PNCWA2025
Flowing Together: Stories of Dedication and Innovation

Annual Conference & Exhibition
September 14th - 17th, 2025
Oregon Convention Center
Portland, Oregon

This CEU Packet Includes:

- Opening General Session Information
- PNCWA2025 Event Agenda with Session Descriptions
- Speaker Bios
- Conference Tour Information
- Operator Breakfast Presentation Description and Speaker Qualifications
- Ops Challenge CEU Request

Determination of Max Conference Credit Amount

Max Credit	Times	Activity
Monday, September 15		
.15	8:30-10:00	Opening General Session
0	10:00-10:15	Break
.2	10:15-12:20	Technical Sessions
0	12:25-1:55	Lunch
.1	2:00-3:00	Technical Sessions
0	3:00-3:15	Break
.15	3:15-4:50	Technical Sessions
Tuesday, September 16		
.1	8:00-9:00	Technical Sessions
0	9:00-9:30	Break
.2	9:30-11:35	Technical Sessions
0	11:35-1:00	Lunch
.1	1:05-2:05	Technical Sessions
0	2:05-2:35	Break
.2	2:35-4:40	Technical Sessions
Wednesday, September 11		
.2	8:00-10:05	Technical Sessions
0	10:05-10:25	Break
.2	10:25-12:30	Technical Sessions
Total Max Credit per Attendee: 1.6 (16 Contact Hours)		

Facility Tours

Tour	Date/Time	Training Time
Convention Center Stormwater Management	9/15 Morning	2 Hours
Carlie Creek Water Quality Facility	9/15 Afternoon	2 Hours
Swan Island CSO Pump Station	9/16 Morning	2 Hours
Stormwater Stewardship & Portland Water System	9/16 Morning	2 Hours
Secondary Treatment Expansion Project Facility	9/16 Afternoon	2 Hours
Ecology, Hydrology, Engineering: Durham WRRF	9/17 Morning	2 Hours

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PNCWA2025 Opening General Session

Keynote Speaker: Maia D. Bellon | Partner, Cascadia Law Group

Bio:

Maia D. Bellon is a Partner at Cascadia Law Group and its consulting affiliate Cascadia Policy Solutions where she advises Tribal government, municipal, and private clients on a wide array of complex environmental matters, including water quality, climate and energy policy, air quality, toxics cleanup, water resources, and Tribal law. Prior to joining Cascadia, Maia was appointed by Governor Jay Inslee, and unanimously confirmed by the Washington Senate, to serve as the director of the Department of Ecology (2013-2019). She was the longest-serving Ecology director in state history and led the agency to great achievements in environmental protection, including intentional integration of environmental justice and climate change policy into the management and regulation of land, air, and water. Before serving as director, Maia was on Ecology's Executive Leadership Team and held positions as the Deputy and Program Manager of the Water Resources Program (2010-2012). Prior to working at Ecology, she represented the agency for 15 years as an Assistant Attorney General at the Washington Attorney General's Office providing client advice and litigation support on a broad range of environmental and natural resources matters. Maia received her J.D. from Arizona State University, College of Law in 1994, and was presented a Dean's Award upon graduation. She was also awarded the Joseph Albert Dear Distinguished Alumni Award in 2015 from her undergraduate institution, The Evergreen State College ('91 graduate).

Presentation Description:

Sharing Our Water Stories – Why Wastewater Work Matters

Behind every flush, every storm drain, and every treatment plant is a story—one of science, service, and stewardship. In this compelling keynote, Maia D. Bellon, environmental leader and former Director of the Washington Department of Ecology, invites us to explore the human side of wastewater work through the power of storytelling.

"Sharing Our Water Stories" centers on the idea that what we do in the wastewater sector is essential—but *why* we do it is just as important. From protecting public health to restoring ecosystems, our work touches every corner of our communities. Yet, it often goes unseen and underappreciated. Maia challenges us to change that by making our work personal, relatable, and visible.

How would you describe your job to your neighbor? Your child? A city council member? Through personal reflection and practical insights, Maia will show how sharing our motivations and experiences can build trust, foster understanding, and elevate the value of wastewater services in the public eye.

Join us for a keynote that celebrates the people behind the pipes and pumps—and reminds us that every story we share helps strengthen the connection between our communities and the critical work we do.

Event Agenda

PNCWA2025 Annual Conference

Sunday, September 14, 2025

Registration Open

3:00 PM – 7:00 PM | Location: Holladay Lobby

ATTENDEE EVENTS

New Member and First Time Attendee Meet and Greet

4:00 PM – 5:00 PM | Location: North Plaza

ATTENDEE EVENTS

All first-time conference attendees and new PNCWA members are invited to attend a special Meet & Greet ahead of the conference on Sunday evening. Please join us to meet fellow new attendees, the PNCWA Board, and Committee Chairs. This event is hosted by the Member Services Committee and is a great opportunity to network, learn about what PNCWA is working on, and determine how best to get involved with PNCWA. We'll have bingo cards to encourage networking and earn prizes! Plus, walk the Oregon Convention Center with us as we point out important locations and highlight can't-miss conference events!

All Attendee Meet and Greet

5:00 PM – 7:00 PM | Location: North Plaza

ATTENDEE EVENTS

All attendees are invited to attend the Meet & Greet Sunday evening and kick off the start of conference! Join your fellow attendees to network and learn about all the committees and volunteer opportunities PNCWA has to offer.

Pro Tip: Pick up your conference badge on Sunday to avoid long lines on Monday morning! Registration will be open all afternoon long!

PNCWA Young Professionals Happy Hour

7:00 PM – 9:00 PM

ATTENDEE EVENTS

Monday, September 15, 2025

Breakfast

7:00 AM – 8:00 AM | Location: Exhibit Hall A

MEALS ATTENDEE EVENTS

Start the day right! Breakfast is open to all attendees so fuel up before hitting the technical sessions!

Opening General Session

8:30 AM – 10:00 AM | Location: Oregon Ballroom

ATTENDEE EVENTS

The PNCWA2025 Annual Conference will kick off with announcements from PNCWA President Amy Dammarell, Conference Chair Hannah Thomascall, and Conference Technical Chair Jen Murphy. They will be joined by Paul Schuler, visiting WEF Trustee, who will recognize the PNCWA WEF Award Winners.

Keynote Speaker: Maia Bellon

CEUS

Break

10:00 AM – 10:15 AM | Location: Oregon Ballroom Pre-Function

BREAK

Grab a coffee and snack and catch up with friends between sessions!

Community Partnerships

10:15 AM – 11:15 AM | Location: Tech Rm 1

STORMWATER & WATERSHED MANAGEMENT

NYC Cloudburst Resiliency: Transformational Community Adaptation through Strong Partnerships

10:15 AM – 10:45 AM

A “cloudburst” is a sudden, heavy downpour that can overwhelm sewer systems and result in flash floods. These intense rainfalls are becoming more frequent, disruptive, and damaging in New York City (NYC); devastating residents, destroying homes, and disrupting businesses. On September 1, 2021, Hurricane Ida shattered the record for the highest single-hour rainfall in NYC, set only two weeks earlier by Tropical Storm Henri. Both storms caused flooding, damaged property, disrupted critical infrastructure, and polluted New York’s waterbodies.

NYC’s Cloudburst Program will protect vulnerable communities, mitigate flood damage, and improve water quality. Historical data measuring which neighborhoods were hit hardest by Hurricane Ida were used to identify cloudburst planning areas, including flood extents with sea level rise, structural damage reports, sewer backups, and social vulnerability index. All the recommended Cloudburst projects are in flood-prone environmental justice areas.

This project redefines stormwater management in the built environment by transforming streets, parks, and other open public areas into multi-functional community assets for recreational use and flood mitigation. Stormwater runoff is absorbed by porous parking lanes, bike lanes, or medians and then transferred into redesigned public spaces that safely accommodate flood waters. After a storm has passed and sewers have regained capacity, the water drains back into sewer systems. This project is the first large-scale innovative application of interconnected green infrastructure for cloudburst management.

NYC’s ultra-dense built environment is congested and presents complex challenges that require meticulous coordination among multiple private and public agencies. Further, the complex drainage network requires careful consideration to maintain gravity flow. These challenges were addressed through interagency partnerships, stakeholder consensus building, sewer system modeling, and developing cost-effective integrated solutions.

Cloudburst stormwater management integrates flood-protection solutions into public spaces, instilling a positive public perception of how engineering solutions can complement community goals. Integrating public amenities and open spaces with stormwater management solutions, such as sunken basketball courts, water squares, and playgrounds with subsurface storage, transforms these public spaces into multi-beneficial community assets. Based on recommendations from this project, the city announced $400 million in the construction of Cloudburst Resiliency Projects to better manage intense rainfall events in flood-prone neighborhoods.

INTERMEDIATE

Speakers

Abigail Thomas

Assistant Engineer II | Hazen and Sawyer

M

Mihir Gupta

Principal Engineer | Hazen and Sawyer

Delivering Green Stormwater Infrastructure Through Community Partnerships

10:45 AM – 11:15 AM

Authors: Shelly Basketfield

Delivering Green Stormwater Infrastructure Through Community Partnerships

Water is at the heart of our communities, shaping our environment and our collective future. RainCity Partnerships is pioneering a new approach to stormwater management in Seattle, implementing the first-ever Community-Based Public-Private Partnership (CBP3) in the Pacific Northwest to deliver green stormwater infrastructure (GSI) retrofits on private property.

This presentation will explore how Seattle Public Utilities (SPU) and CIS came together to develop a scalable, community-driven model for stormwater infrastructure implementation. We will provide an overview of the program's delivery process through a case study, including site prioritization, community engagement strategies, innovative funding approaches, and the unique challenges and opportunities of working with private property owners. The case study will also highlight key socioeconomic outcomes, including how RainCity Partnerships is contributing to local workforce development and environmental justice. This session will share key takeaways on how to build trust with communities, streamline project delivery, and replicate this model in other regions. Join us to learn how water connects us all and how innovation in infrastructure delivery can create a lasting impact. Attendees will gain insight into how collaboration across public and private sectors can accelerate green infrastructure adoption, improve water quality, and create more resilient urban environments.

INTERMEDIATE

Speakers

B

Brenda Gardner

CIS

Alice Lancaster

Water Practice Director | Herrera

Pump Hydraulics

10:15 AM – 11:15 AM | Location: Tech Rm 2

PUMP STATIONS & FORCE MAINS

How Hard can Making a System Curve be?

10:15 AM – 10:45 AM

Creating a system curve for a pump station is a crucial task for pump station design that helps ensure smooth and efficient pump performance. The system curve shows how the flow rate and the total head relate to each other for a pumping system. This curve is made by plotting the static head and system losses against different flow rates.

The static head is the elevation difference between where the water starts and where it ends up. This component of a system curve doesn't change with the flow rate, or does it? The profile and configuration of the pipeline system can cause this common conception to not hold true due to intermediate high points in a system. Examples of how intermediate high points affect static head conditions under different flow conditions and how to account for this will be discussed.

System losses include both friction losses and minor losses. Friction losses happen because water meets resistance as it moves through pipes. These losses get bigger as the flow rate increases. Minor losses come from things like bends, valves, and fittings in the pipes, and they change with the flow rate too, but they're usually smaller than friction losses for large pipeline systems. This presentation will focus on the impacts of friction losses on system curves by diving into effects from aging infrastructure, system demands, and multiple pump stations using the same pipeline system.

Having an accurate system curve ensures that the pump you choose works efficiently, minimizing energy use, and avoids problems like cavitation (bubbles forming in the water) or too much wear and tear on the pump parts. Thus, an understanding of the basic hydraulic principles of static head and system losses and how they are affected is crucial for designing and managing efficient and sustainable water systems. This presentation will provide a crash course of how different system configurations and conditions affect each component of a system curve to demystify this portion of the design process of a pump station.

101 BEGINNER

Speaker

Trevor Stull

Plummer Associates

Pump Up Your Understanding of Centrifugal Pumps

10:45 AM – 11:15 AM

Centrifugal pumps are commonly used for many processes including influent pumping, return activated sludge pumping, and non-potable water pumping. Understanding the basics of centrifugal pumps is useful for optimizing pumping operations and selecting the best pump for your needs. This presentation will walk through the fundamentals of pump curves, explaining what they show and how to read them. We will also cover system curves and their interaction with pump curves, emphasizing the importance of proper pump selection.

This presentation will show the effects of using a valve for flow control versus a variable frequency drive (VFD) on pump and system curves. The impacts on energy use of the pump will also be explained. VFDs can save energy for many pumping applications. This presentation will offer insights into optimizing pump performance.

By the end of the presentation, attendees should have enough understanding to review their own pump curves and consider if they have opportunities for optimization.

101 BEGINNER

Speakers

Matt Smeraglio

Cascade Energy

Wendy Waudby

Senior Engineer | Cascade Energy

Watershed Diagnostics & Protection

10:15 AM – 11:15 AM | Location: Tech Rm 3

STORMWATER & WATERSHED MANAGEMENT

Swimming upstream: Using environmental DNA to assess a potential thermal passage barrier on the Tualatin River

10:15 AM – 10:45 AM

Authors: Taylor Warnick; Julia Crown; Blythe Layton

The Tualatin River is a tributary to the Willamette River and meanders roughly 80 miles through relatively flat, sediment-heavy terrain. With the installment of a fish ladder over Willamette Falls in 1885 and hatchery stocking programs from the 1950's to 1996, previously inaccessible river habitat on the Tualatin River became spawning grounds for Coho salmon. Clean Water Services (CWS), a special-use district, helps jointly manage and maintain flow and water quality in the Tualatin River in part through discharges into the Tualatin River from four water resource and recovery facilities (WRRFs). These WRRFs are regulated for water quality standards including temperature under a watershed-based NPDES permit. Treated effluent is typically warmer than the water in the river leading to on-going questions about whether warm water inputs from the four WRRFs create passage barriers for migrating Coho. To address this, we designed a multiyear environmental DNA study with the goals of better understanding Coho migration timing, environmental cues, and the potential for thermal discharge to prevent upstream migration. First, a time series of Coho DNA was constructed from water samples collected at regular intervals from July 2023 - June 2024. We found Coho DNA concentration was low year-round, increasing from September – January, which correlates with timing of migration and spawning activity. Additionally, we found increases in DNA concentration lagged Willamette Falls fish counts by roughly a week, and positive DNA detections began only after river temperature fell below 20°C at the mouth of the Tualatin. Using this information, two sites were sampled concurrently from August 2024 - February 2025 to determine whether DNA concentration differed upstream versus downstream of thermal inputs. Initial results show similar DNA concentrations at both sites, indicating that discharge of treated water is not acting as a Coho passage barrier. These data also confirm the lag time between fish counts at Willamette Falls and the presence of Coho in the Tualatin River. This study provides novel insight into Coho migration in the Tualatin River, helping us to better meet thermal compliance now and into the future.

BEGINNER

Speakers

Hannah Ferguson

Operations Specialist - Research | Clean Water Services

Rita Cooper

Senior Field Engineer | Clean Water Services

Wastewater Treatment for Watershed Protection

10:45 AM – 11:15 AM

Authors: Tsigereda Woldegiorgis

After four rural communities in central Oregon lost their homes and businesses in a catastrophic wildfire, rebuilding projects were halted by an unforeseen conflict between state and federal regulations. Outdated state administrative rules stood to block a new federally-funded wastewater project critical to the ongoing survival of these communities. The landmark Supreme Court Maui County vs. Hawaii Wildlife Fund held that the jurisdiction of the Clean Water Act under its National Pollutant Discharge Elimination System extended to groundwater discharges if those discharged are determined to be the "functional equivalent of direct discharges" to surface water after consideration of several factors, including the proximity of the groundwater discharge to navigable waters. Oregon's administrative rule OAR 340-041-0350, also known as the "Three Basin Rule", prohibits the issuance of discharge permits under the Clean Water Act in the basins of three rivers of economic importance to Oregon. This rule, created shortly after the Clean Water Act itself, has not evolved to adapt to technological progress in wastewater treatment or to account for new permitting landscapes. The Maui decision, combined with the Three Basin Rule, effectively prohibits discharges of any kind for these cities.

Salem and the four upstream cities formed a partnership to propose new environmental regulations to allow this essential water supply protection project to be completed before the looming federal American Rescue Plan Act (ARPA) funding deadline in 2026. This case study offers a critical look at the importance of water supply protection by examining collaboration between upstream and downstream communities and public participation in overcoming today's regulatory complexity. Presenters will describe the collaborative partnership between downstream & upstream communities and the technical, legal, and public outreach efforts to overcome the challenge of amending long-held environmental regulations, paving the way for communities to rebuild.

INTERMEDIATE

Speakers

Pamela Villarreal

Project Engineer | Keller Associates, Inc.

T

Tsigereda Woldegiorgis

Marion County

J

Jason Pulley

City of Salem

M

Matt Kohlbecker

GSI Water Solutions

DE&I 2.0 in Organizations

10:15 AM – 11:15 AM | Location: Tech Rm 4

LEADERSHIP & WORKFORCE DEVELOPMENT

Panel on DE&I 2.0 in Organizations: Where Do We Go From Here?

10:15 AM – 11:15 AM

We've come to the realization that there's incredible strength in our diversity. Research has documented the positive business case of having more diversity in organizations, including better performance, greater access to talent, increased employee engagement, improved quality of decision making, and increased customer insight and innovation. Equity and inclusion are more difficult to quantify and change within the demographic of an organization, requiring a regular and conscious effort by organizations to close gaps. Intentionally building diversity, equity, and inclusion into workforces and places takes a great deal of time, and organizations have invested years and decades into it.

In the last two years, high profile corporations have scaled back or abandoned their DE&I policies in response to political pressure, a 2023 Supreme Court ruling against race-conscious affirmative action in college admissions, and a 2025 Presidential Executive Order to dismantle Federal DE&I initiatives.

However, our DE&I efforts in the water industry have not been for naught: we recognize that building diversity within the workforce is crucial to representing and serving our communities and there is more that can be done. How do we continue this journey? How do we build on our learning? This panel of leaders explores what's next for the water industry's DE&I journey.

Moderator: TBD

Panelists: TBD, three to four panelists representing utilities and private companies

BEGINNER

Speaker

Linet Bravo

Administrative Staff Analyst | City of Seattle

Professional Growth & Workforce Stories

10:15 AM – 11:15 AM | Location: Tech Rm 5

OUR WATER STORIES

From Aspiration to Action: Leadership Lessons in the Water Industry

10:15 AM – 11:15 AM

This panel discussion session aims to provide insights into effective leadership practices and strategies for attracting and retaining top talent in the water industry. The leaders in our organizations make a huge difference in employee satisfaction, retention, and overall performance. Attracting and retaining a great staff is more critical than ever in the water industry. In fact, many studies show that an employee's relationship with their direct supervisor is one of the top factors influencing their decision to stay or leave a job. In this session we will engage a panel of regional and national leaders and learn about their leadership journey. Each person's journey is unique and yet often with common elements. The session will include leaders from multiple sectors in the water industry (e.g., municipalities, vendors, consultants, regulators). The panel's discussion will include what led them to leadership, what characteristics a great leader has, what they admire in a leader, and what is their greatest learning. Time will be left for an audience Q&A period that will include Interactive discussions and real-life examples to engage the audience and provide practical takeaways.

INTERMEDIATE

Speaker

Mark Poling

Principal Consultant | Clean Water Management

Biological Nutirent Removal 101

10:15 AM – 11:15 AM | Location: Tech Rm 6

NUTRIENT REMOVAL

BNR Bootcamp - Preparing for Emerging Treatment Requirements

10:15 AM – 11:15 AM

Authors: Sarah Galst; Robert Sharp

As nutrient regulations evolve across the Pacific Northwest, wastewater treatment plants that currently operate without nitrogen or phosphorus limits may soon need to adapt. This introductory session is designed for individuals looking to understand the fundamentals of Biological Nutrient Removal (BNR) and prepare for future compliance requirements.

The presentation will begin with an overview of why nutrient removal matters, highlighting the environmental impacts of nitrogen and phosphorus and the regulatory changes that may affect treatment facilities. Attendees will then learn the basics of BNR, including the key microbial processes that drive nitrogen and phosphorus removal, the infrastructure considerations for implementing nutrient removal technologies, and the decision matrix associated with choosing BNR vs other treatment types.

Next, we will explore capacity limitations and planning considerations that utilities should evaluate while upgrading to nutrient removal, helping attendees understand how factors such as influent characteristics and ratios, treatment plant layout, and operational constraints impact BNR performance. The session will also cover common operational challenges associated with running a BNR plant, including troubleshooting issues such as carbon source limitations, managing seasonal temperature impacts, and process instability.

To reinforce these concepts, attendees will participate in an interactive “You Be the Operator” exercise, where they will work through real-world scenarios to select the appropriate treatment approach for different permit limits and troubleshoot BNR process upsets. The session will conclude with a final review of key takeaways, ensuring participants leave with a solid foundation in nutrient removal principles and practical strategies for planning and optimizing treatment processes as well as a brief peak past nutrient removal fundamentals, into future optimizations.

This session is ideal for wastewater operators, engineers, and utility managers who want to get ahead of regulatory changes, improve treatment performance, and ensure long-term compliance in a fun and engaging learning environment.

101 BEGINNER

Speakers

Kelley Florence

Senior Principal Engineer | Hazen and Sawyer

E

Eric Polli

Senior Principal Engineer | Hazen and Sawyer

Force Main Condition Assement & Improvements

10:15 AM – 11:15 AM | Location: Tech Rm 7

PUMP STATIONS & FORCE MAINS

The Bigger, Faster, and SMARTer PIGs: A Detailed Look at Portland's Force Main Condition Assessment Work by Site and Results

10:15 AM – 10:45 AM

Pressure pipe condition assessment has become a critical topic among public municipalities over the past decade. Many sewer system owners are at the early stages of determining the condition of their force mains and planning their integration into Capital Improvement Plans (CIP) and maintenance cycles, but what does it look like after a program has performed substantial field work?

While there are numerous questions in the industry about where to start, it is equally important to understand what the process looks like at the end. In 2020, the City of Portland’s Bureau of Environmental Services (BES) began a comprehensive condition assessment program, that included three (3) phases of fieldwork, and is now near the end of the initial 5-year effort.

This presentation will delve into the end results, showcasing the findings from three (3) select locations that have undergone the full three-phase condition assessment process. The presentation will describe the work performed, with a particular emphasis on the in-line inspection "smart pigging" tools used during the 3rd phase, and compare the output to the initial phase data from the 1st and 2nd phases. Additionally, the presentation will discuss preliminary remedial measures (rehabilitation, repairs, or preventive maintenance) and how the data collected from the condition assessment allows these to be tailored to the specific needs of the force main.

The presentation will be of interest to municipalities seeking to develop their own sewer force main pressure pipe condition assessment efforts, and also consultants and services providers looking to understand the City of Portland's upcoming pressure pipe rehabilitation needs.

ADVANCED

Speakers

M

Molly Nause-McCord

City of Portland’s Bureau of Environmental Services

Dan Buonadonna

Global Principal | Jacobs

Glenwood Force Main Air/Vacuum Valve Replacement Project Case Study

10:45 AM – 11:15 AM

Clark Regional Wastewater District (District) recently completed a project to reduce risk along the critical 2-mile long Glenwood Pump Station force main. The primary challenge? All 10 air release and vacuum relief valves had been installed without isolation, and the pump station had to remain online without disruption. The valves, installed almost 30 years ago, were reaching the end of serviceable life but were essential to long-term performance and function.

The project began with an existing conditions assessment, transient analysis and fatigue analysis. Inspection of the valves showed that at least 3 critical valve locations were functioning, and the transient analysis confirmed the valves were necessary to prevent failure. The fatigue analysis used high frequency pressure data to measure the range of pressures experienced at startup and shutdown and to estimate the annual percent of life consumed. It was determined to have 98% of the useful life remaining, indicating that the force main was worth saving if a solution to the valves could be found.

An alternative analysis used an interactive spreadsheet tool to provide a risk and cost ranked assessment for several different combination of approaches to repair and replace each valve location. The initial solution was to replace the valves using a hot top/bypass system, but a risk analysis found that to be unsuitable. In the end, the District selected installing surge tanks at the pump station and replacing four valve locations. All other remaining valves were deemed unnecessary.

The District selected duplex hydropneumatic “air bladder” style tanks in which wastewater is contained directly in the epoxy-lined steel tank and an air-filled bladder holds the design pre-charged air pressure. This option was chosen to remove the need for air compressors required on bladderless systems while remaining easy to clean because the wastewater is not within the bladder.

Decommissioning the existing valves was completed on the live force main. Bolts were countersunk into the valve body to hold the internal valve assembly in place while corroded flange bolts were replaced. A custom-machined cap was installed using the existing flange holes to permanently seal the valves shut.

The presentation will also focus on challenges and solutions to schedule issues related to specialty parts procured from overseas.

INTERMEDIATE

Speakers

Seth Sokol
Parametrix

Vanessa Johnson
Capital Program Manager | CLARK REGIONAL WASTEWATER DISTRICT

UMC 2025 Recap

10:15 AM – 11:15 AM | Location: Tech Rm 8

UTILITY MANAGEMENT

Panel Discussion: CliffsNotes version of the 2025 Utility Management Conference with National Themes Brought Local

10:15 AM – 11:15 AM

Authors: Neil Jenkins; Panelist Still Being Confirmed; Panelist Still Being Confirmed

Do you ever wish that you could get a CliffsNotes version of an entire conference? Yes, the karaoke was fun and the venue was great, but what were the messages, themes, and lasting takeaways? Specific to utility management, what are the latest trends from utilities around the nation? If you have had this thought, you are in luck. Some of our esteemed colleagues attended the Utility Management Conference this spring that was co-hosted by WEF and AWWA. The UMC conference is a place to share best practices and learn how others in our industry are dealing with their struggles, large and small. From large wastewater utilities with billion-dollar programs to small utilities experiencing high growth for the first time, there is a range of knowledge shared by leaders in our industry. What did our colleagues hear; what did they learn? What does all this mean for us in the Pacific Northwest? Come to our discussion where panelists will share the highlights of what they heard about national utility management themes that resonate locally and how they are implementing what they learned.

INTERMEDIATE

Speakers

Neil Jenkins
General Manager | Eagle Sewer District

Ting Lu
City of Portland's Bureau of Environmental Services

Ryan Locicero
Clean Water Services

Haley Falconer
Deputy Director - Water Renewal Services | City of Boise

Wastewater 101

10:15 AM – 11:15 AM | Location: Tech Rm 9

WASTEWATER TREATMENT

Wastewater Facilities Planning – Flows & Loads 101

10:15 AM – 10:45 AM

Authors: Andrew Matsumoto; Rock (Lin)

A Wastewater Treatment Facility (WWTF) Facilities Plan provides great insight into typical operation at the WWTF and allows for the phased planning of needed improvements through development of Capital Improvement Plan (CIP). One of the earliest steps of a Facilities Plan is the flows & loads analysis which analyzes historical influent data to project future treatment needs in line with the respective service area. The flows and loads analyses are crucial in creating a solid foundation for the rest of the facilities plan and resulting CIP. However, historical influent data are often taken at face value by junior engineers who lack deep experience with WWTFs and collection systems, causing more nuanced considerations to fall through the cracks. This presentation targets early career engineers who have not yet performed this analysis, mid-level engineers who are eager to improve their skills, operations staff who are interested in understanding the analysis procedure, and utility leaders about to begin a Facility Planning effort.

This presentation will outline a typical Facilities Plan approach to highlight how the flows & loads analysis is critical to the subsequent parts of the planning process, discuss how to critically analyze historical information, pose potential questions to ask the Operations team when evaluating historical data, and how to begin the analysis. A mock exercise has been created for a fictional Oregon town with common flows and loads issues that will be walked through by the presenters to reinforce the concepts and strategies presented at the beginning of the presentation. Finally, the presenters will touch on common topics in each of the PNCWA member states that may impact future flows and loads analysis.

Attendees of this talk will not only walk away with an understanding of how to successfully approach a flows & loads analysis relevant to any collection system on the West Coast, particularly one that experiences wet-weather, but also with an understanding of the necessity of collaboration between all parties to come to a solid end result that can best allocate funds for the CIP.

101 BEGINNER

Speakers

Riley Murnane

Principal Engineer | Hazen and Sawyer

A

Ana Haines

Hazen and Sawyer

Wastewater Microbiology 101: The Good, the Bad and the Ugly

10:45 AM – 11:15 AM

The objective of this session is to provide the audience with a basic understanding of the microbiology of wastewater and the types of organisms that we focus on during wastewater treatment. Our target audience includes plant operators, engineers, scientists, and lab staff.

The presentation will cover three main groups of microorganisms:

1) Activated sludge microbiology. Biological nutrient removal (BNR) is a very common and effective wastewater treatment process that is highly reliant on the conventional activated sludge (CAS) microbiology and its properties. When the CAS microbiology is out of balance or disturbed, detrimental organisms (e.g., filaments) dominate, flocs size, structure and shape changes, and operational upsets occur (e.g., reduced BNR and sludge settleability, foaming and bulking). This session helps plant operators, engineers and lab staff understand what a healthy CAS community looks like and what types of changes result in operational upsets. It highlights how operators can monitor the healthy community to detect changes and respond in a timely manner.

2) Fecal indicator bacteria. Since monitoring all potential pathogens in wastewater is impractical, we rely on the use of indicators to monitor treatment efficacy. We will discuss the characteristics of ideal indicator organisms and which of these characteristics are met by currently used indicators, including E. coli and other coliforms, enterococci, and coliphages. We will also highlight the methods, challenges and trends associated with each indicator.

3) Pathogens in wastewater. We will discuss the different groups of pathogens in wastewater that may impact public and occupational health. We will highlight best practices to keep workers safe.

101 BEGINNER

Speaker

Rasha Maal-Bared

Principal Environmental Scientist | CDM Smith

Oregon Convention Center Stormwater Management

10:30 AM – 12:00 PM

TOUR

The Oregon Convention Center has long held a leadership role in green building and other environmentally responsible business practices. In 2004, we were the first convention center to earn the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) for Existing Buildings certification. In 2014, we reached our biggest milestone by earning LEED® Platinum, the highest level of certification, and did it again for our recertification in 2023. We are also proud to be recognized as a Salmon-Safe certified venue and have an award-winning rain garden on the south end of our building which filters and cleans water before it enters our waterways. This behind the scenes tour with OCC's staff will take a look at some of our primary sustainability features including our rain garden, 2 MW rooftop solar array, and innovative back of house recycling and waste diversion program.

Stream Resilience

11:20 AM – 12:20 PM | Location: Tech Rm 1

STORMWATER & WATERSHED MANAGEMENT

From Erosion to Evolution: Resilient Stream Corridors as a Stormwater Management Strategy

11:20 AM – 11:50 AM

Authors: Marjorie Wolfe; Luke Russell; Colin Thorne

Catchment development, especially the unchecked expansion of impervious areas, accelerates stormwater runoff into streams—a process known as hydromodification. This hastens stream evolution, causing incision and widening, which depletes riparian habitat and threatens infrastructure. Traditional management focuses on controlling runoff and erosion through channel armoring or detention facilities, expecting recovery. However, in incised or confined reaches, concentrated stream power makes flow control alone insufficient to restore lost channel functions.

As an alternative, the resilient stream corridor approach reconnects streams to their floodplains and restores hydrologic and morphologic complexity in degraded reaches. This approach reinstates fluvial processes that naturally dissipate stream energy, lowering flood stages and increasing time-to-concentration by enhancing connected width and surface roughness. Morphologically, it accelerates the evolution of degraded streams toward a future condition that is easier to maintain and more productive in ecosystem services. This concept aligns with the Stream Evolution Model (Cluer & Thorne, 2014), where accelerated evolution moves impacted channels from Stages 3 or 4 to Stages 0 or 8.

For a decade, Wolf Water Resources has collaborated with urban authorities and water agencies to develop a framework for implementing the resilient stream corridor approach as a hydromodification management strategy. Our stream power-based assessment and design tool helps authorities assess, quantify, and track urban runoff impacts, linking them to resilience actions that limit or reverse hydromodification effects. Our approach can assess risks, benefits, and costs at the catchment scale more feasibly than conventional methods reliant on detailed hydraulic modeling. These strategies have been used to understand the potential of resilient stream corridors to manage the new development at Cooper Mtn in Beaverton, OR, design successful stage 8 urban stream restoration in the City of Tigard, OR, and develop guidance frameworks for the City of Portland and Aukland Council in New Zealand.

INTERMEDIATE

Speaker

N

Nora Boylan

Wolf Water Resources

Protect Your Assets with Wood not Rock - A Discussion of Using LWM to Protect Infrastructure Instead of Riprap, Concrete or other Armoring Techniques

11:50 AM – 12:20 PM

Effective incorporation of Large Woody Material (LWM) and other nature-based channel and bank revetment into a variety of water, wastewater, and stormwater projects can be an elegant alternative to riprap and armoring for protecting infrastructure from surface waters. Engineers, municipal leaders, and those in key positions of responsibility gravitate toward the tried-and-true, but the practice of applying LWM and vegetative stabilization techniques to protect critical infrastructure is well founded with countless success stories, as well as lessons learned.

My team has also developed unique approaches to applied LWM design that mimic in-stream wood found in nature while providing superior surface water management benefits. This proposed session will start by discussing the cases in which LWM is best suited for application, the benefits of using LWM versus other, more rigid methods of protecting infrastructure from surface water, and to share my team's experience with effective LWM layout, engineering, installation, and monitoring. Due to the historic approach of LWM design that can seem cookie-cutter and over-engineered, we will also share some tools to streamline this design and construction process, as well as strategic approaches to LWM placement that maximizes design efficiency, optimum habitat benefit, and constructability.

101 INTERMEDIATE

Speakers

P

Paul Beskow

Project River & WQ Engineer | GeoEngineers, Inc.

M

Morgan McCarthy

GeoEngineers, Inc.

B

Becca Miller

GeoEngineers, Inc.

Pump Optimization

11:20 AM – 12:20 PM | Location: Tech Rm 2

PUMP STATIONS & FORCE MAINS

Optimizing Pump Performance Through Rheological Analysis: A Case Study on Thickened and Digested Sludge Pumping Challenges

11:20 AM – 11:50 AM

Authors: Nick Martin; Jeffrey Zahller

ISSUE

Thickened solids pumps frequently underperform due to designs that fail to account for sludge rheology variations. At Kitsap County's Central Kitsap Treatment Plant (CKTP), upgrades to the thickening and digestion processes required evaluating new and existing pumps for thickened primary sludge and septage (TPSS), thickened waste activated sludge (TWAS), and digested sludge (DIG). Each sludge type exhibits unique rheological properties – such as viscosity and yield stress – that impact pump performance, making proper design essential to ensure reliability and efficiency.

BACKGROUND

CKTP's facility upgrades introduced hydraulic challenges for existing TWAS pumps, originally designed to pump to digesters in a different location and lower operating level. In addition, a new thickening facility relocated TPSS pumping to these new digesters, significantly increasing pressure requirements. New DIG pumps were also needed to transfer sludge to centrifuges for dewatering. These changes required a detailed evaluation of both existing and new pump systems to prevent underperformance and ensure operational stability.

METHODS

A combination of rheological testing, manufacturer consultations, and system modeling was used to assess the capacity of the TWAS pumps and design the new TPSS and DIG pump systems. Rheological properties – including viscosity, yield stress, and shear-thinning behavior – were measured using a rotational rheometer. These data informed pump selection by quantifying sludge behavior across different total solids concentrations. Manufacturer input guided design modifications to ensure existing TWAS pumps could handle the increased pressure and sludge variability without compromising reliability.

RESULTS

Testing revealed that the existing TWAS pumps would exceed their designed pressure capacity under certain conditions, requiring motor upgrades to maintain performance. For the new TPSS and DIG pumps, rheological data informed sizing and selection, ensuring operational variability. Findings emphasized the importance of designing pump systems that account for differences in sludge behavior.

CONCLUSIONS & APPLICABILITY

This study highlights the critical role of sludge rheology in pump system design, helping optimize performance and reliability. The lessons from CKTP provide a framework for wastewater facilities facing similar challenges. Integrating rheological data into pump selection enables more reliable and efficient pump design, reducing risks associated with process changes.

INTERMEDIATE

Speaker

Elaine Leonard

Water/Wastewater EIT | HDR

Spinning Ain't Winning- Properly Setting Minimum Speeds on VFD Driven Pumps

11:50 AM – 12:20 PM

During a recent operator training session at a water treatment plant in Georgia, an engineer highlighted the complexities of determining minimum speeds for Variable Frequency Drive (VFD) driven pumps. He explained that one of the most common causes of deadheading a pump in the water and wastewater industry is operating it at speeds too low to generate sufficient head to overcome the current static conditions. In such cases, the pump consumes power and produces heat, effectively turning it into a glorified water heater rather than a functional pump. One of the operators aptly summarized this phenomenon with a phrase borrowed from his drag racing days: "Spinning ain't winning." Just as spinning tires fail to transfer power to the pavement, a pump spinning without adequate output metrics achieves nothing productive.

Traditionally, rules of thumb have been relied upon for setting minimum speeds on VFD-driven pumps. However, the only accurate method involves real-time analysis of pump conditions, piping design, and current operational parameters—factors that standard SCADA systems typically cannot fully capture. By leveraging advanced analytics, utilities can transform SCADA data into actionable insights, optimizing equipment performance across varying operational scenarios.

The challenge grows even more complex when multiple pumps operate in parallel, particularly if they differ in size or have varying levels of wear on their impellers. The reality is that there is no single correct speed—optimal pump speed is a moving target that must be continuously analyzed in real time. This presentation will showcase several live systems and models, highlighting various scenarios to illustrate the intricacies of determining the right pump speed for dynamic water systems. By equipping operators with the tools and training to make these decisions dynamically, utilities can reduce energy waste and minimize equipment damage. Moving beyond outdated rules of thumb and static practices is essential for achieving more efficient and reliable pump operations.

101 INTERMEDIATE

Speaker

Ryan Hougham

Vice President Of Business Development | Specific Energy

6PPD-Quinone Fate & Mitigation

11:20 AM – 12:20 PM | Location: Tech Rm 3

STORMWATER & WATERSHED MANAGEMENT

6PPD-quinone in the MS4 and Tualatin River Watershed

11:20 AM – 11:50 AM

Authors: Scott Mansell; Karen Chichetu; Jim O'Reilly

6PPD-quinone (6PPD-q) is a toxic tire-related chemical, which has been linked to coho salmon death. Elevated concentrations have been found in rivers in Washington and other states during rain events as degraded tire-wear particles are taken up in urban runoff. Clean Water Services (CWS) implements an MS4 permit together with its co-implementers for the storm system discharging to the Tualatin River and its tributaries which bear coho salmon. To address 6PPD-q in an effective way, it is important to first understand both the occurrence of 6PPD-q as well as the spatial and temporal trends within the watershed. This information helps to guide and prioritize decisions regarding treatment types and locations. In 2025, CWS developed and validated the EPA draft 6PPD-q method (EPA 1634) for internal laboratory analysis. Partnerships and conversations with other utilities and agencies were fundamental in kick-starting this method development, and split samples were sent to a commercial laboratory for cross-laboratory validation. Since then, CWS has collected samples for analysis of 6PPD-q at various locations in the MS4 as well as surface waters from around the Tualatin River Watershed in both the wet and dry seasons. The goal for sampling in 2025 was to understand the range of concentrations that CWS expects to see in both stormwater and surface water and observe spatial and temporal trends between different land uses and seasons. Stormwater grab samples were collected from five locations in the MS4 that represent a range of traffic and urbanization. Surface water samples were also collected in the wet and dry season from rivers and creeks around the watershed. Focus was placed mainly on urbanized tributaries with no source of wastewater. These efforts will inform future sampling efforts to target areas that may be impacted more directly. Additionally, these efforts within the Tualatin River watershed have resulted in the start of conversations of areas to focus on to protect salmonids.

BEGINNER

Speaker

Summer Sherman-Bertinetti

Operations Analyst | Clean Water Services

What's Really in your Bioretention System? A Survey of Specification Compliance and Impacts of Media QAQC

11:50 AM – 12:20 PM

Over the past 10-15 years, an increasing number of municipal jurisdictions have incorporated bioretention and biofiltration practices into their design manuals for post-construction stormwater control measures (SCMs). These systems commonly consist of a horizontal bed of engineered media designed to filter and/or infiltrate runoff at a controlled rate. Adherence to the bioretention soil media (BSM) specification is critical to the performance and longevity of these SCMs, as studies have shown that BSM can export pollutants and may not meet specification requirements once installed and evaluated in-situ. Research has also demonstrated BSM variability, with different media suppliers providing different levels of media quality. While BSM specification is typically well documented in design manuals, compliance enforcement mechanisms vary greatly, with some municipalities requiring post-installation testing while others rely on periodic batch testing from certified media providers. These specification variances are exacerbated by evolving BSM formulations that incorporate additives such as coconut coir, biochar, and activated alumina or iron to address pollutant export and improve performance. These additives can require more complex and costly analytical methods to ensure the expected water quality benefits are achieved.

To assess how BSM specification is addressed on a project and plan check review level, the ASCE EWRI Stormwater Media Filtration Committee conducted a nationwide survey of stormwater professionals. This presentation will examine the results of the survey and provide recommendations to ensure that bioretention SCMs consistently meet performance, maintenance, and longevity expectations. Results will be presented on BSM analysis from suppliers with most media meeting minimum specifications. Results will also be presented on BSM characteristics not included in specifications, including some demonstrating higher than recommended levels of nutrients and fecal coliforms, most BSMs passing toxicity testing, and some demonstrating gnat and fungal growth. Attendees will learn about the variability inherent in BSM component sourcing, blending, and installation, and understand best practices that can be employed at a project or policy level to improve bioretention performance and longevity. With ever increasing focus on green infrastructure and nature-based solutions, it is critical that BSM specifications are adequate and enforced in order to provide the expected water quality benefits.

INTERMEDIATE

Speaker

Craig Fairbaugh

Contech

Career Pathways & Recruitment

11:20 AM – 12:20 PM | Location: Tech Rm 4

LEADERSHIP & WORKFORCE DEVELOPMENT

Find Your Career Path at a Small Utility

11:20 AM – 11:50 AM

Authors: Chris Kossow; Ron Gearhart; Chris Kossow

It can be challenging in a small organization to not feel like the only way that opportunities to progress in your career will happen is to wait for someone to retire or die. Maybe that is why we have hotdog lunches sponsored by staff so frequently, hoping their manager will choke on a hot dog! No really, how can small organizations motivate their staff to gain the qualifications needed to be ready to take the top jobs when their managers retire when that might be years away? Recognizing that it can be demotivating to staff to always be considered underqualified for management positions and have outsiders hired above them when they have much longer tenure than the new managers will ever have, what can be done? On the other hand, is it okay to not want to be the manager? What if your main desire is to do good work and provide high levels of customer service in the field? Do you have to want an office, desk, or uncomfortable chair? Does this decision mean that you are a failure or underperforming?

Eagle Sewer District took the challenge of workforce development in a small organization head-on. Over the course of a few years we prepared a career advancement program designed to inspire staff to reach the career level that they want. This was especially important to implement now so that when the majority of the current managers retire in the next 5-8 years there will be qualified internal candidates who can be considered for the top jobs. Come hear about the program structure and lessons learned as the new vision and career paths were rolled out to staff and implemented this last year.

INTERMEDIATE

Speakers

Neil Jenkins

General Manager | Eagle Sewer District

C

Chris Kossow

Collections Manager | Eagle Sewer District

Recruiting in non-traditional labor markets - veteran hires for construction management jobs

11:50 AM – 12:20 PM

In today's competitive labor market, it is a challenge to find and hire capable and available staff for technical and construction professional jobs. This paper and discussion will present labor statistics for technically-trained professionals in the United States, options for mining non-traditional labor pools with a focus on candidates with military backgrounds who have skills that translate well to construction management, emergency management and operations/skilled craft labor positions. Methodologies for identifying skill matches, training hiring personnel, debunking myths and overcoming other hurdles in hiring veterans, assimilating veterans into their first civilian job, and presenting success stories will be presented in this discussion. Government clients, consulting engineers, a recent veteran hire and U.S. military personnel will contribute to this paper and panel.

INTERMEDIATE

Speakers

J

John Chandler

CDM Smith

R

Rob Hamilton

Lead Recruiter | CDM Smith

P

Peter Ozzolek

CDM Smith

Personal & Shared Journeys

11:20 AM – 12:20 PM | Location: Tech Rm 5

OUR WATER STORIES

Sacred Water Journey

11:20 AM – 11:50 AM

Severe and ongoing drought has profoundly impacted the entire Colorado River basin, particularly my homeland, the Navajo Nation. Many families across the Navajo Nation continue to lack access to running water, requiring them to haul water from great distances for their daily needs. Through my upbringing, I learned the importance of water and how sacred it was to my people. Managing this vital resource requires expertise, experience, and a deep appreciation for its significance.

In this presentation, I will share my water story, from growing up on the Navajo Nation to my current role at AECOM. I will highlight my cultural understanding of water as a Navajo person through a few stories which inspirated me to purse water. I will discuss my involvement in the water industry through my internship and work opportunities through my career. These opportunities include my time doing research a Walnut Gulch Experimental Watershed in Arizona, pursuing graduate school to earn my master's in civil engineering, and interning at a small engineering firm. These experiences propelled me toward a career in water resources engineering in the Pacific Northwest and ultimately led me to AECOM, where I have expanded my expertise as a water resources planner.

Throughout my journey I always kept the teaching of water as sacred close to my heart. Although, drought impacts on the Navajo Nation continue to persist, other further water problems will arise with climate change driving more frequent and severe weather events. My expertise will be needed. I believe that my knowledge and understanding of water will be conveyed to future generations through the potential work and innovations that I do with AECOM back on my homeland.

BEGINNER

Speaker

Refreeno Harvey
Water Resources Planning Engineer | AECOM

Evolving Mentorship: How To Grow Mentoring Relationships Along With Your Career

11:50 AM – 12:20 PM

While the value of mentoring is well documented, establishing and developing successful mentoring relationships can be a challenge. In today's dynamic workplace, maintaining those relationships can be even more challenging as mentors and mentees change roles, employers, and often must be sustained virtually. While early career mentees often seek out mentors aligned with their technical interests, over time their preferred growth areas naturally trend towards broader topics such as project management, business development or team leadership. Absent intentional action, mentoring relationships can stagnate and fall by the wayside.

Throughout this interactive presentation, the presenters will draw on their personal experience to identify key activities and strategies that have contributed to their long-term mentoring relationship, and solicit feedback from the audience to highlight common experiences and identify next steps for improving the audiences' own mentorship relationships.

Specific topics include:

- Selecting a long term partner

- Establishing ground rules for engaging

- Paying it forward

- Mentor vs Mentee

- Having fun

BEGINNER

Speakers

Kristen Jackson
Jacobs

Michelle Green
Water Collaborative Delivery Association

Nutrient Removal beyond the PNW

11:20 AM – 12:20 PM | Location: Tech Rm 6

NUTRIENT REMOVAL

Leveraging Successful Nutrient Management Strategies from U.S. Estuaries: Insights for the Pacific Northwest

11:20 AM – 12:20 PM

The Pacific Northwest, including areas like Puget Sound, is grappling with water quality challenges due to nutrient loads. To address these issues, it is beneficial to learn from the approaches used in other impacted estuaries across the United States. One notable example is the New York City Department of Environmental Protection (NYCDEP), which was mandated to upgrade and operate eight of their 14 Wastewater Treatment Plants (WWTPs) using the Biological Nitrogen Removal (BNR) process. These upgrades, implemented at four WWTPs discharging to the Upper East River and four to Jamaica Bay, were part of the "Nitrogen Program." This program meticulously planned the upgrades and ensured a smooth transition to BNR operation at each facility. The program successfully met phased reductions in effluent Total Nitrogen (TN) discharges into Long Island Sound and significantly reduced TN discharges into Jamaica Bay. Key components of this success included the development of standardized BNR Design Guidance Criteria, extensive process modeling, target operational parameters for optimal BNR performance, operator training, and a supplemental sampling program. Process modeling was crucial in demonstrating to state regulators that compliance could be achieved with significantly less infrastructure than initially proposed, saving the city money and accelerating the upgrade process.

Similarly, the Chesapeake Bay Watershed, spanning six states and the District of Columbia, has seen significant improvements in dissolved oxygen levels and reductions in nutrient and sediment loading over the past fifteen years. This progress is largely attributed to the implementation of the Chesapeake Bay Total Maximum Daily Load (TMDL) and the efforts of the regulated communities within the Bay Watershed. The tools and insights developed by the EPA and the states to reduce loadings have provided valuable perspectives for other EPA regions, regulators, and regulated communities.

INTERMEDIATE

Speakers

Sarah Galst

Vice President | Hazen and Sawyer

C

Christopher Tabor

Vice President | Hazen and Sawyer

Forcemain Rehab

11:20 AM – 12:20 PM | Location: Tech Rm 7

COLLECTION SYSTEMS

Shining Solutions: How UV-Cured CIPP Saved the Ankeny Forcemain

11:20 AM – 11:50 AM

Initially constructed as a Combined Sewer Outfall to the Willamette River in 1932 and converted to a Combined Sewer Pump Station in 1952 to convey flows from SW and Downtown Portland to the then newly constructed CBWTP for treatment, Ankeny Pump Station is a historic and critical pump station for the City of Portland. Located under the Burnside Bridge in the heart of Portland's bustling SW Waterfront, the Station conveys up to 52-MGD via two forcemains under the Willamette River to Northeast Portland, and is also an integral part of the City's CSO system. It is connected to the CSO Westside Tunnel, and actively pumps to the Willamette River during CSO events, to prevent sewage flooding in downtown Portland.

On February 5th, 2024, Maintenance Staff reported a sewage release at the surface, within the pump station fence line, and directly above the 30" and 42" forcemain alignment. What followed, was a collaborative effort between the BES and Titan Utilities (contractor), to investigate the cause of the sewage release, coordinate with multiple agencies having authority over this historic and very sensitive area, and develop a repair plan that could be implemented in a timely manner while causing the least disturbance to this extremely busy and important public area.

Through CCTV and sending a person into the pipes for inspection, it was determined that the cause of the leak was a longitudinal crack in 30" Cast Iron Forcemain that was installed in 1952. Numerous factors, including the recent installation of transformers directly above the forcemain alignment, the need to keep the station powered continuously, poor soil conditions, tight site, and proximity to the Willamette and the Waterfront made open cut repair methodologies nearly prohibitive. Through thorough collaboration with the contractor, the project landed on the novel approach of repairing the segment of failed forcemain with UV-Cured CIPP liner. This presentation will detail the race to repair the Ankeny Forcemain, and all the challenges and innovative solutions that go with repairing a forcemain under such unique and difficult site conditions.

INTERMEDIATE

Speaker

A

Aaron Lawler

City of Portland - Bureau of Environmental Services

Patching Under Pressure: A Case of Crisis and Quick Thinking at Lombard Forcemain

11:50 AM – 12:20 PM

Constructed in 1982, the Lombard Pump Station is located on the banks of the Columbia Slough in North Portland. This 6,500gpm pump station receives flow from three upstream pump stations and serves the North Portland Peninsula. The Pump Station conveys sewage to a discharge maintenance hole nearly 1-mile away, via a 30-in Concrete lined Steel Pipe (CSP), where it flows by gravity to CBWTP.

On March 31, 2024, a concerned citizen called City of Portland Spill Protection and Community Response to report a possible sewage release at the base of the Columbia Blvd Overpass. Upon arriving to the location of the spill, it was clear that it was an active sewage release. The sewage leak appeared to be associated with the Lombard Forcemain as the sewage release seemed to increase and decrease with the cycling of the Lombard Pump Station pumps.

What was not clear? It was not clear was where the break in the forcemain was. The location where the sewage was visible, was not where the forcemain alignment was. Also not clear was how we would locate the break, what do immediately to reduce environmental damage and keep the public safe, or how we would repair the line. Adding to the chaos, it was quickly determined that Lombard Pump Station could not be offline for longer than two hours, before it would overflow the station.

This presentation will detail:

- The rapid response to the forcemain break: City and Contractor Collaboration on this emergency project

- The unorthodox containment of the spill that continued for the duration of the repair project, and at its peak was discharging over 1,000gpm

- Detective work to pinpoint the location of the break

- Trucking Traffic nightmare: Shutting down the Columbia Blvd Overpass for Public safety

- Close collaboration with sister Bureau

- Repair Methodology

- Lessons Learned and next steps via a planned capital project

- Cool Pictures!

Remarkably, the forcemain break was located and patched in less than two weeks, and the overpass was re-opened in less than 2 months.

INTERMEDIATE

Speaker

A

Aaron Lawler

City of Portland - Bureau of Environmental Services

Utility Resilience

11:20 AM – 12:20 PM | Location: Tech Rm 8

UTILITY MANAGEMENT

Effective Utility Management: A Basis for Organizational Assessment, Dialogue, and Improvement

11:20 AM – 11:50 AM

In 2024, The City of Portland’s Bureau of Environmental Services (BES) embarked on its Effective Utility Management (EUM) Journey. That journey, which continues today, has been comprised of 4 distinct yet interlocking phases. The first phase focused on collective learning, which began with an informational workshop and progressed through team formation and a stepwise learning progression through the attributes of EUM. The second phase, alignment, began by creating a compilation of existing improvement initiatives “aligned” with EUM attributes; that information was integrated with collective learning. The third phase, assessment, involved evaluating the importance and performance of attributes using the EUM self-assessment tools to identify priority attributes for improvements. It also provides a baseline for future re-assessment in 2-3 years. The results, along with the common language of EUM, provided a basis for leadership engagement and dialogue about current performance and priorities for improvements, leading to the fourth phase, prioritization and implementation strategy. This phase involves developing initiatives to drive improvements in priority attributes. BES’ approach and recent experience using EUM benefitted from the flexibility of the EUM framework to suit any organization's capacity and needs. This presentation offers insights to any other organizations interested in exploring EUM.

INTERMEDIATE

Speakers

T

Ting Lu

City of Portland's Bureau of Environmental Services

E

Elizabeth Lee

City of Portland's Bureau of Environmental Services

Resiliency and Emergency Planning 101: Navigating AWIA 2018 for Wastewater Utilities

11:50 AM – 12:20 PM

While the America's Water Infrastructure Act (AWIA) of 2018 mandates these efforts for drinking water systems, wastewater utilities can also benefit by integrating similar strategies to improve preparedness, strengthen infrastructure resilience, and align planning efforts with capital improvement projects. Resiliency and emergency planning are essential for wastewater system management, yet many utilities have not fully explored how risk and resiliency assessments (RRAs) and emergency response plans (ERPs) can enhance long-term planning.

This session will break down AWIA 2018 requirements for water systems and explore how wastewater utilities can apply similar risk assessment and emergency planning approaches to enhance operational effectiveness and long-term resiliency.

Key Topics Covered:

• What is AWIA 2018? Understanding RRA and ERP requirements for water systems and their relevance to wastewater systems.

• Beyond Compliance: Using RRAs as a tool for strategic planning rather than a "check-the-box" exercise.

• Identifying Risks and Resiliency Gaps: Key threats to wastewater infrastructure and how to address them.

• Integrating RRA Findings into Planning: Aligning emergency response, asset management, and capital improvements.

• Lessons from Water Systems: Insights from drinking water utilities that wastewater systems can apply.

• Case Study: How the City of Orting and other municipalities have applied resiliency planning in water systems and are now integrating similar strategies into wastewater infrastructure and long-term capital improvement plans.

This session is designed for water and wastewater professionals who may be new to AWIA 2018 requirements or seeking guidance on integrating resiliency and emergency planning into their current operations and planning processes. Attendees will leave with an understanding of the key components of RRAs and ERPs, practical approaches for implementation, and real-world examples of how these assessments are shaping long-term wastewater system planning.

Attendees will leave with an understanding of the key components of RRAs and ERPs, practical approaches for implementation, and real-world examples of how these assessments are shaping long-term wastewater system planning. Additionally, they will gain insights and actionable ideas on how to initiate and structure their own long-term risk and resilience efforts, as well as develop comprehensive emergency response planning strategies.

101 BEGINNER

Speakers

C **Chris Young**
Parametrix

 **Mari Orama**
Senior Consultant/Group Lead | Parametrix, Inc.

R **Ryan McBee**
City of Orting

Wastewater 102 - N-Removal & Filaments

11:20 AM – 12:20 PM | Location: Tech Rm 9

WASTEWATER TREATMENT

Nitrogen Removal: Fundamentals and Frontiers

11:20 AM – 11:50 AM

This abstract is being submitted in response to the call for “101” series presentations. The proposed presentation will succinctly cover nitrogen removal applied fundamentals and, time permitting, make the linkage of those fundamentals to new frontiers in nitrogen removal strategies and technologies. Fundamentals will also be linked to practical optimization strategies to deliver “take home” messages and key considerations for operating or planning nitrogen removal facilities.

Topics addressed will include:

1. Influent and effluent nitrogen speciation

2. Different nitrogen effluent limits and role of nitrogen species in reliably meeting effluent limits

3. Biological nitrogen transformations including nitrification, denitrification, and short-cut nitrogen removal pathways

4. Environmental and operational effects on nitrogen removal, key metrics, etc.

5. Nitrogen removal process configurations including activated sludge, fixed-film, and tertiary processes

6. Sidestream nitrogen load considerations and management approaches

7. Potential supplemental chemical addition needs (alkalinity and carbon)

8. Optimization strategies and their relevance to fundamentals

9. New frontiers in nitrogen removal, advanced control strategies for optimization, simultaneous nitrification-denitrification, process intensification, etc.

The presenter is a recognized expert in nitrogen removal and has given many similar presentations and webinars. The content can be easily fill a 50 minute time block if appropriate to conference needs, but this length is not a requirement.

101 BEGINNER

Speaker

Bryce Figdore

Sr. Wastewater Process Engineer | HDR

Wastewater Microbiology 101: Filamentous Organisms

11:50 AM – 12:20 PM

Authors: Rick Kelly

Filamentous organisms remain a challenge for water resource recovery facility operators. There are many reasons for their negative reputation, but filaments are not all bad. Through decades of operational support experience in evaluating and preventing the impacts of foaming and bulking caused by filamentous organisms, the presenters have assembled lessons learned from utilities across the country. The key to success is finding the right operational conditions to allow enough filaments to optimize settling, but not so many that sludge bulking or foaming occurs.

This presentation will discuss the various types of filamentous organisms found in biological treatment, how they can impact operation of a secondary treatment system, and how to keep them under control. We’ll discuss how to troubleshoot and manipulate the environment using kinetic, chemical, and metabolic factors that impact proliferation of filaments. Kinetic controls can include operational adjustments to the biological treatment system, such as controlling the timing of when readily biodegradable carbon (i.e., food) is available. Chemical controls can vary depending on whether the filaments are in the bulk sludge or in a surface foam. Metabolic controls impact the environment in which food is made available, often by modulating dissolved oxygen, such as the use of selector zones, and solids retention time.

Each approach will be presented with benefits and drawbacks, ideal conditions for implementation, and metrics for success. We will also share case studies to provide real-world examples of what has worked and challenges that utilities have overcome in dealing with filaments.

101 BEGINNER

Speaker

Mark Strahota

Municipal Operations Manager | Brown and Caldwell

Awards Luncheon

12:25 PM – 1:55 PM | Location: Oregon Ballroom

MEALS ATTENDEE EVENTS

Celebrate PNCWA's annual award winners!

Requires pre-registration.

Carlie Creek Water Quality Facility

2:00 PM – 4:30 PM

TOUR

Since December 18, 2018 the innovative Carli Creek Water Quality facility has been filtering harmful pollutants from stormwater runoff from surrounding industrial properties before it reaches Carli Creek and the Clackamas River, the drinking water source for nearly

400,000 people in Clackamas County. The facility is made up of a meandering channel with pools along nearly 1,700 linear feet of Carli Creek. There are 61 large wood habitat structures for fish and other aquatic wildlife, a backwater channel, floodplain enhancements, and diverse native species planted. The facility is a constructed wetland and contains stream restoration elements.

Sturdy walking shoes recommended. Dress for the weather and bring water. Please note there is no restroom on site.

WAVE Presentations

2:00 PM – 3:00 PM | Location: Tech Rm 1

WAVE

WAVE Presentation - Grp 1

2:00 PM – 2:15 PM

WAVE

WAVE Presentation - Grp 2

2:15 PM – 2:30 PM

WAVE

WAVE Presentation - Grp 3

2:30 PM – 2:45 PM

WAVE

WAVE Presentation - Grp 4

2:45 PM – 3:00 PM

WAVE

Sewer Condition Assessment

2:00 PM – 3:00 PM | Location: Tech Rm 2

COLLECTION SYSTEMS

To Line or Not to Line: Condition Assessment of Outfall Conduits

2:00 PM – 2:30 PM

Metro Vancouver's Iona Island Wastewater Treatment Plant Outfall Rehabilitation project assessed the condition and identified options for repair and rehabilitation of the land section of the two existing outfall conduits located on Iona Island in Richmond, BC. Constructed in 1987, the land section of the conduits consists of two 2.4 m diameter reinforced concrete pipes that are 4.5 km long. In recent years, the land section of the outfall has required several emergency repairs to rectify leaks of this critical facility.

In this presentation we will discuss the inspection methods and technologies (i.e., CCTV, lidar, drone, etc.) used to assess the condition of the existing outfall and structures and explore the condition assessment findings. We will address short-term repair and maintenance recommendations as well as long-term linear rehabilitation options including key inspection intervals required to address ongoing structural and operational issues, and to extend the outfall conduits' useful life.

ADVANCED

Speaker

Carmen Brown

Design Manager | CDM Smith

Condition Assessment: On your mark, get set, to asset class finish line!

2:30 PM – 3:00 PM

The condition assessment process evaluates baseline physical condition, through a variety of asset- or asset class-specific inspection methods. Field collected inspection data is assessed against pertinent planning data to inform asset management and capital decision making. Condition assessment serves valuable purposes including providing detailed insights on the infrastructure owned and operated by the Utility and as a basis for development of operation, maintenance, and funding strategies. A key benefit of refined condition assessment program implementation is providing increased confidence in rehabilitation and renewal near- and long-term budget forecasts.

