arts in business management while serving in the U.S. Army. During his career in the military, Dion earned The Army Achievement Medal, The Army Commendation Medal, Good Conduct Medal, Southwest Asia Service Medal, Kuwait Liberation Medal – Saudi Arabia, and the Kuwait Liberation Medal – Kuwait. He is a lifetime member of the Dorchester County NAACP, served

on numerous boards for service organizations, and is president and co-founder of Eastern Shore Network for Change (ESNC).

8. Wednesday, August 28, 2024
Room 207/208
9:00:00 AM - 9:30:00 AM

Title: Making the Case for Increased Resources and Water Infrastructure Funding

Presenter(s):
Kevin Letterly
Association of State Drinking Water Administrators

Abstract:
More than two years after the signing of the Bipartisan Infrastructure Law (BIL), the water sector is still working to expand its workforce to manage the unprecedented increase in funding. More than 50 billion dollars will be injected into America's drinking water infrastructure by 2026, increasing federal, state, and local workloads. In parallel with BIL, the Biden Administration announced 29 Environmental Finance Centers (EFCs) to provide technical assistance to help communities nationwide access this funding. Alongside the EFCs, state drinking water programs, engineering firms, and EPA have been expanding their workforce to implement the largest funding allotment for water infrastructure. This presentation will discuss findings from recent ASDWA surveys of state agencies, consultants, and technical assistance providers that sought to understand the impact of BIL on the water workforce. The surveys will provide qualitative and quantitative data on the increase in workloads and efforts by these groups to staff up to manage the increased number of projects moving through the Drinking Water State Revolving Funds (DWSRF), which became the primary pipeline for moving the funding for drinking water infrastructure under BIL. Additionally, the presentation will discuss current barriers to expanding the water sector's workforce when dealing with temporary funding. Using these findings, the presentation will discuss how the industry is better prepared than ever to absorb increased funding for drinking water infrastructure. EPA's 7th Drinking Water Infrastructure Needs Survey and Assessment has shown that the funding for our water infrastructure over the next 20 years is $625 billion, far surpassing what BIL will provide, highlighting the need to continue increasing investments into our drinking water infrastructure. With information from this survey, the presentation will summarize existing resources and potential future resources that would help ensure the sector can continue bolstering its staff and bandwidth to manage necessary investments in our drinking water infrastructure beyond BIL.

Learning Objectives:
With information from this survey, the presentation will summarize existing resources and potential future resources that would help ensure the sector can continue bolstering its staff and bandwidth to manage necessary investments in our drinking water infrastructure beyond BIL.

Biography:
Kevin is the Government Affairs Manager for ASDWA and has been with ASDWA for six years. Kevin manages ASDWA's regulatory and legislative strategies, with some of his recent project areas including: the Water System Restructuring Assessment Rule, consumer confidence reports, microbial disinfection byproducts, and lead testing in schools.

9. Wednesday, August 28, 2024
Room 215
9:00 AM – 10:00 AM

Title: Ethics in Patenting for Professional Engineers

Presenter(s):
Clifton E. McCann, Partner
FisherBroyles, LLP

Abstract:
Patents are in a sense contracts between inventors and the federal government. An inventor has a right to keep his invention secret. The government, on the other hand, wants to encourage the inventor to disclose the invention so that it can be used freely by others and benefit society as a whole. The inventor negotiates with the government during patent examination. The inventor agrees to make the invention public and allow others to make and use it after 20 years. If the inventor's negotiations are successful, the government in return issues a patent that gives the inventor the right to exclude others from making and using the invention during the 20-year period. The patent right gives the inventor a powerful advantage over competitors. But industry suffers when an inventor obtains or exploits the advantage unethically, and unethical behavior can result in potentially severe sanctions for the inventor and anyone licensed under the patent. This presentation will focus on the ethics of patent protection and enforcement. It will also more briefly address ethical issues involving other forms of intellectual property.

Learning Objectives:
This presentation will answer questions involving the following topics.
Naming inventors when applying for patent:
- Do I qualify as an inventor?
- Should I name colleagues as co-inventors?
- What if AI helped conceive the invention?

The duty to disclose prior art to the USPTO:
- What kind of information must I disclose?
- Must I search for and disclose prior art?
- Who within my company does the duty extend to?

Enforcing a patent:
- How much proof do I need before alleging infringement?
- What are the risks of alleging infringement prematurely?
- What information must I disclose to pursue a remedy?
- What is "patent misuse" and what are the consequences?

Responding to allegations of patent infringement:
- Must I search for others' patents before offering a new product?
- Can I ignore unreasonable infringement allegations?
- What is "willful" infringement and what are the consequences?

Ethical issues in other areas of intellectual property.

Biography:
Clifton McCann is an experienced patent attorney who obtains, enforces, and leverages patent rights in innovative water and wastewater treatment technology. He represents patent owners and accused patent infringers in litigation in the federal courts and in disputes before the Patent Trial and Appeal Board of the USPTO. He has chaired local and national patent law committees and is now Chair-Elect of the influential Patent, Trademark and Copyright Section of the Bar Association of the District of Columbia. He is a partner with FisherBroyles LLP, a full-service Fortune 200 law firm with over 50 registered patent attorneys.

10. Wednesday, August 28, 2024
Room 217
9:00 AM - 9:30 AM

Title: Outfall-ing Down!

Presenter(s):
Jordan Rang, Project Manager
KCI Technologies
Steven Walsh, Project Manager
Ulliman Schutte Construction
Daniel Sullivan, Urgent Response Section
City of Baltimore Dept. of Public Works

Abstract:
The Back River Outfall Interceptor and its parallel Relief Sewer are crucial pieces of infrastructure in the Baltimore area, bringing wastewater from Baltimore City and surrounding Counties to the Back River Wastewater Treatment Plant. After over 100 years of service, the City found that the Outfall was in dire need of repair and rehabilitation. The Outfall Interceptor Sewer was originally installed in 1907 with a rectangular, brick lined lower half and a semicircular concrete top half, forming an overall arched structure. The parallel 120-inch circular Relief Sewer, which was installed around 1968, had interconnections to the Outfall Interceptor Sewer. Until recently, the only update to the Outfall and Relief Sewers was in 1964, when the Maryland State Roads Commission built the I-695 Expressway, requiring relocation of the Outfall and Relief Sewers. During construction of the Headworks facility at Back River WWTP in 2018 structural deficiencies and failures of the Outfall Sewer were observed. Condition inspection using closed circuit television (CCTV) was ordered to examine the extents of the damage which revealed significant deterioration of the remainder of the sewer structure on the property. Repair of the portions of the pipe which affected the immediate construction activities were initiated immediately, while the City enlisted the KCI team to assess the current condition and evaluate the best means and methods of rehabilitation for the remainder of the deteriorated pipe. In some areas, the deterioration of the pipe extended throughout the entire wall thickness. Therefore, KCI determined that any rehabilitation method should address the surface damage and restore the structural integrity to the existing pipe. The KCI team identified and reviewed multiple technologies that could be considered for large diameter pipe to provide both a surface repair and a structural solution. After extensive review, KCI recommended the Danby-Liner system for the rehabilitation. Due to the specialized approach, pre-qualified Contractors were

invited to bid the project, which initially included 200-feet of rehabilitation under full bypass with 24-hour operational monitoring. Ulliman Schutte bid on the project as offered but included an alternate bypass approach for consideration. As the selected contractor, Ulliman Schutte was given permission to move forward with their alternate approach and began the collaborative nature of the project. Ulliman Schutte implemented a cost-effective bypass solution and subcontracted Boyer Inc. to perform the much-needed structural repairs. Their solution reduced impact to the public, eliminated bypass pumping, road crossings or closures and other MOT considerations. Ulliman Schutte oversaw and assisted in the installation of a Danby-Liner system, which consists of a reinforced, grout in place PVC lining across the sewer's internal circumference to provide a full structural solution, restore the lost concrete and prevent future deterioration. Due to the success of the project approach, the City with support of KCI expanded the lining effort from 200-feet to over 1500-feet, rehabilitating the complete bypassed section extending beyond Back River WWTP, under the I-695 Expressway to a newly constructed crossover structure in an overflow parking lot at a nearby shopping center. Construction was successfully completed in fall of 2023.

Learning Objectives:
Flexible and collaborative construction approach for an expanding scope.
Rehabilitation methods for large, non-circular sewer interceptors.
Creative bypass alternatives.

Biography:
Ms. Rang is a licensed civil engineer with 12 years of experience in water and wastewater design in the Mid-Atlantic Region. Her project experience ranges from preliminary engineering/planning, design, and permitting to construction administration with a specialty in water distribution and transmission and sewer collection and conveyance. Additionally, Ms. Rang has provided design support in numerous pumping station and treatment plant projects. She is currently a Project Manager at KCI Technologies in their Sparks, MD office.
Mr. Walsh helps lead the planning and execution of day-to-day project operations as a Project Manager for Ulliman Schutte Construction. With 10 years of experience in the water/wastewater construction industry, Steven has led numerous project teams throughout the Maryland area. Currently, he is stationed at the Back River Wastewater Treatment Plant, the largest wastewater treatment plant in Maryland. Steven obtained his BS in Mechanical Engineering from the University of Pittsburgh-Johnstown.
Mr. Sullivan is an engineer with 7 years experience at Baltimore City DPW. He currently works as a member of the Urgent Response Section, handling numerous emergencies in water, wastwater and storm water. He received his BS in Mechanical Engineering at Loyola University Maryland in Baltimore.

11. Wednesday, August 28, 2024
Room 201/202
9:30 AM - 10:00 AM

Title: State Actions to Help Water Systems Achieve Sustainability through Asset Management Planning and Implementation

Presenter(s):
Deirdre White, Project Manager

Association of State Drinking Water Administrators

Abstract:
Many small public water systems (PWSs) across the United States face challenges in maintaining Technical, Managerial, and Financial (TMF) capacity. These challenges impact the ability to consistently provide safe drinking water to the public, particularly for small and disadvantaged PWSs that are unable to sustainably manage, operate, and invest in their assets. To help these PWSs, state drinking water programs have employed various capacity development and asset management tools, funding, incentives, and regulatory drivers. Asset management visibility has increased since state drinking water programs added it to their capacity development strategies in 2022, per the requirements of the 2018 America's Water Infrastructure Act. These programs are primarily responsible for ensuring compliance with the Safe Drinking Water Act and implementing these capacity development strategies. This presentation will summarize data obtained through an Association of State Drinking Water Administrators member survey in early 2024. The data analysis will demonstrate states' progress to help PWSs implement successful asset management planning activities and increase the adoption of asset management practices nationwide. Successful PWS asset management stories will also be highlighted. These stories are expected to show how the development of asset, equipment, and service line inventories, maintenance schedules, and budgeting have contributed to enhanced PWS capacity, improved decision-making, and increased access to funding for infrastructure improvements. The presentation will conclude with sharing a compilation of best practices and lessons learned from state strategies for assisting PWSs with asset management. This is intended to encourage other states, technical assistance providers, and PWSs to consider these opportunities that contribute to the long-term sustainability of PWSs and enable the consistent delivery of safe drinking water to the public.

Learning Objectives:
Attendees will gain an understanding of the role of state programs in capacity development and how asset management is fostering positive outcomes for water systems nationwide.
Attendees will learn from a variety of successful water system projects and outcomes that have resulted from asset management planning and implementation.
Attendees will hear about lessons learned and best practices from other water systems that will help them identify challenges and evaluate and enhance their asset management processes.

Biography:
Deirdre White is a Project Manager with the Association of State Drinking Water Administrators. Her work focuses on assisting state drinking water programs with capacity development, asset management, operator certification, and small water system funding and technical assistance issues. Her additional areas of expertise include source water protection, Clean Water Act/Safe Drinking Water Act integration; nutrient pollution and harmful algal blooms (HABs); emerging contaminants and Per- and Polyfluoroalkyl substances (PFAS); and security and resiliency. Ms. White has been leading the efforts of the National Source Water Collaborative since its inception in 2006 and became a co-chair in January 2022. She holds a bachelor's degree from George Mason University.

12. Wednesday, August 28, 2024
Room 203/204
9:30 AM - 10:00 AM

Title: Aligning Cogeneration Sizing with the Plant and Client's Goals (Big Plant Edition)

Presenter(s):
Christian Chiodo, Project Manager
Brown and Caldwell

Abstract:
Energy recovery projects at wastewater treatment plants (WWTP) are typically discretionary and require an attractive return on investment to justify the capital expense. The Inflation Reduction Act (IRA), which provides federal funding for projects that produce renewable energy, has dramatically changed financial considerations for energy projects. The certainty of the IRA to provide up to a 50% rebate on qualified capital expenditures means WWTP bioenergy projects that otherwise would not have been feasible are now moving forward across the United States. To qualify, construction must begin before December 31, 2024, creating increased urgency to accelerate project schedules that is unprecedented. Many WWTPs are pursuing eligibility by implementing biogas fueled cogeneration systems to produce renewable electricity. This session will provide a comprehensive overview of the technical, economic, and non-economic factors that drive cogeneration system sizing and technology selection for large WWTPs. Proper sizing of the prime mover is critical to maximizing power production and ensuring longevity of the asset. The session will use an evaluation done for the City of Columbus, Ohio (City) Southerly WWTP (SWWTP) Bioenergy Project that includes: 6 MG of digestion, organics receiving facility for co-digestion, and 8 MW cogeneration system, as a case study showcasing the influence of IRA funding on cogeneration system alternatives development. Drivers that are client site-specific include: capturing fugitive methane, minimizing natural gas (NG) for fuel blending, and power production buffer from the electrical utility import. To determine how to best leverage IRA funding, the City considered biogas conditioning and biogas upgrading paired with internal combustion engine or turbine prime mover technology. Although very uncommon, pairing biogas upgrading with cogeneration was investigated to evaluate the reduced O&M requirements of the engines or turbines and simplification of fuel blending. Proper sizing of the prime mover is critical to maximizing power production and ensuring longevity of the asset. The evaluation simulated 20-year biogas variability using daily biogas flow data from the SWWTP and similar size facilities to reflect the dynamic operating conditions and turn-down requirements of the cogeneration system. This data enabled 20-year estimates of: power production, NG required for blending at the prime mover, NG for process and facility heating, biogas flaring due to lack of prime mover capacity and downtime, waste heat recovery, and number of prime mover units operating. Lifecycle costs of prime mover alternatives were determined in terms of net present value (NPV) using capital and O&M costs over a 20-year project life. Additional considerations include: methane slip through engines and the impact on fugitive methane; emissions performance; burden on plant staff; and domestic content required for IRA credit eligibility. The session will provide (1) an inside look at how the City navigated evaluating an array of cogeneration system technologies; and (2) a detailed dive into the exhaustive analysis for matching the cogeneration system capacity to the SWWTP's projected biogas production and electrical demand, all on an accelerated design schedule. The goal is to summarize a detailed analysis of sizing and evaluating a new cogeneration system that utilities can learn from.

Learning Objectives:
Why it's important to size cogeneration systems properly.
Understand the technical, economic, and non-economic factors that drive cogeneration system technology selection for large WWTPs.

Strategies for rationalizing prime mover (engine and turbine) selection based on site-specific requirements and owner goals.

Biography:
Christian Chiodo has seven years of experience as a consultant in planning, design, and construction of wastewater treatment facilities. Christian has served as a process designer and project engineer on numerous wastewater treatment designs, in which he developed expertise in: rehabilitating aging infrastructure, laying out upgrades for ease of future expansion, minimizing cost, and enhancing process performance. He draws on this practical experience in his current role as a solids process engineer, focusing on anaerobic digestion and biogas utilization technologies.

13. Wednesday, August 28, 2024
Room 207/208
9:30 AM - 10:00 AM

Title: How WIFIA Financing Benefits Communities

Presenter(s):
Karen Fligger, Deputy Directory
U.S. EPA

Abstract:
The Water Infrastructure Finance and Innovation Act (WIFIA) program is a government bank operated by EPA headquarters that provides supplemental, flexible, low-cost credit assistance to public and private borrowers for all types of wastewater, drinking water, and stormwater projects. The WIFIA program offers long-term loans that can be combined with State Revolving Fund assistance, municipal bonds, and federal and state grants to help communities deliver more critical water infrastructure projects for a lower cost with less impact on rate payers. In this session, we will provide an overview of the WIFIA program and describe WIFIA's water infrastructure-related eligibilities and priorities, including PFAS, climate resilience and mitigation, and lead service line replacement. Additionally, we will discuss the benefits and flexibilities of WIFIA financing, including customized repayment schedules, coordination with other types of debt, the option to fund multiple projects through a single loan, and the ability to finance a combination of staggered projects, like those in a capital improvement plan, under a "master agreement". Finally, we will demonstrate how WIFIA financing has benefitted communities in the Chesapeake Bay area. The WIFIA program enjoys broad political support and expects to continue receiving significant funding for water infrastructure investments. Communities nationwide have borrowed over $19 billion in financing to support $43 billion in total project costs. Through its flexible terms and low interest rate, the WIFIA program has helped borrowers save over $6 billion on projects that will create more than 140,000 jobs and impact 63 million people around the country.

Learning Objectives:
Learn about the Water Infrastructure Finance and Innovation Act (WIFIA) program and its water infrastructure funding eligibilities.
Learn how the WIFIA program provides several financial benefits to borrowers.
Hear how current borrowers in the Chesapeake Bay area are utilizing WIFIA financing to implement sustainable water infrastructure projects at lower costs to rate payers.

Biography:
Karen Fligger is the Deputy Directory of EPA's WIFIA Management Division and has led various aspects of the program, including developing processes and procedures, outreach and communication, and project selection, since the program's inception. Over her EPA career, she built her water infrastructure expertise through her work with the Drinking Water State Revolving Fund, Clean Watersheds Needs Survey, Urban Waters, and WaterSense programs. Prior to joining EPA, she served as a Peace Corps volunteer in Nicaragua. Karen has a B.S. in Biology and Environmental Studies from George Washington University and a M.S. in Natural Resource Planning from University of Vermont.

14. Wednesday, August 28, 2024
Room 217
9:30 AM - 10:00 AM

Title: Streamlining Infrastructure: Relocating a Sewage Interceptor for a Major Highway Interchange

Presenter(s):
Vanessa Nedrick, Regional Manager and Water Resources Department Head
Remington & Vernick Engineers

Abstract:
This presentation explores the successful collaboration between the Pennsylvania Turnpike Commission (PTC), the Pennsylvania Department of Transportation (PennDOT) and the Township of Falls Authority (TOFA) in the relocation of the Queen Anne Creek Interceptor (QAI), a vital sewage interceptor, as part of a new interchange construction project in Bucks County, Pennsylvania. RVE played a crucial role as the Authority Engineer in overseeing the design, approval and execution of the relocation project. The presentation highlights the key challenges faced during the relocation process, the strategic use of both open cut and jack and bore trenchless methods, and the comprehensive inspection and engineering services provided by RVE. Furthermore, it examines the financial arrangements between PTC, PennDOT and TOFA, with PTC reimbursing TOFA for engineering and inspection services. The successful completion of the project within a four-month timeframe, coupled with RVE's cost-effective approach, demonstrates the effectiveness of collaborative efforts in the execution of large-scale infrastructure projects.

Learning Objectives:
Recognize benefits realized through strong project management and collaboration
Employ innovative construction techniques
Demonstrate sound financial management for infrastructure projects

Biography:
Vanessa Nedrick, P.E., is a Principal, Regional Manager and Water Resources Department Head for PA Operations at Remington & Vernick Engineers. Vanessa Nedrick has almost 25 years' experience in the municipal and water/wastewater fields. She graduated from Drexel University with a BS in Civil Engineering and MS in Engineering Management. Prior to working at RVE, she started her career at the Philadelphia Water Department, specializing in Water/Stormwater/Wastewater Design and Trenchless Technology Design.

She was a 2016 Philadelphia Business Journal 40 Under 40 Honoree and 2019 Philadelphia Business Journal Woman of Distinction Award Honoree. Vanessa has written, published, and presented several technical papers for NASTT No Dig Show Conferences, PennTec Conferences, PMAA Annual Conferences, and EPWPCOA Pretreatment Conferences. She serves as Vice Chair of EPWPCOA Pretreatment Committee and the Water Environment Federation Program Committee. Vanessa is married with 4 children. She is an avid runner, running several marathons and half marathons. She also participates in Spartan Races and loves to lift weights. In her community she mentors minority youth interested in STEM related careers, tutors in Math, and is a Math SAT Prep Facilitator.

15. Wednesday, August 28, 2024
Room 201/202
1:00 PM - 1:30 PM

Title: Cracks, shrunken windowsills, water intrusion – it's time for a condition assessment!

Presenter(s):
Chrissie Swann, Project Manager
Carollo
Christopher Barnhill, Asset Strategy Manager
WSSC

Abstract:
Condition assessments identify potential weaknesses, failures and/or defects and enable improved decision making and project prioritization towards infrastructure sustainability, cost effectiveness and safety standards. Failures and defects pose several risks to any facility, its operation, and its occupants. Conducting a comprehensive structural assessment is the most efficient way to evaluate the integrity of the building and identify any issues. In August of 2023, Washington Suburban Sanitary Commission (WSSC), one of the largest water and wastewater utilities in the United States, identified multiple buildings at their Western Branch Water Reuse & Recovery Facility (WRRF) that were exhibiting general structural, architectural, and aesthetic issues. WSSC realized the deteriorating conditions of the structure were a result of water intrusion. The roof of the filter building was replaced in 2017, which partially resolved the issue, however; it was speculated that water continued to intrude into the building as evident in the failing expansion joints caulking, ineffective seals, mold, and weeping bricks. WSSC hired Carollo, Kennedy Jenks and Peer to visually observe and identify the deteriorating conditions in the filter building and to provide insight into the actual condition of the structure, enabling the development of targeted and cost-effective maintenance and repair strategies. The benefits of the structural condition assessment are numerous and played a crucial role for WSSC's infrastructure in ensuring the safety, longevity, and cost-effectiveness of structures. It is important to point out that the Western Branch WRRF staff initiated multiple Project Initiation Forms (PIFs) to address these issues at the Filter and Admin buildings which served as the basis of the structural condition assessment effort for the consulting teams. This abstract will highlight the collaborative efforts of structural engineers, asset management practitioners, and water treatment experts in developing tailored recommendations to address these structural challenges and ensure the accuracy of the assessment.

Learning Objectives:

importance of condition assessment of structural infrastructure
enabling improved decision-making
project prioritization towards infrastructure sustainability, cost effectiveness and safety standards.

Biography:
To be submitted

16. Wednesday, August 28, 2024
Room 203/204
1:00 PM - 1:30 PM

Title: Trial By Fire: Conducting a full-scale pilot study with an emergent disinfection technology

Presenter(s):
Kyle Kinard, Plant Process Engineer
Harford County MD

Abstract:
Redundant and backup systems are critical in maintaining a successfully operated wastewater treatment facility. A treatment plant's ability to prepare and implement a backup system in a timely manner can often mean the difference in meeting effluent quality standards. Exploring the use of new or emergent technologies can be extremely helpful in establishing redundancy for older more established systems. This is never more evident than when a plant's primary disinfection method is threatened by supply shortages and skyrocketing chemical prices. This presentation will review the full scale pilot study that was conducted on using peracetic acid (PAA) as a backup disinfection chemical at the Sod Run WWTP. The methodology and results of the study will be covered as well as the efforts and coordination with state regulators that was required to use an experimental technology to disinfect all plant effluent flow for several months. Sod Run WWTP, owned and operated by Harford County, currently uses chlorine gas for disinfection and sulfur dioxide for de-chlorination of its effluent flow. After experiencing supply shortages and severe price increases of these chemicals it became evident that a backup disinfection system should be evaluated. After researching multiple disinfection alternatives it was found that PAA was an attractive substitute to traditional chemicals. In order to prove the efficacy of PAA a pilot study was conducted. Because of the supply challenges and timeliness concerns the study was conducted at full scale. This means PAA was used as the plant's sole disinfection chemical for the duration of the pilot and not just tested on a side stream of the process. Conducting a pilot in this manner required extensive planning and coordination with Maryland Department of the Environment to ensure compliance with the plant's discharge permit and no adverse impacts on the facility's receiving waters. The pilot study analyzed PAA at several doses and measured its effect on parameters such as: disinfection potential, BOD5, disinfection residuals, pH, dissolved oxygen, and nutrient concentration. After conclusion of the pilot a cost comparison was done on PAA vs the current disinfection chemicals. The pilot study was extremely successful in evaluating the effectiveness of PAA as a backup disinfectant while maintaining high quality effluent. It is hoped that the results of this study will help lay the foundation for similar pilots in the future and that the data that was collected will help other municipalities evaluate PAA as a disinfectant alternative.

Learning Objectives:
Participants will acquire knowledge of wastewater disinfection principals and technology
Participants will have insight on the planning and coordination required to trial an experimental technology at full scale
Participants will gain understanding on the efficacy of peracetic acid as a disinfectant alternative

Biography:
Kyle Kinard currently is the Plant Process Engineer for Harford County DPW wastewater treatment plants. Kyle graduated from Penn State University in 2013 with a degree in Environmental Engineering. Kyle spent 6 years working for a manufacturer of biosolids processing equipment before entering the public sector. Since 2019 Kyle has served Harford County's 3 wastewater treatment plants by optimizing performance, piloting new treatment technologies, and overseeing facility upgrades.

17. Wednesday, August 28, 2024
Room 207/208
1:00 PM - 1:30 PM

Title: Managing Elevated Water Storage Tank Rehabilitation: Lessons Learned from 100+ Tank Jobs in DelMarVa

Presenter(s):
Bernie Wigginton, Senior Construction Manager
Gannett Fleming

Abstract:
Water storage tank condition assessment and tank rehabilitation are critical tasks for tank owners. Regarding the Tank maintenance engineer's functions and qualifications, AWWA M-42 states "The most important qualification for a purchaser's representative is up-to-date knowledge of the industry standards and requirements…" There is no substitute for experience when managing the rehabilitation of water tanks. Mr. Wigginton will present lessons learned from tank rehab projects completed over the last 5 years. Several project case studies will be presented with specific problems that arose identifying the issue, root cause, the solution, and the suggested change to future tank rehab designs. Case studies include coating failure during the warranty period, fugitive dust during blasting; steel shot blasting consequences; stripe coating, and others. The attendee will hear the details of issues encountered during construction and will benefit by incorporating changes to designs and specifications to avoid making avoidable mistakes.

Learning Objectives:
The attendee will hear the details of issues encountered during construction and will benefit by incorporating changes to designs and specifications to avoid making avoidable mistakes.

Biography:
Bernie Wigginton, NACE III is a Senior Construction Manager at Gannett Fleming with 50+ years' experience in the coatings and water tank industry. As the owner of a small business, Mr. Wigginton spent several years as a contractor rehabilitating water tanks before transitioning to engineering

consulting as an Inspector of tank rehab work and now as a Construction Manager overseeing multiple tank rehabilitation projects as an agent of the Owner.

18. Wednesday, August 28, 2024
Room 215
1:00 PM - 1:30 PM

Title: Automation and Analysis: Data-Driven Strategies Improve Utility Processes and Analyze Performance at WSSC Water

Presenter(s):
Dan Scrutchfield, Principal Management Consultant
Arcadis U.S.
Andres Villarraga, Project Manager
WSSC Water

Abstract:
Our world is driven by data across all industries, and the water sector is no exception. This ranges from enterprise systems that have been in place for decades to smart systems that are generating data at an exponential rate. It is increasingly important to incorporate practices to make sound decisions from these systems and implement controls to ensure trusted data. WSSC Water completed efforts to identify processes to improve their data-driven decision-making, and this abstract will present two strategies used to improve their performance across many departments through automation, standardization, and visualization of data. Strategy 1: Enterprise Data Warehousing: A large portion of the data used by decision makers resides in systems of record that are operated by their functional teams. While this data is usually accurate and up to date, it requires an expert from the team to extract it from the system or understand the data that is produced. It is also more granular than decision makers require, and the teams reporting on it consistently aggregate it to produce the intended results. To address these issues, WSSC Water automated the creation of datasets in these functional groups, all of which were a part of their Enterprise Data Warehouse. In the use case for this strategy, they will show the automated Commission Performance Report and Human Resources Dashboards. These items reduced the time spent developing recurring reports, leveraging Power Bi for automated and interactive reporting. Strategy 2: Non-Enterprise Data Management and Application Development: Unlike the enterprise data, WSSC Water identified many users who are managing critical data in their own spreadsheets or other tools. To standardize and automate some of the processes, they worked with these users to provide low-code platforms to manage data in their existing IT infrastructure. These tools included the development of SharePoint data-structures, Applications and Workflows to allow users to edit and maintain datasets in a collaborative environment, with the increased auditability that these tools provide. In the use cases for this strategy, they will show the Transition Plan Tracking Application and Community Investment/Engagement Application. These converted existing series of over ten spreadsheets into a single data source, provided a low-code application for the teams to enter data, and Power Bi Dashboards for reporting. The combination of these two strategies allows groups to take small steps into the world of data-driven decision making. Teams are beginning the process with Strategy 2 by standardizing their reporting, with the intent to be automated into an enterprise solution under Strategy 1 in the future. In the past, tools such as the ones outlined in these strategies were limited to IT Departments and professional programmers.

With the advent of modern data management strategies, they are much simpler to implement and maintain, but still in line with IT standards and supported by their department once they are in production. In the end, WSSC Water identified significant time savings, data quality, and visualization capabilities as a result of taking a data-driven approach to managing some of their manual efforts.

Learning Objectives:
Data-Driven Decision Making
Systems Automation
Business Process Improvement

Biography:
Mr. Scrutchfield is a Principal Management Consultant and registered Professional Engineer in Virginia, who specializes in the design and implementation of low-code solutions to improve business processes, data management, and reporting. He has implemented large-scale program management solutions for clients around the country, leveraging tools such as Power Apps, Power Automate, and Power Bi to facilitate project management best practices while developing automated and interactive reporting. He also specializes in data analysis and management, developing insights from enterprise systems such as maintenance management or SCADA systems.

19. Wednesday, August 28, 2024
Room 217
1:00 PM - 1:30 PM

Title: Safety Regulations Relating to Internal Pipeline Inspection

Presenter(s):
Russell Deason, Project Manager
HDR
Michael Higgins, Condition Assessment Business Class Director
HDR

Abstract:
This paper provides a summary and discussion of the safety and regulatory issues that impact water pipeline inspections. Particularly the issue of double valve isolations and whether this practice is required by regulatory bodies. Condition assessment of large diameter pressurized water mains has been increasing in application during the last two decades. Condition assessment projects often involve isolation and dewatering so trained inspection personnel can enter the pipeline and perform inspection. Such inspections may be simple visual inspections or complex methods such as pulling full diameter inspection tools through a pipeline with advanced non-destructive testing techniques. The isolation points between pressurized and dewatered sections of pipe must be carefully controlled or inundation hazards can impact safety. The need to shut two valves at each isolation point or “double valving” has been evaluated and deployed on many of these projects. For inspection of large diameter drinking water mains, it may not be practical to attain double block and bleed. Valves may be separated by several thousand feet or miles of pipe and shutting two valves may shut off water supply to water users. Many utilities and organizations

have developed safety protocols around using existing valving to provide safe and effective pipe segment isolation. OSHA standards do not specifically address this type of work and there are currently no industry accepted guidelines on the topic. This paper summarizes the applicable safety standards and letters of interpretation and discusses measures that should be considered to improve safety associated with these projects. During the development of this paper, the authors have reviewed and researched safety concerns, industry practices, and the applicable OSHA documents. Review of practical safety concerns concluded that closed and seated water isolation valves do not fail in such a manner that creates engulfment hazards. More information on industry practices, including the performance of closed isolation valves is included.

Learning Objectives:
Pipeline Condition Assessment
Safety Regulations
Valve Operations

Biography:
Mr. Deason has worked in the water and wastewater industry for 14 years. During that time he has worked on a variety of asset management and condition assessment projects for clients in southern Maryland, DC, and across the country. Russell has overseen a variety of watermain condition assessment jobs and has a range of experience from high level PCA program planning to detailed execution planning and PCA results data analysis and is a co-author of AWWA Manual 77 on condition assessment.

20. Wednesday, August 28, 2024
Room 201/202
1:30 PM - 2:00 PM

Title: Advancing Facility Management with Customized Cloud-based Tools for Condition Assessment

Presenter(s):
Andrew Burton, Senior Asset Management Engineer
Carollo Engineers

Abstract:
Condition assessment of treatment facilities is critical to maintaining operational integrity, functionality and to identifying assets requiring rehabilitation before they deteriorate past the point of renewal. Inspection of water and wastewater treatment facilities is typically completed by staff and/or contractors armed with paper, pencil, and a point-and-shoot camera, the product of which is typically a disordered collection of data. A lot of time is generally devoted after the field inspection is completed to decipher handwritten notes, standardize condition scores, and match photos to their corresponding assets. The development of cloud-based software provides a solution which is leading to the advancement of tools available in the practice of facility condition assessments. Using these platforms, data can now be easily captured through mobile devices such as cell phones and tablets by any number of individuals and written in real-time to a database in the cloud. Users can be guided with well-organized and laid out prompts, drop lists, and other features which enhance the experience and efficiency of data captured in the field. Photos and videos can

easily be attached to inspections and reviewed at any point. Progress dashboards help the user judge pace and see what work has been performed to date by others conducting condition assessment. As a results field assessment effort are far more streamlined, accurate, and efficient than ever before. This presentation will describe 3 separate case studies of the application of cloud-based solutions to assess the condition and log data of critical vertical assets more efficiently and accurately. • For the City of Houston, Northeast Water Purification Plant (NEWPP) condition assessments were completed by more than 20 individuals from 5 different consulting firms. Standardizing data collection was critical to making the condition assessments coming from all these teams consistent and easily compared. Tracking progress was also a key element of this study. The cloud-based application provided consistent data collection from the project team, provided a streamlined approach to developing capital and O&M recommendations, and provided the City with real-time access to track progress and review condition data. • Also in Houston, approximately 400 lift stations systemwide collection were flooded during an historic storm event, Hurricane Harvey. Assessing the condition and determining necessary repairs to get them operational again was critical to maintaining system levels of service. The cloud-based approach resulted in assessing all the effected lift stations in less than a month's time. • For the City of Riverside, a treatment facility electrical upgrade prompted a thorough review of existing assets to determine the extent and timing of future work. Based on lack of available upfront information, a format of the was developed to support creating custom asset types and hierarchical changes in the field. This flexible format of the condition assessment app highlights the effective use of customization to address site-specific conditions.

Learning Objectives:
Apply cloud-based tools as part of asset management and condition assessment programs.
Describe tools and applications that can be developed to support detailed condition assessment programs.
Understand options and considerations for developing cloud-based tools.

Biography:
Andrew Burton is a Senior Asset Management Engineer with Carollo Engineers in Pittsburgh PA. He has nearly 15 years of combined experience in the fields of engineering consulting and research. Andy's work concentrations are in the areas of wastewater infrastructure asset management, data analytics, and environmental engineering. His expertise includes condition assessment, risk modeling, and data visualization.

21. Wednesday, August 28, 2024
Room 203/204
1:30 PM - 2:00 PM

Title: Operational Insights from the Patapsco WWTP: Lessons in Process Control and Rehabilitation

Presenter(s):
Chris Saunders, Senior Associate
Hazen and Sawyer
Neal Jackson, Plant Manager
Baltimore City Department of Public Works

Abstract:
This technical paper presents a comprehensive analysis of the challenges and solutions encountered at the Patapsco Wastewater Treatment Plant (WWTP). It highlights the adverse effects of prolonged poor maintenance practices, reduced solids processing, and the loss of experienced operators over an extended period of time. The facility primarily experienced issues with solids accumulation, oxygen transfer, conveyance, hydrocarbons, and enhanced nutrient removal (ENR). This case study discusses control measures that Hazen has implemented and continues to implement to restore critical process performance and ensure compliance with permit requirements. The Patapsco WWTP's treatment train includes primary, secondary, and tertiary processes for TSS, BOD, and nitrogen removal, as well as solids disposal. Hazen's actions to rectify the challenges at each treatment stage demonstrated a commitment to significantly enhance plant performance. In summary, the primary settling tanks (PSTs) were drained and skimmed. Pure oxygen reactors were brought online by fixing aerators and supplementing sufficient oxygen. The secondary clarifiers were repaired, and solids buildup was mitigated. Biologically active filters and denitrification filters were brought back online and chemical feed additions were optimized. Improved backwash prevented recirculation of solids, resulting in removal of bound organic nitrogen from solids. Gravity sludge thickeners (GSTs) were cleared of excessive solids buildup and additional GSTs were brought online to help control solids inventory. Extensive hydrocarbon sampling was conducted, allowing the on-site solids contracting company to restart drying operations. Substantial improvements were achieved in various processes, such as increased oxygen feed, reduced mixed liquor suspended solids (MLSS) in bioreactors, and improved effluent quality, particularly with regard to biochemical oxygen demand (BOD) and total suspended solids (TSS). Significant enhancements in ammonia (98%) and nitrate removal (95%), as well as a remarkable reduction in final effluent total phosphorus (as low as 0.2mg/L) were attained within 2 years of Hazen's presence at the plant. Overall, remarkable improvements in plant operations and maintenance were achieved, leading to successful compliance with NPDES permit requirements. However, the plant still faces several future challenges, including influent flow estimation, industrial wastewater source detection, power loss management, hydraulic constraints, RAS pumping, solids inventory management, as well as management obstacles including employee recruitment and retention, and standard operating procedures development. To sustain progress, Hazen offers recommendations for maintaining reliable oxygen supply, monitoring treatment processes, scheduling sludge pumping operations, and monitoring hydrocarbons. Periodic sampling of all constituents as well as development of strategies to address power outages and emergency conditions are encouraged to prevent process deterioration.

Learning Objectives:
To reinforce the importance of individual unit process performance goals and operating setpoints.

Biography:
Chris Saunders has worked as an operator, superintendent, and administrator at wastewater treatment plants in central Maryland for the last 32 years.

22. Wednesday, August 28, 2024
Room 207/208
1:30 PM - 2:00 PM

Title: "A Challenging Tank Upgrade for a Rapidly Growing System Constructed through the Pandemic"

Presenter(s):
Christy Hollander, Chief Engineer
St. Mary's County Metropolitan Commission
Andy Cooper, Design PM
Witman Requardt Associates
Christopher Soussanin, Chief of Construction
St. Mary's County Metropolitan Commission

Abstract:
The St. Mary's County Metropolitan Commission established in the 1960's owns and operates public water and sewer systems originally consolidated from privately owned water companies and sewage treatment facilities serving the Greater Lexington Park and the Patuxent River Naval Air Station discharging into the Potomac River and middle Chesapeake Bay. Due to increased development in the growth areas, continuous updates and expansions of the systems have occurred and remain underway. The Hickory Hills elevated storage tank is located in the central zone of Metcom's water distribution system. As the original tank was salvage from Green Giant Farms Delaware and installed in the 1990's and approaching end life due to limited storage capacity and a high-water level situated lower than future demands, a decision was made to replace it with a 2.0 M tank and 700 GPM well. This presentation will provide perspectives from the Design Engineer, the Tank Manufacturer and Metcom. Site challenges issues surrounding Land Aquisition, Site Accessibility, Daily crossing an active Hhiker Biker trail, Undercrossing 230-KV power lines and an adjacent new car storage lot containing 500 vehicles. The production well will also be discussed including selection of the Lower Patapsco Aquifer, sizing, coordination of construction along with development and pump selection. Available Tank style choices, foundation design, tank mixing system, communications ready features, interior and exterior coating systems will be presented by CBI along with a brief history of the Company followed by discussions regarding the construction team of CBI, Johnston Construction, Sippel Electric and AC Schultes of Maryland. Construction and Commissioning issues to be presented by Metcom will focus on the Bid, Award, Contract Duration, Covid-19 and Inflation along with supply chain disruptions, relocating of cellular tower telephone services , start-up, demolition of the existing tower and close out procedures for contract and permits.

Learning Objectives:
Site Acquisition and Accessibility
Design Parameters to meet the needs
Keeping the Project moving forward through unknown conditions

Biography:
Christy Hollander is a graduate of University of Maryland with a Bachelors of Science in Civil Engineering along with a Masters Degree in Project Management from Univ of MD, University College. Christy holds a professional Engineering License in Maryland and is currently Chief Engineer for St. Mary's County Metropolitan Commission where she has been associated for 15 years.