The intent of this 101 session is to provide overview information of designing condition assessment programs. The session will cover the benefits and how-to of condition assessment for a Utility, including contracting considerations, asset data management, and program development. The session will focus on the City of Bellevue (City) wastewater and stormwater condition assessment approaches as case studies. The City stormwater and surface water system includes a large network of streams, lakes, pipelines, stormwater runoff controls, and water quality facilities. The City wastewater system includes collection system pipelines, pump stations, lift stations, and flush stations. The session will also draw from the lens of Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC) and recent recommendations that tie-in condition assessment.

101 BEGINNER

Speakers

Jaclyn Knoth
City of Bellevue

Lanelle Ezzard
TY Lin

Microplastics

2:00 PM – 3:00 PM | Location: Tech Rm 3

EMERGING CONTAMINANTS & WATER QUALITY

The Fate of Microplastics in Wastewater Treatment From Sink to Sea

2:00 PM – 2:30 PM

Microplastics—tiny plastic particles found in personal products, textiles, and industrial processes—pose a growing threat to aquatic ecosystems. These particles enter wastewater systems, where their small size and buoyancy allow many to bypass treatment and be discharged into the environment. Once in waterways, microplastics can adsorb harmful pollutants, disrupt marine life, and bioaccumulate in the food chain.

This session explores the sources, fate, and transport of microplastics in wastewater treatment processes. While some are removed through sedimentation and biosolid entrapment, others remain persistent through biological treatment and effluent discharge. A bench-scale study on synthetic and biodegradable microplastics in activated sludge, return activated sludge, aerobic digestion, and anaerobic digestion will be presented, demonstrating partial degradation of biodegradable microplastics but persistence of synthetic polyethylene microplastics.

With growing regulatory attention on microplastics, understanding their behavior in wastewater treatment is crucial. This session will review current policies, discuss technological advancements, and explore how consumer product innovations can help reduce microplastic pollution, ultimately protecting water quality and aquatic ecosystems.

INTERMEDIATE

Speaker

Teigan Gulliver
West Region Biosolids Lead | HDR, Inc

A novel microplastics detection method gives insight to a full-scale wastewater treatment plant

2:30 PM – 3:00 PM

Authors: Taylor Warnick; Ornella Sosa Hernandez; Peter Schauer

Microplastics (MPs) are small plastic particles and fibers measuring less than 5mm in size. These are considered emerging contaminants, as they are invariably of human origin, and are the source of considerable scientific concern due to their environmental persistence and negative impacts on living systems at both organism and ecology-based scales. Wastewater treatment plants remove the majority of MPs from effluent, as they mostly become entrained in solids. While surveys of MP particle distribution on wastewater facilities have been performed, the amount of MP handled by each facility is as individual as their customer base and may require individual survey.

No mass-based methods for determining microplastics are available for wastewater sludge, with most methods relying on particle counts for quantification. However, MP particles can vary greatly with regard to size, shape, and mass. Quantifying microplastics in terms of mass load is far more valuable from an engineering perspective than particle counts. For this reason, we developed a novel method for quantifying microplastic mass in a variety of wastewater matrices. This method has been optimized and was used to process samples from a full-scale plant to develop an understanding of plastics partitioning through the solid and liquid trains. We will present this method, as well as full-scale plant data from the Durham Advanced Water Resource Recovery Facility. This facility relies on fermentation to support biological phosphorus removal and digesters to process solids waste. The goal of this project was to understand the fate and transport of MP particles through these systems. Data collection from Fall 2024 indicates that microplastics comprise 0-4% of total solids at this facility, depending on waste stream and sample location in the plant. Highest MP mass was found primarily in high solids samples, with all plant effluent water samples showing non-detect values. These data, as well as a mass balance of solids through the plant, will be presented showing potential for error and plastic loss and/or input from various plant processes.

BEGINNER

Speaker

Rachel Golda

Operations Analyst II - Research | Clean Water Services

Biosolids Thickening

2:00 PM – 3:00 PM | Location: Tech Rm 4

BIOSOLIDS & RESOURCE RECOVERY

Thickening - Simple Process, Mixed Results

2:00 PM – 2:30 PM

Thickening as a unit process is quite simple, has a small footprint, and is easy to operate. Yet in practice, performance is inconsistent even with mechanical devices, which may average 5% but range from 2% to 8%. Such performance ranges are common to all thickening technologies. On average, thickening performance regardless of equipment type is not only inconsistent but also does not achieve very good thickening altogether. The volume reduction through thickening impacts downstream unit process capacity and drive capital costs. That is not to mention the enormous energy wasted to heat excess water in anaerobic digester feeds. Industry wide this could be measured in hundreds of gigawatts per year. One example facility serving roughly 700,000 people could save 6,000 MW pear year in digester heating. Better thickening can lower operation cost, free up capacity, reduce downstream infrastructure demands and lead to overall more sustainable solutions.

While the technology is simple, achieving more consistent performance is not just a function of improving machine operation. The variability is in part tied to the variability of the solids stream. Without upstream equalization the feed concentration of primary solids will vary with diurnal load fluctuations. Further, first flush events in the collection system can generate slug load of heavy, already partially thickened solids. Secondary solids are more consistent yes full-scale thickening result is not less variable.

Thickening may also be the only unit process where the best possible performance is not always desirable. Thickened sludge, especially waste activated sludge, can have very high friction losses. This often-overlooked fact is the reason that thickened sludge pumping is the most common failure point in thickening operation.

This presentation will review the various thickening technologies, their pros and cons, include full scale performance examples, and discuss options to optimizes performance.

101 INTERMEDIATE

Speaker

Mario Benisch

HDR

Advanced Thickening Upgrades: Maximizing Existing Assets by Integration of New Technology

2:30 PM – 3:00 PM

Authors: Oskar Agustsson; Kip Summers; Tyle Zuchowski

The LOTT (Lacey, Olympia, Tumwater, Thurston County) Clean Water Alliance is located on Puget Sound in Olympia, WA. LOTT operates the Budd Inlet Treatment Plant (BITP), with an average flow of 13 million gallons per day (MGD). BITP relies on four large dissolved air flotation (DAFT) tanks for co-thickening waste activated sludge (WAS) and primary sludge (PS) prior to digestion. The DAFTs, constructed in 1982, perform well, but much of the mechanical equipment has reached the end of its useful life and a significant upgrade was due.

Key objectives this presentation will address:

• Demonstrate strategies to upgrade existing DAFTs with more modern technology, self-aspirating recirculation (SAR) pumps, as opposed to traditional pressurization tanks.

• Present a methodology and results from a full-scale pilot to test SAR pump performance.

• Summarize results and lessons learned from the completed full-scale upgrade, providing design information for use by other utilities and engineers.

In 2017, DAFT 4 was utilized as a full-scale pilot. A single SAR pump (pumping recirculated DAFT effluent) was installed in place of the existing pressurization tank system. The SAR pump concept utilizes a rotameter to direct small amounts of ambient air into the pump volute, where it is compressed into the discharge. Flow from the pump is directed across a throttled valve, inducing a high pressures loss and release of fine bubble entrained air. This is followed by mixing with WAS, PS and polymer prior to entry into the DAFT.

LOTT stress tested the DAFT in 2019 (targeting 6 percent total solids and over 20,000 lb/d). The system reached approximately 12,000 lb/d. The pilot study was modified to add a second SAR pump in parallel. A customized header with a series of ball valves was designed to better control the throttled air release. The second, dual SAR pump pilot, was stress tested in late 2020 and early 2021. The testing achieved loadings above 25,000 lb/d per DAFT.

Given the pilot success, a full upgrade for the remaining DAFTs was completed in 2023-2024. Operational in October 2024, the system is producing consistent effluent solids at 6-8 percent total solids.

ADVANCED

Speaker

Jeffrey Zahller

HDR

Organics & Biosolids Planning

2:00 PM – 3:00 PM | Location: Tech Rm 5

BIOSOLIDS & RESOURCE RECOVERY

Everybody Does It - Biosolids Planning 101

2:00 PM – 2:30 PM

Taro Gomi may have taught us that “everyone poops” but there remains a shroud of mystery in our industry around how to best plan for and manage the solids that every wastewater treatment plant produces. Effective management of wastewater solids reduces risk to the utility, aligns management of these resources with the community’s values, and provides an opportunity to demonstrate to ratepayers how their rates are being effectively used. This presentation will cover how planning for a biosolids program is different from other planning efforts that wastewater utilities develop, the basics of a biosolids management plan, and what tools and approaches we have found to be most effective in developing a successful biosolids management plan.

Key topics will include aligning community and utility values with outcomes of a biosolids management plan, sifting through the myriad possibilities and technologies in this field (e.g., digestion processes, pyrolysis, composting, etc.), managing uncertainty in the face of changing market and regulatory conditions (e.g., PFAS), and effectively making decisions in the face of a surfeit of inputs.

Drawing on nearly 20 years of firsthand experience conducting evaluations and developing planning documents, case studies will be presented to demonstrate the tools available for evaluation and decision making as well as what common attributes apply to any successful biosolids management plan. With this information, utility staff and consultants should be better positioned to clarify what goals they seek to address with their plan, what opportunities are available to them, and what implementation tactics have been shown to lead to positive outcomes. Everyone poops… so you might as well plan for it.

101 BEGINNER

Speaker

Ian McKelvey

Director | Brown and Caldwell

Analysis of Food Waste Recycling Alternatives in King County, Washington

2:30 PM – 3:00 PM

In 2022, Washington State passed House Bill 1799, requiring agencies statewide to divert 75% of organic material from landfills by 2030, including food waste. In response, the King County Solid Waste Division (SWD) developed a strategy to reduce as much organic waste as possible going to its landfill. Working in collaboration with King County Wastewater Treatment Division (WTD), SWD and WTD jointly chartered the Food Waste Recycling Alternatives Analysis project.

This presentation will provide an overview of how King County navigated concepts to develop a new commercial food waste (CFW) processing program, including evaluation of technologies and co-digestion and composting alternatives. This culminated in a business case evaluation of monetary and non-monetary benefits and drawbacks for three alternatives, using Jacobs' multi-objective decision analysis (MODA) process. This session will also provide insight into how Jacobs and the County evaluated potential cost recovery methods and balanced a range of risks, including technical, schedule, reliability, policy, regulatory, economic, contractual, and public perception.

INTERMEDIATE

Speakers

Matt Noesen
Wastewater Regional Solutions Leader - West U.S. | Jacobs

D

Drew Thompson
King County

S

Shruti Jagini
Jacobs

Biological Process Optimization

2:00 PM – 3:00 PM | Location: Tech Rm 6

TREATMENT INNOVATION & INTENSIFICATION

A Breath of Fresh Air – Understanding the Importance of Diffused Aeration Systems

2:00 PM – 2:30 PM

Diffused aeration is a very critical system to a wastewater treatment facility. Although the capital expenditure of a diffused aeration system is inexpensive compared to many other parts of a wastewater plant, the operating expense for an aeration system is very significant and accounts for approximately 49% of operating expenditures. In addition, a diffused aeration system highly contributes to meeting treatment goals. The main challenges of a diffused aeration system are to meet effluent treatment objectives while also minimizing energy usage, maintaining diffuser integrity, managing diffuser fouling and clogging, and minimizing O&M costs. Given these challenges and the importance of meeting treatment objectives, the selection of the diffuser system is a very important one for a wastewater treatment municipality. This presentation will summarize main goals, challenges, design, aeration and diffuser fundamentals, applications, importance of quality control, diffuser technologies, and case studies of diffused aeration systems. The goal of the presentation is for the audience to acquire basic knowledge of diffuser aeration system so that when selecting a diffused aeration system they can make a more informative decision.

101 INTERMEDIATE

Speaker

B

Bryen Woo
Aquarius Technologies LLC

MBR Optimization at the Tri-City WRRF

2:30 PM – 3:00 PM

Authors: Steven Rice; Dan Strong

Clackamas Water Environment Services (WES) owns and operates the Tri-City and Kellogg Creek Water Resouce Recovery Facilities (WRRFs). Since Kellogg Creek is space constrained, the digested sludge generated at Kellogg Creek is hauled to Tri-City for dewatering. Secondary treatment at Tri-City is accomplished in a conventional non-nitrifying train and a parallel nitrifying membrane bioreactor (MBR). While not required to meet a specific ammonia concentration limit, Tri-City minimizes effluent ammonia concentrations by routing the ammonia rich dewatering centrate from both WES treatment plants to the MBR process. This practice has resulted in average MBR feed ammonia concentrations two to three times higher than typical. These high ammonia concentrations coupled with the periodic nature of the dewatering return have resulted in periods of elevated effluent ammonia concentrations from the MBR process. In light of these challenges, WES has invested in optimizing their MBR process in recent years, to maximize ammonia removal.

The optimization process began with a review of the elevated MBR effluent ammonia concentrations between 2019 and 2023. While some of these events appeared to be due to occasional low dissolved oxygen concentrations and solids retention times, the majority appeared to be due to the periodic nature of the centrate return. Currently, centrate loads from Kellogg Creek and Tri-City are not equalized prior to return and both centrate streams are returned over a 10 to 12 hour window, which increases the ammonia load by a factor of 10 through the course of the day. Many of the elevated ammonia concentrations occurred when centrate return significantly increased to compensate for days when no Kellogg sludge was processed or simply when centrate was returned over a shorter window. Based on this analysis, WES has started to directly monitor the MBR feed ammonia concentration and is in the process of implementing centrate equalization.

This presentation will highlight WES's on-going MBR optimization work including a review of their current MBR operational practice, the data review and process modeling that led to recommendations to minimize ammonia concentrations in the MBR effluent, and WES's current effort to construct combined centrate equalization.

ADVANCED

Speaker

Anne Conklin

Engineer | Carollo Engineers

Collection & Conveyance 101

2:00 PM – 3:00 PM | Location: Tech Rm 7

COLLECTION SYSTEMS

Collection Systems 101: Anatomy of a Sewer

2:00 PM – 2:30 PM

Collection systems gather and transport wastewater and/or stormwater from generation points to discharge points. They are the veins and arteries of modern cities, critical to their function yet typically invisible. In this “101” session, we will present an overview of how collection systems are built, what they look like, and how water professionals interact with them.

The presentation will cover the following topics:

• What makes up a collection system?

- Parts and pieces: pipes, manholes, catch basins, etc. with illustrations of each

- What sizes and materials are typically encountered

• What is the difference between combined and separated systems?

- Where should you expect to encounter each

- Why the difference matters

• How do we inspect an existing collection system?

- Remote versus direct inspection

- Overview of inspection technologies

- Safety considerations when conducting inspections

• How do we design a collection system?

- Typical design approach, with visual examples

- Common design parameters such as manhole spacing, drop through manholes, crown elevation matching, etc.

• How do we construct or repair a collection system?

- Replacement versus rehabilitation

- Open cut installation versus trenchless options

- New alignments

- Bypass pumping

- Traffic control

The presentation includes two presenters in order to provide two viewpoints: that of an experienced project engineer and an engineer who is new to learning how to evaluate and design a collection system. Both presenters will cover the technical elements of collection systems and the lessons they’ve learned personally through project work.

Note to reviewers: this presentation is, by design, highly flexible. If we are paired with another presentation and need to focus on specific elements to provide a useful lead-in, we can easily modify our emphasis accordingly.

101 BEGINNER

Speakers

H

Hunter Bennett-Daggett

Tetra Tech

Katelin Vandehey

Civil Designer | Tetra Tech

Tunneling for Water, Stormwater, Wastewater Conveyance Infrastructure

2:30 PM – 3:00 PM

Urbanization and rapid population growth has accelerated the need for underground engineering to address new infrastructure needs and maintenance challenges, leading to solutions using tunneling and trenchless technologies involving tunnel boring machines (TBMs). While these methods require specialist capabilities and require a greater degree of attention during planning, design, and construction stages, they offer unparalleled benefits, such as significantly reduced construction related surface impacts on traffic management, utility relocation, pedestrian access, and reduced environmental risks associated with ground, noise, and vibration impacts.

This presentation will focus on tunneling and microtunneling as an increasingly popular method of constructing of new water, wastewater, and utilities infrastructure. Case studies will be presented, including the Metro Vancouver’s Annacis Island WWTP Outfall project, the Suffolk County Outfall Tunnel Project, The Beaver Creek Clean Rivers Project, and the Cemetery Brook Drain Tunnel Project. Discussion will highlight types of tunneling methods, alternative analysis, design and construction considerations, appropriate use of these methods, and typical risks and benefits.

101 ADVANCED

Speaker

M

Mahmood Khwaja

CDM Smith

Developer Handover & Influent Pump Station Upsizing

2:00 PM – 3:00 PM | Location: Tech Rm 8

SMALL COMMUNITIES & DECENTRALIZED SYSTEMS

More Than Quadrupling Your Influent Pumping Capacity with NO Concrete

2:00 PM – 2:30 PM

Authors: Chad Tesarik; Terry Scoll

The City of Mount Vernon's Influent Pump Station constructed in the 1980s had a six million gallon per day facility with 40 HP motors. The four same sized pumps with 60 HP motors increased the rated capacity to 12.3 MGD in a caisson compartmentalized wet well dry well facility. In 2009 the plant constructed a new headworks and primary clarifiers to enhance its primary treatment capacity. A new 30-inch force main connection intercepted the old headworks connection to the new headworks which is at a slightly higher elevation than the old facility. In 2013 the plant maintenance and operations crews removed two pumps and installed two new Archimedes screw pumps to reduce ragging and maintenance issues that was plaguing them every week. The reliability of the station increased; however, the city still experienced overflows at its CSO regulators during storm events. Then in 2015 one of the two original pumps had a catastrophic impeller failure and needed replacement. Again, the maintenance crew spun into action, purchased, and installed new dry pit submersible pumps. This increased the capacity of the influent pumping station to approximately 24 MGD. This added capacity while significant, the plant still experienced CSO overflows. HDR performed an analysis of the original piping inside the pump station and the short piece of original force main to the headworks. At 24 MGD the velocity in the original header exceeded 17 fps. This was a concern as there were two 90-Degree elbows inside the station exceeding 35 years old and their integrity was unknown. The city wanted to squeeze the last bit of capacity it could from the original deep station, After the design and construction of the new internal and external header, the plant pumped more than 28 MGD. No new concrete and only a stick of pipe, the city pumped more than four times the capacity of the original design! This presentation will present the sequences from the 2013 improvements to the recent improvement that led to the increases in capacities.

101 INTERMEDIATE

Speakers

John Koch

Senior Project Manager | HDR

K

Kenny Packard

HDR

Whether you like it or not, a Developer just gave you a Collection System and Treatment Plant

2:30 PM – 3:00 PM

Authors: Laura Markham

So a developer wants to design and build a new collection system and treatment plant for his new planned unit development over the hill from your current service area and give it to you to own, operate, and maintain forever after. Should you take his offer? If you do, what would the conditions be? What if you are the new leadership that is inheriting this agreement that happened a decade ago; how do you make the most of it?

Eagle Sewer District recently became the owner of a developer-designed and funded collection system and treatment plant. This talk will share lessons learned during the planning, design, construction, and startup phases that may be insightful for other POTWs that are approached by developers wanting public works to own/operate their collection and treatment systems. Included are lessons about technical design strategies, construction inspection, cost of service study and financial reporting, and ownership transitions. Come learn whether to lean into an opportunity like this or run away quickly.

ADVANCED

Speaker

Neil Jenkins

General Manager | Eagle Sewer District

Wastewater 102 - P-Removal

2:00 PM – 3:00 PM | Location: Tech Rm 9

WASTEWATER TREATMENT

Enhanced Biological Phosphorus Removal 101

2:00 PM – 2:30 PM

Authors: Emily Yates

Surface water systems, such as freshwater rivers and lakes, maintain a balance of plant and animal growth that is driven by the availability of nutrients, notably nitrogen and phosphorous, in the aquatic environment. An influx of these nutrients can cause large blooms of aquatic plants, which rapidly uptake nutrients and create eutrophication events once the initial influx is exhausted and the bloom dies off. For freshwater systems, phosphorus is frequently the limiting nutrient, rather than nitrogen. As a result, the approach to control eutrophication is to limit the discharge of phosphorus. While non-point sources, such as agricultural run-off containing fertilizers, often contribute more phosphorus to the environment, wastewater treatment plants are frequently required to restrict their discharge of phosphorus because of the ease of regulating point source discharges. Phosphorus removal can be achieved by chemical precipitation using either alum or ferric chloride to precipitate out the phosphorus; however, chemical usage results in operators handling hazardous chemicals, increased operational costs, and increased sludge production as a result of the chemical precipitation process.

As an alternative to chemical addition, enhanced biological phosphorus removal is a biological process that can be implemented in the secondary treatment process to remove phosphorus by sequestering the phosphorus inside of the bacteria in the activated sludge system, where phosphorus is removed during the sludge wasting process. This presentation will discuss the fundamental mechanism of enhanced biological phosphorus removal, including our current understanding of the bacteria and the different metabolic activities for these bacteria involved in the process. This presentation will also discuss different process configurations, including traditional activated sludge process (e.g., 5-stage Bardenpho, A20, A0) and aerobic granular sludge, as well as key operational parameters, the potential for struvite formation, and concerns about phosphorus recycling with EBPR systems.

101 INTERMEDIATE

Speaker

J **Jason Flowers**
Senior Engineer | Geosyntec Consultants

Striking the Balance: Efficiency vs. Sustainability in Phosphorus Removal

2:30 PM – 3:00 PM

This presentation delves into the key differences between chemical and biological phosphorus removal methods in water resource reclamation facilities (WRRFs), equipping attendees with the knowledge to select the most effective approach for their specific applications. It will provide a comprehensive comparison of the design, operation, and implementation of both methods, highlighting their respective strengths and limitations.

A key focus will be on strategies to optimize phosphorus removal, including the integration of chemical and biological approaches to achieve both conventional and low phosphorus limits in a sustainable manner. Attendees will gain valuable insights into factors influencing method selection, such as influent characteristics, effluent phosphorus targets, and overall process efficiency.

By the end of the session, participants will be equipped with practical tools to evaluate and implement the most suitable phosphorus removal strategy for their facility. The presentation will also explore ways to achieve consistent, reliable performance while minimizing operational complexity and costs.

This session is designed for design engineers, utility staff, and plant operators seeking a deeper understanding of phosphorus removal technologies and their real-world applications.

INTERMEDIATE

Speakers

M **Murthy Kasi**
Ardurra

B **Brent Deyo**
Project Manager | Ardurra

P **Prithviraj Chavan**
National One Water Director | Ardurra

Break

3:00 PM – 3:15 PM | Location: Pre-Function A

BREAK

Grab a coffee and snack and catch up with friends between sessions!

Stream Corridor Renewal

3:15 PM – 4:15 PM | Location: Tech Rm 1

STORMWATER & WATERSHED MANAGEMENT

Transforming Urban Drainage in Seattle's South Thornton Creek Basin

3:15 PM – 3:45 PM

The South Thornton Natural Drainage System project, located along multiple blocks within the southern part of the Thornton Creek basin in northeast Seattle, involves constructing 36 bioretention cells across five sites to manage 13.9 acres of effective impervious area, treating an estimated 9 million gallons of stormwater runoff per year. This effort will help protect Thornton Creek, a salmon-bearing urban creek, by reducing pollutants such as copper, zinc, and 6PPD-quinone. Delivered through partnerships between Seattle Public Utilities, Seattle Department of Transportation, Washington State Department of Ecology, and others, the project provides multiple benefits to the neighborhood and ecosystem:

-Greener outdoor spaces

-Reduced flood risk

-Improved natural habitats and healthier creek ecosystems

-Calmer traffic patterns

This presentation will delve into the lessons learned from the construction and focus on how the project navigated the construction challenges of retrofitting the right-of-way in informal street systems while implementing various innovative features across multiple sites with different constraints. Innovations constructed by the project include: UIC wells, pit drains, high-performance bioretention media, custom curb inlets, weirs, structural soil cells, pre-settling tank, public art and others. The performance of the UIC wells, pit drains, and pre-settling tank will be monitored and the results as well as the construction lessons learned will be used to inform future projects and expand the toolbox available to the City's green infrastructure program.

INTERMEDIATE

Speakers

Dustin Atchison

Global Principal Stormwater and Watershed Management | Jacobs

J

Juan Romero

Jacobs

EROSION EXPOSURE: USING STREAM EVOLUTION TO CREATE RESILIENT STREAM CORRIDORS WITH SANITARY SEWER UPGRADES

3:45 PM – 4:15 PM

Sanitary sewer systems and urban streams often share the same space, leading to conflicts when stream erosion exposes pipes and threatens water quality. At the same time, urban streams are often degraded by increased runoff. What if we found a way to cost-effectively restore urban streams while upgrading sewers? Traditional sewer upgrade projects have avoided impacts to degraded natural areas and resources at great expense, choosing deep alignments in streets or trenchless approaches. These projects have been single-purpose and focused solely on sewer delivery. Choosing an integrated or community-centered approach that restores stream corridors with sanitary sewer upgrades can lead to streamlined permitting and self-mitigating projects, reduced construction costs, and a more resilient urban stream.

This resilient stream corridor approach fast-forwards the evolution of degraded streams towards a future condition that benefits infrastructure and is more productive in terms of ecosystem services. An accelerated evolution is increasingly referred to as moving the impacted channel from Stages 3 or 4 to Stages 0 or 8 in Cluer and Thorne's 2014 'Stream Evolution Model.' The Stage 0 and Stage 8 conditions dissipate stream energy by integrating vegetated buffers and active channels to minimize erosion potential and maximize biodiversity and flow attenuation.

For a decade, we have been working with multiple urban agencies and developers to develop a framework for the practical implementation of the resilient stream corridor approach as a hydromodification management strategy. We have reduced construction costs and improved the riparian corridor, leaving communities with a resilient stream corridor that also improves water quality, attenuates runoff, and provides habitat for multiple species, including humans.

INTERMEDIATE

Speaker

E

Emily Yokum

Wolf Water Resources

Rehabilitation & Trenchless Technology

3:15 PM – 4:15 PM | Location: Tech Rm 2

COLLECTION SYSTEMS

Trenchless Rehab 101: Introduction to Cured in Place Pipe, Spiral Wound Liner, and Pipe Bursting

3:15 PM – 3:45 PM

Navigating the numerous trenchless sewer pipeline rehabilitation options on the market can be overwhelming for newcomers to the trenchless rehabilitation world. This presentation will demystify three trenchless methods: cured-in-place pipe, spiral wound liner, and pipe bursting. The three technologies discussed will cover both established and emerging technologies applicable to a wide range of sewer rehabilitation applications, from small to large diameters. Introductory topics include applications, cost benefits, advantages, and limitations associated with each method. High-level case studies will illustrate real-world project examples, providing practical context. By the end of this presentation, attendees will have a foundational understanding of when and how to select and implement these trenchless rehabilitation techniques and how to implement them for their specific project needs.

101 BEGINNER

Speakers

Sarah Merrill

Engineer | WSP

P

Pranoti Deshmukh

WSP

Selection of Trenchless Rehab Technologies for Small and Large Diameter Sewers

3:45 PM – 4:15 PM

Trenchless rehabilitation of sanitary sewers provides a cost-effective method for renewal of existing pipes. There are numerous trenchless rehabilitation technologies to suit a wide range of conditions, particularly in scenarios where open trench replacement of pipes would be prohibitively expensive or disruptive to the public. This presentation will review three project case studies, all performed in cooperation with the City of Portland Bureau of Environmental Services, which considered varying rehabilitation methods for gravity sewer pipes from 8 inches to 66 inches in diameter. Technologies considered for the projects included cured in place pipe lining, spiral wound pipe lining, slip lining, pipe bursting, horizontal directional drilling, and auger boring.

The presentation will describe how various trenchless technologies were utilized for small and large diameter pipes to solve issues including busy commercial roadways, constrained residential areas, sensitive environmental areas, dense vegetation, limited access project sites, existing utility impacts, geotechnical hazards, buried fittings and structures, and pipe depths greater than 80 feet.

Attendees will gain valuable knowledge on the decision-making process the design teams used to select rehabilitation methods for each project, the specific benefits and limitations encountered and how the projects will restore function to deteriorated sewer pipes at a fraction of the cost of traditional methods. The attendees will leave with insights on how these approaches can be applied to similar projects in the future.

INTERMEDIATE

Speakers

J

Jacob Korsness

Senior Water/Wastewater Project Manager | WSP

Sarah Merrill

Engineer | WSP

P

Pranoti Deshmukh

WSP

PFAS & Industrial Micropollutants

3:15 PM – 4:15 PM | Location: Tech Rm 3

EMERGING CONTAMINANTS & WATER QUALITY

PFAS in Biosolids: Navigating New Updates & 7 Key Steps for Effective Source Control & Mitigation

3:15 PM – 3:45 PM

Authors: Kyle Thompson

The USEPA has published its Draft Risk Assessment for PFAS in biosolids. This document does not compel regulatory action, but it is a sign of future regulations and is expected to accelerate the expanding list of states and jurisdictions that are taking action on this issue.

PFAS are a challenge for wastewater treatment plants (WWTPs) due to the complexity of separating compounds in a wastewater matrix, partitioning of different PFAS compounds into different phases, and difficulty of destruction. In biosolids specifically, PFAS are present in the parts-per-billion range (1000x higher than drinking water MCLs) and have a natural affinity for the solids due to their hydrophobicity.

This presentation provides an overview of the regulatory framework for PFAS management in biosolids, PFAS fate in WWTPs, and potential treatment options. It also discusses opportunities to reduce or mitigate PFAS through source control by discussing the key findings of the Water Research Foundation's Project #5082: Investigation of Alternative Management Strategies to Prevent PFAS from Entering Drinking Water Supplies and Wastewater.

For treatment, several potential technologies have emerged for PFAS destruction in biosolids like incineration, pyrolysis, gasification, supercritical water oxidation, and hydrothermal alkaline treatment. All technologies but incineration need to be proven at demonstration or full scales. Incineration has shown PFAS reduction in the solids phase, but PFAS are volatilized into the air emissions.

Source identification and control remains the most effective and economical way to control PFAS. Carollo's research has identified threshold PFAS concentrations that indicate when industrial sources are the most likely contributors to WWTPs. Further, insights from Water Research Foundation's Project #5082 suggest it is critical for utilities to characterize PFAS sources and minimize PFAS contamination of water resources. However, utilities should be ready to address a significant load from domestic wastewater sources as well.

Four key learnings from this presentation include:

- Why PFAS end up in biosolids.

- A regulatory update on biosolids disposal.

- An overview of PFAS biosolids destruction technologies.

- Why source identification and control are important.

INTERMEDIATE

Speaker

Tyler Kane

Carollo Engineers

Your Biosolids PFOS level just exceeds 20 µg/kg? Thank goodness there are Laundromats in the Sewershed

3:45 PM – 4:15 PM

Authors: Michael Cubas

Biosolids land application PFAS limit is tightening everywhere. States like California is contemplating a legislative ban. What is your State planning to do and do you have a plan to address the upcoming changes? Do you know what is in your biosolid? Do you know what is coming from your sewershed that may have contributed to your biosolids PFAS level?

Absence of industrial users such as papermills or electronics manufacturing in the sewershed, commercial users such as carwashes and laundromats are gaining attention as potential significant contributors to PFAS in wastewater. These users' contribution could potentially be controlled with a good source control program. However, if your sewershed is mostly residential, the PFAS base load of your wastewater is mostly contributed by PFAS in individual household discharges, it would be a lot harder to reduce the biosolids PFAS level in such system. Unless there is outright banning the use of PFAS in everyday products like cosmetics, sunscreens, cleaning products, … etc, public education and consumer behavioral changes would be the remaining tool set to bring about long-term changes. What can be done in the interim if biosolids land application limits tighten fasten than the long-term behavioral changes?

This abstract will discuss how three wastewater facilities in the Pacific Northwest have been doing to understand what PFAS is in their wastewater, the transformation of the PFAS through their facility and what level of PFAS is found in their biosolids. It will also present some future steps that the facilities would be doing in further understand their sewershed characteristics, and the challenges of implementing those steps.

If your sewershed upstream of your facility is mostly residential and biosolids generated are beneficially reuse by land application, there are some promising options for side stream treatment that maybe able to bring your biosolids PFOS level if they are just a hair above 20 µg/kg, If your state is contemplating a complete ban of land application, this abstract will present a few biosolids management options. This abstract intends to give an introductory overview of the Biosolids land application challenges lying ahead and potential path forwards.

101 INTERMEDIATE

Speaker

Kenneth Hui

Project Manager | CDM Smith

Dewatering & Drying

3:15 PM – 4:15 PM | Location: Tech Rm 4

BIOSOLIDS & RESOURCE RECOVERY

Biosolids Dewatering and Drying

3:15 PM – 3:45 PM

Biosolids handling and disposal can be one of the most frustrating parts of operating a water resource recovery facility. Disposal of the biosolids can seem costly and time consuming, especially considering biosolids are not typically found on a discharge permit. PFAS and other contaminants of concern are quickly compounding the issues of biosolids disposal and reuse. Depending on the process, return streams from biosolids handling can also be a major concern for operating the rest of the plant. For example, mechanical dewatering can negatively impact liquid stream treatment capacity due to increased nutrient recycling from the pressate stream. Similarly, upsets or process changes in the liquid stream processes can lead to unintended consequences in the biosolids handling. Understanding the factors that affect biosolids handling can improve dewatering and drying performance.

This presentation will focus on biosolids dewatering and drying as well as discuss the basic mechanisms used for several major technologies. The goal of the presentation is to provide the listener with a better understanding of how these technologies can be effectively applied at water resource recovery facilities to help alleviate current and future issues.

101 BEGINNER

Speaker

D

Dallin Stephens

Keller Associates, Inc.

Sludge Dewatering: Comparing Technologies for Municipal Wastewater Plants

3:45 PM – 4:15 PM

Sludge dewatering is a critical process in municipal wastewater treatment, affecting disposal costs, regulatory compliance, and environmental impact. Various dewatering technologies—including belt filter presses, centrifuges, screw presses, and rotary presses—offer distinct advantages and challenges depending on sludge characteristics, energy consumption, and operational requirements.

This session will compare the technologies, providing insights into factors such as polymer demand, solids capture rates, maintenance needs, water usage, and energy usage. Case studies from municipal wastewater facilities will illustrate real-world performance and best practices for optimizing dewatering processes.

Attendees will gain a comprehensive understanding of dewatering technology selection the advantages and disadvantages of each technology, and how process improvements can enhance sludge management.

101 INTERMEDIATE

Speaker

Teigan Gulliver

West Region Biosolids Lead | HDR, Inc

Pyrolysis and Gasification

3:15 PM – 4:15 PM | Location: Tech Rm 5

BIOSOLIDS & RESOURCE RECOVERY

Designing for the Future of Solids Management Optimizing Drying and Pyrolysis Treatment Design

3:15 PM – 3:45 PM

Authors: David Ernst; Mohammad Abu-Orf; Allan Briggs

The presence of PFAS in biosolids has resulted in significant challenges for the municipal wastewater industry, especially for those utilities who land apply biosolids for beneficial use. In addition, the State of California and serval municipalities across the country have regulations in practice that have developed programs to reduce Short Lived Climate Pollutants (SLCP), which include the diversion of organic waste from landfills and reduce methane emissions. With climate change and a greater focus on a circular economy, these practices are very likely to become more common throughout the country. With these challenges comes opportunities making it an exciting time for solids treatment in our industry.

This paper discusses a novel solids management approach at a small a water resource recovery facility (WRRF) to address these challenges and will benefit utility managers, operation and maintenance (O&M) practitioners, and engineers by providing:

• A highlight of the indirect thermal drying and pyrolysis system sizing,

• Optimization of solids handling prior to biodrying, and

• The lessons learned during the detailed design process.

The Windsor Water District (District) in California owns and operates a 2.25 mgd Water Reclamation Facility (WRF) that currently uses sludge ponds for storage and stabilization of the waste activated sludge (WAS) and sludge generated by the Advanced Wastewater Treatment (AWT) clarifiers. The District currently contracts with an outside service provider that specializes in sludge dredging, dewatering, and disposal for beneficial use. Figure 1 shows the existing overall facility process flow diagram and Figure 2 shows the existing solids treatment process flow diagram.

The District established specific goals for their future solids management, including 1) eliminate current reliance on outside contractors for biosolids disposal, 2) increase beneficial use of biosolids, 3) reduce truck traffic and the associated carbon footprint by increasing the solids content of biosolids hauled offsite, and 4) provide management option in the future for surrounding municipalities. Figure 3 shows the new solids treatment process flow diagram selected by the District that meets their goals and eliminates the reliance on land application should land becomes scarce or future regulations for PFAS are in place.

Lessons learned during the design of this Project include:

• Determine if phosphorus release is an issue and design any storage greater than 4 hours to avoid phosphorus release. This will have an impact on the dewaterability of the sludge and increase the struvite formation potential, which is an O&M nightmare.

• Optimize dewatering as dryer size increases with the amount of water to be evaporated. If possible, operate dewatering and drying as continuously as feasible this will dramatically reduce the unit process sizing.

• Sample the dried product to determine the minimum ignition temperature.

• Provide Class A biosolids loadout to bypass the pyrolysis system in the event of planned or unplanned shut down of those systems.

• Sample your sludge for proximate and ultimate heat value analysis. This will facilitate pyrolysis unit sizing by understanding the energy balance and biochar production. Our system required a minimum LHV of 4,300 BTU/lb.

• Ensure the pyrolysis unit syngas filtration system is adequate in the removal of particulates and is designed to handle the large amount of dust typical with dried biosolids. Inadequate systems contribute to frequent pyrolysis unit down time due to clogging and reduced efficiency, which increases O&M and safety risks.

• Determine if there is a high potential for siloxanes in the pyrolysis exhaust gas as this will impact the thermal energy recovery system and require siloxane removal.

ADVANCED

Speaker

Anthony Tartaglione

Hazen and Sawyer

The State of Full-Scale Implementation - Biosolids Pyrolysis and Gasification

3:45 PM – 4:15 PM

Authors: DJ Wacker

This presentation provides both successes and lessons learned by demonstration scale and full-scale biosolids pyrolysis and gasification projects. The potential for biosolids conversion into fuels and revenue-generating products continues to drive interest in biosolids pyrolysis and gasification. Despite this, technology adoption remains hampered by historical issues, operational complexity, biosolids handling challenges, and high capital outlay. A combination of regulatory uncertainty, public pressure, technology evolution, and an increased offering of technology manufacturers has reinvigorated interest in these technologies as a tool to address today's biosolids challenges.

Currently, technology manufacturers and researchers are working to verify if pyrolysis and gasification can destroy per-and polyfluoroalkyl substances (PFAS) compounds to below detectable limits. In addition to this research, the EPA is conducting a risk assessment study on PFAS found in biosolids. However, destruction of PFAS and future regulations are only one side of the coin. Project delivery and reliable operation remain major concerns in the biosolids market, as there is only one full-scale biosolids pyrolysis or gasification systems owned and operated by a wastewater utility in the U.S. That will soon change with at least 10 full-scale domestic projects in various phases of development (design to construction) across the North America. Attendee will gain an introductory level of information on the state of full scale biosolids pyrolysis and gasification technology.

ADVANCED

Speaker

Greg Mockos

Brown and Caldell

Membrane Aerated Biofilm Reactors (MABRs)

3:15 PM – 4:15 PM | Location: Tech Rm 6

TREATMENT INNOVATION & INTENSIFICATION

MABR 101

3:15 PM – 3:45 PM

Authors: Daniel Coutts

Membrane Aerated Biofilm Reactors (MABR) gaining popularity worldwide as a simple and fast-to-implement biological intensification technology. MABRs can add nitrification and total nitrogen removal capacity to existing wastewater treatment plants without building new tanks. Utilities on the West Coast of the United States, particularly in the Puget Sound and San Francisco Bay watersheds, are evaluating MABR to help meet new effluent discharge requirements for total inorganic nitrogen (TIN), and need to do so within a relatively short timeframe and ideally within existing infrastructure.

This session will provide an introduction to MABRs, starting with what an MABR is and how it works. MABRs are a biofilm based process that use the support media to transfer oxygen directly to the biofilm. They are typically placed in an anoxic zone and enable simultaneous nitrification and denitrification (SND). Nitrification in the MABR allows for plant nitrification at lower-than-typical suspended growth solids retention times.

The session attendees will learn where to place MABRs within a flowsheet, and installation considerations for MABR units. They will learn the basics of MABR process design, including how to select the fraction of nutrient to be removed in the biofilm versus the suspended growth, and what is an appropriate suspended growth SRT. This session will cover considerations for existing wastewater treatment plants that currently have some level of nutrient removal, and ones that do not.

This session will be useful for utilities, their operators, and practitioners, to gain a base understanding of MABRs as a potential technology to intensify wastewater treatment.

101 INTERMEDIATE

Speaker

Juliane Kirby
Veolia

Upgrading from BOD removal to Total Nitrogen Removal - MABR upgrade at Sjölunda

3:45 PM – 4:15 PM

Authors: Marika Murto; Sara Ekström; Matthew Reeve

Wastewater treatment plants (WWTPs) in the Pacific Northwest face increasing challenges due to population growth, industrial expansion, and stricter environmental regulations. The impending Total Nitrogen (TN) limit has put pressure on wastewater treatment facilities that remove only carbon or ammonia (WSDE, 2022). Conventional solutions are often impractical due to space limitations, lengthy construction timelines, and escalating costs. As a result, utilities are turning to biological process intensification to meet these challenges within existing infrastructure constraints.

VA SYD serves over 500,000 customers and operates the Sjölunda WWTP in Sweden with a 142 MLD capacity. The facility's flowsheet includes primary treatment, high-loaded activated sludge (HLAS) for BOD removal, nitrifying trickling filters, and post-denitrification Moving Bed Biofilm Reactors (MBBR).

Sjölunda chose a Membrane Aerated Biofilm Reactor (MABR) upgrade to provide 500 kgNH4-N/d (1100 lbs-NH4-N/d) of additional nitrification capacity, addressing increasing load and aging trickling filters. An intensification solution was necessary as the facility has no room for expansion and the project needed to be completed within one year. The MABR was installed in the unaerated HLAS section, which previously only removed carbon and had an aerobic solids retention time of two days.

MABR is a versatile and simple advanced biofilm technology that utilizes gas-permeable membranes to deliver oxygen directly to the biofilm it supports, which is highly efficient oxygen transfer. Coutts et al., (2022) reported the benefits of the technology, which include: i) high nitrification rates, ii) simultaneous nitrification and denitrification (SND), iii) seeding of nitrifier rich biofilm to the suspended growth, and iv) process resilience.

The MABR upgrade was completed in 12 months, demonstrating the technology's rapid deployment potential. The installation was accomplished with minimal disruption to plant operations, avoiding the need for tank dewatering. The MABR system achieved its target ammonia (and TN) removal capacity within two weeks of operation, showcasing its ability to quickly establish a nitrifying biofilm.

The success of the Sjölunda WWTP upgrade provides valuable insights for WWTPs in the Pacific Northwest facing similar challenges. MABR technology enables WWTPs to meet stricter effluent regulations and accommodate increased loads within existing footprints.

101 INTERMEDIATE

Speaker

D

Daniel Coutts
Veolia Water Technologies and Solutions

Odor Control

3:15 PM – 4:15 PM | Location: Tech Rm 7

COLLECTION SYSTEMS

Evaluating Odor Issues 101

3:15 PM – 3:45 PM

Odor is the perception or interpretation of odorant chemical compounds in the air as a sensation. Exposure to odor can result in community impacts including annoyance, complaints, reduced property values, etc. Exposure to the odorant chemical compounds that comprise odor can result in separate, distinct impacts, like adverse health effects, corrosion, etc.

Fortunately, there are many solutions to minimize odor impacts: chemical injection to minimize odorant generation and release, ventilation and gas-phase treatment to minimize odorant emission, public engagement to reduce community sensitivity to odor exposure.

Unfortunately, knowing when and how to implement solutions can be difficult because characterizing odor and odor impacts can be challenging.

This presentation will review the many different ways to characterize odor and odor impacts – field measurement and monitoring, sample collection and lab analysis, collection system process modeling, and dispersion modeling, using examples from projects around Vancouver, WA and Seattle, WA, to help the audience understand all of the tools available to assess and design solutions to minimize odor impacts. By the end of this presentation, audience members should have a better sense for what measurement, monitoring, sample collection & analysis, and modeling should be done to screen for odor issues, to validate complaints, for process control, to assess emissions and the cost effectiveness of implemented odor controls, and to confirm adherence to odor regulations.

101 BEGINNER

Speaker

Jonathan Gordon
Parametrix

Odor Control 101

3:45 PM – 4:15 PM

Referred to as the third waste stream, odors from wastewater have an impact in water resource recovery facilities and collection systems. This presentation will provide a detailed overview of where odors come from, what odor control technologies are available, and how modeling tools can be used to optimize odor control treatment technologies.

The types of odors that are most prevalent can vary based on where the odor is being produced in the treatment system. Odors are mostly found in the collection system, headworks, primary treatment, and solids treatment. Understanding how odors are produced and the consequences of odor production, which may vary depending on the treatment process, is important when being introduced to the world of odor control.

Once the audience has an overview of odor production, the presentation will detail treatment technologies including liquid phase treatment, vapor phase treatment, and prevention through design. Liquid phase treatment technologies include chemical dosing for sulfide precipitation as well as chemical inhibitors to limit sulfide production. Vapor phase treatment technologies include scrubbers (chemical and carbon), biofilters, and biotowers. Prevention through design includes structures that prevent odor from entering the vapor phase by reducing turbulence. A summary of which technologies are best suited for a range of odor conditions including odor concentration, equipment footprint, and ease of maintenance will be provided.

In addition, the presentation will introduce odor control modeling. Types of modeling in the odor control space includes air dispersion modeling and sewer process modeling. Air dispersion modeling allows utilities to understand the impact of an odor source by modeling how odor will travel from its source. Sewer process modeling uses hydraulic data of the collection system and biological kinetics of the wastewater to optimize chemical dosing rates and size vapor phase treatment systems.

While odor control can be seen as the odd man out in wastewater treatment, it can be a real nuisance that has both immediate impacts due to unpleasant and harmful odors and lasting impacts on assets due to corrosion. An introduction to odors is beneficial to understanding the entire wastewater treatment process.

101 BEGINNER

Speakers

Stephanie Schramm
HDR

Jeffrey Zahller
HDR

Infrastructure Renewal & Startup

3:15 PM – 4:15 PM | Location: Tech Rm 8

SMALL COMMUNITIES & DECENTRALIZED SYSTEMS

Revitalizing Riverside: Collaborative Solutions for Wastewater Infrastructure Renewal in a Small Community

3:15 PM – 3:45 PM

The Riverside Water and Sewer District (WSD) is facing critical challenges with its aging wastewater infrastructure. The 60-year-old lift station is frequently overloaded, causing raw sewage to discharge into the river. The lagoon's treatment capacity has diminished due to decades of sludge buildup, reaching the surface at depths of up to nine feet. Further, the disinfection system is inadequate, leading to short-circuiting and E. coli exceedances. To address these issues, the District completed a comprehensive upgrade, including the installation of a new lift station, full dredging and relining of the first lagoon, and the replacement of the disinfection basin.

The project's success relied on proactive collaboration between key stakeholders, including the District, Engineer, Contractor, residents, regulatory agencies (Idaho DEQ, EPA), and funding partners (Idaho DEQ, USDA-RD, CDBG). A thorough growth analysis and close coordination with regulatory agencies ensured the improvements met current standards and were sized to address future needs. The District and Engineer worked together to secure crucial funding for a community largely dependent on fixed incomes. Their ongoing partnership throughout the planning, design and construction phases was vital in maintaining a streamlined process and delivering a successful project.

This project demonstrates the dedication and innovation of Riverside WSD and its partners. Despite facing unexpected challenges—such as issues with existing infrastructure condition and location, funding limitations, sludge removal and dewatering, and equipment lead times—the team remained adaptable and resourceful. Creative problem-solving and steadfast commitment ensured these obstacles were overcome, keeping the project on track. As a result, by preventing sewer overflows and restoring lagoon treatment capacity, the enhancements will provide long-term benefits for operators, the community, and the environment. Riverside WSD is not only modernizing its infrastructure but also safeguarding public health and the environment for future generations through collaborative efforts.

INTERMEDIATE

Speaker

Brent Deyo

Project Manager | Ardurra

Extending the Life of Lagoon Wastewater Treatment Systems in Small Communities

3:45 PM – 4:15 PM

Many small communities continue to rely on lagoon systems for wastewater treatment due to their low construction, operation, and maintenance costs. Lagoons have minimal mechanical components, reducing equipment failures and operational complexity while requiring less energy. When facing capacity demands or evolving regulatory requirements, extending the lifespan of lagoon systems is often the most cost-effective solution. Transitioning to mechanical plants is expensive, necessitating higher operator certification, additional staff, and increased regulatory compliance.

Objective

This presentation highlights strategies used by five small Oregon communities to extend the life of their lagoon wastewater treatment systems.

Project Status (January 2025)

Vernonia, OR – Operating successfully for eight years.

Gervais, OR – 90% construction complete.

Carlton, OR – Construction began in January 2025.

Donald, OR – Pre-design stage.

Camp Rilea, OR – Fully operational.

Methodology

Each case study involved a community with a population between 1,000 and 3,000, facing financial and operational limitations. Despite these constraints, improvements were necessary due to factors such as capacity expansion, permit compliance, and system reliability. Facility planning and pre-design efforts identified viable solutions to maintain lagoon-based treatment.

Findings

Vernonia addressed flood resilience, summer storage shortages, and ammonia limits by raising dikes, establishing a hyporheic discharge, and implementing hybrid aeration/anaerobic digestion.

Gervais resolved hydraulic and biological capacity limitations, as well as aeration equipment failures, through pump station upgrades, additional aeration, and fine screening.

Carlton improved hydraulic and biological capacity, mixing zone reliability, and O&M concerns by installing three-phase power, site piping upgrades, improved discharge control, an extended contact tank, and upgraded irrigation.

Donald faced a housing-driven capacity increase requiring additional lagoon storage and discharge solutions, with options still under development, including spray irrigation or direct discharge.

Camp Rilea mitigated regulatory challenges associated with an undersized spray irrigation system and livestock interactions by implementing rapid infiltration and a reuse program.

Conclusion

Each community successfully preserved its lagoon treatment system, ensuring project feasibility by minimizing capital and O&M costs related to power, equipment, staffing, and regulatory compliance. These solutions provide scalable, cost-effective approaches for small communities facing similar wastewater treatment challenges.

INTERMEDIATE

Speaker

Gordon Munro

Tetra Tech

Disinfection: Chlorine, UV & Ozone

3:15 PM – 4:15 PM | Location: Tech Rm 9

WASTEWATER TREATMENT

Meeting Aggressive Residual Chlorine Requirements Through Engineering and O&M Collaboration

3:15 PM – 3:45 PM

In 2022, Portland's Bureau of Environmental Services (BES) had to comply with new NPDES permit limits that reduced allowable residual chlorine concentrations by 80%. The existing dechlorination system was not designed to meet these stricter limits, prompting a series of system upgrades to ensure continuous compliance at both permitted outfalls. This session will outline the technical improvements, operational challenges, and key takeaways from BES's experience.

System enhancements included the installation of new flow measurement devices, residual chlorine analyzers, residual sulfite analyzers, a carrier water system for sodium bisulfite (SBS) dosing, and automatic composite samplers at the plant's outfalls. Direct flow measurement near discharge points improved SBS dosing control and simplified BOD, TSS, and flow calculations. Radar-based open-channel flow monitoring (Flodar) was introduced, offering benefits but also revealing some limitations.

Additional improvements focused on optimizing chlorine dosing, including the development of real-time CT calculations to optimize chlorine feed rates . Refinements in dechlorination control involved a feed-forward SBS addition based on upstream flow and chlorine concentration, along with downstream residual SO_3 measurement for fine-tuning. Later field investigations uncovered inconsistencies in SO_3 residual readings, with concentrations at the outfall found to be up to five times higher than at analyzer locations. The primary cause is suspected to be SO_3 metabolism by biofilm microbes in extended sample lines (~300 ft), with seasonal variations affecting reduction rates. Further investigation and mitigation measures are planned to reduce the sampling differential and account for the reduction in the control logic. Control improvements to date have resulted in lowering the target SO_3 residual from 0.15 to 0.1 ppm, resulting in an annual cost savings of approximately $30,000, with further reductions under evaluation.

In-house design and construction of the analyzer stations and dechlorination control logic pulled together a dedicated team of engineering, maintenance, and operations staff able to overcome significant challenges related to instrumentation startup, open channel and surcharge pipe flow monitoring, and fouling of unchlorinated sample piping. This session will share lessons learned and strategies for improving dechlorination processes to meet evolving regulatory requirements.

INTERMEDIATE

Speakers

D

Debi Consani

City of Portland BES

M

Matt Hewitt

City of Portland BES

UV Cost and Capacity Savings: How O&M Improves Capital Planning Impacts and Resists Obsolescence

3:45 PM – 4:15 PM

The City of Bozeman Water Reclamation Facility (WRF) installed a UV disinfection system in 2010, rated for a peak-hour capacity of 16.9 MGD. During 2023 facility planning, major UV upgrades were expected in 2025 to extend its 20-year design life. However, performance data showed the system exceeded treatment requirements, prompting an evaluation of continued equipment use, energy savings, and capacity re-rating.

O&M efforts significantly improved UV system performance. Staff optimized the 5-Stage Bardenpho and secondary clarifier processes, exceeding treatment standards. Routine maintenance reduced lamp sleeve replacements, enhancing UV efficacy and lowering maintenance costs. Key capacity and cost-saving results include:

1) Effluent Quality Improvements:

a) From January 2020 – August 2024, 90th-percentile values for effluent quality exceeded design specifications:

i) TSS: 5.6 mg/L (original: 15 mg/L)

ii) E. coli: 15.8 CFU/100 mL (original: 236 CFU/100 mL)

iii) UVT: 74% (original: 65%)

b) High effluent quality allowed design criteria updates:

i) Increased UVT from 65% to 70%

ii) Lowered design effluent TSS from 15 mg/L to 5 mg/L

iii) Increased rated peak-hour flow from 16.9 MGD to 21.0 MGD, extending the facility's projected design year from 2033 to 2040, delaying capital planning by seven years.

2) Capital Cost Savings:

a) High O&M performance deferred the $1M capital improvement by 15 years.

b) More adaptive planning can improve efficiency and prolong system lifespan.

This presentation will review how effluent quality and UV performance enabled increased capacity ratings. Design engineers will outline key factors influencing these improvements, alongside a summary of hydraulic capacity needs. The WRF Superintendent will provide operational insights on nutrient treatment and UV system maintenance, highlighting how O&M efforts shaped significant capital planning and design changes.

INTERMEDIATE

Speakers

Luke Thompson
Associate | Wastewater Engineer | HDR, Inc.

J

Jon Kercher
City of Bozeman

Women of Water Reception

4:15 PM – 5:45 PM | Location: North Plaza

ATTENDEE EVENTS

Join the Women of Water for wine and snacks, along with a celebration of the Woman of the Year! All conference attendees welcome.

Stream Corridor Renewal (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 1

STORMWATER & WATERSHED MANAGEMENT

Pipes, Piles, and Permits: Overcoming Obstacles Replacing a Critical 78 MGD Outfall

4:20 PM – 4:50 PM

The 13th Avenue Pump Station, a flood management facility operated and maintained by the Urban Flood Safety and Water Quality District (UFSWQD), protects homes and businesses in north Portland, OR, by conveying stormwater from interior drainageways through a levee and into the downstream Columbia Slough. The station's two 30-inch discharge pipes were scheduled for a temporary 10-year repair prior to large-scale upgrades to the station, discharge lines, and outfall planned in the future. However, bathymetric survey investigations revealed the outfall was creating a scour hole undermining the levee toe. To ensure long-term levee integrity, the temporary fix became a project to fully replace the station outfall. The new outfall mitigates further erosion using a custom energy dissipator, replaces and upsizes a portion of discharge piping to accommodate future flows, and restores the levee slope and toe. This presentation will follow the project from planning and design through construction and highlight project challenges, changes, and lessons learned. Unique and challenging project aspects include:

• Condition assessment and bathymetric survey

• Aligning design with US Army Corps of Engineers Portland Metro Levee System Feasibility Study

• Use of 3D hydraulic modeling (CFD) to design a custom energy dissipator

• Energy dissipator structure supported entirely by helical piles, no work area dewatering required

• Unique self-mitigating design with materials and construction methods that met permitting requirements at the local, state, and federal level

• Incorporating O&M staff feedback into design

• Stakeholder coordination and site access across neighboring properties

• UFSWQD involvement in construction management

• Inspection of the pipelines through CCTV

• Constructability challenges including in-water work, steep slope, and crane limitations

INTERMEDIATE

Speakers

M **Mackenna Bell**
Urban Flood Safety and Water Quality District

S **Soraya Azahari**
Parametrix

B **Brandon Moss**
Parametrix

Rehabilitation & Trenchless Technology (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 2

COLLECTION SYSTEMS

ASCE Manual of Practice 145 – is the new Cured-in-Place Pipe design methodology valuable?

4:20 PM – 4:50 PM

Authors: Allen Kalkhoven

Cured-in-place pipe (CIPP) has been a tremendously valuable technology since it's introduction to the North American market in the 1970's. As a fully structural, jointless, and trenchless means of rehabilitation, CIPP allows for the renewal of our infrastructure at a fraction of the cost and impact of open-cut replacement. As CIPP is reaching its 50th anniversary, the rehabilitation community has learned a tremendous amount about the design and installation of CIPP.

Originally developed in the United Kingdom, there are numerous different design methodologies for determining the requirements of CIPP. The most widely adopted design methodology in use in the United States is the American Society of Testing and Materials (ASTM) F-1216. However, within the CIPP industry, ASTM F-1216 is one of the most conservative design methods in the world. This conservatism has some significant implications, particularly for the additional thickness, weight, installation, and costs.

The American Society of Civil Engineers (ASCE) recently released a new Manual of Practice (MOP) 145 that introduces a new method that is less conservative and is more in line with the design approaches of other countries. The design methodology is also appropriate for non-round structures, something that ASTM F-1216 does not include.

This presentation will discuss the new methodology and its benefits for the wastewater community. Specific examples will be used to illustrate the benefits of using this new methodology, including the Woods Trunk, a 36-inch brick sewer trunk that is over 50-feet deep in Southwest Portland. These examples illustrate how the use of ASTM F-1216 resulted in extreme thicknesses and shipping weights that would prohibit the cost-effective use of CIPP. However, the use of MOP145 provided another CIPP design method that addressed these challenges and resulted in significantly reduced project costs while provided reassurance of an industry-accepted design approach. The presenters will offer a unique perspective, representing a municipal agency, a CIPP contractor, and a consulting engineer.

INTERMEDIATE

Speaker

C **Christopher Larson**
C&L Water Solutions

PFAS & Industrial Micropollutants (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 3

EMERGING CONTAMINANTS & WATER QUALITY

Azoles in Semiconductor Wastewater

4:20 PM – 4:50 PM

The semiconductor industry plays an essential role in modern technological infrastructure but presents unique challenges to wastewater treatment facilities due to the diverse chemicals used in its manufacturing processes. Among these, azoles—a class of compounds integral to semiconductor production—present a substantial risk to biological treatment processes, including nitrification and denitrification, and to aquatic ecosystems. With over 95 existing semiconductor facilities in the United States and numerous new plants planned, addressing azole discharge has never been more urgent.

This presentation introduces proven approaches to azole treatment, focusing on advanced oxidation processes (AOP) and their practical application in mitigating risks to biological systems and ecosystems. Ozonation demonstrates high degradation rates, achieving over 90% removal of specific azoles under optimized conditions. However, it requires significant energy input for ozone production and generates byproducts that may require additional treatment. Fenton's reaction achieves comparable removal efficiencies but present challenges, including iron sludge generation and sensitivity to pH levels.

The content of this presentation should provide wastewater professionals with actionable solutions to address emerging industrial challenges. Municipalities hosting semiconductor plants must collaborate with industry stakeholders to implement effective treatment technologies, ensuring sustainable growth and environmental protection. They must also understand the risks azoles pose to their communities; whether it's a failed biological treatment system or algae blooms in waterways, there are solutions to treat azoles.

Attendees will gain actionable insights: manufacturing decision-makers will learn about effective solutions for regulatory compliance and capital and operational cost considerations. Operators and engineers will glean insight on the inhibition properties, treatment kinetics, and the operational experiences that the presenters have with azole treatment processes.

INTERMEDIATE

Speakers

Kerry Lawless

Project Manager | Carollo Engineers, Inc.

C

Carlos Weiler

Carollo Engineers

Dewatering & Drying (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 4

BIOSOLIDS & RESOURCE RECOVERY

Class A Biosolids Dryer Design and Installation at the Scappoose WWTP

4:20 PM – 4:50 PM

For many years, the City of Scappoose had been operating a successful Class B biosolids land application program; however, the evolving regulatory climate, availability of land application fields, dwindling biosolids storage space, and high operating costs prompted concerns with the long-term viability of their program. To get ahead of potential issues with their solids handling, the City decided to pursue biosolids drying in conjunction with other upgrades at the facility. The dryer unit process was to be installed in an existing structure and process dewatered cake from an existing screw press to produce Class A biosolids that would reduce handling/storage requirements and regulatory restrictions for the City. An evaluation of available dryer technologies was completed, and the City pre-purchased the selected equipment. Final design of the dryer installation was approved by DEQ and represented the first review of a biosolids dryer for air emissions in Oregon. The dryer became operational in December 2024 and is currently producing Class A biosolids. The presentation will review the overall project with a focus on major decision points, challenges, solutions, lessons learned, and the future of biosolids drying for Scappoose.

INTERMEDIATE

Speakers

J

Justin Moman

Engineer | Consor

P

Patrick Davis

Consor

Pyrolysis and Gasification (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 5

BIOSOLIDS & RESOURCE RECOVERY

Biosolids Biochar to Concrete - Case Studies, Lessons Learned, and Value Propositions

4:20 PM – 4:50 PM

For municipalities and biosoldis managers, the option of installing pyrolysis brings the inevitable question of 'where does the biochar go and will there be demand. Bioforcetech's OurCarbon biosolids biochar has been utilized in concrete and the built environment in various contexts since 2021, and lessons learned from the deployment of this material have shown the benefits of this supply chain. Signals from scientific studies have also shown the incredible carbon storage potential of materials like biosolids biochar that give new reasons for architects and engineers to incorporate these materials.