23. Wednesday, August 28, 2024
Room 215
1:30 PM - 2:00 PM

Title: Collaborative Project Delivery with Drone Technology

Presenter(s):
Brandon Reider, Project Manager
Garney Construction
Clay Greene, Construction Technology Specialist
Garney Construction

Abstract:
Construction has historically lagged in its adoption and implementation of technology; however, recent advancements have enabled the deployment of cost-effective reality capture systems that can significantly improve project delivery by providing real-time, accurate jobsite information to stakeholders on a collaborative platform. Garney has leveraged drone- and ground-based reality capture technologies to improve construction quality and pace of collaborative decision-making to deliver increasingly complex projects. Technology Overview The reality capture technologies detailed in this presentation include drone-based photogrammetry and ground-based 360-walk through imagery supported by a cloud-based software which renders models and enables a variety of views and interfaces. Drones offer a unique aerial point of view that's not available to current survey tools while 360-walk through imagery allows for real-time data capture that far exceeds what is typical of construction progress documentation. Real-time Site-wide Data Reality capture technologies allow for immediate and detailed understanding of the construction site, providing invaluable insights on project conditions, even in applications where manned entry is not safe or feasible. A key aspect of this is the photogrammetry from drones, which capture high-resolution images that can then be converted into survey-grade 3D models. By harnessing this data, teams can make informed decisions quickly, adapt to changing conditions, and maintain a seamless flow of operations, ensuring that project timelines are met with greater efficiency and accuracy. Cost of Technology Advancements in technology are inherently deflationary – the cost to harness technology decreases over time due to a decrease in the cost to produce the associated hardware and software. The industry stands to benefit from the increasingly affordable reality capture systems whereas historically high up-front costs have resulted in an industry-wide lag of adoption (especially in hard-bid markets). Fortunately, these technologies have hit a cross roads where the benefits and usability are exceeding the associated costs. User Interface & Collaboration Efforts Similar to cost, the user interfaces and operability of reality capture systems have simplified and improved dramatically over time, reducing training requirements from months to days in most cases. This further enables deployment of reality capture systems to a diverse team of non-experts, including executives, safety professionals, managers, inspectors, and field personnel. The simplified user interface equips the diverse group of stakeholders with real-time access to both ground and aerial data about the project. The project team can establish the frequency of ground and aerial data capture, and, following data capture and upload, survey-grade models and imagery can be utilized by all parties (including Owners, Engineers, Contractors, and Subcontractors). The data can also be easily compared to previous scans and design models to precisely understand work completed and work remaining. Conclusion Reality capture technologies, such as aerial photogrammetry and 360-walkthrough imagery supported by a collaborative user interface, can significantly increase quality, collaboration, and visibility during the construction phase of critical

water and waste water projects by providing real-time, accurate site information to a diverse group of stakeholders.

Learning Objectives:
Real-time sitewide Data
Cost of Technology
User Interface & Collaboration Effort

Biography:
Brandon Reider, Assoc. DBIA, is a Project Manager at Garney Construction and has been working in the construction industry since 2010 on a variety of transportation, utility, and heavy civil projects. As a Project Manager for Garney Construction, Brandon's responsibilities include management of field operations, client engagement, and estimating.

24. Wednesday, August 28, 2024
Room 217
1:30 PM - 2:00 PM

Title: Impacts of Streamlined Data Visualization on Program Delivery

Presenter(s):
Chad Whitley, Utility Management Analyst
HDR, Inc.
Grace Caballero, Water/Wastewater Project Manager
HDR, Inc.

Abstract:
In 2017 Winston-Salem/Forsyth County (WSFC) Utilities faced potential regulatory action from the United States Environmental Protection Agency (USEPA) relating to high rates of sanitary sewer overflows (SSOs). With 1,750 miles of gravity sewer to maintain, a 10-year Collection System Improvement Program (CSIP) was developed by WSFC Utilities in collaboration with the Engineer to advance utility maturity in key areas: Collection System Management, First Response, Capital Delivery, Construction & Delivery, and Sewer Cleaning. Through the first five years of the program, the utility experienced significant growth across all maturity areas. With this rapid growth, existing data management practices were not scalable leading to problems across the program. It became increasingly time consuming to answer routine questions like “How many miles of sewer were cleaned?” and “Which assets are at the highest risk for failure?”. Without readily accessible program metrics, it was difficult to optimize the benefit of program funding and leverage existing data to its fullest potential. Seven years into the program, ArcGIS and PowerBI dashboards were implemented to improve data accessibility, transparency, and connectivity, combatting many data management challenges of a multi-million-dollar program. This presentation presents case studies on how organizational maturity was improved across each area through data visualization and connectivity improvements.

Learning Objectives:

Biography:

Chad has been a planner/scheduler with HDR for the last 2 years, acting as a pivotal part of managing the collection system improvement program in Winston-Salem, NC.

Grace Caballero has worked for HDR for the last 3 years, performing condition assessments on both vertical and linear assets.

25. Wednesday, August 28, 2024
Room 201/202
2:00 PM - 2:30 PM

Title: Engineering Approach to Condition Based Maintenance for Mechanical Equipment

Presenter(s):
Joel Thompson, Senior Technologist
Stantec
Ali Alavi,Conveyance Subsector Leader
Stantec

Abstract:
Condition Based Maintenance (CBM) is a form of proactive maintenance that monitors the condition of the assets in real-time. Implementing CBM helps reduce the number of “call-outs”, reduces overtime, and provides cost and energy savings. CBM would allow operators to increase confidence in managing their assets. For example, allowing tank levels to fluctuate more widely and avoiding starting large pumps during the peak use times, which would save energy and costs. An example of CBM is vibration analysis that can provide signs to the O&M team that certain rotating equipment is starting to fail. Vibration analysis uses mathematical functions to analyze the waveform to generate a spectrum that can identify contributions from individual components. An explanation of these functions will be presented. This allows a maintenance technician to zero-in on the cause of the vibration and plan for maintenance. Examples will be presented of this practice. Vibration Resonance is the “silent killer” for mechanical equipment. Resonance describes the phenomenon of increased amplitude that occurs when the frequency of an applied periodic force is equal to or close to the natural frequency of the system on which it acts. It is important to keep the operating speed of a machine sufficiently separated from its natural frequency. If resonance is detected in machines, steps should be taken to shift the natural frequency or the operating speed. Examples will be given where modifications were made to change the natural frequency of a machine. The results discuss predictive foresight, which can be used by utility owners to minimize unexpected failures.

Learning Objectives:
To describe the advantages of Condition Based Maintenance
Describe the resonance phenomenon and how to avoid the problems it causes.
Describe how the vibration spectrum is analyzed.

Biography:
Mr. Thompson is a Senior Technologist at Stantec. Prior to this, he was the Director of the Production Division for Fairfax Water. In this role he is responsible for the operation and

Maintenance of two water treatment plants with the combined capacity of 345 mgd. Mr. Thompson came to Fairfax Water in August of 2005 after serving 20 years with the Washington Suburban Sanitary Commission most recently as Group Leader.

26. Wednesday, August 28, 2024
Room 203/204
2:00 PM - 2:30 PM

Title: Improving MBR Performance Monitoring and Maintenance with Control Chart Methodology

Presenter(s):
Mirzaman Zamanzadeh, Senior Process Expert
inCTRL Solutions Inc.

Abstract:
Transmembrane pressure (TMP) or permeability measures are vital for assessing membrane bioreactor (MBR) performance. A sudden TMP rise (or permeability drop) may signal rapid fouling, requiring immediate chemical cleaning to prevent plant damage. Persistent high TMP can lead to permanent fouling, necessitating early, costly membrane replacement. Monitoring MBR TMP data with control charts helps detect early fouling signs. Control charts are suggested for process control, proving useful for proactive membrane cleaning. Our presented method for detecting membrane fouling and activating alarm systems uses control charts and run-rules. Control chart technology can assist in fault detection and diagnostics across various industries. Preprocessing data to identify the most suitable metric for inclusion in the control charts is crucial for successful control chart applications. These preprocessing methods ensure that the metrics on the control charts provide early warnings of poor process and equipment performance and reduce the risk of false alarms in software interfaces. To apply control charts to MBR data, three elements are needed: a charted metric, control limits for normal operation range, and an alarm system for TMP rises. Selecting the right metric is vital for effective fault detection. Using each TMP measurement as the metric can reduce sensitivity, as data points might not belong to a production cycle. Our approach uses batch cycle endpoints as the metric for fault detection. Since our method uses the production cycle endpoints as the metric, it incorporates real-time batch cycle detection to identify their start and end points. It's important to note that our approach minimizes the required plant-specific information. It does not rely on accessing specific tags or data indicating operation cycles. This design decision is based on the potential unavailability of such information across all plants, and our aim was to create a preprocessing method with broad applicability across different plants. Upon computing a new real-time metric value, it will be automatically compared to the control chart limits in real-time. This assessment allows for both visual inspection and automatic alerts based on pre-programmed software criteria, notifying users of any issues. The alarm informs the user of the pressure raise and remains active until the problem is solved by the operators.

Learning Objectives:
Recognizing TMP and permeability's role in MBR performance, including sudden rises or drops' implications.

Studying control charts and run-rules to detect membrane fouling and improve fault detection across industries.
Understanding preprocessing methods for control charts, prioritizing early warnings and reducing false alarms in software.

Biography:
Dr. Mirzaman Zamanzadeh is a process and modeling expert with a degree in environmental engineering. He brings extensive experience in designing water treatment processes, optimizing energy efficiency in water and wastewater plants, and specializing in wastewater design and optimization. His expertise spans across various areas including optimizing the energy consumption of aeration systems in wastewater treatment plants, design and implementation of anaerobic digestion, and co-digestion of various organic materials and nutrient recovery. He developed model-based decision support tools to empower water/wastewater treatment plant operators with real-time insights for better decision-making. Mirzaman is an expert in building digital replicas of water and wastewater treatment plants to predict performance, optimize operations, and identify potential issues proactively. He authored more than 40 publications in top-tier scientific journals.

27. Wednesday, August 28, 2024
Room 207/208
2:00 PM - 2:30 PM

Title: Controlled Trench Blasting at Druid Lake – How to keep the drinking reservoir in-service and not scare the Zoo animals

Presenter(s):
William Wagner, Senior Vice President
WRA

Abstract:
The Druid Lake Finished Water Tanks includes two large diameter tanks (400-foot and 550-foot) precast, prestressed concrete tanks, approximately 6,000LF of 72-inch diameter steel concrete lined water transmission main, valves and appurtenances, and approximately 500LF of 30- and 48-inch diameter PCCP water transmission main, valves and appurtenances. After an overview of the construction project of building two tanks in an operating drinking water reservoir, the presentation will focus on the lessons learned from blasting near an open reservoir, an old dam, an active park, large prestressed concrete tanks and a zoo. During the project the contractor proposed blasting as part of their means and methods to excavate the rock along the alignment to install 72-inch steel pipe on the north side of the lake. Naturally, WRA, Baltimore City, and MDE Dam Safety were cautious about blasting near the Druid Lake reservoir, relatively close to the Druid Lake Dam, and the newly installed prestressed concrete tanks. We will go over the reasons for considering blasting and the reasons for concerned about blasting. We will review the MDE emergency action plan required by dam safety, the steps and approvals required to get blasting near these approved. We will go over the actual blasting plan submitted and the pre blasting vibration monitoring. We will show photos of the blasting set ups and videos of the blasts. We will go over the blasting results that are received immediately after blasting, as well as the production following blasting. The

presentation will conclude with the close coordination among operations, engineering and construction to bring the tanks on-line to avoid a $67,000 / day fine.

Learning Objectives:
How to maintain a drinking water reservoir in-service while constructing two new tanks within the footprint of the reservoir
How to plan and execute trench blasting adjacent to critical infrastructure
The benefits of collaboration among owner, engineer and contractor during construction and start-up

Biography:
Bill Wagner is a Senior Vice President at Whitman, Requardt & Associates with over 35 years of experience in planning and design of water treatment facilities in the mid-Atlantic region. He received his B.S degree in Mechanical Engineering and received his M.S. degree in Environmental Engineering both from the University of Maryland. He is a licensed professional engineer in MD, DC and 6 other states.

28. Wednesday, August 28, 2024
Room 215
2:00 PM - 2:30 PM

Title: Using data to target customer engagement and outreach efforts in your financial assistance programs

Presenter(s):
Jay Sakai, Prinipal
4Tenets Consulting, LLC
Kelly Caplan, Division Manager, Customer Engagement
4Tenets Consulting, LLC

Abstract:
Affordability has emerged as one of the most important policy issues facing today's water and wastewater providers. In the aftermath of lingering socio-economic impacts from the COVID-19 pandemic, many utilities are re-examining their customer assistance programs and outreach looking for ways to improve their overall approach to affordability. The first step in this assessment is understanding who your customers are and challenges that they face with paying water and sewer bills. An analysis of census and billing data can provide important insights into how and why customers get behind with their utility bills, and how assistance programs can be designed to meet the needs of the most vulnerable ratepayers. This presentation will explore how WSSC performed a comprehensive assessment of its customer assistance programs, identified the level of need among its ratepayers, and designed programs and services that will better meet the long-term affordability needs of these customers. This exploration will provide insights for customer service managers and utility executives on how to use customer data and Census information to target customer outreach and engagement efforts and improve the effectiveness of your utility's financial assistance programs.

Learning Objectives:

Using Census data to characterize your customer base
The importance of outreach and engagement in customer assistance program
Designing financial assistance programs to meet customer needs

Biography:
Jay Sakai is a principal consultant with 4Tenets Consulting, an engineering and management consulting practice that specializes in utility management within the water and wastewater industry. He has over 20 years of experience working on customer assistance programs within the water and wastewater sector and has worked with some of the region's largest utilities on water affordability issues. Jay is a professional engineer with almost 40 years of experience in the water and wastewater field.
Kelly Caplan joined WSSC Water as the Customer Engagement & Advocacy Division Manager where she manages the Water Fund, which helps financially vulnerable customers pay their water bills. Her division promotes financial assistance programs and initiatives assisting those customers most in need. Her team advocates for customers to help resolve their complex issues, promotes effective relationships in the community and spearheads all outreach and engagement with key constituencies. The Customer Engagement & Advocacy Team is also responsible for developing strategic plans to inform the public and local communities, municipalities and other key stakeholders regarding WSSC Water's upcoming construction activities. She currently serves on the Board of Directors for the Penn State Alumni Association Council National Energy Utility & Affordability Coalition, and Leadership Montgomery.

29. Wednesday, August 28, 2024
Room 217
2:00 PM - 2:30 PM

Title: Sewer Data Management and O&M Plan Optimization in the City of Baltimore's Department of Public Works

Presenter(s):
Paul Sayan, Acting Bureau Head, Water & Wastewater
Baltimore City DPW
Jim O'Dowd, Infrastructure Asset Manager
AECOM

Abstract:
Sewer data management and optimization of operation and maintenance (O&M) programs can appear daunting to many utilities. The City of Baltimore's Department of Public Works (DPW) serves approximately 270,000 accounts with a residential population of nearly 570,000. The City's wastewater network consists of more than 1,375 miles of sewer collection piping. Under a consent decree since 2002 that was modified in 2017 (MCD), DPW manages the preventative maintenance activities required by the MCD in addition to a broader mission to implement sound asset management principles across the organization. This presentation features a deep dive into the evolution of DPW's sewer data management and asset management programs that led to the optimization of their O&M plans and describes processes and strategies employed to:

(a) Develop updated specifications for field data collection,
(b) Create a risk model for the network,
(c) Select assets for condition assessment,
(d) Import, manage and evaluate the inspection data,
(e) Develop O&M Programs for Cyclical Cleaning, Root Control and Fats, Oils and Grease (FOG) Control,
(f) Develop capital improvement program (CIP) projects using condition assessment data,
(g) Develop an Asset Management Plan

Learning Objectives:
The purpose of this abstract is to clearly describe and demystify the components, processes and strategies used to develop defensible condition assessment, O&M and CIP programs for sewer utilities. The conclusion is that such practices can be established using best practices and utility staff can implement them to optimize their O&M and CIP programs.

Biography:
Paul Sayan is the acting bureau head for the City of Baltimore Department of Public Works, Bureau of Water and Wastewater. Paul has over 25 years of experience in the water and wastewater industry, including study, design, construction management and program management of various projects and programs throughout the country. Paul has a bachelor of science degree in civil engineering from California State University at Long Beach and a master of science degree in environmental engineering from the Johns Hopkins University. Paul is a registered professional engineer licensed in Maryland and California.

Jim O'Dowd is a professional engineer with over twenty-nine years of experience in water and wastewater consulting. He was the Infrastructure Asset Manager with the Western Virginia Water Authority in Roanoke, Virginia for a decade and has been working with AECOM since 2018. He holds a bachelor's degree in civil engineering from University College Cork, Ireland. Mr. O'Dowd is the current Chair of the ASCE Utility Asset Management Division's Practical Data Analysis Committee. He has presented papers at National and International conferences with a primary focus on hydraulic modeling and asset management.

30. Wednesday, August 28, 2024
Room 201/202
3:30 PM - 4:00 PM

Title: Asset Management – Building Information Management (BIM) 16th & Alaska Pump Station Pilot Demonstration

Presenter(s):
Ogechi Okpechi, Director of Permit Operations
DC Water
Michael Skerritt, Principal Engineer - Water
Mott MacDonald
Monique Mirabeau, Program Manager – Contract Management
DC Water

Abstract:
DC Water uses ESRI GIS to provide a visual interactive interface for managing water and sewer linear assets. The existing connectivity between ArcGIS and Maximo provides access to asset information. In comparison, data sources for vertical assets information such as record drawings, SOPs/O&Ms, service manuals, asset information, etc. are not integrated into a single user interface. This information exists in multiple systems such as Oracle, Unifier, Livelink, SharePoint, Shared Drives, Maximo, Aveva (SCADA), and hard copies. DC Water's Department of Pumping and Sewer Operations (DPSO) decided to pilot Building Information Management (BIM) as an asset management tool that provides a single point of access for vertical assets and facilities information. The BIM pilot was performed on the smallest pumping facility – 16th & Alaska Water Pumping Station. The pilot's primary objective was to integrate (without duplicating) the multiple data sources into a visually interactive user interface to help resolve cross referencing challenges faced by operations and maintenance staff. The BIM Pilot was completed in September 2023 using a software developed by Asite. Asite was able to demonstrate that the selected software solution provided the required functionalities/features for various uses cases identified by operations staff. Operations staff found that the BIM interface could considerably improve their efficiencies as it acts as gateway to all relevant information required for operations and maintenance of the assets. Other benefits gleaned from the piloted BIM Solution were improvements to the visual interface, training capabilities, easier access, cross referencing for SCADA information, and reporting/troubleshooting. These benefits improved user confidence in locating information, allowed office-based staff and managers to familiarize themselves with the facility without field visits, and established near real time updates of dynamic data. The BIM Pilot was successful in providing a proof-of-concept that can be the basis for the decision to implement an enterprise implementation. DC Water sees how it can provide value by increasing operations staff efficiency. Having a system that integrates data sets in an easy-to-use interface opens the door for data analytics across multiple facilities which turns massive amounts of data into useful decision-making information. "It is a capital mistake to theorize before one has data." - Sherlock Holmes in "A study in Scarlet" by Arthur Conan Doyle. This presentation will discuss the timeline and challenges encountered during the BIM pilot and will provide a demonstration of the software tool and its capabilities.

Learning Objectives: to be submitted

Biography:
Ogechi Opechi is the Director of Permit Operations at DC Water. Ogechi directs activities associated with he enforcement of all provisions relating to DC Water's public infrastructure systems, including the mapping of existing water and sewer infrastructure, ensures regulatory compliance, and leads the Authority's Permitting team. Leading by example, she provides strategic guidance and leadership through her commitment to ensuring all residents, private companies, and government agencies have a seamless customer experience when requesting information and pursuing permit approvals from DC Water. Prior to joining DC Water in 2017, Ms. Okpechi worked in the consulting engineering field as a design manager, project manager, and business group leader. Ms. Okpechi earned a bachelor's degree in civil engineering from the University of Nigeria and a master's degree in environmental engineering, with specialization in Water and Wastewater design, from the University of Florida. She is a licensed Professional Engineer in the District of Columbia, Virginia, and Florida and is certified as a Project Management Professional (PMP) and Black Belt Lean Six Sigma.

31. Wednesday, August 28, 2024
Room 203/204
3:30 PM - 4:00 PM

Title: A PFAS Perspective - Laboratory, Landfills, and Biosolids

Presenter(s):
Gary Hunter, Global Process Technology leader
Black & Veatch Corporation

Abstract:
The extensive release of per- and polyfluoroalkyl substances (PFAS) into the environment is causing worldwide concern due to the strong resistance to biotic and abiotic degradation and the potential for adverse health effects on humans. Specifically, PFAS are considered as common contaminants in municipal landfill leachate and are consistently measured at concentrations in the ppb level (i.e., µg/L), which is three to four orders of magnitude greater than proposed federal regulations. There are ongoing studies indicating that landfill leachate may be contribute signifant amounts of PFAS to wastewater treatment facilities. The treatment of leachate brings added complication to PFAS removal since there is no single technology to date capable of cost-effectively treating large volumes of complex water containing a wide range of background contaminants, such as TOC, TDS, and trace metals. Currently proven remediation processes include adsorption, membrane separation, and foam fractionation; however, these would only shift PFAS to another media creating secondary contamination (e.g., PFAS-loaded foam, RO concentrate, GAC media). The two most common approaches for handling PFAS-laden media are landfill disposal and incineration but are considered unsustainable. This study will present results from collected from bench scale testing of 18 different technologies being evaluated by an Utility in the north east part of the US. Although several emerging technologies have shown great candidacy for complete treatment of PFAS waste, the limited availability of scale-up studies suggest the need for a thorough investigation of various treatment combinations considering energy requirements, release of toxic byproducts, and footprint requirements. The most important finding is that a separation/concentration step would significantly decrease the capital and operating costs of the downstream destruction technology by minimizing the volume of treatment and thereby the number of reaction vessels and energy requirements. For instance, 1,067 electrooxidation vessels ($57M) drawing 3.5 Megawatts would be needed to treat 0.35 MGD of raw leachate, whereas only 23 reactors ($1.3M) using 75 kW are required to eliminate PFAS in the foamed leachate to below 10 ppt. Among separation technologies, foam fractionation is the best candidate for leachate because it precludes the need for biological pretreatment and eliminates the production of PFAS-containing biosolids. Most discoveries are still in laboratory testing stage and a comparison of emerging technologies with same water characteristics has not yet been systematically explored. Therefore, ongoing preparations for side-by-side pilot testing of select tandem treatment arrangements will provide crucial insights on treatment performance and fill key gaps for PFAS applications. Another aspect of wastewater treatment where potential PFAS regulations pose a level of uncertainty for utilities is with biosolids management. The second part of this presentation will focus on PFAS related regulation development and feature some research on a technology being considered as a means of destroying PFAS in biosolids. EPA is currently developing their risk management protocols for PFAS, and it could be several years before their analyses are complete. In the meantime, some

states are moving forward with developing their own limits. Some have implemented drinking water limits (specifically notification and response levels) that have the potential to impact biosolids programs. Other states are taking more of a pretreatment approach, intercepting/reducing/eliminating the compounds before they can reach the treatment facility. One state, Maine, recently enacted legislation that bans the application of all biosolids in the state, resulting in significantly higher costs for all utilities in the state. This legislation has sent a shock wave through the industry. The concerns with PFAS have resulted in many utilities revisiting their programs. In addition, several manufacturers are pitching thermal destruction technologies as the panacea for managing PFAS in biosolids. These include manufacturers of pyrolysis and gasification among others. These processes produce biochar and syngas byproducts. The limited data available indicates the processes will destroy PFAS compounds in the biochar, but Black & Veatch has led research to look at the entire pyrolysis process to determine if PFAS compounds are being emitted in byproducts from these processes. The research found transformed PFAS compounds in the py-oil off the process, indicating that more research is needed to fully understand the fate of PFAS compounds in these processes. Black & Veatch will also be initiating research sponsored by the Water Research Foundation (WRF) to help establish protocols for analyzing emissions from these processes to help understand the full fate of the compounds.

Learning Objectives:
Gain understanding of the impacts the different PFAS analytical techniques have on Water Reclamation Facilities
Understand the impact landfill leachate has on the PFAS concentration discharged from POTW
Gain understanding on types of technologies and cost that will impact biosolids disposal practices

Biography:
Mr. Hunter is a Global Process Technology leader at Black & Veatch. In that role he is responsible for the evaluation and deployment of technologies for the treatment of emerging technologies. He holds a BSCE and MSCE from Brigham Young University. He is a BCEE and holds a ENVSP certification. He serves as a vice Chair of the WEF PFAS Taskforce.

32. Wednesday, August 28, 2024
Room 207/208
3:30 PM - 4:00 PM

Title: The Occoquan River Crossing was a BLAST

Presenter(s):
Tim Bulford, Project Manager
Garney Construction

Abstract:
The Occoquan River Crossing stands as a testament to innovative engineering solutions, navigating the intricate challenges of transmitting flows from one side of the river to the other. At its core, this unique project hinged on the installation of two runs of 42" welded steel pipe beneath the Occoquan River. This endeavor included the construction of a 400-ft horizontal tunnel, a 24-ft diameter, 100-ft deep vertical access shaft, and the installation of one 7-ft and one 6-ft diameter, both 100-ft deep vertical raised bores. Undertaking the Occoquan River Crossing project,

engineering marvels emerged through the strategic integration of key components and innovative methods. A 400-ft horizontal tunnel, carved beneath the Occoquan River using specialized drilling and blasting techniques in robust rock, served as the backbone. Accompanying this, a monumental 24-ft diameter, 100-ft deep vertical access shaft and two raised bores, measuring 7-ft and 6-ft in diameter, each plunging 100 feet deep, facilitated the installation of a 42" welded steel pipe. These feats were not without their challenges, including navigating the complexities of the Historical District of Occoquan, VA. The delicate balance between progress and preservation influenced the project. The presentation, therefore, becomes a compelling narrative, delving into the means and methods employed, the engineering marvels that emerged, and the challenges skillfully addressed. It focuses on the intricacies of tunnel construction, pipe installation, and raised bores, offering a transparent discussion on hurdles overcome and meticulous risk assessment and mitigation strategies. The interplay of preservation dynamics within the project's execution serves as a captivating backdrop, emphasizing the symbiotic relationship between modern infrastructure and the preservation of the aesthetic appeal of the local landscape.

Learning Objectives:
Drilling and blasting a 24' diameter, 100' deep access shaft.
Drilling and blasting a 12' x 9' horseshoe shaped tunnel, 400' long.
Performing a 6' diameter and 7' diameter raised bore.

Biography:
Tim Bulford, Project Manager, Garney Construction - Tim has been working in the construction industry since 2001 on a variety of transportation, utility, and heavy civil projects. As a Project Manager for Garney Construction, Tim's responsibilities include CPM scheduling, management of field operations, client engagement, material procurement, subcontract management, and estimating.

33. Wednesday, August 28, 2024
Room 215
3:30 PM - 4:00 PM

Title: Complying with AWIA 2025 deadline

Presenter(s):
Patti Kay Wisniewski, Drinking Water Security/Preparedness
US EPA Region 3

Abstract:
America's Water Infrastructure Act requires risk assessments and updated emergency response plans with certifications to EPA every 5 years from community water suppliers serving more than 3,300 persons. Upcoming deadlines are in mid-2025. This presentation will be an overview of the requirements, clarifications since the first round of certifications, updated tools and how to submit certifications via the EPA portal.

Learning Objectives:
Understanding the ongoing AWIA requirements
Becoming familiar with tools EPA has made available to assist water suppliers with these efforts

Assisting with compliance by all

Biography:
Patti Kay has been with EPA Region III for 38 years performing a wide range of duties including: state grants and contracts management; drinking water rule development and implementing resiliency and climate change initiatives within the drinking water program.
Patti Kay has a Bachelor of Science degree in environmental science from Cook College, Rutgers University.
Since 2002, she has been working on security and emergency preparedness related matters; most recently implementing the America's Water Infrastructure Act requirements for risk assessments and Emergency Response Plans.
Patti Kay is a lifetime member of AWWA.

34. Wednesday, August 28, 2024
Room 217
3:30 PM - 4:00 PM

Title: HRSD WWTP Primary Clarifier Influent & Effluent Pipe Rehabilitation

Presenter(s):
Anna Pridmore, Senior Vice President of Municipal Infrastructure
Structural Technologies
Terry Zentkovich, Project Manager
RK&K
Bob Trovato, Operations Plant Superintendent
York River Treatment Plant

Abstract:
In 2021 a series of events prompted Hampton Roads Sanitation District (HRSD) to examine the conditions of pipelines at the York River Treatment Plant. CCTV footage revealed varying degrees of degradation to three primary clarifier pipelines. To restore the pipelines, HRSD explored options to excavate and replace, or to rehabilitate sections using carbon fiber reinforced polymer (CFRP). Utilizing CFRP proved to be the most cost-effective and delivered the least disruption and environmental impact. Crews dewatered and sanitized the pipelines, performing condition surveys including CCTV inspection. Extensive deterioration was discovered in the primary clarifier influent pipelines that was not seen in the initial CCTV due to the presence of built-up concrete that had fallen from the crown of the pipe and prevented the CCTV machine from continuing all the way down the pipeline. The project team quickly relayed the condition to the owner and modified the project plan to include custom shoring. Crews then performed surface preparation followed by installation of the CFRP system and a chemical resistant topcoat. Additional scopes included pipe abandonment as well as bypass setup and installation. This paper will highlight the investigation, analysis, design, and repair of the influent and effluent pipelines. Perspectives from the Owner, Engineer, and Contractor will be provided, along with insight on the options analysis process, and lessons learned throughout.

Learning Objectives:
investigation, analysis, design, and repair
Perspectives from the Owner, Engineer, and Contractor

with insight on the options analysis process

Biography:
Dr. **Anna** Pridmore is the Senior Vice President of Municipal Infrastructure for Structural Technologies and has over 18-years of interdisciplinary experience working with pipeline condition assessment and rehabilitation, with over 400 projects implemented to date. She assists clients with options analysis, technical support, engineering, specifications, and projects related to pipeline inspection and rehabilitation.
Bob has 26 years' experience in wastewater operations and maintenance with Hampton Roads Sanitation District. He Graduated from HRSD's apprenticeship program and started as an Interceptor assistant working on the collection system before getting promoted to Plant Operator. Bob was a shift Operator for about a year before going into maintenance where he had the opportunity to really learn the inner workings of the plant. That's when he started learning leadership, administration and budgetary skills and eventually was promoted to Operations Plant Superintendent. His passions are playing music, and writing and recording songs. When Bob retires, he plans to dedicate his time to music and possibly make it more than just a hobby. We'll see.
Terry L. Zentkovich has 41 years of experience in municipal water/ wastewater engineering. He manages, trains, and assists planning and design resources to ensure project schedules, technical requirements, and project budgets and project goals are met. He has significant experience in planning, design, construction and start-up and operation in all facets of wastewater treatment including preliminary, primary, secondary and tertiary treatment, final disinfection and biosolids handling, treatment and disposal. He routinely provides operator training on all facilities he has designed and overseen the construction of.

35. Wednesday, August 28, 2024
Room 201/202
4:00 PM - 4:30 PM

Title: How to Sweat the Small Stuff: A Risk Approach for Rehabilitating Small Diameter Sewers

Presenter(s):
Emily Keller, Staff Professional
Carollo Engineers
Ella Garcia, Supervisor
DC Water

Abstract:
Asset management principles tell us to spend our capital dollars on our highest risk assets. For a large system like DC Water's, however, CIP planning cannot simply focus on rehabbing the highest risk assets. Based on detailed risk modeling, DC Water's highest risk assets are large diameter sewers. Small, local sewers that are responsible for servicing the customer and where the consequence of failure can have a greater impact on individual communities (through localized flooding and sewage backups into homes and businesses) had a lower risk profile. These small diameter sewers cannot be ignored simply because the risk prioritization system scores them lower. From an equity perspective, smaller diameter pipes are important to invest in for both the

benefit to people and the environment of reducing failures as well as the financial benefit to ratepayers of avoiding expensive emergency repairs. How can DC Water justify spending money on these mains in the framework of an asset management plan? To meet DC Water's small diameter sewer rehabilitation objectives, DC Water developed the Local Sewer Rehabilitation Program (for sewers less than 60-inches in diameter). To select small diameter assets for rehabilitation a risk-based prioritization process was developed specifically for local sewers. The pipes considered for rehabilitation include sewers with a NASSCO PACP structural and/or O&M maximum grade 4 or 5 defect observation. These pipes were plotted by the small diameter risk categories to see where high-risk assets with severe defects were located. In doing this, high risk pipes were scattered around the district and did not make for reasonable rehabilitation project location. To develop project groupings, the sewer system was divided into areas called prioritization polygons. The prioritization polygons were created by further splitting the established sewershed polygons using natural barriers like water bodies, parks, and major roads to simulate logical rehabilitation project areas. Each sub-sewershed was prioritized based on the length weighted average risk score of the local sewer mains in that polygon as well as an equity score that was applied to each area. The top ranked prioritization polygons were selected as rehabilitation project areas to meet DC Water's local sewer rehabilitation goals.

Learning Objectives:
How to prioritize multiple size assets in a large collection system.
How to utilize risk model results to identify and prioritize improvements.
How to develop a local sewer rehabilitation prioritization approach.

Biography:
Emily Keller is a staff professional with Carollo Engineers. She graduated from the University of Maryland in 2021 with a bachelor's degree in Civil and Environmental Engineering. She has 3 years of experience in master planning, modeling, and design. Her focus includes water resource planning, water and sewer hydraulic modeling, GIS, and asset management.
Ms. Ella Garcia has over 20 years of experience in water distribution system design and wastewater collection and conveyance systems design. As a Supervisor at DC Water, she is responsible for managing the 10-year CIP for the sewer linear assets. She also oversees the management of the sewer program management consultant contract. Ms. Garcia graduated from the University of Santo Tomas, Manila, Philippines with bachelor's degree in civil engineering. She is a registered Professional Engineer in Maryland and DC and a Project Management Professional.

36. Wednesday, August 28, 2024
Room 203/204
4:00 PM - 4:30 PM

Title: Managing Wet Weather Challenges at the Pleasant Hills Authority WWTP

Presenter(s):
Robert Dengler, Senior Project Manager
Gannett Fleming, Inc.

Abstract:

The Pleasant Hills Authority owns and operates a sewer system that consists of approximately 11.5 miles of trunk sewers, two sewage pumping stations, and a 5.0 MGD wastewater treatment plant (WWTP). The trunk sewers, the Lewis Run Pumping Station and the original WWTP were constructed in 1958-59. In January 1988, the Authority awarded contracts to increase the capacity of the Lewis Run Pumping Station; expand the sewage treatment plant capacity from 3.0 MGD to 5.0 MGD; and upgrade the facilities from secondary treatment to tertiary treatment. The expanded and upgraded facilities were placed into operation in June 1990 as a two-state WWTP operation. In 2008, the Pleasant Hills Authority began to study improvements needed to eliminate sanitary sewer system overflows (SSO) at the Lewis Run Pump Station and the WWTP in response to a Consent Order and Agreement (CO&A) with the PADEP and the Allegheny County Health Department (ACHD). The CO&A required the Pleasant Hills Authority to perform all necessary upgrades to the Lewis Run Pump Station and the WWTP to eliminate all bypasses and unauthorized discharges. After the preliminary design phase and collaboration with the member municipalities (Borough of Pleasant Hills, Borough of Baldwin, Borough of Whitehall, and the Township of South Park) the SSO Elimination & Capital Improvements Project was developed. This project at Authority's WWTP involved the Primary Clarifier Effluent (PCE) being rerouted through the WWTP to a parallel activated sludge process instead of the current two-stage process up to 12.5 MGD through a flow management approach. Flows from 12.5 MGD to 25 MGD will be diverted to the existing plant pump station, which will be used as a wet weather pump station. The wet weather pump station will proportionately distribute the wet weather flows to the Stage 1 and Stage 2 aeration tanks. This increases the WWTP capacity to be able to treat up to 25 MGD of wastewater flow in order to prevent WWTP SSOs during a 2-year design storm. This play involved a novel Flow Management Strategy that consisted of the construction of a new Flow Control Chamber that was designed to distribute 40% of the PCE to Stage 1 and 60% of the PCE to Stage 2. For flows between 12.5 MGD to 25 MGD that would bypass the Headworks, Grit Removal and the Primary Clarifiers, this flow would also be distributed in a 40-60 split to the aft end of the Stage 1 and Stage 2 Aeration Tanks. The Part II Water Quality Management Permit was issued by the PADEP in 2016 and construction began in 2017. The project was substantially complete and operational in 2020. The total project cost was $17.5 million and the result was that the SSOs at the WWTP were dramatically decreased. Since the project was completed, no SSOs have occurred at the plant during the 2 year – 24 hour design storm or lesser intense storm events. Further, the volume of SSOs during storms above the design storm was much less than the SSO volume prior to project implementation. Flow Management Strategy allowed Authority to double peak wet weather flow without the need for the substantial capital cost of additional tankage.

Learning Objectives:

Understanding the challenges faced by the Authority realative to managing wet weather flows.
Define the strategies available for wet weather flow management at a treatment plant to reduce overflows.
Identify lessons learned from construction and implementation of a wet weather flow management system

Biography:

Robert (Bob) Dengler is a Senior Project Manager for Gannett Fleming in their Pittsburgh office. He has 29 years of experience in the water/wastewater industry, including executing and managing water and wastewater treatment, pump station and collection system projects, including planning, design and overseeing the construction phases. He is a graduate of Drexel University with a BS in

Civil Engineering and University of Pittsburgh with an MS in Civil Engineering. Bob is a licensed engineer in the state of Pennsylvania.

37. Wednesday, August 28, 2024
Room 207/208
4:00 PM - 4:30 PM

Title: Pipe Bursting Proof of Use for Water Main Replacement: Insights from WSSC Water Pilot Project

Presenter(s):
Yudu (Sonia) Wu, Senior Lead Water Resource Engineer
WSP USA, Inc.
Thomas Payne, Technical Adviser
WSP USA, Inc.
Keith Solomon, Project Manager
WSSC Water

Abstract:
As water distribution systems require replacement due to age and increased demand, engineers are exploring innovative construction methods to stretch budgets and mitigate impacts on the surrounding community. The Washington Suburban Sanitary Commission (WSSC Water) has widely utilized pipe bursting as an alternative to open cut replacement of sewers and was considering pipe bursting as a viable construction method for use in water main replacement projects. Before WSSC Water could expand the use of pipe bursting technologies for systematic improvements, several key questions needed resolution: • What tools and equipment are required for bursting of water mains? • Are there site limitations to using pipe bursting at specific locations? • What pipe materials can be burst, and what pipe materials can they be replaced with? • Which pipe materials are best for water mains with deflections? • Will pipe bursting be a cost-effective method for water main replacement? For this evaluation, WSSC Water selected Lanham Station Road Water Main Replacement Project as a pioneering testbed for this innovative approach, encompassing approximately three miles of water main replacement (diameters ranging from 6 to 12 inches) using PVC. Three construction techniques, Pipe bursting, Relocation and Relay (same trench replacement), were meticulously implemented for comparison. Different types of C-900 PVC pipe (restrained joint and fusible PVC) were installed to evaluate their performance during the pipe bursting process and different site conditions. The project's diverse landscape included various housing densities, apartment complexes, commercial zones, and terrain variations, providing an ideal setting for comprehensive testing. Plans, specifications, and a custom tablet-based field inspection data collection application were utilized to capture field observations. With construction completed in 2020, The pilot project identified and assessed the pros and cons of pipe bursting as compared to conventional open cut methods, observations of different PVC materials performance, and applicability of pipe bursting at different site conditions. The project illuminated the advantages of pipe bursting with water main replacement, including cost savings, shorten project timelines, minimal community and traffic disruptions, and reduced pavement restoration needs. It also highlighted challenges that require further examination, such as addressing deflection issues, resolving utility conflicts, and managing groundwater, soil conditions and surface heaving. Ultimately, the pilot project demonstrated water main pipe bursting's

potential and provided practical recommendations for standard specifications, construction methodologies, material selection guidelines, and checklists. This pioneering initiative underscores the benefits of innovative construction approaches, offering a blueprint for more efficient and cost-effective water main replacement in the future.

Learning Objectives:

This presentation uses a WSSC pilot project to discuss the pipe bursting process, advantages and disadvantages of bursting vs traditional construction methods.
Pipe bursting application/limitations in water main replacement projects and is geared to provide designers and municipalities with an understanding of water main replacement using pipe bursting for consideration on future projects.

Biography:
Sonia Wu is a senior lead water resources engineer with WSP, who passionate about One Water approach for the water industry. She has 17 years of experience in water, wastewater engineering, stormwater management, stream restoration, floodplain management, and asset management.
Thomas Payne, P.E. has 27 years of experience in civil and environmental engineering and is a district water resources lead at WSP where he serves as a company-wide subject matter expert and technical advisor on water and wastewater projects across the United States and abroad for federal, state, regional and municipal clients.
Keith Solomon, P.E. is a Project Manager within WSSC's Civil Engineering Support Section of the Engineering and Environmental Services Division with 10 years of experience in water and sewer design.

38. Wednesday, August 28, 2024
Room 215
4:00 PM - 4:30 PM

Title: The Importance of Cyber Resiliency in the Modern Utility: St. Louis MSD's Journey

Presenter(s):
Jonathon Sprague, Senior Asset Managment and Operations Consultant
HDR
Ginny Kienstra, Director of IT
St. Lois MSD

Abstract:
Authors:, Jon Sprague (HDR), Ginny Kienstra (St. Louis MSD) Resiliency in the Modern Utility is essential and multi-faceted. Traditionally resiliency in utilities focused on operations, and over time it has grown to include finance, supply, workforce, and climate impacts among numerous considerations. In today's digital world, utilities rely on enterprise management systems, computerized maintenance management systems, SCADA, and the internet, which are integrated into our daily lives and workplace. In addition to our reliance on data and information systems the threats to our systems have never been greater. The threat of cyber-attack today is a business and

cyber security an ever-increasing need. The purpose if this presentation is to outline Metropolitan St. Louis Sewer District's (MSD) journey to build a utility not just focused on cyber security, but cyber resilience. Resiliency not only included cyber-attacks, but the ability to bounce back from physical disasters, and equipment failures in a documented and practiced fashion. This was a multi-year journey that has evolved and continually adapted to the fast pace and changing digital landscape. This paper will describe MSD's decision to launch on this journey and methods to identify and mitigate the threats to cyber resilience. The areas of focus were both physical and virtual, including network operations, applications, mobile technology, connectivity, and security. MSD focused on best practices and security frameworks to identify risks and prioritize the controls. Control measures focus on prevention, detection, response, and recovery. This journey was not always perfect, MSD will discuss its success and setbacks, including the disappointment in 2020 when they failed a penetration test even after enacting new policies and controls. In addition, we will discuss the scramble and shifting focus created by the pandemic and new norms and challenges of a remote workforce. Lastly, we will discuss societies shift to the cloud and the opportunities and challenges for cyber resilience and how it has changed MSD's approach.

Learning Objectives:
Importance of Cyber Resilience
Cyber resilience is more than cyber security
Outside perspective/validation is important

Biography:
Jon Sprague is a Senior Asset Managment and Operations Consultant at HDR working out of the Virginia Beach office. Jon has over 30 years of Utility Management experience and spent 18 year as a Director at St. Louis MSD. Jon has extensive experience in Asset Mangement, CMMS and Enterprise IT system integrations and cyber security. Jon is a PE, with a degree from the University of Akron and an MBA from the College of William and Mary.

39. Wednesday, August 28, 2024
Room 217
4:00 PM - 4:30 PM

Title: How to Effectively Perform a Pipeline Health Check for Sewer Force Mains

Presenter(s):
Christopher Korpman, Lead Project Engineer
RJN Group
Christina Camonayan, Project Manager
RJN Group

Abstract:
Effectively evaluating sanitary sewer force mains hinges on understanding how they operate and the various modes of failure. Based on a survey of Water Environment Research Foundation (WERF) and the National Association of Clean Water Agencies (NACWA) utility subscriber members, nearly 50% of force main failures are due to corrosion, either internal or external. An additional 25% of failures are attributed to surge pressure and joint leakage. This means over 70% of force main failures are preventable with a comprehensive management program. An effective pipeline health

check protocol is based on a very prescriptive, phased approach to condition assessment. This is accomplished by doing a thorough review of the pipeline's history, operating parameters, and in-situ conditions. Pre-screening tools such as high-frequency transient pressure monitoring and C-factor testing, provide insight into the functionality and hydraulic efficiency of the force main, while conducting soil and groundwater analysis along the pipeline provide information if external conditions are impacting the life of the pipeline. By analyzing these factors, appropriate additional assessment technologies can be determined. Condition assessment technologies play a crucial role in identifying and locating leaks and gas pockets in sewer force mains. More invasive advanced tools such as electromagnetics and ultrasonic technologies can yield high-resolution results, but come at a high cost. There is no "one size fits all" when it comes to sewer force main assessment, by understanding the capabilities of innovative sensors and technologies in the market, design engineers can ensure the longevity and reliability of sewer force mains. Baltimore County has implemented this two-phased approach to assess their network of over 80 miles of force mains to be proactive in identifying high risk assets and preventing failures. An initial round of these assessments were conducted approximately 10 years ago to create a baseline condition for the assets; now another round of assessments are being conducted to continue to monitor the health of their system.

Learning Objectives:
How to effectively perform a pipeline health check for sewer force mains to meet consent decree order deadline
Understand proper application of pressure pipe assessment technologies
Understand the importance of a multi-phased approach for pipeline assessment to determine the mean time to failure

Biography:
Christina Camonayan is a Lead Project Engineer with RJN Group. She graduated from the University of Maryland Baltimore County with a BS in Environmental Science, with a focus in applied spatial data analysis. She has been with RJN for 8 years, participating in numerous projects across the US with focuses in sanitary sewer collection system studies, condition assessment, and asset management.

40. Wednesday, August 28, 2024
Room 201/202
4:30 PM - 5:00 PM

Title: Manhole Inflow - The Uncomfortable Reality of how much of our peak wet weather flow is related to sheet runoff

Presenter(s):
James Shelton, Vice President and National Technical Director for Buried Infrastructure
Arcadis

Abstract:
After conducting more than a decade of sewer rehabilitation work, including manhole inspection of all manholes and significant manhole rehabilitations, flow metering hydrographs from a year long I&I investigation program for the Kline's Island Sewer System (KISS) of Lehigh County showed

that many basins with the KISS continued to be badly impacted by inflow sources. Investigations including smoke testing and basement inspections confirmed there were very few roof drain connections and no storm drain connections. The source was clearly manhole inflow. Keystone engineers conducted field trials using camera mounted inside manholes to assess sheet runoff impacts on various type of frame, cover, and inflow dish situations. That study confirmed that inflow through manhole lids, lid-frame interfaces, dish to frame interfaces, and frame to chimney interfaces were much higher than previously realized, especially during the type of downpour events that were leading to SSOs, basement backups, and/or pump station wet well alarms. Bolstered by this findings, the various consulting engineers for this 15 municipality Signatory group realized that their manhole inspections were focused on the manhole body – a source of infiltration - and not on the inflow potential of the lid/dish/frame/chimney components. Arcadis developed a revised manhole inspection rubric based on these realizations. However, field trials revealed a huge range of lid/dish/frame/chimney permutations, necessitating three months of field trials with 3 revisions to the inspection rubric. Once this was completed, the inspection protocol was programed into a Fulcrum-based cell phone/tablet manhole inspection application to ensure the needed attention of inflow and provide a standardized inspection approach all 15 municipalities could use. To date, 1500 manhole inspections have been completed on manholes that had been previously inspected and, in many cases, rehabilitated. The new inspection protocol found approximately 2/3rd of the manholes had frames/covers/chimneys with sufficient inflow issues to warrant corrective action. Those actions varied from Signatory to Signatory, but fall into the categories of frame and cover replacement/resetting, replacement/resealing of faulty inflow dishes, chimney sealing, cover gasket replacement, or cleaning and sealing via caulk or gasket. Relevance, Usefulness, and Takeaways This presentation will show the videos of the KCE field trials, demonstrate the inspection rubric, show photographic examples of the inflow defects found, present the percentages of defects encountered, and present the corrective actions taken for each combination of defects found. This presentation will provide operations and engineering staff with specific data and lessons learned directly applicable to every sanitary sewer system. Demonstrated Results The percentage of manholes found to have defects using the revised inspection protocol, the types of defects found, and the costs to repair each type of defect will be presented.

Learning Objectives:
Recognize when sewer main and lateral rehabiliation will provide limited I&I reduction benefits
Learn how and how much inflow enters manholes in different circumstances
Understand the impact of different interventions and their costs

Biography:
Jim Shelton is a Vice President and National Technical Director for Buried Infrastructure for ARCADIS, focusing on condition assessment, rehabilitation, construction management, capacity assurance, operational assistance, and program development and management. He specializes in large program development and in the delivery of turnkey pipeline rehabilitation projects using Construction Manager at Risk and Collaborative Design-Build. He has a degree in Chemical Engineering from University of Pennsylvania, is a licensed water and sewer contractor in several states, and holds active Professional Engineering licenses in Civil Engineering in 14 states.

41. Wednesday, August 28, 2024
Room 203/204

4:30 PM - 5:00 PM

Title: Not your Great, Great, Grandfathers Secondary Clarifier - New clarifier inlet optimization technology using sludge blanket filtration.

Presenter(s):
Todd Latchaw, Sales Director of Municipal Business
Passavant-Geiger Aqseptence Group

Abstract:
Abstract: Title: Not your Great, Great, Grandfathers Clarifier: Clarifier optimization using sludge blanket filtration and online monitoring in real time to improve footprint capacity of 30% or more and reduce total effluent phosphorous without downstream filtration to < 0.3 mg/l and less: Subject: Clarifier Optimization The standard clarifier design has been around for decades. Although there has been some minor changes to the design to help achieve better performance (think sidewall baffles, or fixed EDI inlets for example), in general the EDI design has not become flexible since its original implementation. But on the opposite. the loading of clarifiers is flexible in a wide range – in fact leading from hour to hour to highly varying optimal EDI shapes for one and the same clarifier. In order to achieve significantly better clarifier performance, a smarter clarifier is needed. A smarter clarifier that esp. will change the EDI design continuously with changing influent conditions. The presentation will go through multiple case studies of facilities who have implemented the load adapting EDI technology with online monitoring and automatic inlet design change to achieve maximum performance through sludge filtration. Case studies, CFD's, from both the United States and Europe will show significant total suspended solids reduction as well as reduction in total phosphorus – in best case down to 0.2 mg/l total effluent phosphorous and thus resulting, in some cases, in the elimination for the need of downstream filtration. Passavant hydrograv adapt system - www.passavant-geiger.com (Secondary Clarifier Process Technologies)

Learning Objectives:
Introduction of a new technology for secondary clarification treatment process - EDI technology and automatic variable inlet design to achieve better performance through sludge filtration.
Real time operations improvements to improve water quality - to water reuse standards.
Optimization of current capital infrastructure.

Biography:
Bio: Todd Latchaw (USA)
Sales Director of Municipal Business- US & Canada, - Passavant-Geiger GmbH, a brand of Aqseptence Group.
With over 20 years of experience in water and wastewater, Todd brings a complete understanding of the process treatment and treatment equipment industry. He has represented various equipment technologies in water and wastewater applications throughout his environmental career. Some of which have been new process equipment technologies, such as: screening, biological, clarification, and filtration, to the North American Market and overseen the introduction and implementation of these technologies.

42. Wednesday, August 28, 2024
Room 207/208

4:30 PM - 5:00 PM

Title: CIPP Lining of Water Mains – A Cost-Effective Solution

Presenter(s):
Khalid Qadawi, Senior Project Manager
EBA Engineering, Inc.

Abstract:
The City of Bowie's water and sewer systems provide services to roughly 8,000 customers. As with many large and aging utilities, failures occur for various reasons. In the City's case, water in the distribution system had become discolored due to pipe tuberculation and turbulence, and water main breaks and low water pressures caused service interruptions. Upon recognizing a need for engineering design services to resolve issues in the Kenilworth neighborhood, the City of Bowie engaged EBA Engineering, Inc., for assistance. The resulting innovative solution went beyond meeting the City's identified criteria to provide time and cost savings with minimal disruptions to nearby residents. The pipes requiring repair were in an area of Kenilworth with single-family homes on each side of the 14 streets comprising the work area. Initial efforts involved using the Pipe Risk Screening Tool program to conduct a desktop evaluation of the City's utility system in the designated area. Based on the findings, the team then prepared a pipe rehabilitation plan and performed flow testing, C-factor testing to detect tuberculation, and verification of pipe wall soundness and conditions through sample removal (coupons) and laboratory testing. EBA's evaluation of three rehabilitation approaches—open cut replacement, pipe bursting, and structural lining—involved developing a matrix to assess the advantages and disadvantages of each approach against the City's 18 criteria. To summarize the results, the high amount of disturbance, cost, and permitting associated with open cut ruled out this method, while pipe bursting was rejected due to the required excavation near residences for water house connections. As such, EBA recommended structural lining for its cost and schedule effectiveness and its minimal impacts to the surroundings. The proposed Class IV, fully structural cured-in-place pipe (CIPP) liner is a reinforced felt or woven polyester fiber hose impregnated with a thermoset epoxy resin. The liner is injected into the existing main and then cured with hot water. Stronger than standard CIPP liner, this version is designed to eliminate folds and allows for water service to be reinstated robotically after curing, thereby eliminating the significant excavation needs associated with open cut and pipe bursting replacement methods. With the City's approval, EBA prepared contract documents for the rehabilitation of 3.5 miles of 6-inch and 8 inch water main and appurtenances. Because the use of CIPP lining is generally limited to gravity sewer lines, this project is a first of its kind in the local area for water main rehabilitation. EBA's extensive data research addressed concerns related to odor and taste of the resulting drinking water and convinced City leadership to try this innovative approach. This innovative trenchless pipe technology provided a cost-effective solution that saved over 50 trees and more than $800,000 in construction costs; avoided extensive permitting, survey, and geotechnical investigation; minimized public traffic control and road closure needs; and enabled the City to provide safe, reliable, clear, and odorless drinking water to its citizens through pipes that are in nearly new condition and now have a life expectancy of 50 years.

Learning Objectives:
Using Class IV CIPP liner for water main rehabilitation
Benefits of CIPP liner
Required analysis to determine applicability of CIPP liner

Biography:
Khalid Qadwai, PE, PMP, is an associate and senior project manager at the EBA Engineering, Inc., which he joined in 2008. With nearly 25 years of experience in water main design and rehabilitation, he is currently managing several water and sewer projects in the Baltimore/DC metropolitan area.

43. Wednesday, August 28, 2024
Room 215
4:30 PM - 5:00 PM

Title: Howard County Bureau of Utilities Water Isolation Tracer Tool

Presenter(s):
Jeff Edgin, GIS Group Leader
Howard County Government Bureau of Utilities

Abstract:
This session will show how GIS has given a valuable tool for Operations and Engineering personel with the use of the Water Isolation Tracer Tool. The live demonstration will show how this simple tool saves staff's time and efforts when planning or taking Watermains out of service. And automatically keeping records of the networks valve operations in the service area. The Howard County Bureau of Utilities Water Isolation Tracer Tool is a GIS application that Howard County Bureau of Utilities Operations and Engineering staff uses to plan and execute water shutdowns. By simply clicking on the water main on a map the tool searches the pipe network to find the closest valves that need to be operated to isolate a shutdown. The application does not stop there! It continues to search to the confines of the pressure zone and to the end of the system to make sure there is a back feed. If there isn't a back feed the entire area is included in the shutdown. The application captures and lists what valves need to be closed and time stamped with who operated the valves and a time the valve was shut. If the project is taken over by another crew, it will provide a list of the shutdown valves and logs when and how the operated valves are returned to service. The Tracer application also provides lists of all Fire hydrants, and Customers out of service, including Critical Water Customers. The application also contains a Road Closure Notify Tool. That shows when a road must be closed for utility repair or maintenance. This layer is provided to 911, Police and Fire GIS Maps.

Learning Objectives:
How GIS can help visualize the affects of Watermain shutdowns.
How needed information can automatically be captured in a GIS application.
How the Tool allows the big picture to be viewed.

Biography:
Jeff Edgin has 27 years working in the GIS field. And 22 years working in the Water/Wastewater industry. 20 years with WSSC in several Maintenance positions. 15 years with St. Mary's County as their GIS Manager, and currently 7 years with Howard County Bureau of Utilities as the GIS Group Leader. He has been a 22 year member of MSGIC (Maryland State Geographic Information Committee).

44. Wednesday, August 28, 2024
Room 217
4:30 PM - 5:00 PM

Title: "Post-COVID-19 Modern Trash Loading Proves Sewage Pump Clog Resistance Can Not Be Predicted by Impeller Throughlet Size"

Presenter(s):
Robert Domkowski, Engineering Consultant
Xylem, Inc.

Abstract:
The number one requirement of a solids-handling wastewater pump is its ability to pump unscreened sewage without clogging. The ever-increasing collection system loading rate exacerbated by the effects of COVID-19 further exposes the traditional multi-channel solids-handling impeller as unable to operate without partial to full clogging with soft solids. A wastewater pump's impeller throughlet size has been frequently used to specify clog resistance, despite data that demonstrates the irrelevance of this measurement, especially when considering handling modern wastewater containing non-dispersibles and FOG. Several published guidelines recommend a minimum impeller throughlet size based upon decades-past ideas. Pump clogging is a critical and highly undesirable operational problem in wastewater pumping, which results in increased operational and maintenance costs (OpEx) necessitating emergency calls from the end user utility. Clogging drastically reduces pump efficiency, causing increased energy consumption while pump unit mechanical damage to the bearings, seal and shaft unit can result. This paper will review the historical impeller design perspective as well as discuss the successful modern-day design concepts. The presenter will also establish how a pump's throughlet size has been shown to be a very misleading parameter in specifying solids-handling pump unit clog-resistance. The attributes of various traditional solids-handling impeller type will be reviewed. Finally, attendees will be provided with guidance regarding the importance of a modern solids-handling pump's wet-end design for achieving successful clog-free pump operation while enjoying sustained high hydraulic efficiency and low cost of operation.

Learning Objectives:
Understanding the current level of "Modern Trash" challenges in municipal collection systems
Overview of changes that non-wovens manufacturers have made regarding Do Not Flush labeling
Current Best Practices to minimize OpEx and CapEx non-dispersibles cost within the Municipal Collection Systems

Biography:
Bob Domkowski has nearly 40 years of experience in pump application and pumping station design. His current position is Engineering Consultant at Xylem, Inc., - Flygt. Bob earned his B.S.M.E. degree from Fairfield University in CT. with post graduate engineering studies at U. of Wisconsin-Madison.
Bob is the Chairman of the WEF Manufacturer's and Representatives (MARC) Committee, serves on the WEF, NYWEA and NEWEA Collection Systems Committees, is past president of the Submersible Wastewater Pump Association (SWPA), has had numerous technical articles published, presented technical papers at more than 50 water environment conferences, was an

author/reviewer of the WEF Manual of Practice (MOP-7), participated as the pump expert at WEFTEC and MA Workshops, serves on the editorial advisory board of Pumps & Systems and is a recipient of the WEF and NEWEA Golden Manhole Awards and has been awarded 5-S Shovels from NEWEA and NJWEA member associations.

45. Thursday, August 29, 2024
Room 201/202
8:30 AM - 9:00 AM

Title: Refining PCCP Inspections by Understanding Electromagnetic Field Interactions

Presenter(s):
Martin Korz, Co-Founder
APPIA Pipeline Solutions

Abstract:
No pipe is immune to deterioration over time, but with proper maintenance the life of a pipe can be extended significantly. In the last 20 years, Near-Field Testing (NFT) has emerged as a well-established technique for evaluating Prestressed Concrete Cylinder Pipe (PCCP). One of the challenges of an NFT inspection is to produce refined results when multiple wire break clusters are present. If the clusters are in close enough proximity to each other, the resulting electromagnetic NFT responses can amalgamate into a single response. This effect can disguise the individual break areas and complicate the resulting estimation of wire breaks. Consequently, electromagnetic (EM) inspection companies will typically bin broken wires in groups of 5. The above-mentioned electromagnetic interactions between nearby wire breaks not only complicate the wire break prediction, but also the estimation of the break locations. In the case of multiple clusters it may become exceedingly challenging to provide specific break locations if the clusters are close enough together. The analyst in that case is forced to provide the start and end of a wire break "zone" instead, with each zone possibly containing multiple clusters. To help refine both the wire break estimate and the corresponding locations, APPIA embarked on a research program to help understand the underlying EM field interactions. This paper describes the research performed on Embedded Concrete Cylinder Pipe (ECP) and the corresponding results. We will be showing the observed EM field interactions for different wire break scenarios, and demonstrate how an improved understanding of the interactions helps an analyst refine the NFT inspection results.

Learning Objectives:
Understanding the physics of how NFT identifies broken wires in PCCP pipe.
Learning how different pipe construction and wire break parameters affect the EM field behavior and corresponding NFT signals.
Learning how NFT results can be refined by leveraging our understanding of the EM field behavior.
Improved fundamental understanding of the strengths and limitations of NFT.

Biography:
Martin Korz is a co-founder at APPIA Pipeline Solutions, where he leads Research and Product Development. He is a Professional Engineer with a background in Electrical Engineering. Martin has inspected pipelines around the world for utilities, oil and gas providers and nuclear power plants and he joins us today to present the latest developments in PCCP wire break detection.

46. Thursday, August 29, 2024
Room 203/204
8:30 AM - 9:00 AM

Title: Challenging the retention time of anaerobic digestion using thermal hydrolysis pretreatment

Presenter(s):
Bill Barber, Technical Director
Cambi, Inc.

Abstract:
Anaerobic digesters for treatment of municipal sewage sludge are traditionally designed with modest loading rates resulting in long retention times. The textbooks on which they are designed have changed little over time, in fact the lasted edition of Metcalf and Eddy shows design equations which can be traced back 50 years. Consequently, digestion plants may be unnecessarily large, and this limits their economic viability. With sludge digestion, activated sludge is rate-limiting and its degradation is controlled by first order kinetics. Whilst biogas can be produced from primary sludge relatively quickly, biogas production from activated sludge is sluggish and this results in long retention times. Thermal hydrolysis, a pre-treatment to anerobic digestion, has been gaining traction with over 120 facilities of which 11 are in the United States. Plant sizes range from 10 to 450 tDS/d. It has become well understood that the use of thermal hydrolysis can increase loading rates to municipal digestion plants by making sludge more biodegradable. Higher loading rates have made new digestion plants more affordable, such as the case with DC Water's Blue Plains facilities where construction costs for a new digestion facility, reduced by approximately $200 million, and enabled existing plants, such as HRSD's Atlantic facility, to increase their capacity with no further expenditure. Despite the benefits, these increased loading rates have been relatively conservative and limited by general understanding of what retention times are required for anaerobic digestion. As well as increased loading rates, thermal hydrolysis fundamentally improves dewaterability and this has been proven over may years. Less well known, is that the extracellular polymer materials destroyed by thermal hydrolysis are reintroduced through bacteriological activity during the subsequent anaerobic digestion system, and this results in a deterioration in dewaterability. Typically, thermally hydrolyzed sludge prior to digestion can dewater to about 50% points dry solids. Anaerobic digestion then reduces this by approximately 20% points, resulting in a digested cake dry solids of circa 30%. This reduction in dewaterability is not seen for digestion where thermal hydrolysis is absent as the sludge enters the digester containing large quantities of extracellular polymer concentrated within the activated sludge fraction. The deterioration of dewatering potential during digestion followed by thermal hydrolysis is influenced by the digestion retention time and worsens as digestion time increases. However, with respect to performance in the digestion plant itself related to biogas production, this reduces with reducing retention time. Therefore, there is an optimum retention time during digestion when combined with thermal hydrolysis which gives the greatest combination of anaerobic digestion performance manifested by biogas production combined with least deterioration in dewaterability characteristics. This paper will show results from research looking at the influence of digester retention times between 3 and 22 days on both digester performance, and that of downstream dewatering when combined with pre-treatment. A sensitivity analysis was conducted to show how much loading rates can be

lowered by using pre-treatment, in this way it may be possible to make anaerobic digestion more cost affective thereby overcoming current economic barriers.

Learning Objectives:
Anaerobic digestion is a key part of wastewater treatment and beneficial with respect to reducing pathogens and producing biogas, an important renewable energy source.
Most designs for digesters are conservative and do not account for more modern developments. Subsequently, digesters are larger than they need to be and this reduces their cost benefit.
It is possible to make sludge more biodegradable meaning that less retention time is required to meet regulatory requirements. This increases capacity of existing plants and makes new plants smaller.

Biography:
Bill Barber has a Phd in Biochemical Engineering based on municipal anerobic digestion. He is a chartered engineer with over 25 years experience and has worked in the areas of: research; technology development; consultancy and for a major UK Water Utility. He is reviewer on several academic journals related to sewage treatment and the sole author of IWA's textbook on thermal hydrolysis.

47. Thursday, August 29, 2024
Room 207/208
8:30 AM - 9:00 AM

Title: Rejuvenating the Montebello Water Filtration Plant for the Next 100 Years of Service

Presenter(s):
Jeffrey Thompson, Senior Vice President
Whitman, Requardt and Associates, LLP
Remi Urbonas, Engineering Supervisor
Baltimore City Department of Public Works
Timothy Wolfe, Chiefj, Office of Engineering & Consulting
Baltimore City Department of Public Works

Abstract:
With cost constraints on capital improvement plans, inflationary pressures on construction costs, and aging infrastructure, utilities are faced with the difficult task of prioritizing improvement needs. The City of Baltimore was faced with such a challenge at the 108 year old Montebello Water Filtration Plant No. 1, which is one of three large water treatment facilities operated by the City. Subsequently, the City embarked on a multi-phased improvements project at the 128 MGD facility to address current deficiencies and extend the expected useful service life of the plant. This presentation will focus on unique aspects of the alternatives analysis and implementation of selected process area improvements, with a particular emphasis on flocculation/sedimentation, filtration and chemical systems. The alternatives analysis considered major maintenance and reliability needs, such as failing flocculator drives and flocculation baffle walls. Operational limitations associated with the existing coagulant system and cold weather operation were also addressed. Implementation of the recommended improvements to multiple unit processes required detailed sequences of construction and coordination with the City's other water treatment

plants and distribution system, and included a complete plant shutdown. Initially, this project included limited filter upgrades which consisted of filter media restoration, new wash troughs, and replacement of the surface wash system. However, the City determined that a more comprehensive upgrade of the filtration facility was needed, to increase the plant capacity to 200 MGD and strengthen the resiliency of the City's water treatment systems while continuing to provide high quality water over the long term. The goals of the filtration upgrades were identified as maintaining the high quality of finished water, increasing the loading rate of each filter, improving the plant's ability to treat raw water with high turbidity, maximizing the filter run volume, and reducing washwater consumption. To facilitate the evaluation and design of the filter upgrades, a filter pilot testing program was planned in lieu of the limited filter upgrades. Under the filter pilot testing program, one existing out-of-service gravity filter was upgraded to include dual media (sand and anthracite), stainless steel underdrains with air scour, filter rate control, backwash rate control, new wash troughs, and new filter control panel. The filter pilot is intended to operate as a full-scale demonstration unit to evaluate the new filter design criteria, equipment, and performance. The presentation will summarize initial operational information from the filter pilot.

Learning Objectives:
Review flocculation and sedimentation processes and equipment
Understand filtration design parameters and optimization
Discuss maintenance of plant operations challenges for large water systems

Biography:
Jeff Thompson is a Senior Vice President with Whitman, Requardt & Associates in Baltimore, Maryland. He has over 25 years of experience in the planning and design of water and wastewater treatment facilities in the mid-Atlantic region. He received his B.S degree in Civil Engineering from the Johns Hopkins University and received his Master's degree in Environmental Engineering from the University of North Carolina.

Mr. Wolfe is the Chief, Office of Engineering & Construction (OEC) for Baltimore City DPW. He has 43 years of experience in the civil and environmental engineering. He manages a staff of over 130 engineers, construction managers and inspectors who are responsible for planning, design, and construction of water, sewer and stormwater infrastructure and pumping, water & wastewater treatment facilities with an Annual CIP budget of $0.5 Billion. OEC also manages of On-call Construction Services to supplemental emergency responses for DPW utilities & facilities.

During the first 40 years of his career, he worked for private engineering consultant firms leading the design of numerous water & wastewater infrastructure and treatment facilities as well as solid waste projects. He has been a CWEA/WEF member for 19 years and served as CWEA President and was on the CWEA Board for 13 years.

48. Thursday, August 29, 2024
Room 215
8:30 AM - 9:00 AM

Title: Lessons learned from Operational Excellence and Collaborative Culture at the Patapsco Wastewater Treatment Plant

Presenter(s):
Chris Saunders, Senior Associate
Hazen and Sawyer
Neal Jackson, Plant Manager
Baltimore City Department of Public Works

Abstract:
While the pivotal role of operational parameters in a wastewater treatment plant (WWTP) is clear in ensuring optimal unit process performance, effective operational management is at the foundation of a utility's success. Patapsco WWTP faced numerous challenges including solids accumulation, oxygen transfer issues, conveyance problems, and hydrocarbon contamination, resulting from an extended period of poor maintenance practices and lack of experienced operators and supervisors. Hazen implemented several corrective actions across primary, secondary, tertiary, and solids processes to improve the plant performance. Significant performance improvements achieved at the plant include increased oxygen feed, consistent biochemical oxygen demand (BOD) and total suspended solids (TSS) compliance, excellent ammonia and nitrate/nitrite removal, enhanced backwash cycles, and reduced final effluent TP. Along with the operational actions, Hazen also engaged in operation management and effective staff engagement through various efforts, encouraging a holistic approach to plant management. Efforts were targeted towards collaborative strategies, communication enhancement, and training initiatives. Experienced Hazen engineers worked alongside plant operators in a collaborative effort towards recovery. Hazen held comprehensive training sessions for the operators to enhance their skills and knowledge on process operations. Updated standard operating procedures enhanced unit process operations. Siloed work approaches were replaced with collaborative mindset and interconnected teamwork through regular performance review meetings. Improved communication was achieved between plant staff, city staff, third-party contractors, labs, and consulting firms. Strategic operation management, coupled with proactive staff engagement and open communications are a few of the ways for overcoming process challenges and ultimately meeting stringent discharge limits that was achieved at the Patapsco WWTP. Systematic self-assessment can help utility managers and staff evaluate their operations and identify needs for improvement. Adopting a proactive approach in outlining the plant's vision for future capacity expansion projection has been identified as crucial. The case study highlights the impacts of developing a collaborative mindset, avoiding siloed approach, and promoting interconnected teamwork as essential elements in successful operation at the Patapsco WWTP. Considering these learnings, operational and maintenance (O&M) recommendations include power failure recovery protocols and the development of standard operating procedures tailored for high-flow events. These insights provide a roadmap for future advancements in wastewater treatment plant operations. Lessons learned emphasize strategic operation management, proactive staff engagement, and open communications as vital in overcoming challenges and meeting discharge limits.

Learning Objectives:
Operator training is critical and must be ongoing for all employees regardless of seniority or experience.

Biography:
Chris Saunders has worked as an operator, superintendent, and administrator at wastewater treatment plants in central Maryland for the last 32 years.

49. Thursday, August 29, 2024
Room 217
8:30 AM - 9:00 AM

Title: Kicking it Up a Notch: Year 2 in Modernizing CSO Management

Presenter(s):
Jennifer Baldwin, Digital OneWater Director
Jacobs Solutions Inc.
Patrexia Tampon, Project Engineer
Jacobs Solutions Inc.

Abstract:
This presentation will describe the continued digital transformation of combined sewer overflow (CSO) monitoring in Wilmington, Delaware. In 2020, Jacobs began operating the City of Wilmington's wastewater treatment system, which includes its regional wastewater treatment plant (WWTP), three wet weather storage facilities, and three major pump stations. As presented at last year's conference, only 6 out of its 41 CSOs had level and/or flow monitoring prior to this project, and those are part of an isolated real time control system that is operated separately from the WWTP and the CSOs. We presented at last year's conference about how the City has now installed level sensors at the remaining 35 CSOs. This presentation will provide follow-up results in Year 2 of the installation along with lessons learned over the past year, such as fine-tuning alerts and troubleshooting radio and sensor performance, that enhanced system efficiency and performance. Attendees will learn how the City of Wilmington has added state-of-the-art level and flow monitoring at the CSOs and interceptors and is using these data to amp up their maintenance activities. Details will be shared on dry-weather overflow prevention and alerting that has allowed the CSO maintenance crew to be safer and more proactive. Instead of driving to the sites 3-5 days a week, the crew is able to now perform maintenance that was previously put on the back burner. Additionally, the City is able to now report more accurate information to regulatory agencies about the overflows, especially dry-weather overflows.

Learning Objectives:
Digital tools for CSO monitoring and management
Safer, more proactive CSO maintenance
Operational efficiency at CSOs

Biography:
Dr. Jennifer Baldwin (she/her) is Jacobs Digital OneWater Director and an expert technologist specializing in wet-weather conveyance and storage. She has 22 years of experience in collection system management, working on several multi-million and billion dollar wastewater collection and treatment programs. Dr. Baldwin holds a B.S. degree in Chemical Engineering and a Ph.D. in Civil (Environmental) Engineering from Purdue University.

Pat is a graduate of Catholic University where she obtained her bachelors and masters degree in Civil engineering. She has worked in research concerning wastewater carbon management and has been working with Jacobs for the past 3 years supporting a variety of capital improvements projects for the City of Wilmington

50. Thursday, August 29, 2024
Room 201/202
9:00 AM - 9:30 AM

Title: Water main predictions: how good old statistics still help in the age of AI

Presenter(s):
Annie Vanrenterghem, CEO
infraPLAN

Abstract:
In multiple case studies we have completed, AI has been shown to improve break predictions. This can be demonstrated through classic validation technique. However, it remains a black box approach engineers do not easily relate to. In this presentation, we will show how simple but rigorous descriptive statistics can bring transparency to AI-generated results; help all the stakeholders that apply or use LOF to make expensive decisions, make sense of the results. Furthermore, those statistical results also provide the utility with a snapshot of where the distribution system stands; how its physical condition has evolved over time; the factors that contribute to degradation; and the performance of its past replacement decisions. This is important knowledge before embarking in advanced analytics such as AI-powered break predictions.

Learning Objectives:
Understand water distribution system condition and what makes it degrade prior to embarking into advanced analytics
Better understand results from advanced analytics, such as AI-powered break prediction
Increase acceptance and adoption of advanced analytics, and, as a result, save time and money

Biography:
For the last 25 years, Annie has been helping utilities create Rehabilitation & Replacement plans for water & wastewater buried linear assets, first as a researcher at New York University, then through infraPLAN, a firm she founded in 2008 that provides consulting and software. She has played a pioneering role in the industry introducing advanced analytical approaches. She is a frequent speaker and participant at national conferences, workshops, and forums, and the author of numerous technical papers. Annie holds a Ph.D. in civil engineering from New York University.

51. Thursday, August 29, 2024
Room 203/204
9:00 AM - 9:30 AM

Title: Challenges of Low BOD/TSS Ratios in Wastewater Treatment: A Case Study Analysis

Presenter(s):
Karthik Manchala, Senior Process Engineer
Virginia Tech/Greeley and Hansen

Abstract:
This study conducts a feasibility case analysis on a wastewater treatment plant, focusing on the incorporation of primary clarification and anaerobic digestion in the context of an influent with a low Biological Oxygen Demand (BOD) to Total Suspended Solids (TSS) ratio of 0.56 (225/400). This low ratio significantly influenced the solids handling design for the anaerobic digesters and primary clarifiers. The core objective was to assess the impact of this ratio on sludge production and the feasibility of the anaerobic digestion process. The facility faced a unique challenge due to a high proportion of inorganic or non-biodegradable material in its influent, as indicated by the low BOD/TSS ratio. This imbalance posed significant implications for the planned use of anaerobic digesters and primary clarifiers, which are generally effective for biogas production and sludge reduction. A cost-benefit analysis indicated that alternatives without these systems might be more viable. Key findings include: Reduced Biogas Production: The low BOD limited the amount of digestible organic matter, resulting in decreased biogas production. This was due to the influent's lower biodegradability, impacting methane generation, a key output of anaerobic treatment. Increased Sludge Volume: The primary clarifiers, designed to remove solids before biological treatment, were less effective due to the high inorganic content. This led to higher sludge volumes, as these materials were not processed in the anaerobic digesters. Operational Challenges: Increased maintenance for sludge handling and disposal was necessary, with anaerobic digesters facing process stability issues. This resulted in operational inefficiencies and higher costs. Economic Implications: The reduced biogas yield and increased sludge handling needs diminished the economic attractiveness of anaerobic digestion. Additional costs for sludge disposal and lower energy recovery made this option less financially viable. The study concludes that influent characterization is critical in designing and operating wastewater treatment facilities. A low BOD/TSS ratio can adversely impact the performance of anaerobic digesters and primary clarifiers, leading to operational complexities and reduced economic benefits. This serves as a cautionary example for similar facilities, highlighting the importance of a thorough assessment of influent characteristics to select appropriate treatment processes.

Learning Objectives:
Understanding Influent Characteristics: To grasp the impact of BOD/TSS ratios on wastewater treatment processes, particularly focusing on the challenges posed by low ratios.
Evaluating Treatment Process Efficacy: To assess how different influent characteristics affect the feasibility and performance of primary clarifiers and anaerobic digesters in a wastewater treatments
Analyzing Economic and Operational Implications: To comprehend the economic and operational consequences of utilizing specific wastewater treatment methods under varying influent conditions, with an e

Biography:
Karthik Manchala is a senior process engineer with 15 years of experience in wastewater and biosolids treatment, currently pursuing a PhD in Civil Engineering at Virginia Tech, focusing on wastewater mathematical modeling. He has extensive experience in designing and managing treatment plant projects, from feasibility to start-up. His skills include advanced process modeling of various treatment processes.

52. Thursday, August 29, 2024

Room 207/208
9:00 AM - 9:30 AM

Title: Closing the Loop on PFAS: An Overview of PFAS Destruction Technologies to Expand PFAS Mitigation Efforts in Water and Wastewater

Presenter(s):
Donald Ryan, Environmental Scientist
Stantec

Abstract:
Granular activated carbon, ion exchange, membrane filtration and reverse osmosis have emerged as viable technologies for non-destructive PFAS treatment. However, a major limitation of these processes is the resulting PFAS waste stream generated from treatment such as spent media, and concentrated waste streams. Accordingly, destructive treatment technologies are needed for mitigation of terminal PFAS sinks (i.e. spent media, and biosolids, and membrane concentrates) to prevent recirculation of PFAS into water sources and subsequent accumulation. The implementation of these destructive technologies will promote the feasibility of separation technologies by providing more diversity of disposal options for the PFAS wastes following treatment, and ideally convert PFAS compounds into innocuous degradation products. This presentation will provide a state-of-the-art analysis of PFAS destruction technologies available for solid streams (GAC, IX, and biosolids) such as thermal reactivation, incineration, pyrolysis, gasification, and ball-milling. Additional focus will be on liquid-stream destruction via supercritical water oxidation, electrochemical oxidation, cold-plasma, and hydrothermal alkaline treatment. The benefits and limitations of each destructive technology will be discussed with respect to the underlying environmental chemistry, mechanisms at work, technology readiness level, availability and provide a forecast of future destruction technology trends and research needs.

Learning Objectives:
Provide an overview of PFAS Destruction Technologies for treating solids and liquid matrices
Discuss the benefits and limitations of different PFAS destruction technologies as a function of different applications and system needs
Outline a roadmap-for-research and future work for PFAS mitigation efforts.

Biography:
Dr. Donald Ryan is an Environmental Scientist at Stantec at the Washington D.C. Office. Within Stantec, he is a member of The Institute of Applied Science, Technology, and Policy where he focuses on applied research for PFAS mitigation in Water and Wastewater with additional focus on emerging water treatment technologies and their underlying environmental chemistry. He is also an active volunteer for the Organic Contaminants committee and the Emerging Water Quality Issues committee within the American Water Works Association.