This session will provide a full overview of the pyrolysis process, how it affects biosolids, and the unique characteristics of the biochar that results from such a process. Next, the presentation will dive into details on the ability for biosolids biochar to uniquely replace aggregates in structural concrete, with data points on strength over time and cast studies from multiple projects provided. The presentation will also cover dry cast concrete, asphaltic products, and other cast materials currently under study through various grants. Data from third party labs will be shown for the entirety of the presentation ranging from LCA's conducted to concrete break data and formulation results.

Finally, special attention will be given to a recent study published by UC David highlighting the carbon storage potential of the built environment that illustrates the opportunity for materials like biosolids biochar to be integrated into buildings as a final storage site for carbon. As the co-founder of the OurCarbon brand and development strategy, Garrett is happy to serve as a working expert on the unique development pathway of this new material and is uniquely fit to provide this presentation.

101 INTERMEDIATE

Speaker

Garrett Benisch

Director of Design Development | Bioforcetech Corporation

Membrane Aerated Biofilm Reactors (MABRs) (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 6

TREATMENT INNOVATION & INTENSIFICATION

Assessing the Benefits of MABR for Warm and Cold Climates

4:20 PM – 4:50 PM

Authors: Andre Gharagozian

Membrane Aerated Biofilm Reactor (MABR) is a new intensification alternative for wastewater treatment facilities looking to expand capacity or meet stringent effluent limits on a constrained site. Given the limited full-scale operating experience for MABRs, technology evaluation and design must rely on pilot test data and modeling.

MABR and CAS were evaluated for two full scale facilities— the Spring Street Sewage Treatment Plant (SSSTP) operated by City of Klamath Falls in Oregon (a cold climate, wastewater temperatures of 10.5°C) and the Los Coyotes Water Reclamation Plant (LCWRP) operated by Los Angeles County Sanitation Districts in California (a warm climate, wastewater temperatures of 26.6°C). Both facilities are designed as a CAS process and are looking to expand capacity and meet stricter nutrient limits. Steady state and dynamic modeling with varying SRTs for CAS and MABR were performed and analyzed to establish target SRTs that achieve comparable performance, reliability, and risk for both systems. Based on the evaluation, MABR pilot was recommended for SSSTP and will be tested for a duration of 6 months.

Modeling results indicated that in warmer climates, CAS can achieve similar NH3 removal as MABRs at aerobic SRTs (aSRT) of 1.5 days. However, in colder climates, CAS stops fully nitrifying at a 3-day aSRT while MABR is still fully nitrifying implying more significant benefit in colder climates. The modeling results also captured the seeding effect with overall higher bulk Ammonia Oxidizing bacteria (AOB) biomass for MABR system.

The two methodologies utilized for quantification included: nitrification safety factor (NSF) and relative reserve nitrification capacity (RRNC) (Houweling and Daigger (2020)). The NSF approach results in a potential capacity savings of about 30% and 15% in cold and warm weather, respectively. The RRNC approach shows slightly lower benefits compared to the NSF approach. This is possibly because the RRNC approach normalizes the nitrification capacity to the average influent load and therefore accounts for the system's ability to accommodate peak loads. Both methods provide a useful tool in comparing conventional and hybrid systems. However, the bigger benefit of MABR is its ability to provide partial nitrification below washout aSRTs of the AOBs from the bulk which could offer significant benefit for utilities that do not need to fully nitrify but rather need to increase nitrogen removal.

INTERMEDIATE

Speakers

K **Komal Rathore**

Carollo Engineers

A **Anne Conklin**

Engineer | Carollo Engineers

N **Nick Guho**

Senior Technologist | Carollo Engineers

A **Andre Gharagozian**

Carollo Engineers

Odor Control (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 7

COLLECTION SYSTEMS

Breakthrough H2S Odor & Corrosion Via A Low-Haz & Buffered Iron Salt Alternative to Calcium Nitrate

4:20 PM – 4:50 PM

Authors: Ian Watson

Faced with increasing costs for controlling hydrogen sulfide in its wastewater collection system, the City of Bakersfield, California commissioned an evaluation of its program in 2019. The existing program using Calcium Nitrate dosing stations was becoming cost-prohibitive, particularly in sensitive areas where chemical demands and community sensitivities were highest. A consultant recommended evaluating the use of a more efficient treatment, such as ferrous chloride, in place of certain Calcium Nitrate dosing stations to reduce costs and improve the system's overall performance.

The City commissioned a study in 2021 to evaluate the performance of ferrous chloride dosing using SulFeLox, a low-hazard form of ferrous chloride that is less corrosive than other ferrous chloride products. The study consisted of 12 days of monitoring the baseline Calcium Nitrate scenario, followed by 60 days of SulFeLox dosing at different feed rates, and concluding with 14 days of no chemical dosing to establish the true baseline scenario.

The interceptor segment selected for the test was a 10-mile long (5-6 hour retention) trunkline leading to the City's Plant. Wastewater flows increase from approximately 0.3 mgd at the beginning to 12 mgd downstream.

The SulFeLox dosing station was able to replace two Calcium Nitrate stations. Comparing the Calcium Nitrate and SulFeLox results showed 66-83% lower vapor-H2S peaks upstream and at the treatment plant sites, with less benefit at a downstream site where vapors were impacted by H2S from other flows into the station.

Following the field test, the City continued to feed SulFeLox at these sites and replaced seven other Calcium Nitrate sites with three SulFeLox sites, reducing the total number of chemical feed sites from nine to four. The City is now spending approximately $663k/yr for SulFeLox to meet its system-wide performance targets, where it was previously spending $990k/yr for Calcium Nitrate. Additionally, with a year's experience with dosing iron into the collection system, the treatment plant has observed operational benefits including the elimination of the ferrous chloride feed to their digesters for sulfide control. Future work is planned to evaluate iron regeneration ahead of the treatment plant to provide additional benefit to treatment plant operations.

101 BEGINNER

Speakers

Tam Truong

Territory Manager, PNW | USP Technologies

Ian Watson

Technology Development Manager | USP Technologies

Infrastructure Renewal & Startup (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 8

SMALL COMMUNITIES & DECENTRALIZED SYSTEMS

Startup Lessons Learned from a New Wastewater System—Port Hadlock, Washington

4:20 PM – 4:50 PM

Summary: This presentation will detail the key challenges Jefferson County faced in startup and commissioning of a new Class A reclaimed water membrane bioreactor (MBR) wastewater treatment plant and grinder pump collection system. Attendees will gain knowledge of strategies for startup of a package MBR system as a well as a new grinder pump collection system.

Abstract:

Jefferson County, Washington, is implementing a new sewer utility and constructing a sewer system in the unincorporated area of Port Hadlock, south of the City of Port Townsend. The all-new collection system and all new Class A reclaimed treatment plant were required to be started up simultaneously. This presentation will explore the lessons learned from pre-start, start-up and early systems optimization.

Topics that will be discussed:

• Pre-Startup Challenges—This startup included several key challenges that we identified early in the design phase, including minimum startup flow for the MBR system, uncertain influent loading, and coordination with multiple contractors. The presentation will touch on the approaches used to mitigate these challenges.

• Startup and Commissioning—The process of startup and commissioning will be described, including temporary chemicals and systems required to ensure process performance and ensure nitrogen removal after the first few weeks. Data from the treatment plant performance and impact on the groundwater will be reviewed.

o The simultaneous startup of a new grinder pump collection system will be discussed as well as temporary measures provided during startup. Lessons learned will be discussed in the presentation.

• Early System Optimization Lessons Learned—The optimization of the packaged MBR system will be described. Descriptions of operational tweaks to improve plant performance will be described.

o The packaged MBR plant includes several redundant tanks and systems to accommodate Washinton's reclaimed water standards. The presentation will discuss the approach to using these redundant tanks and systems as a tool for startup and commissioning.

INTERMEDIATE

Speakers

Eric Dienst

Project Manager | Tetra Tech

S

Samantha Harper

Jefferson County Public Works

Disinfection: Chlorine, UV & Ozone (Pt. 2)

4:20 PM – 4:50 PM | Location: Tech Rm 9

WASTEWATER TREATMENT

Geren Island Water Treatment Plant: Overcoming Algal Bloom Challenges with Ozone Treatment

4:20 PM – 4:50 PM

Geren Island, located southeast of Salem, Oregon, houses the City of Salem's Water Treatment Plant (WTP), which sources its water from the North Santiam River. Historically, the WTP's slow-sand filtration system and robust monitoring practices effectively removed cyanotoxins, even during algae season. However, in 2018, an outbreak of algae in the Detroit Reservoir led to a surge in cyanotoxins—specifically cylindrospermopsin and microcystin—at levels and timing earlier than expected. In response, the City of Salem acted swiftly to install a temporary treatment system, which successfully managed toxin levels until a permanent solution could be developed.

In 2020, the City of Salem initiated construction of an intermediate ozonation facility at the Geren Island WTP. Ozone, a potent oxidant and disinfectant, was chosen as the ideal solution to address the cyanotoxins and other contaminants present in the raw water. The system incorporates Mazzei sidestream injection (SSI) technology for optimal ozone mixing, ensuring superior performance in treating the water. This advanced ozone treatment not only eliminated cyanotoxins but also improved the secondary filtration process, reduced chlorine usage, and addressed taste and odor issues.

The Frank Mauldin Ozone Treatment Facility was commissioned in April 2022, allowing the City of Salem to meet both current and future water quality challenges. The facility has been operational for over a year, performing as designed with minimal operational issues, ensuring a reliable and sustainable source of clean drinking water. This case study highlights the critical role of innovative treatment solutions, like ozonation, in addressing emerging water quality issues and preparing utilities for future challenges.

101 ADVANCED

Speaker

Jim White

City of Seattle

Exhibit Hall Opening Reception

5:00 PM – 7:00 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL ATTENDEE EVENTS

Grab a drink and snack and wander through our tradeshow of over 140 exhibitor booths!

Don't forget to check out the Exhibit Hall Passport on the app for the opportunity to earn prizes!

Tuesday, September 16, 2025

Breakfast

7:00 AM – 8:00 AM | Location: Exhibit Hall A

MEALS ATTENDEE EVENTS

Start the day right! Breakfast is open to all attendees so fuel up before hitting the technical sessions!

Operator Breakfast

7:00 AM – 9:00 AM | Location: 201

MEALS ATTENDEE EVENTS

Celebrate the PNCWA Operators of the Year and Collections Operators of the Year!

From Prep to Performance: A Holistic Approach to Operator Certification

This 90-minute session introduces the new operator exams and the comprehensive training tools behind them.

CEUS

Swan Island CSO Pump Station

8:00 AM – 11:00 AM

TOUR

BES operates the 220-mgd Swan Island CSO Pump Station (SICSO) as part of the combined sewer overflow (CSO) program to manage CSO flows to the Columbia Boulevard Wastewater Treatment Plant (CBWTP). The SICSO serves as the terminus of two large CSO conveyance and storage tunnels deep beneath the City of Portland (in excess of 120 feet underground), designed to collect and store over 100 million gallons of combined sewage. The pump station consists of a 135-foot diameter circular cast-in-place, 150-foot deep below grade concrete structure, located adjacent to the Willamette River.

Stormwater and Stewardship & Portland Water System Education Event

8:00 AM – 11:45 AM

TOUR

The PNCWA Stormwater Committee is partnering with the City of Portland Bureau of Environmental Services (BES) to host a stormwater stewardship and Portland water system education event. The stewardship will begin with an introduction to Green Streets, stormwater swales, and stormwater retention ponds near Powell Butte Nature Park. The attendees will have the opportunity to learn about the stormwater systems and conduct stewardship activities. Stewardship activities include pruning blackberry bushes and shrubs, removing sediment, light weeding, and trash pick-up. Tools will be provided. Participants are encouraged to bring their own gloves, especially if they want leather gloves for working with blackberry bushes. After one hour of stewardship activities, participants will be led on a 1 mile hike up Powell Butte. Afterwards, Portland BES will present on the City of Portland's water infrastructure and water system. Light refreshments will be provided during the presentation.

Sturdy shoes, work gloves, and water bottle recommended.

101 - Recycled Water Fundamentals

8:00 AM – 9:00 AM | Location: Tech Rm 1

WATEREUSE

Recycled Water Overview 101

8:00 AM – 8:30 AM

WATEREUSE, 101

Speaker

Scott Mansell

Senior Engineer | Clean Water Services

Recycled Water Econ 101

8:30 AM – 9:00 AM

WATEREUSE, 102

Speaker

Susan Schlangen

Senior Engineer | WSC

Pump Station Improvements

8:00 AM – 9:00 AM | Location: Tech Rm 2

PUMP STATIONS & FORCE MAINS

Pump Station Rehabilitation - A Phased Approach

8:00 AM – 8:30 AM

The City of Tacoma's South Tacoma Pump Station (STPS) Rehabilitation project is a multi-phase design and construction project to rehabilitate the 23 mgd (16,000 gpm) wastewater pump station originally constructed in 1948. The project was structured in phases to first address urgent improvements, followed by long-term upgrades to improve reliability and maintenance needs for the facility. The project included Owner procurement of major equipment during the end of the COVID-19 pandemic that presented supply chain challenges and necessitated construction flexibility. The design team, Owner, and construction contractor worked closely to maintain station reliability while adapting to changing construction market conditions.

Phase 1 expedited an "immediate need" rehabilitation design in two months (February – March 2022) to allow improvements to be constructed in Summer 2022, during the dry weather season. Phase 1 included new pump discharge and header piping via advanced procurement of steel pipe and fittings, a new force main discharge structure, and miscellaneous structural improvements due to hydrogen sulfide corrosion.

Phase 2 design (concurrent with Phase 1 construction) included replacement of four existing dry-pit, shaft driven wastewater pumps with close-coupled, chopper style wastewater pumps and variable speed drives, addition of a bypass structure to facilitate maintenance operations, wet well and discharge structure coating, and miscellaneous electrical and instrumentation upgrades to support the improvements.

To minimize bypass pumping capacity and reduce overall risk, both Phase 1 and 2 require dry weather season construction and a 14.4 mgd (10,000 gpm) temporary bypass diesel pumping system around the STPS to construct the improvements. Advanced procurement of long lead items was essential in both phases to maintain the desired construction timelines, however, supply chain challenges still resulted in construction flexibility during Phase 2. Phase 2a construction was completed in Summer 2024, with Phase 2b construction and project completion to occur at the end of Summer 2025.

This presentation highlights the joint City/Consultant phased design development to complete the bid documents, pre-procurement of materials and challenges to meet summer construction windows, and efficiencies and lessons learned along the way of this fast-paced, multi-phase design and construction rehabilitation project.

101 INTERMEDIATE

Speakers

T

Tyler Whitehouse

Principal Engineer | Carollo Engineers

L

Lance Bunch

City of Tacoma

Pump Up Your Energy Savings

8:30 AM – 9:00 AM

Pumping makes up a significant portion of the energy use at WRRFs. There are typically multiple opportunities at a WRRF to save energy by optimizing pumped systems without sacrificing water quality. Sometimes these optimizations have process and maintenance benefits in addition to energy savings, which is even better. This presentation will showcase examples of operational improvements from facilities in the Pacific Northwest. The examples will include explanations of why the changes save energy without risking operations. Examples include reducing head on influent pumps, optimizing pump sequencing, reducing the operating pressure in non-potable water systems, and optimizing return activated sludge flow rates. Examples will include showing how the energy savings in dollars was calculated. Attendees will gain insights into optimizing pump operations and improving pump selection. Reducing energy use without sacrificing water quality is an additional way for WRRF staff to demonstrate their commitment to financial stewardship to their customers.

101 BEGINNER

Speakers

M

Matt Smeraglio

Cascade Energy

Wendy Waudby

Senior Engineer | Cascade Energy

Membrane Bioreactors

8:00 AM – 9:00 AM | Location: Tech Rm 3

WASTEWATER TREATMENT

Math that Matters: Revealing the Formulas Behind Membrane Bioreactor Performance

8:00 AM – 8:30 AM

This presentation aims to extrapolate the fundamental mathematical principles and formulas that underpin the performance assessment of membrane bioreactors (MBRs). MBRs are increasingly utilized in wastewater treatment due to their superior separation capabilities and compact design. However, a comprehensive understanding of their operational metrics is crucial for optimizing performance and ensuring sustainability. This presentation will provide an overview of key parameters such as flux, transmembrane pressure, permeability, and temperature corrections, which are critical for evaluating MBR efficiency.

Flux is a primary metric used to gauge the rate at which permeate is produced per unit area of membrane surface over time. The presentation will detail the formula for calculating flux (J), defined as J = Q/A, where Q represents the volume of permeate produced and A denotes the membrane area. Understanding flux dynamics is essential in identifying fouling tendencies and optimizing operational conditions within MBR systems.

Transmembrane pressure (TMP) serves as another vital parameter influencing MBR performance. TMP reflects the pressure difference across the membrane and can be expressed mathematically as TMP = P_in - P_out, where P_in is the influent pressure and P_out is the effluent pressure. This section will explore how variations in TMP can indicate fouling or changes in feedwater characteristics.

Additionally, permeability—defined as a measure of how easily water flows through a membrane—is integral to assessing overall system performance. The relationship between permeability (K), flux (J), and TMP will be examined through K = J / TMP.

101 BEGINNER

Speaker

Tony Benavidez

Project Manager | Jacobs

Enhanced Biological Nutrient Removal with an Intensified Flat Plate-MBR

8:30 AM – 9:00 AM

With permits becoming more stringent as regulators aim to detour algal growth in surface waters as well as potable reuse hopefuls and practitioners seek the highest treated wastewater for downstream water treatment technologies, enhanced biological nutrient removal and membrane bioreactor wastewater treatment technologies are natural choices to meet such requirements. Both technologies have proven their worth in practice but in this new world of tight nutrient limitation, it would behoove wastewater treatment plant designers to adopt both technologies, to work together and achieve common goals.

In this study, an MBR pilot study was conducted at Sherburne Wastewater Treatment Plant in Sherburne, NY for three months. The pilot was configured in an A2/O process with the membrane tank as the only oxic tank; therefore, all oxygen transferred to the biomass originated from the submerged membrane unit (SMU) scour aeration diffuser. Thus, the pilot was configured and optimized for nitrogen and biological phosphorus removal. To assess the performance of the pilot plant, several online sensors were utilized in combination with analytical testing. Online monitoring consisted of anaerobic and anoxic tank oxidation reduction potential, membrane tank DO, pH and transmembrane pressure (TMP); TMP being the pressure-loss across the membrane during filtration. Analytical testing included influent and effluent BOD5, total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS), chemical oxygen demand (COD) and fecal coliforms.

The pilot was operated at the Village of Sherburne Wastewater Treatment Plant in Sherburne, NY from January 19 – April 22, 2024. During this period the membrane tank mixed liquor suspended solids (MLSS) concentration averaged 13,038 mg/L, which is a typical operational MLSS concentration for a flat-plate MBR. The average flux was set at 9.80 gal/ft^2/d at the beginning of the pilot study then increased to 12.25 gal/ft^2/d. TMP stayed relatively constant during the study, ranging from 0.20 – 0.40 psi, which mirrored consistent effluent quality.

The A2/O process worked particularly well managing to uphold complete nitrification for the entirety of the pilot study, as well as achieving 82% TN removal and >97% TP removal. BOD and TSS were reduced >99%. Lastly fecal coliforms were below the detection limit. This MBR pilot study not only performed exceptionally, but also provided sufficient groundwork for designing a full-scale MBR build-out for the Village of Sherburne.

101 INTERMEDIATE

Speakers

Larry Morris

Kubota Water and Environment USA Corporation

A

Arsalan Sepehri

Kubota

Efficiency & Energy Optimization

8:00 AM – 9:00 AM | Location: Tech Rm 4

CLIMATE RESILIENCE & SUSTAINABILITY

Optimize WWTP Mixing for Efficiency & Process Resiliency

8:00 AM – 8:30 AM

Wastewater treatment is more challenging than ever, requiring more flexibility, more accuracy, and total reliability. In the past Mixers were designed for worst case scenarios, whether flow or loading, and did not provide flexibility to meet changing mixing demands. With an increased focus on energy management and treatment optimization, mixers present an opportunity for both. Many engineers and operators have come to recognize that mixing can be improved to optimize conditions.

With the increased need for Improved treatment efficiency Variable speed mixing ensures that bacteria and nutrients are consistently in motion, increasing their interaction with changing conditions. The introduction of adaptive mixers has made this control not only possible but also programmable.

This presentation will review the processes involved with biological wastewater treatment, and how adaptive mixing provides enhanced interaction in treatment zones. The purpose and need for mixers will be reviewed with regard to each process. The concept of adaptive mixing will then be introduced along with suggestions on what parameters to monitor within the treatment processes to make mixer speed automation possible. Parameters include monitoring and adjusting mixer speed based on tank levels, flows, DO levels, TSS concentrations and phosphorus release.

Attendees of this presentation will walk away with a better understanding wastewater treatment mixing and the technology available to enhance its effectiveness. In addition, they will learn different ways to monitor treatment processes and will have suggestion on control options that they can attempt at their own facilities to improve resiliency throughout the plant.

Variable speed mixing is crucial for biological nutrient removal in wastewater treatment for several reasons:

1. Enhanced Interaction: Variable speed mixing ensures that bacteria and nutrients are consistently in motion, increasing their interaction. This is essential for the bacteria to effectively consume nitrogen and phosphorus, which are key nutrients that need to be removed.

2. Preventing Settling: Without proper mixing, bacteria can settle at the bottom of the tank, reducing their efficiency. Variable speed mixing helps keep these microorganisms suspended, ensuring they remain active and effective in nutrient removal.

3. Optimized Conditions: Different stages of the biological nutrient removal process may require different mixing speeds. For example, anoxic and anaerobic zones need specific mixing conditions to maintain low oxygen levels and promote the growth of specific bacteria that aid in nutrient removal.

4. Improved Treatment Efficiency: By adjusting the mixing speed, operators can optimize the conditions for nutrient removal, leading to lower effluent nutrient levels and improved overall treatment efficiency.

5. Environmental Protection: Effective nutrient removal is critical to prevent eutrophication, which can cause harmful algal blooms, low dissolved oxygen levels, and fish kills in natural water bodies.

101 INTERMEDIATE

Speaker

Alden Meade

Territory Sales Manager | Xylem Inc.

Missoula's Cogeneration, On Site Solar & Smart Controls Reduce Carbon Footprint

8:30 AM – 9:00 AM

Authors: Don Schmidt

The City of Missoula has been working toward reducing its carbon footprint and has taken meaningful steps toward this goal in its wastewater utility. This work will provide an overview of three components of this program; its cogeneration system installed in 2018 to provide power from digester gas, its 500-KW solar farm installation at its Resource Recovery Facility and improving controls to provide more efficient operation of its blowers.

The City of Missoula installed a cogeneration system in 2018 to beneficially reuse digester gas generated in its anerobic digesters to heat the digesters themselves, as well as the administrative, headworks, solids handling, and primary effluent lift station buildings. The co-generation unit produced 754,000 kW; about $66,000 worth of natural gas in 2024.

The City installed a 500-kW ground mounted solar array (more than 1,000 panels) at its RRF in 2023. As part of its current facilities planning process, the City is considering additional solar arrays to meet future demands. The 2023 solar array installation was constructed as part of a 25 year Power Purchase Agreement with Ameresco at zero capital cost/risk to the City and provides roughly 20% of the electrical power to the plant. This presentation will discuss design considerations, rate of return, and on-going array maintenance as well as plans for a possible future array to service growth.

The City currently operates a biological nutrient removal facility with two 350 hp blowers that are operated with "black box" controls that cause inefficient secondary treatment operation (excess dissolved oxygen or the need to bleed off air). The City is working improve blower controls by reprogramming the control loops and, with a grant from Northwestern Energy, replace one or perhaps both of its blowers. This presentation will discuss how decisions were made around improving the controls, inputs and equipment and expected power savings that will result from making the changes.

INTERMEDIATE

Speakers

Amanda McInnis

Project Manager | Jacobs

R

Ross Mollenhauer

Engineering Manager | City of Missoula

Data Platforms & Digital Twins

8:00 AM – 9:00 AM | Location: Tech Rm 5

DIGITAL SOLUTIONS

Unlocking the Value: The Journey to a Digital Twin

8:00 AM – 8:30 AM

Digital twins for water and wastewater have been deployed successfully numerous times, but they are still far from mainstream at most utilities. Digital twin software driven by embedded hydraulic models can solve a very broad range of complex issues, but they can be perceived to lack value for the cost - they can be overkill for specific situations. Sometimes value is not in the software itself, but rather through newly provided access to the right data at the right time by the right people.

By sharing information about two recently-completed water utility project case studies, this presentation will illustrate best practices for utility managers to maximize value before arriving at the ultimate digital twin destination. We will explore establishing clear, business-driven goals, carefully planning digital transformation, and taking a stepwise approach to realize significant value along the journey to a digital twin.

For West Virginia Water's capital funding application process for construction projects, applying digitization dramatically increased efficiency and ease of operations by streamlining approval workflows. A refined data-driven process and a targeted software solution reduced the processing time required for all critical needs project applications from a year to a single week.

The City of New Bedford, MA regularly experiences combined sewer overflows (CSOs) after storm events, impacting this historic coastal fishing community. As steps along the journey to a digital twin, data integration and visualization provide significant value during and after wet weather events by automating public notification and reducing the response time to within 2 hours after discovery of a CSO. When complete, the "full" predictive digital twin is expected to help the City achieve even greater control of the collection system.

INTERMEDIATE

Speaker

P

Peter Martin

Trinnex

Harnessing Digital Twins for Smarter Nutrient Removal in WRRFs

8:30 AM – 9:00 AM

Excess nutrients from point and non-point sources are a growing concern for water quality, leading to eutrophication, habitat degradation, and harmful algal blooms that threaten both ecosystems and public health. As stricter nutrient discharge limits are imposed on water resource recovery facilities (WRRFs), utilities must adopt more efficient strategies to ensure compliance.

Optimizing nutrient removal requires advanced monitoring and automated control strategies. Many WRRFs still rely on reactive control systems with large safety factors to ensure reliability, often increasing operational costs. To meet stricter regulations while maintaining efficiency, WRRFs must simultaneously optimize multiple biological processes, control costs, and train future operators.

Machine learning (ML) and predictive controls (PC) offer innovative solutions to these challenges. When applied strategically, they improve process predictability, reduce costs, and enhance transparency in nutrient removal. Data-driven predictive control techniques have demonstrated significant benefits, including improved operational reliability, enhanced process performance, and immediate financial returns.

This presentation will provide a foundational understanding of process controls and their role in optimizing nutrient removal while minimizing costs. It will also explore real-world case studies showcasing ML and predictive control applications, including:

- Solids Retention Time (SRT) Optimization

- Chemical Dosing for Nutrient Removal

- Full-Plant Optimization Using Digital Twins (e.g., Beckton, UK – leveraging digital twins for process optimization, maintenance, operations, and financial decision-making)

Attendees will gain practical insights into implementing modern, data-driven strategies to enhance WRRF performance and long-term sustainability.

INTERMEDIATE

Speaker

P

Prithviraj Chavan

National One Water Director | Ardurra

Aeration Optimization

8:00 AM – 9:00 AM | Location: Tech Rm 6

TREATMENT INNOVATION & INTENSIFICATION

Operational Digital Twins for Process Monitoring and Optimization at WRRFs

8:00 AM – 8:30 AM

Authors: Ryan Sanford; Fabio Polesel; Trine Dalkvist

The operation of Water Resource Recovery Facilities (WRRFs) has become increasingly complex, driven by the need to balance multiple, often conflicting, objectives due to the climate crisis. These include meeting effluent quality standards, optimizing energy use, reducing costs, and minimizing greenhouse gas (GHG) emissions, particularly nitrous oxide (N_2O), which can constitute up to 80% of a WRRF's carbon footprint. The challenge lies in the fact that operational choices, such as low dissolved oxygen levels and primary treatment strategies, may reduce energy use and increase biogas production but also exacerbate N_2O emissions. To address these challenges, advanced digital solutions, such as digital twins, are being implemented. Digital twins integrate data processing, process models, control algorithms, and machine learning (ML) to assist operators in optimizing WRRF operations while minimizing costs and environmental impacts.

This study demonstrates the application of a digital twin solution enhanced with a climate footprint layer and a calibrated N_2O mechanistic model to optimize WRRF operations.The N_2O model was calibrated using pilot plant data from Marselisborg WRRF (Aarhus, Denmark) and validated at Bjergmarken. The model was incorporated into the digital twin to track and visualize the carbon footprint, including direct N_2O emissions and indirect emissions from energy and chemical use.

The digital twin dashboard allows operators to visualize the contribution of each emission source to the WRRF's carbon footprint and optimize operational strategies. An optimization algorithm is being tested to recommend control settings that improve energy efficiency and reduce the carbon footprint. Additionally, a machine learning-based N_2O soft sensor was developed to enhance decision-making. The results show how the digital twin and ML models can support sustainable and efficient WRRF operations, helping facilities achieve climate objectives while balancing multiple operational goals.

ADVANCED

Speaker

Ryan Sanford
DHI

Tailoring Advanced Aeration Control for a WRRF

8:30 AM – 9:00 AM

Authors: Tom Weiland

DHI and LACSD partnered to simulated, design, and implement advanced aeration control for the Whittier Narrows WRP with goals of maximizing capacity, using less energy, and supporting operational stability.

An advanced control strategy was distilled into a database integration system packaging data acquisition, preprocessing, control scripts, and postprocessing, referred to as the "Aeration Optimizer".

Separation of optimizer and fallback modes allows operators to retain control of the plant with or without the Aeration Optimizer at their discretion. The Aeration Optimizer can only control the aeration system when all data connectivity and validation checks are passed, and the operator opts to enable the Aeration Optimizer.

The selected control methodology can be simplified and described by the following steps.

1- Calculate Required Airflow

The velocity-form PID algorithm compares measured ammonia concentrations with setpoints while a weighted average airflow is applied to tanks without ammonia sensors.

2- Set Blower Airflow Target

Total airflow required is summed and compared to current airflow. If this new airflow results in a change greater than a threshold (5%), the new airflow setpoint is applied.

3- Air Distribution

A custom step-function was emperically developed and deployed for individual valve throttling ranges, transforming airflow to optimized valve positions.

The Aeration Optimizer also includes logic for permissives checks, feed-forward control, airflow splitting between Grid 2 and Grid 3, a series of if-statements to avoid hydraulic limitations and instability, dissolved oxygen range checks, and a most-open-valve algorithm.

Results indicate 10% savings in aeration energy have been realized since implementation of the Aeration Optimizer. Additionally, the relative amounts of time spent at minimum airflow, maximum airflow, and within the control range reveal that the system was operated at minimum airflow for over 25% of the operational period. This additional capacity has allowed operations staff to safely increase load and identify additional constraints.

ADVANCED

Speaker

Ryan Sanford
DHI

Alternative Delivery

8:00 AM – 9:00 AM | Location: Tech Rm 7

PROJECT, PROGRAMM & ALTERNATIVE DELIVERY

No Longer Alternative: Making Sense of Collaborative Delivery Options

8:00 AM – 9:00 AM

Unprecedented availability of federal infrastructure funding has provided essential capital for water and wastewater utilities to address regulatory mandates, aging infrastructure and constituents of growing concern. Issues such as market saturation, escalation, supply chain issues, and limited staff continue to strain public-sector owners' ability to deliver significant capital improvement programs. To manage these challenges, wastewater utilities are embracing Collaborative Delivery methods which go beyond traditional design-bid-build by providing a wider range of solutions to address specific water and wastewater project needs, integrating both the design and construction phases to optimize innovation, speed, quality control, and risk management. As a result, collaborative delivery is the fastest growing form of project delivery in the water sector. Recent studies by the FMI Corp. predicts that spending on collaborative delivery projects will grow by more than 40% over the next 4 years.

The Water Collaborative Delivery Association (WCDA) is a leading professional association dedicated to advancing successful collaborative delivery solutions for the water and wastewater sector. WCDA serves as a leading source of best practices, knowledge, and resources with the tools designed to help owners, design-build firms, engineering firms, construction firms, and suppliers leverage the power of collaborative delivery to achieve better project outcomes, together.

This presentation will provide a fundamental overview of each delivery model, based on the WCDA Water and Wastewater Collaborative Delivery Handbook. The collaborative delivery spectrum will be defined, and then a deeper description of each delivery method will be provided in turn: construction management at-risk (aka CM/GC or GC/CM), progressive design-build, and fixed-price design-build—defining the similarities and differences among them. This material will be summarized with an overall comparison of each of the common delivery methods, highlighting their relative attributes and when each should be considered.

*** Note to Organizers - this is truly a 101 for an 'Alternative' Delivery track.

101 BEGINNER

Speaker

Michelle Green

Water Collaborative Delivery Association

Integrated Planning

8:00 AM – 9:00 AM | Location: Tech Rm 8

INTEGRATED PLANNING & RESILIENCE

Aligning Priorities in Integrated Planning: Comprehensive Environmental Justice and Affordability Assessments to Better Inform Design

8:00 AM – 9:00 AM

Authors: Dave Clark; To Be Determined; To Be Determined

Affordability and environmental justice (EJ) considerations are becoming critical in water infrastructure planning. Financial and regulatory pressures necessitate evaluating the social impacts of proposed projects, ensuring equitable access to clean water. Historically, federal affordability assessments have not adequately addressed community-specific needs or integrated EJ principles. To foster equity in engineering, more comprehensive analyses that align affordability with EJ are essential.

A 2024 survey of water professionals in Washington (WA), Oregon (OR), and Montana (MT) revealed that 63% of respondents are interested in learning more about affordability and EJ assessments. Key takeaways include:

1. These analyses are increasingly required for larger municipal clients.

2. Some grants and regulations, such as the Puget Sound Nutrient General Permit (PSNGP), mandate EJ analyses.

3. Integrating these assessments into infrastructure planning and financing is essential.

4. Regional variations influence the approach and applicability of affordability and EJ analyses.

A holistic "One Water" approach is emphasized to enhance cross-discipline collaboration and align industry practices with equity goals. Expanding standard design criteria to incorporate socioeconomic impacts will improve equitable access to fundamental human rights, such as water. The industry is encouraged to shift from a focus on "capital cost" to a broader evaluation of "social cost," ensuring that planning efforts account for the full spectrum of community impacts.

The panel discussion will define affordability and EJ, examine historical and current analysis methods, and highlight best practices. Drawing from Water Research Foundation (WRF) studies, white papers, HDR tools, and case studies from the Puget Sound region, the panel will showcase real-world applications of affordability and EJ assessments. By using a watershed-based planning perspective, the discussion will reinforce the necessity of integrated planning.

Panelists will share insights on the evolving regulatory landscape, trends in watershed planning, and lessons from recent EJ assessments in stormwater and wastewater infrastructure projects. Attendees will gain the knowledge and tools needed to integrate EJ and affordability considerations into capital planning and decision-making processes. Ultimately, this panel aims to inspire regional water professionals to adopt these methodologies, ensuring a more equitable and just approach to water infrastructure development.

BEGINNER

Speakers

Geneva Bernsten

HDR

Luke Thompson

Associate | Wastewater Engineer | HDR, Inc.

Break - Exhibit Hall

9:00 AM – 9:30 AM | Location: Exhibit Hall B/A1

BREAK EXHIBIT HALL

Grab a coffee and snack and check out emerging technologies on the Exhibit Hall between sessions!

Don't forget to check out the Exhibit Hall Passport on the app for the opportunity to earn prizes!

Exhibitor Spotlight Session 1

9:30 AM – 10:30 AM | Location: Exhibit Hall B/A1

EXHIBIT HALL

Follow the Nitrate Pathway to More Biogas, Less N, H2S & Struvite

9:30 AM – 10:00 AM

EXHIBIT HALL

The nitrate pathway provides numerous benefits in an Anaerobic Digestion system including enhanced biogas production, reduced H2S & less struvite via nitrogen removal in the digesters. By producing nitrate in an Aerobic Digester and recycling flow back to an Acid Digester, denitrification occurs upstream of the Anaerobic Digester. This process increases pH and optimizes conditions for hydrolyzing bacteria.The nitrate pathway is energetically preferred over the sulfate pathway, which produces H2S and more CO2. Recycling nitrate from the Aerobic Digester to the Acid Digester promotes the nitrate pathway, improving the entire anaerobic digestion system in several ways: increased VSR, increased methane production, and reduced chemical usage, offering a holistic, robust, and resilient solution to common Anaerobic Digestion challenges.

This study explores combining nitrification and denitrification in an Anaerobic Digestion system to improve biogas production, reduce hydrogen sulfide (H2S) and remove nitrogen. By integrating an Aerobic Digester after Anaerobic Digestion, ammonia is converted to nitrate. Recycling this nitrate-rich sludge to an Acid/Denitrification Digester upstream of the Anaerobic Digester enables denitrification, which removes nitrogen, increases pH, reduces corrosivity, and optimizes conditions for hydrolyzing bacteria. These improvements enhance the efficiency of methanogens in producing biogas with higher methane content.

Denitrification in the Acid Digester, facilitated by the recycled nitrate, is energetically preferred over sulfate reduction and significantly reduces H2S concentrations in the biogas. The reduced ammonia levels also lower struvite formation and methanogen inhibition, further boosting methane production.

A pilot study demonstrated the process alongside existing anaerobic digesters. The pilot unit utilized this 3-stage process and varied recycle rates to observe impacts on nitrogen concentrations, volatile solids reduction (VSR) H2S production, and methane production. Continuous system monitoring and routine analysis were conducted to assess performance.

The nitrate pathway yielded diverse benefits. H2S concentration in the biogas was reduced by at least 85% without additional chemicals. Genomic analysis revealed a consistent shift from sulfate-reducing bacteria to nitrogen removal bacteria. The pilot system achieved a higher VSR and better dewatering, reducing biosolids mass.

Reduced pH and ammonia levels in the Anaerobic Digester prevented struvite formation, while increased VSR and methane yield improved net energy production. Optimized digester chemistry and biology led to significant process efficiencies that would result in cost savings.

The nitrate pathway is energetically preferred over the sulfate pathway, which produces H2S and more CO2. Recycling nitrate from the Aerobic Digester to the Acid Digester promotes the nitrate pathway, improving the entire anaerobic digestion system in several ways: increased VSR, increased methane production, and reduced chemical usage, offering a holistic, robust, and resilient solution to common Anaerobic Digestion challenges.

Speaker

Matthew Williams

Regional Sales & Product Manager | Thermal Process Systems

Thermal Hydrolysis Process (THP) Compared to Other Advanced Digestion Processes

10:00 AM – 10:30 AM

EXHIBIT HALL

Speaker

Andrew Christy

Sales Manager | Cambi

Advanced Reuse Planning

9:30 AM – 10:30 AM | Location: Tech Rm 1

WATEREUSE

WATEREUSE

Flowsheets for Potable Reuse

9:30 AM – 10:00 AM

WATEREUSE

Speakers

Katie Peach
NAM Domain Leader for Potable and Advanced Reuse | Veolia WTS

Alexandra Szewczyk
Veolia

Growth Management, Water Reuse & Efficiency

10:00 AM – 10:30 AM

WATEREUSE

Speaker

Anne Thebo
Climate Impacts Group, University of Washington

Hydraulic Modeling for Collection Assets

9:30 AM – 10:30 AM | Location: Tech Rm 2

COLLECTION SYSTEMS

Physical Modeling as a Design Tool - Not just for demonstrating Hydraulic Institute Compliance

9:30 AM – 10:00 AM

Authors: Jeff Macomber

Physical hydraulic models have long been used by design engineers as an important tool to demonstrate that a wet well and / or suction piping will provide hydraulic conditions at the pump inlet that will allow the pump to perform in accordance with the intended design capacity and without excessive maintenance. A pump intake can be determined 'in compliance' with the Hydraulic Institute Standards if it meets the physical modeling acceptance criteria established in ANSI/HI 9.8. A physical hydraulic model is commonly completed following the preliminary design allowing any recommended design modifications to be incorporated when the design is approaching completion. This scheduling approach leaves a limited opportunity for significant design optimization to be explored during the physical modeling process without substantial schedule disruption. An alternate approach is to complete the physical hydraulic model during preliminary design. With this approach, the design engineer can include various design alternatives in the scope of the modeling evaluation that, if successful, can provide construction cost savings and improvements to operation and maintenance.

This presentation will be centered around physical modeling of the Mill Creek Wastewater Treatment Plant Headworks Pump Station in Cincinnati, Ohio, which is designed as a trench-style self-cleaning wet well with a pumping capacity of 700 million gallon per day. Numerous design alternatives were evaluated during the physical hydraulic modeling effort that support optimization of the station design and construction cost savings. The alternatives evaluated include turned-down pump inlets verses horizontal pump inlets and short-radiused compared to long-radiused pump suction reducing elbows.

Although evaluation of these alternatives increased the scope and cost of the physical modeling effort, the design features evaluated influence the depth and maintainability of the pumping facility, which directly impact construction and operating costs. In addition, the use of the physical model as a design tool has allowed for the side-by-side evaluation of the trench configuration as presented in the Hydraulic Institute Standards with alternate configurations that demonstrated improved hydraulic performance.

101 INTERMEDIATE

Speaker

James Gagnon
Hazen and Sawyer

Getting from up here to down there, using CFD modeling to optimize vortex drop structure design

10:00 AM – 10:30 AM

Authors: Sean Bistoff ; Tammy Cleys

The challenging northwest terrain impacts gravity conveyance design, primarily due to its varied topography. Gravity sewers are ideally installed with slopes that balance the need for solids conveyance and adequate velocity, while keeping hydraulic conditions within a subcritical flow region, i.e. not too steep. Additionally, pipe depth is a key factor, as deep sewers are both costly to install and difficult to maintain. The terrain can necessitate large vertical drops in collection systems, which require energy dissipation and possibly air management to control odor and prevent corrosion. A vortex drop structure is a common approach to transition grade, providing energy dissipation and air management. Numerous empirical design relations have been developed to guide the design of vortex drop structures, but methods like scale or numerical modeling are often used to verify and optimize specific designs for local conditions.

In Southwest Portland, the Sheridan Trunk is a deep sewer in need of rehabilitation. The rehabilitated design calls for a 60-ft drop to convey combined sewer flows to the downstream piping. The system is further complicated by significant direct inflows, which results in extremely high peaking factors. Additionally, a 24-inch and 48-inch sewer converge just upstream of the drop at an angle of approximately 135 degrees, adding complexity to the flow conditions entering the drop structure.

To address these complexities, three-dimensional computational fluid dynamics (CFD) modeling was used to optimize the design of the diversion structure. This modeling helped create a passive system that can manage flows. The CFD model was used for developing the junction structure, the vortex generator, the barrel size, and outlet transition. The model was able to capture the complex 3D water surface through the system. Using this approach allowed for optimizing the vortex inlet nozzle based on the calculated approach flow distribution for the range of operating conditions and ensured that the design would not lead to an excessive backup and high hydraulic grade line in the upstream sewers.

INTERMEDIATE

Speaker

Ed Wicklein

Chief Technologist | Carollo Engineers

Nutrient Optimization Strategies

9:30 AM – 10:30 AM | Location: Tech Rm 3

NUTRIENT REMOVAL

Identifying Nutrient Optimization Strategies: How Aligned are PSGNP Optimization Plans with WRF 4973 Suggestions?

9:30 AM – 10:00 AM

In Puget Sound alone, there are 58 marine dischargers. Each of these is required by the Puget Sound General Nutrient Permit (PSGNP) to submit annual Optimization Plans via the Annual Report requirement. Such plans have been developed by various stakeholders to identify optimization strategies.

The Water Research Foundation (WRF) project 4973 Guidelines for Optimizing Nutrient Removal Plant Performance proposed an approach to guide the decision-making process using a decision tree online tool to identify potential nutrient optimization strategies. These strategies are designed to achieve the following objectives: (1) reduce treatment cost, (2) improve process performance reliability, and (3) reduce nutrients discharged into the receiving water. The Guidance Document covers three nutrient species (NHx, TN, TP) and WRRF types ranging from secondary treatment, conventional and advanced nutrient removal, small and large WRRFS and more.

This presentation will highlight a few case studies of Puget Sound dischargers, comparing what was submitted to Department of Ecology in their Optimization Plan to strategies the tool identified. The presentation will explore the differences the strategies identified by the tool and the Optimization Plans submitted to PSGNP and identify local conditions that favored the Optimization Plan.

101 INTERMEDIATE

Speakers

A

Amara Cairns

Water/Wastewater Engineer | HDR Inc.

JB Neethling

Sr VP | HDR

Enhancing Total Inorganic Nitrogen Removal with the Mobile Organic Biofilm (MOB) Process: Insights from a 12-Month Demonstration at Winona, MN WWTP

10:00 AM – 10:30 AM

The Mobile Organic Biofilm (MOB) Process is an advanced biofilm technology that combines fixed-film and suspended-growth biology to enhance biological treatment and sludge settleability in secondary wastewater treatment. This hybrid process utilizes plant-derived media, which is introduced into the bioreactors and recirculated through the return activated sludge (RAS) stream, fostering biofilm growth and providing a ballasted settling effect in the secondary clarifiers.

A 12-month demonstration at Winona, MN Wastewater Treatment Plant (WWTP) aimed to intensify secondary treatment by achieving year-round nitrification and stabilized sludge settleability. Within the first four months, the MOB Process successfully achieved complete nitrification, even under challenging seasonal variations, while significantly improving sludge volume indices (SVI).

With complete nitrification established, the second half of the trial (December 2024–June 2025) is shifting its focus to total inorganic nitrogen (TIN) removal in preparation for a future regulatory limit of 10 mg/L. At Winona, MN WWTP, various strategies are being explored to enhance denitrification, including simultaneous nitrification-denitrification (SND) within the biofilm and the potential creation of an anoxic selector by deactivating a portion of the aerobic reactors. To assess treatment intensification, nitrogen and BOD profiling are being conducted to map nutrient distributions throughout the treatment process. These profiles offer critical insights into system performance, guiding optimization efforts for effective TIN removal.

Come September, the 12-month demonstration will be completed. The assessment of potential modifications, strategic decision making, and outcomes will be shared with the relevant data. The presentation will summarize key findings from the entire trial focusing on nitrification stability, improved SVIs, and TIN removal tactics. Attendees will gain insight into the MOB Process's role in process intensification, regulatory compliance, and retrofitting new technologies into existing infrastructure. By examining operational challenges, innovative solutions, and performance data, this presentation will offer practical guidance for utilities seeking to enhance nitrogen removal and overall plant efficiency.

INTERMEDIATE

Speaker

Graig Rosenberger

Nuvoda

Emissions & Energy

9:30 AM – 10:30 AM | Location: Tech Rm 4

CLIMATE RESILIENCE & SUSTAINABILITY

Consider Emissions in your Decision: Greenhouse Gas Accounting Fundamentals for Wastewater Planning Projects

9:30 AM – 10:00 AM

Many cities and utilities have climate action plans and net zero goals that require greenhouse gas (GHG) reduction and decarbonization. To support these initiatives, utilities should consider GHG emissions in planning-level decision making. GHG accounting typically relies on real plant data, however at a planning level many assumptions must be made since the unit processes being evaluated do not yet exist. This presentation will provide information and resources on wastewater GHG emissions estimation and will better prepare utilities and consultants to perform GHG accounting on future planning projects.

This presentation will cover GHG accounting fundamentals for planning-level analyses comparing multiple alternatives. Fundamentals including Scope 1-3 emissions sources and biogenic vs. anthropogenic emissions will be presented, and attendees will understand what assumptions to make and emission factors to use for sources including electricity, chemical, and fuel use, process nitrous oxide and fugitive methane, embodied carbon, biogas utilization, and biosolids end use. Case studies from two planning projects will be presented. The value of developing a baseline inventory to use for future projects and the role of measurement-informed inventories will also be discussed.

For Nutrient Reduction Evaluations, different technologies are evaluated and GHGs are often a decision-making criterion considered in alternatives analysis. A project will be presented in which GHG estimates included secondary treatment electricity and chemical demand, embodied carbon associated with construction, and nitrous oxide and methane emissions. This project used a new approach to estimate process nitrous oxide, first modeling the emissions using process modeling software then comparing to emissions measured at the Utility's treatment plants and reported in literature.

For solids projects, biogas and biosolids end use are considered in GHG estimates and have a large impact on an alternative's carbon footprint. For the City of Vancouver's Solids Planning project, the Biosolids Emissions Assessment Model (BEAM) by NEBRA and Northwest Biosolids was used to estimate emissions from solids processing and residuals management for technologies such as incineration, anaerobic digestion, codigestion, thermal drying, and pyrolysis.

This information will provide attendees with a strong foundation in GHG fundamentals and empower them to bring this knowledge to their projects.

101 BEGINNER

Speaker

Shannon Cavanaugh

Process Engineer | Brown and Caldwell

Watt a Journey! Portland's Dedication to Innovation and an Energy-Efficient Future

10:00 AM – 10:30 AM

Authors: Daryl Payne

The City of Portland Bureau of Environmental Services (BES), in partnership with Energy Trust of Oregon, has proudly completed its seventh consecutive year in the Strategic Energy Management (SEM) program, achieving a cumulative savings of 3.54 million kWh. SEM is a comprehensive approach to optimize energy usage by reducing or avoiding unnecessary costs and minimizing the environmental impact through best business practices, data driven monitoring, employee engagement, and partnering with subject matter experts. This enduring commitment reflects our dedication to innovation and collaboration as we transition SEM efforts in-house while continuing to leverage the Capital Improvement Project (CIP) incentive program for projects, such as the Aeration Blower Upgrade, and identify Operations and Maintenance (O&M) projects that qualify for Energy Trust incentives, such as reduced blower pressure setpoints.

The Energy Team was formed to support BES's dedication to sustainable and self-sufficient energy methods, some CIP examples currently being adopted include the Renewable Natural Gas Facility, Organic Waste Receiving Facility, and Water Reuse. Focused on uncovering low-cost, low-effort strategies, the Energy Team drives long-term energy savings and supports net-zero goals by reducing overall consumption. This multidisciplinary effort combines electrical, automation, operations, maintenance, and engineering staff working toward innovative solutions.

Early efforts targeted "low-hanging fruit" projects, such as LED lighting upgrades and simple O&M practices like turning off idle equipment and increasing Dissolved Oxygen (DO) probe cleanings. BES now pursues more complex initiatives requiring advanced engineering solutions, including programming equipment to run optimally based on real-time sensor data. Expanding our sensor network and leveraging advanced analytics enhances efficiency by identifying optimal operational strategies and ensuring systems operate at their best efficiency point.

This presentation will share BES's SEM journey, highlighting our methods, successes, and key lessons learned to help us achieve a savings of 1.63 million kWh and 1,922 therms just last year. Attendees will gain insight into how strategic change management has embedded energy efficiency into daily operations, fostering a culture of innovation and inclusion among BES wastewater employees. From simple practices to advanced strategies, we'll showcase how organizations can implement SEM principles and, together, flow toward a more energy-efficient future.

BEGINNER

Speakers

Brittany Downing
City of Portland, Bureau of Environment Services

L

Leo Lal Mathew
City of Portland, Bureau of Environment Services

D

Daryl Payne
City of Portland, Bureau of Environment Services

T

Tyler Weber
Energy Trust of Oregon

Data & Machine Learning for Wastewater

9:30 AM – 10:30 AM | Location: Tech Rm 5

DIGITAL SOLUTIONS

Machine Learning for Wastewater Treatment

9:30 AM – 10:00 AM

In the last decade, advances in artificial intelligence (AI) and machine learning (ML) have precipitated changes across diverse industries. More recently, ML tools have generated significant interest within the wastewater sector, and have been applied to problems of prediction, control, and optimization. However, terminology definitions, best practices, and common pitfalls around ML remain murky at best. Unfortunately, this uncertainty is a stumbling block for many people who want to get started on the path to leveraging ML tools at their utility.

This presentation will provide a broad overview of ML as it relates to wastewater treatment, including a brief introduction to ML, a case study of current research, and finally recommendations on how to get started. The ML introduction will cover key ML concepts and terminology, such as the different types of ML, common problems each type might be used to solve, and some of the limitations associated with ML.

The case study will examine the application of reinforcement learning (RL) to the optimization of a simulated water resource recovery facility (WRRF). RL was applied to the holistic optimization of the secondary treatment process, encompassing the dissolved oxygen, internal mixed liquor recycle, and return activated sludge set points. While maintaining effluent compliance, an RL agent was able to achieve an 8.3% reduction in total WRRF operations costs, which included aeration energy, pumping energy, and solids handling costs, as well as costs associated with effluent pollution.

INTERMEDIATE

Speaker

H

Henry Croll
HDR

Enhanced Information Retrieval in the Digital Age

10:00 AM – 10:30 AM

Authors: Katya Bilyk; Charles Waldorff

In an increasingly data-driven world, access to large amounts of digital information has become an invaluable resource in guiding business operations and decision-making. This project will explore how natural language data, including associated figures and tables, can be utilized to improve organizational efficiency in the water sector.

Natural language data includes but is not limited to reports, contracts, specifications, operations and maintenance manuals, invoices, and customer communication. Additionally, these language data sources may include other forms of media, such as design drawings and report figures. Retrieving information effectively from these data sources has been challenging since it has no predefined structure, understanding the meaning and context of words requires more than just keyword searching, and the sheer volume of natural language data that is generated daily makes efficiently indexing, searching, and retrieving relevant information a significant technical challenge. Furthermore, associated figures and tables provide tremendous value but are more challenging for digital approaches to interpret.

Recent advances in natural language machine learning models, as well as cloud computing services, have addressed these challenges enough to unlock a new paradigm for interacting with an organization's data. Using a process called Retrieval Augmented Generation (RAG), organizations can now privately and securely incorporate their own natural language data into tools like ChatGPT, and then query that data more effectively and efficiently. Additionally, cloud computing services like Azure provide premade tools for creating these private ChatGPT instances with no or minimal coding, in addition to their known benefits like optimized storage solutions.

This presentation will discuss a first-of-its-kind project completed in August 2024 to retrieve information from city council meeting minutes dating back to the 1940s using a private ChatGPT interface to query the data. Azure Document Intelligence, AISearch, and OpenAI services were utilized in this project. In addition, a significant portion of the presentation will focus on further applications of these tools and the readiness of the existing tools for more complex applications such as:

• Institutional knowledge retention that involves critical thinking

• Interpreting design documents and design intent

• Capital improvement planning using past reports and current cost indices

BEGINNER

Speaker

Nandita Ahuja

Associate | Hazen and Sawyer

Process Optimization

9:30 AM – 10:30 AM | Location: Tech Rm 6

TREATMENT INNOVATION & INTENSIFICATION

Innovative Approaches to Oxidation Ditch Treatment

9:30 AM – 10:00 AM

The Sanitaire process solution to the oxidation ditch application is the BioLoop system. A novel configuration used with the BioLoop is the simultaneous nitrification denitrification (SNDN) process. This innovative approach uses oxidation reduction potential (ORP) probes with dissolved oxygen (DO) probes with ditches either in a series or parallel to achieve stringent total nitrogen (TN) and total phosphorus (TP) requirements in combination for BOD, TSS, and ammonia removal.

Operating with two or more ditches in series allows total nitrogen removal to be optimized over a wider range of flows, loads, and temperatures. The series option uses an aerated/ anoxic ditch upstream to denitrify and nitrify, operating under low DO operation, and a second ditch, operating in an aerobic environment, at the back end of the process for ammonia polishing and to keep a higher DO concentration before secondary clarification.

For cases where it is not practical to operate ditches in series, it is feasible to achieve SNDN in a single reactor. To optimize SNDN with ditches in parallel, modeling is used to determine oxygen gradient throughout the ditch, placement of mixers, and denitrification capacity. With the combination of process control to achieve SNDN and decoupling of mixing and aeration, the BioLoop process minimizes energy consumption by reducing aeration demand while promoting increased denitrification and recovering alkalinity, and reducing the need for supplemental carbon, making it an efficient and sustainable choice for wastewater treatment plants (WWTPs).

Two notable BioLoop process applications are at the Cambridge, Indiana and Globe, Arizona WWTPs, which highlight the effectiveness of the BioLoop system with the SNDN process. In Cambridge, Indiana, ditches are configured in series with pre-anaerobic tanks upstream to achieve advanced biological nutrient removal (BNR) specifically TN and TP limits. We compare the effluent requirements to what the facility is achieving on an annual basis. Similarly, a single-ditch SNDN application in Globe, Arizona, also demonstrates the versatility of the BioLoop system with the SNDN process. The Globe installation achieves nitrification and denitrification in one oxidation ditch, utilizing separate mixer and aeration control to denitrify in the un-aerated zones of the ditch and nitrify in the aerated portion to achieve effluent requirements. The BioLoop system's success in both ditches in series and single ditch in parallel application with the SNDN process show the systems capability for both greenfield application or ditch retrofits, and to meet stringent nutrient limit requirements.

INTERMEDIATE

Speaker

Jeremy Jensen

Xylem Territory Manager - West Region | Xylem

Creative Design and Novel Approach - Maximizing Capacity with a Flexible Selector

10:00 AM – 10:30 AM

In 2019 the City of Pasco worked with Consor to finalize a facility plan to address decades of rapid sustained growth for an aged and limited capacity treatment plant. With significant capital expenditure needs across the City's various utilities, maximizing capacity while minimizing capital expense was a key area of focus in the secondary treatment expansion design. Improvements to the WWTP included two new aeration basins, refurbishment of two existing aeration basins, and blower system expansion. This presentation will provide an overview and discussion on:

• The operational issues with the prior plant: filamentous growth, F:M control, alkalinity limitation and pH control.

• Solutions implemented to address these issues and gain capacity: Selector size and type (aerobic vs anoxic vs anaerobic),

• An overview of selector design and performance criteria: Hydraulic residence time, food to microorganism ratio, and metabolic selection vs kinetic selection.

• How the novel use of a seasonally "flexible" selector was able to provide the City with a 20% increase in capacity for no additional cost. This is due to seasonal optimization and balance of nitrification, denitrification, and anaerobic conditions with capacity constraints due to airflow from blowers/diffusers and solids handling of the secondary clarifiers.

• Pros, cons, and lessons learned regarding the use of a flexible selector: alkalinity addition, aeration and blower performance, filamentous control, and others.

INTERMEDIATE

Speakers

C

Craig Anderson

Principal Technologist - Wastewater | Consor

Mark Cummings

Senior Engineer | Consor

CM/GC for Treatment

9:30 AM – 10:30 AM | Location: Tech Rm 7

PROJECT, PROGRAMM & ALTERNATIVE DELIVERY

Powering Through: Delivering a New Main Substation at Columbia Boulevard WTP

9:30 AM – 10:00 AM

Not all public infrastructure projects delivered to help keep our water clean touch water. Replacement of the main electrical substation (MASU) at the Columbia Boulevard Wastewater Treatment Plant (CBWTP)—Oregon's largest wastewater treatment plant, serving more than 650,000 customers in and around Portland, owned and Operated by the City of Portland, Bureau of Environmental Services—is one such project.

The existing substation, constructed in the early 1970s and consisting of dual-end fed15kV switchgear, medium voltage transformers, and 5 kV switchgear, had reached the end of its useful life. The switchgear manufacturer was out of business, making it difficult to source replacement parts and CBWTP operation and maintenance staff reported multiple circuit breaker and protective relay failures. Finally, the metal housing for the gear had rusted through, leaving air gaps and leading to water leaks and rodent infestation.

Overall, the substation represented a safety risk to staff and a reliability risk to the operation of the entire plant.

The project scope was to replace the substation in-place with limited expansion of the existing MASU footprint while keeping the CBWTP operational with limited approved outages. In 2017, the project was initially conceived a standard design-bid-build delivery. By the time substantial completion was achieved in 2024, the new substation was complete with $4.5 million worth of medium voltage electrical gear procured directly by the owner and installed by a Construction Manager/General Contractor.

This presentation will discuss how and why the project delivery strategy evolved over time and the challenges and benefits presented by directly purchasing large equipment and the collaborative/alternative delivery methods.

Additionally, we will discuss the challenges inherent to keeping a large facility operational while implementing replacement of such large critical electrical equipment. The City's project manager, an environmental engineer by training, will discuss the opportunities presented by managing a project that is outside your area of expertise.

Speakers will include the City's project manager and the engineering design consultant's project manager and potentially others.

INTERMEDIATE

Speakers

C

Cyrus Osborn

City of Portland--Environmental Services

J

John Rice

Tetra Tech

Value Engineering: Treatment Plant Design-To-Budget using the CM/GC Delivery Process

10:00 AM – 10:30 AM

The City of Estacada (City), Oregon provides sewer service to approximately 5,750 residents. The City operates a traditional secondary wastewater treatment facility the community has outgrown and meeting effluent quality under Oregon's 3 Basin rule has been challenging. Rather that retrofit the aging plant, the City has opted to replace it with tertiary membrane treatment on an adjacent site. The City is proposing to construct a 6.6-million gallon per day (MGD) flat-plate membrane treatment facility, with fine screening, closed-vessel ultra-violet (UV) disinfection, and aerobic digestion.

With a fast-paced regulatory-driven implementation schedule, this project is being delivered in record time. In just over a year, the project progressed from site selection to a 90% design for bidding using the Construction Management/General Contractor (CMGC) delivery method. With cost escalation due to material shortages, economic inflation and wage increases, the actual cost of improvements was nearly 65% over preliminary estimates. Needless to say, the City was in shock and the project was in jeopardy.

The team collaborated on an extensive value engineering process using the 60% design to identify cost savings while prioritizing operational efficiency and maintaining the design's integrity. We will discuss how cost saving measures were selected and refined during the 90% design. The team identified over 23 value engineering options totaling over $20M in potential savings. The team vetted their ideas with operations staff and the City Council resulting in acceptance of $15M in savings, or a 20% decrease from the initial estimate. We will describe the process of regulatory approval for value engineering within Oregon Department of Environmental Quality's State Revolving Fund framework and how approval to defer some improvements was justified. Finally, we will show how value engineering through the CMGC delivery process leveraged our teaming partners to maximize value.