53. Thursday, August 29, 2024
Room 215
9:00 AM - 9:30 AM

Title: Tackle Brain Drain: Howard County's Approach to Capture Institutional Knowledge

Presenter(s):
Ben Asavakarin, Vice President
Johnson, Mirmiran & Thompson
Sanjay Kulkarni, Project Manager
Howard County DPW

Abstract:
Howard County's public water and wastewater systems serve more than 85% of the County's population (approx. 330,500) with an average demand of over 22 million gallons of water each day, with 15 water pumping stations that feed 11 water storage towers and a wastewater distribution system that includes 34 wastewater pumping stations and a water reclamation plant with an average daily flow of 20 MGD. Loss of operations and maintenance knowledge as veteran operators approach retirement age is a serious problem for the water/wastewater industry. These long-term employees possess tacit knowledge of existing utility infrastructure and operations procedures. Howard County DPW faces the daunting challenge of capturing and documenting essential staff knowledge with planned retirements at multiple senior staff levels looming. JMT is supporting Howard County to develop and implement a plan to capture and organize institutional knowledge and develop a System Operations Manual for current and future operations and maintenance team members. The System Operations Manual will be developed in a format that is: consistent with Industry Best Practices; structured to promote usability; and structured to promote continual improvement. The scope of work is being performed in various phases with the final phase being the deliverable of the comprehensive System Operations Manual. This presentation will describe the work completed in Phase I, the Project Definition Phase. During Phase I, JMT engaged County stakeholders to define the current "As-Is" condition of their operations and maintenance resources and to establish the County's preferences for the future "To-Be" state. JMT completed multiple workshops and interviews with members of the County's engineering, operations and maintenance teams. The project team completed an Affinity Diagram exercise to understand the collective vision for the System Operations Manual. To assist in defining the desired "To Be" state, JMT performed a review of Federal and State regulatory agency guidance documents related to development of Operation and Maintenance Plans for water and wastewater systems. The product of Phase I was the recommended structure and content for the Organizational Support Manual. The goals of this presentation will be to discuss project drivers and criteria defined by Howard County and discuss the steps JMT took to understand the current state of the County's physical resources and tacit knowledge held by operations team members. The presentation will share the team's approach to defining the structure and content of a System Operations Manual. This presentation will be beneficial to utility managers who are facing similar challenges associated with retiring workforce and loss of institutional knowledge and are interested in learning about an approach to knowledge capture and development of a comprehensive System Operations Manual.

Learning Objectives:
Approaches for knowledge capture and management
Electronic Operation and Maintenance Manuals
Industry best practices for knowledge management

Biography:
Mr. Asavakarin has more than 20 years of experience in the areas of water and wastewater process engineering, pumping stations, instrumentation and controls, and collection system design. His

work has included feasibility studies, alternative analysis reports, preparation of contract documents, permitting, and construction phase services. He received his B.S. in Civil Engineering from the University of Maryland at College Park, and his M.S. in Environmental Engineering from Georgia Institute of Technology.

54. Thursday, August 29, 2024
Room 217
9:00 AM - 9:30 AM

Title: Best Practices Learned from Twenty years of Large Diameter PCCP Force Main Monitoring and Management

Presenter(s):
Philip Hwang, Project Manager
Pure Technologies
Mohina Sharma, Senior Condition Assessment Engineer
Pure Technologies

Abstract:
Middlesex County Utilities Authority (the Authority) was established in 1950 to provide regional wastewater management for 36 municipalities in three counties of central New Jersey. A critical system asset includes the 102-inch diameter prestressed concrete cylinder pipe (PCCP) Sayreville Relief Force Main (SRFM), which runs 3.5 miles from the Sayreville Relief Pump Station to the Edward J. Patten Water Reclamation Center. The SRFM was commissioned in 1982 and experienced a failure in 1983 and another one in March 2003. This presentation will discuss how MCUA has worked with Pure Technologies (Pure) over the past twenty years, to use acoustic fiber optic (AFO) monitoring, electromagnetic (EM) inspections, and finite element analysis (FEA) to identify pipes in the SRFM that require repairs, and how these repairs were implemented in 2023. As a result, MCUA has benefitted from applying cost effective solutions to avert further force main failures. From 2003 to 2021, Pure conducted several EM inspections of the SRFM using its PipeWalker inspection platform, and visual and sounding inspections of the interior, but that required manned entry in a dewatered pipeline over a span of three to four days. In June 2023, after having many years of reliable internal visual inspection data, MCUA elected to primarily use Pure's PipeDiver technology for an EM inspection of an active pipeline. This allowed most of the EM inspection to be completed in one day, without the operational and safety risks of manned entry. (A PipeWalker inspection was still required for one small section of pipeline). After comparing the EM inspection data with historical wire break data from the AFO system, and performing an FEA, Pure recommended the pipes for MCUA to repair as part of its annual 2023 maintenance budget. The recommendation was based not only on the number of wire breaks observed at the time of the EM inspection, but on other data as well. Selecting the correct pipes for repair is critical to mitigating the risk of a force main failure. MCUA performed the repairs on the selected pipes in October 2023. The advantages and disadvantages of both external post-tensioning and internal CFRP (Carbon Fiber Reinforced Polymer) repairs were compared before selecting the repair method. Factors for making the decision included cost effectiveness, impact to operations, safety, site access, and constructability.

Learning Objectives:

How to use AFO, FEA, and EM technology to gather data about the current state of a force main.
How to select pipes to be repaired to avert a force main failure.
How to select and implement the best force main repair method.

Biography:
Phil Hwang is a registered Professional Engineer in several states and the District of Columbia, and has 27 years of experience in the water and wastewater industry, including both the private and public sectors. This includes vertical infrastructure such as wastewater treatment plants, wastewater and water pumping stations, and linear infrastructure such as gravity sewers, force mains, and water mains. He is currently a Program Manager at Pure Technologies (a Xylem Brand) where he manages both water main and sewer force main inspection and condition assessment projects across the United States.

55. Thursday, August 29, 2024
Room 201/202
9:30 AM - 10:00 AM

Title: How to Predict the Uncertain: DC Water's Use of Monte Carlo Analysis to Quantify Lead Service Lines in DC.

Presenter(s):
William Elledge, Director of Engineering & Technical Services
CDM Smith
Matthew Young, Management Specialist
CDM Smith

Abstract:
DC Water launched the Lead Free DC Initiative in 2019 to accelerate lead service line replacement and combine all lead reduction efforts under one program. The estimated count of lead services lines published in 2019 was 28,000. This estimate included every premise in DC Water's material inventory database that had material listed as lead or galvanized steel (21,000), plus 50% of the 14,000 premises that were missing material data in the database (7,000). During initial construction packages of the LFDC Program, test pits were performed at a variety of premises to confirm the material listed in the material database. It was discovered that some premises, which had copper listed as the material in the database, were revealing lead in the test pits. With approximately 95,000 premises listed as having copper services, DC Water had to come up with a solution on how to quantify the estimated lead in the District. An evaluation was performed on each type of data source used to populate material in the inventory database. These data sources included as-built drawings, meter records, tap cards, GIS, inspection records, replacement records, and customer reported data. DC Water separated the copper premises into two categories; Verified Non-Lead and Suspected Non-Lead. Verified Non-Lead premises has trusted data sources and did not require additional verification. Suspected Non-Lead premises, over two thirds of the non-lead premises, required additional verification. Suspected data sources were reviewed to estimate the chance that they could yield lead pipe. DC Water utilized a Monte Carlo analysis, a probability simulation used to estimate the possible outcomes of an uncertain event, to estimate how much lead remained in DC. These estimates returned a 90% confidence rate that the LFDC Program would replace 41,157

lead services or less. This new information was used to plan and budget the Program moving forward.

Learning Objectives:
Provide case study on how to estimate the amount of lead service lines in a system when existing material inventory data is missing or unreliable.
Demonstrate process of Monte Carlo statistical analysis.
Explain how to refine results as a lead service replacement project moves forward and new data becomes available.

Biography:
Will Elledge is the Director of Engineering & Technical Services for DC Water. He has spearheaded many large drinking water programs and is currently managing DC Water's Lead Free DC Program, which aims to remove up to 42,000 lead services in the District.

56. Thursday, August 29, 2024
Room 203/204
9:30 AM - 10:00 AM

Title: Anaerobic Digestion with H2S & Nutrient Control - What if your Digesters were the Sidestream?

Presenter(s):
Matthew Williams, Regional Sales Manager and Anaerobic Product Manager
Thermal Process Systems

Abstract:
Mesophilic Anaerobic Digestion (MAD) is commonly used at WRRFs to stabilize solids and generate biogas for heat, energy and pipeline injection. Traditional MAD can create undesirable challenges at WRRFs including a nutrient-rich return from dewatering operations. Nitrogen recycled from dewatering of MAD biosolids can represent up to 70% of the overall load on the facility. Sidestream processes have been employed to address this, but some remarkable benefits and efficiencies arise when the nutrients are treated within the solids stream. A digester that is pH-controlled and optimized for the desired biology has other beneficial side-effects including increased methane concentration, decreased H2S levels, reduced struvite, lower odor and more robust digester performance. Acid Digesters ahead of MAD have been installed at several facilities including the Atlantic Treatment Plant (VA) and have been considered repeatedly for Back River (MD). Post-aerobic digestion (PAD) following MAD has been employed at Speedway (IN), Denver Metro (CO) and in several other locations. However, these "add-ons" have typically been used independently. However, recent pilot tests at several facilities in Indiana, California and Arizona have shown consistent results when both Acid Digester and PAD are added to conventional MAD with a recycle loop to send nitrite from the nitrifying PAD to the Acid Digester for denitrification. The issues resulting from the acidic conditions in the Acid Digester (H2S production, odor, corrosion) have traditionally been accepted as a necessary evil. For example, because of the nitrates suppressing populations of sulfate-reducing bacteria, H2S concentration in the biogas consistently decreased by at least 90%, without the addition of ferric chloride or other chemicals. This significantly reduces costs for chemicals and by extending scrubber media life. pH in the Acid Digester was also

increased into ranges more optimal for the biology in that reactor. Nutrient control within the solids process can eliminate the need for additional sidestream tankage and processes. Also, with a slightly more acidic pH in the Anaerobic Digester and lower ammonia concentrations, the stoichiometry is not conducive to struvite formation. Ammonia and H2S toxicity on methanogens are also reduced. The combined effect of increased VS destruction and a richer (higher methane percentage) in the biogas results in a significant (approximately 10%) increase in the net energy yield from the digesters. Dewatering performance is improved by the aerobic conditions within the PAD. Odors within the dewatering room and the solids from the PAD are significantly lower (and more pleasant!) than from MAD. Dewatering performance increases since extracellular polymeric substances (EPS) are broken down. Also, since VS destruction is increased and no metal precipitates are created from coagulant addition, the overall mass of the solids is reduced in multiple ways. Overall, there are several benefits to employing this process as a retrofit to existing anaerobic digesters or in the design of a new system. The value of each benefit will vary with each WRRF's specific situation but for facilities struggling with any (or all) of these issues, this approach is worth considering.

Learning Objectives:
Attendees will have a deeper understanding of the benefits, challenges, and side-effects of Anaerobic Digestion as well as root-cause solutions to problems traditionally considered to be inherent.
The presentation will discuss reasons for sidestream nutrient treatment, current and alternative approaches as well as their interface with biosolids processes including digestion and dewatering. There will also be discussion of alternative approaches to reducing hydrogen sulfide production and improving the overall efficiency of Renewable Natural Gas (RNG) Production.

Biography:
Matt Williams, PE is a Regional Sales Manager and Anaerobic Product Manager at Thermal Process Systems and has worked in the water and wastewater industry for over 18 years, serving in various roles in manufacturing and consulting with an emphasis on biosolids and Anaerobic Digestion. He was the lead author for the Stabilization chapter of the WEF Manual of Practice 8 - Design of WRRFs. Matt earned his Bachelor of Science and Master of Engineering degrees in environmental engineering from Cornell University. An avid birdwatcher, Downhill skier and Nordic ski-dad and, he currently lives in the mountains of Utah with his wife, 4 kids, a couple dozen chickens and some honeybees.

57. Thursday, August 29, 2024
Room 207/208
9:30 AM - 10:00 AM

Title: Programmatic Rapid Deployment of Small-Scale PFAS Wellhead Treatment

Presenter(s):
Sean Lammerts, Director – Emerging Contaminants
Lammerts
Joseph Pearce, Chief of Operations and Engineering
AQUA - NC

Abstract:
Many utilities are asking themselves how they will comply with the upcoming and much anticipated PFAS regulations. While all utilities will face significant challenges to meet the timelines of the regulation, this presentation details how an investor-owned utility with hundreds of small systems and an island utility with a distributed well supply tackled their PFAS challenges by implementing a programmatic approach to deployment of small-scale treatment systems. By using a programmatic approach, these utilities were able to consider their systems holistically which allowed them to select a treatment scheme that was replicable and rapidly deployable.

Learning Objectives:
The audience will take away how a programmatic approach to distributed supply/treatment can decrease cost and dramatically reduce time to implementation

Biography:
Sean Lammerts graduated in 2004 from the Environmental Science and Forestry College at Syracuse University with a degree in Environmental Engineering.
Mr. Lammerts has had a varied career working as a consultant designing water and wastewater systems, for a funding agency on energy efficiency and for a manufactured solution provider before coming to Black & Veatch to lead their Emerging Contaminant Practice. In his current role, Mr. Lammerts focuses on delivering innovative solutions to solve water and wastewater problems for municipal and industrial clients.
Joseph R Pearce, Jr. PE, CFM. Joe Pearce is Aqua's Vice President for the Company's Emerging Contaminant Program. Joe has been with Aqua for more than six years and previously served as Aqua North Carolina's Chief of Operations and Engineering. Joe lead the design of the Aqua's modular PFAS treatment and enclosure design for small water systems. He is a chemical engineering graduate of NC State University, a registered Professional Engineer and has multiple certifications in water operations and floodplain management. Prior to joining Aqua, Joe worked as a public works director, an environmental regulator, an engineer for industrial manufacturing, process water treatment and recycling, and in sales/marketing of water, wastewater, and electrical power supplies.

58. Thursday, August 29, 2024
Room 215
9:30 AM - 10:00 AM

Title: Work at Baltimore City DPW – why would you do that?

Presenter(s):
Paul Sayan, Acting Bureau Head
Baltimore City DPW
Brian Ball, Chief, Office of Asset Management
Baltimore City DPW
Timothy Wolfe, Chief, Office of Engineering & Consulting
Balitmore City DPW

Abstract:

I have worked for 25+ years in the water and wastewater industry from California to Washington D.C. I have worked for a water/wastewater pipe manufacturer, as a design consultant for various water/wastewater design projects and studies and as a program manager for a Consent Decree program and assisting with improving organizational business processes. I made a good living and had stable jobs so why would I want to take a job in the public sector? Why would anyone take a pay cut, deal with public scrutiny and criticism with little appreciation and contend with the bureaucratic challenges that are inherent in the public sector? And why work for the City of Baltimore Department of Public Works, which is under 2 Consent Decrees and an Administrative Order, has had regulatory compliance issues with its wastewater treatment plants and has experienced significant staff loses in recent years? Is it the pension, is it concern of a slowing economy, is it a step to something bigger? Maybe it's as simple as a sense of duty to public service? The acting bureau had and 5 of the 6 division chiefs at the City of Baltimore Department of Public Works, Bureau of Water and Wastewater have changed positions from the private to public sector. Each of the individuals has unique experiences and skill sets and each person has had successful careers in the private sector. Some people have managed large capital improvement projects/programs, managed engineering consultant office; even owned businesses. The presentation will be a short story from the acting bureau head and each of the division chiefs to explain their motives, their visions for the future of their division, their challenges and success and what motivates them to continue the job. Presenters will include: • Paul Sayan – acting bureau head • Tim Wolfe – Chief, Office Engineering & Construction • Brian Ball – Chief, Office of Asset Management • Bryan Samuels – Chief, Utility Maintenance Division • Craig Daly – Chief, Water Facilities Division • Mike Hallmen – Chief, Wastewater Facilities Division

Learning Objectives:
Understand the motives for public service
Understand the motives for working at the City of Baltimore, Department of Public Works

Biography:
Paul is the acting bureau head for the City of Baltimore Department of Public Works, Bureau of Water and Wastewater. Paul has over 25 years of experience in the water and wastewater industry, including study, design, construction management and program management of various projects and programs throughout the country. Paul has a bachelor of science degree in civil engineering from California State University at Long Beach and a master of science degree in environmental engineering from the Johns Hopkins University. Paul is a registered professional engineer licensed in Maryland and California.

Mr. Wolfe is the Chief, Office of Engineering & Construction (OEC) for Baltimore City DPW. He has 43 years of experience in the civil and environmental engineering. He manages a staff of over 130 engineers, construction managers and inspectors who are responsible for planning, design, and construction of water, sewer and stormwater infrastructure and pumping, water & wastewater treatment facilities with an Annual CIP budget of $0.5 Billion. OEC also manages of On-call Construction Services to supplemental emergency responses for DPW utilities & facilities.

During the first 40 years of his career, he worked for private engineering consultant firms leading the design of numerous water & wastewater infrastructure and treatment facilities as well as solid waste projects. He has been a CWEA/WEF member for 19 years and served as CWEA President and was on the CWEA Board for 13 years.

59. Thursday, August 29, 2024
Room 217
9:30 AM - 10:00 AM

Title: Leveraging Real-Time Performance Data for Daily Operations and Long-Term Planning of Wastewater Collection Systems

Presenter(s):
Don Shields, Vice President and Director of Engineering
New Jersey American Water
John Marciszewski, VP Business Development
SmartCover

Abstract:
Using smart technology to improve asset management has become an essential part of managing wastewater collection systems, especially for aging systems with little to no historical data. As an Investor-Owned Utility (IOU), New Jersey American Water has a mixture of wastewater systems with different topographies, sewer pipe ages, and other physical challenges. Performance data is critical to understanding both the (daily) operational and longer-term investment needs for the collection systems. New Jersey American Water started its first (pilot) deployment of sewer monitoring technology in Lakewood in June 2020, using SmartCover© satellite-based sensors. The pilot was successful in reducing the number of annual SSO events from 12 to zero, and the platform also provided valuable data for estimating levels of inflow and infiltration (I&I). The sewer monitoring program was expanded over the following 3 years, and there are now over 160 units deployed across 7 wastewater systems. New Jersey American Water uses the SmartCover© performance data to accelerate the evaluation of new acquisitions, including: 1) Rapid identification of areas prone to sewer overflows, backups, and subsequent cleanup. 2) The units provide valuable data for I&I analysis to help make informed capital investment decisions.

Learning Objectives:
Provide history and details of collection system monitoring in New Jersey American Water's 7 wastewater systems, including operational & financial results.
How sewer level monitoring data can be used by asset owners to target/plan efforts for both cleaning programs and long-term repair/replacement investments.
Demonstrate the value of integrated (virtual gauges) for weather (NOAA) and rivers/streams/tidal (USGS)

Biography:
Donald C. Shields, PE, is Vice President and Director of Engineering for New Jersey American Water, the largest investor-owned water utility in the state, providing high-quality and reliable water and/or wastewater to approximately 2.8 million people. Shields oversees a staff of over 60 professionals including construction managers, engineers, planners and geographic information systems (GIS) specialists. He is directly responsible for delivering New Jersey American Water’s capital investment program of more than $400 million/year. He also provides oversight to engineering activities in other Eastern Division states, i.e., Virginia and Maryland.

Shields has more than 30 years of industry experience. He joined American Water in 2001, and first served as Engineering Director of New Business Development for American Water's Corporate Engineering Group. While there, he supported American Water's regulated and market-based businesses, offering technical guidance and expertise for project development and execution, including large water, wastewater and solids digestion/management/handling/energy production. He also spent ten years at American Water's former subsidiary, Applied Water Management, where he managed a team of 30 construction managers and engineers. He has significant experience with designing, building and commissioning membrane bio reactors. Shields is a licensed PE in New Jersey and earned his Mechanical Engineering degree from Villanova Ule blanniversity.

John Marciszewski is the VP of Business Development for SmartCover. He helps wastewater utilities employ innovative practices for collection system management, focusing on capital efficiency, system resiliency, and environmental protection. John's areas of interest include asset management, regulatory frameworks, and cloud-based monitoring systems. He earned an M.Eng. from UC-Berkeley, and a B.Eng. from Kettering University.

60. Thursday, August 29, 2024
Room 201/202
11:00 AM - 11:30 AM

Title: Indirect Corrosion Inspection for Water Pipelines

Presenter(s):
Andrew Fuller, Vice President
Engineering Design Technologies
Gwen Sullivan,
Engineering Design Technologies
Hassan Rashidian Dezfouli,
Engineering Design Technologies

Abstract:
With indirect inspection, external corrosion can be accurately located for excavation. This is valuable in the assessment and integrity management of buried pipelines. These methods can identify potential issues and degradation due to corrosion before they lead to significant failures. They are performed relatively quickly and can cover a long distance of the pipeline in a short time. The information gathered by indirect inspections can identify areas of concern, such as damaged coatings and areas with active corrosion, or areas that may be susceptible to corrosion based on environmental conditions. The results of these surveys assist asset managers in understanding the existing condition of their assets and making informed maintenance decisions. For hazardous material pipelines federal law requires these surveys to guarantee leaks are prevented. While various indirect inspection methods exist, this presentation focuses on some of the most common methods, such as Close Interval Survey (CIS), Direct Current Voltage Gradient (DCVG), Alternating Current Voltage Gradient (ACVG), and AC Current Attenuation (ACCA). Each of these methods has its own advantages and limitations. Some tests cannot be performed on pipe without coating and electrical continuity. Thus, the selection of each method should consider the specific situation of the site and pipeline condition. Parameters such as depth of pipe, bare or coated pipe, electrical continuity and others will be discussed and used to sort for the best inspection method for each

case. This presentation will serve as an asset manager's guide to determine the best indirect inspection method. A variety of variables are included to help find the right solution. In this presentation, the aforementioned indirect inspection methods are introduced, and the advantages or limitations of each method will be presented. Selected projects in which indirect inspection methods were employed to evaluate the condition of the pipelines will be discussed, and challenges and lessons learned will be described.

Learning Objectives:
Learn the primary indirect inspection methods and the results they can produce
Understand the most important factors to consider when determining whether a pipeline is a candidate for indirect inspection

Biography:
Andrew is a registered engineer and cathodic protection specialist. In his role with EDT he manages the Mid-Atlantic office based in Glen Burnie and all corrosion engineering services.

61. Thursday, August 29, 2024
Room 203/204
11:00 AM - 11:30 AM

Title: How Low Can We Go? Successful Low DO Operations for Biological Nutrient Removal at Pomona WRF

Presenter(s):
Natalie Beach, PhD, PE, Lead Technologist | Mid-Atlantic/Northeast Regional Wastewater Lead
Carollo Engineers, Inc.

Abstract:
Presentation Goals: This presentation will benefit managers, engineers, operators, and maintenance personnel who want to better understand low dissolved oxygen (DO)/suboxic biological nutrient removal (SBNR) operations. We will present findings from a DOE-funded project "Transforming Aeration Energy in Water Resource Recovery Facilities (WRRFs) through Suboxic Nitrogen Removal," with a focus on the full-scale implementation and testing at Los Angeles County Sanitation District's (LACSD) Pomona Water Reclamation Plant (PWRP). From this presentation, participants will gain an understanding of: • Facility modifications required for the full-scale demonstration. • First-hand experience from a variety of aeration control strategies, including machine learning/model predictive aeration control (MPAC). • Performance data from baseline operation and transition to steady-state SBNR operation. Abstract: Traditional activated sludge processes operate at >1.5 mg DO/L, consuming ~50% energy used at many water resource recovery facilities (WRRFs). Over-aeration wastes energy and removes organic carbon that could be used for additional nutrient removal or energy recovery through anaerobic treatment. However, pilot-scale operations have demonstrated that bacteria can perform biological nutrient removal in low DO (<1.0 mg/L) or suboxic (0.2 – 0.7 mg DO/L) conditions. This presentation will discuss the upgrades required, project approach and data from successful implementation of SBNR processes. As part of this DOE study, full-scale demonstration testing is being conducted at the LACSD PWRP. PWRP is a 15 MGD Modified Ludzack-Ettinger (MLE) activated sludge plant with 3 aeration basins. As part of this project, the facility was retrofitted with dual-core APG Neuros blowers, new aeration

control valves and actuators, nutrient probes, a modified diffuser layout, and the MPAC software packages DO/Nmaster™ (Ekster and Associates, Fremont, CA). DO/Nmaster™ is based on machine learning model predictive algorithms and real-time ammonia, DO, pressure, and airflow control. Since August 2023, the project team documented the performance of the (1) traditional PID based DO control, and (2) using DO/Nmaster™. MPAC tuning occurred through November 2023 in the context of a) the challenging reality of significantly unequal load distributions between the three aeration basins, b) pronounced diurnal influent TKN peak loads resulting in daily effluent ammonia breakthrough, and c) local operations staff accustomed to traditional operations. Beginning in December 2023, PWRP will operate using DO/Nmaster™ in ammonia-based aeration control (ABAC) and DO setpoint control mode. Over the next 6 months, DO setpoints of the ABAC controller will be maintained between upper and lower "guardrails", or setpoint limits, and decreased in a stepwise manner to SBNR conditions. Even ahead of the full planned reduction of DO setpoints to SBNR, operations data has shown that the combination of the capital and controls improvements have decreased control performance variability around DO setpoints from about 30% to 5% without equipment issues, impacts to nitrification efficiency, or sludge settleability. Specific energy usage has decreased from approximately 1,200-1,500 kWh/MG to 750 kWh/MG with upgrades and control improvements to date. The presentation will also summarize critical operational parameters like nitrification and denitrification efficiency, phosphorus removal, and sludge settleability.</p>

Learning Objectives:
Facility modifications required for the full-scale demonstration of low DO/suboxic biological nutrient removal (SBNR).
First-hand experience from a variety of aeration control strategies, including machine learning/model predictive aeration control (MPAC) for SBNR operations.
Performance data from baseline operation and transition to steady-state SBNR operation at a medium-sized WRRF.

Biography:
Dr. Natalie Beach is Carollo's Mid-Atlantic/Northeast Regional Wastewater Lead and a National Low DO Lead with 11 years of experience in biological nutrient removal systems. At Carollo, she specializes in wastewater process optimization, process modeling, and planning and design. She received her MS and PhD from the University of Wisconsin-Madison in Civil & Environmental Engineering. Her research there focused on the performance and microbial ecology of innovative and energy efficient low DO/suboxic BNR systems. When not working, Natalie enjoys spending time with her two boys, taking care of her family's growing collection of farm animals, gardening, and hiking.

62. Thursday, August 29, 2024
Room 207/208
11:00 AM - 11:30 AM

Title: Evaluating the Presence of PFAS and Gen-X Chemicals in a Raw Water Source and Developing a Treatment Strategy for a 12 MGD Water Treatment Plant

Presenter(s):
Mark Notheis, Principal Project Manager

Jacobs

Abstract:
The US EPA recently proposed a maximum contaminant level (MCL) of 4 nanograms per liter (ng/L) for PFAS substances (i.e. PFOS and PFOA). A Virginia utility operates a water treatment facility (WTF) that receives surface water from a lake located in close proximity to a military base. Given the concerns with PFAS substances, the utility took a proactive approach and began a three phased study in October of 2022 to determine 1) if these contaminants were present; 2) if present, determine if any removal was occurring in their existing treatment process; and 3) determine what treatment process would be required in the long-term to reduce concentrations of the perfluorooctanoic sulfonate (PFOS) below the proposed MCL of 4 ng/L. Quarterly sampling of PFAS substances were performed in the raw water with the concentration of PFOS averaging 5.95 ng/L. Based on this information, filtration (reverse osmosis and nanofiltration) and adsorptive media treatment (i.e. ion exchange (IX), GAC, and Fluorosorb (FS)) were evaluated to determine the most economical method for removal of the contaminant. Based on modeling and a desktop analysis, the filtration processes were eliminated from further consideration due to the energy intensive process as well as the difficulty of concentrate disposal. It was therefore determined that adsorption was the most viable treatment process and would be piloted for 1 year with six columns of different media types to assess performance on a seasonal basis. The results of the column testing will provide real world data on media performance and basis of design for full scale. This presentation will summarize results of the PFAS sampling effort, pilot study, and integration into the full-scale treatment facilities.

Learning Objectives:
Understanding PFOS and Gen-X Chemicals Source Water Sampling
Best available technologies for treatment of PFAS and Gen-X chemicals
Developing a pilot plant to evaluate and select the most viable treatment processes

Biography:
Mark Notheis is a principal project manager for Jacobs with 31 years of experience in water treatment design of conventional and advanced water treatment technologies.

63. Thursday, August 29, 2024
Room 215
11:00 AM - 11:30 AM

Title: Delivering on a Critical Linear Infrastructure Project for Garrett County: Meeting Constructability Challenges while Providing Resiliency

Presenter(s):
Ranjith Ravindiran, Senior Project Manager
A. Morton Thomas and Associates, Inc.
Bobby Witt, Division Chief Captial Projects
Department of Public Works

Abstract:

We provided engineering and construction administration services to install approximately 5,500 linear feet of new water main across Deep Creek Lake to connect the McHenry Water System located north of Garrett Highway (US-219) bridge to the Thayerville Water System located south of the bridge. Garrett County has recently experienced an increase in water demand in the McHenry service area from new construction of lakefront and mountain top condominiums and recreational facilities. Completion of this project increases water supply to the unincorporated community of McHenry by tapping into the Thayerville Water System where demand has stayed relatively constant over the past eleven years. Greater resiliency in the overall water system serving the communities around Deep Creek Lake was needed to meet this increased demand. By connecting the two water systems, a second feed to either system is provided in case the McHenry or Thayerville Water System is offline due to an emergency such as contamination of source water in a wellhead protection area or when an unexpected maintenance need impacts one of the two water systems. Groundwater wells located in wellhead protection areas around Deep Creek Lake are the source of water supply to both water systems. Construction was substantial complete in early December 2021, with a temporary connection of the McHenry Water System to the Thayerville Water System in late May 2021, to meet the expected peak summer demand from condominiums and resort facilities north of the lake. Engineering design provided for four different methods of pipeline installation methods due to location of alignment, environmental constraints, a planned future connection, and Maryland SHA requirements for pipeline installation in their right-of-way: 1. Subaqueous installation of approximately 900-feet of 12-inch (HDPE) pipe across Deep Creek Lake. The HDPE pipe sections were joined together using butt-fusion on the staging area south of the lake; thereafter, pre-cast concrete ballasts were attached to the pipe before "strung across" the lake and installed on the lake bottom using the float-and-sink method. Cofferdams were later installed on the northern and southern shorelines to provide construction access for trenching at the lake shores and to complete the connection to the HDPE pipe sections under water to the HDPE pipe sections installed on the land side. 2. Open-trenching installation of 10-inch water main north of Garrett Highway bridge using DIP and PVCO pipes; similarly, 12-inch water main was installed south of the bridge using DIP and PVCO pipes. 3. Used jack-and-bore under Garrett Highway to install an 8-inch DIP water main inside a 24-inch steel casing pipe. The new 8-inch pipe extended to Rock Lodge Road to provide a future water service connection to residents who rely on on-site groundwater wells for water supply. 4. Horizontal Directional Drilling (HDD) was used to install several water service connections to the property line where new meter pits were installed. Use of HDD provided several benefits to Garret County in terms of lower construction cost and footprint and an expedited construction schedule.

Learning Objectives:

1. How Engineer and Owner can work together to identify alignment and constructability challenges early on during the design stage and looking at different pipe materials for use in construction.
2. Why evaluating impact to private properties and critical environmental assets during the early stages of design can keep to a minimum the number of easements needed, and the environmental permits n
3. You can have huge savings to construction cost by evaluating and choosing different pipe materials required to provide the expected level of service.

Biography:

Ranjith Ravindiran is Senior Project Manager with A. Morton Thomas and Associates (AMT) and was the lead designer for this project. He has more than 23 years of design experience including serving as the water engineering discipline leader at several A/E firms.

Bobby Witt has worked in the water and sewer industry for the last 25 years. The last 19 years, he has been employed with Garrett County Department of Public Works. He currently serves as the Division Chief of Capital Projects for Garrett County.
Bobby oversees all water and sewer projects for Garrett County from conception through project completion. He has overseen the construction of multiple water and sewer plants, pump stations, booster stations and a magnitude of pipelines and multiple water crossings.

64. Thursday, August 29, 2024
Room 217
11:00 AM - 11:30 AM

Title: Collaborative Delivery and Innovation Pass the Test of an At-Risk Wastewater Interceptor Rehabilitation Challenge

Presenter(s):
Chris Garrett, National Practice Leader for Conveyance Infrastructure
Brown and Caldwell

Abstract:
The District of Columbia Water and Sewer Authority (DC Water) owns and maintains more than 1,900 miles of sewers that convey over 300 million gallons per day (mgd) of wastewater for treatment at the largest advanced wastewater treatment facility in the world. DC Water has a proactive asset management and preventative maintenance program for inspection and rehabilitation of its sewer assets, including major or large diameter gravity sewer assets. This has led to the identification of high-risk assets for repair before potential catastrophic failure. The East-West Outfall Relief Sewer (EWORS) is a recent example of proactive identification of need, collaborative delivery, and use of innovative repair to restore this critical asset, which consists of large, twin reinforced concrete rectangular gravity conduits separated by a shared midwall. The upstream junction chamber receives wastewater discharges from a large force main and twin interconnecting branch gravity interceptors, with flow rates up to 700 mgd. The EWORS was identified as having severe deterioration and a candidate for immediate repair. The asset's interior outer walls and shared top slab had severe deterioration, with portions of the shared midwall missing. The goal for the project was to return the asset to normal operation in less than 12 months, through collaborative delivery between DC Water and its contracted service providers. Phase 1 of the tactical plan focused on diversion of flow with a temporary sheet pile diversion channel around the EWORS to facilitate the repairs. Phase 2 included evaluation of trenchless rehabilitation alternatives that could provide a long-term repair solution in the harsh operating environment. The suitable repair solutions were shortlisted to two with the PALTEM Flow Ring system chosen. This innovative system was never installed in the United States but selected due to its ability to meet the operating conditions, strength of the contractor installing the system, and ability to meet a fast-track schedule. This presentation summarizes the project drivers, timeline and logistical challenges of working with federal stakeholders in Washington DC, and an overview of the diversion,

rehabilitation and return to normal operations. It concludes with next step recommendations that prioritize corrosion control strategies for DC Water.

Learning Objectives:
Response strategy to a perceived emergency, including use of Incident Management Tewa's and collaborative delivery
Understanding biogenic deterioration arc of concrete outfall/interceptor sewers
Leveraging innovation in the rehabilitation market for a fast-track solution

Biography:
Chris has over 36 years of inspection, planning, design and construction administration experience in the aging infrastructure industry. He is Brown and Caldwell's (BC) National Practice Leader for Conveyance Infrastructure, and a vetted Subject Matter Expert (SME), guiding the evaluation and introduction of new technologies for condition assessment and rehabilitation, and developing standards for new pipe and rehabilitation solutions using trenchless methods. Chris chairs NASSCO's Technical Advisory Council and was an early advocate of the P/L/MACP condition assessment methodology as a certified trainer since 2002.

65. Thursday, August 29, 2024
Room 201/202
11:30 AM - 12:00 PM

Title: What goes first? A Prioritization Approach for Very Large Sewers

Presenter(s):
Laura Khouvilay, Associate Vice President
Carollo Engineers
Ella Garcia, Supervisor
DC Water

Abstract:
DC Water has a goal to rehabilitate 12 miles of very large sewer and interceptors per year. Due to aging infrastructure and generally conservative PACP coding, major systems like DC Water are dealing with a high mileage of grades 4 and 5 sewers. CIP budgets do not allow every very large pipe with a grade 4 or 5 defect to be rehabilitated within typical CIP time frames. This presentation describes DC Water's new approach to identify and prioritize very large sewers to achieve its rehabilitation goal and meet CIP budget constraints. To help manage the over 100 miles of available inspection data, DC Water developed a decision tree to select and prioritize the assets for rehabilitation through detailed examination of defect type and clustering. The decision tree identifies certain discrete defects as severe enough to deem rehabilitation of a pipe on their own. For the less severe defects, their clustering within a pipe was evaluated to decide whether rehabilitation was needed. The clustering was determined by calculating the defects average rate of occurrence within a pipe (i.e., pipe length divided by number of defects in the pipe). The rehabilitation decision tree focuses attention on structural family defect observations with grades of 3, 4, and 5, and select O&M family defect observations. The application of the decision tree resulted in the assigning of each very large sewer pipe identified for rehabilitation to one of four rehabilitation priority timing: • 0 to 10-year Rehabilitation • 10 to 20-year Rehabilitation • Root

Control Program • No Rehabilitation, continue with routine inspection. After each very large sewer pipe was assigned a rehabilitation priority, the next step was to validate the decision tree prioritization results. The validation encompassed reviewing the CCTV inspection videos and verifying the defect observations that influenced the prioritization. The findings of the validation were used to 1) revise the rehabilitation priority for the individual pipes, 2) support further prioritization of the pipes assigned to the 0 to 10-year rehabilitation priority, and 3) refine the decision tree. With each asset placed into a rehabilitation timeline, the results were plotted in GIS to support the grouping of pipes into project areas based primarily on the risk, rehabilitation priority, and geographical proximity, preferably within the same interceptor. To develop a CIP implementation plan, the recommended projects areas were assigned to CIP projects based on available funding, coordination with other DC Water or third-party projects, and permitting requirements. By applying this decision tree and prioritization process, DC Water was able to process in a relative short time over 100 miles of inspection data to select and prioritize pipes for rehabilitation for their 10-year CIP. This process also allows DC Water to better plan their inspection program.

Learning Objectives:
Describe how to interpret NASSCO PACP data for very large sewers.
Apply a process for efficiently reviewing and managing large amounts of inspection data.
Develop a rehabilitation prioritization approach and a CIP project identification for very large sewers.

Biography:
Laura Khouvilay is an Associate Vice President in Carollo's Washington DC office. She has more than 15 years of experience in the water and wastewater industry and her expertise includes strategic system planning, asset management, condition assessment, and CIP planning. She is a registered professional engineer in VA, MD, and DC.

66. Thursday, August 29, 2024
Room 203/204
11:30 AM - 12:00 PM

Title: Innovative new media with advanced deep bed primary filtration makes significant strides

Presenter(s):
Amit Kaldate, Vice President
Tomorrow Water

Abstract:
A new deep-bed primary filter was developed in Korea and transferred to North America as a more sustainable carbon diversion strategy than traditional chemically-enhanced primary treatment. This technology has been proven at scale and adapted to new markets by employing new configurations such as a biological split bed and retrofittable design. This innovative technology is currently being tested at Linda County, CA under California Energy Commission project. This technology, originally developed in Korea, has evolved to address limitations of primary treatment technologies such as chemical consumption, managing peak hydraulic capacity and managing

extent of carbon diversion to balance with downstream nutrient removal. The new media used a cross-shape design and an expanded polypropylene material to achieve a higher void fraction (0.4), lower specific gravity (<0.01) and higher specific surface area (2100 m2/m3) than previous synthetic BAF medias and also does not require fine pre-screening, as do other BAFs. This new media was first installed for APT at full scale (250,000m3/d capacity) at the Jungnang WRC in Seoul in 2017 followed by another large (720,000m3/d) dual-use primary and wet weather flow treatment system at the Seonam WRC, also in Seoul. This installation also addressed carbon limitation at this plant by using a larger media of identical shape. A new split-bed configuration was tested for the first time in North America during a 15-month pilot at a Michigan utility seeking a solution for treatment of excess peak flows. Another important update to the technology was recently tested in a 2022 pilot at Milwaukee Metropolitan Sewerage District's South Shore treatment plant with retrofittable APT using this technology with shallower bed depth. This new design could be fit into the existing PST batteries while increasing the peak hydraulic capacity of the primary process from 1,136,000 m3/d to 1,420,000 m3/d. These full-scale and pilot-scale experiences demonstrate the ability of evolving primary filtration technologies to outperform conventional PST performance while overcoming the limitations of earlier chemical-based APT processes, such as high O&M, inconsistent performance in peak flows, and dependence on complex chemical supply-chains. This paper presents progression of this innovative technology that helps solve decarbonization, carbon diversion and wet weather treatment challenges at the Wastewater Resource Recovery Facilities. The data presented spans the range of sizes from pilot plants to the world's largest advanced primary treatment facilities. The TSS removal efficiencies ranged from 60 - 80% without the use of chemicals and as high as 94% with chemical addition.