101 INTERMEDIATE

Speakers

Shawn Spargo

Senior Engineer | Kennedy Jenks

Allison Lukens

Associate Engineer | Kennedy Jenks Consultants

K

Keith Beckman

MWH Constructors

Beyond Compliance Planning

9:30 AM – 10:30 AM | Location: Tech Rm 8

INTEGRATED PLANNING & RESILIENCE

Orting's Strategic Approach to Integrated Municipal Planning: Going Beyond Checking the Box

9:30 AM – 10:00 AM

The City of Orting, Washington, sets itself apart by embracing required planning that integrates and leverages the interdependence between water systems, sewer systems, general city plans, telemetry, and asset management, moving beyond merely 'checking the box'. By integrating these planning efforts, the City has developed plans that do not create 'an elephant they can't take a bite out of' by preventing the overlap of major capital projects, making each more manageable and effectively coordinated.

Coordinated planning improves the effectiveness of the City's planning efforts, leading to streamlined and effective operational strategies. By aligning capital improvement plans (CIP) with these efforts, Orting supports each department, improving the feasibility of funding and completing projects.

Key components of interconnecting planning include:

• Integrated Planning Strategy: Continuous alignment of diverse municipal planning efforts to enhance system efficiency and operational strategies.

• Collaboration and Synchronization: Active pursuit of interdepartmental collaboration, utilizing shared resources for condition assessments and asset management that inform decisions on infrastructure interdependencies.

• Strategic Integration: Coordinated efforts that ensure streamlined operational strategies and the achievability of CIP goals.

Attendees of this presentation will gain actionable insights into implementing strategic, integrated, and collaborative planning strategies within their municipalities. They will learn how these approaches can enhance interdepartmental efficiency and improve overall municipal management. The session will highlight the direct benefits of synchronized, interdependent planning, providing PNCWA members with practical approaches to avoid unsynchronized municipal management and promote effective system planning coordination.

INTERMEDIATE

Speakers

JC Hungerford

Water Division Manager | Parametrix

R

Ryan McBee

City of Orting

Mari Orama

Senior Consultant/Group Lead | Parametrix, Inc.

A Ripple of Hope: moving beyond Stormwater Permit compliance in Clark County, WA

10:00 AM – 10:30 AM

Historically Clark County's Clean Water Division has only had funding and political support to implement state and federal mandates under the National Pollution Discharge Elimination System (NPDES) Phase 1 Municipal Stormwater Permit to remain in compliance with the Clean Water Act requirements. Additionally, Clark County had the lowest Stormwater rates in Western Washington, which greatly limited the program's ability to implement innovative programs beyond Permit compliance. In January 2024, the Clean Water Division completed a Stormwater Rate Study to identify its compliance risks, service gaps, and unmet needs in order to to update the County's Clean Water Fee, which is the main source of funding for clean water services. Through this Rate Study process, our team charted a new vision for a clean water future that identified over 60 new, enhanced, and improved services to officially move Clark County's stormwater program beyond regulatory requirements for the first time in history. By the end of 2024, Clark County Council voted unanimously to increase the county stormwater rates by approximately 55%, achieving the first stormwater rate increase in Clark County in almost 10 years, and only the second stormwater rate increase since 2000. With this increased source of revenue, Clark County's Clean Water Division has a new ripple of hope as we are slated to almost double staff capacity over the next 5 years to implement more proactive asset management services to address aging infrastructure, while simultaneously increasing our program's ability to implement more nature-based solutions to improve watershed health and achieve critical salmon recovery goals. In a time of unprecedented funding challenges, Clark County Clean Water Division is experiencing a ripple of hope to officially move beyond Stormwater Permit compliance, into a new era of proactive and innovative clean water services.

INTERMEDIATE

Speakers

D

Devan Rostorfer

Clark County Public Works Clean Water Division

J

Jeff Schnabel

Clark County

Exhibitor Spotlight Session 2

10:35 AM – 11:35 AM | Location: Exhibit Hall B/A1

EXHIBT HALL

Minimizing Aeration Energy & Reclaiming Alkalinity for Process Stability

10:35 AM – 11:05 AM

EXHIBIT HALL

Wastewater treatment plants are designed based on future loading conditions, but in many cases treatment facilities take many years to fully realize the design loading conditions. Operating under lower loading conditions can present challenges for operators to manage an aeration system in an energy efficient manner and effectively utilize embedded carbon for process and energy benefits. Employing a solution that adapts activated sludge process environments more effectively manages variable loading conditions with efficient aeration control to minimize energy while providing process performance benefits.

The Grandville Clean Water Plant utilizes a conventional activated sludge process to meet BOD5, TSS, NH4-N, and TP effluent requirements. The activated sludge configuration follows primary clarifiers and consists of three parallel plug flow trains, each train consisting of three passes. The activated sludge trains are fully aerobic utilizing diffused aeration for oxygen supply and mixing. The Grandville facility typically operates at about 65% of the design flow capacity. The reduced loading conditions presented challenges for efficient aeration control, often resulting in elevated DO in the second and third pass of each treatment train.

In addition to improving aeration control, the staff was also challenged with a lack of influent alkalinity to support complete nitrification. While Grandville has year-round effluent NH4-N limits with higher limits in the winter, the plant staff aspired to always discharge effluent NH4-N <1 mg/L, regardless of the season. It was not uncommon for nitrification to be limited by the available alkalinity, which typically resulted in depressed pH and poor settling in the secondary clarifiers.

Recognizing the opportunity for improved aeration control and alkalinity recovery, Grandville staff reviewed the benefits of an adaptive volume process solution for their activated sludge trains. The staff selected a process solution which utilized the second pass of each train and included the addition of compressed gas mixing and automated actuators on each of the three grids within the second pass.

Combining compressed gas mixing with each aeration grid, created three sub-volumes within the second pass which could be individually operated to create aerobic, anoxic, or low DO environments with independent mixing and aeration equipment. Targeting alkalinity recovery and reducing aeration energy, the subzones were anticipated to operate in a mix only mode with the compressed gas mixing system operational and the aeration grids off.

Positioning the adaptive volume process in the second pass of each train provided an opportunity to utilize influent embedded carbon for denitrification under anoxic conditions in the second pass. This mode of operation not only reduced aeration energy but also recovered alkalinity via denitrification and improved overall process stability with elevated effluent pH and alkalinity. In addition to recovering alkalinity and reducing aeration energy the plant effluent NO3-N declined. The plant staff considers this process modification to be a success and appreciates the energy saving as well as the process benefits.

Speaker

M

Mark Gehring

Director of Regional Sales | EnviroMix

From Overkill to Optimal: CT-based Dosing Control for More Efficient and Effective Chemical Disinfection

11:05 AM – 11:35 AM

EXHIBIT HALL

Traditionally, wastewater treatment facilities (WRFs) have often relied on chemical disinfection with conventional control measures, such as flow-pacing, for chemical dosing. However, this approach is challenged by system variability and its impact on disinfectant chemical demand. This often leads to WRFs significantly overdosing disinfectants – roughly twice the necessary amount. This overuse of disinfectants results in inflated chemical disinfectant and quenching costs, increased disinfection byproduct formation, inconsistent performance, and compromised public health protection.

Technology: OaSys iCT™ is a model-based advanced disinfection control technology designed to address these challenges. OaSys iCT™ normalizes disinfection performance by accounting for system variability, including hydraulics, background chemical demand, and disinfection kinetics. By accounting for these factors, OaSys iCT™ optimizes chemical dosing to prevent both over- and under-dosing

This presentation explores the fundamental principles behind this technology, applying the Integrated Disinfection Design Framework (IDDF) in real time, and showcases recent full-scale case study examples highlighting its effectiveness compared to conventional flow-pacing methods across various disinfectants, including bleach, peracetic acid, or other disinfection chemistries. Furthermore, it highlights the significant benefits realized at facilities that have adopted iCT™ control for chemical disinfection.

OaSys iCT™ can be deployed directly in reactor basins or via a slip-stream reactor. On the exhibit floor, we will showcase the slip-stream reactor, which models disinfectant demand and decay external to the disinfection process. This setup helps simplify the implementation of OaSys iCT™ dose pacing when residual measurements unavailable or inaccessible and supports performance testing of alternative disinfection strategies.

Key Benefits: With advanced modeling, OaSys iCT™ can use performance data to establish the disinfection chemical dose required to achieve the desired microbial kill and selects a setpoint. By assimilating the myriad of variables impacting chemical disinfection and calculating an OaSys iCT™ setpoint, the system recommends the ideal disinfectant dose required given flow and water quality conditions. As a result, the system allows for:

•Chemical Optimization: Reduces chemical feed based on real-time conditions, allowing for reduced consumption when available while simultaneously responding quickly as demands change. Depending on the scale of variability (e.g. inflow, background demands, etc.), this can reduce chemical consumption by 20-50%.

•Performance Precision: Maintains disinfection performance within +/- 0.5 Log Removal of the target, even with changes in flow or water quality, by targeting the OaSys iCT™ setpoint that repeatably achieves the desired disinfection performance.

•Effluent Quality: Minimizes residual disinfectant in the plant effluent, since the system does not overdose chemical, reducing the risk of DBP and unreacted disinfectant discharge as well as the demand for quenching chemical.

•Regulatory Confidence: Enhances reliability and consistency of performance to discharge specifications, helping facilities simultaneously improve disinfection performance while reducing chemical usage and costs.

By implementing OaSys iCT™ control, WRFs can achieve more efficient, cost-effective, and environmentally responsible disinfection.

Speaker

Ian Watson

Technology Development Manager | USP Technologies

Oregon Reuse Panel

10:35 AM – 11:35 AM | Location: Tech Rm 1

WATEREUSE

WATEREUSE

Oregon Reuse Panel

10:35 AM – 11:35 AM

WATEREUSE

Speakers

Mark Cullington

Kennedy Jenks

Jadene Stensland

Amazon Web Services

Wet-Weather Controls & CSO Storage

10:35 AM – 11:35 AM | Location: Tech Rm 2

COLLECTION SYSTEMS

Designing a Wet Weather Treatment Station for an Uncertain Climate Future

10:35 AM – 11:05 AM

Designing a wet weather treatment station likely to be in service beyond its 75-year lifespan presents significant challenges in the face of uncertain and potentially accelerating climate change impacts. The Mouth of Duwamish Wet Weather Treatment Station will treat combined sewer overflow during wet weather events to minimize overflows from four outfalls in Seattle, WA. While the treatment station is unlikely to be directly threatened by coastal inundation, the discharge point will be affected by rising sea levels, threatening the discharge capacity. Furthermore, increasing frequency and intensity of storm events, driven by climate change, will necessitate greater treatment and storage capacity. This presentation will provide a discussion of treatment system parameters that were selected based on climate projections and explore treatment technologies with flexibility to accommodate future flow increases exacerbated by climate change.

Sea level rise projections were crucial in informing the design of the wet weather treatment station. The analysis relied on data from the University of Washington's Climate Impacts Group, which incorporated factors like local land movement and considered various greenhouse gas emission trends. These projections provide likelihoods of reaching various levels of sea level rise. Using these probabilistic sea level rise projections, a site elevation was selected to ensure the treatment station can discharge at full capacity throughout its lifespan.

Designing the station with sufficient capacity to handle projected increases in flow volumes resulting from more intense and frequent storms was paramount. The analysis considered a range of treatment rates and equalization storage volumes, ultimately selecting an operating point that balanced cost-effectiveness, operational efficiency, and constructability while providing some flexibility to accommodate future increases in rainfall intensity.

The design of the wet weather treatment station incorporated adaptable treatment technologies to accommodate future flow increases due to climate change. For example, the hydraulic capacity of the ballasted sedimentation treatment process can be expanded beyond its rated capacity during peak storm events or in response to future storm intensities, providing flexibility to handle increased flow volumes. This forward-thinking approach will help ensure the station continues to effectively protect water quality in the Duwamish River for generations to come.

BEGINNER

Speaker

Becca Andrus

Jacobs

Port Gardner Storage Facility: An Innovative Solution to Urban Water Management

11:05 AM – 11:35 AM

The City of Everett, Washington, is transforming the decommissioned Kimberly-Clark Wastewater Treatment Plant into the Port Gardner Storage Facility (PGSF) to improve Puget Sound water quality. The PGSF will exemplify innovative water management by leveraging repurposed infrastructure for combined sewer storage and stormwater treatment. The site will both exceed the minimum requirements for combined sewer overflow (CSO) capture and treat stormwater from more than 300 acres of the City's watershed. The excess storage provided at PGSF will reduce the risk of CSOs and system failures, provide crucial storage needed for maintaining service continuity during peak extreme weather conditions, and allow the City to respond to changing weather patterns and increased urbanization. By repurposing existing infrastructure for wet weather storage, the facility maximizes resource efficiency and minimizes costs, showcasing a sustainable and adaptable approach to urban water management.

The PGSF facility design incorporated a site condition assessment, alternatives analysis, collection system modeling, and climate and seismic resiliency evaluations to establish project design criteria. Key design elements for this project include retrofitting the site for screens and grit separation, converting aeration basins and clarifiers into temporary wet weather storage, implementing a 9,500 square foot regional stormwater treatment system, constructing two new pump stations, and installing multiple large diameter pipelines in poor soils with a high seismic risk and elevated groundwater. Construction of the PGSF is scheduled to start in the summer of 2025.

This presentation highlights innovative approaches to repurposing retired assets and how the themes of resiliency and operational flexibility underscore the design. The audience will understand how resiliency considerations played a key role in project decision making and unique challenges with repurposing assets.

INTERMEDIATE

Speaker

Casey Gish

Engineer | Brown and Caldwell

Energy and Carbon Efficient BNR

10:35 AM – 11:35 AM | Location: Tech Rm 3

NUTRIENT REMOVAL

Nutrients & Carbon: Treating More While Emitting Less

10:35 AM – 11:05 AM

As plants throughout Puget Sound prepare to upgrade treatment infrastructure to meet new watershed nutrient permit requirements, the specific oxygen demand for treatment is predicted to increase, potentially leading to significantly higher aeration energy use and Scope 2 GHG emissions. At the same time, biological nitrogen removal (BNR) can increase the carbon footprint of treatment through increased nitrous oxide emissions. Luckily, new decarbonization techniques are allowing WRRFs to adopt intensified BNR and improve effluent quality while actually reducing their overall carbon footprint.

This presentation will discuss four decarbonization opportunities for utilities: fleet electrification and three key BNR innovations (biomass fermentation, low DO operation, and densification). Each decarbonization strategy will be reviewed to demonstrate the potential carbon reduction opportunities achievable by stacking electrification and advanced biological process technologies.

The presentation will cover:

• Fleet electrification: Zero-emissions vehicle types, infrastructure needs, fleet transition approaches, lessons learned from two case studies in the Seattle area, and best practices to guide a successful transition to a decarbonized fleet.

• Biomass fermentation: How to produce readily bioavailable carbon onsite for GHG-optimized denitrification (and chemical carbon avoidance) using anaerobic selectors or sludge fermenters. Calculation and measurement of apparent fermentation rates and relationship with SRT.

• Low DO operation: By shifting ecologies, optimal nitrification rates can be maintained at DO concentrations as low as 0.25 mg/L while maintaining good settling and maximizing the value of endogenous BOD. Rate testing from three retrofit facilities demonstrate how this technique provides better, more resilient nitrogen removal while minimizing blower energy demand.

• Granulation and densification: techniques to increase capacity by improving sludge settleability without the need for costly capital modification or expansion. Two case studies of retrofittable increases in biomass inventory that boost nitrification capacity while improving resilience to load variation.

• Combining low DO with densification: densified biomass does not require a higher specific airflow per tank area to be mixed. This provides the ability to operate at low DO without adding mixing energy or increasing the risk of densified biomass settling in the basin.

The conclusion of the presentation will provide guidance on how wastewater characteristics influence the technology choices for decarbonization.

ADVANCED

Speakers

Leon Downing
Global Practice and Technology Leader - Nutrient Removal & Recovery | Black & Veatch

Will Einstein
Principal Consultant | Black & Veatch

Turn down to what? Transitioning to low-DO for energy & carbon saving BNR and better effluent

11:05 AM – 11:35 AM

Many Puget Sound WRRFs will soon incorporate total nitrogen removal for the first time in response to new watershed discharge permits. This transition is predicted to dramatically increase energy use at these facilities to meet nitrification aeration requirements, while also presenting challenges in reconfiguring secondary processes to reserve carbon for denitrification. This presentation will review the experiences of three large utilities in the southern and midwestern US in transitioning to a low-DO ecology for total nitrogen control, providing insights on the benefits, requirements, and risks of low-DO operation. Case studies from Trinity River Authority (TX), New Water (WI) and Fond du Lac (WI) will be reviewed, with special emphasis on comparing low-DO and conventional DO operations, either within the same plant or between neighboring plants.

Benefits realized from low-DO operation included lower energy use for nitrification (a savings of over $400,000 annually at TRA), but also improved process stability resulting from reduced sensitivity of the nitrifying population to DO dips and a greater ability to respond to slug loading with temporary increases in DO. For example, results from rate-testing at Trinity River Authority (TRA) illustrate that ammonia removal specific rates for one low-DO facility were between 87-92% higher than two neighboring, conventional-DO facilities under the low DO condition, but that this facility also outperformed in the high DO condition with ammonia removal rates between 33-47% higher than the other two sites.

Additional advantages result from replacement of conventional MLE-type configurations with simultaneous nitrification-denitrification (SND), which eliminates the need for internal baffle walls and recycle pumping, and reserves influent carbon for denitrification. This has allowed TRA to achieve lower effluent total nitrogen following the transition to low-DO, while also realizing capital savings from implementing simpler BNR configurations in plant expansions. Finally, SND configurations preserve more alkalinity, reducing or avoiding chemical addition at facilities which may be alkalinity-limited for nitrification. In addition to case studies, this presentation will review advanced aeration control processes, lessons learned and equipment selection considerations for successful low-DO operation, as well as transitional approaches for successfully acclimating a nitrifying population to low DO setpoints.

INTERMEDIATE

Speakers

Leon Downing
Global Practice and Technology Leader - Nutrient Removal & Recovery | Black & Veatch

Sara Sadreddini
Black & Veatch

Digester Emissions Monitoring & Control

10:35 AM – 11:35 AM | Location: Tech Rm 4

CLIMATE RESILIENCE & SUSTAINABILITY

The Swiss Army Knife of Testing: Aeration Performance and GHGs in One Go

10:35 AM – 11:05 AM

Authors: Greg Stanczak; Maya Pruett; Jorge Zambrano

The wastewater sector is increasingly adopting intensification technologies to enhance efficiency, reduce space requirements, and improve nutrient recovery. However, the environmental trade-offs, particularly in terms of energy consumption and greenhouse gas (GHG) emissions, remain underexplored. While aeration is a major contributor to indirect (Scope 2) emissions, direct (Scope 1) emissions, such as nitrous oxide (N_2O), are significant yet often overlooked. N_2O, with a global warming potential 270 times that of CO_2, represents a major portion of emissions from conventional biological treatment processes. However, its impact in emerging intensification technologies remains largely unstudied.

Off-gas testing, traditionally used to assess aeration performance, presents a versatile tool for simultaneously monitoring both Scope 1 and 2 emissions. By estimating oxygen transfer efficiency (OTE) and blower energy use, off-gas testing provides critical insights into potential energy and indirect GHG reductions. When coupled with real-time N_2O monitoring, this approach enables a comprehensive assessment of both Scope 1 and 2 emissions, revealing their respective contribution. Tracking emissions variability over time allows to develop operational strategies that mitigate both sources.

This study presents work performed at three facilities (West Bank NDN, MLE NDN at low-DO and tertiary MBR) using an inflatable, self-ballasting hood with a portable analyzer to monitor direct N_2O and indirect emissions from the energy used by the blowers. Results showed that N_2O concentrations correlate with OTE, highlighting the effects of gas stripping and absorption. Continuous monitoring of the three tests, showed that N_2O emissions contributed to 78% (West Bank NDN), 17% (MLE at low-DO) and 98% (tMBR) of the overall aeration-related emissions. Comparisons across emission factors electrical grids from different states indicated that N_2O remained the dominant emission source.

Further testing is required to fully determine the driving mechanism of the N2O emissions, however, recommendations included: i) avoid rapid swings in DO, ii) maintain sufficient C/N ratios (C/N>6) and iii) avoid the introduction of oxygenated streams in the anoxic zones.

These findings underscore the need for real-time, high-frequency monitoring to assess and reduce the carbon footprint of intensification technologies. Off-gas testing helps utilities optimize treatment, cut energy use, and minimize emissions, promoting sustainable wastewater treatment.

INTERMEDIATE

Speaker

Sam Reifsnyder
Technologist | Carollo Engineers

I Spy Fugitive Methane: A Look at 3-Years of Leak Detection Surveys

11:05 AM – 11:35 AM

Authors: Shannon Cavanaugh

Anaerobic digestion and beneficial use of biogas have been the cornerstone of many municipal bioenergy programs looking to offset costs and have a climate positive impact. While these bioenergy programs can significantly reduce a utility's carbon footprint, fugitive methane (FM) leaks from digesters and biogas handling systems can undermine this climate benefit. FM is the unintended release of biogas and one of the largest sources of GHG emissions from WRRFs. The significance of methane and its impacts on the climate, coupled with burgeoning interest and attention of WRRFs as a source, creates considerable opportunities within the wastewater sector to address both local and global climate action goals through emission reduction.

The adoption of leak detection and repair (LDAR) programs can substantially reduce emissions while addressing odors, safety, asset renewal, and other drivers. A vast majority of WRRFs do not deploy regular LDAR as part of routine maintenance. New detection methods developed in the oil and gas sector provides the significant opportunities to implement effective LDAR programs. These methods include audio, visual, and olfactory inspections; portable monitoring instruments; or optical gas imaging (OGI) cameras. The direct appropriation of some of these methods by the wastewater sector may present challenges due to high variability and the diffuse nature of emissions. However, OGI technology has translated well for its use at WRRFs where it has been effective at detecting biogas leaks and could potentially be a key component of LDAR programs.

This presentation will provide an overview of LDAR programs and summarize data collected from optical OGI surveys from 15 WWTPs over the course of 3 years. A Konica Minolta GMP02 camera was used to identify and record methane emissions at solids and liquid treatment processes. Over 200 emissions leaks were classified in three categories of small, moderate, and large. Quantifications of FM occurred at most locations, but some emissions were qualitatively classified. The outcomes of the survey found that the most common sources of leaks included PVRVs, floating covers, digester appurtenances, compressors, and biogas equipment. At several WRRF, leaks were corrected by plant staff and resurveyed for verification, resulting in emission reduction and improved resource recovery.

INTERMEDIATE

Speaker

Trung le
Engineer | Brown and Caldwell

Data Management & Visualization Tools

10:35 AM – 11:35 AM | Location: Tech Rm 5

DIGITAL SOLUTIONS

Engineering and Data Management Tools

10:35 AM – 11:05 AM

Municipal storm, sanitary, and water systems require continuous maintenance and planned lifecycle replacements. This work involves tracking and analyzing tremendous amounts of data such as asset conditions, project scope and design, and developing cost estimates. Municipalities make significant investments in staff training, urgent repairs, and replacements of assets. However, agencies often do not invest in developing engineering and data management tools that can significantly reduce analysis time, assist with engineering and project management decisions, and increase efficiency, quality, and insight into the data. This paper provides a business case demonstrating how investments in the development of such tools are worthwhile to save time, money, and improve project quality.

The City of Portland has developed many such tools for performing tasks including the following: developing planning level budgets, calculating construction costs and return on investment for multiple alternate construction methods, tabulating project bid item quantities, calculating CIPP liner thicknesses, aggregating and analyzing historical bid item unit prices, collating project specifications, documenting condition assessments and project designs, and generating reports for stakeholders.

It is important that tool development avoids potential pitfalls such as developing black box solutions that are blindly trusted without understanding the engineering and assumptions behind it. This paper provides examples of tasks appropriate for engineering and data management automations and considers other tasks that are not appropriate because they require hands-on supervision and engineering. It examines where some solutions may not provide enough benefit to be worth pursuing or may require more maintenance than is worthwhile. The paper wraps up with some best practices and discussion of how to begin developing these tools.

INTERMEDIATE

Speakers

Daniel Boatman

Collections System Engineer II | City of Portland

S

Sam Gould

City of Portland Bureau of Environmental Services

Data Management and Visualization - Planning Consideration's

11:05 AM – 11:35 AM

The arrival of new digital tools, data storage and visualization software has brought the need for utility centralized data management into focus. Like anything else, this requires resources. This presentation reviews planning and design considerations for data management and visualization and presents a working example dashboard with a unit process performance evaluation focus.

The advent of new digital tools like machine learning or digital twins has brought data management and visualization to the forefront. Most existing systems are SCADA centric and theoretically simple tasks as overlaying data from SCADA with lab data or field measurements remains a stubborn challenge. The lack of central data management and meaningful data visualization represents a barrier not just to implement new digital tools but is also prevents proactive operation, slows down troubleshooting, makes administrative benchmarking difficult, and assessing the health and performance of any unit process or major equipment an hourlong task rather than a simple check.

This presentation will review basic data management elements at a planning level; how is data accessed, what data is required to assess a unit process or equipment, and how frequent data should be logged. Relevant structured data can be grouped into water quality, process control, administration, and assets. Most data originate from four sources, SCADA, operators, laboratories, and administration. Which data is relevant for storage and visualization depends on the users or stakeholders and how it is used.

Designing and delivering data visualization solutions must begin with the end in mind: who will use it for what purpose. In the past, technology constrains limited the scope of data management and visualization. That is no longer the case, newer data management architecture and software allow us to handle the data volume and provide secure access to stakeholders.

The presentation will include an example dashboard with an emphasis on performance focus, rather than the status focused SCADA. For instance, how does one unit process performance compare to last week or last month? How long has an asset been running? Is compliance trending in the right direction? The example dashboard provides stakeholder with quick answers to these and many other questions.

INTERMEDIATE

Speaker

M

Mario Benisch

HDR

Treatment Performance Testing

10:35 AM – 11:35 AM | Location: Tech Rm 6

TREATMENT INNOVATION & INTENSIFICATION

Bench Testing Ballasted Sedimentation and Enhanced Metals Removal at the Elliott West CSO

10:35 AM – 11:05 AM

Authors: Dan Davis; Erin Thatcher; Douglas Jones & Rowena Johnson

King County operates the Elliott West Wet Weather Treatment Station (EWWTS) CSO treatment facility located in Seattle, WA. The facility discharges treated CSO to Elliott Bay in Puget Sound. EWWTS was first completed in 2005 and includes screening and chemical disinfection, however the facility has not met their NPDES permit requirements. Following an alternatives evaluation, the County determined that the EWWTS would be upgraded using ballasted sedimentation treatment followed by Ultraviolet (UV) disinfection. The ballasted sedimentation process is based on Veolia Water Technology's Actiflo® treatment process. Since 2021, Brown and Caldwell has been conducting bench testing of the ballasted sedimentation process on CSO samples collected during wet weather events at the EWWTS facility. Bench testing is intended to inform chemical selection, chemical dosing, compatibility with disinfection, and removal of metals.

Bench testing has included 11 separate wet weather events—typically when rainfall exceeds 0.5 inches during an event. A gang stirrer was used to simulate the process in jars using different coagulant and polymer doses. Based on testing over several events with varied water quality conditions, a range of optimal coagulant and polymer doses were identified. Additional disinfection testing was conducted using Collimated Beam on the supernatant of optimized jar tests. The dose-response curve obtained from the Collimated Beam testing will be used to aid in the UV disinfection design.

To reduce metal concentrations in the effluent, the Veolia product MetClear was used to evaluate the potential for reducing total and dissolved copper and zinc when used in conjunction with the Actiflo® process. Different MetClear formulations and doses have been included in the testing. Results suggest that it can be effective at reducing metals and is planned to be incorporated into the design of the upgraded facility.

The presentation will include an overview of the bench testing program and the results of testing conducted to date. Attendees will gain insight about key considerations for bench testing at intermittent wet weather facilities, performance of proposed methodologies for removal of select metals, and the role of bench testing in a broader CSO upgrade project.

BEGINNER

Speaker

Shannon Cavanaugh

Process Engineer | Brown and Caldwell

Assessing the impacts of a novel dissolved oxygen infusion system on wastewater treatment plant performance

11:05 AM – 11:35 AM

Authors: Sondra Miller

Wastewater treatment plants (WWTPs) rely on complex biological, chemical, and physical processes to transform constituents, and innovations in operational systems are crucial for optimizing performance. This study investigates the efficacy of a novel high-concentration dissolved oxygen (DO) infusion system installed in a WWTP in Greenleaf, Idaho. The system was designed to deliver return activated sludge (RAS) infused with elevated DO levels (>20.0 mg/L) to enhance microbial activity and improve nutrient removal processes. Seasonal monitoring of key parameters, including DO, temperature, pH, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and nutrient concentrations, revealed significant operational benefits. The DO infusion system facilitated improved total nitrogen and total phosphorus removal, demonstrating its potential to enhance the plant's nutrient reduction performance. However, the elevated DO environment also led to an increase in sludge volume index (SVI), likely driven by shifts in microbial community dynamics within the oxidation ditch.

Comprehensive correlation analyses established significant correlations between operational parameters, highlighting the DO infusion system's dual impact—improving nutrient removal while introducing operational challenges such as increased sludge volume index (SVI) due to microbial shifts.

These findings underscore the potential of high-concentration DO systems as a transformative tool for wastewater treatment, advancing sustainability and operational efficiency. This research contributes to the understanding of how such systems can be integrated into existing WWTPs while navigating the trade-offs associated with their implementation.

BEGINNER

Speaker

Gregor Posadas

Graduate Research Assistant | Boise State University

Progressive Design Build for Treatment

10:35 AM – 11:35 AM | Location: Tech Rm 7

PROJECT, PROGRAMM & ALTERNATIVE DELIVERY

Playing “Clack-A-Mole”: Leveraging PDB delivery to tackle multiple challenges

10:35 AM – 11:05 AM

Clackamas County’s Water Environment Services (WES) is on track to construct a new 90-inch outfall - the largest new outfall in the Northwest. Once complete, this project will enhance water quality, protect beneficial uses in the Willamette River, and increase resiliency of the Tri-City WWTF in Oregon City, OR.

Together with the existing outfall (which will be used during peak wet weather events), the new outfall provides capacity for buildout flows of 168-mgd. The new mile-long outfall required installation of a 114-inch-diameter tunnel for half of its length below the I-405/99E interchange, in challenging ground conditions with a wet recovery in the Willamette River to install the 18-port 150-ft long diffuser at channel depth. The remainder of the alignment was constructed via open-cut, routed in a tight corridor between an old landfill and two of WES’s major 72-inch-diameter pipeline assets that require uninterrupted use during construction.

Due to the project complexity, WES implemented the project using the Progressive Design Build (PDB) delivery model. The PDB contract started in 2022 after careful selection of a qualified Design-Builder, allowing WES to validate the project path forward while refining construction approaches to meet permit requirements and achieve greater cost certainty. The project benefited from early contractor input to successfully address challenging design criteria; rigorous permitting requirements; construction risk; and careful sequence of schedule constraints to work concurrently with the adjacent ODOT I-405 Abernethy bridge widening project.

This presentation will provide lessons learned and an update on how the team navigated construction risks and construction input by leveraging the PDB delivery approach. The PDB approach has also allowed WES to collaborate more effectively with major stakeholders along the corridor (ODOT, City of Oregon City, multiple regulators) regarding project impacts and opportunities.

INTERMEDIATE

Speakers

J **Jeff Stallard**
Clackamas WES

Q **Quitterie Cotton**
Jacobs

Progressive Design Build and You | Benefits and Challenges from an Owner’s Perspective

11:05 AM – 11:35 AM

Abstract:

The City of Nampa recently completed the $180M Water Recovery Facility Upgrade project– the largest capital project in city history and their first experience with the Progressive Design Build (PDB) delivery model. Working with Brown and Caldwell (Program Manager) and Jacobs (Design-Builder), Nampa created a collaborative environment that leveraged PDB benefits, such as early price certainty, expedited schedule, and reduced project risk. The results not only enabled the City to meet requirements for Class A reuse for the entire plant flow, but also resulted in project completion within the original agreed budget, one year ahead of the contracted delivery date.

Take that to City Council!

This presentation will share insights into how the collaborative team operated through each project phase and key lessons learned in the process, such as:

• DELIVERY MODEL EVALUATION: Is collaborative delivery appropriate for municipal water projects? What behaviors encourage trust among all parties?

• DESIGN PHASE: How is the owner’s input considered during the design phase? How does an organization encourage individual contributions and focus on team accomplishment?

• PHASE 2 CONTRACT PRICE DEVELOPMENT: How does the owner evaluate the cost competitiveness of the Guaranteed Maximum Price (GMP) Proposal? How does the team fairly allocate risk?

• CONSTRUCTION PHASE: How to deal with conflict and change throughout construction? How does PDB change the owner’s role in construction management?

• COMMISSIONING: What are the differences between PDB performance requirements and warranties of specified products/equipment?

• CHANGE AND RISK MANAGEMENT: Can risk management associated with collaborative delivery be applied to more traditional delivery models?

• IMPROVEMENTS – What would we do differently? Was it worth the effort to try a new delivery approach?

BEGINNER

Speakers

G **Gregg Thompson**
Jacobs Engineering

J **Jeff Barnes**
Director of Water Resources | City of Nampa

Regional Watershed Collaboration

10:35 AM – 11:35 AM | Location: Tech Rm 8

INTEGRATED PLANNING & RESILIENCE

Watershed views: targeting the possible with regional collaboration

10:35 AM – 11:35 AM

Authors: Kamuron Gurol; Lisa Huntington; Renee Willet

The purpose of this panel is to increase awareness around the benefits of regional approaches to achieve better environmental outcomes for communities in the pacific northwest.

The panelists will provide their personal experience on successes and challenges using regional collaboration to address watershed issues. The panel discussion will identify similarities and differences between their regional approaches; define ways to look beyond parameters and regulations; create alignment with community and stakeholder interests; and provide insights to achieving better outcomes. Challenges faced by the panelists include stringent nutrient regulations, TMDL requirements, affordability, and stakeholder management. In addition to the experience provided by the panelists, there will be information shared regarding different collaboration models from across the United States.

Attendees will leave this panel discussion with 1) key insights on how to develop and drive regional collaboration, 2) understanding how it can achieve better environmental outcomes sooner and/or at a more affordable cost, 3) common pitfalls to avoid, and 4) a better understanding of what collaboration models have been tested across the country.

INTERMEDIATE

Speakers

Mami Hara

CEO | US Water Alliance

L

Lisa Huntington

Natural Systems Enhancement and Stewardship Director | Clean Water Services

PNCWA Business Luncheon

11:40 AM – 1:00 PM | Location: Oregon Ballroom

MEALS ATTENDEE EVENTS

The PNCWA Board of Directors will provide State of the Association announcements and elect new Board members. All PNCWA members are encouraged to attend to vote!

Requires pre-registration.

Exhibitor Spotlight Session 3

1:05 PM – 2:05 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL

Schwing Bioset Triple Threat: Grit Hoppers, Trolley System, and Belt Conveyors for SFPUC Headworks

1:05 PM – 1:35 PM

EXHIBIT HALL

The San Francisco Public Utilities Commission (SFPUC) is in the final commissioning stages of a billion-dollar headworks overhaul at its 250 million gallon per day (MGD) facility. Tasked with overcoming unique challenges and constraints, three custom-engineered Schwing Bioset systems are helping the SFPUC start strong with vital grit and screenings management.

System 1: Headworks Grit Storage Hoppers

SFPUC's first SBI solution was two massive grit storage hoppers. Offering 72 cubic yards of storage each, the facility's grit capacity worries are a thing of the past. Size doesn't negate speed and efficiency, though. Each 316 Stainless Steel-fabricated hopper features load cells for easy inventory management, and custom 48"x72" hydraulically actuated gates provide operational simplicity and peace of mind, all while loading trucks in 15 minutes or less.

The SFPUC was ready to "hop" into action the second each system arrived fully assembled bins ready for installation — no field welding required — saving valuable time and labor.

System 2: Screenings Trolley Hopper System

Facing tight spatial constraints and unique challenges, SBI created two fully automated 5-cubic-yard screening trolley hoppers, optimizing inventory management in a big way with a small footprint.

Each trolley drive system is programmed to report to designated fill points under the washer/compactor discharges, receiving screenings material from the sluice gates. Level sensors reporting a full condition automatically move the trolley into the proper dumping position. The 48"x48" electrically actuated gates open to the trailer below. Once complete, the system returns to the fill or parking locations as directed.

System 3: Screening Belt Conveyor

The last in SFPUC's triad of SBI systems goes the distance with a screening belt conveyor. Two multi-rake screens feed the conveyor, which carries them across an 83' horizontal run, up a 6' incline before discharging into a compactor.

The belt system's fully enclosed stainless-steel cover ensures a clean site that keeps odors and debris in check while protecting the screenings from the elements. Strategically placed access doors allow for operator viewing, while hinged covers offer unrestricted access for convenient maintenance, cleaning, or adjustments.

Speaker

Joshua DiValentino

Senior Sales Manager | Schwing Bioset Inc.

Dewatering: Multi-Disc Technology Compared and Contrasted with Others

1:35 PM – 2:05 PM

EXHIBIT HALL

Providing a simple but in-depth theory of operation of multi-disc dewatering technology will build the base of knowledge needed to compare and contrast various dewatering machine technologies. Making a highly informed decision in regards to implementation of machinery is imperative and can impact your plant for years to follow.

This presentation will include a 3-D animation that details how water and wastewater sludge processes through a multi-disc dewatering system. Details of how sludge is fed to the system, how the sludge is precisely dosed with polymer and/or coagulant, how the sludge is combined with these chemicals and how it is flocculated, how the flocculated sludge is delivered to the dewatering drum(s) and how the sludge is ultimately dewatered is very clearly illustrated.

Key attributes of the system include fabrication from the highest quality materials and tight quality control. To assure the highest level of functionality and life expectancy of the machine and its wear items, inspection and quality control will be discussed. Maintenance routines and spare parts will be discussed followed by a short discussion about the ease of operations and machine autonomy.

With an understanding and knowledge of the multi-disc screw press and associated dewatering technology, another discussion will follow in which a comparison of other technologies will be presented. In each case a full comparison of the pros and cons of each type of system will be detailed and discussed.

Other technologies to be highlighted is a belt filter press, a conventional screw press, and a centrifuge.

Specific points learned from the discussion will be:

•Theory of operation, multi-disc

•Sludge and chemical feed and processing related to this technology

•Little to no special startup/shut down requirements

•Slow moving, easy to maintain parts

•Low operating costs

•Minimal operator attention required

Multi-disc screw presses have many advantages to consider and should be looked at in order to make an informed decision when it comes the making capital investment in dewatering equipment.

Speaker

Randy Burns

Sales Engineer | Esmil Corp.

Forever Chemicals in Water Reuse

1:05 PM – 2:05 PM | Location: Tech Rm 1

WATEREUSE

WATEREUSE

Forever Chemicals: Understanding the Risk

1:05 PM – 1:35 PM

WATEREUSE

Speaker

Erin Day Cox

Vice President - Northwest Water Resources Growth Leader | Jacobs

Forever Chemicals: Communicating the Risk

1:35 PM – 2:05 PM

WATEREUSE

Speaker

Natalie Monro

Jacobs

Data-Driven PFAS Tracking

1:05 PM – 2:05 PM | Location: Tech Rm 2

THE FURTURE OF PFAS?

Exploring Machine Learning for PFAS Source Identification and Control Efforts

1:05 PM – 1:35 PM

PFAS are present in the influent of many water resource recovery facilities (WRRFs) due to their widespread use in manufacturing, commercial operations, and household products. Although no limits have been identified federally for WRRFs, regulatory agencies' current focus is on source identification within WRRF collection systems. However, source identification is resource intensive for WRRFs, both in staff time and budget.

South Platte Renew (SPR), the third largest WRRF in Colorado, is required to complete a PFAS source identification study as part of additional monitoring required by the Colorado Department of Public Health and Environment (CDPHE). This effort has required hundreds of hours of staff time and tens of thousands of dollars to conduct sampling, lab analysis, and reporting.

The University of Oklahoma (OU) and Brown and Caldwell (BC) have been collaborating to identify alternative methods that could be used in PFAS source identification—specifically, using machine learning algorithms and signatures found in PFAS samples (Kibbey et al. 2024). To date, this algorithm has only been used for environmental groundwater samples. The project team of OU, BC, and SPR—funded by the Water Research Foundation (WRF) project 5276—aims to determine if existing machine learning applications can be expanded to identify PFAS sources in WRRF influent and if machine learning can identify correlations between commonly measured influent water quality parameters and PFAS. PFAS source classification through pattern identification would allow WRRFs to collaborate and develop a robust database that narrows down sources of the specific PFAS present in WRRFs' plant influent, marking a significant advancement in the industry. This ability has the potential to significantly reduce costs and time associated with meeting PFAS source identification requirements and the cost associated with future treatment if source control is implemented.

This presentation will cover the methods and findings of the WRF 5276 project, including 1) expanding an existing database and machine learning algorithm from environmental samples to those specifically found in wastewater collection systems and plant influent streams, and 2) investigating the use of a spectrophotometric sensor to correlate real-time UV reflectivity to PFAS compounds present in plant influent streams.

ADVANCED

Speaker

Jamie Lefkowitz

National Analytics Engineering Lead | Brown and Caldwell

How Do I Deal With All These PFAS Non-Detects? Better Statistical Methods to the Rescue

1:35 PM – 2:05 PM

Authors: Scott Mansell; Summer Sherman-Bertinetti

'Censored' data, such as non-detects, pose significant challenges in accurately interpreting environmental datasets, especially when the majority of results are below detection limits. Traditional practices, like substituting non-detects with zero or half the detection limit, introduce bias in statistics and visualizations, which can lead to misinterpretation, skewed trends, and misinformed critical decisions. To address this, Clean Water Services (CWS) explored advanced statistical methods to handle non-detects in a more consistent, statistically defensible way. CWS has collected over 1,300 samples for 40 PFAS compounds. With over 80% of the PFAS results falling below the method detection limits, and the detection limits varying by compound and from sample to sample, significant complexities and risk of misinterpretation are ever present. Until recently, CWS relied on using multiple traditional methods for handling the non-detects and compared the results of each approach to obtain a range of findings. However, this required a lot of time repeating analyses in different ways and was not a consistent, reproducible process. CWS evaluated three advanced statistical methods on subsets of the PFAS dataset with varying characteristics including different proportions of non-detects values, detection limits, and sample sizes. The effect on statistics, visualizations, and findings was evaluated and compared. Each approach has distinct strengths and limitations, but compared to traditional methods, these approaches reduce bias and provide more consistent and defensible results. These methods, while applied to PFAS data in this study, are broadly applicable to other environmental and laboratory analyses with censored observations. In addition, modern tools make using these advanced statistical methods much more approachable and user-friendly. The presentation will describe each of these methods with their strengths and limitations, how to implement them using practical tools, and the findings of this case study on CWS's PFAS data. By the end of the session, attendees from a variety of backgrounds will gain actionable insights in how to use these advanced techniques as better alternatives for accounting for non-detects in data-driven decision-making.

INTERMEDIATE

Speaker

Connie Rodriguez

Clean Water Services

Stormwater 101

1:05 PM – 2:05 PM | Location: Tech Rm 3

STORMWATER & WATERSHED MANAGEMENT

Stormwater 101: Runoff, Surface Water, and Watersheds

1:05 PM – 1:35 PM

Stormwater and surface water runoff affect watershed health physically and chemically whenever it rains, the severity of the impacts are influenced by our actions. Understanding how a natural watershed operates and how storm and surface water runoff interact in a watershed is critical to understanding how anthropogenic impacts can be adjusted and the mechanisms currently in place to mitigate negative receiving water impacts. We all live in a watershed, large and small and our actions can positively and negatively impact the waterbodies within our watersheds. Farming, roadways, buildings, industry and other land use changes all change storm and surface water runoff chemistry, rate, volume, and impacts. Tools such as development and planning standards, regional, state, and federal regulations such as the Clean Water and Safe Drinker Water Acts, watershed plans, land use zoning, and stormwater master plans, enforce and direct management of storm and surface runoff from anthropogenic changes. Some of the specific regulations that uniquely focus on watershed and drinking water health include the National Pollution Discharge Elimination System (NPDES), Municipal Separate Storm Sewer System (MS4), Total Maximum Daily Load (TMDL), and Water Pollution Control Facility (WPCF). These regulations have been implemented to address specific challenges impacting the water in our environment. Successful implementation of these tools and the continued evolution and development of how we address storm and surface water will enable us to reduce our impact on the watersheds we live in, and improving the health of our streams, rivers, lakes.

101 BEGINNER

Speakers

Ryan Retzlaff

Office Manager | Keller Associates

Trenton Buster

Project Engineer | Keller Associates, Inc.

Blueprint for Success: Crafting Effective and Approved 1200-Z Stormwater Pollution Control Plans

1:35 PM – 2:05 PM

Revised Abstract (with examples and approach per reviewer comments):

Navigating the complexities of Oregon's 1200-Z permit for industrial stormwater can be challenging for both facility operators and consultants. At Windsor Engineers, we've developed a practical and highly effective approach to crafting Stormwater Pollution Control Plans (SWPCPs) that not only meet Oregon DEQ's rigorous standards, but are also operational and tailored to the site.

Our strategy starts with a detailed review of the 1200-Z permit language, which we incorporate directly, almost verbatim, into a structured SWPCP template. This forces each section of the plan to directly reflect compliance requirements, while guiding the consultant and operator through each decision point in a way that's clear and actionable. The result is a plan that is both technically complete and user-friendly for those implementing it on the ground.

Another best practice is to involve facility operators in the development process by having them review and sign off on each section of the SWPCP before submittal. This step helps ensure the plan is operationally accurate, that responsibilities are clearly understood, and that nothing falls through the cracks. This presentation will walk attendees through this planning framework using real-world examples, including:

-How to structure a permit-driven SWPCP template to support clear, compliant decision-making.

-Techniques to engage operators early and improve plan accuracy and buy-in.

-Tools to support long-term compliance, including monitoring logs, reporting checklists, and internal inspection systems.

Whether you're writing your first SWPCP or looking to improve plan quality and approval rates, this session will provide concrete tools and lessons learned from real projects that set stormwater plans up for long-term success.

101 BEGINNER

Speaker

Emily Stephens

Civil PE | Windsor Engineers

Digestion

1:05 PM – 2:05 PM | Location: Tech Rm 4

BIOSOLIDS & RESOURCE RECOVERY

Applying Real World Data to Digester Heating Reliability Decisions

1:05 PM – 1:35 PM

Consider sizing a digester heating system to meet current and future demands, with seasonal variations in ambient and influent temperatures, diurnal and seasonal variations in solids loading. These designs can be tricky, especially in an existing facility with limited available footprint. Now consider that the existing digester heating system must be demolished and completely out of service for months to install the new system. This aspect requires designing a second temporary system covering most of the variations mentioned above. How do you decide on the right size and quantity of boilers and pumps? This project confirmed the design approach using real world data to confirm reliability and redundancy.

The City of Portland, Bureau of Environmental Services (BES) ran trials with reduced heating to identify trends in heat loss under varying conditions. Brown and Caldwell (BC) used the heat loss data to confirm how long the digester heating system could be out of service, which was especially important in the design of the temporary system, but also useful in determining the level of reliability needed in control of the new heating system. The project team is now going into construction with a better understanding of the criticality of each piece of the heating and hydronic system design.

In addition to the trial results, this presentation will also discuss planning for future heating demands with evolving gas utilization priorities and waste streams, equipment alternative evaluations, and impacts to air permitting. Come along for the ride as BES and BC team up to present how this project was more than just a boiler replacement project.

BEGINNER

Speakers

Brandon Dunagan

City of Portland Bureau of Environmental Services

Katie Pollock

Project Manager and Engineer | Brown and Caldwell

Revolutionizing Anaerobic Digestion: Enhancing Performance with the Microbial Hydrolysis Process

1:35 PM – 2:05 PM

Authors: Dave Parry

Wastewater residuals management is a major cost component for water resource recovery facilities (WRRFs). Anaerobic digestion can lessen operating costs by reducing sludge volume while producing biogas, a renewable energy. Jacobs has developed the Microbial Hydrolysis Process (MHP), an innovative technology that results in increased volatile solids reduction (VSR) and biogas production through advanced hydrolysis of recalcitrant organics. This presentation will detail the MHP system, results of laboratory and pilot studies, and the business case evaluations and designs for multiple facilities. For WRRFs in the Pacific Northwest, where sustainability and cost-efficiency are paramount, implementing MHP can unlock new opportunities in biosolids management, renewable energy generation, and plant resiliency. The results have demonstrated significant cost savings on biosolids management—a major interest for WRRFs.

MHP uses a hyperthermophilic bacterium (Caldicellulosiruptor bescii) in a 75°C/167°F reactor to hydrolyze complex carbohydrates such as cellulose into biodegradable volatile acids. These acids are returned to the anaerobic digestion system where methanogens then convert them to biogas. Unlike pre-digestion hydrolysis technologies, MHP operates on digestate and has a short, two-day retention time. Laboratory and pilot studies at five WRRFs have demonstrated consistent results, including increased VSR from a baseline of ~60% to over 75%, enhanced biogas yields, and increased dewaterability of the final product. Data from these studies have been used to develop a model to predict the effects of MHP on existing anaerobic digestion systems based on sludge feed characteristics. By breaking down complex carbohydrates, MHP achieves the highest reported VSR for municipal WRRF anaerobic digestion systems while reducing pathogen levels and improving dewaterability. The results of these groundbreaking laboratory and pilot studies have led to the development of preliminary designs for several WRRFs across the US and an ongoing full-scale design in Denmark.

INTERMEDIATE

Speaker

Maddy Fairley-Wax

Jacobs Engineering Group

Process Control

1:05 PM – 2:05 PM | Location: Tech Rm 5

DIGITAL SOLUTIONS

P&IDs 101: How to Read and Understand Process and Instrumentation Diagrams Like an Expert

1:05 PM – 1:35 PM

Process and Instrumentation Diagrams (P&IDs) are essential tool for designing and controlling processes at wastewater treatment plants. They communicate the process equipment, the piping, the instruments, control elements, and source of power. Being able to read a P&ID empowers plant staff to understand the possible reasons for alarms and how to prevent them. It will also enable plant staff to anticipate problems before they arise. For young engineers, this session will give them a jump start into interpreting and creating P&IDs.

This session is designed to provide engineers and operators with the foundational knowledge needed to read, interpret, and create P&IDs effectively. The presenters will cover key concepts and practical strategies for understanding these critical diagrams. Specific topics will include:

- Overview of P&ID sections and their significance

- Key information found in each section

- Guidelines on what data should (or should not) be on P&IDs,

- The different tiers of instrumentation and control

- Insights into ghost/nuisance alarms and how to manage them

- A user guide to reading P&IDs

Real-world examples from various systems' P&IDs will be used to illustrate the concepts, including:

- Pumping plants

- Wastewater liquid treatment systems such as headworks and aeration basins

- Wastewater solid treatment systems such as digesters and dewatering systems

Presented by an instrumentation and controls engineer and a process subject matter expert, this session offers a comprehensive perspective on how to read, design, and use P&IDs. Whether you are a newcomer to process engineering or looking to refine your P&ID literacy, this session will equip you with practical tools to enhance your understanding and application of these critical diagrams.

101 BEGINNER

Speakers

Joel McReynolds

HDR Inc.

Teigan Gulliver

West Region Biosolids Lead | HDR, Inc

Data-Driven Control Performance Monitoring and Automated Tuning

1:35 PM – 2:05 PM

Traditional PI/PID tuning methods often rely on trial and error or require time-consuming open-loop step tests, which disrupt routine closed-loop feedback control. Traditional retuning procedures typically don't take a holistic view including bounds settings or process restrictions and therefore fall short of substantial improvements of the controller performance. The Controller Performance Monitoring (CPM) methodology addresses these challenges through automating and data-driving the process. It encompasses data collection, quality checks, benchmark estimation, KPI calculation, and control chart monitoring. A Key Performance Indicator (KPI) is used to quantify the performance of the control system, with deviations indicating when retuning is necessary. Alarms are triggered when KPI thresholds are breached, prompting retuning recommendations. CPM continuously tracks system performance, updating suggestions in real-time and offering a user-friendly interface for informed decision-making, ensuring that retuning efforts are only applied when truly beneficial.

The CPM methodology provides an efficient, data-driven solution for automated assessment and improvement of control system performance. By automating data collection, quality checks, benchmark estimation, and KPI calculation, CPM ensures that control systems are tuned based on actual performance rather than relying on trial-and-error or disruptive testing. The system triggers alarms and provides retuning recommendations when necessary, improving performance while avoiding unnecessary interventions.

INTERMEDIATE

Speaker

P

Philip Lander

InCTRL

Blower Upgrades

1:05 PM – 2:05 PM | Location: Tech Rm 6

WASTEWATER TREATMENT

Not Just a "Blower Project": An Interdisciplinary Approach to Identifying the Preferred Alternative for the City of Portland BES Blower Project

1:05 PM – 1:35 PM

The City of Portland Bureau of Environmental Services (BES) owns and operates the Columbia Boulevard Wastewater Treatment Plant (CBWTP) which protects public health, safety, and the environment by treating sanitary sewage and stormwater from the City of Portland. The CBWTP blower system supplies air to the plant's aeration basins and includes four single stage centrifugal blowers. Two blowers were installed in the early 1970s and two were replaced in the early 1990s. Since installation, the blower system has operated 24 hours a day, 365 days a year for over 50 years.

The goal of the CBWTP Blower System and Building Improvements Project is to address deficiencies of the blower system which has reached the end of its useful life, improve system reliability, enhance energy efficiency, and meet wastewater treatment operational needs. During the project development phase, the consultant team worked with the City to identify the preferred alternative to advance to detailed design.

This presentation will summarize the critical interdisciplinary aspects of the alternatives evaluated and how they shaped City decisions. The following alternatives analysis topics will be discussed:

Blower technologies considered including positive displacement, multi-stage centrifugal, single-stage centrifugal, and high-speed turbo.

HVAC, architectural, and electrical design implications resulting from the unique characteristics of each blower technology considered.

Structural implications of the various blower alternatives considered relative to building code triggers for implementation of required gravity and/or seismic strengthening.

How the project is being leveraged to implement voluntary seismic retrofits to mitigate structural deficiencies identified using the American Society of Civil Engineers 41, Seismic Evaluation and Retrofit of Existing Buildings Tier 1 (Screening) and Tier 3 (Systematic Evaluation) procedures.

At the conclusion of this presentation, attendees will understand:

What major factors affected the preferred blower technology and arrangement selection.

How potential seismic deficiencies, mitigation recommendations, and the associated retrofit cost informed interdisciplinary design.

INTERMEDIATE

Speakers

Y

Yang Zhang

City of Portland Bureau of Environmental Services

V

Victoria Lopez Boschmans

Carollo Engineers

J

Jim Newell

SEFT Consulting Group

Energy Savings Don’t Blow (or Do They?) – Laramie WWTP Upgrades Project

1:35 PM – 2:05 PM

The City of Laramie Wastewater Treatment Plant (WWTP) initiated a modernization project aimed at enhancing energy efficiency and upgrading aging equipment. The 2021 WWTP Upgrades Project targeted a minimum 20% reduction in energy consumption through innovative design and process optimization, particularly focusing on aeration systems. This abstract serves as a final update and review of lessons learned in the last year.

Key improvements included replacing five 200-hp multistage centrifugal blowers with high-speed turbo (HST) blowers, which utilized advanced technology to enhance mechanical efficiency. Additional upgrades converted aerobic digesters to aerated sludge holding tank (ASHT), which included dramatic reduction in blower power demand.

Upon bringing new equipment and infrastructure online, the project achieved an impressive 65% reduction in power consumption compared to pre-project levels, resulting in approximately $19,000 in monthly savings. This substantial reduction exceeded expectations, as initial assessments did not account for severe corrosion in the air supply piping, which had previously inflated air demand by 40%.

Additional upgrades included a full plant backup generator, process control improvements, replacement of all buried aeration supply piping, and an efficient air handling unit for the dewatering facility. These enhancements addressed power usage inefficiencies and operational challenges linked to fluctuating flow and load.

The Laramie WWTP Upgrades Project not only surpassed its energy reduction goals—achieving a threefold reduction compared to initial projections—but also significantly shortened the payback period. The City leveraged $352,200 in incentives from Rocky Mountain Power’s Wattsmart® program, marking the largest incentive payout ever awarded by the utility in Wyoming. This project serves as a replicable model for small wastewater treatment facilities aiming to improve energy efficiency as well as utilities at large seeking to bundle capital improvements with enhanced sustainability.

INTERMEDIATE

Speaker

Ben Miller

Project Manager | Tetra Tech

Operator Stories

1:05 PM – 2:05 PM | Location: Tech Rm 7

OUR WATER STORIES

Evolving from Operators to O&M Consultants: Solving Wastewater Challenges

1:05 PM – 1:35 PM

Mark and Grant began their careers as hands-on operators in the water and wastewater industry, gaining invaluable experience in troubleshooting equipment failures, optimizing treatment processes, and ensuring compliance with ever-evolving regulations. Over the years, they recognized a critical challenge in the industry—many utilities were struggling with aging infrastructure, stringent regulatory requirements, and a growing shortage of skilled personnel. At the same time, engineering firms often designed systems without the practical operational insight needed for long-term functionality.

Seeing this gap, Mark and Grant transitioned from operators to O&M consultants, leveraging their expertise to support utilities facing these challenges. With over 50 years of combined experience, they founded Waterdude Solutions and Solidsdude Solutions, dedicated to providing foundational tools, mentorship, training, and permit compliance support. Their approach integrates foundational tools and best practices to help municipalities optimize wastewater systems, improve operational efficiency, and achieve long-term regulatory compliance.

Their work has directly impacted municipalities like Seaside and Sweet Home, Oregon. Seaside’s wastewater treatment plant was out of compliance and lacked a system supervisor. Solidsdude Solutions stepped in, implementing process control solutions, mentorship, and training to restore compliance. Similarly, Sweet Home faced compliance issues and needed leadership in operations. Waterdude Solutions provided hands-on training, innovative tools, and strategic guidance, ultimately improving compliance and operational efficiency.

Through their consulting work, Mark and Grant have become trusted advisors, helping utilities navigate the challenges of aging infrastructure and staff turnover. By integrating foundational tools and best practices, they ensure sustainable and efficient wastewater management, helping utilities adapt to an evolving industry. Their journey from operators to consultants exemplifies the value of real-world experience in shaping the future of wastewater operations and maintenance.

INTERMEDIATE

Speakers

M

Mark Walter

Waterdude Solutions

A

Andrew Grant

Solidsdude Solutions

Dedicated Operators Innovated to Save Energy Without Sacrificing Water Quality

1:35 PM – 2:05 PM

There are fantastic stories to tell from across the Pacific Northwest of dedicated operators improving their operations with low and no-cost operational adjustments to save energy without sacrificing water quality. Some facilities have reduced their energy use by over 10% annually! Energy management has become an integral part of operations and capital planning at these WRRFs. Nationally, the energy used by water and wastewater utilities accounts for 35 percent of typical U.S. municipal energy budgets (NYSERDA, 2008). Wastewater facilities upgrades are built to meet community needs for decades into the future. Designs rely on conservative projections of flows and loads, coupled with safety factors and provisions for load peaks, storm flows, maintenance and outages. These factors often lead to systems which can meet the needs of the worst-case scenarios yet aren't operating efficiently at average or low flows or loadings.

While energy use hasn't been on everyone's radar in the past, thinking about energy use and ways to operate more efficiently is becoming more common. Some WRRFs have overcome barriers including the "this is the way we've always done it" thinking. Hearing success stories from facilities who have made changes that led to significant energy savings might provide valuable insights for your facility. Even those who believe their facilities are already optimized have found ways to optimize even more.

This panel presentation will include operators from facilities in the Pacific Northwest. They will share how they overcame organizational and technical challenges to operate more efficiently. They will share their experiences in identifying and implementing no and low-cost operational changes to save energy without sacrificing water quality. They will also share how incorporating energy considerations into their decision-making has improved their capital planning and projects.

BEGINNER

Speakers

D **Dan Black**
Jacobs

K **Kayla Brown**
Laboratory Supervisor | Jacobs

S **Shane Colglazier**
WWTP02 | West Sound Utility District

L **Lorenzo Determan**
WWTP02 | West Sound Utility District

Combined Sewer Overflow (CSO)

1:05 PM – 2:05 PM | Location: Tech Rm 8

COLLECTION SYSTEMS

Combined Sewer Overflow (CSO) Tunnels 101

1:05 PM – 1:35 PM

Combined sewers collect stormwater and sewage into one pipe. Under normal conditions, the wastewater is treated prior to discharge. But if the volume of wastewater exceeds the capacity of the combined sewer or treatment plant (for example, during a major rain event), overflow into nearby streams, rivers and other water bodies can occur. When this occurs, it is called a Combined Sewer Overflow (CSO). CSOs contain untreated human and industrial waste, toxic materials and debris, and are a major source of water pollution. Combined sewers serve approximately 830 communities in the United States with a total population of about 40 million people. Federal and state regulations have been implemented to reduce CSOs. Tunnels can be used to intercept, store and transport combined sewage. The tunnel stores the wastewater until the treatment plant can catch up. Several major CSO tunnel programs have been undertaken in the United States and Canada, including the Dig Indy CSO Tunnel Program in Indianapolis, the St. Louis Clear CSO Program, the Northwest Side Relief Sewer Tunnel in Milwaukee, the OSIS Augmentation Relief Sewer Tunnel in Columbus, the Coxwell Bypass Tunnel in Toronto, Ontario, the East Side and West Side CSO Tunnels in Portland, and the King County Ship Canal Water Quality Project in Seattle. This presentation discusses how tunnels are being used to mitigate CSOs and restore water quality in major cities across North America including an overview of typical tunneling methods and technology used on these projects and design considerations to optimize long-term operations & maintenance including air entrainment and control of surges, odour control, sediment management, and optimization of drop structures through CFD modeling.