Learning Objectives:
To understand the need for and benefits of advanced primary treatment
To learn about design parameters and procedure for deep bed advanced primary filter
To understand the progress of technology adoption internationally and in the US

Biography:
Amit Kaldate is Vice President with Tomorrow Water and has 22 years of extensive experience in design, commercialization, and growth of technologies. He received his Ph.D. from University of Illinois, Urbana-Champaign. He has contributed to water industry by serving on committees (WEF Program, WEF Innovations in Process Engineering, WRF Energy Advisory) and task forces (WEF MOP8, MOP31, Utility of the Future, WRF LIFT).

67. Thursday, August 29, 2024
Room 207/208
11:30 AM - 12:00 PM

Title: How Pilot Testing Changed the Design of a PFAS Treatment Facility

Presenter(s):
Sophia Liskovich, Senior Project Manager
Gannett Fleming
Jackie Mawalla, Water Designer
Gannett Fleming

Abstract:
The City of Eau Claire, WI has a water plant with an average flow of 9 MGD. The plant can be served by two sets of wells – "North" and "South" wells, which both have different water qualities. During testing it was determined that a majority of their Northern wells had been contaminated by PFAS. The City selected Gannett Fleming to assist them in navigating the PFAS treatment evaluation, design, and associated funding. The two pilot units started up in February/March of 2023 and due to funding requirements the design had to be completed for permitting submission by June 2023. Although the manufacturers had indicated that a clear "winner" would be identified in time for the June deadline that was not the case. The decision was made to make the plant layout based on Granular Activated Carbon (GAC) and designed to included six 12' GAC systems. Two months after the submission it was determined that in fact GAC was not the most efficient method of treatment. Instead, Ion Exchange (IX) performed significantly better. Gannett Fleming worked with the WI DNR to modify the permit drawings and change from a GAC to IX system. This presentation will discuss the data analyzed from both pilot and the give the reasoning related to the water quality. In addition, the presentation will present the facility design and give the attendees an understanding of the required components.

Learning Objectives:
Discuss Data from the Pilot
Discuss how different items within water quality effect the treatment process
Discuss the layout of the new facility and the reasoning behind it

Biography:
Sophia is a Senior Project Manager at Gannett Fleming and has been in the field for 22 years where she focuses on water treatment and water storage. Sophia got her Engineering Degree from the University of Maryland College Park and correctly holds PE licenses in Maryland, Virginia, Florida, and Wisconsin.

68. Thursday, August 29, 2024
Room 215
11:30 AM - 12:00 PM

Title: Understanding Non-Revenue Water using AWOL

Presenter(s):
Kenrick Stlouis, Vice President
DC Water
Michael Skerritt, Principal Engineer – Water
Mott MacDonald
Tayina Tardieu, Project Manager
Mkissack & McKissack
Mandy LeBlanc, Senior Manager of Pumping Operations
DC Water

Abstract:
In 2020, DC Water benchmarked themselves for water loss against industry peers and fell near the median. The question raised - "can we do better?". DC Water supplies a service area of 62 square miles; water is purchased from Washington Aqueduct (WA) and then distributed using 4 water

pump stations, nine storage facilities, and a pipe network of approximately 1300 miles. As a starting point, DC Water sought to understand the relationship between the volume pumped versus that consumed by customers. Specifically, water consumed in each of the nine pressure zones. Historically, DC Water maintained a detailed spreadsheet to calculate water pumped into the service area and payment to WA. In 2019, DC Water identified the need for more thorough and ongoing tracking of water balance, both system-wide and at a pressure zone level. The Accounting Water Operating Losses (AWOL) tool was developed in Microsoft Excel to pull information from different departments at DC Water that track pumping and customer consumption data separately. The AWOL tool used SCADA data uploaded to Microsoft Azure database to calculate volume of water distributed to the pressure zones. The tool linked Microsoft Excel spreadsheets of customer billing data and WA billing information to calculate water used by DC Water consumers and total volume of water acquired from WA before being distributed to the DC and neighboring utility systems. AWOL was designed to display the water balance information on a monthly basis in a user-friendly graphic interface and to create trend charts. AWOL provided a visual representation of the data, which aided operations in focusing on the pressure zones presenting the greatest problem with water loss. In 2021, it was decided that Power BI could be leveraged to improve efficiency in processing data and the "AWOL 2.0 Tool" was developed. AWOL 2.0 improved accuracy of the water loss calculations by providing automation of data collection from DC Water's SCADA and Advanced Metering Infrastructure (AMI) system and by introducing the accounting of known water losses in the system such as pipe breaks, flushing events, and storage facility draining. Sustainable and Resilient are two of the five organizational imperatives in the 2022-2027 strategic plan – Blueprint 2.0. With sustainability and resiliency taking center stage locally and globally, the ability to quantify water loss and narrow the geographical area has taken on added significance. A reduction in losses has an impact from source extraction to wastewater treatment. The AWOL tool can help to reduce "trial and error" repairs and aid prioritization of the available dollars for Capital and Operations projects. Ultimately, reduced water loss is directly proportional to the volume of water extracted from the source and the footprint required to move that water through established treatment and distribution processes. As a bi-product, Non-Revenue Water is reduced and less dollars are required to meet customer needs, and this level of efficiency can improve lender confidence and positively impact the cost of future borrowing. This presentation will share the user interface, results, and lessons learned while implementing the AWOL Tool.

Learning Objectives:
Discuss the tool developed to track NRW in DC
Provide lessons learned during the implementation

Biography:
Kenrick St. Louis is the VP of Pumping and Sewer Operations at DC Water. Over the last 25 years he has worked in many industries including Manufacturing, Energy, and Water. Kenrick's education includes a BT in Chemical Engineering Tech, BS in Chemical Engineering with an Environmental Engineering bias, and a MBA in Management and Finance. He is also certified as a Project Management Professional (PMP), Certified Reliability Engineer (CRE), and Certified Supply Chain Professional (CSCP) and has an Infrastructure Asset Management Certification. Kenrick's experience in Operational Excellence coupled with his ability to ensure effectiveness and consistency of operational requirements earned him employee of the year at DC Water in 2018 and and co-winner of the 2019 General Manager's Award.

Michael Skerritt is currently a Principal Engineer in Mott MacDonald's Water and Wastewater Division. His education includes a BSc in Civil Engineering and a MSc in Infrastructure. Michael has 14 years' experience in the planning, design, construction, and management phases of multiple projects. These projects are in the areas of potable water storage and distribution, Digital Asset Management, stormwater management, WWTP Upgrades, earthworks and retaining structures, and road construction.

Mrs. LeBlanc is a licensed Civil - Water Resources engineer that brings 20 years of experience across the water, wastewater, and storm water industries. Her current position in the DC Water Dept. of Pumping and Sewer Operations has her managing the Pumping Operations Branch and performing various analysis to improve pumping and operational efficiencies. Her Pumping Operations team monitors, operates, and manages 9 sewage, 16 stormwater, and 4 drinking water pump stations within the District of Columbia along with associated inflatable dams, tanks, and reservoirs.

69. Thursday, August 29, 2024
Room 217
11:30 AM - 12:00 PM

Title: Critical Thinking and Swift Mitigation in Saving a Century Old Masonry Trunk Sewer in Washington DC

Presenter(s):
Renni Zhao, Ph.D., Engineer
DC Water
Steve Bian, Supervisor
DC Water
Tahir Qureshi, Engineer
DC Water

Abstract:
During DC Water's multiple-camera entry inspection for an in-depth condition assessment of the Northeast Boundary Trunk Sewer (NEBTS), an abnormal condition with severe invert heaving, crown sagging, longitudinal fracture, and up to 10% ovality in a century old 72" brick sewer trunk sewer triggered DC Water Engineering attention. DC Water engineers coordinated with DC Water's Permitting and Construction Management teams to conduct a thorough investigation and review all adjacent construction activities in the damaged area. The investigation found that a tieback from the recently completed building was placed too close to the invert of the brick sewer. The pressure grouting in the tiebacks heaved the brick invert causing the crown and invert to deform and crack. The risk assessment revealed that there was a potential high impact sinkhole in the narrow street congested with a gas line, two other sewer lines, two water lines and multiple duct banks above the 72" brick sewer. To prevent a catastrophic sinkhole, an immediate "No-Dig" zone in these blocks was enforced and DC Water engaged a sole source high confidence specialty contractor to perform carbon fiber reinforced pipe (CFRP) laminating to structurally replace the compromised brick sewer without compromising hydraulic capacity. This paper will present how DC Water performed every

critical step to manage the risk and successfully averted a catastrophic failure, handled design and construction challenges, and lessons learned.

Learning Objectives:
This repair project demonstrates a collaborative effort among DC Water and repair contractor which resulted in an effective and creative design-build solution
Selection of rehabilitation methods hinges on the practicality of flow control of the peak flow condition and potential material imperfection/stability risk during and post construction.
This paper will present how DC Water performed every critical step to manage the risk and successfully averted a catastrophic failure, handled design and construction challenges, and lessons learned

Biography:
Dr. Renni Zhao has been with DC Water for over 10 years. He is a licensed engineer with a Ph.D in Chemical Engineering from the University of Cincinnati in 1994. Prior to joining DC Water, he worded with several engineering firms on Water and wastewater treatment processes, distribution and collection system design, and rehabilitation projects. He has extensive experience in large pipe assessment and rehabilitation.

70. Thursday, August 29, 2024
Room 201/202
12:00 PM - 12:30 PM

Title: Comparison and Validation of Water Pipe Condition Assessment Results on a 16-inch Cast Iron Pipe from Two Inspection Technologies

Presenter(s):
Claire Chen, Senior Project Engineer
Mott MacDonald LLC
Jessica Shiao, System Assessment Supervisor
DC Water
Churchill Okonkwo, Assistant Program Manager
DC Water

Abstract:
Water main Pipe Condition Assessment (PCA) is critical to the management of water transmission and distribution systems. It ranks among the most important subjects in water utilities with aging infrastructure. In this project, we will extend the discussion of PCA by comparing and validating results from two technologies, Echologics, and Hydromax p-CAT, on a 16-in cast iron (CI) water main on Reservoir Rd, NW, Washington DC. This water main, which was installed in 1918 and lined in 1961, serves some critical customers in the nation's capital including Georgetown Hospital, Georgetown University, and the embassies of France and Germany. It thus has a high consequence of failure and was inspected with Echologics in 2014 but without an immediate capital improvement recommendation. In 2023, however, two key questions were raised as part of DC Water's adaptation of a proactive, less intrusive PCA program. 1) How much has the 16-inch CI water main deteriorated in the past 10 years? 2) Is there a need to rehabilitate the water main? To address these questions, Hydromax p-CAT was selected to reinspect the 16-inch water main. This

provides an opportunity to validate the 2014 inspection results and understand the current condition and deterioration, if any, in the past 10 years. The presentation from this study will include 1) A brief background on the 16-inch CI main and its criticality in the Second High Pressure Zone of DC Water. 2) Inspection results comparison and validation between 2014 and 2024. 3) Lessons learned and the next steps for the 16-inch CI. The findings from this study will provide insight to help utilities manage aging water infrastructure and improve the resilience of their water system.

Learning Objectives:
Pipeline Condition Assessment
Asset Management
Water Main Inspection

Biography:
Claire Chen is a licensed professional engineer specialized in water system capital planning, hydraulic modelling and system assessment.

71. Thursday, August 29, 2024
Room 203/204
12:00 PM - 12:30 PM

Title: Retrofitting Solutions for High and Variable Airflows Using Low-Pressure Membrane Diffusers

Presenter(s):
Ladan Holakoo, Senior Wastewater Technologist
Jacobs

Abstract:
This presentation addresses the retrofitting challenges faced at JEA's Buckman Water Reclamation Facility, specifically focusing on the high airflow demand that made use of standard membrane diffusers unfeasible. The Buckman WRF is a regional facility that includes biosolids handling for other JEA facilities as well as septage receiving. Waste biosolids from other JEA WRFs are either pumped or truck-hauled to Buckman. The biosolids treatment process includes thickening, anaerobic digestion, centrifuge dewatering and drying. The centrate is processed with an activated sludge sidestream treatment process and pumped to the first anoxic zone. The centrate contributes an additional 25% ammonia load to the aeration basins. During normal operations, the Buckman WRF secondary treatment process uses a sequential, four-pass aeration basin layout with step-feed to the first three passes. Each of the four passes includes a swing zone that can be operated as an anoxic zone or aerobic zone, and a separate aerobic-only zone. When operating in an anoxic mode, floating surface mixers keep the mixed liquor in suspension. During periods when one of the passes is bypassed for maintenance, the sequential treatment layout converts to three trains operating in-parallel. One of the challenges for the retrofit was to ensure sufficient aeration for either sequential or in-parallel operation. A calibrated whole-plant dynamic model was developed in BioWin to determine the process air demand under (1) normal sequential, four-pass operation and (2) when any single pass might be out of service for maintenance and the basin is changed to in-parallel operation. The existing Buckman WRF uses a standard 9-inch diameter membrane disc having a range of 1 to 3 scfm per diffuser. The BioWin model results led to the selection of a low-

pressure membrane disc having a range of 2 to 8 scfm/diffuser. Despite a 3% reduction in oxygen transfer efficiency compared to standard membrane diffusers, the low-pressure membranes were found to be suitable due to their ability to handle higher airflows at reduced pressure loss compared to standard membrane diffusers. The reduced pressure loss was critical because replacing the existing high-speed and single-stage centrifugal blowers was not part of the retrofit. This presentation will demonstrate delivery of the higher airflow rates using the existing centrifugal blower system, required modifications, and introduction of new thermal-mass insertion air flowmeters on each of the four air headers.

Learning Objectives:
Process design
Process optimization

Biography:
Dr. Ladan Holakoo is a senior wastewater technologist at Jacobs and has over 17 years of experience. Ladan is a licensed professional engineer and holds a Ph.D. in Chemical Engineering. She specializes in wastewater treatment process design, optimization, and biological nutrient removal. Throughout her career, she has been involved in numerous projects focusing on facility expansion, upgrades, retrofit analysis, and optimization.

72. Thursday, August 29, 2024
Room 207/208
12:00 PM - 12:30 PM

Title: Effective PFAS Removal and Waste Reduction using a Novel Micro-adsorbent Slurry and Separations Technology

Presenter(s):
John Dyson, Product Manager
Aqua-Aerobic Systems, Inc.

Abstract:
Adsorptive media like granular activated carbon (GAC) and anion exchange resins (AIX) are currently the most practical and widespread methods to remove PFAS. Reverse osmosis (RO) and nanofiltration (NF) membranes can achieve exceptional PFAS removal, but are limited by higher capital and operational costs while producing significant waste streams that must also undergo treatment before disposal. Certain destructive technologies like supercritical water oxidation (SCWO) and electrochemical oxidation (ECO) offer the potential for complete defluorination, but are economically viable mainly on low-volume, high-strength applications. Micro-adsorbents (MA) represent a special class of PFAS separation technologies which are designed to achieve high unit removal capabilities due to their exceptionally small size. The finest adsorbents can provide external surface areas several orders of magnitude greater than GAC and AIX per equivalent mass. Diffusion limitations are also reduced due to the much shorter distance between the solute and the internal adsorption sites. A novel treatment system is presented which uses an efficient micro-adsorbent in a concentrated slurry to achieve high PFAS removals while sustaining hydraulic throughput. A specially designed separations technology retains the sorbent slurry at concentrations of 5,000 to 50,000 mg/L while producing particulate-free effluent. The unique cross-

flow design exploits the relative hardness between the MA and the separator to control fouling and elevate slurry concentrations. An integrated waste reduction technique produces between 40 and 80 gallons of spent sorbent per 1 million gallons of water treated. The technology has been demonstrated in various matrices including surface water, groundwater and RO concentrate streams. Contaminated surface water PFOA and PFOS concentrations were reduced from 3,500 and 250 ng/L, respectively to less than 4 ng/L each. A combined 40 ng/L target for UCMR3 compounds (PFOA, PFOS, PFNA, PFHxS, PFHpA and PFBS) was achieved from a 5,000 ng/L influent. Treatment of highly contaminated groundwater from another military site showed even greater adsorption capacities with removal of combined UCMR3 compounds from 40,000 ng/L to less than 40 ng/L in two stage treatment. The technology also effectively treated RO concentrate from a municipal drinking water treatment plant. In that application, PFOS and PFOA were reduced to less than 4 ng/L from an influent of 900 and 150 ng/L, respectively. The system also showed that it could meet the US EPA's proposed 1.0 Hazard Index for PFOA, PFOS, PFNA, PFHxS, PFBS and GenX. The micro-adsorbent and separations technology was able to achieve these levels with comparative sorbent quantities less than both GAC and AIX technologies.

Learning Objectives:
Introduce new solution for PFAS removal with new EPA proposed limits
Introduce the different solutions for PFAS removal
Discuss the importance of cost evaluations in evaluating PFAS removal solutions

Biography:
John Dyson is the Product Manager for AquaPrime/AquaStorm and AquaPRS technologies. John holds a B.S. degree in Chemistry from Longwood College. He has experience working with many treatment technologies in all parts of water and wastewater facilities. In his over the 30+ years, worked on many projects varying in size up to 600 MGD. John experience with the many technologies gives him a unique ability to evaluate and determine the best solutions for clients. In addition, he has been involved in the introduction of several new technologies through his career including clarification processes, membranes, filtration technologies and adsorption process.

73. Thursday, August 29, 2024
Room 215
12:00 PM - 12:30 PM

Title: A Sustainable Strategy for WSSC's Water Supply and Treatment: Climate Impacts, Water Quality Trends, and Regulatory Challenges

Presenter(s):
Priscilla To, Senior Scientist
WSSC Water
Naomi Souza, Environmental Engineer
Ramboll Engineering
Narayan Venkatesan, Project Officer
Ramboll Engineering

Abstract:

WSSC Water is one of the largest water and wastewater utilities in the nation, serving 1.9 million residents in the Washington Metropolitan Area. WSSC Water operates two water filtration plants (WFPs) delivering a total average of 170 MGD to Prince George's and Montgomery Counties, MD. Potomac WFP draws from the Potomac River and Patuxent WFP from a reservoir located on the Patuxent River. WSSC Water is developing a Long-Term Water Quality and Treatment Master Plan to position WSSC Water with a sustainable strategy for meeting its water supply and water quality objectives with a planning horizon of 30 years. The Master Plan is being completed in two parts. Part 1, which was completed in 2023, included a desktop evaluation of future water quality regulations and a preliminary assessment of water quality trends and operational data. Workshops and interviews were conducted with WSSC Water staff to review prior investigations, assess operational constraints, gather institutional knowledge, and collect stakeholder feedback. Part 2 is ongoing and includes a mix of desktop evaluations, bench scale testing and full-scale demonstrations at the water filtration plants, informed by the foundational work in Part 1. This presentation will explore the main findings of the Master Plan - Part 1 and results that are available from ongoing-Part 2, including: 1. Water supply reliability, considering the impact of climate change on WSSC's surface water sources, increasing demands for water and the potential for source water contamination. 2. Source water quality, including long-term water quality trends in the Potomac River and the Patuxent reservoirs, such as increasing salinity and algal blooms. 3. Future water quality regulations that are expected to establish more stringent limits on per- and polyfluoroalkyl substances (PFAS), disinfection byproducts, algal toxins, and manganese. 4. Reliable capacity and resilience of WSSC Water's Potomac and Patuxent WFPs to meet water demands even during extreme weather events and algal blooms, including the results of ongoing production capacity demonstrations at both Potomac WFP and Patuxent WFP. 5. Conventional and advanced water treatment process evaluations, including tabletop studies from Part 1 and ongoing bench testing focused on PFAS treatability. The PFAS treatability study is assessing the ability of processes which EPA has identified as Best Available Technologies (BAT) for PFAS reduction to also provide other water quality enhancements, such as reductions to disinfection byproducts. WSSC Water is evaluating granular activated carbon (GAC), ion exchange and nanofiltration in Part 2, including consideration for disposal of concentrated PFAS waste. 6. Water resource management, including the maintenance of operations during low flows in the Potomac River and potential conversion of a nearby quarry into a regional water storage reservoir.

Learning Objectives:
Understand long-term challenges related to source reliability and water treatment for a large public system.
Understand local trends related to water quality and potential implications to water treatment.
Analyse the potential impact of pending regulatory changes on water treatment and strategies to address it.

Biography:
Dr. To is a Senior Scientist with WSSC Water. She focuses on WSSC Water's two drinking water treatment plants, providing treatment process and optimization support to meet safe water quality objectives.
Dr. Souza is an Environmental Engineer within Ramboll's Water Division, she addresses clients' needs related to water quality and emerging contaminants.

74. Thursday, August 29, 2024

Room 217
12:00 PM - 12:30 PM

Title: Repairing History – DC Water's Experience Designing Rehabilitation of a 150-yr Old Sewer

Presenter(s):
Anthony Laufik, Civil Engineer
Greeley and Hansen
Steve Bian, Supervisor
DC Water

Abstract:
The Northeast Boundary Trunk Sewer (NEBTS) is one of the oldest combined sewers in Washington, DC. It was constructed between 1879 and 1894 and serves the north-central portion of the District, which covers approximately 35 percent of the District's combined sewer system. It ranges from approximately 6 feet to 23 feet in diameter and is approximately 28,800 linear feet (LF) in length. In 2018 DC Water commissioned a report on the condition of various sections of the sewer. Based on the results of the report, two sections of the sewer, which have shown cracks and are located under buildings, required rehabilitation. Segment 1 is about 800 LF long, comprised of brick, and has a circular cross-section with a diameter of 22 feet. Segment 2 is about 300 LF long, comprised of both a brick section and an unreinforced concrete with brick invert section, and has a 9-foot by 6-foot wide egg-shaped cross-section. Both segments are located within a highly developed portion of the District. Access to Segment 1 is primarily within the public right of way, with the exception of a manhole in the backyard of a private residence. Segment 2 can be accessed via a manhole inside one of DC Water's meter shops from one end, and from the public right of way on the other end. DC Water tasked the Greeley and Hansen/Ramboll Joint Venture with development of a Concept Finalization Report (similar to a Preliminary Engineering Report), to identify issues that may be encountered in the design and construction phases, analyze potential rehabilitation technologies, recommend a technology for design, and develop planning level costs. Based on the results of the analysis, geopolymer lining was selected as the preferred rehabilitation method. Once the rehabilitation method was selected and the design was underway, a Finite Element Analysis was performed on each segment of the sewer to determine the required thickness of the geopolymer lining. The Finite Element Analysis considered the shape, material, size, and depth of pipe, as well as surface loadings. Once the design was complete, the project was solicited for bids and a low bidder was selected. Construction is anticipated to begin in Spring 2024 and finish in Summer 2025. In this presentation, we will identify factors which led to the decision to rehabilitate these sections of pipe, detail the access issues and constraints encountered, and describe the factors considered in the Finite Element Analysis.

Learning Objectives:

Biography:
Mr. Laufik has over 17 years of experience in the water/wastewater industry working primarily in the DC metro area. He has worked on a variety of sewer program management contracts along with design projects for large diameter sewer/water replacement and rehabilitation, pumping station upgrades, stormwater management and environmental permitting.

75. Thursday, August 29, 2024
Room 201/202
2:00 PM - 2:30 PM

Title: Charm City Criticality: Optimizing Valve Management in Baltimore

Presenter(s):
Ethan Vidal, Project Manager
Xylem
Greta Vladeanu, Senior Decision Scientist
Xylem

Abstract:
Maintaining the integrity of water systems is essential for ensuring continuous water service, preserving public health, and resource sustainability. Operable isolation valves, integral to these systems, efficiently manage incidents of service interruptions, whether planned or unforeseen. Their strategic system-wide positioning allows for utilities to efficiently manage routine maintenance, prevent widespread disruptions, and minimize service interruptions during emergency incidents. Therefore, ensuring that critical isolation valves are operable allows for incident control, streamlined maintenance, and overall system resilience and reliability. As part of a proactive water asset management program, the City of Baltimore has implemented a routine valve exercising program to comprehensively assess the location, accessibility, and operational status of valves within the City's network. To better aid in the implementation of such a program, a valve criticality analysis is beneficial to understand the risks associated with pipe failures as well as the consequences of shutting down portions of the system. This study focuses on the development of a valve criticality model for the active isolation valves in the Baltimore Metropolitan Water System. The primary objective is to prioritize the most critical valves, thereby enhancing the City's valve asset management strategies. To assess valve criticality, the proposed methodology involves a comprehensive review of isolation areas through valve isolation and closure optimization modeling to define the isolation areas associated with each valve in the network. This assessment examines the impact of service disruptions on the affected customers in the event valves within specific isolation areas are shut down or become inoperable. By leveraging the known operational condition of valves within the system and integrating it with the valve criticality results, an optimized plan has been proposed to enhance the City's valve asset management program, addressing both short- and long-term objectives. For inoperable valves, batches of rehabilitation work have been recommended using decision logic that evaluates criticality, valve issue, such as access or mechanical problems, and the complexity of the rehabilitation method. The results of the system-wide criticality analysis have been incorporated into the City's existing valve exercising program to ensure that critical valves will be regularly assessed, minimizing the impact of water service disruptions on affected areas. This study illustrates how harnessing advanced analytics and comprehensive system-level information can optimize planning strategies to address both immediate maintenance concerns and long-term infrastructure sustainability through prudent resource allocation.

Learning Objectives:
Valve Assessment
Criticality Analysis

Data-Driven Decisionmaking

Biography:
Mr. Ethan Vidal, P.E. is a Program Manager for Xylem, and a Trustee of the Chesapeake Section for AWWA. He is a licensed professional engineer in Maryland with over 10 years of experience in the municipal water industry, specializing in establishing and managing linear asset condition assessment programs. He has a Bachelor's degree in Psychology from Amherst College and in Civil Engineering from the University of North Dakota. He is always willing to talk about valve and pipeline condition assessment, Liverpool soccer, and how to get more involved with AWWA!

76. Thursday, August 29, 2024
Room 203/204
2:00 PM - 2:30 PM

Title: OUT WITH THE OLD AND IN WITH THE NEW

Presenter(s):
Ezgi Kurdoglu, Project Engineer
Maryland Environmental Service
Mark Kaiser, Environmental Systems
Maryland Environmental Service

Abstract:
In 2018 the wastewater treatment plant at Rocky Gap State Park was upgraded to a four (4) stage Membrane Bio-Reactor (MBR) system. This system provided consistency and reliability of effluent water quality, long term compliance with effluent discharge limits, and ease of automation all within a smaller footprint. This, combined with the ability to process higher volumetric loading rates and MLSS concentrations led MES to membrane bio-reactor technology. An additional potential benefit of the MBR process is the use for non-potable applications such as irrigation, which is perfect for watering the golf course at the existing resort. Flat sheet ultrafiltration membranes made of Polyether Sulfone having an average pore size of 0.09 micron were installed. Membranes typically lose their ability to easily permeate with throughput. It is natural for membranes to get fouled gradually as throughput increases. However, in 2021, the frequency of Clean-In-Place (CIP) cleaning began to increase, and the permeability recovered after each cleaning cycle went down. Although the plant was still producing the required effluent quality, the permeability loss and frequent CIP cleanings started to create operational issues. The membranes were pulled out for cleaning and inspection. During the inspection of the membranes, tears and cracks in the outer layer of several sheets were observed and several separations were beginning to form as well. There seemed to be a failure in the composition of the outer layer of the semi-permeable membrane or the bonding agent used to attach the membrane to the core. It was decided to replace the existing polymeric technology with a silicon carbide membrane technology to gain the benefits of improved membrane performance via energy efficiency and reduced membrane fouling. This upgrade of membrane technology will improve operational performance and longevity. However, replacing the polymeric membranes with a silicon carbide membrane comes with its own challenges. Common complications include compatibility with existing equipment, such as the necessary piping and pumping capacity for backwashing, different air scour flow rates and cycle times, necessary control

adjustments, and sequencing construction such that treatment continues throughout the project. The purpose of this paper is to provide an overview and present the process of retrofitting the existing polymeric technology with the silicon carbide membrane technology. We will discuss adaptation of pipework, upgrades to pumps and blowers, alteration of lifting mechanisms for removal and programming changes.

Learning Objectives:
Analyze the challenges involved in retrofitting a wastewater treatment system from one membrane technology to another

Biography:
Ezgi Kurdoglu is a Project Engineer with Maryland Environmental Service. She has a bachelor's degree in Environmental Engineering from Istanbul Technical University and a master's degree in environmental engineering and environmental sciences from Istanbul Technical University. She has over 9 years of experience in the planning, design, and construction of water and wastewater facilities.

Mark Kaiser is currently the Environmental Systems Regional Supervisor for the western region of Maryland for Maryland Environmental Service. He has 22.5 years of experience with MES and started as an operator at the Frostburg WTP. He also has 5 years of prior experience, mostly with membranes, Ozone, and high purity water systems with Hydromax.

77. Thursday, August 29, 2024
Room 207/208
2:00 PM - 2:30 PM

Title: Ending the Use of Chlorine Gas at Major City of Baltimore Drinking Water Sites – How to Improve Safety and Reduce Chemical Demands

Presenter(s):
Tim Weaver, Senior Project Engineer
Whitman, Requardt and Associates

Abstract:
The Montebello Filtration Plants and five remote sites use chlorine gas for disinfection of the drinking water. Most locations use 2,000-pound chlorine containers which pose a risk to operators and surround civilians. For the purposes of risk reduction and uniformity with the remainder of the City's water treatment system this task aimed to convert remaining gaseous disinfection delivery to liquid sodium hypochlorite. At the Montebello plants, chlorine is added to the raw water ahead of the open sedimentation basins resulting in the need to dose upwards of 6 ppm (parts per million) during clear summer days. During the same season at night, the dose is reduced to approximately 2 ppm indicating a majority of the dosed chlorine is wasted due to UV and heat degradation. A study was undertaken to determine if the Plants could benefit by moving the point of disinfection to after the sedimentation process and before filtration. The study was successful in presenting the potential benefits of moving the point of chlorination to significantly reduce the amount of

disinfectant (sodium hypochlorite) needed, resulting in a much smaller storage facility than would be required with the existing disinfectant application points. The presentation will document the study and its findings and how it was used to size the facilities at both filtration plants. A sodium permanganate system was designed for oxidation of the raw water to limit algae, taste, and odor constituents becoming noticeable. The presentation will include an outline of the facilities at both Montebello plants and sequence of construction to maintain plant operations. The presentation will also include the five remote chlorination booster facilities and the steps needed to be taken to convert from gaseous chlorine use to liquid hypochlorite. The first step was to analyze chlorine dosage records since the gas systems were designed with the existence of open tanks and reservoirs that would exacerbate UV degradation. The actual chlorine demands are far less now that all reservoirs are covered; therefore, the liquid storage systems could be designed in the existing buildings while maintaining treatment and distribution operations, further benefiting the City.

Learning Objectives:
Chlorination Disinfection
Treatment Plant Upgrades
Improved Safety and Risk Reduction

Biography:
Tim Weaver, P.E. is a Senior Project Engineer at Whitman, Requardt & Associates with over 9 years of experience in planning and design of water treatment and chemical facilities. He has a B.S. in Mechanical Engineering from Virginia Tech. He has been involved with professional engineering associations, which he is currently the local Baltimore representative for the YP Committee of the Chesapeake Water Environment Association.

78. Thursday, August 29, 2024
Room 215
2:00 PM - 2:30 PM

Title: Holistic Design Processes and Post Construction Monitoring of In-Stream Asset Protection

Presenter(s):
Jessica Krueger, Project Manager
RK&K
Chris Caro, Section Manager
WSSC Water

Abstract:
WSSC Water provides water and sewer services to approximately 1.8 million residents of Montgomery and Prince George's Counties in Maryland. The agency ranks among the largest water and sewer utilities in the country, encompassing a service area of nearly 1,400 square miles. Directly from their mission statement, "we are entrusted by our community to provide safe and reliable water, life's most precious resource, and return clean water to our environment, all in an ethical, sustainable and financially responsible manner". Increasing peak storm flows, higher frequency storms, and highly erosive forces have caused asset protection difficulties for aging

water and sewer infrastructure within stream valleys. The past solutions of armoring infrastructure with riprap and concrete have only provided temporary protection from the storm flows that are constantly increasing from development and urbanization, in addition to providing stream instability within stream valleys. We will explore the design processes used for a more holistic and sustainable asset protection approach, including understanding the stream instability, degradation, and dynamics of the overall stream system as well as continued post-construction monitoring of assets. These holistic design alternatives can provide long-term stability in the stream, resulting in infrastructure stabilization within urban environments. We will also discuss the additional benefits that an integrated stream restoration and infrastructure stabilization project can provide in an urban environment. RK&K is working hand-in-hand with WSSC Water to provide sustainable asset protection for several broken or exposed utilities within their utility service area. We will showcase efforts of identification and planning, design, permitting, construction support, project closeout, and post-construction monitoring. Several case studies and project specific before, during, immediate post-construction, and long term post-construction photos will be showcased. We will describe how post-construction monitoring can be used to improve upon holistic design processes for in-stream asset protection. By providing resilient solutions to utility asset protection, we are able to repair water and sewer infrastructure systems and improve the stream system to provide more holistic and sustainable solutions for long term stability.

Learning Objectives:
This presentation showcases several case studies in environmental sustainability.
We will highlight pillars of economic viability, environmental protection and social equity.
Lastly, we will share stories of engaging stakeholders, securing permits and provide detailed photos of pre and post construction activities.

Biography:
Jessica Krueger, PE is a Project Manager at RK&K in the Environmental, Water Resources department with 11 years of experience. She has a Bachelor of Science in Civil Engineering from Virginia Tech, and a Masters of Science in Environmental Engineering and Science from Johns Hopkins University. Jessica manages the WSSC asset protection projects and many others at RK&K including design development, contract documents, MS4 permit planning.

79. Thursday, August 29, 2024
Room 217
2:00 PM - 2:30 PM

Title: Spinning Ain't Winning- Properly setting minimum speeds on VFD driven pumps

Presenter(s):
Michael Bernard, Vice President of Business Development
Specific Energy

Abstract:
Various rules of thumb have been used for decades to set the minimum speed for variable speed pumps. Unfortunately, most of the time these rules of thumb are wholy inadequate and wrong. Across the water and wastewater industry, thousands of pumps are operating at or near deadhead because of setting the minimum speed too low. The minimum speed a pump should run changes

dynamically based upon current system conditions, the number of pumps in operation, and even the condition of the pumps themselves. The only way to do this correctly is to analyze all of these conditions in real time. Digital twins are analytics platforms that can help with this challenge. Complex real time data is analyzed to not only show the impact of changing system conditions, but also the impact of pump wear and tear on system performance.

Learning Objectives:
Attendees will learn about operating pumps at shutoff head and why it is so dangerous.
Attendees will learn about how to analyze pumping systems to determine how to avoid shutoff head
Attendees will see real case studies of how digital twins help operators avoid shutoff head.

Biography:
Mike Bernard is Vice President of Business Development at Specific Energy. He spent 24 years as a design consultant and principal at an engineering firm in Nashville where he was involved with a myriad of innovative design projects in both water and wastewater involving technologies like membrane filtration, advanced oxidation, hypochlorite generation, nutrient reduction, and beneficial reuse of both biosolids and effluent. He came to Specific Energy because he believes that this technology has the potential to help operators operate better, managers manage better, and engineers engineer better systems.

80. Thursday, August 29, 2024
Room 201/202
2:30 PM - 3:00 PM

Title: Navigating the Transition to ESRI's Utility Network

Presenter(s):
Natalie Ciletti, GIS Manager
AECOM
Anthony Dowell, AVP GIS & Asset Management
AECOM

Abstract:
Water utilities rely heavily on Geographic Information Systems (GIS) technology, which often serve as the system of record for utility asset data and leverage enterprise GIS solutions to support the management and maintenance of data, to facilitate the sharing of information across the organization, and to provide crucial data to other business systems. Many utilities have invested in the Esri ArcGIS suite of GIS solutions and have been using traditional GIS data structures to model their utility networks and to support key utility functions such as data visualization, network analytics and modeling, and others. Esri's Utility Network solution has recently been released as the next generation of tool and applications, providing capabilities for more effective utility data modeling and visualization (including for vertical assets and facilities), improved access to data and analytic capabilities in the field, and leverage modern service-based GIS architecture. While there are many benefits to migrating to the Utility Network, the transition to this solution represents a significant change for most utilities who have their own custom data schemas, custom-developed tools and applications built on legacy technologies, and existing integrations that have been established between GIS and other business systems. This presentation will serve to provide best practices and lessons learned for water utilities who are preparing to embark on a migration from

their legacy utility data models to the Utility Network and will also discuss key considerations related to upgrading legacy GIS tools and workflows, as well as impacts to other GIS-integrated systems such as CMMS, EAMS, hydraulic modeling and others. Several case studies will be shared from Utility Network migrations that have been undertaken by major utilities within the Mid-Atlantic region, providing peer utilities with an opportunity to develop their own road map to successful transition to the Utility Network.

Learning Objectives:

Biography:
Natalie has been consulting on GIS for the water industry for over 12 years since pursuing her B.S. in Environmental Science at Towson University in 2012. As a GIS Professional leading a team of GIS Specialists under the water business line at AECOM, she enjoys providing geospatial solutions to a variety of asset management programs. Making GIS technologies such as web mapping applications more accessible to all audiences is a passion of hers, as is adventuring in the great outdoors!

81. Thursday, August 29, 2024
Room 203/204
2:30 PM - 3:00 PM

Title: Optimizing DC Water's Aerated Grit Chambers with Innovative TruGrit Approach

Presenter(s):
Jason Kerns, Vice President
HDR
Ryan Little,
DC Water
Ryu Suzuki,
DC Water

Abstract:
Uneven grit deposition caused the aerated grit chamber movable pumping system to be restricted at DC Water's Blue Plains AWTP. Collecting samples, lab testing, CFD modeling, and pilot testing were used to optimize the operation. Sampling occurred in a 55-gallon drum during wet and dry weather to fully characterize the range of grit particle size. Once at the lab, the grit samples were analyzed to determine actual settling velocities of the grit particles. The innovated process used a settling column called TruGrit. TruGrit uses up flow velocity currents to slow down the settling velocity of the grit particles. In summary, settling rates were categorized by different grit particle velocities. CFD modeling of the aerated grit chamber was used to simulate the interactions between air, water and grit inside a tank. Different baffle configurations that increased the influent velocity were tested to promote improved grit settling distribution throughout the tank. Three new baffles strategically located inside the tank more evenly distributed the grit. Three stainless steel baffles were installed in two of the tanks as a pilot test. Cut-outs were incorporated to allow the traveling grit bridge pump system to traverse the tank through the baffles. The baffle wall seemed to enhance the distribution of grit in various wet weather events, and DC Water intends to continue

assessing their effectiveness over an extended duration. Baffles are anticipated to be installed in the other tanks.

Learning Objectives:
How to sample grit particles to determine settling velocity.
How to perform CFD modeling of air, water and grit particles.
How to perform pilot testing.

Biography:
Jason has 17 years of experience performing design and construction administration for projects throughout the Mid-Atlantic region with individual project values upwards of $500 million. As Project Manager, he has been directly responsible for numerous wastewater design-bid-build and collaborative delivery projects. His areas of expertise include managing multidiscipline design teams, pumping system and treatment plant hydraulic analyses, and pump and process equipment evaluation and selection.

82. Thursday, August 29, 2024
Room 207/208
2:30 PM - 3:00 PM

Title: Lead Sampling Plan Development for Schools and Childcare Facilities Under the LCRR

Presenter(s):
Baljit Sidhu, Environmental Scientist
Hazen and Sawyer

Abstract:
The Lead and Copper Rule Revisions (LCRR) include enhanced monitoring for lead in schools and childcare facilities. Lead can have adverse health impacts particularly on young children (particularly those six years or younger) and pregnant women. Lead can cause neurological issues, hinder growth and development, cause learning and behavioral problems, and hearing and speech impediment. There is no safe blood lead level for children. The LCRR requires all public water systems to conduct public education and lead monitoring at elementary schools and childcare facilities they serve that were built prior to January 1, 2014, or the date the State implemented lead-free plumbing whichever is earlier. Secondary schools can be sampled upon request. This presentation focuses on providing guidance on developing lead sampling plan for use by schools, childcare facilities, and water system staff to assist in lead monitoring in accordance with the revised requirements enumerated in the LCRR. The lead sampling plan is in accordance with the LCRR, and sampling instructions provided are as per the US EPA's 3Ts Guidance for Reducing Lead in Drinking Water in Schools (as referenced in the LCRR). Development of lead sampling plan for schools and childcare facilities comprises of the following four key elements: (a) public education to schools and childcare facilities focusing on information about health risks from lead in drinking water, compilation of list of schools and childcare facilities served by the water system (b) lead sampling in schools and childcare facilities that includes development of sampling protocol, identification of sampling taps, etc. (c) frequency of sampling which incorporates the percentage of elementary schools and childcare facilities that the water system will sample per year i.e., 20% and once in five years, secondary schools will be sampled upon request and lastly (d) notification of

results to schools and childcare facilities, local and State health departments, and the State. Sample results from schools and childcare facilities do not count towards the 90th percentile calculations for the water system. The lead sampling plan development along with a utility case study discussed in this presentation can help water utilities with the planning and lead sampling monitoring for schools and childcare facilities as part of the LCRR requirements.

Learning Objectives:
Guidance to water system staff to develop lead sampling plan for schools and daycare facilities as part of LCRR requirements
Lead mitigation strategies for schools and daycare facilities
Overview of lead sampling programs across different states in the US

Biography:
Ms. Baljit Sidhu works as an Environmental Scientist at Hazen and Sawyer on a broad spectrum of drinking water quality projects. Ms. Sidhu graduated with a Bachelor of Civil Engineering from Mumbai University and a Master of Environmental Engineering from Old Dominion University. Ms. Sidhu's particular areas of expertise include lead and copper corrosion control treatment, iron and manganese control, and DBP treatment. Ms. Sidhu is primarily involved with potable water quality and treatment studies at Hazen. She has also been actively involved with several AWWA and WRF research projects focusing on lead in drinking water and brominated DBPs. Ms. Sidhu is currently the Technical Writer for the VA AWWA Drinking Water Quality and Research Committee.

83. Thursday, August 29, 2024
Room 215
2:30 PM - 3:00 PM

Title: Collaboration in mitigating SSO risk in buried stream crossing

Presenter(s):
Steve Bian, Supervisor
DC Water
Tim Bako, Vice President of Corporate Strategy
Spiniello Companies

Abstract:
The Foundry Branch flows through Glover Park in northwest Washington DC. An encased sanitary sewer on shallow piers crosses the creek to discharge into a 27" interceptor. With a history of SSO's within the manhole at the crossing, a DC Water Capital Improvement project has been in planning for a total replacement, as part of a larger CIP to retrofit the creek crossing as well as the receiving 27" sanitary trunk sewer. Such CIP within the wet land, with multiple permitting with NPS, DOEE and USACE, will likely take 4-5 years from the start of the design to construction completion. Climate change has brought DC consistent, record rainfall in recent years, converting a tranquil creek into an angry river. In the fall of 2022 and spring of 2023, two SSOs occurred in the manhole eight months apart. DC Water performed an in-depth geo-structural evaluation of the creek crossing and our Emergency IR&R contractor Spiniello Companies conducted a vicinity site assessment upstream for significant infiltration. DC Water worked in partnership with NPS, DOEE and USACE to strategize and discuss solutions to eliminate the SSO risk. The DC Water team met

with the governing agency representatives to demonstrate an in-house design for sewer replacement and submitted an emergency work plan and received NPS/DOEE consensus for approval. The DC Water IR&R Emergency Contractor performed the tree removal and constructed an access path within the deep wooded area to facilitate the crossing demolition, sewer bypass setup, and the helical pile installation. A 12-inch PVC sewer at 2% slope was encased and placed on helical anchors as a new crossing with a steppingstone top, per request and approval from NPS, as a pedestrian crossing. The rest of the sewer segment will be encased in flowable fill and a concrete headwall on piles will divide the creek crossing and sewer in creek bank to enhance embankment erosion resistance. DC Water's engineer will present its resilient design to provide a clear solution to mitigate current and future torrential storm events due to climate change and to discuss the forward-thinking solutions that CIP could not timely accomplish. With an oversized sewer crossing on erosion resistant pile support and an upstream new monolithic manhole with watertight frame and lid, SSO risk is managed for decades to come in this environment sensitive setting.

Learning Objectives:
tougher challenger brought by climate change from record breaking storms
The design is as good as your assumption (of your storm event)
Erosion resistance in stream crossing could be critically under-engineered if solely on material prone of erosion

Biography:
Steve Bian plays a role of integrity manager as the supervisor of civil and structural design section in DCWATER.Engineering. His duty in DCWATER covers full spectrum of responsibilities related to planning, design, construction, and emergency response for both vertical and linear assets. So far he spent 19 years of his 37 year professional career in DC Water since 2005.
Tim Bako is the Vice President of Corporate Strategy at Spiniello Companies with over 20 years of experience in infrastructure construction and engineering. He has spent his career focused on business development, organizational leadership, project/program management and operations with organizations serving federal, state, and local governments, as well as the private sector. Mr. Bako serves in several advisory and leadership positions and is active with professional organizations specific to water and sewer infrastructure.

84. Thursday, August 29, 2024
Room 217
2:30 PM - 3:00 PM

Title: Cathodic Protection Installation and Testing

Presenter(s):
Andrew Fuller, Vice President
Engineering Design Technologies

Abstract:
Extending asset life improves the return on investment. Utility owners must balance the benefit of life extension with the cost to achieve the extra life. Repairing main breaks is often a very expensive

method for extending life. Preventing the need for emergency intervention with corrosion control has proven effective throughout the water industry. Effective cathodic protection (CP) can prevent corrosion indefinitely. Test stations simplify testing allow operators to quickly check performance. Anodes provide CP and can be installed in many different ways. By looking at how the methods for controlling corrosion are seen in the field, attendees will be better able to inspect their assets. This presentation focuses on the operation, maintenance, and installation of CP. Examples of methods successfully used in the Baltimore-Washington area will be presented. Demonstration of the most critical tests will illustrate their ease to facilitate implementation.

Learning Objectives:
Basics of CP and different ways that anodes can be installed to extend asset life
How to identify and maintain test stations
The types of tests for CP and what they can tell us about asset condition

Biography:
Andrew is a registered engineer and cathodic protection specialist. He manages EDT Mid-Atlantic.

85. Thursday, August 29, 2024
Room 201/202
3:00 PM - 3:30 PM

Title: Smart Geospatial Analytics: Revolutionizing Corrosion Management in Water and Wastewater Infrastructure

Presenter(s):
Wenxuan Dong, Sr. Condition Assessment and Corrosion Engineer
Black & Veatch

Abstract:
As urban centers grow, the integrity of municipal water and wastewater infrastructure becomes increasingly critical for public health and environmental sustainability. Corrosion is a major threat to these systems, leading to costly pipeline failures and asset degradation. This presentation introduces an innovative approach to corrosion management through the integration of geospatially-referenced corrosion data, including soil corrosivity, stray current, and pipe break history. By leveraging advanced data analytics and geographic information systems (GIS), this method provides a visual and comprehensive understanding of corrosion risks, facilitating smarter decision-making. Case studies from various municipalities will demonstrate how this approach significantly optimizes resource allocation, enhances corrosion control strategies, and promotes infrastructure longevity. The expected outcomes include improved system performance, cost-efficiency, and sustainability, aligning with the urgent need for advanced solutions in infrastructure management.

Learning Objectives:
Understand the critical role of advanced geospatial analytics in identifying and managing corrosion risks within municipal water and wastewater systems.
Learn how integrating various data sources like soil resistivity, stray current, and pipe break history can create a comprehensive risk assessment model for infrastructure management.

Explore real-world applications and benefits of this approach through case studies, demonstrating improved decision-making, resource optimization, and enhanced infrastructure resilience.

Biography:
Wenxuan (Peter) Dong is a Sr. Condition Assessment and Corrosion Engineer at Black & Veatch, where he brings over a decade of specialized experience to his role in advancing infrastructure integrity and sustainability. Throughout his career in the industry, Peter has cultivated deep-seated expertise in pipe condition assessment, corrosion control, risk modeling, and the application of geospatial information systems. Known for his analytical approach, Peter has effectively evaluated, designed, and managed the implementation of corrosion control and asset management systems for a diverse array of clients across the country. His dedication to the field is demonstrated by his commitment to finding innovative solutions that safeguard vital water and wastewater infrastructure.

86. Thursday, August 29, 2024
Room 203/204
3:00 PM - 3:30 PM

Title: An innovative lime slurry system provides low cost, transitional, and contingency solutions for biosolids stabilization at WSSC Water

Presenter(s):
Malcolm Taylor, principal Environmental Engineer
WSSC Water

Abstract:
WSSC Water is the process of upgrading biosolids processing at five (5) water resource recovery facilities (WRRF) from lime-stabilized, Class B to thermal hydrolysis and anerobic digestion (THP/AD). By 2024 WSSC Water will be producing a Class A product at a centralized Bioenergy Facility located at the Piscataway WRRF. With the commissioning of the Bioenergy Facility, lime systems will no longer be required for daily operation. Lime stabilization will be used as a backup to TH/AD, however system operation will be infrequent and intermittent. Major capital investments for repairs and / or system upgrades of existing lime systems are therefore difficult to justify. Further, maintaining granular lime systems in operable condition following prolonged periods of dormancy can be problematic. For these reasons, alternative solutions for biosolids stabilization were required. Piscataway WRRF biosolids are stabilized to Class B using lime stabilization. The lime system design was unique in that lime was added at the second stage thickeners prior to dewatering with belt filter presses (BFP). The lime slaking system was nearing the end of its useful life. The slakers are a quarter mile from the dewatering building requiring hydrated lime to be pumped in a looped configuration 24/7 to avoid pipe clogging. Slaker hydration and lime delivery was inefficient, often requiring severe overdosing of lime to meet biosolids stabilization requirements. System inefficiencies and excessive lime dosing produced filtrate supersaturated in Ca(OH)2. Resulting precipitation of CaCO3 scale in return lines clogged pipes, damaged pumps, and resulted in damages and operational costs exceeding $500,000. An innovative system utilizing prehydrated lime slurry was pilot tested for 3 months and provided a viable alternative to lime slaking. Prehydrated lime slurry was injected directly ahead of the BFPs eliminating the need for the slakers and the recirculation loop. With consistent lime slurry quality, efficient mixing and improved

process control, the dosage of lime required for biosolids stabilization was reduced by ~50%. The drastic reduction in lime resulted in lower Ca(OH)2 concentrations in the filtrate and measurably reduced the CaCO3 precipitation potential. Scale buildup was measured using coupons immersed in the filtrate stream. Upgrades were subsequently made to the pilot unit, lime slakers were decommissioned and a full-service system was installed for less than $250,000. Design of the system included multiple flushing ports allowing for the complete removal of lime residuals prior to prolonged shutdowns. After 18 months of operation, disruptions in operation due to scale precipitation in return lines has been effectively minimized. Western Branch (WB) WRRF biosolids were centrifuged and lime amended for odor control as required for landfill disposal. Landfilling of biosolids was practiced when the incinerators at WB were decommissioned in 2012. Ownership and operation of the granular lime system installed to control odors was contracted to a 3rd party contractor. Costs of contracted operations and landfilling was almost three times that of Class B land application. High costs and the need to ensure that WB WRRF has the capacity to stabilize biosolids to Class B standards independent of the TH/AD system required a solution. A lime slurry system was installed at WB. A major concern was the difference in dewatering with a BFP vs. a centrifuge. Lime slurry was added to centrifuge feed prior to polymer to ensure adequate mixing. Biosolids consistently exceeded Class B standards and a permit for beneficial land application was obtained. While generally successful, centrate recovery was reduced and required higher polymer dosages. Impacts of scale forming centrate remained a concern. In response to system limitations, the lime feed point was moved downstream of dewatering and mixed using screw agers that feed solids discharge pumps. With this change, the lime dose needed to meet Class B standards was reduced and the issue of scale precipitation in return lines was eliminated. Upgrades were subsequently made to the pilot unit, contractor owned equipment was removed and a full-service system was installed for less than $250,000. The system will serve as a backup to the Bioenergy Facility. This presentation will provide a summary of issues that prompted the need for low-cost, innovative solutions. Observed benefits and limitations of using prehydrated lime slurry in place of conventional granular lime systems will be discussed. Project costs and resulting savings will be summarized including a discussion of how the systems will be used for contingent operations following the transition to the Bioenergy Facility. The potential for prehydrated lime slurry to provide solutions for other utilities in a variety of applications will be presented.

Learning Objectives:
Understanding the key design elements of a lime slurry system for biosolids stabilization
Balancing operational demands and capital funding requirements during a transition to new processes
Providing reliable, resilient ad cost effective solutions required for contingent operations

Biography:
Dr. Malcolm Taylor is a principal Environmental Engineer with the Washington Suburban Sanitary Commission with over 25 years of experience in the water & wastewater industry. His work focuses on optimization of advanced wastewater treatment processes and promoting the beneficial reuse of biosolids and water treatment residuals. Before coming to WSSC, Malcolm earned his PE as an engineering consultant and taught at Penn State University where he received his PhD in Agricultural and Biological Engineering. In his spare time Malcolm enjoys surfing &snowboarding, golf, and mountain biking.

87. Thursday, August 29, 2024

Room 207/208
3:00 PM - 3:30 PM

Title: Leveraging BAC to Remove HAA in Drinking Water – Innovative DBP Treatment Pilot Testing to Supplement Charles County's Water Supply

Presenter(s):
Alicia Afroilan, Engineering Supervisor
Charles County Government
Meric Selbes, Senior Principal Engineer
Hazen and Sawyer
Christopher Ramo, Senior Associate
Hazen and Sawyer

Abstract:
This presentation tells the story of the pilot test program undertaken by the Charles County Government to verify the viability of the biologically activated carbon (BAC) process in removing haloacetic acids (HAAs) from drinking water purchased from a neighboring utility prior to distributing it to customers within their Waldorf Water Supply System. Charles County is experiencing significant growth and demand from its well-based Waldorf Water Supply System and is projected to significantly exceed existing groundwater withdrawal limits in the near future. In response, Charles County has embarked on a multi-phase Water Supply Expansion Program that is commencing with the fast-track design and construction of an interconnecting pipeline with a neighboring utility that will allow for the purchase and distribution of up to 5 MGD of potable water. Because water from the neighboring utility is sourced from surface water and the connection point is at the far end of the distribution system, the need for a treatment process at the interconnection was identified to boost chlorine residual concentrations and address relatively high disinfection byproduct (DBP) concentrations before further distributing purchased potable water to the Waldorf System. The removal of trihalomethanes (THMs) is commonly achieved with air stripping technology that is well established in drinking water treatment. However, the removal of haloacetic acids (HAAs) from potable water is a unique requirement with minimal studies and ever fewer real-world applications. Building from a desktop study and literature review, Charles County and Hazen developed a 6-month pilot study that verified the viability of biologically activated carbon (BAC) in removing HAAs under different operating conditions (i.e., EBCT, media, pretreatment, etc.), and developed design criteria and operational requirements for the interconnection application. This presentation will describe the pilot approach and system, and share the results and lessons learned from the study.

Learning Objectives:
Understand role and effectiveness of biologically activated carbon in the removal of haloacetic acids from drinking water
Share lessons learned and best practices in BAC pilot testing

Biography:
Bio: Alicia Afroilan is an Engineering Supervisor for Capital Planning & Design within the Infrastructure Management Division of Charles County Government. She has worked as an engineer, inspector, and project manager for the County for most of her career in the water/sewer industry, and as an engineer in the structural repair/rehabilitation industry prior. Born in Ohio,

Charles County, Maryland has been her home for over 25 years, and she is proud to live where she works and contribute to the community that she now raises her 3 boys in.
Bio: Meric Selbes received his PhD in Environmental Engineering in 2014, winning an academic achievement award for his dissertation on disinfection and disinfection byproduct formation. His areas of expertise includes oxidation/disinfection systems, disinfection by-products formation and control, process optimization, carbon adsorption, membrane treatment and biologically active filters treatment. He has co-authored 20+ papers, 3 book chapters, a WRF report and 3 AWWA Manuals. He is currently working at Hazen & Sawyer on drinking water projects in the DC/Maryland and Virginia area.
Bio: Christopher Ramo, PE, PMP has worked in the water industry for eighteen years and has touched nearly all facets of water systems. He is currently working at Hazen & Sawyer in the Maryland-Northern Virgina-DC metro area.

88. Thursday, August 29, 2024
Room 215
3:00 PM - 3:30 PM

Title: Cherry Hill Drainage Improvement to Mitigate Flooding in Baltimore's Cherry Hill Neighborhood

Presenter(s):
Elizabeth Kanner, Project Manager and Senior Associate
STV
Jalil Abdul, Engineer II
City of Baltimore DPW OEC

Abstract:
For years, Baltimore's Cherry Hill Community home to the city's largest public housing units, lived in the shadow of chronic flooding. Devastating storms rendered homes uninhabitable, forcing residents to confront the limitations of their aging drainage system. The City of Baltimore's Department of Public Works investigated that the storm drainage systems that run along Spelman Road and Round Road in Cherry Hill were not functioning properly caused by land development fill at the end of the system, offsite sediment buildup, significant sediment entering the system, and potential blockages, pipe collapses or misalignments. Also, numerous other defects were discovered in the outdated storm drain system, primarily consisting of joint offsets and deformation in the existing 54-inch outfall corrugated metal pipe (CMP) at Reedbird Park. In 2022, the floodwaters reached a turning point. The City of Baltimore partnered with STV, a firm committed to sustainable and resilient utility management, to embark on a mission: reimagining Cherry Hill's relationship with a new storm drainage system while balancing the site's unique complexities, such as threading the needle of a new system through an existing water line, gas lines, and old steam banks. During the Design and construction phase of the project, DPW emergency standby pumps were installed to provide immediate relief to the impacted residents because every rain event created hazardous conditions before the new stormwater system was functioning. The new design meets the city's current 10-year storm event design requirements; it includes Cured -in-Place-Pipe (CIPP) lining of the existing pipe and an oversized trunk line to allow for future replacement to accommodate sea level rise. STV also designed trash and sediment mitigation features.

Learning Objectives:
How to balance competing utility goals and needs
Trash mitigation and preparing O&M manuals
Managing construction change orders

Biography:
Elizabeth Tane Kanner, PE, is a project manager and Senior Associate with STV with over 20 years of experience in planning and designing storm drain systems, hydrology & hydraulics, eco-restoration, stormwater management, and erosion & sediment control. She has inspection experience in the construction/compliance of BMPs throughout the Mid-Atlantic. She has served as an in-house water resources consultant for the Maryland Department of Transportation managing large-scale water resources projects like Environmental Stewardship & Mitigation for MD 200 (ICC) and Stream Restoration Implementation Lead for MDOT SHA's MS4/TMDL program.

89. Thursday, August 29, 2024
Room 217
3:00 PM - 3:30 PM

Title: Phased Construction for Expedited Gravity Thickener Rehabilitation

Presenter(s):
Chris Painter, Project Manager
HDR
Jason Kerns, Vice President
HDR

Abstract:
DC Water's Blue Plains Advanced Wastewater Treatment Plant operated eight gravity thickeners (GTs) that were failing and required rehabilitation. The Gravity Thickener Upgrades Phase II project involved taking all eight GTs offline in phases for repair and replacement of the rotating mechanism as well as the demolition of existing tank covers and installation of new aluminum dome covers. The project also returned two previously abandoned GTs to operation, bringing the plant up to ten operational GTs by the end of the project. Due to equipment failures, only six GTs were available by the time of construction. Planned rehabilitation work to solids treatment facilities upstream of the GTs required eight tanks to be available prior to the other work commencing. Therefore, bringing additional GTs online as soon as possible was a top priority in order to allow additional work to commence. However, due to atmospheric conditions inside a covered tanks, no GT could receive its dome cover until the associated ventilation system also installed under the project was operational. To address these concerns, a detailed approach was outlined in the Maintenance of Plant Operations requirements to provide the contractor a roadmap for completing the work while minimizing disruption to the treatment process. The approach prioritized initially rehabilitating tanks and returning them to service without covers in order to rapidly increase the plant's capacity for thickening solids. The cover installation could occur later, after the new ventilation system was successfully demonstrated. The MOPO plan created a phased work sequence that quickly increased DC Water's treatment capacity while providing the contractor flexibility in scheduling work and procuring materials. Requirements for a partial utilization approval were developed to allow rehabilitated GTs to be returned to service prior to receiving covers but having critical systems

successfully demonstrated so reliable operation could be verified. Operational demonstration would follow at a later date once the cover was installed and balancing of the ventilation system was confirmed. The sequencing of GT rehabilitation followed by tank cover installation was paired with a laydown sequencing plan that utilized different areas of the plant for laydown and storage areas depending on which tanks were under construction. This was necessary to provide the contractor access to the work areas while leaving plant roads unobstructed for staff and contractors working on adjacent facilities. This also guaranteed space would be available for the contractor's crane as the work moved from tank to tank. Once the plant could reliably operate eight GTs, other solids process improvement work was allowed to commence upstream and occur concurrently with the remaining GT upgrades. Thanks to this carefully detailed approach, the project reached substantial completion on time and with minimal disruption to plant operations. This abstract will discuss the work restrictions placed on the contractor and how the contract documents outlined a detailed plan for a successful, phased construction approach that provided the contractor flexibility while preserving the owner's treatment capacity.

Learning Objectives:
Discuss approach to expediting construction work
Identify challenges with installing tank covers on operational tanks
Demonstrate the success of the phased construction approach with meeting a challenging deadline

Biography:
Chris Painter graduated from Virginia Tech in 2011 with a B.S. in Civil Engineering and minor in Green Engineering. Chris has worked for HDR for twelve years, designing pump stations and treatment plant facilities in Maryland, Virginia and Washington DC.

90. Thursday, August 29, 2024
Room 201/202
4:00 PM - 4:30 PM

Title: Streamlining Sustainability: A Tailored Asset Management Approach for Small Community Water Systems

Presenter(s):
Nirav Shah, Project Delivery Leader
RK&K
Ryan Jaeger, Water Utility Supervisor
Municipal Services Commission

Abstract:
Municipal Services Commission (MSC) is a publicly owned utility in the historic City of New Castle, Delaware. MSC owns and operates the public community water system through New Castle Water Department, serving nearly 5,500 customers via 2,300+ service connections. MSC utilized grant from the Water Infrastructure Advisory Council (WIAC) to develop a comprehensive asset management (AM) program for their water infrastructure with the primary goal to ensure the long-term sustainability of the water utility while providing excellent level of service to their customers. MSC's Asset Management (AM) program encompasses both horizontal and vertical assets, aligning

with the framework and guidelines published by the Environmental Protection Agency (EPA). The program is structured around five essential components: Asset Inventory and Condition Assessment, Sustainable Level of Service, Critical Assets for Sustained Performance, Minimum Life Cycle Cost, and a Long-Term Funding Plan. The development approach for Asset Management involved integrating a thorough asset inventory using the ESRI Local Government Model, conducting asset mapping and condition assessments, and creating a risk-based prioritization model.

Learning Objectives:
Tailored approach to develop water infrastructure asset management program for horizontal assets

Biography:
Mr. Shah is a Project Delivery Leader with RK&K, with more than 20 years of experience in water design and engineering, condition assessment, asset management, program management, emergency response, distribution system quality, and regulatory compliance for small and large systems. Mr. Shah has bachelor's and master's degree in mechanical engineering, is a licensed Professional Engineer in Maryland, DC, Virginia, and Georgia, a certified Project Management Professional, and a certified Associate Water Asset Manager.

Ryan Jaeger is the Water Utility Supervisor for the Municipal Services Commission in the City of New Castle Delaware. Ryan graduated from Salisbury State University with a Bachelor of Science Degree in Environmental Health. After college, Ryan worked with Duffield Associates, an Environmental Engineering Firm for 6 years as an Environmental/Construction Field Technician. Ryan has been employed with the Municipal Services Commission's Water Department for over 21 years. He is responsible for supervising the water department's operations and personnel. Ryan is a Delaware Licensed Water Operator with all required endorsements.

91. Thursday, August 29, 2024
Room 203/204
4:00 PM - 4:30 PM

Title: Bay-Driven Regulations: Innovative Nutrient Mitigation Strategies for Wilmington WWTP

Presenter(s):
Heather Stewart, Process Engineer
Jacobs
Liie Hill, Program Manager
Jacobs

Abstract:
The Wilmington WWTP is a conventional activated sludge facility located in Wilmington, Delaware, that services the City of Wilmington and New Castle County. The facility is permit rated for 134 MGD maximum month average daily flow and has a hydraulic capacity of 340 MGD. The WWTP currently does not have a permitted ammonia limit and is designed to remove BOD only. Potential new regulations promulgated by the Delaware River Basin Commission (DRBC) and the Delaware Department of Natural Resources and Environmental Control (DNREC) will require technological

upgrades to meet future permit effluent limits. These limits are intended to reduce the nutrient loading discharged to the Delaware River and to aid in the ecological recovery of the Delaware Bay. The DRBC has proposed a future summer month (May-October) effluent limit of 1.5 mg/L NH4-N for nine dischargers to the Delaware River, including the Wilmington WWTP. A workshop was conducted to determine which improvements could be implemented at the Wilmington WWTP to achieve the target ammonia removal, including process intensification approaches that would fit within the existing footprint of the facility. Of the many technologies considered to meet this criteria, four (4) technologies were selected for a life cycle alternatives analysis. The selected technologies included Integrated Fixed Film Activated Sludge (IFAS) and Mobile Organic BiofilmTM (MOB) which are two biofilm intensification technologies, centrate sidestream treatment, and a novel approach to using natural treatment systems within the existing large tertiary settling ponds. The proposed Natural Treatment System utilizes the tertiary settling ponds (30 acres each) and converts them into man-made wetlands with native flora. The wetted surface area of the plants provide habitat for nitrifying organisms. These innovative technologies were considered holistically with the entire facility as well as in combination with each other to find the best solution for the City in terms of operation, performance, cost, maintenance reduction, ease of construction, and non-monetary benefits to the city. This presentation will provide the audience with the steps and benefits of using dynamic whole-plant process simulations to evaluate predicted performance and estimate both capital and operational costs. This analysis produced one alternative which surpassed the others - good final effluent performance with minimal operational and infrastructure changes to the WRRF for the lowest cost. The presentation will reveal which combination of technologies was found to be the best fit for this facility and provide an update on full-scale piloting of these technologies.

Learning Objectives:
Attendees will learn the operational benefits and limitations of several innovative nutrient removal technologies, including IFAS, MOB, and Natural Treatment Systems
Attendees will learn the benefits and limitations of wastewater process modeling

Biography:
Heather is a process engineer with 10 years of water industry experience. She performed doctorate research at DC Water on advanced nutrient removal. Heather is a wastewater technologist with Jacobs sitting in Philadelphia, PA. Heather is a registered engineer and passionate educator.
Liie is a civil engineer with over 15 years of water industry experience. She holds a chemical engineering Bachelors' degree and Environmental Engineering Master's degree. Liie is a program manager with Jacobs in Wilmington Wastewater Treatment Plant in Delaware. Liie is a registered engineer and a licensed water operator. She lives in Philadelphia with her two dogs – Patu and Skittles.

92. Thursday, August 29, 2024
Room 207/208
4:00 PM - 4:30 PM

Title: Novel UVLED Reactor for Indirect Potable Reuse

Presenter(s):

Athira Haridas, Water/Wastewater Designer
HDR

Abstract:
Anne Arundel County (AACo) is currently operating the first indirect potable reuse pilot for managed aquifer recharge in the state of Maryland. UV disinfection is a critical part of the treatment approach to achieve the high levels of inactivation required to meet the projects pathogen reduction goals. Despite the global prevalence of UV treatment, the mercury lamps used in conventional UV technology have significant drawbacks. These include fragility, limited on/off cycles, warm-up times, high energy costs and the inability to dose-pace at the small flows typical to pilot studies. In response to these drawbacks, AACo is piloting the world's first UV system capable of dose-pacing at pilot-scale made possible by light emitting diode (UVLED) technology. UVLEDs are gaining popularity in the water industry due to their reduced environmental impact, robust design, and flexible operation. UVLEDs contains no mercury, require no start-up time, and can be turned on and off frequently without negatively impacting lamps' lifetime or performance. This study compared the mercury UV and UVLED reactors from a disinfection, scalability, cost savings, and operability perspective. This presentation will discuss findings from this UV pilot research being conducted at the AACo Patuxent Water Treatment Facility. This includes both disinfection and UVAOP investigations, specifically 1,4-dioxane destruction using chlorine and hydrogen peroxide as oxidant. Cost modeling and power consumption results between mercury systems and LEDs will be discussed in addition to considerations for operators, and the larger impact to industry. Audience members can expect to leave the presentation having a grasp on UV fundamentals, UVLEDs vs mercury UV at pilot and full-scale, and the significance of piloting as our industry comes together to tackle increasingly unique and complex water treatment challenges.

Learning Objectives:
Fundamentals for UV disinfection and UVAOP
Differences between mercury UV and UVLED reactors from a disinfection, scalability, cost savings, and operability perspective
UVLED technology implications for piloting and scale-up

Biography:
Athira Haridas recently Joined in HDR Inc. as a Water/Wastewater Designer, she has embarked on projects focused on the design of PFAS treatment facilities. She received her master's degree in environmental engineering from the University of Massachusetts this past May and relocated to Philadelphia in June. During the master's program, she conducted research on UV disinfection, preventing biofilm formation on surfaces using UV light and oversaw various disinfection by-product (DBP) formation studies. Her work is driven by a commitment to developing innovative solutions for environmental challenges.

93. Thursday, August 29, 2024
Room 215
4:00 PM - 4:30 PM

Title: Lead Free DC - Public/Private Partnership, Lead Pipe Replacement Program (LPRAP)

Presenter(s):
Lori Reid, Project Manager
Lead Free DC JV/Ramboll Americas Engineering Solutions, Inc.
Gian Cossa, Sr. Management Analyst
DC Water

Abstract:
Through the Lead Free DC (LFDC) program, the District of Columbia Water and Sewer Authority (DC Water) and the District of Columbia are working to remove all lead service lines in the District. One of the LFDC subprograms is the Lead Pipe Replacement Assistance Program (LPRAP) a customer-initiated discount program for private-side only service line replacements established in DC law in September 2019. LPRAP addresses approximately 12,000 existing partial lead service lines, where DCW has historically replaced the public portion of the service line during routine watermain upgrade projects. A partial lead service line is a mixed material water service pipe connecting a residential property's plumbing to a water main that may result in lead contamination. If the private portion of the service pipe is lead, galvanized, or brass, and the public portion is not lead, the residential property owner is eligible for financial assistance under LPRAP. As of July 2023, DC Water obtained Bipartisan Infrastructure Law (BIL) funds to further subsidize District funds so that any homeowner costs incurred for private side lead service replacements result in a 100% discount to the customer. DC Water, in partnership with the District of Columbia's Department of Energy and the Environment's (DOEE) Affordability and Efficiency Division, and in collaboration with District Department of Transportation (DDOT), approved local plumbers/contractors, community members and other interested stakeholders work together to make this program a success. Annually, DC Water issues a Request for Qualifications to provide local plumbers the opportunity to participate in the LPRAP program and be included on the Approved Contractors List for that fiscal year. This list is then used by residential property owners to complete all work for this program. To help support economic growth for the approved local businesses, LFDC has developed a LPRAP toolkit for plumbers to work alongside DC Water to promote the program with resources including website content, mailers, example social media posts, and scripts for calls by their customer service team. In addition, a dedicated LPRAP dashboard allows plumbers to target marketing efforts in areas of high partial lead service lines. The LFDC Marketing and Communications team, on behalf of DC Water, is also providing community outreach to all District residents who may receive water through a lead, galvanized or brass service line (tenants as well as housing providers) to maximize participation in the appropriate replacement program. DC Water continues to educate and inform customers about the program through, door-to-door direct engagements and indirect communications, stakeholder engagement, community-based organization engagement, targeted outreach, and marketing campaigns.

Learning Objectives:

Biography:
Lori is a Project Manager with over 23 years of experience at Ramboll. She is the lead for a broad range of drinking water and wastewater projects for both large and small municipal and industrial clients. Lori holds a B.S in Civil Engineering from Queen's University in Kingston, Ontario, Canada, and Professional Engineer license in New York State. She is also a member of AWWA, American Society of Civil Engineers (ASCE) and Society of Women Engineers (SWE).
Gian is a Program Manager with DC Water and launched the LPRAP program in 2019. He continues to lead this highly successful public/private partnership that drives private side pipe replacements

throughout the District of Columbia. Gian served as the 2021/2022 President of the Chesapeake Water Environment Association (CWEA) and has Chaired the Tri-Con Planning Committee in 2016, 2019, and 2023.

94. Thursday, August 29, 2024
Room 217
4:00 PM - 4:30 PM

Title: Predicting Interior Flooding: Building an Integrated Flood Model for Washington, DC

Presenter(s):
Christine Estes, Vice President
AECOM
Alireza Parhami, Director Digital Transformation
DC Water

Abstract:
Washington, DC is uniquely situated at the confluence of two tidal rivers and is vulnerable to flooding from three different sources: riverine, tidal/coastal storm surge, and interior. As emphasized in the DC Department of Energy & Environment's (DOEE) 2015 Climate Projections & Scenario Development report, all three types of flooding in the District are intensifying as the climate changes. Over recent years, the District has experienced more frequent short intense storms that produce greater rainfall than the city's stormwater pipe system can handle, causing significant interior flooding. In 2022, the DC Department of Energy & Environment (DOEE) with their contracting team started work on an Integrated Flood Model (IFM) for the District to better understand interior flooding risk throughout the city, and better predict where this flooding will occur in the future. Over the past year, the IFM has been built and validated, and displays the depth and extent of flooding and ability to test various scenarios. The IFM is helping DOEE prioritize where flood mitigation efforts should be directed. The IFM will soon be used to design and test solutions to reduce flood risk throughout the city and will provide District residents a better picture of their flood risk. DOEE is looking for greener, more equitable, and economically sound flood risk reduction solutions. This presentation will review the goals and objectives of the IFM, discuss technical approach and challenges encountered while building the model and identified solutions, review selected model scenarios, describe the system architecture document and designed user interface, and discuss interagency coordination with DC Water, FEMA, the USACE, and other stakeholders. Finally, we will discuss next steps for the IFM.

Learning Objectives:

Biography:
Christine Estes is a Vice President at AECOM in Washington, DC. Christine has over 20 years of experience working in the civil engineering industry, with a focus in water resources. Christine's work has focused on floodplain and stormwater management, watershed planning, and hydrologic, hydraulic, and coastal modeling. Prior to joining AECOM, Christine obtained an M.S. in Civil and Environmental Engineering from Virginia Tech and B.S. in Civil Engineering from University of Virginia.

95. Thursday, August 29, 2024
Room 201/202
4:30 PM - 5:00 PM

Title: Development of a Framework and Business Processes for GLWA's Linear System Integrity Program

Presenter(s):
Susan Donnally, HDR

Abstract:
To be submitted

Learning Objectives:
To be submitted

Biography:
To be submitted

96. Thursday, August 29, 2024
Room 203/204
4:30 PM - 5:00 PM

Title: Continuous Flow Aerobic Granular Sludge process helps with sustainable upgrades at WRRFs

Presenter(s):
Amit Kaldate, Vice President
Tomorrow Water

Abstract:
Water Resource Recovery Facilities (WRRFs) are increasingly faced with the challenge of meeting stringent nutrient goals, while also minimizing their carbon footprint. The existing intensification processes have three shortcomings. Most WRRFs utilize some version of biological process to remove main pollutants such as biochemical oxygen demand (BOD), nitrogen and phosphorus to minimize reliance on and cost of chemical treatment for this purpose. However, this heavy reliance on biological processes using suspended cultures results in high energy costs for the aeration of the reactors. It also results in high volumes to sustain biological reactions. In recent years, aerobic granular sludge (AGS) has emerged as one solution for removing nitrogen and phosphorus simultaneously in smaller reactor volumes at lower aeration energy requirements. However, the variants using granular sludge also require batch process operation as well as new construction, increasing the plant footprint as well as carbon footprint. The sequenced batch operation of existing granular processes makes them less suitable for handling peak flows experienced by the WRRFs. A new type of granular sludge process called BeFlow® was developed in Belgium over last two years to overcome these shortcomings. It uses aerated granular cultures with granule sizes in

the range of 0.2 to 4 mm and operates in continuous flow mode unlike the existing variants of AGS. This continuous flow ability of the process to be versatile for implementing in any secondary biological treatment, most of which are continuous flow makes it attractive solution at WRRFs. This process has the advantage of maintaining healthy concentrations of both floccular sludge as well as granular sludge, thus providing advantages of each of these sludge types. This aerated granular process has the advantages of quick settling, maintaining significantly higher biomass concentrations and handling peak flows. It allows for reduction of the biological reactor volumes and settling surface areas significantly. Conversely, it provides higher treatment capacity in the existing reactors and better SVI30 values for sludge settling. On-site demonstration tests in Belgium proved that it reduces the SVI30 to less than 50 mL/g. This has helped reduce the footprint of new designs by 50% using this process. The treatment efficiencies for the pilot in Belgium were 98% for BOD, 96% for TSS, 79% for nitrogen and 78% for phosphorus. Granular sludge is formed and maintained under both constant and variable flow conditions. The success of this process is based on a combination of biological and physical selection strategies. This paper presents design considerations, process configuration, control strategies and results from implementation.

Learning Objectives:
To understand basics of aerobic granular sludge process
To learn about benefits and features of continuous flow aerobic granular process
To understand progress of the continuous flow AGS with data from international case studies

Biography:
Amit Kaldate is Vice President with Tomorrow Water and has 22 years of extensive experience in design, commercialization, and growth of technologies. He received his Ph.D. from University of Illinois, Urbana-Champaign. He has contributed to water industry by serving on committees (WEF Program, WEF Innovations in Process Engineering, WRF Energy Advisory) and task forces (WEF MOP8, MOP31, Utility of the Future, WRF LIFT).

97. Thursday, August 29, 2024
Room 207/208
4:30 PM - 5:00 PM

Title: What happens during drought? Impacts on Sourcewater and Treatment

Presenter(s):
Priscilla To, Senior Scientist
WSSC Water

Abstract:
The Potomac River Basin and Patuxent Reservoir source waters saw historically low levels in 2022 through 2023. This presentation will summarize the impact of drought on WSSC Water's sourcewater and treatment. In the source water, data will be shared on how low water levels affected river and reservoir source water quality, including general water quality parameters, taste & odors, algae, disinfection byproduct precursors and levels of emerging contaminants like bromide and PFAS. Water treatment plant modifications to chemical feed systems and treatment trains will also be discussed, which were needed to adapt to the convergence of above-average

system demands, plant construction, limited reservoir storage, and changes in source water quality.

Learning Objectives:
Effect of drought to WSSC Water source water quality
Effect of drought to WSSC Water operations and treatment

Biography:
Priscilla To is Senior Scientist with WSSC Water. She focuses on WSSC Water's two drinking water treatment plants, providing treatment process and optimization support to meet safe water quality objectives.