101 INTERMEDIATE

Speakers

A **Ashley Galagusz**
Tunnel Practice Lead – Northern California and Pacific Northwest | Black & Veatch

B **Brenna Tomaiuolo**
Black & Veatch

Enhancing Capacity of Drop Structures in Wastewater Collection Systems: a CFD-Based Design Approach for Sites with Limited Access

1:35 PM – 2:05 PM

Authors: Matheus Lauar; Mizan Rashid

Capacity enhancement of wastewater collection systems is challenging due to the complex hydraulics, which can be further complicated by limited site access. This study demonstrates a three-dimensional computational fluid dynamics (CFD) model to analyze the hydraulics of four drop structures connected to a wastewater pump station. Each drop structure consists of a maintenance hole (MH) with a funnel-type bottom, where flow behavior is influenced by vortex formation and a large air core, leading to a reduced effective flow area and increased surcharge depth. The study evaluates flow conditions within the MH and determines its capacity constraints to ensure that surcharge height remains within the operational limit of 5 feet below the MH rim.

CFD simulations reveal that vortex formation is driven by tangential inflow from the force main, high inflow velocity due to the small pipe diameter, and the funnel-shaped MH bottom. At one system, the drop structure operates within limits at a normal flow of 500 gpm and a peak flow of 1,000 gpm, with a possible increase to 1,250 gpm while maintaining acceptable surcharge height. A design modification incorporating four equally spaced 6-inch-wide vanes within the MH is proposed to further enhance capacity. The model results indicate that these vanes mitigate vortex effects, reducing surcharge height and allowing increased flow capacity. The vanes could be pre-fabricated and installed at each MH funnel.

This paper presents detailed CFD modeling methodologies, flow field analysis, and validation of design modifications for improved hydraulic performance. The findings contribute to innovative strategies for optimizing drop structure designs in wastewater systems with difficult access and complex flow dynamics.

ADVANCED

Speaker

A

Ashraful Islam

RIE Consultants

Secondary Treatment Expansion Project (STEP) Facility Tour

1:15 PM – 4:00 PM

TOUR

Since 2022, PNCWA Attendees have heard about CBWTP's Secondary Treatment Expansion Program (STEP), the City's largest investment in it's resource recovery plant since the Clean Water Act when secondary treatment was first added. The project stemmed as the final action required from a 2011 Mutual Agreement and Order coming on the heels of the last "Big Pipe" being installed to control and minimize Combined Sewer Overflows in the Willamette River. The core regulatory requirement of the project aimed to add secondary treatment capacity during wet weather events, which would otherwise be treated via chemically enhanced primary treatment. However, the CBWTP being such a constrained site with many adjoining needs, BES adopted a programmatic approach starting in 2017 to maximize delivery efficiency, minimize risks to plant operation, minimize risks to safety, while maintaining the regulatory schedule. The site tour will showcase the newly built facilities (clarifiers and RAS pump station, aeration basins rehabilitation, utility tunnels and major electrical work, non process facilities) and those remaining in construction, notably the solids handling facilities. A number of lessons learned will be shared from representatives of the partnering teams (City, Engineer, Construction) during the tour.

Hard hat, vest, full-length pants, and safety shoes required.

Break - Exhibit Hall

2:05 PM – 2:35 PM | Location: Exhibit Hall B/A1

BREAK EXHIBIT HALL

Grab a coffee and snack and check out emerging technologies on the Exhibit Hall between sessions!

Don't forget to check out the Exhibit Hall Passport on the app for the opportunity to earn prizes!

Exhibitor Spotlight Session 4

2:35 PM – 3:35 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL

The Differential Difference: Breakthroughs in Differential Metering on Valves

2:35 PM – 3:05 PM

EXHIBIT HALL

How do you know what is happening in your water system? With recent breakthroughs in differential metering technology, you can get more information through your valves! This presentation will discuss flow metering options, implementation, advantages and disadvantages for different types of flow metering and the differential difference provided by differential metering. From displacement flow metering to differential meters on valves. Differential metering in particular will be discussed in principle, advantage, and disadvantage and how it can be implemented to increase resilience in water distribution systems.

There are many different types of metering and pressure monitoring for water distribution systems. From electromagnetic flow meters, Ultrasonic flow meters, Turbine Flow meters, vortex flow meters, positive displacement flow meters, and differential flow meters.

Electromagnetic flow meters are highly accurate but have straight pipe requirements and are not economical. They are well suited to high accuracy applications.

Ultrasonic flow meters have no moving parts, low maintenance, and low power consumption but a high upfront cost. Ultrasonic flow meters are an excellent choice for service end connections to consumers.

Turbine flow meters have high accuracy and are durable but are not suited for all applications.

Vortex flow meters are durable and independent of temperature and pressure but they are susceptible to contamination and vibration. They are useful where economic options are most important and accuracy is not important.

Positive displacement flow meters are accurate and reliable but have flow rate limitations and are not suitable for pulsating flows. These can be used for steady flow metering for service ends.

Differential metering refers to measuring flow rates based on the pressure differential of an orifice with a known flow coefficient (CV factor). In previous decades this has been difficult to do on automatic control valves because of the changing size of the opening depending on their modulation. Recent breakthroughs in technology have made position indicators more precise and more economical to measure the open percentage of the valve. Combined with breakthroughs in pressure transmitter accuracy and price differential metering is a more economic option for systems. Given a known flow coefficient, pressure differential, and percentage open an automatic control valve can now be turned into a flow meter. This has distinct advantages to traditional flow meters in the distribution system because of its accuracy, economical nature, deployment, and lack of straight pipe requirements.

Municipalities should consider the advantages and disadvantages of different flow metering and implement a layered solution with different meters for different applications throughout their water distribution system to get the most data possible. Using these new technological breakthroughs municipalities can make their systems more resilient than ever.

Speaker

Raymond Velasquez

Sales Manager | Cimco-GC Systems

Working Smarter: Acoustic Inspection for Sewer Cleaning

3:05 PM – 3:35 PM

EXHIBIT HALL

Proactive sewer cleaning is a core function of any municipal collection system maintenance program but efficiently deploying resources remains a challenge. By prioritizing gravity sewer lines with known blockages, municipalities can save time, money, and water. Traditional inspection methods used to locate these blockages, however, are often too costly and time-consuming to deploy systemwide.

Transmissive acoustic inspection offers a fast, low-cost alternative. The Sewer Line Rapid Assessment Tool (SL-RAT®) leads in this space, using a transmitter to emit a series of tones through the pipe and a receiver in the adjacent manhole to measure sound degradation. Each pipe segment is scored from 0 to 10 with higher scores indicate greater flow capacity. By targeting low-scoring lines, municipalities can avoid unnecessary cleaning and focus efforts where they're needed most. Each acoustic test takes about three minutes and requires no flow contact, making it 10–20 times faster and more affordable than conventional inspection methods.

Compared to reactive or time-based cleaning schedules, a condition-based strategy allows utilities to concentrate resources on the 10–30% of pipes that require attention. This approach not only reduces the risk of SSOs but also yields substantial savings in labor, cleaning costs, and water usage.

To date, over 1,500 communities have inspected more than 500 million feet of pipe using acoustic inspection. This presentation will explore real-world results from condition-based maintenance programs in the Pacific Northwest, emphasizing practical implementation and measurable outcomes.

Speaker

Sam Taaffe

Pacific Northwest Territory Manager | InfoSense

Innovative Reuse Applications

2:35 PM – 3:35 PM | Location: Tech Rm 1

WATEREUSE

WATEREUSE

Sustainable Water Treatment & Reuse at the Oregon Zoo

2:35 PM – 3:05 PM

WATEREUSE

Data Centers: Trends & Innovation for Water Use

3:05 PM – 3:35 PM

WATEREUSE

Speaker

Lauren Barbir

Initiatives Director, Data Centers & Tech | HDR

PFAS in Biosolids

2:35 PM – 3:35 PM | Location: Tech Rm 2

THE FURTURE OF PFAS?

Regulating PFAS in Biosolids

2:35 PM – 3:05 PM

The regulation of PFAS in drinking water is well underway, but the regulation of PFAS on the wastewater side is still dynamic and developing. Nationwide, the discovery of PFAS in biosolids has led to growing public concern about potential PFAS uptake in soil, agriculture, and ultimately people. Litigation regarding allegedly harmful amounts of PFAS in land-applied biosolids has started in earnest since 2023. Despite this, there is still a regulatory gap. The EPA regulates the permissible content of biosolids under the Clean Water Act, but it hasn't added significant new requirements since 1994, but under the new administration, it has signaled an appetite for new PFAS regulations in biosolids. In the meantime, states have stepped in to regulate biosolids beyond what the federal rules require, often in a bipartisan fashion. Further restrictions on PFAS in biosolids are pending in proposed rules or bills in other states. This presentation aims to provide a survey of current and proposed regulations of PFAS in biosolids (including relevant rules in Washington, Oregon, and Idaho), consider what future regulations may look like, and provide concrete guidance on how publicly owned treatment works can plan for such regulations and mitigate legal risks today.

INTERMEDIATE

Speaker

Victor Xu

Senior Associate | Marten Law LLP

What is on The Horizon for Wastewater Treatment Plants for Emerging Contaminant Treatment and Biosolids Management in the Pacific Northwest?

3:05 PM – 3:35 PM

Authors: Sean Lammerts

Recent contaminants of concern have proved particularly challenging due to their ubiquitous and persistent nature, especially PFAS and microplastics.

USEPA has established draft human health water quality criteria, released the risk assessment for biosolids, as well as effluent guidelines that will impact PFAS discharges from industrial sources. In the pacific northwest, anticipated regulations and permitting approaches that seek to mitigate the discharge of PFAS compounds into the environment. With so much regulatory uncertainty, variability in practices by state, difficulty quantifying PFAS entering water resources recovery facilities and the wide array of point and non-point PFAS sources, what can utilities do to be prepared?

While there are no pending regulatory actions considering microplastics, their nature and widespread concern shows a similar trajectory to that of PFAS. Given that some treatment technologies that remove PFAS also reduce microplastics, it is prudent to consider the long-term benefits of ancillary treatment when looking at the horizon.

The best prepared utilities have adopted a strategy that incorporated the 3Ps – Prevention, Pretreatment, and Planning. The adoption of these 3Ps can assist utilities in the ability to meet “one water” goals and objectives. Adopting prevention and pretreatment as part of a holistic plan, together with being proactive with an understanding of pending regulations, can provide utilities with the needed resilience to adapt to changing emerging contaminant requirements.

Specifically, this presentation will contemplate how proactive planning can utilize stepwise treatment and source control improvements to make meaningful reductions in these contaminants of concern. Discussion will include examples of ongoing studies and case studies on how emerging technologies can be implemented to reduce the discharge of these contaminants at WWTPs.

INTERMEDIATE

Speakers

Gary Hunter

Sr. Wastewater Process Engineer | Black & Veatch

Courtney Thomas

Black & Veatch Corportation

Watershed Health

2:35 PM – 3:35 PM | Location: Tech Rm 3

STORMWATER & WATERSHED MANAGEMENT

Increasing Participation: Making Water Quality Planning Accessible Through Gameplay

2:35 PM – 3:05 PM

The City of Vancouver, BC (City) had an opportunity to rethink investment in its sewer and stormwater infrastructure to more optimally reduce polluted discharges and deliver benefits to residents of Vancouver. Even though technical tools, analyses, and mapping are critical components of any planning effort, getting stakeholders to align is key to any kind of lasting change. The Health Waters Plan developed a Charette to gamify planning and cultivate a safe environment for technical and non-technical stakeholders to explore how different kinds of projects, programs, and policies could meaningfully change Vancouver's investment in their collection system. Using game play allowed participants to explore the costs, benefits, and most importantly, trade-offs of different types of investment, and engage in learning based conversation with their game play peers. This Charette combined technical analyses and structured decision-making to unlock a new future and align stakeholders around a potential change in approach for CSO reduction and stormwater management. This presentation explores the Charette's input analyses and tools, the gamification of planning, and the new areas of alignment it unlocked.

INTERMEDIATE

Speaker

Brent Robinson

Washington Municipal Operations Manager | Brown and Caldwell

Partnering with Beavers and Volunteers to Improve Climate Resiliency and Water Quality in Urban Watersheds

3:05 PM – 3:35 PM

Prior to European Colonization, between 100-400 million North American beavers (Castor canadensis) worked to modify streams and watersheds for millions of years in an area that stretched from the arctic circle to the Sonoran Desert of modern day Mexico. The advent of large-scale fur trading in colonial America, and the resulting westward expansion, had a devastating effect on the species. By 1900, as few as 100,000 North American beavers remained, resulting in loss of millions of acres of wetland habitat, and permanent alteration of stream hydrology across the continent. Additional human modification of the landscape in the 20th century, including urban development, stream simplification and channelization, and draining and filling of wetlands, has resulted in unhealthy watersheds prone to poor water quality, exacerbated impacts of flooding and drought, and wetland habitat loss on a large scale. Climate change will intensify the impacts of each of these challenges as weather events like storms and droughts become more intense. In recent decades, beaver populations are rebounding along urban and rural watercourses. Scientists widely accept the many ecosystem services that beavers provide, which include improved water quality, increased water storage and flood water retention, and expanded and more connected wetland habitat. Despite these benefits, coexisting with beavers in our modern world can be a challenge, as homes, roads, and other infrastructure are often built within the historic floodplain of urban streams. Beavers Northwest is working to harness beavers' natural abilities to improve the health of urban streams and mitigate some of the effects of climate change through coexistence efforts across the Puget Sound region of Washington State. These efforts include installation and maintenance of coexistence devices like pond levelers and vegetation protection, as well as outreach and education efforts. Additionally, we are demonstrating beavers' effects on water quality through a citizen science initiative to monitor water quality in beaver modified streams in urban areas around the Seattle metropolitan area. By partnering with beavers and volunteers, we are fostering watershed health and climate resiliency, as well as creating a more connected, educated, and engaged community.

INTERMEDIATE

Speakers

Joe Mouser

Communications Manager | Beavers Northwest

April Rhodes

Project Manager | BEAVERS NORTHWEST

Digester Feedstock Process & Economics

2:35 PM – 3:35 PM | Location: Tech Rm 4

BIOSOLIDS & RESOURCE RECOVERY

Challenges and Predicting Biogas Digester Substrates for Reliable Mixing Operation and Peak Performance

2:35 PM – 3:05 PM

Biogas, a renewable energy source produced from organic waste, has gained substantial recognition for its dual role in energy generation and waste reduction. Manufacturers in the Biogas industry have made great strides in improving the sustainability of our products, especially with respect to energy efficiency. The symbiotic integration of biogas plants within wastewater treatment facilities empowers water utilities to convert a significant environmental challenge into an opportunity. The segment examines cutting-edge developments in biogas equipment design and selection methods and the background work to understand and predict the fluid characteristics of so many varying biogas substrates. Continued development of these tools and our experience of combined biogas substrates is critical to the continued success of biogas as a renewable energy resource.

Whether processing manure, silage, wastes from food processing, or even recovery of food residual from restaurants or residential homes, waste streams are rich in energy potential. Biogas production turns these waste streams into assets, creating renewable sustainable energy sources, while reducing gas emissions linked to climate change. Anaerobic digestion is a natural process, and relatively simple in concept. However, producing biogas efficiently requires effective process control of often difficult substrates. Effective biogas starts with a homogenous feedstock. A biogas nightmare occurs when the feedstock can settle, stratify, or worse yet, harden.

The challenge in developing a successful biogas digester requires the process equipment to blend substrates, distribute solids, prevent surface crust and foam formation, prevent settling, maintain stable and optimal temperature, and produce biogas at all depths of the digester. The solution is found in superior hydraulic design for optimized performance which generates homogenous mixtures with minimum energy consumption, equipment that is specifically made to perform in Biogas high yield stress and high viscosity applications, providing effective gas production reliably, and lower energy costs.

A focus on the characteristics of common biogas substrates and predicting the energy required, and the optimal way to introduce the energy requires a combination of field experience, lab analysis, and simulation software. With a growing interest in fine tuning and maximizing the potential of biogas production via feedstock availability and quality, equipment manufacturers are being relied upon to improve existing solutions and develop new technologies and methodologies.

This presentation takes a look at the technical characteristics of biogas substrates and the non-Newtonian nature of the feedstock mixture. With the goal of taking real world results to accurately provide a predictive model of economical performance. Combining real world results with computational fluid Dynamics (CFD) simulations has provided confirmed Rheology parameters allowing for accurate modelling of performance, and sustainable equipment selection and operation.

101 INTERMEDIATE

Speaker

Alden Meade

Territory Sales Manager | Xylem Inc.

CAUTION: Gravy Train Crossing Ahead – How Diverted Organics Mix with RNG Economics

3:05 PM – 3:35 PM

Authors: Layne McWilliams

The role that wastewater treatment plants can play in the world of renewable natural gas (RNG) production is expanding – and getting more complicated. With Washington following in the footsteps of California with its organic waste diversion law, and some municipalities moving in that direction as well, more and more municipal wastewater systems are going to be offered the opportunity to co-digest food waste. Concurrently, the EPA has been actively updating the Renewable Fuel Standard (RFS) requirements with which biogas and RNG producers must comply to qualify for generating the associated emissions credits called renewable identification numbers (RINs). Aside from contributing a renewable vehicle fuel alternative to the market, the potential for significant revenue from RNG production and RIN generation represents a tremendous financial opportunity for treatment plants. However, the incorporation of food waste into existing anaerobic sludge digestion and biogas systems poses additional (and restrictive) hurdles to clear with respect to the credit programs.

While on one hand food waste digested within a WRRF is diverted away from landfills and transformed into renewable resources like biosolids and biogas, food waste produces less economically valuable RINs than municipal wastewater sludge. Co-digestion also requires specialized process monitoring of feed streams and the biogas product under the EPA's RFS regulations that could increase operations and maintenance cost and labor. Additionally, many plants have multiple digester tanks producing biogas that is collected into common gas headers. Tracking RINs gets complicated quickly! Balancing emerging regulation compliance, a fluctuating RINs market, and maintaining efficient treatment processes no doubt comes with challenges. The multi-million-dollar question these facilities are faced with now is how to maximize the benefits that RNG production offers while mitigating the challenges and uncertainty that come with it.

This presentation will provide insight and real-world lessons learned for anyone looking at the opportunities co-digestion and RIN generation has to offer. We will provide a quick overview of how RINs are generated, the relationship between feedstock and RIN type, and how the definitions in the credit program regulations impact the physical design and operation of digester facilities.

INTERMEDIATE

Speakers

J

Jeff Semigran

Sr Engineering Associate - Process | City of Portland Bureau of Environmental Services

E

Emma Sheets

Engineer | Parametrix

Predictive Process Tools

2:35 PM – 3:35 PM | Location: Tech Rm 5

DIGITAL SOLUTIONS

Decisions in Real-Time: How a small utility improved nutrient removal and avoided construction with a digital predictive model

2:35 PM – 3:05 PM

As regulatory pressures and environmental stewardship drive new nitrogen regulations along the west coast of North America, water resource recovery facilities are adding new nutrient removal and recovery processes that can require intensive operator attention and costly inputs. When leveraged effectively, modeling tools can provide plant staff with insights and forecasts which enable them to switch from reactive operations (responding to process upsets or effluent changes) towards a proactive approach which optimizes and controls processes inside of tighter bounds through the power of real-time prediction.

The Fond du Lac Wastewater Treatment & Resource Recovery Facility (Fond du Lac, WI) is a smaller utility (~60,000 PPE) facing an effluent limit of 0.19 mg/L total phosphorus. The plant combines biological and chemical phosphorus removal, but was challenged in protecting its permit by carryover of suspended solids to effluent. Without improved process controls, the plant would need to construct a new tertiary filtration process to ensure compliance. To achieve this goal without incurring significant construction or operational costs, the facility collaborated with Black & Veatch and MAIA Water to design, train, and deploy a digital twin hybrid model. The hybrid model couples a machine learning model that forecasts primary effluent flows and loads with a mechanistic process model capable of predicting final effluent quality and process performance. The result produced carbon and ferric chloride dosing recommendations that allowed Fond du Lac to achieve consistently low effluent TP concentrations (≤0.19 mg/L) at lower chemical costs, and without the use of tertiary filters.

This presentation will discuss the approach, lessons learned, and best practices of a digital twin that complimented operational decision making to improve nutrient removal performance. This tool was built with the intent of maximizing function while minimizing effort and complexity. The hybrid model operates behind a simple web-based interface and updates at the frequency operations staff update process data. The simplicity of this interface is one of the keys to successful implementation of digital water at Fond du Lac.

INTERMEDIATE

Speaker

Jon Liberzon

Emerging markets process engineering lead | Black & Veatch

Creating A Holistic Wastewater Process Advisory Tool

3:05 PM – 3:35 PM

One of the key opportunities in the water sector is to create useful digital tools that empower people and achieve superior results when compared to doing work without the digital tool. For example, mechanistic models of wastewater treatment process operation, hydraulics, conveyance, and distribution systems exist and are well used in the engineering design industry. While these tools are well suited to provide operational support, these software packages can be challenging to learn and typically have no direct connection to the operation of individual systems.

This presentation will focus on a holistic digital wastewater process advisor tool and its components using case studies from four facilities. The holistic tool includes the following four components:

(1) A group of machine learning (ML) models that predict hourly influent flow and load to a wastewater treatment plant.

(2) A mechanistic model of that treatment plant developed using commercially available software.

(3) An ML models that combines the mechanistic model inputs and outputs along with live sensor data from plant operations to predict effluent quality and equipment setpoint recommendations.

(4) An optimization algorithm that uses the digital platform described in steps 1-3 to optimize the equipment setpoint recommendations. The objective is to minimize effluent limits while balancing energy and chemical costs. This algorithm also optimizes for low SVI values.

We will present this framework for optimization along with demonstrated results of each component using four case studies. All of these projects resulted in a more educated operations staff with greater insight into operations of their unique treatment process. There were also significant cost savings with these tools. One of the facilities was able to defer a $115 million capital investment with optimization.

INTERMEDIATE

Speaker

Eric Polli

Senior Principal Engineer | Hazen and Sawyer

Water Reuse & Reclamation

2:35 PM – 3:35 PM | Location: Tech Rm 6

WASTEWATER TREATMENT

The Promise and Perils of ZLD for Pretreatment of Difficult Industrial Wastewater

2:35 PM – 3:05 PM

• Introduction.

Wastewater and brine discharges from semiconductor and complex manufacturing processes pose substantial challenges for municipal wastewater resource recovery facilities (WWRFs). These discharges often contain aggressive and corrosive constituents, nitrification-inhibiting compounds, and high levels of non-assimilable chemical oxygen demand (COD), which are not typically addressed (or measured) in municipal treatment operations.

• Objectives and Methods

This presentation will use the semiconductor manufacturing industry as a case study to illustrate how Zero Liquid Discharge (ZLD) technologies can effectively remove challenging waste products from municipal systems. We will analyze the overall costs and benefits of ZLD within the context of circular economics - considering impacts on manufacturers, WWRFs, consumers, energy use, and environmental sustainability.

Our methodology includes a comprehensive analysis of typical semiconductor wastewater streams and their impacts on municipal wastewater treatment across various scenarios. We evaluate the reduction in treatment impacts through a hierarchical pretreatment process, which includes:

- Equalization

- Peroxide quench

- Biological COD and ammonia removal

- Ion Exchange

- Reverse osmosis

- Salt-making via ZLD

The method then compares the cost of each of these hierarchical steps against the benefits (and reduction in cost) for the municipality. Further, we look at the cost in terms of energy usage, disposal of solid waste fractions, and environmental benefit/degradation from either a financial or subjective perspective as appropriate. An additional method included validating the energy balance of the ZLD processes in an attempt to find possible means to reduce the energy footprint of ZLD, as well as discussing lessons-learned with ZLD operators.

• Findings.

The findings indicate that the benefits of ZLD can significantly outweigh the energy costs associated with its operations, depending on the nature and volume of industrial discharges relative to the capacity of the municipal WWRF. In our cases studied, the manufacturers only partially (or did not) utilize the distilled water from the ZLD process for beneficial purposes – such reuse could possibly increase the benefit on the manufacturer's side of the equation. For smaller dischargers and larger municipal WRRFs it was found that the environmental, worker safety, and energy costs of running a ZLD process may outweigh the benefits to the municipal WRRF.

ADVANCED

Speaker

Geoff Baldwin

Tetra Tech

Project Drivers and Technical Considerations with Rural and Small-Scale Reuse Applications

3:05 PM – 3:35 PM

We stand on the precipice of potentially enormous challenges in water supply and quality in the face of recent and imminent regulation changes, emerging and unresolved contaminants of concern, and increasing water quality expectations from our communities and industries. Often communities and utilities with the largest user base can leverage the benefits of centralized solutions for water reclamation and advanced water treatment solutions, such as Advanced Water Purification (AWP) and Direct Potable Reuse (DPR) to help meet their water resources needs. However, smaller communities and areas with more dispersed users and customers, may be limited to decentralized solutions where the cost to build and manage centralized solutions would be unfeasible.

This presentation explores how the implementation of water reuse in rural and remote locations can address water scarcity while promoting environmental sustainability and economic resilience. This research explores the key project drivers and technical considerations necessary for developing effective water reuse systems in these regions. The analysis identified environmental, economic, regulatory, and social motivations, alongside advances in decentralized treatment technologies, as critical enablers.

Technical considerations include achieving water quality standards, selecting appropriate treatment technologies, addressing infrastructure challenges, optimizing energy use, and evaluating economic feasibility. Case studies of successful projects and engagement with stakeholders highlight practical lessons and pathways for community acceptance. By aligning technical solutions with regulatory frameworks and stakeholder priorities, this study provides actionable insights to support the deployment of sustainable water reuse systems in rural and remote areas.

This presentation will define the goals and drivers of implementing water reuse in rural and remote communities, considering water scarcity challenges and the importance of water reuse in sustainable resource management and will discuss pathways for rural and small-scale projects.

INTERMEDIATE

Speaker

Frederick Tack

National Wastewater Technical Practice Leader | Consor

Community Partnerships & Engagement

2:35 PM – 3:35 PM | Location: Tech Rm 7

OUR WATER STORIES

Partnerships Make Wetlands Restoration a Reality at a Lagoon Treatment Facility

2:35 PM – 3:05 PM

Do you ever have regrets about the infrastructure decisions that you make? What if your predecessors built your treatment plant next to a river and used the area between the lagoon treatment system and the river as a borrow source? What if the river ran high a few years ago and threatened to enter the borrow pond that is full of water and presented a real risk of pit capture and potentially wash out your treatment lagoons?

Eagle Sewer District capitalized on an opportunity to restore a riparian wetlands and flood plain that was historically used as a borrow source. By partnering with the Idaho Department of State Parks and Recreation as they developed an RV campground for which they needed sewer infrastructure, Eagle Sewer District was able to leverage the topsoil and gravel from the campground pond to restore the riparian wetland. This project has the added benefit of improving the water temperature in the Boise River by reducing this near-stagnant body of water with connection to the river. The project was awarded a matching construction grant from the Idaho Water Resources Board for the river improvement. Come hear about the exciting environmental win that came about through partnerships.

INTERMEDIATE

Speaker

Neil Jenkins

General Manager | Eagle Sewer District

Building Community Support for Upgrading Aging Infrastructure

3:05 PM – 3:35 PM

Your engineering expertise solved the technical challenge—now comes the harder part: People. This presentation addresses the reality that even the most critical infrastructure projects can fail to move forward without effective public engagement, and that traditional "educate the public about the need" approaches often fall on deaf ears or can even backfire.

The presentation begins with the understanding that communities often reject infrastructure projects not because the engineering "How" isn't explained — they reject it because the "Why" isn't properly framed from the community's point of view. Residents have legitimate concerns about construction disruption, economic impacts, competing interests, and scarce resources, and they want their voices to matter in the decision-making process. Success isn't about doing more, but about strategically approaching it so that community members are partners, not obstacles.

What you'll learn:

Stakeholder mapping beyond the obvious – Identifying the unofficial influencers, economic interests, and community dynamics that determine project success

Communication that connects – Translating engineering necessity into community benefit using language and examples that resonate with residents' daily lives

Proactive crisis communications – Addressing construction impacts, business concerns, and quality-of-life issues before they become project-stopping points

Collaborative planning frameworks – Integrating meaningful community input without compromising technical requirements

The framework transforms the communication around infrastructure projects from something imposed on communities into investments that communities support. The presentation will walk through specific case studies of projects that went wrong and how they recovered, as well as projects that were effective from the start.

INTERMEDIATE

Speaker

Stephen Groner

SGA Marketing

Combined Sewer Overflow (CSO) Control

2:35 PM – 3:35 PM | Location: Tech Rm 8

COLLECTION SYSTEMS

Strategic Optimization of Salem's Wastewater Collection System: Evaluating and Understanding Thousands of Solutions for Enhanced Hydraulic Performance and Maximum Return on Invesment

2:35 PM – 3:05 PM

The City of Salem sought a collaborative, data-driven approach to identify issues and prioritize improvements in its Wastewater Collection System Master Plan. Using multi-objective optimization, the project evaluated thousands of potential combinations of improvement alternatives, assessing interdependence across level of service design criteria and life cycle costs. The improvements considered included gravity sewers, pump station upgrades, storage, flow diversions, infiltration/inflow (I/I) reduction and operational strategies. Compared to traditional planning, this method enabled a comprehensive, transparent assessment of alternatives and sensitivity analyses for multiple scenarios, and allowed full life-cycle costs, system performance and growth drivers to be analyzed simultaneously.

A calibrated hydraulic model assessed existing and future system performance under a 5-year design storm. The deficiencies identified guided the development of improvement alternatives. Optimization first tested flow path and conveyance upgrades to define baseline solutions without I/I reduction or storage. Then, storage and I/I reduction options were introduced to identify cost-effective alternatives that mitigated capacity upgrades. This iterative process revealed optimal storage locations and volume to attenuate peak wet weather flows, preventing unnecessary trunk sewer upgrades. Sensitivity analyses were completed for various hydraulic conditions and cost assumptions. By systematically layering solutions, the analysis provided a strategic roadmap balancing hydraulic performance and costs.

Optimization yielded multiple viable solutions meeting design criteria without requiring additional wastewater treatment capacity. Sensitivity analyses confirmed strategy robustness, showing minimal impact from I/I cost assumptions. The process identified essential capacity improvements and rehabilitation projects that maximize return on investment across all scenarios. Additionally, results highlighted how targeted storage placement or I/I reduction effectively reduces downstream upgrades, optimizing capital expenditure while maintaining system reliability and providing redundancy.

Optimization enabled Salem to evaluate thousands of strategies to manage wet weather flows cost effectively while considering system-wide interdependencies. Scenario testing ensured adaptable, long-term planning by identifying resilient strategies under varying assumptions and prioritizing the highest return on investment early in the program. This case study demonstrates the power of intelligent algorithms in collection system master planning, offering a scalable approach for utilities seeking data-driven, cost-optimized solutions.

101 INTERMEDIATE

Speakers

J **Julia Matton**
WCS Engineering

K **Keith Garlinghouse**
City of Salem

Design Challenges of the Ohio River CSO Tunnel in Pittsburgh, PA

3:05 PM – 3:35 PM

The Allegheny County Sanitary Authority (ALCOSAN), Pittsburgh, PA is one of the region's premier environmental and public health organizations, treating wastewater for 83 Allegheny County communities, including the City of Pittsburgh. ALCOSAN operates and maintains approximately 90 miles of interceptor sewers that convey wastewater to a 59-acre wastewater treatment plant on Pittsburgh's North Side that processes 250 million gallons of wastewater daily and is one of the largest such facilities in the Ohio River Valley. ALCOSAN is currently under Federal Consent to implement a Clean Water Plan (CWP) to reduce CSO discharges to the surrounding three rivers. The CWP includes a number of large infrastructure improvement projects, one of which is the Regional Tunnel System consisting of three deep rock combined sewer overflow (CSO) tunnels totaling 18-miles. The Ohio River Tunnel (ORT) is the first of the three tunnels to be constructed under the CWP. The project consists of a total of approximately 5.5 miles of 18-ft and 14-ft finished diameter, segmentally lined deep rock tunnels and smaller diameter dewater and flow connector tunnels, as well as 8 deep flow drop and access shafts varying from 25-ft to 70-ft in finished diameter and 130-ft to 170-ft in depth. This presentation describes the project components and the primary engineering challenges faced during design, including tunnel alignments and shaft site optimization with tight right-of-way constraints and multiple railroad and highway crossings, tunnel system hydraulic analysis and surge dynamics modeling, and constructability challenges. Assessment of tunneling methodology as well as tunnel and shaft designs included overcoming 5-bar hydrostatic pressure, abrasive bedrock, and the selection of the appropriate support of excavation systems in high-permeability alluvial soils adjacent to the Ohio River.

ADVANCED

Speaker

Z **Zhenqi Cai**
mott macdonald

Exhibit Hall Mobile Sessions: "Influent to Effluent" Wastewater Technologies

3:40 PM – 4:40 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL

Join us on the exhibit floor for a walking session, during which attendees will be brought to selected booths on the exhibit hall floor for a series of presentations focused on specific topics by exhibitor experts.

Hosted by the PNCWA Students and Young Professionals Committee

Exhibit Hall Mobile Sessions: Collections Systems Technologies

3:40 PM – 4:40 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL

Join us on the exhibit floor for a walking session, during which attendees will be brought to selected booths on the exhibit hall floor for a series of presentations focused on specific topics by exhibitor experts.

Hosted by the PNCWA Collections Systems Committee

Exhibit Hall Mobile Sessions: Stormwater Technologies

3:40 PM – 4:40 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL

Join us on the exhibit floor for a walking session, during which attendees will be brought to selected booths on the exhibit hall floor for a series of presentations focused on specific topics by exhibitor experts.

Hosted by the PNCWA Stormwater Committee

Regulatory Perspectives on Reuse

3:40 PM – 4:40 PM | Location: Tech Rm 1

WATEREUSE

WATEREUSE

Reuse Regulator Session & Q&A (Part 1)

3:40 PM – 4:10 PM

WATEREUSE

Reuse Regulator Session & Q&A (Part 2)

4:10 PM – 4:40 PM

WATEREUSE

PFAS Removal

3:40 PM – 4:40 PM | Location: Tech Rm 2

THE FURTURE OF PFAS?

Impact of Several Stabilization Technologies on PFAS in Biosolids

3:40 PM – 4:10 PM

Per- and Poly-Fluoroalkyl Substances (PFAS) are a large family of organic compounds, including more than 12,000 synthetic fluorinated organic chemicals used in commercial, consumer and industrial products since the 1940s. Conventional sewage treatment methods do not effectively remove PFAS, leading them to persist in treated solids and biosolids. In 2021, the US EPA identified eight PFAS in biosolids and recently (January 15, 2025) released a draft biosolids risk assessment report focusing on PFOA and PFOS. If deemed necessary to regulate PFOA and PFOS in biosolids, the US EPA will require biosolids producers to meet certain standards for these compounds—underscoring the importance for biosolids producers to understand the technical solutions available to treat PFAS in biosolids. The focus of this presentation is to help utilities and biosolids producers understand options available to them to mitigate potential PFAS contamination in biosolids. This information will help utility planners, operators, engineers, and administrators better understand the nature of the PFAS issue, how these compounds are introduced into biosolids, the rapidly changing regulatory landscape, and the effectiveness of various technologies to reduce or eliminate measurable concentrations of these compounds from wastewater biosolids products.

Jacobs tested several biosolids products (dried, pyrolyzed, and compost) to assess PFAS concentrations. Using a process known as Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS), samples of input and output solids and finished products were analyzed for 24 PFAS compounds. Data will be presented on eight dried biosolids facilities, two pyrolyzed dried products, and six compost products. The presentation will cover measured concentrations of PFAS in wastewater solids, dried biosolids, pyrolyzed biosolids, chemical alkyl treated biosolids, incinerator ash, and biosolids-based compost products. PFAS precursor analyte presence and concentrations in the input solids as well as the resultant biosolids products will be presented. This information will be useful for agencies considering methods to reduce or eliminate PFAS in wastewater solids to achieve the lowest feasible PFAS concentrations in end products.

ADVANCED

Speaker

Todd Williams

Global Principal | Jacobs

Emerging Separation and Destruction Technologies to Mitigate PFAS in Leachate Destined for a Municipal Water Resource Recovery Facility

4:10 PM – 4:40 PM

Authors: Fabrizo Sabba; Christian Kassar

Per- and polyfluoroalkyl substances (PFAS) have substantially altered our water and wastewater management landscape. It is now critical to understand sources of PFAS into municipal water resource recovery facilities (WRRFs) so that technologies can be assessed for PFAS reduction when needed. Landfills often have high levels of PFAS from the breakdown of consumer products that are composed of PFAS. Leachate is often sent to WRRFs and can be a notable source of PFAS to the WRRF. Reduction of PFAS in the leachate can be beneficial in light of limitations on biosolids land application due to PFAS, effluent surface water limit guidelines, and drinking water concerns when source water is heavily influenced by wastewater effluent. Leachate is a complicated matrix though, and assessment of technologies requires testing on actual leachate samples. Technologies can be categorized into two classes. Separation Technologies can remove PFAS from one phase (such as water) and concentrate the PFAS into another phase. These technologies remove PFAS, but they do not destroy PFAS. Destructive Technologies can actually break the carbon-fluorine bond and thereby destroy PFAS. The objective of this research study was to assess the suitability of both separation and destruction technologies on PFAS removal. Specifically, four emerging technologies were evaluated. Foam Fractionation can concentrate PFAS into a foam phase and remove PFAS from water by addition of air and/or surfactants. Electrochemical Oxidation generates radicals in-situ that can breakdown chemical bonds in PFAS. Supercritical Water Oxidation applies high temperature and pressure to breakdown chemical bonds. Lastly, thermal plasma employs a plasma torch to generate reactive oxidants and reductants to oxidize PFAS. These four technologies were assessed for PFAS removal, and their advantages and disadvantages were evaluated. Reducing PFAS in leachate that is destined for a WRRF would ultimately reduce PFAS levels in biosolids as well as wastewater effluent. Treatment of landfill leachate could be one targeted area to reduce the perpetual cycling of PFAS through the urban water cycle.

101 BEGINNER

Speakers

Gary Hunter

Sr. Wastewater Process Engineer | Black & Veatch

S

Srivalli Veerapaneni

Black & Veatch Corporation

Flood Management & Resiliency Planning

3:40 PM – 4:40 PM | Location: Tech Rm 3

STORMWATER & WATERSHED MANAGEMENT

Using a Watershed Restoration Lens to Rethink Urban Water Management

3:40 PM – 4:10 PM

In the pre-colonial past of Pacific Northwest cities, rainwater and snowmelt moved freely through the landscape via natural hydrologic processes. Water bodies were in equilibrium with the landscape – characterized by a balanced exchange of water, sediment, nutrients, and energy flowing between land and waters. In the ensuing centuries of colonization and city-building, natural hydrology was slowly lost. Creeks and streams were diverted and pushed underground into pipes, wetlands and shorelines were filled in, native absorbent landscape was hardened, and people were disconnected from land and water. The equilibrium between land, water, and people was thrown out of balance. The resulting urbanization of these lands and waters yielded increased inland flooding, poor water quality, lost habitat, and other diminished ecosystem functions.

With this history in mind, the City of Vancouver, BC has been working to rethink the way that water interacts with and moves through the urban environment. The City's vision is to create a network of Blue Green Systems, which have been conceived as connected park-like streets and open spaces throughout the City that manage rainwater and floodwater, promote active transportation, connect people to parks and nature, and provide habitat for wildlife and pollinators. These Blue Green Systems have the potential to be transformational in the City's response to existing water management issues (including combined sewer overflows (CSOs) and water quality); extreme rains, droughts, and sea level rise associated with climate change; as well as development, mobility, and livability pressures.

Blue Green Systems work to restore natural hydrologic and ecological systems and functions lost through urbanization and to re-imprint them on the City's existing urban fabric. Roads become flow paths for water. Parks and open spaces become sponges. Processes that occur in natural systems are reintroduced but with an urban twist that acknowledges practical constraints present in the City. Essential hydrologic and watershed functions can be restored using natural systems as a guide. The connection and relationship of people with water and the environment can also be restored and enhanced. On the continuum of fully urban to fully natural systems, Blue Green Systems seek to blend the best of both.

INTERMEDIATE

Speaker

B

Brian Busiek

Herrera

Coming together to document decades of watershed work and inform future planning: Johnson Creek Restoration Retrospective Analysis

4:10 PM – 4:40 PM

Johnson Creek Restoration Retrospective Analysis:

Coming together to document decades of watershed work and inform future planning

Project overview: The City of Portland Bureau of Environmental Services (BES) has been providing and improving stormwater and sanitary sewer services in the Johnson Creek Watershed using a watershed management approach for more than 25 years. Restoration efforts have been informed by the 2001 Johnson Creek Restoration Plan, which presents strategies for addressing a broad suite of watershed impairments. Fifteen restoration projects implemented since 2001 have enhanced the capacity of the Johnson Creek watershed to manage frequent floods, treat and convey stormwater, support fish and wildlife, and improve environmental health.

Problem statement: While these projects represent a significant investment on the part of the city, the Bureau lacked a model for compiling and assessing the work performed. In response, the project team implemented a novel approach: collaborative development of the Johnson Creek Watershed Retrospective, intended to capture institutional knowledge, document efforts and outcomes in the watershed, analyze past work to determine if intended outcomes were successfully achieved, and build a feedback loop to inform future planning efforts.

Process: The Bureau worked with a consultant team led by ESA and including JLA Public Involvement to develop a process that would collect and consolidate the required information, including critical knowledge held by Bureau staff about decades of work completed in the watershed, and then guide decision-making about future planning. A framework of meetings was developed, including two key groups: a “Technical Team” and an “Editorial Team.” The Editorial Team focused on telling the story – developing a vision and outline for the report and overall work program, which then informed the approach and agendas for Technical Team meetings. A series of Technical Team meetings analyzed the results of six representative projects to document what was done, and whether it met the stated goals of the program. This retrospective formed the basis of the report. Additionally, the process considered and provided input on other watershed issues, such as equity, houselessness and climate change.

BEGINNER

Speakers

A

Adrienne DeDona

JLA Public Involvement

L

Luke Johnson

ESA | Environmental Science Associates

Kate Carone

City of Portland, Bureau of Enviromental Services

Solar-Powered Biosolids Drying

3:40 PM – 4:40 PM | Location: Tech Rm 4

BIOSOLIDS & RESOURCE RECOVERY

Harnessing the Sun: A Recycled Biosolids Story

3:40 PM – 4:10 PM

Kennewick, along with much of the US, is experiencing an ever-growing trend where landfills are restricting biosolids disposal. Additionally, odor issues and costs of lagoon dredging and disposal are unfavorable to the City. Seeing the need to be proactive, the City of Kennewick contracted with Merrell Bros. Inc to provide progressive design build services for a new Class A biosolids processing facility.

Merrell Bros. has developed an innovative, cost-effective biosolids treatment process that's simpler and less capital-intensive than traditional biosolids dryers. It's called solar-thermal pasteurization and it follows a two-step work-flow:

1. Solar Drying in Greenhouses: Sludge is contained in a sludge holding tank, then run through a belt filter press for dewatering, and mechanically transferred into a large-scale greenhouse. This method takes advantage of Kennewick's abundant sunshine, while protecting the material from rain and weather. The greenhouse design also contains any off-gassing odors, making the process more community-friendly.

2. Next, dried biosolids are passed through a pasteurization oven. This step reduces pathogens, meets vector attraction reduction standards, and results in Class A fertilizer that can be sold in bulk or pellets. Harvesting the sun's solar energy for pre-oven drying reduces the carbon footprint by using solar energy instead of consuming fossil fuels, a non-renewable resource. This results in approximately 90% reduction in natural gas consumption compared to oven drying alone.

Hear from both the engineering consultants and the company who patented the process of converting aerobic sludge into fertilizer on how a Utility can take a total comprehensive approach to addressing their current biosolids program and direct it towards a long term, controlled sustainable solution.

101 INTERMEDIATE

Speakers

T **Ted Merrell**
Merrell Bros.

 **Deanna Martin**
Practice Builder - Water/Wastewater | Kimley-Horn

W **Wayne White**
Kimley-Horn

Innovative Biosolids Drying: Meridian's Thermally-Enhanced Solar Greenhouse Dryer

4:10 PM – 4:40 PM

Authors: Donnie Stallman; Ric Traeger; David Briggs

The City of Meridian, Idaho, is constructing a thermally-enhanced solar greenhouse for drying biosolids at its Wastewater Resource Recovery Facility (WRRF). This dryer, which is the first of its kind in the northwest U.S., expands on traditional greenhouse drying by adding stainless steel floor plates for additional heat transfer, conveyors to evenly distribute solids across the floor, and fans to circulate air flow in the facility. These innovations accelerate the drying process, reduce the facility footprint, and allow for more consistent operation overnight and seasonally. A similar system has been operating successfully in Surprise, Arizona, for several years. By drying biosolids with this method, the City of Meridian expects to improve percent total solids from 20% (after centrifuge dewatering) to approximately 80%. This would reduce the total mass of biosolids by 75%, resulting in a 4-to-1 reduction in hauling and disposal costs. Other facilities in the northwest could similarly benefit from this technology.

This presentation will focus on design features and operation/performance considerations for this type of dryer. It will also cover a capital cost comparison to thermal belt dryers and a return-on-investment (ROI) calculation for biosolid drying at Meridian. Finally, construction notes and photos from the Meridian facility will be shared. The facility is expected to be operational in early 2026.

INTERMEDIATE

Speakers

D **Dan Berthe**
Boise Operations Manager | Brown and Caldwell

C **Clint Dolsby**
Assistant City Engineer | City of Meridian

AI-Driven Collection System Analytics

3:40 PM – 4:40 PM | Location: Tech Rm 5

DIGITAL SOLUTIONS

Harnessing AI for Risk Management of Water Transmission Lines

3:40 PM – 4:10 PM

Abstract:

Public utilities face increasing challenges in maintaining the reliability and resilience of water transmission infrastructure. Aging pipelines, environmental factors, and growing demand highlight the need for innovative approaches to asset management and risk mitigation. Artificial intelligence (AI) is emerging as a transformative tool for addressing these challenges, offering utilities the ability to analyze complex datasets and predict potential system failures with greater accuracy.

This presentation will explore the application of AI in risk management for water transmission lines. By leveraging diverse data sources, including historical performance, geospatial information, and environmental conditions, AI models can identify patterns and forecast the likelihood of pipe failures. These insights enable utilities to prioritize maintenance, allocate resources effectively, and plan for long-term infrastructure sustainability.

Key topics will include the integration of AI-driven insights into existing asset management practices, the role of predictive analytics in optimizing operational decision-making, and the benefits of transitioning from reactive to proactive maintenance strategies. Real-world examples will demonstrate how AI has improved reliability, reduced costs, and enhanced service delivery for public water systems.

This session aims to provide utility managers, engineers, and policymakers with a clear understanding of the potential of AI to revolutionize water infrastructure management. Attendees will gain valuable insights into the practical implementation of AI technologies and how these tools can address the growing complexities of maintaining critical public utilities. By embracing AI-driven approaches, utilities can better manage risks, improve operational efficiency, and ensure the sustainability of essential water transmission systems.

101 INTERMEDIATE

Speaker

Bill Weymouth

Fracta

An Open Source Framework for Cloud-Based Continuous Collection System Planning

4:10 PM – 4:40 PM

In this presentation you will learn how the City of Portland Bureau of Environmental Services (BES) has developed and applied an open-source framework for Continuous Collection System Planning (CCSP). The CCSP Tools standardize and streamline BES' collection system risk assessment approach using modern cloud technologies and a flexible scripting environment.

BES has leveraged explicit hydraulic & hydrologic modeling and an asset management framework for collection system risk assessment and planning since the start of the Combined Sewer Overflow Program over 25 years ago. To support detailed analysis of pipe rehabilitation needs, assessment of capacity constraints, green infrastructure benefits, and other parameters, BES has historically relied on a complex ecosystem of scripts, sql queries, models, and GIS databases running on individual planners and engineers desktop computers as well as BES' SQL Server and dedicated application servers. As this framework matured, BES desired to streamline and standardize this tool ecosystem.

Working with consultant Environmental Science Associates, BES built the CCSP Tools, a cloud-based tool using Microsoft Azure to streamline dozens of scripts, spatial analysis, cost estimation calculations, and other data sources to enable analysis of collection system needs and opportunities from the block- to neighborhood- to citywide scales.

The CCSP Tools works by chaining a suite of discrete and flexible data processing tasks written in the Python or C# programming languages. Data processing is set up with configurable workflows that send the output of preliminary tasks to serve as the inputs of the subsequent tasks. Once configured, these workflows can be re-run automatically as input data sources are updated in their system of record. Data sources include hydraulic model outputs, enterprise GIS systems, and alternative analysis design files from BES' explicit model system. The CCSP Tools support analysis workflows including citywide capacity and mortality risk assessment, pipe rehabilitation prioritization, collection system characterization, and multi-objective alternatives analysis.

ADVANCED

Speakers

Sam Gould

City of Portland Bureau of Environmental Services

John Burns

Environmental Science Associates

Liz Arikawa

ESA

Water Reuse & Reclamation

3:40 PM – 4:40 PM | Location: Tech Rm 6

WASTEWATER TREATMENT

Operation and performance of the Nampa WRF: 1-year with tertiary filtration, struvite sequestration, EBPR, and water reuse

3:40 PM – 4:10 PM

Authors: Lindsey Smoot

Population within Idaho's Treasure Valley has skyrocketed in recent years – for good reason. Landscapes, recreational opportunities, and mild weather draw the attention of people from all walks of life. Thus, public awareness of water conservation, reuse, and surface water protection has correspondingly increased. The City of Nampa and Jacobs partnered to address public concerns with the Group F upgrades project to provide sophisticated wastewater treatment most applicable for protecting Treasure Valley waterways.

Recently deployed treatment technology solutions associated with the Group F upgrades reliably produce low level effluent phosphorous with flexibility to meet both surface water and Class A reclaimed water quality standards. These solutions may provide a template for other treatment plants across the valley that will be instrumental in addressing low phosphorous discharge limits. Upgrades completed as a part of the Group F project target phosphorous removal from both a liquids and solids perspective to protect public waterways and meet these stringent discharge requirements. Technologies include deep sand filtration, EBPR, and struvite sequestration.

This presentation will review impact of new processes on Nampa WRF effluent water quality as well as discuss challenges and lessons learned associated with the first year of operation, including:

· Sidestream struvite sequestration – Challenges of struvite blinding pipes and equipment is well documented. Struvite sequestration addresses this by precipitating phosphorous to be removed with dewatering. However, this presentation will explain how the Nampa WRF addressed challenges with the settling of the dense struvite crystals formed during struvite sequestration.

· Disinfection – The Nampa WRF transitioned from chlorine disinfection to UV disinfection as part of the project. This presentation will describe the City's perspective on the O&M pros and cons of the two disinfection methods.

· Deep Bed Sand Filtration – The Nampa WRF experienced rapid blinding of Filters during process startup. This presentation will describe the challenges and the impacts of process decisions on Filter runtimes.

· Cold Weather Impacts – Idaho winter weather and particularly freezing fog exposed a handful of issues during the first winter in operation. This presentation will cover some of the unique challenges faced at the WRF and fixes that were implemented.

INTERMEDIATE

Speakers

Alex Voffie

Jacobs

William Leaf

Principal Technologist | Jacobs

Lindsey Smoot

Junior Engineer | Jacobs

Water Reuse at a CSO facility: Reuse System Upgrades at Portland's Columbia Boulevard Wastewater Treatment Plant

4:10 PM – 4:40 PM

The Columbia Boulevard Wastewater Treatment Plant (CBWTP) currently uses approximately 4 million gallons per day of plant water for spray systems, washdown, flushing, makeup water, and other operational needs. For many years, groundwater has served as the primary source of plant water. However, increasing demand, challenges posed by aging wells, and sustainability goals have prompted Portland's Bureau of Environmental Services (BES) to evaluate alternative water sources.

In 1997, BES installed a microscreen filtration system with disinfection to produce reuse water for plant operations. The system faced persistent fouling issues, often during high TSS wet weather events, that reduced capacity and limited consistent operation. Over the past two decades, the system has been largely inactive, with the original screening equipment now beyond practical use.

In 2024, BES conducted an alternatives evaluation with support from Tetra Tech to identify replacement treatment options capable of producing up to 8 million gallons per day of Class A Recycled Water while addressing the operational challenges of the previous system. A cloth disk filter system was selected based on its proven reliability for the application and relative ease of maintenance. A conceptual design of the upgraded system has been completed and will also feature new filter feed pumps, a sodium hypochlorite disinfection system, and upgraded reuse water distribution pumps.

A review of eight years of secondary effluent data revealed occasional total suspended solids (TSS) secondary effluent concentrations exceeding 60 mg/L, posing a potential fouling risk for the cloth disk filters. To mitigate this, BES will manage flow rates to reduce solids loading and supplement reuse water with groundwater as needed.

As part of broader efforts to improve resource management, BES is also exploring alternative approaches, including utilizing additional city groundwater rights and negotiating a wholesale water rate to support plant water demands. This session will discuss the technical evaluation, decision-making process, and lessons learned from CBWTP's evolving approach to sustainable plant water supply.

INTERMEDIATE

Speakers

Matt Hewitt

City of Portland BES

Jesse Fields

Project Engineer | Tetra Tech

Public Communication & Outreach

3:40 PM – 4:40 PM | Location: Tech Rm 7

OUR WATER STORIES

Innovative Communication Strategies for Water Conservation

3:40 PM – 4:10 PM

Effective communication is essential for inspiring environmental action. Cascade Water Alliance's "We Need Water" campaign demonstrates how bold, innovative strategies can drive real change in water conservation. Over the past 3 years, Brilliant Marketing has partnered with Cascade to rethink how water conservation messages resonate with their four main audiences:

1. The Environmentalist Homeowner

2. The Committed Educator

3. The Good Sense Gardener

4. The Interested Student

This case study presentation will delve into the evolution of the campaign's communication strategies—where initial efforts fell short, how they were reworked, and ultimately how traction was gained. Together, we amplified Cascade's mission to provide clean, safe, and reliable drinking water while fostering sustainable water use practices.

Key highlights include:

- Humor and Memes: Reaching younger audiences through relatable, lighthearted content that made water conservation shareable and engaging.

- Paid Advertising: Utilizing paid social advertising to increase our reach and target the right audiences.

- Social Media Contests & Gamification: Building community through interactive campaigns, including monthly giveaways, to encourage action and deepen connections.

- Podcasting: Expanding reach through the "We Need Water" podcast, which became a direct and informative communication channel.

- Local Partnerships: Creating meaningful collaborations with the Northwest Flower and Garden Show, local nurseries, and community groups to extend campaign visibility.

We'll share data-driven results demonstrating the campaign's success in increasing social media followers, interactions, and overall engagement. This includes a yearly social media reach of 640,689 and 1,700 podcast downloads.

This presentation will equip attendees with actionable insights to adapt these strategies to their own initiatives. From leveraging humor to fostering partnerships, we'll provide practical ideas for enhancing communication efforts, driving engagement, and inspiring collective action to protect vital water resources.

In a world full of competing messages, learning to cut through the noise is imperative. Join us to explore how bold communication strategies can inspire real-world change in the water industry.

BEGINNER

Speakers

E

Emily Trickey

Brilliant Marketing

Mikaela Bolling

Owner | Brilliant Marketing

The Ripple Effect: Storytelling for Project Buy-In and Public Trust

4:10 PM – 4:40 PM

Effective communication is a critical skill for water professionals seeking approval for their projects and programs. Whether advocating for funding, presenting to stakeholders, or engaging with the public, the ability to tell compelling stories can make the difference between success and setbacks. This presentation equips water professionals with actionable tips to inspire confidence and gain buy-in. Attendees will learn the fundamentals of crafting persuasive narratives tailored to diverse audiences, from municipal boards to community groups. The session will provide insights into:

- Presenting Yourself Effectively: Cultivating presence, confidence, and professionalism during meetings and presentations.

- Communicating Clearly: Delivering messages clearly, adapting tone and style to the audience, and using data effectively.

- What to Present: Structuring presentations that emphasize key takeaways, integrating visuals to enhance impact, and addressing stakeholder concerns proactively.

The presentation will feature real-world examples, practical tools, and templates that attendees can adapt to their unique challenges. Participants will leave with a toolkit to transform technical information into stories that resonate, inspire, and drive action. By connecting with audiences on a deeper level, water professionals can champion projects that support sustainable and resilient communities.

Join us for an engaging session designed to empower water professionals with the communication skills needed to turn vision into reality.

BEGINNER

Speaker

Alexander Mockos

Northwest Growth Leader | Brown and Caldwell

CM/GC for Collections

3:40 PM – 4:40 PM | Location: Tech Rm 8

COLLECTION SYSTEMS

Maximizing CMGC for the Carolina Sewer Trunk Rehabilitation

3:40 PM – 4:40 PM

Authors: Chris Bottoms

The City of Portland Bureau of Environmental Services (BES) is undertaking the Carolina Sewer Trunk Rehabilitation Project, a critical infrastructure initiative aimed at replacing a deteriorating section of the Carolina Trunk sewer pipe. This project is located west of the Willamette River in the South Portland Neighborhood, spanning from SW Slavin Road under Interstate 5 to Macadam Avenue. The project is being delivered using the Construction Manager/General Contractor (CMGC) method. This innovative delivery approach allows for enhanced collaboration and efficiency throughout the project lifecycle. The presentation will provide an overview of the project, highlighting the unique challenges and solutions associated with rehabilitating a nearly 90-year-old sewer trunk.

In alignment with the conference theme, "Flowing Together: Stories of Dedication and Innovation," this presentation will highlight how the CMGC method fosters a collaborative environment that brings together diverse expertise and dedication to achieve project success. Key topics will include the early contractor involvement, risk management and construction strategies.

A panel discussion will feature representatives from all major stakeholders: the Owner (BES), the Owner's Agent (Kennedy/Jenks Consultants), the Engineer of Record (WSP), and the Contractor (J.W. Fowler). Each panelist will share their perspectives and insights on leveraging the CMGC method to achieve project success. Attendees will gain valuable knowledge on the collaborative mindset and strategic planning required to optimize the CMGC delivery method, ensuring a high-quality and timely completion of the project design phase.

INTERMEDIATE

Speakers

Sarah Lingley

Oregon Water Business Lead | WSP

A

Ainsworth Marshall

Capital Project Manager IV | City of Portland

M

Michael Humm

Kennedy Jenks

Exhibit Hall Closing Reception

4:40 PM – 6:40 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL ATTENDEE EVENTS

Grab a drink and snack and wander through our tradeshow of over 140 exhibitor booths!

Don't forget to check out the Exhibit Hall Passport on the app for the opportunity to earn prizes!

Operations Challenge Awards

6:40 PM – 7:00 PM | Location: Exhibit Hall B/A1

EXHIBIT HALL ATTENDEE EVENTS OPS CHALLENGE

Celebrate the hard work of our three Ops Challenge teams!

PNCWA Block Party

7:00 PM – 10:00 PM | Location: Convention Center Plaza

ATTENDEE EVENTS

Step right up for an evening of fun, food, and festivities at the PNCWA Fun Fair! Test your skills at carnival games and grab a bite from local food trucks. It's the perfect way to unwind, network, and celebrate our shared commitment to water and community.

Wednesday, September 17, 2025

Breakfast

7:00 AM – 8:00 AM | Location: Exhibit Hall A

MEALS ATTENDEE EVENTS

Start the day right! Breakfast is open to all attendees so fuel up before hitting the technical sessions!

Ecology, Hydrology, and Engineering: An Innovative and Collaborative Pilot Project for Habitat Restoration Through Water Reuse

8:00 AM – 12:30 PM

TOUR

Hosted by our Conference Partner, WateReuse!

The tour will include a comprehensive tour of the Durham WRRF, including the reuse process. After the WRRF tour, participants will tour the reuse pilot project know as Thomas Dairy where CWS is using Class A Recycled Water to enhance ecological function at a degraded urban wetland as a new beneficial use in Oregon.

Startup & Asset Management

8:00 AM – 9:00 AM | Location: Tech Rm 1

DIGITAL SOLUTIONS

Operation Readiness and Transition of Capital Project Assets and Data

8:00 AM – 8:30 AM

Operational Readiness and Transition (ORAT) ensures capital project assets and data are effectively integrated into operational workflows. It minimizes risk, enhances reliability, and ensures seamless handover by validating systems, processes, and documentation. ORAT optimizes resource utilization, supports compliance, and prepares teams with the knowledge to manage new assets. This process ensures a smooth transition, enabling faster realization of business value, improved service quality, and sustained operational performance while aligning project outcomes with organizational objectives. Public agencies around the USA, and specifically in the Pacific Northwest, are heavily investing in capital projects to replace aging assets and expand services. These capital projects require a process for the transition of assets and systems to the operations teams that are efficient and effective. The process requires both risk management and resource management to sustain the increasing workload for operations staff in support of the system upgrades while maintaining and operating a growing system.

Key operations activities that need improvement:

• Submittal reviews

• Punch list and project close out visits and activities

• Asset data verification

• Maintenance planning and systemwide maintenance evaluation

• Simulations and Integrated Operational Trials

• SIT and Commissioning

• Spare Part Delivery Verifications

• Training Support for System Expansion

This paper describes the operational readiness and transition (ORAT) process that addresses the needs of the operations team and what is required to effectively manage new or upgraded assets. ORAT is a global best practice that has been used in other major infrastructure projects worldwide (Airport, Healthcare, Power) but has only been partially adapted into just a handful of water and wastewater organization in the United States.

ORAT can be implemented as an internally staffed process or with a staff augmentation process. The (ORAT) process ensures that new or changed systems, processes, or services are effectively deployed and supported in an operational environment. By ensuring systems are fully operational, supported, and aligned with business objectives, the ORAT process maximizes return on investment (ROI) for technology and process changes, while maintaining operational efficiency and customer satisfaction.

101 BEGINNER

Speaker

Scott Bash

Director of Operational Systems and Technology | Stantec

A Homegrown Strategic Asset Management Plan can be the Best Plan

8:30 AM – 9:00 AM

Authors: Chris Kossow; Laura Markham; Neil Jenkins

Doesn't strategic asset management just mean that you remember where the mayor or sewer board chairman lives and make sure that their sewer doesn't back up? Does creating a strategic asset management plan have to mean countless hours arguing in conference rooms about the scoring criteria for the consequence of failure and likelihood of failure matrices so that assets can receive their risk score? In the end isn't it just the loudest manager who gets all the money for their projects anyway? While these perspectives might be based on real experiences, there is a better way to add strategy to managing utility assets so that the limited time, money, and attention can be devoted to the assets most critical to accomplishing the shared utility mission and vision.

Inspired by the focus on asset management at the national Utility Management Conference in 2024 Eagle Sewer District decided to advance their asset management program from reactively fixing things that break and maintenance that was the responsibility of one staff member to memorize and not miss anything during a time of high growth, to a more formalized program with documentation and a focus on criticality. Enough of the managers had been previously trained in risk-based asset management and criticality assessments to prepare a home-grown in house Strategic Asset Management Plan tailored specifically to the needs of the organization. Then came the culture change during implementation. Come hear the lessons learned from a smaller utility on how to prepare your own strategic asset management plan and progress on your asset management improvement journey.

INTERMEDIATE

Speaker

Ron Gearhart

Treatment Manager | Eagle Sewer District

Finance Strategies

8:00 AM – 9:00 AM | Location: Tech Rm 2

UTILITY MANAGEMENT

Capital Currents: Navigating Strategic Water Infrastructure Financing

8:00 AM – 8:30 AM

Innovative treatments are emerging to tackle PFAS contamination, along with watershed-scale, nature-based stormwater solutions that trap 6PPD-Q, protecting the iconic salmon of the Pacific Northwest. Additionally, capital investments are crucial to maintain the integrity of existing drinking water and wastewater treatment facilities, ensuring they continue to safeguard public and environmental health. Every water infrastructure project, regardless of size, requires sufficient capital to become a reality, and a successful project hinges on a robust financing strategy.

Jacobs Engineering's Water Infrastructure Funding and Grants consulting practice is led by Tahne Corcutt, a 17-year veteran and expert on the State Revolving Funds, WIFIA program, and EPA grants. She previously served as a prime federal contractor for the EPA's Office of Water Oceans and Wetlands, Office of Wastewater Management, and the 319 Nonpoint Source Program. Ms. Corcutt has secured over $500 million in project funding for communities, spearheaded 15 innovative water infrastructure financing pilots to establish new financing mechanisms such as programmatic financing, conduit lending, and sponsorship lending for agencies like the Alaska Department of Environmental Conservation, Oregon Department of Environmental Quality, Hawaii State Department of Health, California State Water Resources Control Board, and Washington Department of Health.

Ms. Corcutt will share valuable insights on strategic water infrastructure financing from the perspectives of community leaders and engineering consultants involved in planning, designing, constructing, and implementing projects. Using case studies from Seattle Public Utilities' Duwamish Valley Resilience Program, the City of Pasco's Butterfield Water Treatment Plant, and the Upper Klamath Basin Agricultural Collective, this session will highlight the importance of integrating funding strategies into the project planning phase. It will cover comprehensive funding alignment analysis for curated capital stacking, utilizing over 13 different financing mechanisms to overcome eligibility hurdles, how to generate revenue through leveraging, and offer tips for navigating the federal funding landscape in uncertain times. With proper execution, these practices can lead communities to a steady state of funding, enabling more efficient and economical capital improvement project implementation.

101 INTERMEDIATE

Speaker

T **Tahne Corcutt**
Jacobs Engineering

Watershed Outcomes Bank: A Conceptual Watershed-based, Integrated Funding Initiative to Improve Water Quality in the Puget Sound

8:30 AM – 9:00 AM

Authors: Tim Wigington

Many different regulatory and voluntary programs exist to address the myriad water quality and flow control challenges facing the Puget Sound. However, these programs largely operate independently and lack the capacity necessary to make significant headway on a watershed-scale. To achieve meaningful improvements across the Puget Sound, it is necessary to rapidly fund and implement coordinated, high-impact, and cost-effective natural infrastructure projects that reduce pollutant loading and provide compounding benefits to communities and the watershed. This requires a new strategy designed to integrate the existing planning, project development, funding, outreach, and implementation efforts into a regional engine that can catalyze and sustain results by coordinating multiple funders to pursue interrelated actions that maximize outcomes for each of the participants.

To advance this goal, The Freshwater Trust partnered with King County, Washington, to develop a conceptual coordinated regional investment strategy, referred to as a Watershed Outcomes Bank. At its core, the Bank approach is an integrated funding and implementation framework that leverages together multiple regulatory and voluntary funding programs, and directs those coordinated funds to the highest impact project investments. The centralized Bank would manage several key transactional functions, namely project fund aggregation and leveraging, securing financing, and managing environmental and financial accounting. The Bank would utilize existing King County analytical tools to prioritize projects based on comparative effectiveness, then direct the expenditure of funds on the highest priority projects in coordination with the participants, taking into account the funder requirements and priorities. The Bank would track the project implementation, workflow, timing and the resulting benefits in a centralized system. This would enable the participants to focus on implementation and stakeholder responsibilities and ultimately deliver multiple efficiencies and benefits to watershed partners.

While still in the conceptual phase, this Bank approach holds much promise for increasing the pace and scale of watershed improvements across the Puget Sound. Importantly, this strategy is not limited to the Puget Sound, comparable Banks could be developed and deployed in watersheds across the Nation to integrate the disparate regional regulatory and funding programs and achieve outcomes that are greater than the sum of the individual parts.

BEGINNER

Speakers

T **Tim Wigington**
The Fresh Water Trust

D **David Primozich**
The Fresh Water Trust

C **Chris Thomas**
Senior Attorney & Policy Specialist | The Freshwater Trust

Program Management

8:00 AM – 9:00 AM | Location: Tech Rm 3

PROJECT, PROGRAMM & ALTERNATIVE DELIVERY

Program Management Lessons Learned from Public Sector Water Utilities

8:00 AM – 9:00 AM

Authors: Erica Rooney; Muriel Gueissaz-Teufel; Chad Merrill

This panel discussion will explore the use of program management in the context of public sector water utilities. Program management offers a structured approach to managing multiple projects in a coordinated way to obtain benefits and control not available from managing them individually. The panel is comprised of at least three experienced northwest public sector water utility owners including the Portland Bureau of Environmental Services, the King County Wastewater Treatment Division, and the City of Lake Oswego which represent the drainage, wastewater, and drinking water areas. Each panelist will share their insights and experiences on how program management has allowed them to meet a high volume of more complex needs, improve efficiency, reduce risk, improve schedule and cost performance, and enhance coordination and collaboration with internal and external stakeholders. The discussion will be highly relevant to utility owners who are looking to deliver projects using this method or want to learn more about it and to consultants and contractors who support owners using this approach.

The panel will highlight real-world examples of recent northwest program management implementations including the delivery of complex wastewater treatment plant expansions and drinking water treatment plants, delivery of a collection of smaller projects, and restructuring of an entire capital delivery organization around the delivery of programs. The panel will showcase the tangible benefits achieved but also the implementation challenges. Each panelist will provide practical solutions to overcome these obstacles.

Join us for an engaging and informative discussion that will equip you with valuable insights into best practices and innovative approaches to successfully implement program management.

101 BEGINNER

Speakers

K **Keith Ward**
Senior Program Manager | Brown and Caldwell

M **Muriel Gueissaz-Teufel**
Portland Bureau of Environmental Services

C **Chad Merrill**
WTD Capital Strategy, Quality, and Standards Unit Manager | King County Wastewater Treatment Division

Granular & Densified Sludge

8:00 AM – 9:00 AM | Location: Tech Rm 4

TREATMENT INNOVATION & INTENSIFICATION

Intense Intensification Modeling: Improved Sensitivity and Capacity Analyses of Densified Sludge

8:00 AM – 8:30 AM

The densified sludge (DS) process is commonly used to enhance secondary wastewater treatment, with hydrocyclone wasting gaining traction in continuous flow systems. However, effective modeling practices for such systems remain underexplored. This study evaluates two primary modeling approaches: defining state variable retention fractions by cyclones and using a zero-dimensional DS model to differentiate granule and floc biomass. While the DS model simplifies cyclone modeling, it lacks thorough sensitivity analysis and case study documentation.

This research aims to improve hydrocyclone-based DS modeling through (1) sensitivity analysis of key input parameters and (2) a case study on hydrocyclone wasting capacity modeling. Sensitivity analyses were conducted using SUMO's A2O plant + Cyclone simulation, integrating the DS model add-on. The study focused on nitrogen and phosphorus removal indicators, including densified biomass fraction (FGranule), nitrifying biomass fraction, and effluent quality.

Key calibration parameters include biomass diffusion resistance (DR) and mass split to cyclone underflow. DR impacts substrate-organism kinetics, while mass split influences flocculant suspended solids retention. Findings indicate that higher DR reduces FGranule by inhibiting granule biomass growth. Under high DR, nitrification slightly decreases, but total nitrogen in effluent also drops, potentially due to increased anoxic biomass. While phosphorus accumulating organisms (PAO) remain largely unaffected, ammonia oxidizing bacteria (AOB) and nitrite oxidizing bacteria (NOB) significantly decline under high DR conditions.

A case study at Bozeman Water Reclamation Facility (WRF) assessed inDENSE hydrocyclone wasting implementation, revealing key findings:

1. Modeled granulation trends aligned with expected results.

2. Hydrocyclones reduced solids retention time (SRT) by 40%, and granule retention was 1.6 times floccular retention.

3. Minimum SRT required for permit compliance decreased by 45%, highlighting improved sludge efficiency.

4. Hydrocyclones increased maximum month flow capacity by 13%.

5. Effluent winter ammonia and summer phosphorus loads decreased by 45% and 66%, respectively.

6. InDENSE capacity costs ($1.4M/MGD) were comparable to a bioreactor upgrade ($1.5M/MGD) but significantly lower than a new bioreactor ($5.2M/MGD).

The findings suggest DS modeling is a viable tool for planning-level wastewater treatment optimization. These modeling efforts show promising results and improve nutrient treatment and capacity planning.

ADVANCED

Speakers

Luke Thompson

Associate | Wastewater Engineer | HDR, Inc.

G

Geneva Schlepp

HDR

Keeping Granules Happy in a Salty Environment: Aerobic Granular Sludge (AGS) Testing at Sand Island WWTP

8:30 AM – 9:00 AM

Authors: Julian Xheko; Trudy Hamic ; Paula Dorn

The Sand Island Wastewater Treatment Plant (SIWWTP) currently provides removal of BOD and TSS through advanced primary treatment. The City and County of Honolulu is in the process of upgrading SIWWTP to meet secondary treatment water quality standards (30 mgTSS/L, 30 mgBOD/L) using a hybrid secondary treatment approach, where 20 mgd will be treated using MBR (currently under construction) and 70 mgd will be treated through AquaNereda®'s aerobic granular sludge (AGS) process. SIWWTP is one of the few places in the world that will use AGS with a low-strength, high-salinity wastewater, providing insight to other facilities.

SIWWTP wastewater is unique compared to conventional wastewater, such that chloride concentration ranges from 3,000 to 5,000 mgCl-/L, BOD is ~160 mgBOD/L, TSS is ~140 mgSS/L, and COD is ~350 mgCOD/L. The high-salinity wastewater impacts go beyond AGS performance and stability; it also affects instrumentation reliability which can be challenging when using a treatment technology that is reliant on online instrumentation for process control, and it affects laboratory procedures for process monitoring to verify online instrumentation.

A 12-month pilot study (March 2024 to March 2025) is being conducted to evaluate AGS performance using SIWWTP influent wastewater with respect to maintaining sufficient granulation conditions, stable effluent quality, and representative online measurements. The pilot equipment includes two parallel reactors which can be independently operated to test the impacts of various flow/load conditions. Results from the technology testing will be used to inform full-scale design.

Testing is being completed in three phases: Phase 1 seed the reactors with pre-formed granules and acclimate to SIWWTP influent wastewater, Phase 2 compare influent sources of primary influent vs. primary effluent at average annual load, evaluate various load conditions (maximum month load and wet weather flow) and adjust the aeration control setpoints for recipe optimization, and Phase 3 seed with conventional mixed liquor (ML) from a nearby facility to evaluate the rate of granule formation.

This presentation will provide an overview of the results, including the impacts of using AGS in a low-strength, high-salinity wastewater, performance using different aeration control strategies, lessons learned on online instrumentation, and design implications.

INTERMEDIATE

Speakers

Rachel Shaw
Process Engineer | Stantec

Katerina Messologitis
Stantec

Phosphorus Removal

8:00 AM – 9:00 AM | Location: Tech Rm 5

PHOSPHORUS REMOVAL & RECOVERY

Biological Phosphorus Removal Intensification and Optimization

8:00 AM – 8:30 AM

Water Resource Recovery Facilities (WRRFs) in the Northwest are under increasing regulatory pressure to reduce effluent total phosphorus (TP) to low levels. Many facilities are required to remove TP below 0.5 mg/L, either on a mass load allocation or concentration basis. A combination of biological and chemical phosphorus removal with tertiary settling or filtration is typically used to meet these low limits. Challenges to providing reliable biological phosphorus removal (BPR) include limited influent volatile fatty acids (VFAs), solids recycle stream loadings, dissolved oxygen return to unaerated (anaerobic) zones, and competition with other organisms that uptake requisite VFAs. These challenges result in greater chemical feed to reliably meet effluent P levels, which increases operational costs and further inhibits BPR.

Recent advances in BPR provide the opportunity to intensify BPR and reduce reliance on chemical removal. One approach is return activated sludge (RAS) fermentation, where a portion of the RAS (5 -10%) is diverted to a dedicated anaerobic zone with a long HRT (up to 48 hrs) to ferment the RAS and create VFAs. The VFAs are an effective carbon source for phosphate accumulating organisms (PAOs) and denitrifying bacteria in the anaerobic and anoxic zones. RAS fermentation may also promote growth of a more diverse, robust PAO population that can further enhance PBR. RAS denitrification zones, which are operated at a shorter retention time and typically treat all of the RAS, have also provided significant benefits.

Several facilities have implemented RAS fermentation or denitrification zones and achieve effluent TN and TP concentrations below 3.0 and 0.3 mg/L respectively, with substantially less chemical feed compared to plants without RAS fermentation. These plants approach RAS fermentation/denitrification differently, and their approaches can be leveraged at existing facilities in the Northwest to optimize nutrient removal.

The presentation will provide case studies of facilities that have leveraged RAS fermentation/denitrification to reduce or eliminate chemical phosphorus removal. Each case study will include the process configuration, fermentation design/operation, effluent N and P concentrations, and chemical usage. The presentation will conclude with operational guidance and low-cost modifications that can be implemented to promote more reliable BPR at facilities in the Northwest.

INTERMEDIATE

Speaker

Robert Sharp
Hazen and Sawyer

Interrogating EBPR Performance Data and Process Metrics to Refine Process Monitoring and Future Process Designs for Two Clean Water Services EBPR WRRFs

8:30 AM – 9:00 AM

Authors: Adrienne Menniti; Peter Schauer

While EBPR is a sustainable process relative to chemical P removal, EBPR remains prone to unexpected, unpredictable upsets and process failure. Since 2017 Clean Water Services (CWS) has been immersed into the study of EBPR at full scale to gain insight on potential process control parameters that inform process stability and indicate a potential impending upset. Residual Phosphorus Uptake (RPU) is one such parameter that CWS has found to be a strong indicator of process stability. The RPU metric is determined by exposing EBPR biomass obtained immediately upstream of the secondary clarifier to a pulse of additional phosphate and monitoring aerobic phosphorus uptake over a thirty-minute period. RPU is determined based on the rate of phosphorus uptake (zero-order reaction) normalized to the MLVSS, with the units being mgP/gVSS-hr. RPU data collected for two independent treatment trains at CWS' Durham water resource recovery facility (WRRF) indicate that an RPU exceeding 2-3 mgP/gVSS-hr indicates process stability and vice versa. Durham's process analyst uses this data to guide dosing of alum to maintain NPDES permit compliance.

Metabolic conditions in the anaerobic zone are most critical to achieving EBPR process stability and success; RPU is indirectly a function of metabolic conditions realized in the EBPR anaerobic zone. CWS actively collects data on primary effluent (PE) VFAs and NOx at their Durham and Rock Creek EBPR WRRFs; CWS also actively monitors anaerobic HRT. To interrogate potential metabolic linkages between RPU, performance of both WRRFs has been statistically evaluated to assess how RPU might correlate with 1) PE VFA load, 2) PE NOx, 3) PE VFA load less NOx, 4) anaerobic HRT, and 5) a process parameter proposed by Siebritz et al. This presentation will elaborate on the data and findings. In particular, data will be presented that illustrates how design improvements incorporated into Durham aeration basin 5 positively improved EBPR stability and compare the anaerobic zone sizing and other design elements across all CWS EBPR systems.

ADVANCED

Speaker

Erik Coats

University of Idaho/Clean Water Services

Sidestream Treatment

8:00 AM – 9:00 AM | Location: Tech Rm 6

NUTRIENT REMOVAL

Demystifying Sidestream Treatment with (or without) Anammox

8:00 AM – 9:00 AM

As the impact of nutrients on coastal waters is recognized, nitrogen removal is expected to expand along the Northwest coast. Upgrading to mainstream nitrogen removal can significantly increase the cost, complexity, footprint and climate impact of WRRFs, and so determining the most efficient and sustainable treatment strategy is critical. Anammox is a unique biology that can implemented in sidestream treatment as a 'first-step' in the journey towards full BNR, with potentially reduced costs and improved sustainability. But how efficient is it? Is it a "one-size fits all" solution? What support facilities and consumables are truly required, or only optional?

We will review data from 9 BNR facilities with sidestream treatment to introduce basic design considerations and interrogate common misconceptions of sidestream deammonification, including:

• Anammox bacteria are difficult to grow and retain. Once established, anammox bacteria are quite resilient and it is in fact other microbes (particularly ammonia oxidizing bacteria) that are fickle.

• Systems should be sized and run for maximum loading conditions. Shifting the design and operational approaches of sidestream facilities to lower removal goals can improve the applicability and payback benefit to the utility.

• Shortcut technologies are always best for sidestream. A comparison of chemicals, energy, carbon, footprint and performance for each facility shows that in some cases, alternatives such as post-aerobic digestion (PAD) win.

• Centrate quality is critical to performance. This section explores the levels of pre-treatment required and corresponding impact to performance. Early adopters focused on TSS, but recently, soluble organic compounds are credited with BOTH improved removal and decreased performance.

• Thermal hydrolysis processes (THP) requires sidestream treatment and produces difficult liquors. Adding THP often results in only incremental increases in sidestream N loading. However, recalcitrant soluble products may need pretreatment or dilution to reduce potential inhibition of the sidestream process.

• Sidestream treatment doesn't require temperature management. Cases in which direct heating, cooling or dilution were required are considered. Temperature and performance for each facility will be correlated.

• Sidestream processes produce lots of GHGs (N2O). Reviewing new data suggests that GHG impacts of Anammox systems can be mitigated to levels similar to mainstream treatment.

101 INTERMEDIATE

Speakers

Jon Liberzon

Emerging markets process engineering lead | Black & Veatch

F

Francesca Cecconi

Black & Veatch

Repurposing & Funding Sewers

8:00 AM – 9:00 AM | Location: Tech Rm 7

COLLECTION SYSTEMS

Maximizing Infrastructure Value: Repurposing for Dual Use

8:00 AM – 8:30 AM

The Budd Inlet Treatment Plant (BITP), located at the southern end of Puget Sound, has the most stringent effluent discharge limitations on Puget Sound and uses advanced biological nutrient removal to meet those limits. It treats an average flow of 13 million gallons per day (MGD). Peak flows can reach over 70 MGD due to a combined storm/sewer collection system. Effectively managing peak flows resulting from climate change and preventing combined sewer overflows is a high priority for LOTT. Combining this with the need to address aging infrastructure, LOTT identified an opportunity to repurpose former primary clarifiers for multiple uses of both additional peak flow capacity and centrate management.

LOTT engaged staff from across work groups in the pre-design process, evaluating multiple alternatives to include refurbishment and replacement of the facility. The project team chose a creative and cost-effective strategy to rehabilitate the existing facility, providing for dual use and multiple benefits, and extending the facilities useful life by 25 years. The project created the ability to expand centrate storage, when wet weather is not anticipated, which results in more flexible centrate management and protects the biological treatment process. The project also enabled the tankage to be dedicated to wet weather primary treatment when storm events are anticipated. This capability allows LOTT to indefinitely postpone previously planned, costly new primary clarifiers. Rehabilitating the existing facility minimized demolition and disposal costs and the need for new building materials. Sustainability goals were further achieved by incorporating rooftop solar to power new EV fleet charging stations. Safety, working conditions, and odor management were improved through electrical, seismic, and odor control upgrades, preventing migration of odors offsite.

This was a highly successful and collaborative approach to project scoping, considering long-range infrastructure investment and capacity needs. It also furthered LOTT's sustainability goals, maximizing the overall value to LOTT's ratepayers. The end result is continued safe and reliable management of centrate and increased wet weather primary treatment capacity, helping LOTT to continually meet its stringent discharge permit requirements while mitigating climate change impacts.

INTERMEDIATE

Speakers

Tyle Zuchowski
Capital Planning Manager | LOTT Clean Water Alliance

Michelle Barnett
Senior Construction Manager | LOTT Clean Water Alliance

Funding Strategies and Challenges of Extending Sewer to the Largest Unsewered Community in Montana

8:30 AM – 9:00 AM

Up until 2011, Lockwood, Montana had the distinction of being the largest unsewered community in Montana (population = 5,500) with property owners relying on septic tanks and drainfields for sewage disposal. In 2008, design began on the Lockwood Water and Sewer District Phase 1 Sewer Subdistrict consisting of five projects to construct the backbone of its sewer collection system including 13.5 miles of sewer mains, two lift stations, and a low-pressure sewer system. Phase 2 design began in 2014 to extend 19,000 feet of sewer to residences with construction completed in 2016. Today, design of the Phase 3 project which includes 71,000 feet of sewer main and one lift station is nearing completion with construction anticipated in 2025 and 2026. Phase 3 also extends mains further into Lockwood residential areas. A partnership with the City of Billings pumps sewage from the Lockwood community to the Billings Wastewater Reclamation Facility. All three phases have an estimated cost of $53 million, a high price tag for a small community.

The Lockwood community has few alleys and even fewer utility easements. Thus, most public and private utilities are in the public street rights-of-way or occupy all available alley width. As one of the last major utilities to be installed in the community, sewer construction is complicated by the existence of numerous other facilities within the right-of-way including private utilities, a public water utility, irrigation facilities, and abandoned structures including culverts and bridges. Lockwood is also bisected or bordered by Interstate 90, several highways, railroads, and the Yellowstone River requiring numerous sewer crossings. These challenges required significant planning, coordination, and collaboration with other utilities and entities.

This presentation will summarize innovative funding strategies for the Lockwood sewer collection system. A high-level overview of challenges and resolutions of extending sewer into a developed area will also be presented.

This presentation has applicability and will be of interest to communities with deteriorating infrastructure or considering new facilities within developed areas and how to address the challenges of extending sewer into highly developed areas.

INTERMEDIATE

Speakers

Stephanie Seymanski
Senior Civil Engineer | Morrison-Maierle, Inc.

Jill Cook
Vice President | Morrison-Maierle, Inc.

Design Tools & BIM

9:05 AM – 10:05 AM | Location: Tech Rm 1

DIGITAL SOLUTIONS

BIM 101 -

9:05 AM – 9:35 AM

Building Information Modeling (BIM) is now the industry standard for integrated project delivery across the architecture, engineering, and construction (AEC) industry.

The key advantages of using BIM on design projects are many:

• Enhanced Collaboration

BIM enables a collaborative environment where all project stakeholders, including owner and operator representatives can work on a shared

digital model, reducing errors and misunderstandings.

• Design Efficiency

With all project design data in one model, changes are automatically updated across all related documents, minimizing rework and saving time.

• Visualization and Simulation

High-quality 3D models allow for better visualization, aiding in decision-making, owner and operator input presentations, and performance

simulations like energy efficiency.

• Facility and Data Management

Consolidating all building data into one model simplifies access to information for future renovations, maintenance, or expansions. Post-

construction, BIM models are useful for facility and operations management, and SCADA data applications.

This 101-level presentation will summarize the importance, and benefits, of BIM and will include proven BIM workflows developed over the past 12 years. These original workflows have been extremely successful for stakeholders on water and wastewater design projects across the United States and Canada.

101 ADVANCED

Speaker

S **Steve Seibert**
Lead BIM/Revit Specialist | AE2S

Leveraging Digital Solutions for Enhanced Project Delivery: A Case Study of the Rock Creek Primary Clarifier No. 4 Project

9:35 AM – 10:05 AM

The wastewater industry is undergoing a significant transformation as digital delivery methodologies redefine traditional design and construction processes. This evolution is showcased in Clean Water Services' AWWTF Rock Creek Primary Clarifier No. 4 project, where a suite of digital technologies was employed to boost project efficiency, accuracy, and collaboration.

This presentation will explore the practical application of these digital tools across the project lifecycle—starting with point cloud 3D scanning of existing infrastructure and progressing through Building Information Modeling (BIM) development during design, to the integration of BIM within construction workflows. The discussion will highlight how these technologies streamlined data management, improved stakeholder communication, and supported real-time decision-making.

Through a comprehensive case study, we will examine the unique perspectives of the project's key stakeholders: the Owner, the Engineer, and the Contractor. Attendees will gain insights into how digital solutions identified and mitigated potential design conflicts early in the process, optimized project layouts to enhance constructability, reduced risks and improved safety outcomes, and fostered a transparent, collaborative construction environment through digital construction management platforms.

With the construction phase complete, the project is transitioning to the development of an as-built digital model, leveraging the original BIM design. This digital asset will serve as a valuable resource for Clean Water Services, streamlining future maintenance, upgrades, and operational planning.

INTERMEDIATE

Speakers


Lucas Becia
Staff Engineer | Kennedy Jenks

V **Vasily Chernishov**
Engineer | Clean Water Services

R **Ryan Hartlieb**
Slayden

Regulatory Policy & Planning

9:05 AM – 10:05 AM | Location: Tech Rm 2

UTILITY MANAGEMENT

Navigating One Water Planning through Municipal Water Programs: Meeting Multiple Objectives and Regulatory Challenges | WRF Project 5175

9:05 AM – 9:35 AM

Today's municipal water utilities are facing unprecedented challenges ranging from current and emerging regulatory drivers, climate change impacts, and affordability challenges while striving to achieve the levels of service that customers expect. Utilities are exploring means to meet multiple objectives while prioritizing equity and health concerns, regulatory obligations, and affordability constraints to provide higher-value investments for their customers. These One Water strategies require utilities to diverge from traditional least-cost and siloed investments to innovative approaches through partnerships with a wide array of water sector stakeholders.

The Water Research Foundation's Navigating One Water Planning through Municipal Water Programs: Meeting Multiple Objectives and Regulatory Challenges (WRF Project 5175) provides fundamental insights, tools, and strategies for water utilities to use based on the principles of One Water holistic management to strategically comply with Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) requirements. This research aims to provide a One Water decision support framework and planning methodology that can be tailored to multiple regulatory requirements, utility-specific drivers, and institutional structures. The research approach includes a streamlined process of building the vision, an in-depth literature review, and meaningful water sector engagement. Water sector engagement include fifty utilities throughout the US and Canada, along with regulatory agencies, water associations, and other sector stakeholders.

The final deliverable for WRF Project 5175 is a utility-facing One Water Planning and Decision-Making Guidance will be in final draft form in July 2025 and finalized by the end of 2025. The planning guidance highlights the opportunities for integrated, long-term water program investments using partnerships across water industry sectors. The guidance includes considerations for interconnected CWA and SWDA requirements, regulatory navigation strategies, decision-making guidance and tools for integrated investments, and linkages to WRF's One Water Cities and Program Management research, and case studies from partnering utilities.

This presentation will provide participants with the detailed One Water Planning Framework and results of utility, regulatory agency, water sector association, and stakeholder engagement. We will discuss key challenges facing water utilities, potential regulatory solutions to balance CWA and SDWA obligations, and capital planning and prioritization approaches to deliver higher value investments.

INTERMEDIATE

Speaker

Trent Stober

Senior Vice President | HDR

Realizing the Benefits of Innovations in Regulatory Approaches - Lessons Learned from 10 Years of Implementing the Lower Boise River TMDL

9:35 AM – 10:05 AM

It has been nearly a decade since the Lower Boise River (LBR) Total Phosphorus (TP) Total Maximum Daily Load (TMDL) Addendum was approved in December 2015. This approval culminated a nearly twenty-year effort to better understand the impact of TP in the LBR watershed and chart a path to address these impacts. The TMDL targets were initially expected to be reached in 70 years. However, three key aspects have resulted in rapid improvements in the LBR nearly achieving the TMDL targets in under a decade.

1. The success of the TMDL implementation is driven by a robust commitment to scientific research and monitoring spanning multiple decades. This scientific foundation has enabled adaptive management strategies, ensuring that investments are evidence-based and effective. The alignment of scientific understanding among regulators, dischargers, and stakeholders has been essential in guiding decision-making processes and fostering trust in the TMDL framework.

2. Another pivotal factor has been the establishment of technology-based, realistic phosphorus reduction targets for municipal wastewater treatment facilities. This approach facilitated phased upgrades, allowing municipal dischargers to comply with regulations while making necessary infrastructure investments over a period. Establishing targets aligned with the typical removals from common technologies has also allowed some communities to pursue unique approaches to exceed TMDL targets while simultaneously supporting other community goals.

3. Finally, consistent engagement with the agricultural sector has also been instrumental in nearing water quality targets. Through collaboration with the Lower Boise Watershed Council and other stakeholders, agricultural producers have adopted best management practices aimed at reducing runoff. These practices, supported by funding mechanisms such as the 319 Grants, have led to significant reductions in nonpoint source phosphorus contributions. The availability of financial incentives has been crucial in encouraging the adoption of conservation measures among farmers.

The Lower Boise River TMDL implementation exemplifies how grounding actions in sound science, setting realistic targets, and engaging stakeholders with adequate support can lead to substantial improvements in water quality. This presentation will focus on the details around how each of these factors was enabled and highlight how this has provided tangible benefits during implementation, which offer valuable lessons for other watersheds addressing nutrient challenges.

INTERMEDIATE

Speaker

Matthew Gregg

Client Service Manager | Brown and Caldwell

Construction & Commissioning

9:05 AM – 10:05 AM | Location: Tech Rm 3

PROJECT, PROGRAMM & ALTERNATIVE DELIVERY

Construction Communication 101 - We're All in This Together.

9:05 AM – 9:35 AM

Effective communication is critical for the success of construction projects, serving as the backbone for collaboration between the General Contractor, Engineering Consultant, and Client. Clear and consistent communication ensures all parties are aligned with project goals, timelines, and expectations, minimizing misunderstandings and potential delays which can be costly. The General Contractor, responsible for project execution, must convey progress, potential risks, and logistical concerns to both the Engineering Consultant and Client. The Engineering Consultant plays a vital role in delivering technical expertise and addressing design-related issues, while also offering timely design related input to the General Contractor and Client. The Client, needs to stay informed about progress, budget status, and any challenges that may arise. Establishing regular, structured meetings, transparent reporting, and leveraging project management tools for real-time updates can improve decision-making, resolve conflicts efficiently, and keep the project on schedule. Ultimately, fostering a culture of open, respectful communication and trust among these stakeholders leads to better outcomes, enhanced project quality, and timely delivery.

Key topics to discuss with respect to communication throughout the life cycle of a construction phase project:

Establishing communication methods among all parties especially during project startup

- Contractor, Owner, and Engineer Relationships during Construction phase.

o Understanding workflows for each party (Engineer review workflows, Contractor and subcontractor workflow, Owner workflow)

- Construction Management / Construction Administration Roles and Importance

- Spirit of teaming and collaboration and sharing success in final results.

- Setting Expectations from all parties and expectations for forms of communication.

- Understanding final goals and schedule impacts.

- Importance of meetings and open forms of communication (kickoff, progress, impromptu meetings, etc.)

Document Control and Review.

- Contract Documents and Construction Documents (Submittals and RFI) as a form of communication.

o The interaction and relationship between Specifications and Contract Drawings and Contractor Submittals.

- Importance of Submittals, RFIs, Change Orders/Change Conditions, Closeout

- Tools for document management and keeping every party informed

- Establishing tone of communication and interactions using submittals and RFIs through quality packages.

Start-Up/Commissioning and Closeout

- Formal documentation

o Records Keeping and quality as-builts as a means to communicate to the future.

- Project success dependent on effective communication throughout all phases of construction.

101 BEGINNER

Speakers

S **Soraya Azahari**
Parametrix

J **Joe Laciny**
Slayden Constructors, Inc.

The Achilles Heel of Water & Wastewater Commissioning and Startup – Ancillary Systems!

9:35 AM – 10:05 AM

The purpose of this presentation is to share lessons learned from the commissioning and startup (C&SU) perspective, how ancillary systems (e.g. plant air, plant water, instrument air, natural gas etc.) can halt startup, result in major delays and bring a near “immortal” equipment to its knees.

Major equipment, for example Membrane Bioreactor (MBR), or belt filter press (BFP) or vertical turbine pump (to name a few) are reliant on ancillary systems to operate. For this presentation, ancillary systems are defined as a system that supports the operation of another piece of equipment or system. Common ancillary systems in the water and wastewater industry include plant air, plant water, instrument air, and natural gas.

During the planning phase, project stakeholders are commonly hyper-focused on the new major equipment and ancillary systems fall to the wayside. The design will include the ancillary systems required to operate the equipment, or the ancillary system may already exist but how systems integrate is frequently overlooked.

A case study the presentation will highlight was a new membrane system which required three ancillary systems to operate correctly, including plant water, plant air and natural gas. During the C&SU phase the team found issues with all three ancillary systems, most severely the plant water system. The C&SU team found the plant water system did not have enough capacity to support the new membrane system and the plant’s existing facilities. When in operation, the membrane system would get a low water pressure alarm, interlocking the system, causing a system shutdown. The mitigation resulted in a redesign of the plant water system and additional pumps were installed several months later.

This presentation will share multiple case studies, where MWH served as the general contractor and the Commissioning Manager. Each case study will share how an ancillary system impacted C&SU and resulted in a project delay. The purpose of this presentation is to share lessons learned, help all project stakeholders understand how to integrate major equipment with existing ancillary system(s), and empower teams to ask critical questions during the planning process to mitigate potential impacts.

INTERMEDIATE

Speaker

Kiersten Lee

Director of Commissioning & Startup | MWH

DAS & SBR Process Intensification

9:05 AM – 10:05 AM | Location: Tech Rm 4

TREATMENT INNOVATION & INTENSIFICATION

Intensification Case Studies: From Pilot to Full Scale Applications of Densified Activated Sludge (DAS) and Mainstream Deammonification via Partial Nitrification-Denitrification-Anammox (PdNA/PANDA)

9:05 AM – 9:35 AM

Utilities are increasingly challenged with meeting new or lower nutrient effluent limits while seeking to reduce costs, energy and carbon footprint. Process intensification, i.e., doing more with less, has emerged as a water sector trend whereby utilities seek to find financially responsible and effective nutrient treatment. This paper will highlight biological process intensification strategies densified activated sludge (DAS) and Partial Nitrification/Denitrification/Anammox (PdNA/PANDA) and the value they can provide to water resource recovery facilities.

DAS is a strategy for WRRFs to improve the often rate-limiting step of gravimetric settling to unlock treatment capacity and achieve process intensification. Densification is the process of growing and retaining particles with improved settling characteristics, allowing operation and high mixed liquor suspended solids concentrations (4,000 to 8,000 mg/L) while employing gravimetric settling with 50th percentile SVI30 of 80 mL/g or less. DAS terminology represents a continuum of settling conditions generally characterized as consistently achieving rapid settling velocities and high compaction, with an activated sludge matrix comprised of both flocs and granules. Process intensification by DAS allows utilities to optimize the use of existing facilities and reduce the need for additional infrastructure while also potentially reducing energy and chemical consumption. This presentation will showcase the experiences and lessons learned from two full-scale demonstration facilities. Utility A’s capacity is 220 MGD and employs a combination of metabolic, kinetic, and physical selection for achieving DAS. Utility B’s capacity is 16 MGD and employs kinetic and metabolic selection for achieving DAS.

The PdNA/PANDA process represents a low energy and resource strategy to remove ammonia from the mainstream by partially nitrifying ammonia to nitrate while retaining some residual ammonia in the post-anoxic phase. During this phase, the residual ammonia and nitrite produced by partial denitrification (PD) are eliminated through the Anammox process. As Anammox bacteria do not need aeration or carbon, this innovative technique can allow utilities to meet low nitrogen limits while reducing supplemental carbon and energy. This presentation will showcase the experiences and lessons learned from multiple pilot-scale and the first full-scale tertiary moving bed bioreactor (MBBR) PdNA/PANDA system in the world.

INTERMEDIATE

Speaker

Blair Wisdom

Hazen and Sawyer

Meeting Modern Challenges with ICEAS: A Case Study from Sutherlin, Oregon

9:35 AM – 10:05 AM

The Intermittent Cycle Extended Aeration System (ICEAS) is a proven technology for over 30 years with long-term application in wastewater treatment due to its robust performance, modularity, operator flexibility, and effective treatment process. With a track record of delivering high-quality effluent, ICEAS has established itself as a reliable solution for meeting stringent discharge standards.

The ICEAS SBR can treat wastewater through all phases of the treatment cycle (aeration, settling, and decant), which eliminates short circuiting of the system. Because the ICEAS SBR is continuous flow, the system eliminates the idle time required for a traditional SBR and can operate as single basin without flow equalization during low load. The system is time-based which provides equal loading and flow to all basins. Alternating periods of aeration during the react phase can produce aerobic/ anoxic/ anaerobic conditions which promote nitrification/ de-nitrification and enhanced biological phosphorous removal. New and existing plants can also be designed to accommodate future BNR effluent requirements

The presentation with this abstract will focus on the application of the ICEAS with the NURO processor for ammonia-based aeration control, and the case study of Sutherlin Oregon WWTP. Sutherlin has been in operation since 2020, consistently achieving excellent effluent targets. The ICEAS system at this facility is designed for BOD, TSS, and ammonia removal with effluent results shown below.

Performance data from Sutherlin highlight the ICEAS system's ability to handle variable loads, achieve low nutrient discharge levels, and maintain compliance with environmental regulations. This established technology, combined with advanced control systems, exemplifies sustainable wastewater treatment solutions capable of addressing modern challenges while delivering reliable and cost-effective results

INTERMEDIATE

Speaker

Jeremy Jensen

Xylem Territory Manager - West Region | Xylem

Phosphorus Recovery

9:05 AM – 10:05 AM | Location: Tech Rm 5

PHOSPHORUS REMOVAL & RECOVERY

Solids and Resource Recovery 101: Struvite Control and Harvesting

9:05 AM – 9:35 AM

Authors: Rick Kelly

Struvite in solids handling processes can be a nuisance or an asset, depending on the systems in place at a water resource recovery facility (WRRF). Many WRRFs experience unwanted accumulation of struvite and similar material in their systems that require maintenance and removal over time. The material notoriously hardens on pipe walls, creating unanticipated hydraulic bottlenecks in systems. Once formed in bulk liquid, struvite can act like grit, causing excess wear on equipment and settling in tanks, taking up valuable treatment or digestion capacity. To combat these impacts, some agencies have decided to invest in recovering struvite as a fertilizer, but that doesn't resolve all of their struvite issues.

This presentation will discuss the chemical makeup of struvite (and vivianite, a similar compound), what causes them to form, and preventative measures to keep their chemical components in solution rather than precipitating out as a solid. We'll dive into practices from utilities in the Pacific Northwest that are tackling their own struvite challenges, including successes, challenges, and side effects. These practices include telltale signs for struvite formation, effective methods for clean-in-place solutions, and preventative measures like chemical feed. We will also discuss the benefits, drawbacks, and operational optimization measures of technologies on the market for harvesting struvite from WRRFs and converting it to different types of soil amendments.

101 BEGINNER

Speaker

Mark Strahota

Municipal Operations Manager | Brown and Caldwell

P Recovery Integration in Process Design and Operation Strategy

9:35 AM – 10:05 AM

While the procurement and commissioning a phosphorus recovery system is not overly complex, the successful integration and operation of the recovery process faces many potential pitfalls and unintended consequences. This paper summarizes two decades of phosphorus recovery and related struvite control experience including planning, design, operation, and lessons learned.

Most recovery systems are implemented at larger facilities with already complex BNR processes, anaerobic digestion, and effluent phosphorus compliance requirements. The impact of adding phosphorus recovery goes beyond reduced recycle loads and product handling. It triggers changes in operation strategy, it can further the decline in dewaterability, increase struvite scaling throughout digestion and dewatering as well as accelerating struvite grit accumulation inside digesters and sludge storage tanks. Most of the resulting issues can be mitigated, but each mitigation increases complexity and cost.

Once integrated, the product yield and quality are dependent on the upstream process; from grit removal and screening, EBPR performance, to coagulant addition elsewhere in the process which sequesters phosphorus and lowers the product yield. Recovery systems also generally do not have redundant units such that during shutdowns the recycle load may result in effluent phosphorus excursion and trigger the need for product yield reducing chemical addition.

Yet, successful resource recovery can have very tangible benefits, such as more stable EBPR performance, revenue from product sales as well as improved public perception.

Finally, there are the environmental benefits of removing phosphorus from a given watershed entirely and reduced agronomic phosphorus loads, both of which give utilities tangible bargaining chips in negotiating future effluent phosphorus limits, especially very low limits (<0.1 mg/L), which can reduce the recovery yield enough to render a recovery system obsolete.

While there are technical solutions for other forms of P recovery this paper focuses on the prevailing struvite-based recovery technologies.

INTERMEDIATE

Speaker

Mario Benisch

HDR

Addressing PFAS in Biosolids

9:05 AM – 10:05 AM | Location: Tech Rm 6

THE FURTURE OF PFAS?

STARx – An Innovative Solution for PFAS Treatment of Water Treatment Wastes and Biosolids

9:05 AM – 9:35 AM

Authors: Gavin Grant; Tarek Rashwan; Taryn Fournie

Per- and polyfluoroalkyl substances (PFAS) are a group of persistent, synthetic chemicals found in a wide range of consumer and industrial products which have been found to cause a wide range of negative health effects. The recalcitrant nature of PFAS makes them extremely difficult to treat and, due to their prolific usage, PFAS are now regularly found in drinking water and accumulate in wastewater treatment plant sewage sludge. Granular activated carbon (GAC) is often used to scrub PFAS from water, however, disposal of the PFAS-laden GAC remains an on-going issue. Furthermore, emerging USEPA guidance and state legislation around land applying biosolids strongly indicates growing concern over PFAS contamination and a growing likelihood of more stringent biosolids end-use regulations.

STARx is a low cost, energy efficient technology which utilizes smoldering combustion to completely destroy PFAS. The STARx reaction is a highly energetic, self-sustaining process which consumes organic matter (ie. bioslids or GAC) while also mineralizing bound PFAS. Compared to pyrolysis or hydrothermal treatments, the resulting ash product from STARx is free of all organics and PFAS, while still retaining the beneficial minerals and nutrients for further reuse or land application. Initial work has demonstrated that STARx is capable of treating virgin biosolids with moisture content up to 80% and resulted in volume reductions of up to 95%. Detailed analysis has also shown near-complete destruction of PFAS with less than 0.1% of the PFAS initially present released as an emission or condensate product. Additionally, compared to the parent sludge, residual ash from smoldering biosolids contained higher quantities of inorganic phosphorus in sorbed and mineral phases, which improve plant uptake by avoiding early phosphorus washout during land application.

Overall, STARx is a promising technology for PFAS in water treatment wastes and WWTP sludges. This work will present the state of the research on smoldering WWTP biosolids, with a focus on PFAS destruction and end-use potential in the emerging regulatory framework.

101 ADVANCED

Speaker

Joshua Brown

Savron

Rethinking the impact of PFAS emissions in biosolids thermal processes through a holistic life cycle assessment

9:35 AM – 10:05 AM

Authors: Patrick McNamara; Lynne Moss

Per- and polyfluoroalkyl substances (PFAS) have undoubtedly impacted the world of biosolids management. While our industry strives to adapt to changing regulations, we still have not yet assessed how important PFAS impacts are when considering the overall impact of biosolids handling processes to human and environmental health (i.e. the impact of PFAS on toxicity in tandem with more traditional concerns such as global warming and eutrophication). Through this Water Research Foundation Project (#5211), five different biosolids management options employing various thermal processes were compared using life cycle assessment (LCA) that incorporated (PFAS) using experimental data in combination with literature data. PFAS have been linked to both cancerous and noncancerous toxicity, and so both were considered in the LCA. The relative impact of PFAS on ecotoxicity and cancerous toxicity was small due to the relatively larger impact from heavy metals, but there was an appreciable impact on non-cancerous toxicity from PFAS. Incineration and gasification had higher PFAS removal, resulting in lower non-cancerous toxicity. With respect to global warming and eutrophication potentials, pyrolysis was in both cases the best alternative. This analysis highlights the relative importance of PFAS when taken into context with other known and regulated toxicants such as heavy metals. It also highlights how pyrolysis is a low impact alternative from more traditional LCA impact categories like global warming and eutrophication potential, but may not be the best option if complete PFAS removal is a primary driver for a utility. The key impact of this work is the reframing of PFAS as one of several considerations out of many to be included for holistic biosolids management. This presentation provides information on PFAS removal and LCA.

INTERMEDIATE

Speakers

Gary Hunter

Sr. Wastewater Process Engineer | Black & Veatch

E

Evelyn Choudhary

Project Manager | Black & Veatch

I&I Mitigation & Rainfall Analytics

9:05 AM – 10:05 AM | Location: Tech Rm 7

COLLECTION SYSTEMS

Oregon City Inflow & Infiltration Program - Challenges and Solutions

9:05 AM – 9:35 AM

The Oregon City Inflow and Infiltration (I&I) Program looks to reduce I&I in problem areas by 65% with sewer mainline and lateral rehabilitation. The City has a mixture of materials and conditions that challenge typical traditional designs and construction techniques. Wallis Engineering was hired to help envision a comprehensive program, provide technical expertise, and support City efforts. Key to meeting program goals is including private lateral rehabilitation in the program, but this also poses particular challenges.

One of the main challenges of working in one of Oregon's oldest cities is knowledge – many properties have centuries of underlying history, reflected in the complicated and piecemeal nature of private sewer systems and paucity of as-built records. A successful rehabilitation approach needed to center on flexibility. Oregon City adopted a Contractor-led investigation and design framework that is both nimble and cost effective. This is accomplished by having robust specifications, concise bid items, and well-structured communication.

The keystone of this approach is trenchless rehabilitation – CIPP, HDD, and pipe bursting allow for lateral replacement in the city's challenging situations. Paired with strategic point excavations and repairs, trenchless methods have allowed Oregon City to completely renew degraded and failed laterals safely in a variety of situations such as running under trees, walls, and prized rose bushes. The City's specifications provide a flat rate for all rehabilitation methods. The fact that Contractors typically recommend trenchless rehab as the first option is a perfect example of agency and contractor goals aligning.

Measurement of program success comes from flow monitoring at strategic locations in the city system. Compared to baseline, 2024 measurements captured the results of incomplete construction of one priority area, indicating that both mainline sewer and private lateral rehabilitation provides significant reduction in I&I. Upcoming flow monitoring should capture the completed priority area and the incomplete construction of two more key areas, which will help confirm program direction.

Kenneth Cannady-Shultz of Oregon City will discuss the implementation of a lateral rehabilitation program in one of Oregon's oldest cities using finely tuned specifications, trenchless technologies, measurement, and public outreach to facilitate construction and reach program goals.

INTERMEDIATE

Speaker

K

Kenneth Cannady-Shultz

Oregon City

How Much Does it (Really) Rain? Quantifying Historical Rainfall and Preparing for a Changing Climate

9:35 AM – 10:05 AM

This presentation will discuss the importance and implications of validated rainfall data, in addition to technical approaches to stormwater planning that incorporate historical trends and preparation for future climate change projections. We will offer a proposed approach for other jurisdictions wrestling with these same planning-related questions.

As part of current stormwater planning and design standards development initiatives, the City of Eugene, OR (City) is preparing for a climate-changed future. Foundational to these efforts is the quantification and evaluation of both current and future projected rainfall. Rainfall assumptions provide a basis for running stormwater models, designing capital projects, and providing guidance for the management of stormwater runoff. A seemingly simple question–how much has it rained historically–combined with and a more complex one–how much is it projected to rain in the future–led the City to develop unique approaches for their planning practices.

Currently, the City relies on design storm events developed in 1990 from rainfall data dating back to 1948. As part of its 2024 Stormwater Master Plan update, the City sought to evaluate more recently collected rainfall data (1990 to present) to identify whether changes have occurred over the last 34 years that warrant design storm adjustments. Additionally, the City sought methods to adjust actual rainfall data to account for a projected future climate.

The resulting study confirmed a suspected and significant bias in the historical rainfall record. This prompted conversations with City staff about what rain data should be used for continued planning, and how to address inherent conservatism in past planning while also incorporating potential future climate projections. To plan for climate change impacts, the City explored methods of adjusting projected rainfall using downscaled data produced by the University of Washington from available global climate models. Planning methods were developed to apply projections to both design storms and continuous rainfall records for modeling. This process necessitated decisions about risk tolerance and conservatism, such as weighing worst-case future climate scenarios against practical design processes and outcomes.

This study offers methods to quantify rainfall patterns and make sound planning decisions with limited data and future climate uncertainties.

INTERMEDIATE

Speakers

Krista Reininga

Brown and Caldwell

Thomas Suesser

Associate Environmental Engineer | Brown and Caldwell

Break

10:05 AM – 10:25 AM | Location: Pre-Function A

BREAK

Do-NUT miss Wednesday! Perk up your morning with fresh donuts and hot coffee—just what you need to power through the final stretch of the conference.

DE&I in Capital Projects

10:25 AM – 11:25 AM | Location: Tech Rm 1

LEADERSHIP & WORKFORCE DEVELOPMENT

Panel on DE&I in Capital Projects: Where Do We Go From Here?

10:25 AM – 11:25 AM

Many agencies have been working to integrate diversity, equity and inclusion (DEI) not only into their internal workforce, but also into their capital projects and programs. At the national level, there are emerging barriers to DEI, including potential limitations on federal contractors and federal funding. Those barriers are still emerging, creating uncertainty for both public agencies and the companies that serve them.

Wastewater agencies have generally done a great job in delivering a consistent level of sewer service to all customers. However, there remain disparities in how community members receive impacts and benefits of public projects. Most agencies get more engagement from more affluent community members and it is common for facilities in more affluent neighborhoods to have nicer finishes and lower construction impacts. Utilities are also important to local economies — investing millions, even billions, of dollars into their local communities. Many community members face barriers in accessing the jobs and contracting opportunities those investments bring.

The ultimate goal is the fair distribution of the benefits of our work to all in our communities. This panel will address how we can navigate new restrictions, holding onto the progress we have already made and continuing to advance towards more equitable infrastructure projects.

INTERMEDIATE

Speaker

Nicki Pozos

Principal | The Formation Lab

Condission Assesment & Asset Management

10:25 AM – 11:25 AM | Location: Tech Rm 2

UTILITY MANAGEMENT

Revitalizing Critical Infrastructure: San Jose-Santa Clara Regional Wastewater Facility's Yard Piping Improvements

10:25 AM – 10:55 AM

The San Jose-Santa Clara Regional Wastewater Facility, the largest in the San Francisco Bay area, is conducting an ambitious improvements program targeting its 67,000 linear feet of process piping. This infrastructure, with over 70% of the piping exceeding 25 years in age and more than 10% surpassing 50 years, has been in continuous service since installation. Our presentation will delve into the program's strategic condition assessment and rehabilitation approach.

Over an 8-year capital improvement timeline, the program aims to repair, rehabilitate, or replace the most critical sections of piping based on their physical condition and operational importance. In 2015, a risk-based framework was established to prioritize condition assessments, along with developing a guide to conduct the assessments considering the various inspection vendors that would be collecting data. Since 2018, over half of the process piping has undergone field assessments, informing rehabilitation strategies.

Given that process piping is typically buried and cannot be taken out of service without disrupting operations, assessing their condition poses significant challenges. Techniques such as process shutdowns, isolation, dewatering, and flow bypassing have been employed. The annual cyclical schedule includes three key stages: 1) pipeline inspections during the dry-weather season, 2) design package preparation in the wet-weather season based on inspection results, and 3) construction in the following dry-weather season.

Detailed data on corrosion and other factors are crucial for informed decision-making. Thanks to an array of condition assessment technologies, corrosion can be thoroughly documented in both concrete and metal piping. Based on the assessment results, the team opted for various trenchless rehabilitation alternatives to address safety, access, and cost challenges. Each project follows a design-bid-build (DBB) model, with improvements projected to extend the piping service life by 50 years, supporting reliable operations and mitigating future disruptions.

The corrosive environments of the Pacific Northwest and San Francisco Bay area present unique challenges. The insights gained from this improvements program underscore the importance of proactive maintenance of essential infrastructure, offering valuable lessons for similar initiatives.

INTERMEDIATE

Speakers

Clinton McAdams

Black & Veatch

Cat Cecilio

Civil Engineer | Black & Veatch

Incorporating O&M into Asset Management

10:55 AM – 11:25 AM

Authors: Rob Lee

Clark Regional Wastewater District, “District”, is one of the largest sewer districts in the state of Washington and provides customer focused, professional wastewater services to more than 109,000 people. The District has consistently served a rapidly growing community, providing reliable service in an environmentally and financially responsible manner.

The District has had an asset management program that focuses on gravity conveyance, pump stations, and now treatment facilities. For the gravity conveyance asset management program, the District has largely focused on structural condition to determine the likelihood of “failure” and determine when repairs, rehabilitation, or replacement is required. However, the vast majority of the gravity conveyance performance issues were the result of operational defects, such as debris, root intrusion, fats, oils, and grease (FOG) buildup, and sags. Traditional risk conveyance risk assessments often overlook the complexities of operational and maintenance (O&M). The District desired to evaluate how incorporating operational defects in gravity conveyance systems might lead to influence their capital program and better manage the District’s risks.

This presentation will discuss the methodology that the District utilized to incorporate operational defects and maintenance history into the asset management scoring process. Additionally, this presentation will present the scoring methodology that includes pre-cleaning condition assessments and weighted scoring based on maintenance frequency, providing a more nuanced evaluation of asset health. The District also introduced an updated Return on Investment (ROI) tool that helps assess whether it is more cost-effective to repair or continue with routine maintenance on the District’s highest-risk pipes.

Additionally, this presentation will provide an in-depth look at the development and application of the dynamic scoring system, its influence on maintenance planning, and practical insights for utilities looking to advance their asset management programs. Maintenance staff played a critical role in refining the scoring process through workshops, contributing field experience and operational insights to align asset management efforts with real-world conditions.

INTERMEDIATE

Speakers

Vanessa Johnson

Capital Program Manager | CLARK REGIONAL WASTEWATER DISTRICT

Melissa Moe

Operations Manager | CLARK REGIONAL WASTEWATER DISTRICT

Delandra Clark

Leeway Engineering Solutions

Rob Lee

Principal | Leeway Engineering

Clarifier Optimization & Startup

10:25 AM – 11:25 AM | Location: Tech Rm 3

WASTEWATER TREATMENT

Unlocking Hidden Potential: Optimizing Secondary Clarifiers for Increased Capacity

10:25 AM – 10:55 AM

Secondary clarifiers are a critical step in meeting permitted discharge levels for activated sludge treatment facilities. Elevated nutrient regulations require longer plant solids retention time (SRT), resulting in higher solids loading to secondary clarification. Understanding the capacity of a treatment plant’s secondary clarifiers is critical in defining the facility’s overall treatment capacity and nutrient removal capabilities. The use of computational fluid dynamic (CFD) modeling is emerging as a technique that allows for deeper understanding of secondary clarifier capacity.

Tools used for the design and capacity analysis of secondary clarifiers have evolved over time. Traditional methods such as surface overflow and solids loading rates gave way to the innovation of state point analysis which has been followed by CFD modeling. Surface overflow, solids loading, and state point analysis provide a snapshot of clarifier operation, while CFD models consider factors like sludge flocculation, sludge blanket accumulation, and clarifier hydrodynamics, which offers a dynamic look at secondary clarifier loading and capacity.

Using the case study of the Kailua Regional Wastewater Treatment Plant, where CFD modeling was instrumental in developing recommendations for increasing secondary clarifier capacity, the audience will be guided through the modeling process, from field data collection to model calibration and process optimization. This presentation demonstrates the potential for CFD modeling as a tool for achieving more efficient TSS removal in the secondary clarification process, contributing to the overall resiliency, performance, and reliability of wastewater treatment facilities.

101 BEGINNER

Speaker

Casey Gish

Engineer | Brown and Caldwell

An Epic Journey: Starting Up and Commissioning Oregon's Largest Clarifiers

10:55 AM – 11:25 AM

Authors: Jeff Maag

This presentation will highlight the lessons learned by a team that successfully navigated an extremely short window to complete the startup and commissioning phase, despite long equipment procurement times, regulatory deadlines, and the inherent schedule constraints posed by the end-of-year holiday season. It includes perspectives from Jacobs, Portland BES engineering, and Portland BES operations staff.

After 3 years of design and 2 years of construction on the Secondary Treatment Expansion Program (STEP), the team had about a month to startup and commission 7 major systems for over 24 pieces of equipment and their associated control systems. These systems included secondary clarifiers, RAS pumping, mixed liquor pumping, disinfection upgrades, ventilation systems, sump pumps, and city water to plant water intertie. The startup period included a 5-day demonstration test that needed to be completed prior to the December 31, 2024 regulatory deadline.

A highlight was the process training, featuring a 10-hour training program that awarded operators with 1.0 continuing education units towards certification. This training was provided to three shifts, resulting in 27 sessions for over 40 city operators. Maintenance staff received over 30 hours of equipment training over 4 weeks. Operational planning involved identifying go/no-go conditions and a staffing plan to ensure operators were available for testing and commissioning.

The success of the startup and commissioning is attributed to the team's collaboration and grit. Lessons learned to be highlighted include:

• Enhancing pre-planning for startup conditions and setpoints for process fluids

• Coordinating hand-offs between Operations Readiness Testing (ORT) 1 and ORT 2

• Managing software and graphics changes during startup

• Daily startup meetings in the construction trailer

• Challenges of starting up during major back-to-back public holidays

INTERMEDIATE

Speakers

K **Kristen Jackson**
Jacobs

M **Mark Walter**
Waterdude Solutions

S **Stefan Chabane**
City of Portland Bureau of Environmental Services

Densified Sludge

10:25 AM – 11:25 AM | Location: Tech Rm 4

TREATMENT INNOVATION & INTENSIFICATION

Optimizing Suspended Solids Removal in Secondary Clarifiers from DAS Systems

10:25 AM – 10:55 AM

Authors: Rudy Maltos

Metro Water Recovery's Robert W. Hite Treatment Facility in Denver, CO, is permitted for a maximum month flow (MMF) of 220 mgd, including the 106-mgd MMF North Secondary (NSEC) treatment train. Metro commissioned a full-scale demonstration train to test densified activated sludge (DAS) to comply with future stringent nitrogen and phosphorus regulations by increasing aerobic solids retention time without the need for secondary treatment basin expansion. DAS can improve settleability and increase treatment capacity but can also increase secondary effluent suspended solids (ESS). This study explores strategies for improving ESS by modifying existing clarifiers utilizing an updated 2Dc computational fluid dynamics model.

NSEC clarifiers feature dual launders, inboard (two weirs) and outboard (one weir), with different effluent quality associated with each. The narrow space between the inboard and outboard launders creates higher velocity currents up the side wall where approximately 2/3 of the effluent leaves the clarifier. DAS may exacerbate this effect due to higher settling velocities and reduced agglomeration, indicated by increased dispersed suspended solids.

The updated 2Dc modeling code was enhanced to better represent the dual launder system and report ESS per weir, including weir blocking capabilities. Calibrated against field data, the model was used for a sensitivity analysis including weir blocking, center well extensions, and addition of a Stamford baffle. Results indicate that multiple alternatives may significantly reduce ESS:

Alternative 1: Blocking the outboard launder weir is a simple, low-cost modification, predicted to reduce ESS by 25-50%.

Alternative 2: Extending the center well is predicted to reduce ESS by 30-70%, but will require structural modifications.

Alternative 3: Adding a Stamford baffle is predicted to reduce ESS by 40-70%.

Alternative 4: Integrating all strategies is predicted to reduce ESS by 45-75% but requires careful sludge blanket monitoring and return activated sludge flow control.

These modifications can offer practical, site-specific solutions for reducing ESS. The enhanced 2Dc model is a valuable diagnostic tool for utilities to make informed decisions to optimize clarifier performance. By combining advanced modeling tools with targeted clarifier improvements, utilities can effectively reduce ESS variability and position themselves to meet future regulatory requirements.

INTERMEDIATE

Speakers

Ryan Priest

Senior Principal Engineer | Hazen and Sawyer

Anna Scopp

Principal Scientist | Hazen and Sawyer

Unraveling the Differences between Densified and Flocculant Activated Sludge Properties

10:55 AM – 11:25 AM

Authors: Haley Noteboom; Gaya Ram Mohan; Paul Pitt

Densified activated sludge (DAS) is a process intensification technology that allows water resource recovery facilities (WRRFs) to meet increasingly stringent effluent limits by combining the benefits of metabolic, kinetic, and physical selection. Given the emergence of this technology, it is important to understand the properties of DAS and how it may be different from flocculant conventional activated sludge (fCAS). The purpose of this study was to characterize sludge properties from full-scale and pilot facilities with a view to identifying what distinctions exist when comparing fCAS and DAS sludge characteristics including but not limited to particle size distribution of the mixed liquor, settling velocities, compression properties, exocellular polymeric substances (EPS) content and distribution, sludge rheology, and particle strength. Additionally, the data was interrogated to determine what correlations may exist between parameters.