98. Thursday, August 29, 2024
Room 215
4:30 PM - 5:00 PM

Title: What happens when your lead inventory map needs to account for data that is "mostly" correct: How DC Water updated its inventory map

Presenter(s):
Andrew Welter, Division Officer
Ramboll
Matthew Young, Management Specialist
CDM Smith
William Elledge, Director
DC Water

Abstract:
Since 2016, DC Water's website has shared a map displaying the service line material of each premise in DC Water's inventory. The 2017 map displayed the material on both the public and private sides using a color-coded, two-sided circle for each of the available categories: Lead, Non-Lead, and Unknown. But what happens when you find out the data for your public map isn't so accurate? As DC Water acquired more certainty about the material in the service line inventory through test pitting, we knew that certain data sources were less reliable than others. When preparing the June 2023 update for the Lead Free DC Report, DC Water had enough statistical data to show certain databases for non-lead materials were only 80% accurate, meaning we needed verification or lead services would be left in the ground. DC Water updated its Lead Inventory Map with two major changes. The first change was the introduction of new categories with descriptors to account for the data uncertainty: Verified Non-Lead, Suspected Lead, No Information, Suspected Non-Lead, and Verified Non-Lead. The descriptors "Verified" and "Suspected" were added based on the level of confidence DC Water had on the source data for material information. Data sources where DC Water had a high level of confidence (available replacement/inspection records) were deemed as verified sources. Data sources where DC Water had a low level of confidence (historical records with no backup data) were deemed as suspected sources. The updated lead map displays these new categories, with a pop-up for each address that details the material listed in the inventory database and a description of source data for the material listed. The second change was switching from a display icon for each premise, which was a two-sided circle that showed different

categories for the public or private side of the lead service line, to a simplified single color reflecting the new display category. The single color designation was determined by whichever category on the public or private side carried a higher chance of yielding lead (the worst-case scenario). This change made it easier for the customer to understand if their drinking water came in contact with lead during transmission to their premise.

Learning Objectives:
Recognizing when to pivot when new information becomes available.
How to create transparency with stakeholders.
Providing complex information in an understandable manner to the public.

Biography:
To be submitted

99. Thursday, August 29, 2024
Room 217
4:30 PM - 5:00 PM

Title: Stormwater Utility: Revenue Generation and Expenditure Patterns in the Chesapeake Bay Area.

Presenter(s):
Adrielli Bonfanti Pagnoncelli, BS
Morgan State University

Abstract:
This case study focuses on the Phase I Municipal Separate Storm Sewer System (MS4) municipalities, in the Chesapeake Bay region, where 19 of the 25 municipalities have implemented stormwater utility fees (SUFs). These 25 municipalities are distributed across the states within the Chesapeake Bay region. Specifically, Maryland has 7 municipalities with the utility, representing 87.5% of the state permits. Virginia has 9 municipalities, constituting 81.82% of the state's permits, Pennsylvania has 2 municipalities, representing 100% of the state's permits, and the District of Columbia. The study will examine SUF revenue generation and expenditure patterns. It also investigates trends related to parameters like population size, annual rainfall amounts, and others. To ensure an analysis of revenue allocation the study categorizes expenditures into distinct categories. This approach allows the analysis made to be uniform and consistent, consequently resulting in a more meaningful insight into the allocation of stormwater utility fees. The findings and evaluations presented in this study provide information, for policymakers, environmental stakeholders, and the wider public. By promoting public awareness regarding the allocation and utilization of SUF funds, the municipality will promote transparency and strengthen public engagement in environmental management.

Learning Objectives:
Understand the importance of stormwater management
Revenue generation and expenditure patterns of stormwater utility fees
Promote public awareness regarding the allocation and utilization of stormwater utility fees

Biography:
Adriélli Bonfanti Pagnoncelli is a Ph.D. student in the third year of her program at Morgan State University in Baltimore - MD, where she is pursuing her Ph.D. in Sustainable and Resilience Infrastructure Engineering. She completed her Bachelor's degree in Civil Engineering in 2019 at the Centro Universitário Fundação Assis Gurgacz, in Brazil. Her current research focuses on the development of innovative financing mechanisms for municipal stormwater management programs in the US.

100. Thursday, August 29, 2024
Room 201/202
5:00 PM - 5:30 PM

Title: Maximizing Project Success through Integrated Asset Management and Strategic Planning: Case Study DC Water

Presenter(s):

Zelalem Hailu, Specialist, CIP
DC Water

Abstract:
In a world-class water utility like DC Water, the asset management principles driving the capital improvement program are multifaceted and pivotal. Asset management encompasses the strategic maintenance, operation, and optimization of physical and intangible assets throughout their life. When asset management decides rehabilitation or replacement of the asset is needed, project initiation begins. This is followed by defining objectives, delineating scope, and formulating a comprehensive plan for successful project execution. This is done during the planning phase of a project. In addition to the usual responsibility of delivering the project, the project manager is responsible for updating asset information following standard practices and handing over information in a usable format to operation and maintenance. Other responsibilities of a project manager that would be demonstrated in the case study include resource optimization, risk management, data-driven decision making and alignment with organizational strategic goals. In essence, the project manager ensures that projects are effectively planned, executed and aligned with the mission of the organization, contributing to improve asset performance, reduced risks, better utilization of resources and satisfy the needs of project stakeholders. This case study will demonstrate the imperative nature of aligning organizational strategies with project objectives. It underscores that leveraging insightful reports and dashboards from standard and spatial asset metadata helps inform project decisions, preventing redundancy and duplication of effort within the organizational framework.

Learning Objectives:
Appreciate the value of asset management in the initiation, planning and execution of projects
Understand the role of a project manager in maintaining the original intents and contents of a project through the life of a project.
Recognize one of the project manger's responsibilities is updating asset information following standard practices and handing over information to operation and maintenance in a usable format.

Biography:
Zelalem is a Capital Improvement Program Specialist at DC Water, working within the Capital Improvement Program Infrastructure Management department. Zelalem holds a certificate in Asset Management from the Institute of Asset Management, is a licensed Professional Engineer in the District of Columbia and possess PMP and Citizen Development Practitioner credentials from the Project Management Institute.

101. Thursday, August 29, 2024
Room 203/204
5:00 PM - 5:30 PM

Title: Can you spiral down to ENR easily ..... MABR can help you reach a TN of 3 with no additional carbon

Presenter(s):
Bruce Stevens, Business Development Manager
FLUENCE
Jason Loar, Principal/Sr. Design Manager
Davis Bowen & Friedel

Abstract:
Over the past several years, the world has seen some new, innovative and advanced wastewater treatment processes generally grouped together and labelled as Intensification Technologies. Throughout this paper, we review the plants and present drivers that lead to MABR acceptance & implementation in areas that have little room for plant expansion to meet stringent nitrogen removal permit conditions and also are at the mercy of high energy costs for electricity and labor. INTRODUCTION AND DISCUSSION Membrane Aerated Biofilm Reactors (MABR) are gradually becoming an established technology with first large scale retrofit projects reported in 2017-2018 when multiple package plants sold in the Caribbean, Asia, Europe and the Middle East. The promise of MABR relates to lower energy consumption for aeration as well as total nitrogen removal through simultaneous nitrification and denitrification (SND) [Shechter et al, 2019]. The passive aeration through oxygen permeable membranes results in energy savings of 50%-85% by using biofilms rich in autotrophic bacteria for the biological wastewater treatment process compared to complete mix activated sludge (CMAS) using inefficient fine bubble diffusers. MABR enables total nitrogen removal to high effluent quality in a simple and easy to operate process. MABR based treatment solutions can be packed in standard shipping container units ideal for decentralized communities or as loose MABR modules to be installed in a concrete basin, like in the Israeli, Jamaican and NAM cases we will examine in this discussion. The MABR technology was first approved by Jamaica EPA in 2017, followed by approval for four different projects. Drivers for the projects included: High effluent quality including Nutrient removal Ultra-low energy consumption, only 15% of traditional technologies Ease of installation and low maintenance Robustness and Resilience to load and flow fluctuations It has subsequently been approved in CA, OR, NM, TX, IA, IL, CO and several other states are currently expected to give blanket approval to implement this exciting system considering the solid performance results seen to date from multiple installations

Learning Objectives:

The audience will gain familiarity with the basics of Membrane aerated bioreactor technologies
Attnedees will learn how one facility modified it's process arrangement to avoid complexity and avoid supplemental carbon use
The audience will learn how a pilot process was approved by MDE for an innovative approach to confirm this technology really performs as described

Biography:
Bruce attended Northeastern University in Boston & excelled in their co-operative education program, majoring in Chemical Engineering. He worked for Chemineer Kenics in Dayton OH as a mixing specialist. He was an outside sales representative in New England marketing Water, Wastewater and Industrial products until 2007. He worked with PAX Water / NE Tank for 2 years marketing storage systems and potable water tank mixers. He was Eastern Regional Manager for ChemScan's process spectrometers, titrators + online monitoring for nutrients and metals for seven years. After this, he focused on UltraViolet Disinfection & AOP for six years with Aquionics & Suez / Veolia. Based in Atlanta, he is now FLUENCE's Business Development Manager + prioritizes BNR/ENR applying their energy efficient MABR technology for nitrogen removal. In his spare time, he also dabbles in fermentation of malted barley, honey for mead, wine production and is doing research into distillation practices of the Southern Appalachian region using copper and stainless steel .... when he is not out chasing deer, elk, turkey, ducks or various fish species.

Jason Loar has a Bachelor of Science in Bio-Systems and Agriculture Engineering from the University of Kentucky. He has over twenty-five years of experience in project planning, design, and contract/construction administration. He is responsible for oversight of municipal engineering throughout the company as well as the day-to- day operations of the firm's Easton office. His background primarily consists of providing water, wastewater, renewable energy, and site engineering services to various clients in both Maryland, Delaware, and Virginia. He serves as on-call engineer to several municipalities and works regularly with multiple funding programs. He likes to take a hands-on approach to all projects and ensures that the client, both field personnel and administration, are kept up to date from the preliminary planning stages through construction and operations.

102. Thursday, August 29, 2024
Room 207/208
5:00 PM - 5:30 PM

Title: Carbon-Based Advanced Treatment brings (Direct) Potable Reuse to the East

Presenter(s):
Eva Steinle-Darling, Chief Technologist for Reuse and PFAS
Carollo

Abstract:
Twenty-five years ago, potable reuse was considered a "solution of last resort." Now a mainstream supply solution in the west, potable reuse is tackling a wider range of challenges in the east, from supply shortages and groundwater subsidence to nutrient and effluent volume discharge reductions. Enabling this transition has been the recognition that carbon-based advanced

treatment (CBAT) can provide an equivalent level of treatment as the reverse osmosis (RO)-based advanced treatment standard employed in California. This means communities now have access to potable reuse without the cost of RO membranes or needing to dispose of RO concentrate. Several groundbreaking early projects, first on the Upper Occoquan, then in Gwinnett County, and now around the Hampton Roads demonstrated CBAT for indirect potable reuse in the East. Now, CBAT projects push towards the last frontier: direct potable reuse (DPR). Starting in 2017 with the pureALTA project in Altamonte Springs, Florida, and followed thereafter by similar projects in Florida, Utah, and Tennessee, CBAT is being established as the standard approach to DPR where desalination is not required. A recent innovation, using suspended ion exchange and softening, is providing an add-on solution for communities that require some salt, nutrient, or specific anion removal – all without producing a brine. This presentation will discuss the evolution of our understanding of CBAT performance, including discussion of pathogen, regulated, and unregulated chemical, and surrogate removals as well as cost optimization considerations. All of these project data were built into a customizable CBAT process model that allows utilities to explore whether potable reuse, and even DPR would be right for them.

Learning Objectives:

Biography:
Dr. Eva Steinle-Darling is Carollo's Chief Technologist for Reuse and PFAS, leading Carollo's overall efforts to support utility client response to PFAS challenges in water and wastewater. Eva also brings a robust background in treatability evaluation, regulatory approaches, and guidance development, particularly with respect to constituents of emerging concern in potable reuse applications, where she has supported regulatory guidance efforts for six US states, the National Water Research Institute, and the World Health Organization. Her areas of technical expertise include membrane processes, advanced oxidation, filtration, disinfection, and other advanced treatment processes for microconstituent removal and management of microbial risks and has been responsible for over $2 million in applied research on those topics. As a member of the WateReuse Association's Regulatory and Policy Committee and former Board Member, she is also leading education and advocacy efforts related to reuse in across the U.S.

103. Thursday, August 29, 2024
Room 215
5:00 PM - 5:30 PM

Title: A Lead and Copper Rule Service Line Inventory Through a Digital Approach: A Case Study from the City of Rockville, Maryland

Presenter(s):
Trevor McProud, Environmental Scientist
CDM Smith Inc.
Yaolin Fennell, Principal Environmental Engineer
City of Rockville
Chakavak Hajsoleymani Kamran, Project Manager
CDM Smith Inc.

Abstract:

As EPA's Lead and Copper Rule Revision (LCRR) compliance deadline of October 16, 2024, quickly approaches, it is beneficial to review lessons learned from utilities further ahead in the process. This presentation will outline Rockville, Maryland's LCRR compliance approach, provide insight on what worked, and share how the process can be streamlined. This session will be chocked full of useful information and strategies to efficiently prepare and submit an inventory in advance of the deadline. As a result of research and planning, Rockville chose to employ a turnkey digital platform to manage their LCRR program. City and consultant staff worked together to compile the LCRR inventory for use within the platform. This gave Rockville the ability to manage the full array of their LCRR program all in one place leveraging functionality such as real-time visualization via dashboards and GIS maps, field data collection forms, and public communication. Support for LCRR-specific requirements: There are specific needs of a LCRR inventory process that are not seamlessly supported by the standard information systems, or which would take intensive effort to customize. For this reason, leadCAST was chosen as Rockville's digital platform solution. The Rockville leadCAST system allows the management of the service line inventory with support for specific LCRR-based requirements. For example, Rockville can now independently manage the material of "private-side" and "public-side" segments of the lead service line and a master "lead status" is dynamically calculated for the entire service line, consistent with the LCRR. The information is summarized in a specially designed dashboard for program managers, which provides them with real-time data on project progress, public outreach response rate and inventory status. Management of customer-entered data: Like many water systems, after migrating available water system GIS data and completing further historical records review, Rockville still had a significant number of "lead status unknown" service lines in its inventory, especially on the private-side segment of the service line. To address this, CDM Smith and Rockville deployed broadscale outreach to enlist customers and residents to self-report service line material where it enters the home. Directed mailings and customer outreach materials focused on using visuals, simple language, and one clear ask: please fill out your material in the leadCAST public-facing reporting tool (i.e. "portal"). App-based integration with field: Integrating inventory data management with routine maintenance also helped Rockville refine its inventory. Rockville used targeted inspections and routine operations already scheduled to investigate and update their inventory. By integrating the routine use of the leadCAST inspection app into activities such as water main repairs and meter replacements, the City made significant progress identifying previously unknown service line materials. Use of a digital platform that included afield app was a powerful tool to identify priority areas for field inspection activity, efficiently complete those inspections, reduce in-office data entry and meet overall progress goals.

Learning Objectives:
Lessons learned from utilities further ahead in the process.
Support for LCRR-specific requirements.
Focusing on the next steps and new LCRI requirement.

Biography:
Trevor McProud: Mr. McProud has 14 years of technical experience in the complex regulatory frameworks which water suppliers and other clients must navigate to provide their services and public resources. He brings a depth of knowledge and understanding of drinking water supply compliance issues, including monitoring, reporting, and corrective actions requirements. Prior to joining CDM Smith, Mr. McProud spent his career leading the Office of Public Health Engineering at the largest U.S. local health agency – New York City (NYC) Department of Health – and working in

the critical interface between applied regulatory oversight, environmental and natural resource sciences, environmental health, and public messaging.
Yaolin Fennell: Yaolin Fennell, Ph.D. P.E. is a Principal Environmental Engineer with over 20 years of experience specializing in water and wastewater treatment. Her expertise lies in developing and implementing compliance programs, managing complex projects, and ensuring regulatory adherence. Dr. Fennell has a proven track record in leading teams, analyzing data, and driving process improvements to protect public health. She is highly skilled in project management, regulatory compliance, and stakeholder engagement.
Chaka Kamran is the Project Manager for the Lead and Copper Rule Service Line Inventory Through a Digital Approach: A Case Study from the City of Rockville, Maryland at CDM Smith, Inc. She is a client facing project manager and water resources engineer with more than seven years of experience working for various public and private clients. She has experience in project management, engineering, and design services from horizontal to vertical construction in various capacities ranging from planning, design, construction phase services, permitting, proposals, scheduling, budgeting, data analysis, and bid assistance for a variety of private and public clients. In addition, Chaka has experience managing environmental and Federal Emergency Management Agency (FEMA) policies and supporting activities to meet regulatory requirements. Chaka is also the CWEA's Delaware Trustee and Publications Committee Chair.

104. Thursday, August 29, 2024
Room 217
5:00 PM - 5:30 PM

Title: Using a digital twin and AI to predict surface water quality and flood events

Presenter(s):
Christopher Tryon, Digital Transformation Specialist
Mott MacDonald

Abstract:
Safeswim is a water quality management program initially developed in Auckland, New Zealand, that provides real-time and forecasted water quality information to the public. The program was implemented in 2017 to overcome limitations related to sampling data availability and to maximize the use of water monitoring data by integrating it with real-time modeling, artificial intelligence, big-data analytics, visualization, and information dissemination. Safeswim has grown into a reliable and efficient public decision support system for the Auckland Council. The success of Safeswim in Auckland has led other communities around the world to consider implementing similar programs. In the last couple of years Safeswim has been expanded to cover New Zealand's Northland Region and has also become Surf Life Saving New Zealand's national platform to inform the public in real-time of potential safety risks associated with swimming. Ongoing improvements to provide trusted and reliable water quality predictions are considered before each season. Improvements can be integration of new data sources or new technologies becoming available. Sharing water quality information publicly has also resulted in a greater investment in monitoring wastewater overflows and in using Artificial Intelligence (AI) to help prevent minor or partial blockages from escalating to overflows. Utility crews are dispatched when alarms go off; hence, reducing the impact on the receiving environment. With Safeswim's help, the public is more engaged in the benefits of a

properly working stormwater collection system. This has enabled Auckland Council to request and pass budget requests to address critically needed infrastructure repairs. The Safeswim digital twin concept also forms the basis for the City of Bangkok, Thailand's flood management decision support systems. The predictive nature of Safeswim, with its comprehensive alarm system, and data integration solution allows the city to focus response efforts where they are needed most, preemptively evacuating areas where floods are likely. Having a single source of truth has improved interdepartmental coordination and improved the quality of life for all citizens. Ultimately, the interventions will contribute to more sustainable urban environments that enhance inclusive economic growth, reduce poverty and gender inequality, increase mobility, and remain safe and resilient against climate threats. A digital twin combined with the power of AI can be used to monitor and predict water quality and floods, giving local governments, companies and organizations the information needed to make decisions and take action to preserve life and property. There is opportunity to apply predictive analytics and data integrative solutions in the mid-Atlantic region for local and regional utility stakeholders. The same concept of digesting and visualizing large, complex data sets offers opportunity for relating infrastructure performance to its asset adjacent impacts can help utility owners gain support for investment and reinvestment in improvements.

Learning Objectives:
Understanding digital twins
Using artifical intelligence for real-time predictions
Publicizing data can lead to increased public funding and support of projects

Biography:
Mr. Tryon is a digital transformation specialist at Mott MacDonald. He has a passion for creating game-changing solutions, and he has extensive experience in developing web and mobile applications, leading teams of developers, conducting specification workshops, and architecting solutions for infrastructure clients.
Mr. Tryon is currently supporting two major projects: a large water utility's lead service line replacement program and a state department of transportation's digital maintenance management system. In both of these projects, he is focused on collecting quality data efficiently and presenting that data in a way that is easy to understand and use by decision-makers.
Mr. Tryon holds a Computer Science degree from Rutgers University. In his free time, he mentors a First Robotics Team and performs trail maintenance for the Jersey Off Road Bike Association.

105. Friday, August 30, 2024
Room 201/202
9:00 AM - 9:30 AM

Title: How to Avoid the #1 Mistake in Public Communications Before Your Service Line Inventory Rollout

Presenter(s):
Mike Mcgill, President
WaterPIO/LeadCopperRule.com

Abstract:

Because the goal of the lead service line inventory provision of the revised Lead and Copper Rule is to find lead everywhere it can, a utility's LSLI work requires constant customer communication because any discovery or series of discoveries could cause. difficult questions from, not only customers, but the press, elected officials, and community leaders. When you add in the fact that most utilities are required to make the inventories publicly available, guaranteeing that the work will ultimately make news, water providers must conduct a variety of COMMS efforts using carefully chosen messages. The development of a lead service line inventory, and subsequent public posting of it, will not only generate significant public attention but could create customer and key stakeholder expectations that a utility will immediately replace the lines, which is not required under the LCR. If the inventory's rollout is not handled properly, a utility could find itself facing demands for "find-and-fix" programs combined with calls for the utility to pay for the LSL replacements out of their own pockets. We will show attendees how to prepare the press, public, and community leaders for their LSLI rollouts using "planned transparency," and then demonstrate how to avoid immediate "find, fix, and pay!" demands from customers and key stakeholders. The "butterfly effect" is another reason why utilities must form and implement communication plans that transparently inform customers, elected officials, community leaders, and the news media. Even utilities that find they have little or nothing to worry about when it comes to lead could find themselves facing a potential crisis if their neighboring utilities have significant issues and/or have failed to properly communicate about their own efforts. WaterPIO has been called in to help several utilities explain the simple fact that lead findings can vary from service area to service area. Simple facts, however, can be difficult to explain when the public is in the middle of a panic. The presentation will help attendees avoid the #1 mistake being made throughout LSLI work, the application of methods and messages used for their lead service line replacement efforts to inventory work. We'll lay out the important differences and demonstrate how to carry out correct COMMS plans. We'll highlight how utilities that use replacement tactics and talking points for their inventory work can find themselves unwittingly creating "find and fix" programs with added expectations that all the customers' lines found will be replaced by the utilities at the utilities' cost. We'll also show how to use social media to inform the public and minimize misinformation that could sidetrack the LSLI rollout.

Learning Objectives:

Attendees will learn how to prepare and implement public communication efforts for their October 2024 rollout.

Attendees will learn how to avoid the #1 mistake being made during inventory rollouts by setting proper expectations with elected officials, community leaders, and the media.

Attendees will learn how to prepare, and implement if necessary, crisis communication plans for use before, during, and after the rollout.

Biography:

Mike McGill is the President of WaterPIO, a national public communications firm he founded in 2016 to affordably help water utilities and industry organizations of all sizes improve their customer, media, and crisis communications.

WaterPIO serves clients in more than a dozen states, including utilities, engineering firms, state primacy agencies, and the Association of State Drinking Water Administrators.

In 2021, McGill launched LeadCopperRule.com to help utilities successfully manage the public communication challenges created by the revised LCR.

Before starting WaterPIO, Mike directed public information and customer service operations for major water utilities for a dozen years in Maryland, Virginia, and North Carolina.

McGill holds a Dual Degree in Broadcast Journalism and Political Science from Syracuse University. He began his career as a news writer and producer for National Journal's Hotline, CNN, and WUSA-TV in Washington, DC.

106. Friday, August 30, 2024
Room 203/204
9:00 AM - 9:30 AM

Title: Growing Up Together Lessons Learned During Startup: Commissioning Sidestream Deammonification Concurrent with THP Digestion to Meet Strict Recycle Lim

Presenter(s):
Paul Le Bel, Associate
Hazen

Abstract:
WSSC WATER will commission the Bio-Energy project in Q1 2024, which centralizes biosolids processing at Piscataway WRRF, including thermal hydrolysis pretreatment (THP) and mesophilic anaerobic digestion to provide necessary stabilization to create Class A biosolids and produce digester gas, which is converted to renewable natural gas. Sidestream deammonification is critical to successful implementation of the Bio-Energy Project, mitigating the impacts of increased nutrient recycle from THP and digestion and imported sludge from WSSC Water's remote WRRFs. The stability of the concurrent biological startups of sidestream treatment and digestion are critical to meeting nutrient recycle targets and ultimately effluent discharge limits. This presentation discusses early challenges, successes, and lessons learned during concurrent biological startups. Preparation and Seeding Commissioning begins with preparation and biological seeding of one digester and one sidestream reactor. Lessons learned include: • Planning for and executing successful delivery of seed sludge and media during winter. • Pre-heating digester to mesophilic temperature range, and sidestream reactor to annamox temperature range • Maintaining Class A digester in preparation for seed sludge. Digester Ramp Up to Piscataway Load During initial digester ramp up, only Piscataway sludge is processed. Indigenous sludge from Piscataway WRRF is thickened, screened and dewatered prior to THP. THP throughput is increased from 4 dry tons/day (dtpd) up to the full Piscataway load, approximately 16 dtpd. Lessons learned include: • Managing indigenous sludge management between THP and current pathway, while limiting increase in feed and overall organic loading. • Building volume in Digester 1 while maintaining conditions conducive to THP mesophilic community. Sidestream Reactor 1 Startup and Initial Acclimation Used to build volume under digestion, establish robust microbial communities in both digesters, and fine-tune operations prior to introduction of imported sludges. Digester withdrawal also begins to generate filtrate used in the sidestream reactors. Lessons learned include: • Dewatering optimization for thermally hydrolyzed digestate • Balancing digester filtrate generation with sidestream reactor capacity Sidestream Reactor 1 Acclimation and Reactor 2 Preparation Digester 1 and 2 continue building volume under digestion, digester microbial communities, and fine-tuning operations. Sidestream reactor 1 influent ammonia concentration and load gradually increased and RAS recycle initiated, and process converted from MBBR to IFAS mode. Sidestream Reactor 2 prepared for startup. Lessons learned include: • Managing Filtrate EQ Basin for nutrient load equalization and solids capture. • Sampling campaign to target biological startup concentrations and mass loading

conditions. Increased Digester Loadings, Sidestream Reactor 1 Fast Acclimation and Reactor 2 Initial Acclimation Sludge import from four remote WSSC Water WRRFs initiated to increase sludge to Bio-Energy process. Both digesters reach normal operating level, and digester withdrawal is carefully managed to ensure filtrate does not overwhelm the sidestream reactor treatment capacity or exceed total allowable Bio-Energy recycle limits. Lessons learned include: • Growing sidestream treatment capacity to meet full load from digesters. • Impacts to filtrate quality and sidestream treatment during digester upsets or dewatering issues. Steady State Digestion and Sidestream Deammonification Bio-Energy process reaches full loading, with all indigenous and remote sludge being treated through THP and digestion. Both digesters and sidestream reactors are in steady state operation.

Learning Objectives:
Lessons Learned During Startup
THP and Digestion
Sidestream Deammonification

Biography:
Mr. Le Bel works throughout the Mid-Atlantic region to provide evaluation, design, commissioning, and start-up of wastewater treatment and resource recovery processes.

107. Friday, August 30, 2024
Room 207/208
9:00 AM – 10:00 AM

Title: Ethics Regulations and Cases in Engineering

Presenter:
Samuel Grant, Technical Specialist
Whitman, Requardt and Associates, LLP

Abstract:

Learning Objectives:

Biography:
Sam Grant is a technical specialist at Whitman Requardt in Baltimore MD. He has 45 years of experience as a professional Engineer and 41 years as a practicing attorney in Maryland. He got his Bachelors in Engineering at Duke University and his Masters in Environmental Health Engineering from Northwestern University. He also received is JD in Law from the University of Baltimore.

108. Friday, August 30, 2024
Room 215
9:00 AM - 9:30 AM

Title: Assessment of First Floor Elevations using Unmanned Aerial Vehicles

Presenter(s):
Sean Farley, Water Resource Engineer and Commercial Drone Pilot
Arcadis

Abstract:
Sea-level rise and increased storm intensity stand as some of the most important challenges that coastal cities face in the present and near future due to their adverse effects on flood elevations. In attempts to assess the impacts of flooding, ground elevation cannot be used as the only metric to determine when flood waters cause the most impact to habitable structures. First Floor Elevation (FFE) is the most important height to determine when setting prices for flood insurance, doing a cost-benefit analysis for flood mitigation, or determining risk for an area. Slight differences in FFE can have dramatic effects on the estimates of flood damage for a particular storm event. In many cities, FFE data is missing, outdated, or inaccurate, and the only way to currently measure FFE for an official elevation certificate (EC) is with a land surveyor, which can be costly and intrusive. Arcadis conducted a study using unmanned aerial vehicle (UAV/drone) flights in two coastal cities (Miami, Florida, and Portsmouth, Virginia) that are prone to flooding, and compared FFEs derived from the photogrammetric point clouds generated by the drone flights to elevations from flood certificates and/or ground surveys. Results from that study showed that UAV photogrammetry may be a cost-effective method for quickly and accurately obtaining FFE data for use in flood mitigation efforts.

Learning Objectives:
To showcase alternative elevation assessment methods for large areas
To outline techniques for the prioritization of resource allocation
To highlight some challenges overcome with the use of new aerial imagery technologies

Biography:
Sean Farley is a water resource engineer and commercial drone pilot with Arcadis. He has experience in hydraulic and hydrologic modeling and planning, regulatory compliance, and both stormwater and drinking water infrastructure design and management. He joined Arcadis in 2020 and acquired his commercial drone license in 2022 to begin performing drone work for Arcadis alongside his water modeling and design focus.

109. Friday, August 30, 2024
Room 217
9:00 AM - 9:30 AM

Title: Frederick County's Approach to Water Resources Element Updates

Presenter(s):
Ted Saltos, Environmental Scientist
Dewberry
Jessica Seipp, Senior Associate
Dewberry
Karin Flom, Livable Frederick Director
Frederick County

Abstract:
The Water Resources Element (WRE) is a required component of local land use plans in the State of Maryland to ensure that planned development can be supported by limited water resources. In 2022, an updated WRE guidance was issued to reflect changes in the water resources management framework in Maryland since the original guidance was issued in 2007. The updated guidance also incorporates climate resiliency and environmental justice considerations. Frederick County is currently developing an update to their WRE, with adoption expected in late summer of 2024, to incorporate the new requirements and consolidate recent planning documents into a cohesive strategy for sustainable development and water resources management. This included incorporating sustainable development concepts defined in the 2019 Livable Frederick Master Plan. Dewberry assisted the County with data compilation and analysis, future demand projections, and policy recommendations for the WRE update. The presentation provides an overview of the work performed to update the Frederick County WRE. Data for the drinking water, wastewater, and stormwater sectors was compiled and analyzed to assess current conditions and to project demand under future conditions. The analysis moves the County's approach to water resources management closer to a "One Water" strategy where the stormwater and water-wastewater sectors are assessed collaboratively. The stormwater section of the WRE includes an analysis of water quality standards, total maximum daily loads (TMDLs), waterbody special designations, existing water quality data, NPDES stormwater management facility data, land use/land cover data, and planning data. The analysis establishes a current conditions baseline from existing data, estimates potential future stormwater pollutant loads based on four development scenarios established in the County's Livable Frederick Master Plan, and identifies opportunities to mitigate the stormwater impacts of future development. Pluvial flood modelling conducted for the Frederick County Hazard Mitigation and Climate Adaptation Plan was used to evaluate flood risk in planned growth areas, and MDE Environmental Justice data was used to assess potential water resource impacts in marginalized communities. The goal of the Frederick County WRE update is to unite all County planning units into a comprehensive and adaptive water resources management plan. The Frederick County WRE update can serve as a template for other jurisdictions as they approach WRE updates, and can help establish a valuable planning tool to identify and prioritize stormwater management improvements that address the impacts of future development.

Learning Objectives:
Audience will learn about a unique approach to integrating stormwater management into comprehensive planning.

Biography:
Ted Saltos is an Environmental Scientist at Dewberry with a background in water resources management and environmental regulatory policy. His technical experience in both state government and consulting settings has focused on the implementation of watershed management plans for Total Maximum Daily Load (TMDL) compliance, analysis of point and nonpoint source pollutant loading, and assessment of stormwater best management practices. He developed his passion for all things water at the University of Maryland, where he earned a B.S. in Environmental Science and Policy. He continued down the water resources management path at Ohio State University, where he earned a Ph.D. in Environmental Science focused on watershed management in the Great Lakes region.

Karin Flom has worked as a planner for Frederick County for two years and was a co-lead planner for the current update of the Frederick County Water Resources Element. Prior to Frederick County, she worked in planning for municipal governments in North Dakota and Minnesota. Ms. Flom graduated with a Masters in Community Planning from the University of Maryland College Park.

110. Friday, August 30, 2024
Room 201/202
9:30 AM - 10:00 AM

Title: Equitable Infrastructure investments for Equitable Outcome – DC Water's Experience

Presenter(s):
William Elledge, Direcor
DC Water
Jennifer Belknap, Vice President
Carollo

Abstract:
Like many agencies, DC Water is committed to further operationalizing and elevating equity in its capital investments. Some stakeholders have asked for a "spending per neighborhood" analysis to verify that equity is being considered. While this is an important checkpoint to show the benefits of utility investments throughout the service area, it's also an opportunity to dive deeper. Complex interconnected infrastructure of varying ages and risks requires a more nuanced analysis to provide affordable rates and inter-generational equity in customer experiences, supporting the needs of customers not only in the 20-year planning horizon but over the next 100 years. To support inter-generational equity, DC Water is using an analytical approach in an "Equity in CIP" tool that goes far beyond a simplistic evaluation of spending per neighborhood to dive into the details of customer experiences, connect those experiences with needed capital investments and operational improvements, and tie the work together with asset management to reduce risks and manage costs equitable and efficiently. DC Water's Equity in CIP tool also creates a two-way communication link between operations customer requests and further engagement opportunities for customers to understand and give input in utility priorities. This presentation details the analysis tools and methods DC Water has developed to provide a more in-depth analytical approach for equitable outcomes as well as the outreach and engagement tools for building community trust in the approach.

Learning Objectives:
How to ensure capital spending and infrastructure decisions are made equitably, addressing vulnerability and affordable rates as well as intergenerational equity.
How customer experiences are sought out and included in Operations data in a way that can be analyzed and systematically included in CIP planning along with data on system condition and risk.
How asset management principles could be integrated into the Equity in CIP tool to prioritize equitable outcomes while simultaneously supporting efficient investments to reduce risk where the infra

Biography:

Will Elledge is the Director of Engineering & Technical Services for DC Water. He has spearheaded many large drinking water programs and is currently managing DC Water's Lead Free DC Program, which aims to remove up to 42,000 lead services in the District.

111. Friday, August 30, 2024
Room 203/204
9:30 AM - 10:00 AM

Title: Steam Treatment and Thermal Hydrolysis: A Synergistic Approach in Solids Management

Presenter(s):
Rafael Iboleon, Civil/Process EIT
Stantec

Abstract:
Steam treatment of biosolids by thermal hydrolysis has become an ascending practice in solids management across the United States and globally. This method not only ensures the production of Class A biosolids but also significantly enhances the efficiency of the entire wastewater treatment process. The key requirement for this process is the generation of large quantities of steam, which necessitates robust and efficient boiler systems. Boiler System Configurations for Thermal Hydrolysis: Types and Comparative Analysis 1. Traditional Boiler Brick and Mortar Buildings: This section explores the conventional approach of constructing boiler systems within brick-and-mortar structures. These systems, often characterized by their large footprint and significant infrastructure, are known for their durability and capacity to house large-scale boiler operations. The presentation will delve into the design considerations, operational efficiencies, and challenges associated with these traditional systems. 2. Modularized Boiler House Units: The advent of prefabricated, modularized boiler house units has introduced a new dimension in boiler system deployment. These units offer the advantages of reduced on-site construction time, minimized disruption to existing plant operations, and the flexibility of expansion. This segment examines the integration process of these units into wastewater treatment facilities, focusing on their scalability, cost implications, and maintenance requirements. 3. Containerized Units: Containerized boiler systems, housed in traditional shipping containers, present a unique solution for facilities with limited space or those seeking temporary or mobile options. This section will assess their installation process, operational capabilities, and suitability for different scales of wastewater treatment operations. Real-World Case Studies: Practical Insights and Lessons Learned The presentation will feature case studies from two major projects: • The Washington Suburban Sanitation Commission's Piscataway Bio-Energy Wastewater Resource Recovery Facility project in Accokeek, MD. • The Louisville/Jefferson County Metropolitan Sewer District's Morris Forman project in Louisville, KY. Best version: Steam treatment via thermal hydrolysis, rising in the US and globally for biosolids management, not only produces Class A biosolids but also boosts wastewater treatment efficiency. This process requires substantial steam, necessitating robust boiler systems. This presentation delves into an in-depth exploration of boiler system configurations used for steam production in thermal hydrolysis, highlighting their operational benefits and integration within wastewater facilities. Boiler System Configurations for Thermal Hydrolysis: Types and Comparative Analysis: 1. Traditional Boiler Brick and Mortar Buildings: Known for durability and capacity, these systems are characterized by their large footprint. We'll discuss design considerations, efficiencies, and challenges. 2. Modularized Boiler House Units:

Prefabricated units reduce construction time and minimize plant disruption. This segment focuses on integration, scalability, cost implications, and maintenance. 3. Containerized Units: Ideal for space-limited or temporary needs, these units offer unique solutions. We'll assess their installation, capabilities, and suitability for various scales. Real-World Case Studies: Practical Insights and Lessons Learned: • Washington Suburban Sanitation Commission's Piscataway Bio-Energy Wastewater Resource Recovery Facility, Accokeek, MD. • Louisville/Jefferson County Metropolitan Sewer District's Morris Forman project, Louisville, KY. These case studies will provide insights and lessons from major projects, emphasizing the diverse applications and effectiveness of different boiler systems in thermal hydrolysis.

Learning Objectives:
Understand the significance of steam treatment via thermal hydrolysis in biosolids management, including its role in producing Class A biosolids and enhancing wastewater treatment efficiency. Explore the different boiler system configurations used in thermal hydrolysis, including traditional brick and mortar buildings, modularized boiler house units, and containerized units, and evaluate t Gain practical insights and lessons learned from real-world case studies, such as the Washington Suburban Sanitation Commission's Piscataway Bio-Energy Wastewater Resource Recovery Facility project an

Biography:

Rafael (Rocky) Iboleon is a Stantec Civil/Process EIT with 2 years of experience working on design-build solids management projects. He conducted his graduate research on thermal hydrolysis and anaerobic digestion at Virginia Tech, where he gained expertise in advanced wastewater treatment technologies and their applications in sustainable environmental engineering solutions. His passion for innovative biosolids management practices has led him to contribute actively to the field, bridging the gap between academic research and practical implementation in the water industry.

112. Friday, August 30, 2024
Room 215
9:30 AM - 10:00 AM

Title: Building Climate Resiliency into Flood-Prone Facilities

Presenter(s):
Rachel Albrecht, President
Albrecht Engineering, Inc.

Abstract:
More and more agencies and municipalities are evaluating and upgrading their facilities to provide greater resiliency against sea level rise and more intense storm events caused by Global Warming. This presentation will discuss how to determine the structure's risk of flooding, code requirements for floodproofing, and retrofit methods for floodproofing structures to a 500-year flood event. More frequent and intense storm events show how public safety and well-being are jeopardized by the disruption to crucial water and sewerage facilities as well as transportation, communication, and energy infrastructure. Much of the critical infrastructure in the mid-Atlantic region was developed

long-ago with little to no forethought given to changing climate conditions. Critical facilities as part of water supply, transportation, and energy infrastructure, are increasingly vulnerable to higher sea levels and storm surges, inland flooding, erosion, and very heavy precipitation events. Climate-related changes are already having profound impacts on coastal built environments. Long-term sea level rise and short-term flooding from storms are threatening infrastructure such as roads, sewers and drainage systems, wastewater treatment plants, and power grids. The presentation will provide several project examples of the outcome of evaluations and methods used to improve the flood resiliency of facilities, providing owners with the ability to evaluate if the capital cost and benefits of the investment in resiliency outweigh the comparable costs of taking no action.

Learning Objectives:
How to determine if a structure is at risk of flooding.
Code requirements for wet and dry floodproofing structures for new and existing construction.
Retro-fitting methods for floodproofing structures to withstand 500-year flood event.

Biography:
Rachel Albrecht is the president of Albrecht Engineering, Inc. She has over 30 years of structural engineering experience, including over 25 years working on water and wastewater facilities. She has a BSCE and BSAE from Drexel University, and a MS in Engineering from the University of Maryland, College Park.