Representative grab samples of mixed liquor and return activated sludge were collected and overnighted on ice to the lab facility from each participating facility, where all analyses were performed within 8 hours of reception to minimize travel and hold time impacts. Sludge was characterized for properties noted above. A description of the methods will be provided during the presentation.

Key takeaways from the analyses are as follows:

• DAS samples had at least 25% of particles > 212 um, and less than 30% of particles < 106 um.

• DAS samples had a higher particle strength, or resistance to abrasion, than CAS samples.

• Rheology testing indicates that both DAS and CAS behave as non-Newtonian fluids with pseudoplastic properties. There is a limited difference between DAS and CAS at typical mixed liquor concentrations.

• EPS content for well-settling samples (SSVI30 < 80) is lower than for samples with poorer settling characteristics. An increase in EPS content, particularly in loosely bound fractions, is generally associated with an increase in SSVI30.

Cumulatively, this work demonstrates that DAS and fCAS have similar rheological properties. However, DAS systems possess larger particles that were resistant to abrasion, that have high initial settling velocity. Data from this work can be used by utilities to inform design decisions when considering DAS implementation.

ADVANCED

Speaker

Wendell Khunjar

Hazen and Sawyer

Membranes & Media

10:25 AM – 11:25 AM | Location: Tech Rm 5

NUTRIENT REMOVAL

Achieving Enhanced Nutrient Removal in MBR for Full Reuse

10:25 AM – 10:55 AM

Authors: Adam Rutz

The Big Sky County Water and Sewer District, had an aging Sequencing Batch Reactor–Dual Media Filtration facility, embarked on construction of a new Membrane Bioreactor (MBR) facility designed to produce Class A-1 reuse water. In Montana, Class A-1 reuse water must be oxidized, disinfected, and maintain total nitrogen (TN) below 5 mg/L year-round—a significant challenge given the facility's high elevation (6,600 ft AMSL in the Northern Rocky Mountains) where activated sludge temperatures can drop to 6°C.

To maximize reuse opportunities and address rising salinity in the effluent without relying on chemicals (which are also less favorable due to the facility's remote location), the District opted for a primarily biological treatment process. The new design employs a 4-stage biological process—Anaerobic, Pre-Anoxic, Aerobic, and Post-Anoxic—integrated with a hybrid inline/sidestream fermenter upstream of the anaerobic zone. This fermenter allows the operator to adjust mixtures of screened wastewater and Return Activated Sludge (RAS), which can be routed to either the anaerobic or aerobic zones. Additionally, an internal mixed liquor recycle transfers nitrified mixed liquor from the end of the Aerobic Zone back to the Pre-Anoxic Zone. This configuration is inspired by the Water Research Foundation's MBR Nitrogen and Phosphorus Removal Process, aiming for advanced nutrient removal without external chemical addition.

Construction commenced in early 2021 but was delayed due to COVID-related supply chain disruptions. The biological process startup began in May 2024, and despite occasional interruptions from ongoing construction activities, process optimization (including programming, balancing return flows, and fine-tuning dissolved oxygen levels) progressed. Record-low flows during Fall 2024 required innovative cyclical aeration strategies. By January 2024, the fermenter and biological process were operating steadily, achieving effluent TN often below 3 mg/L and total phosphorus (TP) below 0.2 mg/L.

This presentation will detail the challenges and successes of the WRRF's construction, startup, and optimization phases—including the hybrid fermenter, return flow balancing, and aeration control—offering real-world insights into implementing advanced biological nutrient removal in a cold, variably loaded system.

ADVANCED

Speaker

Z

Zach Frieling

AE2S

Assessing Kenaf's Effectiveness in Two Wastewater Treatment Configurations

10:55 AM – 11:25 AM

Authors: Stephany Wei; Brian Roman; Mari Winkler

This presentation evaluates the performance of kenaf in two wastewater treatment plant (WWTP) configurations—with and without an anaerobic selector—using data from two facilities: Moorefield (West Virginia) and the City of Edmonds (Washington). The presentation focusses on nutrient removal efficiency and microbial community dynamics.

Total inorganic nitrogen and phosphorus species were analyzed to assess chemical treatment effectiveness, while metagenomic sequencing was conducted to characterize microbial communities associated with Kenaf biofilms. Biofilm structure was further examined using Live/Dead staining.

Kenaf carriers enhanced ammonium removal capacity by 2–4 times compared to pre-upgrade levels ($p \leq 0.001$). Metagenomic analysis revealed that the kenaf biofilm supports and enriches slow-growing bacteria, such as nitrifiers and Phosphate Accumulating Organisms (PAOs), even without a defined anaerobic stage. Compared to the EBPR-based kenaf system in Moorefield, the kenaf-based biofilm at City of Edmonds showed similar specific ammonia oxidation rates but exhibited lower performance stability due to the lack of an anaerobic zone, which occasionally led to filamentous bacteria overgrowth on the kenaf carriers. Results provide insights into the potential of Kenaf-based treatment systems for nutrient removal and biofilm formation, contributing to the development of sustainable wastewater treatment technologies.

101 INTERMEDIATE

Speaker

B

Bao Nguyen Quoc

Brown and Caldwell

PFAS & Contaminants of Emerging Concern

10:25 AM – 11:25 AM | Location: Tech Rm 6

THE FURTURE OF PFAS?

Managing PFAS in RO concentrate through foam fractionation and electro-oxidation for onsite PFAS destruction – a municipal drinking water plant pilot study

10:25 AM – 10:55 AM

This presentation will highlight the piloting and commercial-scale design of an integrated treatment approach for onsite PFAS destruction on Reverse Osmosis (RO) concentrate. Ozone Foam Fractionation (FF) and Electrochemical Oxidation (EO) were combined at the pilot scale to treat RO concentrate at a drinking water facility located in Alabama. The piloting of the two technologies demonstrates that PFAS can be destroyed at the source, protecting sensitive receptors, and ending the PFAS cycle. During the pilot study, FF was applied on PFAS impacted RO concentrate under varying operational conditions, including leveraging ozone to optimize PFAS removal efficiencies and concentrate PFAS into a low volume foamate. The high PFAS concentrated foamate was subsequently treated using EO for PFAS destruction. The results show that the use of ozone in FF drives a more energy efficient EO treatment solution for an integrated onsite PFAS destruction solution. The piloting of the FF and EO system provided information to support an initial design basis to commercially concentrate and destroy 1.8 MGD of PFAS-impacted RO concentrate onsite. The commercial implementation provides an effective solution to destruct PFAS for large flowrate applications. The integration of the two technologies provides a robust solution to manage PFAS onsite.

INTERMEDIATE

Speaker

Zia Klocke

Research Engineer | OVIVO

PFAS in Wastewater – What Should Utilities Do Next?

10:55 AM – 11:25 AM

Over the past year, there have been several Poly- and perfluoroalkyl substances (PFAS) related developments that could have major ramifications for WRRFs. There have been several federal lawsuits around the country where the EPA is facing claims that the they have failed to prevent PFAS in biosolids fertilizers from contaminating crops and water supplies. In addition, several states are now requiring monitoring to PFAS in effluent permits, and there is also the recent ruling by the EPA that PFOA and PFOS will be designated at hazardous substances under CERCLA. While this ruling specifically exempts WRRFs, it will likely drive states to regulate PFAS in wastewater.

Given this fast changing and uncertain regulatory landscape related to PFAS, what should Utilities do at this point to be in the best position to handle upcoming PFAS related issues? The answer to this question can be obtained by development of a PFAS roadmap, specifically developed for each individual utility. This roadmap is designed to provide a systematic approach to tackle PFAS issues. It investigates the presence of PFAS at the WRRF, upstream sources of PFAS, and potential mitigation and source reduction measures.

Over the past few years, presentations at conferences have generally focused on the regulatory aspects of PFAS or treatment technologies that are very expensive and currently cost-prohibitive to implement at WRRFs, and therefore, those presentation are not immediately applicable to current needs of utilities. This presentation will be focused on providing current and relevant guidance that will help utilities develop a roadmap specific to their system, and provide information on how to conduct sampling programs, interpret sampling results and take future action based on the results. The presentation will also provide a summary of results from other areas of the country to help with benchmarking of sampling results that may be obtained by a utility. Also presented will be a case study and demonstration of a PFAS roadmap that was developed for the City of Nantucket, MA, that was used to to advise the City management on next steps to handle PFAS issues. This could serve as a good example for other utilities who wish to develop a similar roadmap for their wastewater systems.

101 INTERMEDIATE

Speaker

Samir Mathur

Senior VP | Practice Leader for Water Reclamation | CDM Smith

Trenchless Sewer Rehabilitation

10:25 AM – 11:25 AM | Location: Tech Rm 7

COLLECTION SYSTEMS

Bendemeer Trunk Sanitary Sewer Replacement Project

10:25 AM – 10:55 AM

The Bendemeer Trunk Sanitary Sewer Replacement Project (the Project) was a vital infrastructure initiative by the City of Hillsboro aimed at enhancing the capacity and reliability of the local sanitary sewer system to accommodate future development of the sanitary sewer basin north of Highway 26. This Project involved replacing and upsizing approximately 3,500 linear feet of existing sewer lines using a combination of pipe bursting and open trench methods. One significant challenge was that most construction occurred on existing easements on private property and wetlands.

This presentation will cover the Project's background, technical approach, and risk management techniques. We will discuss the subsurface soil conditions along the alignments, highlighting the challenges and solutions associated with these geological factors. Following this discussion, we will provide insights into the advantages and applications of static pipe bursting versus dynamic (pneumatic) pipe bursting methods. We will address the challenges associated with pipe bursting, such as ground heave, the potential presence of obstructions, and existing pipe materials. By understanding these risks and the strategies to mitigate them, attendees will gain a comprehensive understanding of the advantages and disadvantages of pipe-bursting technology and the Project's impact on the community and environment. Our agenda will conclude with sharing the collaborative approach employed by the Contractor, Engineer, City, and regulatory agencies during the construction phase, offering valuable insights for future projects.

101 BEGINNER

Speakers

Kevin Wood
Shannon & Wilson, Inc.

Aaron Isenhart
Harper Houf Peterson Righellis, Inc.

Big trouble in little Healdsburg: A tale of a stuck microtunnel boring machine and the steps taken to successfully complete the project

10:55 AM – 11:25 AM

Prior to 2020, the City of Healdsburg, relied on two force mains constructed in the 1970’s and 1980’s to convey all City raw sewage from the Magnolia Lift Station to the City’s water treatment plant. The force mains were originally buried eight to 10 feet under a crossing of Dry Creek. However, in the mid 2000’s, after two decades of continuous creek flows, one of the pipes was visible on the creek bed. The Magnolia Force Mains Relocation Project was initiated by the City to provide three new force mains deeper under the creek to in order to reduce risk of damage to the force mains. A microtunneled casing approximately 27 feet below the new streambed was the preferred option to house the new force mains.

During construction, after completing two thirds of the microtunnel drive, the boring machine abruptly stopped working due to unknown reasons. After several failed attempts to diagnose and restart the drive, a rescue operation was implemented. The drive was completed by jacking the casing through a flooded open-cut trench and receiving shaft. The solution provided greater schedule certainty for completing the project given the unknown condition of the machine. Following the successful completion of the new force mains, the contractor and City were unable to reach an agreement as to the responsible party for the additional costs for the rescue work and, as a result, a lawsuit was filed. The verdict was ultimately decided upon by a jury.

This presentation reviews the overall project and project goals, the construction activities leading to stoppage of the boring machine and those undertaken to rescue it, the steps taken to settle the dispute, and lessons learned from the perspective of the engineer.

INTERMEDIATE

Speaker

Justin Lianides
Mott MacDonald

Post-Pandemic Resilience & Balance

11:30 AM – 12:30 PM | Location: Tech Rm 1

LEADERSHIP & WORKFORCE DEVELOPMENT

Regenerating Flow After a Drought: Professional Involvement Following the Pandemic

11:30 AM – 12:00 PM

Authors: Allison Lukens

As new professionals join our field and contribute new ideas, perspectives, and attitudes, we need to better understand their needs for connection, support, and mentorship. In-person collaboration became stagnant during the pandemic, and organizations are working to rebuild and strengthen strategies for engagement. This presentation takes a focused, local approach to define community engagement as it relates to our industry. We drew from our personal experiences as new professionals and our efforts over the past few years to foster connections and build community. To better understand the role of engagement in today's Pacific Northwest Clean Water community, we interviewed new professionals across consulting firms, municipalities, vendors, regulatory agencies, and students. We facilitated discussions to answer the following questions: • What makes people feel supported in their careers? What opportunities would you like to see that would help you feel better supported? • What opportunities allow people to develop meaningful relationships with peers and mentors within their local wastewater industry? • How do people define community involvement, how has it evolved over the past few years, and what do they want it to look like? • What motivates people to connect in person? • What are effective ways to advertise opportunities using today's technology? During this presentation, we will share strategies proven to be effective in our own experiences and present qualitative data collected from the interviews. Finally, we will open up the session for discussion. The goal of the presentation is to reflect upon the past few years and strategize ways to encourage active participation in the industry in order to connect, build mentorship opportunities, and foster a supportive local community. These strategies are not only useful for growing organizations but also for implementing office initiatives.

BEGINNER

Speakers

Brittany Downing

City of Portland, Bureau of Environment Services

Allison Lukens

Associate Engineer | Kennedy Jenks Consultants

L

Lauren Tetzloff

Kennedy Jenks Consultants

Fitting it all into 5 to 9 so you can thrive in your 9 to 5: Managing Managers, Coworkers, Wellbeing, and Life as a Young Engineer

12:00 PM – 12:30 PM

Time is precious, we can all agree. Building the skills to stay devoted to high-level mental productivity during billable hours, while maintaining a fulfilling life outside of 9 to 5, is crucial to a young engineer. I intend to give a presentation that prompts introspection and discussion, targeted to those at the start of careers as we are those at PNCWA 2025 whose days are spent most in service of others' goals. Finding ways to flow together with others to progress towards our own goals will be a central focus. In the first ten minutes of my time, I will share tips and tricks from various sources in professional development and social psychology on effective boundary setting and cultivating acceptance for others and oneself, building on the premise of disciplined self-devotion. In the second fifteen minutes of my time, I will pose questions to the audience with genuine curiosity, designed to allow discussion with accessible ways to participate such as taking a finger poll or allowing time to write a private response.

Boundaries and acceptance may seem like opposites, but try framing them as two sides of the same coin. Within an engineering workplace, there is plenty that must simply be accepted. How co-workers behave, decisions the boss makes, or demands of work are often not available to have boundaries set that meaningfully change that experience. This marks a shift from undergraduate life, when one could largely choose how to allocate time according to priorities. Creatively setting more nuanced boundaries in disciplined devotion to oneself becomes paramount in the workplace, such as refusing to feel guilt for leaving on time to prioritize movement and community.

In Brene Brown's book Dare to Lead, she says that we "must either invest a reasonable amount of time attending to fears and feelings, or squander an unreasonable amount of time trying to manage ineffective and unproductive behavior." Our conference theme, Flowing Together, works well within this framework, highlighting the importance of self-care in enabling us to show up for ourselves, the people, and the ecosystems who rely on us.

BEGINNER

Speaker

L

Lauren Wittkopf

KPFF/As Yet Unknown University in the Fall (Likely UW)

Pathogen Tracking in Wastewater

11:30 AM – 12:30 PM | Location: Tech Rm 2

UTILITY MANAGEMENT

Wastewater Surveillance as a Public Health Tool

11:30 AM – 12:00 PM

Authors: Melissa Sutton; Tyler Radniecki

This presentation is intended to explore new topics in wastewater surveillance while also covering introductory material for those unfamiliar with the field. It will examine the evolution of wastewater surveillance and its growing role in public health, from early applications in poliovirus monitoring to its nationwide expansion during the COVID-19 pandemic. The establishment of the National Wastewater Surveillance System (NWSS) by the Centers for Disease Control and Prevention (CDC) has significantly enhanced the ability to track pathogens in communities through systematic wastewater monitoring.

We will provide an overview of the historical foundations of wastewater surveillance and highlight how the COVID-19 pandemic accelerated its implementation as a critical epidemiological tool. The presentation will also discuss the CDC's role in supporting wastewater surveillance through NWSS, facilitating the collection, analysis, and interpretation of wastewater data across the country.

A key focus will be Oregon's wastewater surveillance program, detailing how the state has adopted sampling protocols, laboratory methods, and data interpretation strategies to support public health decision-making. The presentation will outline the general process of wastewater sample collection and pathogen detection, emphasizing the collaboration between public health agencies, wastewater utilities, and surveillance program staff.

Finally, we will showcase specific examples of how wastewater surveillance data is applied in Oregon, illustrating its impact on disease tracking, early warning systems, and public health interventions. By demonstrating the value of wastewater-based epidemiology, this presentation will highlight the future potential of wastewater surveillance as an integral part of public health infrastructure.

101 BEGINNER

Speaker

Christine Kelly

Oregon State University

Optimizing dPCR for Enhanced Pathogen Detection in Wastewater and Disease Trend Tracking

12:00 PM – 12:30 PM

Authors: Rebecca Falender; Melissa Sutton; Tyler Radniecki

Wastewater surveillance has emerged as a powerful epidemiological tool for monitoring disease burden in communities. The adoption of digital polymerase chain reaction (dPCR) platforms has significantly enhanced viral pathogen detection in wastewater —a complex and challenging matrix—by improving sensitivity and reliability. In Oregon, these advancements have strengthened public health monitoring efforts by enabling the rapid tracking of viral prevalence, emerging pathogens, and broader communicable disease trends.

The Oregon Health Authority, in collaboration with Oregon State University, launched a wastewater surveillance program in 2020 to monitor SARS-CoV-2 across 40 communities. Initially, the program utilized droplet digital PCR (ddPCR) on the Bio-Rad QX200 system, which allowed for a maximum of three targets per assay. While sufficient for detection of SARS-CoV-2 (N1 and N2), expanding surveillance to include influenza and respiratory syncytial virus (RSV) required additional assays, doubling supply costs and increasing processing time from 6 to 12 hours per week.

To address these challenges, the program transitioned to the QIAcuity dPCR system in July 2023, consolidating five key targets (N1, RSV, influenza A, influenza B, and H5) into a single multiplex assay. This transition reduced costs and improved efficiency. Additionally, a recent software update expanded the system's capacity to 12 targets per assay, allowing for further enhancements in surveillance efficiency.

Given these recent advancements we have developed a framework for optimizing pre-existing dPCR assays together, focusing on strategic target selection, fluorophore compatibility, and minimizing cross-talk interference. These considerations have enabled the development of high-efficacy assays with improved thresholding accuracy, avoiding signal noise (known as "rain" in dPCR) when possible.

This work highlights the transformative impact of dPCR in wastewater surveillance. By expanding multiplexing capabilities, the QIAcuity dPCR system has enhanced efficiency, reduced costs, and increased data throughput while maintaining the high sensitivity and reliability of dPCR. These advancements reinforce the critical role of wastewater surveillance in public health, supporting proactive disease monitoring and community protection.

BEGINNER

Speaker

David Mickle

Research Faculty Assistant | Oregon State University

Treatment Upgrades

11:30 AM – 12:30 PM | Location: Tech Rm 3

WASTEWATER TREATMENT

Operational Challenges of Antiquated Oxygen Generation System at West Point Treatment Plant

11:30 AM – 12:00 PM

Authors: Wade Phillips; Ayman Shawwa; John Ambriano

Operating and maintaining a 30-years old oxygen generation system for high-purity oxygen activated sludge process are challenging and costly. The West Point Treatment Plant, owned and operated by King County, has an oxygen generation system with two train vacuum pressure swing adsorbers (VPSA), one operating and the other is standby. Each train comprises of three vessels filled with adsorption media designed to produce 100 Ton per day oxygen with 93% purity. Significant performance issues started in 2021 due to moisture contamination of the media which caused 30% loss of oxygen production capacity. King County had to rely on their liquid oxygen backup system to meet secondary oxygen demand, which was very expensive. King County worked with Stantec and Adsorptech, a New Jersey based SME, to complete an assessment of options for replacing the existing adsorption media. A weighted risk-based method was developed to help WPTP's staff to select the most suitable media option. Adsorption media manufactured by Honeywell was selected as it provided the shortest delivery schedule. Removal of existing adsorption media from VPSA Trains commenced after the procurement of the media. King County contracted with a company specializing in catalyst removal and installation work. Internal inspection of the adsorption vessels was performed after removing the old media followed by mesh screen repairs. Unexpected problems were encountered during and after filling the media which created many challenges to the operations and maintenance staff. To limit exposure to moisture, loading the new media took longer than expected as one barrel had to be loaded at a time through 4-inch fill ports on top of each vessel. After filling the media in each vessel, pressure testing revealed that existing valves were leaking which required replacing them with new valves and actuators. WTD's O&M staff resolved all the mechanical problems and both VPSA Trains have been running successfully with oxygen purity between 91 to 93%. In this presentation, the collaborative approach adopted by King County to replace the damaged adsorption media, while maintaining the plant operations, and the challenges and lessons learned will be shared with other water sector professionals.

ADVANCED

Speakers

Ayman Shawwa

Stantec

Wade Phillips

King County WTD

Building Resiliency: Lewiston's Wastewater Plant Upgrade Amidst COVID-19

12:00 PM – 12:30 PM

Lewiston, Idaho's wastewater treatment plant dates back to the 1950s, and before the recent upgrade, several of the original components were still in operation. Although the equipment had been maintained, several equipment failures (and the associated emergency repairs) opened the city's eyes to the need for additional investment. Also, the lack of system redundancy put the city at risk. Over the past few years, the city has made several critical decisions to improve its treatment plant. Their approach eventually led to the construction of a $35 million project.

The project touched every part of the plant and included several innovative approaches to reusing existing infrastructure to fit within the city's budget. The project also addressed urgent dewatering upgrades, necessary process improvements for ammonia removal, and reduced the city's emergency repair risk by adding redundancy. Some of the procedures used on the project included early prepurchase and installation milestones, reusing some existing structures, utilizing older structures for shoring, and taking advantage of energy rebates. Construction sequencing was critical to ensure no interruption in treatment to the community. Lastly, construction was conducted during the beginning and middle of the COVID-19 pandemic, which required collaboration to keep the project progressing without compromising worker health and addressing affected delivery schedules. This presentation will discuss the collaborative and innovative efforts of the team (City, Engineer, and Contractor) to create a more resilient facility for the city during a challenging time.

BEGINNER

Speakers

Stillman Norton

Area Manager - Washington | Keller Associates, Inc.

Holly C. Johnson

Sr. Project Engineer | Keller Associates, Inc.

Nanobubble Intensification

11:30 AM – 12:30 PM | Location: Tech Rm 4

TREATMENT INNOVATION & INTENSIFICATION

Operational Adjustments with Nanobubbles Provide Big Impact on Plant Performance

11:30 AM – 12:00 PM

Authors: Daniel Fahr; Baji Gobburi; Kyle Schoenheit

One key issue that plants through out the US and in the pacific northwest is foam. Foam is a nuisance on basins and cause permit violations if it is discharge into the environment.

The Maple Creek Wastewater Treatment Plant (MCWWTP) in Greer SC, has historically received industrial waters containing nonionic surfactants. The discharge of nonionic surfactants has resulted in operational challenges requiring the addition of chemicals (up to $2,000/day) to improve the settling characteristics and decrease foaming. A new technology, nanobubbles, has been investigated to mitigate the surfactant issues and minimize the amount of chemicals required to be added during the treatment process to maintain compliance.

Bench scale testing was conducted to approximate the removals that could be achieved using the nanobubble technology. Based on the results of the testing, it appears that nanobubble could be used to decrease the nonionic surfactant loading being discharged to the treatment plant and reduce the amount of chemical being used while maintaining an effluent that would continue to meet permit requirements. Demonstration testing has shown a decrease in effluent surfactant concentration as well a elimination in defoaming chemical used at the plant. Current cost savings are ranging in the $1,000 to $1500 per day alone in chemicals This presentation will discuss the results of testing that highlights the water quality improvements as well as the operational data that was collected during the test. Capital and operating costs comparison of nanobubble to the existing chemical system for the full-scale installation will also be presented. Presentation will also discuss how this technology can be applied to plants in the pacific northwest.

BEGINNER

Speakers

Gary Hunter

Sr. Wastewater Process Engineer | Black & Veatch

A

Austin Maranville

Black & Veatch Corporation

Intensifying Wastewater Treatment and Nitrogen Removal with Nanobubble Technology

12:00 PM – 12:30 PM

Increasingly stringent nutrient discharge limits, exacerbated by climate change, necessitate innovative and cost-effective wastewater treatment solutions. This presentation explores the potential of nanobubble technology to enhance treatment within existing infrastructure, improving performance, reducing operational costs, and potentially deferring or eliminating the need for major capital upgrades.

Nanobubbles (sub-200 nm diameter) create a unique physiochemical environment, stimulating both aerobic and anaerobic microbial activity and enhancing contaminant removal. Full-scale demonstrations across North America have evaluated nanobubble systems treating a variety of wastewater types. Results from these installations demonstrate significant improvements, including nitrogen removal (25-40%), energy consumption (15-40%), chemical consumption (10-100%), and biogas production (10-25%). Importantly, nanobubbles have also been shown to increase ammonia removal and nitrifier growth rates, further enhancing nitrogen removal performance.

This presentation will detail these performance results, along with impacts on biomass characteristics and overall treatment capacity. The fundamental mechanisms of nanobubble-induced process intensification will be explored, providing insights into potential applications for diverse wastewater treatment configurations based on findings from multiple full-scale demonstration projects. By intensifying existing processes, nanobubble technology offers the potential to increase treatment capacity and improve nutrient removal within existing infrastructure.

INTERMEDIATE

Speaker

J

John Crisman

Senior Water Process Engineer | Moleaer

Nitrogen Removal Case Studies

11:30 AM – 12:30 PM | Location: Tech Rm 5

NUTRIENT REMOVAL

Nitrogen Optimization at the Post Point WRRF: Insights and Lessons

11:30 AM – 12:00 PM

The City of Bellingham's Post Point WRRF operates an activated sludge process to meet effluent BOD5 and TSS NPDES limits. The Puget Sound Nutrient General Permit (PSNGP) has prompted the City to evaluate opportunities to optimize their existing infrastructure to reduce effluent total inorganic nitrogen.

Proactive work commissioned by the City identified seasonal nitrogen removal as the most feasible option for optimization. The combination of elevated wastewater temperatures and lower wastewater flows in July and August provided ideal conditions for achieving nitrification without exceeding the facility's secondary clarification capacity. The City started preparing for seasonal nitrogen removal in 2023. Preparations included increased sampling and process monitoring, installing a temporary alkalinity feed system, testing return and waste activated pumps, completing preventative maintenance on the secondary clarifiers ahead of schedule, developing new standard operating protocols, and completing operator training for nitrogen removal. In the summer of 2024, Post Point successfully transitioned into nitrogen removal for the first time, sustained the process and returned to normal operations.

This session will present the City's experience with their first foray into nitrogen removal. After briefly reviewing the Post Point WRRF and its history, the specifics of the selected nitrogen optimization strategy and its implications on the facility's operation will be discussed. This will include a comparison of the City's historical operation with the new nitrification/denitrification mode. While historical operation removes negligible nitrogen, the nitrification/denitrification mode achieved effluent ammonia concentrations below 1 mgN/L and an overall TIN removal of 61 percent. The City gained significant insight into nitrogen removal through this evaluation. This session will also present how the City overcame numerous challenges, including the need for alkalinity supplementation, reduced primary treatment performance due to a concurrent headworks project, as well as limitations in downstream processes (solids treatment and disinfection) and supporting system (RAS pumping and scum removal). Finally, this session will discuss how the City is building on this success and gearing up to evaluate nitrogen removal in 2025.

INTERMEDIATE

Speaker

Nick Guho

Senior Technologist | Carollo Engineers

Single Aerobic Basin Nitrification/Denitrification at Grand Canyon's Phantom Ranch

12:00 PM – 12:30 PM

BACKGROUND

Nestled at the base of the Grand Canyon, Phantom Ranch Wastewater Reclamation Facility (WRF) is an 11-mile hike or helicopter ride from the outside world. Increasing visitors have strained its 1980-installed activated sludge system, designed for 5,400 gpd. With limited space, Phantom Ranch sought to upgrade treatment without expanding its tank. The WRF effluent targets are ≤ 2 mg/L NH_3-N and ≤ 5 mg/L BOD_5.

TECHNOLOGY SOLUTION

In late 2022, the activated sludge system was replaced with two hybrid fixed/moving media IFAS WavTex™ modules.

[Figure 1. Plant Upgrade]

The modules contain EnTextile™ fabric media sheets: high-surface-area, buoyant media tethered at the bottom to a stainless-steel frame. With a specific gravity of 0.92, sheets stand upright when submerged, allowing free movement. Each sheet has two exterior protective layers connected by internal fibers, forming a three-dimensional structure that enhances simultaneous nitrification and denitrification in a single aerobic tank. The oxygen-rich surface supports nitrification, with an anoxic interior, facilitating denitrification. Built-in coarse bubble aeration scours the film, ensuring optimized removal kinetics while supplying aeration for treatment and mixing. With 1,350 m^2/m^3 surface area, these modules are ideal for compact spaces and require no maintenance beyond air scour—perfect for remote locations like Phantom Ranch.

RESULTS

This hybrid IFAS system removes BOD and ammonia at the increased flowrate, eliminating the need for new tankage.

[Figure 2. Phantom Ranch Nitrification Post-Installation]

Though only nitrification was required, increased simultaneous denitrification was observed. The graph below shows the TN reduction achieved at Phantom Ranch before and after installation.

[Figure 3. Phantom Ranch TN Removal Before and After Installation]

Pre-installation, TN reduction averaged 12%; post-installation, 60%. A Canadian hybrid system achieved 44% denitrification during a 9-month Performance Verification period.

[Figure 4. Peterborough TN Removal via Hybrid IFAS System]

Other hybrid media installations showed even higher denitrification, including a 65,000 gpd municipal lagoon in Pax, WV, and a 25,000 gpd plant in Lead, SD.

CONCLUSION

As nitrogen limits tighten, cost-effective, space-efficient hybrid media systems offer solutions. Phantom Ranch's 60% TN reduction demonstrates their potential for retrofits in a single aerobic basin, supporting Grand Canyon conservation for 20+ years.

INTERMEDIATE

Speakers

L **Lauren Takitch**
Entex Technologies

W **Wayne Flournoy**
Entex Technologies

PFAS Treatment & Delivery Strategies

11:30 AM – 12:30 PM | Location: Tech Rm 6

THE FURTURE OF PFAS?

SCWO vs the status quo: using Supercritical Water Oxidation to unriddle biosolids management in the PFAS era

11:30 AM – 12:00 PM

Authors: Sudhakar Viswanathan

The PFAS era has brought about a slew of managerial decisions that wastewater utilities must make in the near term to invest in treatment technologies that keep costs at bay for their customers. The status quo—land application and incineration— may face rising costs and bans in response to growing concerns over PFAS. Utilities will benefit from conducting preliminary planning efforts to prepare for future monetary changes, such as price hikes to biosolids land application fees and rising air permitting costs for incineration. These challenges prompt an evaluation of alternative technologies, like supercritical water oxidation (SCWO), that can eliminate PFAS.

SCWO is a treatment technique for wastes rich in organics that converts the waste into clean vent gas and liquid effluent containing only inert inorganics/minerals. During the SCWO process, the waste is heated above the critical point of water (374°C, 221 bar) so that water in the waste becomes supercritical. In supercritical water, organics are highly soluble, resulting in the mineralization of recalcitrant organics such as PFAS. Additionally, oxidation of the organic matter within the waste fuels the process; when oxidized, these organics release energy in the form of heat which is re-used within the process. The result is a treatment technology that can convert organic wastes such as biosolids into a contaminant free mineral rich effluent and clean vent gas.

This session will provide a comprehensive comparison of supercritical water oxidation (SCWO) to alternative technologies such as thermal combustion (e.g. incineration, pyrolysis, gasification) and sub-critical thermal treatment (e.g. hydrothermal carbonization, hydrothermal liquefaction, hydrothermal alkaline treatment). Comparisons will be made across several key factors including solids and volume reduction, generation and end-use of solid treatment products, greenhouse gas emissions, PFAS removal, and capital and operating costs. Attendees will gain valuable insights to help them make informed decisions about diversifying their biosolids management plans. The main takeaway will emphasize the importance of keeping costs down, ensuring compliance, and advancing the industry toward resource recovery and sustainable waste management practices.

101 BEGINNER

Speaker

Naomi Senehi

Technical Solutions Lead, Municipal and Global Access | 374Water

Solutions to PFAS Using Alternative Delivery Methods

12:00 PM – 12:30 PM

This presentation covers real world PFAS treatment systems implemented over the past three years at existing water treatment facilities. It focuses on technology selection and key approaches and lessons learned. Four example sites are covered in this session ranging from small (600 gpm) to large (17,360 gpm) systems and includes projects recognized as American Society of Civil Engineers (ASCE) Projects of the Year. We will discuss how design build delivery was beneficial to these projects.

The first project is the Serrano Water District's C.L. "Larry" Pharos Jr. Filtration Plant which has a 3000 gpm capacity and a PFAS removal system constructed in 2022. The presentation highlights why ion exchange was the chosen treatment technology and how project incorporated site improvements to account for neighborhood impacts from the plant improvements.

The 600 gpm capacity Irvine Ranch Water District's SGU PFAS Treatment Plant at the former El Toro Marine Base was retrofitted in 2023 with a granular activated carbon (GAC) system due to the presence of very high VOC levels and PFAS. The source water comes from 12 shallow wells. The material covered in the presentation includes why and how the GAC system was designed to replace an existing air stripper system.

The City of Fullerton Kimberley Well 1A Water Treatment Plant was the first project to obtain an Orange County Division of Drinking Water Permit and the first project placed into service (June 2021) under the Water District's PFAS program. This is a single groundwater well facility with a 3,200 gpm capacity utilizing an ion exchange system. Key items to be covered include how the added PFAS treatment system was configured and added to an extremely small site and how upgrades to the well, pump, motor, and VFD were incorporated.

The Yorba Linda Water District Headquarters PFAS Treatment Plant is a 17,360 gpm facility with the largest PFAS ion exchange treatment plant in the US. The presentation covers how this project was implemented after evaluating options to treat at three sites or at one combined site, and includes a detailed blending analysis as part of the permitting process. The improvements included a 25 MGD pump station and emergency back-up power generators treating PFAS from 10 groundwater wells since May 2022.

101 INTERMEDIATE

Speaker

Steve Tedesco

Senior Vice President | Tetra Tech

Large Diameter Rehab

11:30 AM – 12:30 PM | Location: Tech Rm 7

COLLECTION SYSTEMS

Structural Rehabilitating 12 Ft CMP and Protecting Fish Passage During Construction by Spray Applied Pipe Liner

11:30 AM – 12:00 PM

Twin County Highway Department in Idaho was faced with a structurally compromised existing 12 foot diameter corrugated metal pipe (CMP) culvert that directs Rock Creek flow (which a sensitive fish stream that has trout larger than 2.5 ft long) under the county road in Kimberly, ID. The pipe was 35 ft below ground surface. The CMP had several issues to address included: the invert was deteriorated for half the pipe, the road directly above had signs of a depression that was repaired in the past, the pipe ovality was in an excessive of 8% and soil piping was occurring around the outside circumference of the pipe creating large cavities around the pipe, besides not impacting aquatic life. The work could only be down when the seasonal low flow through the CMP is around 30-110 cfs during August and September.

The highway department hired Civil Science from Twin Falls Idaho as the design firm for the project. They evaluated different trenchless methods for the project including dig and replace, slip lining, Cured in Place Pipe (CIPP) and Spray Applied Pipe Lining (SAPL) geopolymer mortar.

The presentation will discuss why SAPL was selected, the design approach to determine thickness for structural rehabilitation and specification writing for the project. The contractor faced many challenges including internal pass for the stream to continue to flow (3 – 12 inch diameter pipes were used), invert completely gone in sections, major voids behind the pipe causing soil piping and road damage and not distributing aquatic life. The contractor discusses lessons learned to help the asset owners and engineering firms that are faced with rehabilitating large culvert pipes.

101 BEGINNER

Speakers

K **Kurt Chirbas**
GeoTree Solutions

M **Matthew Cosenzo**
Ashlar Structural

Ultra-Violet Cured-In-Place-Pipe Lining of Deer Creek Trunk, a Large Diameter Sewer with Complex Site Constraints

12:00 PM – 12:30 PM

Roseburg Urban Sanitary Authority (RUSA) owns and operates the Deer Creek Trunk, a sanitary sewer trunkline which runs along Deer Creek in Roseburg, Oregon. The Deer Creek Trunk contains over a mile of 18- and 24-inch diameter gravity sanitary sewer that was determined to be structurally deteriorating and in need of rehabilitation, along with adjacent manholes and laterals.

Because the trunk runs along Deer Creek, an environmentally sensitive creek corridor running through a ravine with steep, unstable slopes, and is located beneath two separate buildings along the sewer alignment, open cutting the trunk for rehabilitation would be incredibly complicated to construct. The Deer Creek Trunk is also located almost entirely on private property and required a complex temporary bypassing plan to manage flows during construction.

Due to the trunk's location, several site constraints contributed to the trenchless design and decision to use ultra-violet (UV) cured-in-place-pipe (CIPP) for rehabilitation. Manholes and laterals were also structurally rehabilitated trenchlessly when possible.

The project team also came up with creative a bypassing solution which involved utilizing the existing storm sewer system to minimize environmental and traffic impacts. Due to wet-weather flows that would present a challenge for this bypassing solution, the project had strict deadlines imposed for the various portions of work that were included as contract milestones.

This paper will present how Leeway determined that UV-CIPP was the best solution for mainline rehabilitation, the site-specific design challenges of the project, the complex bypassing, the presentation of the construction activities, and lessons learned.

BEGINNER

Speakers

R **Rylee Archuleta**
Leeway Engineering

R **Ryon Kershner**
Engineering and Operations Manager | Roseburg Urban Sanitary Authority

R **Rob Lee**
Principal | Leeway Engineering

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Aaron Lawler

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Aaron Lawler. Engineering Supervisor, City of Portland BES, Pump Station Engineering. 15 years in the industry.

Adrienne DeDona

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Adrienne has helped government agencies positively and productively engage with the communities they serve since 1999. She leads collaborative decision-making and engagement programs for a broad range of topics, particularly policy and planning around natural resources, transportation and water resources. As an experienced public policy facilitator, Adrienne's expertise has helped foster collaboration and agreements on processes involving complex topics, multiple agencies and diverse communities.

Ainsworth Marshall

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Ainsworth Marshall is a professional civil engineer with 20+ years of industry experience. Ainsworth is the City of Portland's project manager for the Carolina Sewer Trunk project, which is being delivered using CMGC method.

Alden Meade

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Alden Meade is a Mechanical Engineer with Xylem's Flygt Mixer Group. His focus is primarily Mechanical Mixers & Mixer hydraulics in WWTP applications, Alden has over 10 years' experience in the wastewater industry and wastewater system design.

Alex Yoffie

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Alex is a process engineer with a variety of experiences in the wastewater treatment industry. He has held key roles for a variety of projects that include process and hydraulic modeling, detailed design, SDC management, startup and commissioning. Alex has extensive experience in commissioning water and wastewater treatment plants, having served

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as the Jacobs' Startup and Commissioning Manager on 6 projects with construction costs ranging from $70 million to over $400 million.

Alexander Mockos

amockos@brwncald.com | Brown and Caldwell | Seattkr, Washington

Alexander Mockos is the Northwest Growth Leader for Brown and Caldwell with over 15 years of experience planning and implementing large projects and programs both as a consultant and as a utility manager. He has presented to councils, public boards, operators, executive teams, public works directors, schools, and to the general public and from that experience Alexander has learned that clear tailored communication and compelling stories are key to getting buy-in and approval for the important work we are doing in the water sector.

Allison Lukens

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Allison Lukens is Professional Engineer at Kennedy Jenks Consultants. She graduated from Michigan State University with a bachelor's degree in environmental engineering. Her areas of expertise include water/wastewater design and planning, process mechanical design, hydraulic modeling, and pipeline design. Projects range from reclaimed water storage and distribution to membrane bioreactor design for wastewater treatment facilities.

Amanda McInnis

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Amanda is a Senior Project Manager at Jacobs. She was the Project Manager for the City Missoula's Wastewater Facilities Plan.

Amara Cairns

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Amara Cairns is a Professional Environmental Engineer based in Bellevue, Washington. She has six years of experience in consulting on wastewater treatment projects, including in planning, condition assessment, risk and resiliency assessment, design, and construction.

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Ana Haines

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Ana is an EIT and has been with Hazen for two years in their Seattle office. She has primarily focused on wastewater projects, particularly on pumping hydraulics.

Andrea White

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Andrew Grant

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Grant is the founder of Solidsdude Solutions, a consultancy focused on wastewater policy and project management. With over 20 years of experience in wastewater treatment across multiple facilities, Grant has led operations, developed biosolids, recycled water and pretreatment programs. He holds Oregon Grade IV and III certifications in wastewater treatment and collection, respectively. Grant has previously chaired the Biosolids and Recycled Water Committee for the Oregon Association of Clean Water Agencies and is currently working with the City of Portland on a renewable natural gas project.

Anna Scopp

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Anna Scopp is a wastewater professional with over eight years of experience, including the past three at Hazen and Sawyer. Originally from Kansas City, she holds a bachelor's in Cellular Biology from the University of Kansas and a master's in Microbiology from CU Denver. Her passion for wastewater started in a KU lab extracting exopolymeric substances from granular sludge. Before Hazen, she supported microscopy, piloting, and innovation work at Metro Water Recovery. These days, Anna focuses on process troubleshooting, clarifier modeling, nutrient management, and her favorite—sludge densification. When she's not geeking out over microbes, you'll find her snowboarding, doing yoga, or loudly cheering on her Kansas City Chiefs.

Anne Conklin

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Dr Conklin is a Principal Technologist at Carollo Engineers, and has twenty years of experience in facility planning and wastewater treatment process modeling. She joined Carollo after earning her PhD in Civil and Environmental Engineering from the University of Washington.

Anne Thebo

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Anne Thebo is a research scientist with the University of Washington Climate Impacts Group (CIG). Her work at CIG focuses on understanding water-related impacts of climate change to support resource managers, communities, and policy makers in the advancement of climate-resilient water systems. Her work combines stakeholder engagement with spatial analysis and modeling to assess opportunities, benefits, and tradeoffs of integrated water management, reuse, and efficiency in the urban and agricultural sectors. Prior to joining CIG, Anne was a senior researcher at Pacific Institute and worked for 10+ years in the NGO, consulting, and academic sectors. Anne holds a Ph.D. in civil and environmental engineering from the University of California, Berkeley, a M.S. in environmental engineering from Stanford University, and B.S. degrees in civil engineering and environmental science from Ohio State University.

April Rhodes

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April Rhodes joined Beavers Northwest in Fall 2023 as a Project Manager. She originally graduated from Seattle University in 2018 with a B.A. in Humanities for Leadership and minors in Environmental Studies and Nonprofit & Public Administration. After her time in university, she went into national and public service with the Washington Conservation Corps, where she spent five years as a restoration practitioner installing native plants, removing invasive weeds, and managing dynamic projects and teams. With a background in restoring and protecting salmon habitat, April is extremely passionate about enhancing the health and resilience of our aquatic ecosystems through beaver coexistence strategies.

Ashley Galagusz

GalaguszA@bv.com | Black & Veatch | Vancouver, British Columbia

Ashley Galagusz is the Tunnel Practice Lead for Northern California and the Pacific Northwest with Black & Veatch and is a licensed professional engineer with 12 years of experience in design and construction of tunnel and trenchless projects in the water and wastewater industry. Ashley's skillset includes tunnel and shaft design, geotechnical engineering, construction management, engineering management and business development.

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Austin Maranville

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Mr. Maranville is a Civil Design Engineer at Black & Veatch with 4 years of experience specializing in pipeline and pump station design. Austin has contributed to delivering efficient and innovative solutions for critical infrastructure projects and is now expanding his expertise into water treatment facility design.

Ayman Shawwa

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Ayman is Senior Process Engineer at Stantec (Walnut Creek, CA) with more than 30 years of experience in the water industry. Ayman worked with top consulting engineers in Canada and US providing design services for municipal clients and he also worked with equipment manufacturers providing innovative treatment technologies for drinking water, wastewater and water reuse.

Bao Nguyen Quoc

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Bao is a process engineer at Brown and Caldwell. He earned a Ph.D. from the University of Washington, specializing in cutting-edge biofilm-based technologies for wastewater treatment, including aerobic granular sludge and Nuvoda kenaf biofilm. His research focused on enhancing nutrient removal and recovery through biofilm-based technologies while minimizing greenhouse gas emissions in water treatment.

Becca Andrus

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Becca Andrus is a wastewater mechanical process engineer. She earned her Master's from the University of Illinois in 2020 and has since been involved in several exciting conveyance, pump station, and treatment plant projects. For the past two years, she's been working on the Mouth of Duwamish Combined Sewer Overflow Wet Weather Treatment Station as the project engineer for the 300 MGD influent pump station. When she's not tackling complex engineering challenges, you might find Becca climbing mountains as one of her life goals is to climb Washington's 100 highest mountains.

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Ben Miller

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Ben is a client service manager for Tetra Tech located in Denver, Colorado. He has a bachelor's and master's degree from the University of Colorado, Boulder, where he also racked up enough hours fly fishing the local waters to have received several PhDs!

Blair Wisdom

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Blair is a wastewater process engineer at Hazen with extensive experience in the research, design, operations, and optimization of wastewater treatment plants. As a former Director of Technology and Innovation at Metro Water Recovery, she led research and development efforts, gaining firsthand insight into the challenges utilities face in planning for the future. With a strong background in wastewater facility master planning, process controls, and nutrient treatment and recovery, Blair brings both technical expertise and a utility-focused perspective to every project. Her ability to bridge consulting and operational needs ensures that master plans are practical, forward-thinking, and tailored to real-world utility challenges.

Brandon Moss

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Brandon is a senior engineer and project manager at Parametrix. He leads planning, modeling, and design work for water and wastewater infrastructure projects including pump stations, forcemains, and treatment plants.

Brenna Tomaiuolo

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Brenna is a member of the Tunnel Engineering team at Black & Veatch with four years of experience in the industry. She graduated with a Bachelor's Degree in Civil Engineering & Society from McMaster University in Hamilton, Ontario. Her particular interest is determining unique engineering solutions to suit particular environmental and sociological factors in projects.

Brent Deyo

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Brent Deyo is a project manager at the consulting engineering firm Ardurra in Coeur d'Alene. He has worked on a wide variety of water and wastewater projects – from collection/distribution through treatment and disposal – at all stages – concept, planning, design, construction. His work has primarily been with small municipalities and water/sewer districts. Brent lives in Coeur d'Alene, Idaho and enjoys partaking in the many wonderful outdoor opportunities present there.

Brian Busiek

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TBD

Brittany Downing, EIT

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Brittany Downing is a Senior Engineering Associate – Mechanical with the City of Portland Bureau of Environmental Services (BES), where she has been a key contributor to the Operations & Maintenance Group's (O&MG) Maintenance Reliability and Asset Management (MRAM) team, which supports the Columbia Blvd and Tryon Creek Wastewater Treatment Plants and 98 pump stations citywide. Brittany holds a B.S. in Mechanical Engineering from Oregon State University and is an expert in reliability centered maintenance, using data-driven strategies to enhance asset performance and extend equipment life. In addition, Brittany has been an active member of the O&MG's Energy Team for six years and took on the lead role in 2023. She is strongly committed to advancing a more energy-efficient future, supporting climate change initiatives, and improving operational practices that prioritize energy savings and environmental sustainability. Through cross-disciplinary collaboration and strategic planning, she helps drive BES's Strategic Energy Management (SEM) efforts, integrating sustainability into daily operations and long-term infrastructure goals.

Bryce Figdore

bryce.figdore@hdrinc.com | HDR | Everett, Washington

Bryce Figdore is a senior wastewater process engineer with HDR based in Everett, WA. Bryce has Bachelor's, Master's and Doctorate degrees, respectively, from Penn State, Villanova, and the University of Washington. He is enthusiastic about applying his expertise in biological nutrient removal to deliver robust and innovative wastewater treatment solutions. Outside of these pursuits, Bryce enjoys fly fishing, tennis, and hiking with his family.

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Bryen Woo

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He is currently the Business Development Director for Aquarius Technologies. He has over 20 years of experience in the wastewater industry which includes biological processes, BNR, biosolids stabilization and resource recovery, and diffused aeration systems. He specializes in Aerobic Digestion process design and operations. He has a Masters Degree in Environmental Engineering from Cal State University of Fullerton and is a registered professional civil engineer in the state of California.

Carlos Weiler

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Carlos Weiler, M.Eng., EIT

Carlos Weiler is a process engineer specializing in industrial wastewater treatment and reuse. With a strong foundation in chemical and environmental engineering, Carlos has led multidisciplinary teams on advanced treatment projects involving solids separation, MBBR, ion exchange, ozonation/UV, and catalytic systems. His experience spans work with major clients in the semiconductor industry, food and beverage, and other private clients, delivering innovative solutions to their manufacturing facilities. Carlos brings a research-driven approach to design, informed by studies in greenhouse gas mitigation, trace organic contaminant degradation, and heavy metal removal in wastewater. He holds a master's degree in chemical engineering from the University of Virginia and dual bachelor's degrees in chemical engineering and environmental engineering from the University of Arizona.

Carmen Brown

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Carmen Brown has over 23 years of consulting experience serving municipal water clients in the Pacific Northwest, nationwide and internationally. She is a technical design manager and facility lead engineer at CDM Smith in municipal water and wastewater projects and programs. Her project experience includes water and wastewater treatment plants, pump stations, lift stations, reservoirs, and conveyance. Her work experience includes master planning, conceptual design, detailed design, permitting, CM/GC coordination and engineering services during construction. She has extensive experience in project technical design, leadership and discipline coordination that is essential throughout the planning, designing and construction of a successful project.

Casey Gish

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Casey holds a master's in environmental engineering from the University of Washington and is part of Brown and Caldwell's process mechanical group. Casey's experience includes project management, water and wastewater treatment plant hydraulic modeling, pump system modeling and design, transient analysis, wastewater treatment process modeling, wastewater and drinking facility planning, and CSO facility design. Casey is an active member of the Pacific Northwest Clean Water Association (PNCWA) and the Water Environment Federation (WEF).

Cat Cecilio

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Catherine (Cat) Cecilio is a Civil Engineer with a focus on water resources, specializing in the technical design of water and wastewater facilities, construction support, field work, and condition assessment. With experience working with various clients and stakeholders, Cat ensures the successful delivery of projects from initial concept to final construction.

Chris Kossow

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Chris Kossow

Collections Manager

Eagle Sewer District

Chris Thomas

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As the Senior Attorney & Policy Specialist for The Freshwater Trust, Chris assists with the development, implementation, and administration of innovative water quality financing and compliance programs that achieve better outcomes for regulated utilities and the watershed. Chris has more than 10 years facilitating the restoration of riparian habitats, the improvement of ecosystem funding, and the creation of novel compliance programs and funding strategies.

Christine Kelly

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Christine Kelly is a professor in the School of Chemical, Biological, and Environmental Engineering at Oregon State University. She has been collaborating with the Oregon Health Authority since September 2020 to execute Oregon's wastewater surveillance program.

Christopher Larson

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Chris Larson currently serves C&L, an Azuria Water Solutions Company, as its General Manager. Business development expertise is one of Christopher's strongest attributes. Since his graduation from the University of Denver in 2007, Christopher began launching the UV cured in place pipe movement in the predominately felt driven CIPP pipelining marketplace. With determination, he enabled C&L to become one of the largest UV cured in place pipeline contractors in the United States as of 2024 with more than 2,500,000 feet installed to date. While this is one of his most valued accomplishments, Christopher has many other areas of proficiency. Some of these areas include expertise in manhole rehabilitation, lateral rehabilitation, pipe bursting, slip lining, pipe fusion, cut and cover utility installations. In 2017, Chris was the NASTT Young Trenchless Person of the Year Award recipient. Chris has also served as the chair and past chair on the Board of Directors of the North American Society for Trenchless Technology – Rocky Mountain Chapter (RMNASTT).

Christopher W. Tabor, PE

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Chris is a Vice President with Hazen and Sawyer and has over 30 years of experience in design, design-build, planning, regulatory permitting, and project management across multiple water sectors. Chris served on the Commonwealth of Virginia Governor's Chesapeake Bay TMDL Stakeholder Advisory Committee and routinely supports regulatory permitting and planning. Mr. Tabor is a member of Water Environment Federation (WEF) House of Delegates and is member and former president of the Virginia Water Environment Association (VWEA).

Clint Dolsby

cdolsby@meridiancity.org | City of Meridian | Meridian, Idaho

Clint Dolsby, P.E. (Idaho), is an Assistant City Engineer for the City of Meridian. In his 21

years with the City, he has managed several expansion projects at the Meridian WRRF. He has also served as Chair of the Lower Boise Watershed Council.

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Clinton McAdams

McAdamsC@bv.com | Black & Veatch | Los Angeles, CA

Clinton is the West Region water market lead for Infrastructure Advisory solutions, which are aimed to optimize agency expenditures and improve resilience. He has provided successful, programmatic solutions for agencies like Coachella Valley Water District, City of San Diego, Kern County Water Agency, City of Oakland, Irvine Ranch Water District, Western Municipal Water District, and City of San Jose. Past projects include program management and enablement, asset management strategy and software, condition assessment and corrosion engineering, vulnerability assessments / hazard mitigation, CapEx and OpEx optimization, and rehabilitation design and construction services.

Connie Rodriguez

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Connie Rodrigues is a Data Scientist at Clean Water Services (CWS) with a background in civil and environmental engineering. She holds a B.S. in Civil Engineering with a specialization in Environmental Engineering from Texas A&M University, and a graduate certificate in GIS from Portland State University. While working for CWS, Connie has focused on applying data science to environmental challenges, integrating her engineering expertise with advanced analytics to support water quality research and decision-making. Her recent work centers on PFAS analysis — developing Python tools to process lab results, create visualizations, track mass loading and explore statistical methods for working with censored datasets that include non-detect values.

Corey Klibert

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Courtney Thomas

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Courtney Thomas is a Civil Engineer based in Portland, Oregon, with 10 years at Black & Veatch. With a background in Environmental Engineering from Cal Poly San Luis Obispo, she's passionate about creating a more sustainable future through water. Courtney thrives on collaboration, problem-solving, and leading projects that make a lasting impact on communities and the environment.

Craig Anderson

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Craig is a Consor Wastewater Principal Technologist with extensive expertise in wastewater treatment and sewage collection planning, permitting, design, funding, and construction. For more than thirty years, his work has focused on helping Northwest communities address their wastewater system needs, big and small.

Craig Fairbaugh

craig.fairbaugh@conteches.com | Contech | Astoria, OR

Craig is a Regional Regulatory Manager for Contech Engineered Solutions covering 11 states in the Central and Rocky Mountain regions of the US. He assists state and municipal agencies in achieving stormwater compliance with Manufactured Treatment Devices, as well as shares national industry best practices for developing stormwater policy and design guidance. He has a BS and MS in Environmental Engineering from Portland State University and is chair of the ASCE EWRI Stormwater Filtration Media Committee.

Dallin Stephens

dstephens@kellerassociates.com | Keller Associates, Inc. | Pocatello, Idaho

Dallin graduated from Utah State University with a Master's Degree in Civil Engineering. He brings a decade of experience with planning, design, and construction services for a wide variety of process designs for municipal WWTPs, including liquid and solids treatment, water reuse, energy recovery, chemical treatment, and odor control. He has experience with every major liquid and solids stream process across much of the Western U.S. and has been involved in projects at more than 50 wastewater treatment facilities, ranging from less than 1 million gallons per day (MGD) capacity to over 30 MGD capacity.

Dan Berthe

dberthe@brwncald.com | Brown and Caldwell | Boise, Idaho

Dan Berthe, P.E. (Idaho), is the Operations Manager in Brown and Caldwell’s Boise office. Dan has experience in Project and Client management as well as inside/outside the fence site civil design.

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Dan Black

dan.black@jacobs.com | Cascade Energy | Boise, Idaho

Dan Black is the plant manager at the Twin Falls Idaho WWTP. He has 24 years of experience in the field. He currently holds the following Idaho certifications - WWT4, WWC2, DWD2, WWLA, WWL1

Dan Buonadonna

Daniel.Buonadonna@Jacobs.com | Jacobs | Seattle, Washington

Dan Buonadonna is a Global Principal for Jacobs's Condition Assessment and Rehabilitation Services (CARS) community of practice. He has over 24 years of pipeline analysis, design, and rehabilitation experience and is an executive board member for the North American Society of Trenchless Technology. Dan holds Civil Engineering degrees from the University of Notre Dame, and the University of California, Berkeley.

Daniel Boatman

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Daniel Boatman is an engineer for the City of Portland's Bureau of Environmental Services (BES). Daniel has spent the last decade working for BES on small and large diameter sanitary and combined collections system projects. He has been the architect for a number of BES' engineering and data management tools and process improvements.

Daniel Coutts

daniel.coutts@veolia.com | Veolia Water Technologies and Solutions | London, United Kingdom

Daniel is responsible for the commercialization of process intensification technologies at Veolia with specific focus on ZeeLung MABR, zeeDENSE (combination of continuous flow densification and MABR) and memDENSE (combination of continuous flow densification and MBR). Having spent half his career in Europe, Daniel has vast experience designing MABR globally, including the 2 largest operating MABR facilities in the world. His main focus is deploying sustainable process intensification technologies to solve the toughest challenges for a wastewater facility.

Daryl Payne

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Daryl Payne is a Lead Operator (Operator III) at the Columbia Boulevard Wastewater Treatment Plant for the City of Portland. With over 14 years of experience in the wastewater treatment field—12 of those at Columbia Boulevard and 2 years at the Westside Reclamation Plant in Vancouver, WA—Daryl brings extensive knowledge and hands-on expertise to plant operations.

He holds a two-year degree in Water and Environmental Science and a Grade IV Wastewater Treatment Operator Certification. In his current role, Daryl is responsible for overseeing plant processes from influent through to the outfalls, excluding digestion and solids handling. His responsibilities include flow adjustments from the collection system, scheduling, training, implementing operational changes, developing standard operating procedures (SOPs), coordinating lockout/tagout (LOTO) procedures, and planning outages.

A core focus of his work is optimizing plant operations to improve efficiency and ensure consistently high-quality treatment results. This is particularly challenging in the context of an aging facility, but Daryl has successfully navigated many of these hurdles, often in collaboration with the plant's energy team.

David Primozich

primozich@thefreshwatertrust.org | King County | Seattle, Washington

David Primozich has more than 20 years of experience working with private and public entities on regulatory compliance. As Vice President of Water at The Freshwater Trust, David leads efforts to deploy advanced analytics to identify and prioritize land and water management actions to achieve water quantity and water quality outcomes more efficiently.

Deanna Martin

deanna.martin@kimley-horn.com | Merrell Bros. | Kokomo, IN

Deanna has 24 years of experience delivering planning, design, and construction services for water and wastewater projects, with 20 years in the Pacific Northwest. Deanna integrates her onsite field experience into thorough quality control (QC)/constructability reviews and value engineering. She has also managed numerous private development projects, understanding the nuances of developing properties in urban corridors. Additionally, Deanna has served various muncipalities in the Pacific Northwest in staff augmentation roles, providing peer reviews and code recommendations. Her diverse experience and positive energy have made her a trusted advisor to clients and built long-term relationships with local agencies.

Debi Consani

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Debi Consani is a project manager for the City of Portland managing Rehab, Replacement, and Modification (RR&M) projects at the Columbia Blvd Wastewater Treatment Plant. She has 13 years of operations experience in the Pulp and Paper industry and six years' experience as a project manager for the City of Portland.

Delandra Clark

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Delandra Clark, EIT

Staff Engineer, Leeway Engineering Solutions

Delandra Clark is a Staff Engineer at Leeway Engineering Solutions, specializing in wastewater collection systems, hydraulic modeling, and GIS-driven alternatives development. With 3 years of experience, she's supported projects involving sewer rehabilitation and asset management. She holds a Bachelor's degree in Environmental Engineering from North Carolina State University

Drew Thompson

DrThompson@kingcounty.gov | Jacobs | Bellevue, WA

Drew, who was King County WTD/s PM for this study, has over 8 years of work experience with the King County Wastewater Treatment Division. Drew is also the Program Manager for WTD's Sewer Heat Recovery Program, the first of its type in Washington state, where he works with private commercial property owners and developers seeking to recover heat energy from sewer pipes for heating or cooling their buildings. Drew collaborates with Alejandro Davila-Miranda, Project Manager, for the program to gather the data that potential users need. Drew also leads the approval process for all planning and construction of new projects and ensuring approved users have a seamless experience with King County. The program is currently a pilot and actively looking for participants for its final two spots.

Drew is also a strong advocate for King County's equity and social justice initiative (ESJ) and chairs the WTD ESJ Capital Projects Committee. As Chair of this committee, Drew seeks to find ways to improve advocation and support ESJ on the County's Capital Project's. On a particular effort, he partnered with Scott Mingus, another project manager, and collaborated with their colleagues to design and implement the 1% for ESJ, a pilot project a pilot project to fund ESJ efforts on WTD capital projects.

Drew has managed several energy-efficiency projects that helped WTD meet significant energy reduction targets included in King County's Strategic Climate Action Plan (SCAP). He also manages the utility's Carbon and Energy Fund, which funds projects that reduce greenhouse gas emissions and energy use. WTD reduced its normalized energy use by 10% between 2014 and 2021

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Experience: 8 years

Education: BS, Mechanical Engineering, University of Idaho

Certifications: PMP, Green Belt Six-Sigma

Dustin Atchison, PE, PMP

Dustin.Atchison@Jacobs.com | Jacobs | Seattle, WA

Dustin is Jacobs' Global Solutions Director for Water Resources with over 27 years of experience (19+ at Jacobs/CH2M) in water resources and stormwater management. Mr. Atchison is a recognized regional and national leader in green infrastructure with project management and technical expertise in development of master plans, guidelines, education and implementation of stormwater solutions that bring multiple benefits to communities. Additionally, Dustin enjoys extending this skillset to ecosystem restoration projects including stream and wetland restoration and culvert fish passage replacement projects.