113. Friday, August 30, 2024
Room 217
9:30 AM - 10:00 AM

Title: Leveraging Private Ownership and Real-Time Control for Cost-Effective Stormwater Treatment in Howard County, MD

Presenter(s):
Jason Murnock, Mid-Atlantic Account Representative
OptiRTC, Inc.
Lindsay DeMarzo, Stormwater and Sustainability Programs Manager
Howard County, MD

Abstract:
Howard County, MD, located adjacently west of Baltimore City, is roughly 253 square miles in area with an estimated population of 326,000 (2020 census). It is categorized both as a medium and large jurisdiction by the MDE and is therefore regulated by a Phase I MS4 Permit. At roughly (50%) urban* area, the latest permit (issued in 2022) contained another "restoration treatment" goal toward the Chesapeake Bay TMDL of 10% of the County's baseline untreated impervious area. This current goal is in addition to the previous permit's goal of 20%, bringing the total to 30% by the end of this permit cycle. The County is challenged to meet permit goals within a finite geography of land and opportunities. In addition to water quality challenges, the town of Ellicott City has experienced intense flooding in recent years, and the County added a deliberate effort to incorporate effective flood mitigation projects to benefit the town, if and where possible, as they sought after their water quality target. With a primary focus on judiciously spending citizen tax revenue to best comply with these goals while spending the least amount of money and maximizing benefits to the public and

community resilience, the County's MS4 program, lead by the Stormwater Management Division and Office of Community Sustainability, explored two innovative strategies: 1.) That of leveraging water quality improvement projects on private land as well as publicly-owned land, and 2.) That of technology, namely the Continuous Monitoring and Adaptive Control (CMAC) of stormwater management facilities. While the county's action plan contains many cost-effective projects, two pond projects, one on public land and the other on private, have incorporated CMAC and have met all initiatives, providing downstream flood relief with substantial water quality benefits. These two projects resulted in Impervious Acre Credits at 70% the cost of more conventional projects ($15,000 each vs. $50,000), and a 90% reduction of peak flows during storm events. This session will explain how the county bridged the gap to private property and developed strategic commercial partnerships to expand their efforts and opportunities for success in achieving Chesapeake Bay water quality goals. Attendees will also learn what makes a good CMAC project, the logic behind this new technology, how the adaptive control of these ponds has doubled stormwater runoff capture without changing the volume of the original ponds, and nearly quadrupled the average retention time within the ponds, maximizing water quality. *2010 Census Map, urban = >50,000 population

Learning Objectives:
Public entities leveraging private property and developing strategic commercial partnerships
Logic behind Continuous Monitoring and Adaptive Control of stormwater management
How to enhance stormwater runoff capture without changing the volume of existing facilities

Biography:
Lindsay DeMarzo serves as the Stormwater and Sustainability Programs Manager for Howard County, Maryland's Office of Community Sustainability. She manages Howard County's commercial stormwater programs, as well as oversees stormwater policy, pilot project development, and nature-based climate solutions. Ms. DeMarzo has worked for Howard County almost 17 years in stormwater and sustainability. Ms. DeMarzo holds a BS from Marquette University and a Master of Environmental Management from Duke University Nicholas School of the Environment.
Jason Murnock, CPESC, CPSWQ has been assisting clients with solutions to water quality and stormwater management issues here in the Chesapeake Bay area since 2002. Representing OptiRTC and their CMAC technology has been a great addition to this history, providing an innovative way for communities and owners of stormwater management facilities to see how the facility is functioning in real-time and enabling greater quality and quantity benefits over passive configurations.

114. Friday, August 30, 2024
Room 201/202
10:15 AM - 10:45 AM

Title: Innovative Project Delivery: CMAR Design-Build for Success in Water Projects

Presenter(s):
Anna Kazasi, Senior Project Manager
Virginia American Water
Thomas Lawlor,

Bowen Engineering, Corp.

Abstract:
Water and wastewater projects present distinctive challenges, encompassing not only engineering and treatment components but also intricate dynamics in project implementation. Owners consistently grapple with adhering to rate case guidelines, meeting strict deadlines, managing capital expenditure budgets, and upholding public perception. In this complex landscape, the Design-Build Construction Management at Risk (CMAR) project delivery approach emerges as a strategic choice, providing the flexibility and benefits essential for successful project execution. This document delves into the advantages offered by the CMAR approach, with a specific focus on flexibility, schedule optimization, and cost control, all grounded in real-life case studies. The team will highlight how CMAR empowers owners to achieve more accurate project budgets and cost projections throughout their initiatives, crucial for aligning with capital spending plans. The presented case studies illustrate a distinctive and innovative application of the CMAR project delivery method. This method proves invaluable for those aiming to incorporate similar strategies into their projects. Through this approach, the owner effectively carried out a challenging clarifier replacement project within a 7-month onsite construction period, seamlessly aligning with rate case guidelines and internal project budgets. Additionally, the same owner successfully completed the construction of an entirely new water conditioning facility. This paper provides an in-depth exploration of the advantages of the CMAR method, supported by practical insights derived from successful implementations. It serves as a valuable resource for industry professionals seeking innovative project delivery methods.

Learning Objectives:
Demonstrate the benefit of the Construction Manager at Risk (CMAR) contracting.

Biography:
Anna Kazasi is a Chemical Engineer with a master's degree in Environmental Protection and Sustainable Development and a second one in Environmental Engineering from Virginia Tech. She is a registered PE, an Envision Sustainability Professional, and a Construction Document Technologist. She is a Senior Project Engineer with Virginia American Water, responsible for the management and technical support on Capital Improvement Projects.

115. Friday, August 30, 2024
Room 203/204
10:15 AM - 10:45 AM

Title: An Instrument Calibration Program Is Key to Quality Water Treatment

Presenter(s):
Charles Bartley, Managing Partner
Chesapeake Calibration Services
Jay Alford, Managing Partner
Chesapeake Calibration Services

Abstract:

AN INSTRUMENT CALIBRATION PROGRAM IS KEY TO QUALITY WATER TREATMENT Introduction: Historically, instrumentation at water companies has been a reactive process. The status quo is to let instruments fail, then replace them, with little or no preventive maintenance. Would a comprehensive instrument calibration program provide operational, financial, and data advantages. Methodology: A calibration program was established at a Northern Virginia water company. An SOP for each instrument type was initiated. In a database, a master calibration record was created by collecting and entering instrument manual information, product processes, and owner criteria. For each instrument, including local, remote, and SCADA display, performed an initial loop calibration using NIST traceable standards. For each instrument, collected data on a calibration certificate and generated the next scheduled calibration. Results: Using said methodology, management, operators, and technician's trust instrument and SCADA data, providing optimal instrument and site performance. The program improved VDH/DEQ compliance, advanced chemical control accuracy, reduced faulty readings, and provided reliable current and historical data. Other benefits include decreased use of on-call and improved ability to assess the performance of specific instruments and devices by manufacturer. These factors all assist with asset management and future audit and data transparency. Conclusion: There are numerous benefits to establishing a comprehensive instrument calibration program based on ISO standards for water facilities. Instrument calibration programs provide plant and community systems operators and managers reassurance as to readings and data accuracy.

Learning Objectives:
The prevalence on instrument calibration programs in other industries.
Determine if your company is currently receiving accurate instrumentation readings.
Learn how an instrumentation program can help your facility, plant or company.

Biography:
Charles Bartley - (Senior Metrologist)
Chesapeake Calibration Services - Managing Partner
14+ years performing calibrations in the biotech industry, and 9 years building and maintaining a calibration program for a water / wastewater company located in northern Virginia.
ISA certified
FDA GMP procedures, writing and editing Standard Operating Procedures, building and maintaining the calibration database "ProCalv5, performing calibrations on Tank or wet well levels, pressures (differential, gauges, transmitters, levels, flow, switches), analytical devices (pH, CL2, ORP, DO, Chem Scan), flows (mag, differential, ultrasonic, paddle wheel, v-notch), chemical inductions, temperatures on the following types of equipment: Tanks, community systems, water plants, wastewater plants, PRV's, sewer pump stations, well levels, bioreactors, fermenters, incubators at small- and large-scale manufacturing plants.
Setting out to help small- or large-scale water & wastewater and construction companies establish a calibration program for themselves or their clients. Performing scheduled calibrations and / or training staff members to perform calibrations, provide SOP's, database setup and training, also database management for smaller companies.

116. Friday, August 30, 2024
Room 207/208
10:15 AM - 10:45AM

Title: PFAS: The Latest on an Ever Evolving Regulatory Landscape - National & State Update

Presenter(s):
Mary Firestone, Executive Director
Mid-Atlantic Biosolids Association

Abstract:
The topic of PFAS is inescapable and actively developing in the commonwealth and across the country. Through this presentation MABA presenter(s) will provide a history and overview on the EPA PFAS Strategic Roadmap, the EPA Proposed Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances, the Senate EPW Committee continued development of bipartisan PFAS legislation, as well as PFAS research including the National Collaborative PFAS Study conducted by Dr. Ian Pepper and his team at the University of Arizona. Additionally, this presentation will cover any Maryland state specific updates regarding new PFAS regulations or policies from the Maryland Department of the Environment (MDE). Attendees will leave the session informed and empowered to better assist their municipality's biosolids handling professionals with this difficult topic, as well as the citizens of their communities.

Learning Objectives:

Biography:
Mary Firestone is the Executive Director of the Mid-Atlantic Biosolids Association (MABA). Previously, Mary worked with several statewide member associations including the Pennsylvania Funeral Directors Association, the Pennsylvania Newsmedia Association, and the Pennsylvania Chiropractic Association. In addition, Mary is a violist and composer, active in the string ensemble Sempre Dolce, and she instructs private lessons on violin and viola. Mary resides in the Harrisburg, Pennsylvania area with her fiance, and her two children, and two wily cats.

117. Friday, August 30, 2024
Room 215
10:15 AM - 10:45 AM

Title: Preparing Your Water Utility for a Lower Carbon Future

Presenter(s):
Nicolle Boulay, Vice President and the North American Drinking Water Sector Leader
Stantec

Abstract:
Many municipalities in the United States have set goals for reductions in greenhouse gas (GHG) emissions and/or carbon neutrality by milestone years ranging from 2030 to 2050. As municipalities look to create action plans for achieving their carbon reduction goals, many will look to “energy sinks” such as water and wastewater treatment plants to ask for a contribution to achieving carbon reduction goals. There are many ways that water utilities can look to reduce their carbon footprint. A first step is to create a Carbon Reduction Plan which includes an emissions inventory to assess the baseline GHG emissions of the treatment plant and distribution system. The next step is to

determine emissions projections based on growth projections and potential regulatory activity. Finally, the plan would include recommendations for “quick wins”, short-, medium- and long-term carbon reduction measures. Total carbon reduction is calculated for each reduction measure and a timeline for implementation and key performance indicators (KPIs) to measure progress is developed. This presentation will provide an outline of how to complete a Carbon Reduction Plan and provide case study examples. Water utilities in England joined forces in 2019 to make a pledge to reach net zero on operational carbon emissions by 2030. Since then, water companies in Scotland and Wales have committed to achieving carbon neutrality across all emissions by 2040. This presentation will provide case study examples from the England and Scotland as to their Carbon Reduction Plans and mitigation opportunities that they have identified and implemented. In summary, this presentation will help water utilities plan for developing an approach to contributing to a lower carbon future.

Learning Objectives:
What is carbon neutrality and why is it important?
How is a Carbon Reduction Plan developed and what are some examples of these plans?
How are other utilities, including those in Europe, reducing their utility carbon footprint?

Biography:
Nicolle Boulay is a Vice President and the North American Drinking Water Sector Leader for Stantec. Nicolle has 25 years of experience in water and wastewater planning, design and construction for projects across the Mid-Atlantic region. She is a registered engineer in Virginia and Maryland and has a bachelor’s degree in engineering from Bucknell University and a Master’s degree in Environmental Engineering from Virginia Tech. Nicolle is a Past Chair of the Chesapeake Section of AWWA and is currently serving as Chair of the CSAWWA Water Quality Committee.

118. Friday, August 30, 2024
Room 217
10:15 AM - 10:45 AM

Title: A 21st Century Tool to Address 21st Century Flooding: Baltimore’s Approach to Identifying Concern Areas and Solutions.

Presenter(s):
Matthew Zelin, Senior Associate
Hazen and Sawyer
Jemil Yesuf, Section Chief, Infrastructure Planning
City of Baltimore

Abstract:
Many communities throughout the country suffer from routine and often severe flooding due to a combination of riverine flooding, undersized stormwater collection systems, and/or tidal flooding. For most of these communities, an initial step is to develop detailed hydrologic and hydraulic (H&H) models to assess runoff and where flooding has occurred. The City of Baltimore has embarked on an innovative approach to developing hydrologic and hydraulic models for the City to assess the stormwater collection system during intense rainfall events. During the 2023 TriCon conference, this team presented the methods to build these models which included a discussion

on the use of social media for identifying past flood reports, detailed modeling methodologies, and alternative approaches in gathering needed data. This year, the team will be discussing the results of the study. An initial challenge after developing the H&H models is prioritizing which flooding problems to address. This presentation will describe an approach to prioritizing which projects have the greatest flood reduction potential so that communities can make informed decisions. In addition, we will discuss how solutions have been developed and evaluated to address these locations. Case studies will be used to show proposed concepts (pipe upsizing, above-ground storage, etc.), how the projects were evaluated using the hydraulic model, and how the benefits (reduction in flooding depth) were quantified. This methodology aligns with FEMA's Benefit Cost Analysis approach which prepares communities to apply for financial support from a variety of partners.

Learning Objectives:
Methodology to evaluate urban flooding and prioritize locations for flood relief
Identification of solutions for pluvial flooding

Biography:
Jemil Yesuf, PhD, PE has over 10 years of experience in the transportation and municipal wet weather infrastructures planning, modeling and design sectors. He has worked both in private and public sectors and utility firms. Currently, he serves as Engineer Supervisor leading the infrastructure planning and modeling section in the Bureau of Water and Wastewater at the Department of Public Works for the City of Baltimore.
He earned his Bachelor of Science in Civil Engineering in 1995 in Addis Ababa, Ethiopia; MS in Civil Engineering in 2006 and PhD Engineering Science in 2012 from Southern Illinois University at Carbondale, Illinois.

119. Friday, August 30, 2024
Room 201/202
10:45 AM - 11:15 AM

Title: Soooo...How did your first CMAR go?

Presenter(s):
Jessica Hou, Vice President
Gannett Fleming
Holly Anne Matel, Project Manager
HRSD
Kristina Bruns, Project Manager
Ulliman Schutte

Abstract:
This presentation will identify lessons learned from members of the owner, construction manager at-risk, and engineer who had never participated in a CMAR project delivery before. Although all three organizations have experience with CMAR projects, this presentation will showcase the voices of members of the team who were learning as they go. This program consists of a neighborhood collection system improvement consisting of 3 new sewage pump stations, 3 pump

station rehabilitations, and 3 pipeline projects. Lessons learned include: Early costs independently developed by the CMAR and engineer created confidence in budget-driven decisions to change the program. Value engineering teams with CMAR estimators provided accurate and timely cost information for decision-making. Not having to design and manage the project to accommodate limitations that are experienced with the lowest bidder; this delivery method allows the team to choose the preferred options for various construction packages, provided additional allowances are included to accommodate this. Having the CMAR on the team early provides input on efforts that the engineer otherwise has to make assumptions on, including constructability in tight rehabbed spaces and specific equipment used in analysis of noise and vibration construction effects. Very early public outreach can have tangible benefits later in the program. The team found that when meeting with residents for potential turnaround of backyard sewers, they were so familiar with the overall program and its goals, the result was the highest voluntary participation in the turnaround program than in recent memory.

Learning Objectives:
Introduce audience to the perspective of team members new to CMAR delivery method
Highlight benefits of CMAR delivery method
Showcase benefits to public outreach that CMAR brings

Biography:
Jessica is celebrating 25 years at Gannett Fleming, currently a principal project manager for Virginia water clients. She is a graduate of Old Dominion University with a Bachelors in Civil Engineering and Masters in Environmental Engineering. She is a Board Certified Environmental Engineer and an Envision Sustainability Professional. She is active in Virginia AWWA and VWEA, and is Past Chair and Research Committee Chair for the Civil and Environmental Engineering Visiting Council at ODU.
Holly Anne Matel is a Treatment Process Engineer at HRSD. She is a Professional Engineer with 11 years of experience in wastewater treatment design and optimization. Holly Anne has a bachelor's and master's degree in Environmental Engineering from Old Dominion University.

garcia

120. Friday, August 30, 2024
Room 203/204
10:45 AM - 11:15 AM

Title: Starring into the Abyss: Using Remote Operated Submarines to Safely Inspect Underwater Infrastructure

Presenter(s):
Prarthana Pradhan, Professional Engineer
Carollo Engineers

Abstract:
Condition assessment of the DC Water Blue Plains Advanced Wastewater Treatment Facility's Filtration and Disinfection Facility's (FADF) substructure is a complex and challenging task. Originally constructed in 1974, the FADF substructure comprises two filtered water conduits connected to four disinfection tanks (two tanks per conduit). The disinfection tanks are located

directly beneath 80 filter cells (40 dual cell filters), and filtered water conduit beneath the filter pipe gallery. These channels convey a full design flow of 658 million gallons per day (mgd) of filtered water from the facility to the outfall and are integral to protecting the Potomac River from permit violation. Each conduit is approximately 1,000 feet long and 20 feet wide and is equipped with butterfly valves at the inlets and outlets for isolation. The substructure is believed to have significant debris accumulation, specifically filter media, due to witnessed filter failures at the facility. Cleaning the substructure is included within the ongoing filter upgrades design at the facility and introduces several logistical challenges given the limited access throughout. Preliminary sequencing includes requiring partial facility shutdowns for isolation and dewatering of the conduits and tanks. However, the previously mentioned butterfly valves are believed to no longer seal, resulting in a lack of functioning isolation. Construction of secondary isolation options such as stoplogs and cofferdams is being considered to permit isolation in lieu of the butterfly valves. Therefore, a need for inspection of the substructure in the wet was realized to gather detailed intel and assess the scope of work before undertaking such high-risk tasks. An underwater inspection using a Remotely Operated Vehicle (ROV) was completed with the help of a specialty contractor to ascertain the current condition of the conduits, tanks and butterfly valves and estimate the volume of debris accumulation. The ROV successfully inspected approximately 100,000 sf of the substructure, five butterfly valves, and a backwash water wetwell (one of four) without taking the facility off-line. The underwater survey provided visual evidence (video footage) of the current structural condition and permitted rough estimate of quantity and location of filter media deposition. The survey enabled the Engineer to document areas with high media accumulation; thereby allowing to better strategize the cleaning efforts. Additionally, the visual inspection of the butterfly valves indicated the valves had no major deformity that may render them beyond repair. As a follow up, detailed investigations involving functionality testing and sampling of the valve seals is currently being pursued for valve repair, which is a significantly lower risk and lower cost solution compared to constructing secondary isolation options. Overall, the survey provided valuable findings that aided DC Water in making informed decisions for rehabilitation work at the FADF. ROV inspections such as this allow thorough inspection of underwater structures while maintaining plant operations and mitigating the cost and safety concerns inevitably associated with underwater and substructure investigations.

Learning Objectives:
Efforts involved in performing an underwater inspection using ROV
Benefits of using technology such as ROV for inspections
Survey findings from the ROV inspection performed at Blue Plains

Biography:
Prarthana Pradhan is a Professional Engineer licensed in the state of Virginia with over 5 years of experience. She has provided support on a wide range of projects, including design, condition assessment inside and outside the fence, potable reuse applications, and disinfection technologies.

121. Friday, August 30, 2024
Room 207/208
10:45 AM - 11:15 AM

Title: An award-winning Gasification Technology shows capacity of destroying PFAS In Biosolids: Australian Initiative to Transform Sewage Sludge into Energy

Presenter(s):
Shashank Khatiwada, Wastewater Engineer in Training
Stantec

Abstract:
Biosolids management techniques and strategies are being challenged with emerging contaminants of concern, such as per- and polyfluoroalkyl substances (PFAS) and microplastics, and the costs associated with treatment. PFAS, the “forever chemical” and its fate in wastewater management is still unclear and needs to be analyzed with strong evidence and data. Literature suggests that incineration, hydrothermal liquefaction, pyrolysis, gasification, and supercritical water oxidation are emerging technologies for PFAS destruction. A survey of these technology suppliers showed variations in commercially available options. Various scholarly articles were reviewed to compare these available technologies and their application in various parts of the United States and globally. However, further research and strong verification is required to authenticate the fate of PFAS (particularly in the air) and the reliability and scalability of these emerging technologies. An Australian wastewater utility is using gasification technology to treat 37,000 wet tons of biosolids annually. The sewage sludge is processed by dewatering it in a centrifuge, drying it in a thermal dryer and treating it at around 650 °C in a low oxygen environment to produce biogas and biochar which is rich in nitrogen, phosphorus, and potassium. The process is energy self-sustaining as the biogas produced is used to provide energy to the thermal dryers and the facility is estimated to reduce carbon emissions by about 6,600 tones/year. This gasification technique is showing promising results in PFAS destruction from the biosolids through their demonstration plant. Additionally, the WWTP is producing 2600 tons/year of biochar which will further fuel the revenue stream for the city. The final biochar produced is sterile, does not generate odor, and is easier to handle. It reduces the volume of dewatered sludge cake by 90% requiring fewer hauling and further reducing volumes and costs. There is a great potential for this biosolids gasification technology to be adapted and enhanced across the United States.

Learning Objectives:
PFAS treatment from Biosolids
Gasification Technology as an option to handle biosolids in a Wastewater Treatment Facility
Insights on different commercially available PFAS destruction technological options.

Biography:
The speaker is a graduate student from Old Dominion University with a master's in environmental engineering. His master's research was on "Low Dissolved Oxygen Adaptation of Microorganisms" at an activated sludge BNR pilot plant. Currently, the speaker is with Stantec and working under different biosolids management strategies for Biosolids Master Planning with a focus on PFAS destruction.

122. Friday, August 30, 2024
Room 215
10:45 AM - 11:15 AM

Title: Planning for The Future: Coastal Resilience Modeling For Public Utilities

Presenter(s):
Erin Rooney, Mid-Atlantic Coastal Lead
HDR
Nick Brown, Coastal Sicentist
HDR

Abstract:
A public utility client maintains vital infrastructure on a major tidally influenced river. The utility client is planning for existing and future coastal resiliency by contracting with HDR to conduct a coastal resiliency study to better understand current coastal risks and risks with future relative sea level rise. Results of this study will be used to better understand future funding needs for facility maintenance or upgrades. This presentation will discuss the motivation behind the study, the technical aspects of how the study was conducted, the findings, and the utility's next steps to plan for future funding needs to address these concerns. This model for understanding future coastal resiliency concerns can be beneficial for all public utilities and other landowners that manage infrastructure on or near a coastline or tidally influenced waterway. The coastal resiliency study will use data provided by the public utility and publicly available data to numerically model waves on the river that may affect a treatment plant. The model mesh will include existing elevation data of the river bathymetry, the nearshore, and the existing facilities. Water level inputs and boundary conditions will include data from NOAA tide gauges, nearby wind data stations, data outputs from the North Atlantic Coast Comprehensive Study (NACCS), and leading guidance on anticipated relative sea level rise from NOAA and other federal agencies. The wave modeling output will be used to calculate anticipated wave runup and wave overtopping at the facility for existing conditions and in the future with sea level rise and subsidence. The results of the wave runup and wave overtopping analysis will be used to develop structural and non-structural resiliency measure alternatives. Part of the alternatives identification and evaluation will also include considerations of adding a pump station facility if wave overtopping rates indicate potential site flooding in the future. A workshop for stakeholders will be held to identify Potential Failure Modes, discuss coastal hydraulic loading, discuss consequences, severity of consequences, and develop a risk ranking approach to alternatives screening. After the workshop, up to four alternatives will be reassessed through updated wave modeling and calculations as necessary. A final feasibility level design and report will discuss constructability, design considerations, impacts to permitting (including FEMA FIS), scheduling and next steps for design and analysis. Work on the project is currently underway and is scheduled to be completed by early summer 2024. Anticipated results will show wave runup and overtopping rates for existing sea levels and select future relative sea level rise scenarios. Results will also show select alternatives developed to address these potential issues and the process that the project team used to make these decisions.

Learning Objectives:

Biography:
Erin Rooney, PE, CFM is the Mid-Atlantic Coastal Lead with experience with several types of coastal engineering projects including shoreline protection, nature-based features, storm surge analysis, and feasibility studies. She currently serves on the board of the American Shore and Beach Preservation Association Mid-Atlantic Chapter.

Nick Brown, PhD, WEDG, is a Coastal Scientist at HDR with experience in coastal resilience and adaptation projects including nature-based solutions, hazard analysis, resilience planning studies, and community engagement. He currently serves on the board of directors of the American Shore and Beach Preservation Association and the Coastal Zone Foundation.

123. Friday, August 30, 2024
Room 217
10:45 AM - 11:15 AM

Title: Integrated Short- and Long-Term Approaches to Reduce Nutrient Loading at a Major Recreation Lake Amenity

Presenter(s):
Christina Hughes, Project Manager
Ramboll
Michael Manning, Dvision Officer
Ramboll

Abstract:
Harmful Algal Blooms (HABs) occur when aquatic conditions are optimal for algal growth, produce toxins that are harmful to humans and aquatic species, and are often triggered by warm temperatures and increased nutrient loads from human activity. We are already witnessing that as our climate warms, rainfall events become less frequent and more extreme, and the population increases, aquatic systems that are not able to adapt suffer from poor water quality. Reactionary approaches can offer temporary solutions, but holistic site planning helps identify the full range of water quality impacts to provide a more sustainable and resilient solution. A case study at Harriman State Park in New York shows how integrated solutions can be applied across a large area to benefit water quality more efficiently. Lake Welch Beach at Harriman State Park is a significant recreational resource for the New York City metropolitan area. During an especially warm summer, the beach was closed for almost the entire 2022 peak season due to multiple persistent HABs. The lake currently receives treated effluent from a seasonal on-site WWTP as well as non-point source contributions resulting in high nutrient loading. To address high nutrient concentrations and warming temperatures impacts on recreation and habitat, New York State Office of Parks, Recreation, and Historical Preservation (OPRHP) has initiated a multi-phased approach to understand the root cause of HAB outbreaks, develop a comprehensive lake nutrient budget, and implement solutions to rehabilitate the lake and prevent future HAB concerns. During a 1-year monitoring period, OPRHP implemented several immediate treatment methods that resulted in no beach closures during the peak 2023 season. Ongoing park infrastructure improvements will provide enhanced water quality inputs into the lake, including WWTP upgrades, effluent outfall relocation, and green infrastructure. This presentation will discuss how an integrated approach to park improvements are addressing short- and long-term aquatic resilience.

Learning Objectives:
Understand the impact of human activity and climate change on HAB formation and why HABs are harmful for the environment and recreation.

Identify short- and long-term water quality improvement techniques to address nutrients, including direct treatment applications and infrastructure improvements to target pollutant sources. Understand how developing a nutrient budget informs large-scale planning to benefit long-term water quality resiliency.

Biography:
Christina Hughes is a project manager at Ramboll with a focus on climate adaptation in surface and stormwater. She currently serves as deputy project manager for the Lake Welch Water Quality Improvements project at Harriman State Park in New York.

124. Friday, August 30, 2024
Room 201/202
11:15 AM - 11:45 AM

Title: Why would you use multi-prime contracting when you don't have to?

Presenter(s):
Thor Young, Principal
GHD
Steven Clark, Associate
GHD

Abstract:
Multi-prime contracts are required for most public works projects in many states. Wick's Law in New York has required municipalities and public utilities to receive separate bids for general construction, plumbing, HVAC, and electrical work since 1912, while the Separations Act in Pennsylvania has required much the same thing since 1913. To those of us in the Mid-Atlantic region who are used to having to being able to award an entire public works project to a single general contractor who will be responsible for the entire construction, multi-prime contracts may seem like a headache we are happy to not have to deal with. But are there some cases where delivering a project using multiple prime contracts may be advantageous, even if its not specifically required by law? This presentation will focus on a case study in Sussex County, Delaware where multi-prime contracting was used for municipal wastewater treatment upgrades. As an innovative contracting approach, planned upgrades at two separate wastewater treatment facilities – the South Coastal Regional Wastewater Facility in Ocean View and the Rehoboth Beach WWTP in Rehoboth Beach were bid together as a single project managed by the Sussex County Engineering Department. This was done to create a larger project which would be more attractive to larger construction firms, and to allow both projects to take advantage of the economy of scale a large project provides and share the savings of having a single management team and joint construction meetings. As a further innovation, it was decided to bid the project using a multi-prime contracting approach instead of the more typical approach used in Delaware of having a single prime contract. Under this arrangement, separate contracts were awarded for general construction ($39.5 Million) and electrical construction ($22.2 Million) to construct both facilities under the same set of contracts at the same time. Some of the advantages the multi-prime approach provided included being able to attract more sophisticated and higher quality electrical contractors, eliminating the typical 15% subcontractor markup on electrical work, having more direct lines of communication with the electrical contractor, and having more direct control of the electrical contractor's work

quality and schedule. These items are particularly important for wastewater treatment upgrade projects, which often have a large and complex electrical portion of the work that often becomes the critical element in whether a project is completed on-time or not. For this particular project, separate plumbing and HVAC prime contracts were not considered because neither trade was a large component of the work for these two upgrades, which mostly involved new wastewater processes and the associated electrical work. The construction management team will summarize the lessons learned from this approach and highlight both the successes and challenges this contracting arrangement provided. The team will provide advice on what type of projects this type of contracting arrangement might be best suited for in the future.

Learning Objectives:
Understand the advantages and disadvantages multi-prime contracting can provide
Share lessons learned from a multi-prime contracting example
Learn what types of projects multi-prime contracting may be best suited for

Biography:
Thor Young is a Principal with GHD and is located in the Bowie, MD office. He is a registered PE in Delaware and was the Project Director on the referenced project.
Steven Clark is approaching 20 years as an engineer and project manager with GHD. Steven spent his first 9 years with GHD in Australia, and the last 10 here in the Mid-Atlantic. The large majority of his experience has been gained in wastewater treatment projects in Delaware and Maryland. He's just back from 2 weeks hiking and swimming in Glacier National Park and still hasn't found the bottom of his inbox.

125. Friday, August 30, 2024
Room 203/204
11:15 AM - 11:45 AM

Title: Opening Opportunities with Cross-Connection Thinking - DC Water's Path to Enhancing their CCC Program

Presenter(s):
Mangaliso Goba,
Mott MacDonald
Pierre Constant,
DC Water

Abstract:
DC Water owns and operates a water distribution system comprised of approximately 1,300 miles of water mains and around 127,000 customers. Across this customer base, tens of thousands of service connections exist which provide potential pathways to contaminate the water distribution system. To combat the risks associated with these Cross Connections, DC Water administers a Cross-Connection Control (CCC) Program that serves to manage these connections and protect the distribution system from potential contamination. DC Water's Program has a CCC Manual which is used to educate its customers about the hazards of Cross Connections, the methods of backflow control and its policies related to backflow prevention. The manual includes backflow

requirements for new facilities as well as monitoring and reporting requirements for existing facilities. The existing CCC Manual was last published in 1999 and was due to be updated. Since this time, there have been a number of advancements in the types of backflow prevention assemblies (BPAs) and the systems used to track the compliance of backflow prevention devices and assemblies across the distribution system. Further, implementation of a CCC program requires extensive coordination with stakeholders including municipal government, departments of health and plumbing departments and coordination with building owners including hospitals and other facilities which may not be fully accessible (such as military installations). As part of efforts to enhance their CCC Program, DC Water undertook the task of revising Municipal Regulations related to Cross-Connection Control, which were last published in 2001. The revised regulations serve to establish standards for inspecting, testing and surveying backflow prevention assemblies; and equip DC Water with more tools to enforce its' backflow prevention policies. The revisions help to improve the overall customer compliance ratio (the number of compliant BPAs to number of BPAs tracked), which saw a decline through the pandemic. There is no single reference on the development of a Cross Connection Control Program. Guidance manuals have been prepared by the EPA, USC Foundation for CCC Research, University of Florida TREEO Center and AWWA. As part of the update for DC Water, a detailed comparison of the requirements included in each of these sources was prepared to inform revisions to the manual. Another component of the manual update was to compare DC Water's program to those of similar utilities. Three utilities participated in benchmarking activities wherein the practices of the utilities (related to CCC) were discussed. DC Water's Manual was updated to incorporate best-in-class practices from all these sources. This presentation will provide a review of the Manual updates including the guidance manual summary and benchmarking activities.

Learning Objectives:

Biography:
Mangaliso is a Professional Engineer in the District of Columbia with 15 years' experience. He's been with Mott MacDonald for over 8 years working primarily on DC Water's Water Program. He has a keen interest in water infrastructure and the opportunities this service provides to communities.

126. Friday, August 30, 2024
Room 207/208
11:15 AM - 11:45 AM

Title: PFAS in Biosolids: What Pros Need to Know

Presenter(s):
Rashi Gupta, Vice President and Project Manager
Carollo

Abstract:
Per- and polyfluoroalkyl substances (PFAS) are a national concern with widespread implications for biosolids management. The USEPA aims to finalize its risk assessment for PFAS in land-applied biosolids by the end of 2024. The risk assessment could lead to a PFAS limit in land applied biosolids by 2030. Concentrations of key PFAS such as perfluorooctanoic acid (PFOA) and perfluorosulfonic acid (PFOS) are typically in single digit parts per billion (ppb) in biosolids. Maine

has banned biosolids land application over PFAS concerns, while four states (Michigan, Wisconsin, Colorado, and New York) have implemented tiered frameworks requiring source control for PFAS over certain thresholds. The USEPA has stated they would recommend states require quarterly sampling of PFAS in biosolids once Method 1633 is finalized. Conventional solids treatment processes do not remove PFAS. Several advanced technologies such as supercritical water oxidation have been proposed to destroy PFAS in biosolids. However, these technologies are still in demonstration stages, so full-scale operational feasibility and cost-effectiveness remain uncertain. Source control remains the most effective and economic method for controlling PFAS in biosolids. For example, five wastewater facilities in Michigan with biosolids PFOS concentrations >100 ppb identified metal finishers as the contamination sources. Through source treatment, the impacted facilities achieved >90% reduction of PFOS in their biosolids. We have calculated screening levels for what PFAS concentrations indicate industrial sources so that initial source control can be targeted appropriately. This presentation will summarize this current state of affairs regarding PFAS in biosolids.

Learning Objectives:

Biography:
Rashi Gupta, a vice president and project manager with Carollo Engineers, has specialized in delivering sustainable solutions for biosolids management and wastewater treatment throughout her career. Ms. Gupta is Carollo's National Solids Process Technology Lead, which allows her to remain current on leading technologies and changes within the biosolids management field. Her responsibilities as project manager and process specialist on solids-related projects across the country have taken her from the initial planning phase through design to start-up after construction. She also leads applied research projects for solids processes to assess the best ways to integrate innovation into facilities. From this experience, Ms. Gupta has become a national expert in all things related to solids – from thickening and dewatering to digestion and subsequent practices to beneficially use biogas and biosolids.

127. Friday, August 30, 2024
Room 217
11:15 AM - 11:45 AM

Title: Building Resilience and Adapting to Climate Change Impacts for Drinking Water and Wastewater Utilities

Presenter(s):
Audrey Ramming, Natural Resources Specialist
Environmental Protection Agency

Abstract:
Climate change impacts pose both an immediate and long-term threat to the continuity of wastewater, stormwater, and drinking water utility operations and water supplies. To reduce the risks associated with climate-related hazards, the Environmental Protection Agency's (EPA) Creating Resilient Water Utilities (CRWU) initiative provides training through a collaborative technical assistance program and provides online tools designed to educate the water sector on climate science and adaptation options. This session will explore CRWU's Climate Data Maps,

which provide easy-to-access historical and projected climate data from the National Climate Assessment, as well as our Climate Resilience Evaluation and Awareness Tool (CREAT) and Resilient Strategies Guide, applications that guide water utility managers through the climate risk assessment process and help them evaluate adaptation priorities. The session will also highlight CRWU's 2024 technical assistance work with Maryland and Delaware utilities and will touch on financing resiliency projects.

Learning Objectives:

1. Explore the various local climate threats impacting drinking water and wastewater utilities
2. Describe how utilities can benefit from conducting a climate change risk assessment that analyzes the resiliency of their water infrastructure and operations
3. Understand the technical assistance and funding opportunities available for implementing climate adaptation strategies

Biography:

Audrey Ramming is a member of EPA's Creating Resilient Water Utilities initiative, which provides water utilities with the resources and technical assistance needed to adapt to, and prepare for, changing climate conditions. Audrey joined the EPA's Office of Water in April 2022.
Prior to the EPA, Audrey worked in the corporate governance sector as an ESG Analyst for Institutional Shareholder Services; and before that, as a Climate Research Journalist for the Potomac Conservancy and GlacierHub. Audrey holds a dual degree in Biology and Environmental Studies from Salisbury University and a Master's in Climate Science & Society from Columbia University in the City of New York.

128. Friday, August 30, 2024
Room 217
11:15 AM - 11:45 AM

Title: Stormwater Management for Flood Resiliency: A Comparison of Approaches

Presenter(s):
Matthew Vanaskie, Senior Project Manager
HRG

Abstract:
Many communities deal with stormwater and flooding issues and are often in various states of preparing and mitigating the associated risks. Communities that are aware of stormwater problems and flood hazards that plan approaches to address these issues are more resilient to these wet weather threats. Location and situation, land use and management, local climate, and geology are each factors that effect a community's specific stormwater and flood issues. This presentation will review three case studies and compare the variety of stormwater capture and mitigation approaches to deal with flooding issues. The presentation will review the approaches, each community's status in the path to resiliency prior to and after each study, and a review of communication approaches for public and stakeholder engagement. The Fishing Creek Watershed Flood Mitigation Study was a comprehensive effort to identify flooding and wet weather issues within the Columbia County Pennsylvania portion of the watershed and to investigate the mitigation options available from the site to watershed scale. The watershed is primarily a rural and

agricultural area. With this in mind, the study yielded conceptual solutions that supported goals of achieving Chesapeake Bay TMDL requirements while capturing stormwater and reducing flood issues. The Lewisburg (Pennsylvania) Flood Mitigation Study was an extension of previous stormwater and flood mitigation planning and projects, with goal of the study to identify actionable steps and recommendations towards achieving flood resiliency and mitigating adverse impacts from flooding events. This study incorporated a green stormwater infrastructure demonstration project to engage the community in stormwater and flood awareness. The Bethlehem Township (Pennsylvania) stormwater and flood mitigation program was initiated to develop a comprehensive approach to meeting MS4 requirements while reducing flood risks. Each study summarized problems and projects for stormwater capture and flood mitigation, identified recommended areas and issues for further study, and summarized the evaluation of prioritized options. Recommendations were developed to provide officials with the information to prioritize next steps for increasing flood resiliency. For each Study, a consideration of project prioritization was included to address issues of highest impact or benefit to the community. The project teams developed systems to prioritize projects that considered technical analysis, engineering judgment, and input from public officials and interest groups that participated in the process. For each, a set of criteria were developed to determine the priority of each problem area. Criteria to assess each problem area and potential mitigation concept project included items such as frequency of problem, property vs public impacts, problem reduction, resiliency, cost, community preference, and maintenance. Conference attendees will benefit from the presentation through gaining understanding of how stormwater management policies, requirements, and solutions aid in addressing flooding issues from individual site and municipal scales to full watershed impacts. The presentation will also cover topics of public and stakeholder engagement approaches for these various communities informing attendees of approaches they can take to inform their community about stormwater and flooding awareness and mitigation.

Learning Objectives:
Review how stormwater capture/management plays a role in flood preparation, mitigation, and resiliency.
Review of a comparison of three approaches covering rural, suburban, and urban settings.
Review of public and stakeholder engagement approaches and the importance it plays in stormwater/flood management success.

Biography:
Matt is a Senior Project Manager in the Civil Service Group at HRG and has 20 years of experience ensuring regulatory compliance with Clean Water Act, NPDES, TMDL, MS4, and Chesapeake Bay PRP requirements. He has had a primary role on some of the Mid-Atlantic's signature wet weather and water resources projects dealing with water quality compliance including Philadelphia's Green City, Clean Waters, Capital Region Water (Harrisburg, PA) City Beautiful H2O, and thirteen Pennsylvania counties County-wide Action Plans for the Chesapeake Bay TMDL. At HRG, he is responsible for the management of water resources projects as well as permitting, municipal representation, and land development plan reviews.