Ed Wicklein

ewicklein@carollo.com | Carollo Engineers, Inc. | Seattle, Washington

ED WICKLEIN has 25 years of experience in design and analysis of hydraulic facilities using numerical models. He has conducted thousands of CFD studies to support design and operation of municipal and industrial water and wastewater facilities. Through these efforts he has modeled most of the major treatment components and processes. He is actively involved in both the Hydraulic Institute and the IWA Working Group on CFD Modeling.

Elaine Leonard

elaine.leonard@hdrinc.com | HDR | Bellevue, Washington

Elaine Leonard is a Water/Wastewater EIT at HDR with over three years of engineering experience and almost two years of hands-on work as a municipal wastewater treatment operator. She supports design for water reclamation facilities, with most of her focus on plant hydraulics and solids handling. Her combined background in chemical engineering and operations informs her work. She currently leads collaborative and customized designs based on site-specific sludge characteristics.

Elizabeth Lee

PNCWA2025 Speaker Bios

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Dr. Elizabeth Lee (she/her) is a social psychologist who has steered data-informed change initiatives across education, consulting, and government sectors. Currently, she is a Process Manager at the City of Portland's Bureau of Environmental Services, collaborating with leadership on strategic projects and processes. Much of her work centers on advancing the bureau's success within a citywide transition in its form of government.

Elizabeth relies on the collection and application of data to inform paths forward and applies a thoughtful, team-building orientation when managing multi-year engagements. Previously, she has been entrusted to lead equitable process improvements, consult on scaling research operations, advocate for inclusive governance protocols, and streamline performance metrics infrastructure. She serves on the Board of an educational institution to enhance their data operations, accreditation processes, and strategic planning. She received her Ph.D. at the Pennsylvania State University.

Emily Stephens, PE

estephens@windsorengineers.com | Windsor Engineers | Ridgefield, WA

Emily is a Stormwater Engineer and Civil Group Manager at Windsor Engineers, where she leads efforts in stormwater compliance, planning, and design across Washington, Oregon, and Minnesota. With over a decade of experience in water resources and municipal infrastructure, she has helped numerous industrial facilities develop and maintain effective, regulator-approved Stormwater Pollution Control Plans under Oregon's 1200-Z NPDES permit. Passionate about making stormwater regulations practical and accessible, she works closely with treatment plant operators, public works staff, and private industry to bridge the gap between compliance and on-the-ground implementation. She also serves as a Planning Commissioner and Watershed District Board Manager, bringing a multi-perspective approach to water quality and environmental protection.

Emily Trickey

emily@hellobrilliantmarketing.com | Brilliant Marketing LLC | Bellingham, Washington

Emily Trickey is a seasoned marketer with a rich history of guiding companies and nonprofits toward their goals. With a passion for conscious marketing, she helps organizations communicate with clarity and purpose through brand strategy, advertising, and integrated campaigns. Before co-founding Brilliant Marketing, Emily led global initiatives at Allison Worldwide, collaborating with major consumer brands and mission-driven nonprofits to craft stories that resonate.

Based in Bellingham, WA, Emily is especially drawn to work that blends strategy with heart. At Brilliant Marketing, she partners with purpose-led clients to develop thoughtful, effective marketing rooted in strategy, storytelling, and design. She thrives on collaboration and brings a calm, thoughtful presence to every project.

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Outside of work, you'll find her mountain biking with her family, soaking up the outdoors, or guiding a yoga class as a certified instructor.

Emily Yokum

eyokum@wolfwaterresources.com | Wolf Water Resources | Portland, Oregon

Emily specializes in natural resource permitting and mitigation and is an integral team member to the resilient stream corridor work of Wolf Water Resources where their team has developed approaches to integrating stream corridor restoration in conjunction with sanitary sewer upgrades. Because sanitary sewer lines and streams often share the same spaces where storm events can lead to erosion that puts sanitary pipes at risk, choosing an integrated approach to sanitary sewer projects can lead to multiple benefits including streamlined natural resource permitting. In this talk she will discuss considerations of this integrated approach, and how to achieve a stream condition that minimizes erosion potential and maximizes flow attenuation. She will share lessons learned in sewer upgrade projects that have reduced costs, and have improved water quality, attenuated runoff, created urban stream amenities, and provided improved habitat.

Eric Dienst

eric.dienst@tetratech.com | Tetra Tech | Seattle, WA

Eric is a wastewater project manager for Tetra Tech.

Eric Polli

epolli@hazenandsawyer.com | Hazen and Sawyer | Seattle, Washington

Eric Polli has been with Hazen for 8 years, primarily focusing on wastewater process modeling, design, optimization, and master planning. Originally from Raleigh, NC, he holds a bachelor's and master's in Environmental Engineering from NC State. When he is not grossing his friends out by calling mixed liquor miso soup, he can be found playing in mud whether that be pottery, backpacking, or off-roading.

Erik Coats

ecoats@uidaho.edu | University of Idaho/Clean Water Services | Moscow, ID

Dr. Coats is a professor of environmental engineering at the University of Idaho. He has been studying EBPR and BNR processes for over 20 years.

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Evelyn Choudhary

choudarye@bv.com | Black & Veatch Corporation | Simpsonville, SC

Evelyn is an engineering manger at Black & Veatch and is responsible for the day to activities to ensuring that projects are accomplished on time and under budget.

Francesca Cecconi

CecconiF@bv.com | Black & Veatch | Irvine, California

Francesca Cecconi, Ph.D. is a process engineer at Black & Veatch

Frederick Tack

Frederick.Tack@consoreng.com | Consor | Phoenix, Arizona

Frederick is a Vice President with Consor Engineers and serves as the National Technical Practice Leader for Water and Wastewater Treatment. He is a licensed Civil Engineer in CO, AZ, TX, and WA, a Grade 4x4 Certified Water and Wastewater Operator, a Board-Certified Water Resource Engineer, and a Certified Sustainability Professional. He holds a BSE in Civil Engineering, and a MS in Civil, Environmental and Sustainable Engineering from Arizona State University, and is a graduate of the Water Environment Federation, Water Leadership Institute. He has authored eight publications, over 60 conference proceedings and journal articles and was an editor on the recent Wastewater Treatment Fundamentals III, Advanced Treatment training manual published by WEF. He is an active member within the WEF Small Systems Community, Technical Focus Group and was an Arthur Sidney Bedell Award recipient in 2024 from AZWEA.

Garrett Benisch

g.benisch@bioforcetech.com | Bioforcetech Corporation | South San Francisco, California

Garrett Benisch has been at Bioforcetech since 2020 developing their unique biochar output from biosolids known as OurCarbon. As the material's production and development has advanced, so has the lexicon around the material class and its applications, leading Garrett to be chosen as an active member of the ASTM committee for biochar use in concrete and of the US Biochar Initiative industry working groups setting specifications and opening new market adoption for the material. With production and sales of OurCarbon in both USA and Italy, Garrett has interfaced with industries ranging from construction to fashion to build markets for this unique material.

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Gary Hunter

HunterGL@bv.com | Black & Veatch Corporation | Tualatin, Oregon

As a specialist assigned to Black & Veatch's Water Technology Group, Mr. Hunter is responsible for process evaluation for both domestic and industrial wastewater treatment facilities. In this role, he is responsible for industrial pretreatment programs, industrial treatment, industrial reuse, and sustainability measures at treatment facilities associated with PFAS mitigation and treatment. In this work, he has gained expertise in the design, operation and troubleshooting of wastewater treatment processes. Mr. Hunter serves as a Reuse Technology specialist in the East Region of Black & Veatch. He serves as the 2nd Vice chair of WEF's Emerging contaminant Community.

Geneva Bernsten

geneva.schlepp@hdrinc.com | HDR | Seattle, Washington

Geneva Bernsten is a wastewater treatment focused EIT with 2 years of experience who is passionate about bringing clean water and sanitation to all communities. As a native Washingtonian, Geneva has enjoyed supporting planning, design, and services during construction in the Pacific Northwest. Beyond municipal wastewater, she ventured into the Water-Energy nexus with her master's research which tackled furthering the development of a novel technology to remove organic arsenic from landfill gas condensate. Now approaching PE licensure, Geneva is excited to step into larger roles and responsibilities as an engineer in the important field of water engineering.

Geoff Baldwin

geoff.baldwin@tetratech.com | Tetra Tech | Portland, OR

Geoff is a process engineer with over 30 years experience in the water-environment industry. He has designed and provided operations management support for dozens of municipal and industrial wastewater treatment plants, with expertise in using operations data to inform planning and design choices. This has led to the current question of whether thermal residuals processing is a good fit for complex discharges.

Gordon Munro

gordon.munro@tetratech.com | Tetra Tech | Portland, OR

I am a civil engineer and have been providing consulting services in Oregon for over 40 years. Currently, I work for Tetra Tech, Inc. located in our Tigard office performing as office manager and vice president. Projects I have worked on include planning, design and construction management for a wide variety of public works projects including 14 treatment plants, 20 pump stations, 30 studies, more than 200,000 feet of pipe as well as water, storm water and transportation projects.

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Graig Rosenberger

graigrosenberger@nuvodaus.com | Nuvoda | Wauwatosa, Wisconsin

Graig Rosenberger is the President of Nuvoda, the leader in Mobile Organic Biofilm technology. With over 25 years of experience, he has held executive and technical roles at major firms including Veolia and Ovivo, specializing in biological wastewater treatment and full system design for industrial and municipal clients. Graig is recognized for his expertise in process engineering, project execution, and business management within the water sector. He is a frequent speaker at industry conferences and is committed to advancing sustainable solutions for water and wastewater treatment.

Greg Mockos

gmockos@brwncald.com | Brown and Caldell | Tacoma, Washington

Greg is Brown and Caldwell's NW Practice Leader for Solids and Energy and bring more than 18 years of experience in the delivery of biosolids handling projects with a focus on advanced thermal treatment technologies such as drying, pyrolysis, and gasification out of Tacoma WA. Greg has a bachelor's in environmental engineering from Montana Tech and a MS in Civil and Environmental Engineering from UC Davis as is the proud father of two daughters that help him spread Tagro and Soungro products on his lawn and garden.

Gregg Thompson, P.E.

gregg.thompson@jacobs.com | Jacobs Engineering | Corvallis, Oregon

Gregg is a Project Manager with Jacobs. He has 30 years experience with a focus on collaborative delivery of water and wastewater treatment plants. Gregg has a Batchelor of Science degree in Civil Engineering from Oregon State University and a Master of Science degree in Environmental Process Engineering from the University of Illinois Urbana-Champaign.

Gregor Posadas

gregorposadas@u.boisestate.edu | Boise State University | Boise, Idaho

Gregor Posadas is a graduate researcher and M.S. Civil Engineering candidate at Boise State University, where his thesis focuses on evaluating high-concentration dissolved oxygen (DO) delivery for improving wastewater treatment plant performance. His research includes feasibility testing of novel DO infusion technologies aimed at enhancing contaminant removal and reducing solids generation in municipal systems.

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He has co-authored multiple peer-reviewed papers on wastewater treatment innovations, including an article in Environmental Research Communications and a forthcoming presentation at the 13th World Congress on Water Resources and Environment (EWRA 2025) on the liquid and solid phase effects of elevated bioreactor DO. Gregor has also co-authored papers on the occurence and dynamics of emerging contaminants in wastewater unit processes.

Hannah Ferguson

FergusonH@CleanWaterServices.org | Clean Water Services | Hillsboro, OR

Hannah Ferguson holds a BS in Biology from Pacific Lutheran University and an MS in Biology from Ball State University. Joining Clean Water Services in April 2021, Hannah's work involves designing sampling campaigns that use environmental DNA to answer regulatory and ecological questions, tracking viral and microbial pathogens through influent, surface and reuse waters, and on-boarding new molecular assays.

Henry Croll

henry.croll@hdrinc.com | HDR | Omaha, NE

Henry Croll is a wastewater data scientist and process engineer at HDR. With a PhD from Iowa State University, Henry’s research bridges traditional wastewater engineering and cutting-edge data science. His work aims to leverage machine learning techniques to holistically optimize wastewater treatment processes and help develop decision support tools to assist operators.

Holly C. Johnson

Hjohnson@kellerassociates.com | Keller Associates, Inc. | Meridian, Idaho

Holly Johnson, P.E., Senior Project Engineer for Keller Associates, Inc.

Holly has over 35 years of wastewater engineering experience in the Midwest and Pacific Northwest. She has been responsible for all phases of project development, from master planning through design and construction. Holly was responsible for design of dewatering improvements, primary and secondary clarifier upgrades, the UV disinfection improvements, and preliminary planning for a new Headworks at the Lewiston WWTP . She has a master's degree and a bachelor's degree in civil engineering from the University of Nebraska–Lincoln.

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Hunter Bennett-Daggett

hunter.bennett-daggett@tetratech.com | Tetra Tech | Portland, OR

Hunter Bennett-Daggett has 20 years of experience as a civil engineer, working on a wide range of water, wastewater, and fisheries projects. He graduated from Worcester Polytechnic Institute and has works at Tetra Tech's Portland office.

Ian McKelvey

imckelvey@brwncald.com | Brown and Caldwell | Seattle, Washington

Ian McKelvey is a Director at Brown and Caldwell with nearly 20 years of experience in wastewater consulting. His work has been focused on planning efforts for utilities throughout Puget Sound, including biosolids, renewable energy, and comprehensive utility planning.

Jaclyn Knoth

JKnoth@bellevuewa.gov | City of Bellevue | Bellevue, WA

To be provided by first speaker

Jacob Korsness

jacob.korsness@wsp.com | WSP | Portland, Oregon

Jacob Korsness has more than 10 years of experience in water and sewer design, with a focus on trenchless sewer rehabilitation and replacement as well as sewer pump stations. He has designed and managed dozens of projects throughout the Portland metro area and enjoys identifying creative uses of trenchless technologies to solve problems.

James Gagnon

jgagnon@hazenandsawyer.com | Hazen and Sawyer | Seattle, WA

James Gagnon is a Senior Associate in the Cincinnati, OH office of Hazen & Sawyer. He has 30 years experience in water and wastewater treatment facility and pumping station planning, design, construction, start-up, and operational evaluation. He is a licensed PE in several states and is a Hydraulic Institute certified Pump Systems Assessment Professional.

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Jamie Lefkowitz

Jlefkowitz@brwncald.com | Brown and Caldwell | South Lake Tahoe, CA

Jamie Lefkowitz is the Innovation Development Leader at Brown and Caldwell. She has 19 years of experience working with utilities on developing innovative approaches to solve a variety of water and wastewater challenges

Jason Flowers

jflowers@geosyntec.com | Geosyntec Consultants | Seattle, Washington

Jason is a Senior Engineer at Geosyntec Consultants with 25 years of experience in the water and wastewater industry. He earned his doctoral degree from the University of Wisconsin-Madison, where his research focused on understanding the fundamental mechanisms of enhanced biological phosphorus removal in wastewater. Since completing his education, Jason has assisted clients in both the municipal and industrial sectors with their water and wastewater treatment challenges.

Jason Pulley

jpulley@cityofsalem.net | Marion County | Salem, Oregon

Jason joined the City of Salem in 2002 and currently manages master planning for the City's water, wastewater, and stormwater systems. Previously, he oversaw the City's regulatory compliance program for its drinking water system. Prior to the City of Salem, Jason spent time as a project scientist for an environmental and engineering consulting firm, specializing in soil and water remediation, mine reclamation, and land application processes.

Jason received a Bachelor of Science degree in Natural Resource Management from the University of Tennessee and a Master of Science in Soil Chemistry from the University of Arkansas. He has over 25 years of experience in the environmental and water utility field.

JB Neethling

jb.neethling@hdrinc.com | HDR Inc. | Folsom, California

JB Neethling is the Technical Director for Wastewater with HDR Engineering. JB has designed nutrient removal plants in the Pacific Northwest for Boise, Coeur d'Alene, King County, Clean Water Services, and others. He was the principal investigator for the Water Research Foundations project to produce Guidelines for Optimizing Nutrient Removal Plant Performance.

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Jeff Barnes, P.E.

barnesj@cityofnampa.us | City of Nampa | Nampa, Idaho

Jeff is the Director of Public Works Water Resources overseeing the Domestic Water, Pressure Irrigation, Environmental Engineering, Wastewater and Capital Projects Divisions. He has over 24 years Civil Engineering experience, holds a Bachelor of Science from Western Washington University and a Master of Public Administration from Boise State University. He is leading a “One Water” initiative driving water quality, water conservation and water reuse.

Jeff Stallard

jstallard@clackamas.us | Clackamas WES | Oregon City, Oregon

Jeff Stallard has 24 years of experience in the water and wastewater industry delivering both in plant and collection system projects. Jeff spent the first 16 years of his career as a consulting engineer and joined Water Environment Services in 2017 as the Civil Engineering Supervisor and is now the Capital Program Manager. Jeff got his bachelors of science degree from the University of Cincinnati. He moved to the pacific northwest 15 years ago where he now spends his spare time exploring the wilderness with his wife and two kids.

Jeffrey Zahller

Jeffrey.Zahller@hdrinc.com | HDR | Bellevue, WA

Jeff is a registered chemical engineer and has served as a process mechanical engineer with HDR for over 20 years. He specializes in process design and field analysis and has completed projects across the treatment plant, from headworks to disinfection, clarification to dewatering and digestion.

Jeremy Jensen

jeremy.jensen@xylem.com | Xylem | Preston, Idaho

Jeremy Jensen has worked in the water and wastewater industry for the past seventeen years in research, testing, consulting, and equipment sales roles. He developed an appreciation for water while working at the Utah Water Research Laboratory before completing his graduate studies in Civil Engineering at Utah State University in 2008. He is a licensed professional engineer in both Utah and Idaho and is currently the Xylem Territory Manager for the West Region.

Jeremy has been active in multiple professional organizations, serving as president of the Northern Utah Branch of the Utah ASCE Section, a member of serval committees in industry organizations. Jeremy is an area director of the Southeast

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Idaho Operator Section of the PNCWA, the membership services chair of the AWWA Intermountain Section and most recently the Idaho Regional Director for the Pacific Northwest Clean Water Association (PNCWA)

Jeremy loves spending time with his wife and six children. Some of his favorite activities are learning and teaching Kenpo and skiing, swimming, and kayaking in the lakes and mountains near his home.

Jessica Christofferson

jessicac@osbornconsulting.com | Osborn Consulting | Bellevue, Washington

n/a

Jill Cook

jcook@m-m.net | | ,

Jill Cook is a senior engineer with experience in planning, design, and construction of wastewater facilities. She has served as Project Engineer, Project Manager, and Client Service Manager on a wide variety of projects including collection system improvements, lift stations, and treatment facilities. She has a strong background in the preparation of Master Plans and Preliminary Engineering reports to meet funder requirements and to assist communities in maximizing their success in securing state and federal funding. Jill has broad experience working on complex projects with numerous funders and state and federal regulatory and permitting agencies to bring projects to a successful completion in accordance with the requirements of numerous participating stakeholders. She has been involved with both the rehabilitation of sewer systems and the development of new systems in previously unserved but already developed areas.

Jill is a Senior Project Manager for the Lockwood Water and Sewer District Phase 3 Sewer Subdistrict project and has worked on the previous LWSD Phase 1 and 2 Sewer Subdistrict projects either as the Lead Project Engineer or Project Manager.

Jim Newell

jnewell@seftconsulting.com | SEFT Consulting Group | Portland, OR

Dr. Newell is a Senior Project Manager with SEFT Consulting Group where he focuses on resilience planning and mitigation for critical buildings and lifeline infrastructure systems, including water, wastewater, and electric power.

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Jim is the author of over 30 technical papers and research reports. He served as a member of the water and wastewater subgroup that developed the Oregon Resilience Plan and was a major contributor to two chapters of the National Institute of Standards and Technology Community Resilience Planning Guide for Buildings and Infrastructure Systems.

Jim White

jwhite@mazzei.net | Mazzei Injector Company | Bakersfield, California

Jim brings over 25 years of experience in technical engineering, sales, marketing and management in the field of water and wastewater with focus in the municipal, industrial, remediation, and food & beverage markets. In his current capacity with Mazzei Injector, he is responsible for all industrial business in western North America and Asia. In addition, he is responsible for all municipal ozone projects up to 5 million gallons per day. Previously he has held sales and engineering positions with DEL Ozone, H2O Engineering and the PulseOx division of APTwater. Jim is a U.S. Army veteran and graduate of Cal Poly State University, San Luis Obispo with a Bachelor of Science in Industrial Technology.

Joe Laciny

joe.laciny@mwhconstructors.com | Slayden Constructors, Inc. | Portland, Oregon

Joe Laciny is a senior project engineer at Slayden Constructors. He has 8 years of experience in design, commissioning, and construction. Joe has been involved in CMGC / CMAR and hard bid style projects that range from existing plants to greenfield constructions.

Joe Mouser

joe@beaversnw.org | Beavers Northwest | Seattle, WA

Joe Mouser graduated from the University of Washington with a B.S. in Plant Biology in 2018. In 2023, he returned to complete a Certificate in Wetlands Science and Management. His position of Communications Manager for Beavers Northwest allows him to combine his passion for wetland habitats with his skills in community engagement and outreach to make an impact on the world around him. He believes that by helping beavers and humans to coexist, we can improve the functions of the urban watersheds of our region to better serve the plants, animals, and humans that rely on them.

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In his spare time, you may find Joe in your local park looking for unique and interesting plants, helping to lead his softball team to victory, or cheering on the Mariners, Seahawks, and Huskies!

Joel McReynolds

Joel.McReynolds@HDRInc.com | HDR Inc. | Gig Harbor, Washington

Joel McReynolds is an instrumentation and controls engineer with HDR, Inc. where he works on a variety of water and wastewater design projects. After nine years of hands-on commissioning and programming experience, he moved to the design side of wastewater. His experience includes a wide variety of projects, ranging from a small drinking water system for a dozen homes to work on some of the largest wastewater treatment plants in the country.

John Burns

jburns@esassoc.com | Environmental Science Associates | Portland, Oregon

John is a team lead at Environmental Science Associates (ESA) in Portland, Oregon. His career focuses on combining computer science with civil and environmental engineering. Prior to working at ESA, he was a Civil Engineer in stormwater planning for the City of Portland. His passion for protecting natural resources and enthusiasm for technology are demonstrated in a BS in Computer Engineering from Oregon State University, followed by an MS in Environmental Engineering from Oregon Health and Science University. He has 20 years of experience developing and managing technology projects in the natural resource space. John lives on his family farm in the Willamette Valley with his wife and children and enjoys working on the farm when he can get away from the computer.

John Chandler

ChandlerJS@cdmsmith.com | CDM Smith | Vero Beach, Florida

Mr. Chandler has been a Senior Construction Manager with CDM Smith for more than 17 years and is currently serving as the company's Construction Management Discipline Leader. He has more than 40 years of experience as a contractor and consultant in the construction of water treatment plants, conveyance facilities and distribution pipelines; wastewater treatment plants, conveyance facilities and collection pipelines; stormwater conveyance and control facilities and collection channels and pipelines; landfills; manufacturing facilities; and power generating facilities.

John Crisman

JohnC@Moleaer.com | Moleaer, Inc. | Sparks, Nevada

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John has 20 years of experience in wastewater treatment operations and management. He is a grade V certified wastewater treatment operator. In his current role as Senior Water Process Engineer and Operations Specialist at Moleaer, he specializes in developing and evaluating process intensification applications for nanobubble technology.

John Koch

john.koch@hdrinc.com | HDR | Eatonville, WA

Short Bio for John Koch (cook)

John is a licensed professional engineer with over 5 decades of varied experience in planning, design, construction, commissioning, troubleshooting and condition assessment of water and wastewater treatment and pumping facilities in the United Stated and Canada. He is a Senior Project Manager and Vice President at HDR for over half his career and is a Board Certified Environmental Engineer by the American Academy of Environmental Engineers and Scientists.

Jon Kercher

jkercher@bozeman.net | City of Bozeman | Bozeman, Montana

Jon Kercher is an operations professional and superintendent of the Bozeman, Montana Water Reclamation Facility. With 18 years serving in wastewater operations and maintenance in a variety of treatment plants across Washington and Montana, he uses data-driven, O&M-focused solutions to enhance plant performance. He has a keen awareness of industry trends and is proactive in strategizing what future technologies or innovations can improve treatment e'iciency, operations and maintenance, and overall watershed quality.

Jon Liberzon

LiberzonJ@bv.com | Black & Veatch | Des Moines, Iowa

Jon Liberzon is Emerging Technologies Process Lead at Black & Veatch

Jonathan Gordon

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jgordon@parametrix.com | Parametrix | Puyallup, Washington

Jonathan Gordon is a Water/Wastewater Engineer and Odor Practice Lead with Parametrix. He has a bachelor's degree in chemical engineering from the University of Virginia and a master's degree in environmental engineering from Johns Hopkins University. He has worked in the industry for twelve years and has experience with nearly every aspect of odor, from sampling & measuring to modeling to designing odor treatment facilities

Joshua Brown

jkbrown@savronsolutions.com | Savron | Cambridge, Ontario

Joshua Brown, M.E.Sc., P.Eng., is an Engineer with Savron, a division of Geosyntec Consultants International, Inc. Joshua was the lead research engineer under the direction of Dr. Jason Gerhard – co-inventor of the STARx technology before joining Savron in 2021. He is keenly involved with planning STARx treatment strategies for PFAS-impacted sites and wastes and contributes to system design, installation, operations, and management of STARx systems. Joshua leverages creativity and a broad theoretical knowledge to find innovative solutions for clients' remediation and waste needs.

Juan Romero, PE

Juan.Romero@jacobs.com | Jacobs | Shoreline, WA

Juan was the project engineer and basin lead for the South Thornton Natural Drainage Systems project. In this role he oversaw all aspects of the project design and provided support for Seattle Public Utilities during the construction phase. He is a water resources engineer with Jacobs' Buildings, Infrastructure, and Advanced Facilities group in Bellevue, Washington with over 13 years of civil engineering experience (7+ at Jacobs/CH2M) including serving as project engineer for other stormwater and green infrastructure projects in Western Washington.

Julia Matton

julia.matton@wcsengineering.com | WCS Engineering | Portland, OR

Julia Matton is a licensed professional engineer and operations director with a background in hydraulic modelling, water and wastewater system optimization and master planning. With nearly a decade of experience in infrastructure consulting, she brings a unique blend of technical precision and big-picture thinking to every project. Julia has supported public and private sector clients of every size across the United States, Australia, New Zealand and Brazil. Her strengths lie in bridging engineering experience with clear, compelling communication- making her a trusted partner for both technical teams and decision makers.

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Juliane Kirby

Juliane.kirby@veolia.com | Veolia Water Technologies & Solutions | Hamilton, Ontario

Juliane graduated from Wayne State University in Detroit Michigan in 2001, with a bachelor's degree in Chemical Engineering. She also holds a Bachelor of Science with specialty in Biological Sciences from the University of Windsor in Ontario, Canada. She has been with Veolia and the former Suez/GE Water & Technologies/Zenon for over 23 years. Prior to her current role as a Senior Process Engineer in Municipal Wastewater, she spent most of her career in Technology/R&D supporting the development of new products introduced into the ZeeWeed product line, including ZW500 Evolve and ZeeLung MABR.

Justin Lianides

justin.lianides@mottmac.com | Mott MacDonald | San Ramon, California

Justin is a licensed engineer with a primary focus on engineering and construction support services for tunnel and trenchless projects. As a principal project manager, he has led engineering for numerous trenchless pipeline installations, including horizontal directional drilling, microtunneling, and horizontal auger boring. He regularly participates in industry events, such as those organized by the North American Society for Trenchless Technology (NASTT) and Pipeline Users Group (PUG). He currently serves as Board of Directors Secretary for the Western Chapter of NASTT.

Kate Carone

kate.carone@portlandoregon.gov | City of Portland Bureau of Environmental Services | Portland, Oregon

Kate Carone is a Senior Water Resources Planner with the Resilience Program at the City of Portland's Bureau of Environmental Services. Her work focuses on increasing bureau climate change and seismic resilience through risk assessment, planning, project management, policy development, and engagement. Kate has worked in environmental planning and restoration for twenty years in the public and nonprofit sectors. She has planned floodplain restoration projects along Johnson Creek in southeast Portland, led the FEMA Community Rating System program, served as the Flood Investigation Captain, and contributed to development of Portland's Natural Hazard Mitigation Action Plans and the Climate Emergency Workplan. She holds a B.A. in Science in Society from Wesleyan University, a Master of Urban and Regional Planning degree from Portland State University, and is a Certified Floodplain Manager.

Katelin Vandehey

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katelin.vandehey@tetratech.com | Tetra Tech | Portland, OR

Katelin Vandehey is a 2022 graduate from Oregon State University. She has a total of 3 years of experience with Tetra Tech and has been working on drinking water, storm water, and sanitary sewer conveyance projects.

Katerina Messologitis

| Stantec | Denver, CO

Katerina has 7 years of experience as a process engineer. Her experience ranges from facility planning to full-scale plant design and operation. Katerina is well versed in wastewater process modelling, piloting, and water quality and treatment optimization studies through her involvement in projects across the Western U.S. Her broad range of experience has provided her with skills to close the loop between planning, testing, design, and operations.

Katrina Hyman-Rabeler

krabeler@geoengineers.com | GeoEngineers, Inc. | Bellingham, WA

As a member of GeoEngineers' river science and engineering team, Katrina uses hydrologic and hydraulic modeling to understand and design complex water systems. She helps protect homes and infrastructure from flooding, restores river habitat, and removes manmade barriers that block fish passage. No matter the project, water resources engineers like Katrina are working to protect public health and the environment, while building more sustainable watersheds for the future.

"I'm fascinated by the flow of water and love how it connects all people, plants, animals, and ecosystems," Katrina says. "I like to think my background in all forms of water movement—from surface water to groundwater and the vadose zone in between—allows me to consistently consider the big, watershed-scale picture."

Katrina's fascination with rivers started early. A childhood spent in and around the Susquehanna River inspired Katrina to begin serving as an AmeriCorps community planner for the National Park Service's Rivers, Trails, and Conservation Assistance (RTCA) program. She helped guide non-profits and local governments through conservation, recreation and river projects—experience that eventually led her to jump into professional consulting.

Over the next four years, Katrina worked as an environmental scientist, honing her skills in everything from field investigations to environmental impact statements. With plenty of practical field experience under her belt, Katrina headed back to school. She enrolled at the University of Wisconsin-Madison to pursue a master's in water resources engineering, focusing on hydrologic/hydraulic modeling and groundwater recharge. After graduating, it wasn't long before she found GeoEngineers.

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“When I saw the job posting from GeoEngineers, it seemed perfect, especially since I was also looking for an employee-owned company with a great team,” Katrina says.

In her free time, Katrina is often in and around the rivers and watersheds she works to protect. She enjoys canoeing, kayaking, and all forms of snow skiing (“on frozen water”). When she’s not on the water, Katrina likes to mountain bike, hike, camp, and explore her Portland neighborhoods. When “forced to be inside,” you might find Katrina reading or trying her hand at various artistic pursuits.

“I feel lucky my work matches my values and passions,” Katrina says. “I’m honored to be part of GeoEngineers’ great team, to work to restore rivers and streams and improve water resources in the Northwest.”

Kayla Brown

Kayla.Brown@jacobs.com | Cascade Energy | Portland, Oregon

Kayla is the laboratory supervisor for the City of Vancouver's Westside WWTP Laboratory. She has 14 years of environmental lab experience serving the City of Vancouver's Wastewater treatment systems as well as a commercial environmental lab. She has a Bachelor of science degree in Biology from Washington State University. As the laboratory supervisor, she oversees the lab accreditation, NPDES permit compliance as well as Title V incinerator operations compliance. She also serves as the sustainability point of contact for the operations team at the Vancouver site and is the liaison for energy efficiency efforts with the treatment plant staff.

Keith Beckman

Keith.Beckman@mwhconstructors.com | Slayden Constructors | Portland, Oregon

Keith Beckman is a project manager for municipal water/wastewater projects with Slayden Constructors, Inc.

Keith Garlinghouse

KGARLINGHOUSE@cityofsalem.net | City of Salem | Salem, Oregon

Keith works for the City of Salem Public Works Department in the Strategic Planning Group and provides technical engineering services with a focus on Water and Wastewater. The Strategic Planning Group provides services to Operations, Engineering, Development Services and the Directors Office for the second largest municipal public works department in Oregon. Keith is a licensed Professional Engineer, Professional Land Surveyor and Water Rights Examiner in the State of Oregon and he received a Bachelor’s Degree in Civil Engineering from Colorado State University. Keith has worked in the Oregon Public Works Government Sector at small, medium and large municipalities for over 38 years and at Salem for the past 30. Keith has extensive experience modeling municipal water distribution systems, sewer

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collections systems, urban stormwater systems and river systems. Keith, his wife Joyce, raised 3 children, spend much of their free time exploring the Pacific Northwest and participating in a variety of outdoor activities including many that involve water.

Kelley Florence

kflorence@hazenandsawyer.com | Hazen and Sawyer | Denver, Colorado

Kelley Florence has been with Hazen for 9 years, primarily focusing on wastewater process modeling, BNR design, and master planning. Originally from New York, Kelley has slowly moved southwest, attending school at Virginia Tech, then moving to Kentucky prior to relocation to Denver CO where she resides now. When she isn't sampling or modeling, she can be found hiking, biking and running.

Kenneth Hui

huikc@cdmsmith.com | CDM Smith | Bellevue, WA

Kenneth has 30 years of broad-spectrum experience in the infrastructure industry. His work spans planning, evaluation and design of new or expansion of water and wastewater treatment facilities. He had led multi-disciplinary teams to successfully deliver a $300 million wastewater treatment plant expansion program, to operation. He has conducted and championed pilot studies of innovative treatment technologies to collect data for full-scale design and new application of existing technologies as proof of concept to support client design decisions. He has recently completed a multiyear PFAS sampling project to support a client in Washington state to characterize and benchmark PFAS level in their wastewater treatment facilities.

Kenny Packard

kenny.packard@hdrinc.com | City of Mount Vernon | Mount Vernon, WA

Kenny has 15 years if experience in the design and construction of wastewater facilities in the Norhtwest

Kerry Lawless

klawless@carollo.com | Carollo Engineers | Portland, Oregon

Kerry Lawless, PE

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Kerry is a wastewater engineer and project manager with experience leading wastewater design, construction, and start-up of various wastewater treatment systems, including ozonation, precipitation/clarification, solids handling, ion exchange, and reverse osmosis.

He brings extensive experience from a major U.S. semiconductor manufacturer where he led a team responsible for the continuous operation and maintenance of multiple wastewater treatment systems and their chemical distribution networks. His background as an operations manager fuels his commitment to designing and building cost-effective wastewater systems and leading teams to tackle complex challenges.

Kiersten Lee, PE, PMP

Kiersten.Lee@mwhconstructors.com | MWH | Boise, ID

Kiersten has 15 years of experience in the water and wastewater industry and specializes in commissioning and startup of treatment facilities. Kiersten education and background is in hydraulics and water/wastewater treatment design. She currently manages MWH's commissioning and start-up group, which includes process mechanical, I&C integration, electrical and treatment process specialists.

Komal Rathore

krathore@carollo.com | Carollo Engineers | Walnut Creek, California

Komal is a process engineer at Carollo with 3 years of experience. Since joining Carollo she has supported several master planning projects and nutrient removal studies. Her current focus and expertise are in process modeling and evaluation of established and emerging technologies.

Krista Reininga

kreininga@brwncald.com | Brown and Caldwell | Portland, Oregon

Krista Reininga is a Water Resources Engineer at Brown and Caldwell with 37 years of experience in urban stormwater management. She has a bachelor's degree in civil engineering from Michigan State University, and a master's degree in environmental science from Indiana University. Her focus is on comprehensive stormwater master planning, stormwater design standards development, climate resiliency, and regulatory compliance related to NPDES MS4 permits and total maximum daily load requirements. She has managed 11 stormwater master plans in Oregon, and managed or supported the development of many municipal stormwater design standards manuals, stormwater monitoring plans, pollutant

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loads models, water quality data evaluations, hydrologic/hydraulic models and rainfall evaluations. She also managed the development of a climate and seismic resiliency plan for the City of Portland's sewer system.

Kristen Jackson

Kristen.Jackson@jacobs.com | Jacobs | Portland, Oregon

Kristen Jackson is a wastewater treatment process engineer and project manager with expertise in process mechanical design, startup and commissioning, and alternative delivery projects. She is personally passionate about energy conservation and she spent three years in the Peace Corps solving rural water and sanitation problems in Peru.

Kurt Chirbas, Sr

Kurt.chirbas@Henkel.com | GeoTree Solutions | Sacramento, CA

Kurt Chirbas, PE(IL) CPESC is currently Regional Sales Manager for GeoTree Solutions for 8+ years with a current emphasis on technical sales for GeoSpray used for pipe rehabilitation, mining and irrigation systems. Kurt holds a BS in Civil Engineering from Purdue University in West Lafayette, Indiana ('85). Kurt has over 35+ years of experience that includes, remediation, field investigation, design/build, construction management, product development, technical sales and home builder. He specialized in remediation and rehabilitation projects for: Superfund sites, Landfills, Water Vapor issues for on grade slabs, sewer systems and erosion control and soil stabilization for public transportation projects. Kurt has written numerous papers on different technologies, including geopolymers, turf reinforcement matts, hydraulic applied erosion control products, hard armor erosion control products and pipe rehabilitation.

Lance Bunch

LBunch@tacoma.gov | City of Tacoma Environmental Services Department | Tacoma, Washington

Lance Bunch brings over 16 years of engineering experience with the City of Tacoma's Capital Delivery Group, where he has managed wastewater infrastructure projects, developed engineering solutions, created detailed design documents, and led multi-disciplinary teams to successful outcomes. Prior to his public sector career, Lance spent more than a decade as a Journeyman Millwright, specializing in mechanical systems. Outside of work, Lance is passionate about martial arts, surfing, snow skiing, and fishing. He is a proud Washington State University alumnus.

Lanelle Ezzard

lanelle.ezzard@tylin.com | HDR | Seattle, WA

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Lanelle Ezzard is the new Water Sector Manager for TYLin in the Northwest region. Lanelle manages key client relationships and leads strategic water infrastructure projects. With over 15 years of dedicated experience in the water sector, Lanelle has expertise in program management, strategic planning, asset management, capital improvement planning, and decision support. Her background positions her to help address the many pressures utilities face, including aging infrastructure, climate and disaster risk, and the drive toward data-driven decision-making.

Larry Morris

larry.morris@kubota.com | Kubota Water and Environment USA Corporation | Canton, OH

Larry Morris, serves as the General Manager of Research & Development at Kubota Water and Environment U.S.A., Corporation, having held various roles in the organization, including Deputy General Manager and Senior R&D Scientist. His primary focus is developing and improving flat plate membranes and MBR systems for wastewater treatment and reuse applications. He holds a PhD in physical inorganic chemistry from Michigan State University and a BS in chemistry from Lipscomb University.

Lauren Takitch

lauren.takitch@entexinc.com | Entex Technologies | Chapel Hill, NC

As Engineering Manager at Entex, Lauren leads process design and project execution. She is also involved with project start-up and commercial responsibilities. Lauren began working for Entex in 2019 as a Project Engineer and has since become well acquainted with Entex's operations and systems. She has a B.S. in Chemical Engineering and a minor in Environmental Engineering from Penn State University, which fostered her original interest in wastewater treatment.

Lauren Tetzloff

LaurenTetzloff@kennedyjenks.com | City of Portland Bureau of Environmental Services | Portland, Oregon

Lauren Tetzloff is a Professional Engineer with Kennedy Jenks Consultants in Portland, Oregon. She holds a bachelor's degree in Environmental Engineering from Oregon State University and brings technical expertise in water and wastewater conveyance, wastewater treatment planning and design, and process modeling. She has facilitated the PNCWA mentorship program for several years and is actively involved in PNCWA's Student and Young Professionals Committee along with other professional organizations such as Women in Environment.

Lauren Wittkopf

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laurenwittkopf@outlook.com | KPFF/As Yet Unknown University in the Fall (Likely UW) | Olympia/Seattle, Washington

Lauren is an engineer with a passion for people, water, and optimization. Graduating from University of Washington with BS Environmental Engineering in 2023, she has been working in Olympia for the past two years at KPFF. Delivering water and stormwater design and permitting for private and public clients, including Western Washington's second-ever wastewater treatment plant decommissioning, has been a springboard into the next adventure; pursuing an MS in Earth and Environmental Engineering at Columbia University in New York City in Fall 2025. As she furthers education on the innovative processes that protect waterways and thereby enable our complex civilization, techniques to optimize the creativity we each have inside of us are a central focus. Aiming to always foster relationships, safe vulnerability, and excellence, Lauren relishes any opportunity to integrate process engineering, social psychology, and even her recent training as a yoga teacher.

Leo Lal Mathew, EIT

Leo.Mathew@portlandoregon.gov | City of Portland, Bureau of Environment Services | Portland, OR

Leo Lal Mathew is an Engineering Associate – Electrical, with the City of Portland, Bureau of Environmental Services (BES). Leo has been part of the Operations & Maintenance (O&M) team and served as Electrical Maintenance Coordinator for the past 8 years. Last April Leo has moved to Treatment and Pumping Systems Division (TPSD) as an Engineering Associate – Electrical.

During his career with City of Portland, Leo has been widely involved with the energy program and played various roles within the program as master data collector, energy coordinator, energy co-champion, and energy champion. Leo has coordinated well with various internal and external stakeholders extensively for implementing energy projects and strategies, reporting, and presentation here at the bureau.

Leo holds a B.S in Electrical Engineering and is an expert in the field of energy saving ideas, reliability centered maintenance, resource recovery, Kaizen methodology etc. Leo is super excited and is always inspired by new technologies in energy savings and resource recovery. He is always thrilled in implementing innovative ideas, strategies, best O&M plans, and standard operating procedures (SOPs) in achieving the goals of the organization.

Leon Downing

downingl@bv.com | Black & Veatch | Madison, Wisconsin

Leon Downing is the Global Practice Technology Leader for Nutrient Removal & Recovery at Black & Veatch, and Director of the Innovation Platform.

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Lindsey Smoot

Lindsey.Smoot@jacobs.com | City of Nampa, ID | Nampa, ID

Lindsey Smoot is an EIT with 3 years experience. She has an academic background in biological nutrient removal and project experience with plant optimization studies, permit renewals, facility plans/engineering reports, tertiary filtration and UV design. Lindsey assisted in commissioning of the Nampa Group F upgrades.

Linet Bravo

Linet.Bravo@Seattle.gov | City of Everett, WA | Everett, WA

Linet Bravo has more than 10 years of experience in local government and race and social justice leadership and is a clinically trained social worker specializing in bridging individual well-being with institutional responsibility. Linet is currently the Racial Equity and Policy Advisor in Corporate Policy and Planning at Seattle Public Utilities.

Lisa Huntington, PE

huntingtonl@cleanwaterservices.org | Brown and Caldwell | Seattle, WA

Lisa is the Director of the Natural Systems Enhancement & Stewardship (NSES) Department of Clean Water Services (CWS), a regional water resources utility in Washington County, Oregon. CWS applies an integrated watershed approach, combining science and nature to meet regulatory requirements and enhance the Tualatin River watershed. NSES plans, designs, and implements ecological enhancement projects; and provides long-term maintenance and stewardship of a vast network of wetlands, streams and forests.

She has 25-years of experience in civil and water resources engineering, working within the public and private sectors. Originally from Michigan, Lisa spent the first decade of her career working to restore watersheds in the Great Lakes Region but has focused on restoring Portland-metro area watersheds since 2012. She holds a B.S. in Civil Engineering from Michigan State University and an M.S. in Civil Engineering from Lawrence Technological University.

Liz Arikawa

larikawa@easssoc.com | | ,

Liz is a software engineer with a wide array of experience from processing large mass spectrometry datasets at Lawrence Berkeley National Laboratory to updating decades old legacy code at Intel. Now she works at Environmental Science Associates as part of "Team H2O" contributing to web applications and data management systems that help various

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government agencies across the country manage their water. Passionate about the environment, Liz strives to deliver impactful solutions that align with both user needs and business goals.

Lucas Becia

lucasbecia@kennedyjenks.com | Kennedy Jenks | Portland, Oregon

Staff Engineer - Kennedy Jenks

Luke Johnson

ljohnson@esassoc.com | JLA Public Involvement | Battle Ground, Washington

Luke Johnson is an interdisciplinary scientist in Portland and leads the Northwest Fisheries Program at Environmental Science Associates. He leverages his background as a restoration ecologist and watershed planner while supporting communities throughout the Pacific Northwest to envision, plan, and implement aquatic habitat restoration projects that yield multiple benefits.

Luke Thompson

lthompson@hdrinc.com | HDR | Seattle, Washington

Luke Thompson, a PE with six years of experience, is passionate about developing innovative water engineering solutions that enhance our communities and the environment. He has contributed to projects across the U.S., with a focus in the northwest, specializing in wastewater treatment, nutrient optimization, hydraulic modeling, integrated planning, and program management and collaborative delivery.

Mackenna Bell

mbell@urbanfloodsafetyor.gov | Parametrix | Seattle, Washington

Mackenna is an engineer and project manager at the Urban Flood Safety & Water Quality District (UFSWQD) with a background in environmental engineering. The UFSWQD operates and maintains a flood safety system along the Columbia River in Multnomah County.

Maddy

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Fairley-Wax | Jacobs Engineering Group | Chicago, Illinois

Maddy Fairley-Wax is a project engineer at Jacobs specializing in anaerobic digestion design and optimization, biogas conditioning, and combined heat and power system designs. She leads the research and development of Jacobs' Microbial Hydrolysis Process.

Mahmood Khwaja

KhwajaM@CDMSmith.com | CDM Smith | Boston, Massachusetts

Mahmood Khwaja is CDM Smith's National Discipline Leader for Tunnels and Underground Structures and is a registered professional Engineer in eleven states. He is an accomplished tunnel/geotechnical/structural engineer, project manager and technical leader with more than 30 years of experience designing above and below ground structures. He is experienced in managing projects and project teams that are complex underground engineering projects located domestically and internationally. He has worked on more than a hundred miles of micro-tunnels, mined tunnels, and bored tunnels ranging in diameter from 3-ft to more than 25-ft, at depths up to 100-ft below grade; large diameter shafts constructed to more than 100-ft depths. His project experience includes soft ground, mixed face conditions, and hard rock. Mahmood leads risk management on tunneling projects and develops sub-surface investigation for large-scale tunneling projects to help mitigate project risks related to differing site conditions.

Mami Hara

mhara@uswateralliance.org | Brown and Caldwell | Seattle, WA

Short Version:

Mami Hara is CEO of the US Water Alliance, a national nonprofit advancing policies and programs that build a sustainable water future for all. Mami's experience in sustainable and equitable land and water management was earned in public sector, private practice, and non-profit roles in which she guided award-winning green infrastructure, sustainability, utility, and community investment programs. Prior to serving at the Alliance, Mami was general manager and CEO of Seattle Public Utilities, where she shepherded leading affordability, customer service, One Water, zero waste, and anti-displacement programs. Mami leads development of the Alliance as a National Environmental Finance Center.

Long Version:

Mami Hara is CEO of the US Water Alliance, a national nonprofit advancing policies and programs that build a sustainable water future for all. Mami brings over three decades of experience in land and water management, fostering sustainable and equitable policies and practices through cultivating leaders, partnerships, workforce, and community centered participation, planning, and management. In her public sector and private practice roles, Mami has guided the planning

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and implementation of award-winning green infrastructure, sustainability, utility, and community investment programs across the nation. Mami leads the Alliance's efforts as a National Environmental Finance Center.

Prior to serving at the Alliance, Mami was general manager and CEO of Seattle Public Utilities, which provides solid waste, drainage, and wastewater services for Seattle residents and businesses, as well as drinking water for 1.4 million regional customers. In Seattle, Mami shepherded leading affordability, customer service, One Water, zero waste, and anti-displacement programs as well as the largest capital project ever undertaken by the City of Seattle. Mami also served as first deputy commissioner of Philadelphia Water, where she helped foster the groundbreaking green infrastructure program, Green Cities, Clean Waters. Additionally, as a principal with a leading urban design and planning firm, Mami led seminal projects such as GreenPlan Philadelphia, and impactful environmental justice-centered, open space, infrastructure, and development plans for underserved communities across the eastern US.

Mami has helped to build and lead networks including the Green Infrastructure Leadership Exchange, a peer-to-peer network for cities and utilities advancing green infrastructure programs, and has been an advisor to several environmental, philanthropic, planning, and design advocacy organizations. Mami taught at PennDesign, Temple School of Architecture, and the Department of Urban Studies and Planning at MIT, and she holds degrees from the University of Pennsylvania and Harvard University.

Mario Benisch

mbenisch@hdrinc.com | HDR | Portland, OR

- 1998: Graduated from University of Stuttgart, Germany with MS in Environmental Engineering
- Since 1998 with HDR in Portland OR
- Now senior wastewater process engineer with focus on nutrient removal and recovery, emerging technologies, process intensification, dewaterability, and plant data visualization.

Mark Cummings

mark.cummings@consoreng.com | Consor | Boise, Idaho

Mark is a Consor Principal Engineer with extensive experience in the planning, modeling, design, and construction of water, wastewater, and site civil projects.

Mark Poling

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mark@wastewater.org | Clean Water Management | Grand Rapids, MI

Mark is an independent consultant and sole proprietor of Clean Water Management, a consulting firm focusing on utility management. He is a past member of the Water Environment Federation House of Delegates, and a former Trustee of the WEF Board. He is also a past president of the PNCWA. He has nearly 40 years of experience at Clean Water Utilities including utility management, water resource recovery facility operation, maintenance, design, and construction.

Mark Walter

markw@waterdudesolutions.com | Waterdude Solutions | Oregon City, Oregon

Mark D. Walter is the founder of Waterdude Solutions, a consulting firm specializing in operations and maintenance support for wastewater treatment facilities. With decades of experience spanning plant operations, maintenance leadership, and process optimization, Mark has led major initiatives including advanced nitrogen removal, equipment commissioning, and asset management planning. A frequent presenter at regional and national conferences, he is a past president of PNCWA and a U.S. Army veteran. Mark holds Oregon Grade IV certifications in both wastewater treatment and collection.

Matt Hewitt

Matt.Hewitt@portlandoregon.gov | City of Portland BES | Portland, Oregon

Please see Matt Hewitt's response to the acceptance email. Thank you.

Matt Noesen

Matt.Noesen@jacobs.com | Jacobs | Vancouver, WA

Matt has worked in 23 states and on over 100 capital programs. Matt has experience with traditional design-bid-build, GC/CM and progressive Design-Build delivery methods. He also has extensive experience with innovative procurement approaches to accelerate project schedule and enhance Owner control of desired outcomes. Matt is passionate about connecting the Water-Energy nexus dots and especially projects that are associated with resource recovery at municipal wastewater treatment facilities. Several recent, relevant work includes:

Food Waste Recycling Alternatives Analysis - King County, Washington

Beyond Net Zero Program - Gresham, Oregon

Organic Materials Recovery and Bioenergy Feasibility Study Project - Clatsop County, Oregon

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Wasatch Co-Digestion Evaluation - Layton and North Salt Lake, Utah

Comprehensive Facilities Plan Update – Metropolitan Wastewater Management Commission (MWMC), Eugene and Springfield, Oregon

Experience: 34 years.

Education:

MS, Environmental Engineering, University of California, Berkeley

BS, Electrical Engineering, Carnegie-Mellon University

Matt has been WEF member since 1990

Matt Smeraglio

matt.smeraglio@cascadeenergy.com | Cascade Energy | Boise, Idaho

Matt Smeraglio is a Senior Energy Efficiency Engineer at Cascade Energy, where he partners with water and wastewater operators and engineers to reduce energy costs at treatment plants. His experience spans energy efficiency consulting for capital improvement projects, low- and no-cost strategic energy management programs, and utility grant funding. Matt holds an M.S. in Mechanical Engineering from Portland State University, a B.S. in Mechanical Engineering from the University of Portland, and he is a registered Professional Engineer in the state of Oregon.

Matthew Cosenzo

mscosenzo@ashlarstructural.com | Ashlar Structural | Boise, Idaho

Matthew Cosenzo has spent over 18 years in the Heavy Civil and Infrastructure construction markets in projects ranging from shotcrete and specialty liners, deep excavations, tunnel construction, cast in place concrete, pile installation. His diverse background from being the field as a laborer to now President of Ashlar Structural brings practical experience through a wide variety of technically challenging projects throughout the US.

Matthew Gregg

mgregg@brwncald.com | Brown and Caldwell | Boise, Idaho

Matthew Gregg is Brown and Caldwell's Central Area Growth Leader in addition to serving as a program manager and client service manager. Matt's primary focus is assisting clients with long-term utility management decisions and large program execution. He is currently leading the implementation of over $700M in recycled water programs. Matt has a

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master's degree in civil engineering with a focus in wastewater engineering and a bachelor's degree in civil engineering, both from the University of Idaho.

Maud De Bel

mdebel@kingcounty.gov | King County | Seattle, WA

Melissa Moe

mmoe@crwwd.com | Clark Regional Wastewater District | Vancouver, Washington

Melissa?Moe, MA, PMP

Operations Manager, Clark Regional Wastewater District

Melissa Moe has served as Operations Manager (Collections) at Clark Regional Wastewater District since October 2023, after advancing through key leadership roles—Systems Program Manager (Feb–Oct?2023) and Control Systems Administrator (Feb?2020–Feb?2023). With over five years at the District, she was honored with a 5?Year Service Award in February 2025, recognizing her impactful work.

She holds an MA in Management (Project Management) from Avila University (2021) and a BS in Environmental Science & Geography from the University of Missouri–Kansas City (2012).

Michael Humm

MichaelHumm@KennedyJenks.com | Kennedy Jenks | Portland, Oregon

Michael Humm is a civil engineer with 20 years of industry experience. He is the Owner's Advisor for the Carolina Sewer Trunk project which is being delivered using the CMGC method.

Michelle Barnett

michellebarnett@lottcleanwater.org | LOTT Clean Water Alliance | Olympia, WA

Michelle Green

Michelle.Green@jacobs.com | Water Collaborative Delivery Association | Portland, Oregon

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Michelle Green is Jacobs' Water design-build lead for the Western U.S. She has over 30 years of design and construction experience on water and wastewater projects. A PNW resident for over 20 years, Michelle is a licensed PE in Washington and Oregon, and actively engaged in and a past board member of PNCWA. She has led Design, PDB, DB and DBOM teams and supported owners as an advisor on CM/GC and PDB projects.

She has delivery management experience gained from overseeing schedule, budget, and quality control for collaborative delivery projects totaling nearly $800M in constructed value. This broad perspective, gained from sitting on both sides of the table, informs her project-first approach.

As past President of the Water Collaborative Delivery Association, Michelle regularly presents at conferences and education sessions on collaborative delivery models and best practices on behalf of the Association. As Chair of the Best Practices Committee for nearly 5 years, she led development of best practices guidance work products for owners' and practitioners' use in implementation of collaborative delivery to serve educational, informational, and advocacy purposes.

Mikaela Bolling

mikaela@hellobrilliantmarketing.com | Brilliant Marketing | Bellingham, Washington

Mikaela is a marketing strategist, entrepreneur, and advocate for values-driven business. With a background that spans environmental nonprofits, business consulting, and brand strategy, she brings a unique blend of mission and strategy to her work. She holds an Executive MBA and has partnered with purpose-led organizations and entrepreneurs to clarify their message, grow sustainably, and use marketing as a force for good. Since co-founding Brilliant Marketing, she has helped build strategy-backed campaigns that are both thoughtful and effective.

Based on Maui, Mikaela is especially committed to community-centered economic development and supporting women in business. Outside of work, you'll find her helping on a local farm, catching waves, or hiking.

Molly Nause-McCord

molly.nause-mccord@portlandoregon.gov | City of Portland's Bureau of Environmental Services | Portland, Oregon

Molly Nause-McCord is a Wastewater Collections Systems Maintenance Engineer for the City of Portland's Bureau of Environmental Services. She is a professional problem solver and science enthusiast. For over 15 years Molly has worked in sewer and stormwater infrastructure including managing new construction, urgent site repairs, condition assessment activities, and field engineering. Molly holds a Civil Engineering degree from the Oregon Institute of Technology and is the president of the Oregon Water Education Foundation.

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Murthy Kasi

mkasi@ardurra.com | Ardurra | Coeur d'Alene, ID

Murthy Kasi is a Wastewater Technology Leader at Ardurra. His expertise includes nutrient removal and process modeling. He leads Chemical Phosphorus Removal, a sub-focus group of Nutrient Removal Focus Group under WEF's MRRDC. He has also published several articles and authored book chapters.

Nandita Ahuja

nahuja@hazenandsawyer.com | Hazen and Sawyer | Portland, Oregon

Ms. Nandita is a Civil and Environmental Engineer with over 10 years of experience in a broad range of projects, including wastewater treatment, master planning, and hydraulic modeling. She is passionate about integrating data science into traditional civil engineering practices to drive innovation, enhance decision-making, and improve efficiency.

Naomi Senehi

naomi.senehi@374water.com | 374Water | Costa Mesa, CA

Naomi Senehi is the Technical Solutions Lead for Municipal and Global Access at 374Water. She is a proud gator and Rice alumni with over ten years of research experience on projects related to triclosan, coronavirus, and PFAS removal from wastewater. Naomi is based out of Southern California and is looking forward to presenting today on supercritical water oxidation.

Nathan Erickson

nerickson@tfid.org | City of Twin Falls | Twin Falls, Idaho

NA

Neil Jenkins

njenkins@eaglesewer.org | Eagle Sewer District | Eagle, Idaho

Neil Jenkins serves as the General Manager of Eagle Sewer District where he oversees the administration, collection, and treatment of the used water in the Eagle, ID area.

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Nick Guho

nguho@carollo.com | Carollo Engineers | Boise, Idaho

Nick Guho is a lead technologist at Carollo with 15 years of experience in applied research and consulting. He specializes in wastewater process modeling, data analytics, process design, and BNR facility planning. He holds MS and PhD degrees in Civil Engineering from the University of Idaho.

Nicki Pozos

nicki@theformationlab.com | The Formation Lab | Portland, Oregon

Dr. Nicki Pozos, Principal with The Formation Lab, brings 20 years of experience in engineering, planning and communications for major infrastructure projects. Nicki leads efforts to integrate equity into the infrastructure life cycle: leading equity strategies for multiple major ($B+) infrastructure programs, developing Equity Plans for sewer, pump station and levee upgrade projects, and finding innovative ways to engage urban Indigenous and other underrepresented communities. Nicki aspires to be the world's first engineering psychologist, bringing engineering thinking to understanding what makes people tick!

Nora Boylan

nboylan@wolfwaterresources.com | Wolf Water Resources | Portland, OR

Nora Boylan is an ecohydrologist and geomorphologist for Wolf Water Resources (W2r) in Portland, Oregon. Nora has been with W2r for six years since receiving her Master's degree in Water Resource Science in 2019 from Oregon State University. Nora's work at W2r has involved research-based hydrologic and geomorphic analyses to address questions surrounding resilient stream corridors, stormwater management, and hydromodification. She also works with river and floodplain restoration, with a focus on groundwater-surface water interactions.

Pamela Villarreal, PE

pvillarreal@kellerassociates.com | Keller Associates, Inc. | Salem, Oregon

Pam Villarreal is a Project Manager at Keller Associates, Inc. with 13 years of experience. She earned her Bachelor of Science in Civil Engineering from the University of California Los Angeles and spent the first part of her career doing retail remediation engineering in Southern California and New York before stepping away to stay home with her five children.

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She returned to engineering in 2019 and now provides engineering consulting services for various aspects of water and wastewater treatment systems in the Inter-Mountain and Pacific Northwest.

Paul Beskow

pbeskow@geoengineers.com | GeoEngineers, Inc. | Tacoma, WA

Paul is a project engineer on GeoEngineers' River and Hydraulic Engineering Team, where he plays multiple roles including project manager, design engineering manager, and construction engineer. He manages project scope, budget, and schedule while coordinating across disciplines to ensure collaborative and high-quality design solutions.

His daily work also involves reviewing projects, writing design reports, supporting construction engineering, and actively contributing to design and drafting efforts.

With more than 12 years of experience in civil engineering, Paul has worked across a wide range of sectors including water and wastewater infrastructure, stormwater management, dredging design, fish passage, stream bank restoration, construction management, and more. With this background, Paul can understand the big picture of multidisciplinary projects and anticipate challenges, proactively coordinating solutions that keep projects on track. Paul notes, "My top priority is successful project execution, whether I'm in a supporting role or leading a task."

Paul's interest in civil engineering grew from a lifelong passion for math and science combined with hands-on construction experience working alongside his father, a plumber. Growing up in the Pacific Northwest, he felt a strong connection to the region's natural systems. "I am delighted with the energy around salmon protection and habitat restoration across the PNW," he says. "My dream, a decade in the making, of making a difference in the real world is being realized here at GeoEngineers, and I couldn't be happier."

Prior to joining GeoEngineers, Paul spent over a decade consulting for public agencies and municipalities, working on projects spanning engineering, natural resources, permitting, master planning, and more.

Looking forward, Paul aims to expand GeoEngineers' reach in water resources projects and be a catalyst for innovation. "I want to make an impact in my local community and beyond, always looking up and around for opportunities to grow and make a difference."

Outside work, Paul enjoys a wide range of activities including hiking, kayaking, running, creative writing, woodworking, and spending time with friends. He also enjoys music from his vinyl collection and the occasional TV show or video game.

Peter Martin

peter.martin@trinnex.io | Trinnex | Roseville, CA

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Peter Martin has been helping water & wastewater utilities and their consultants solve problems with digital water and asset management software for 25 years now. He currently is a Digital Solutions Consultant with Trinnex. Peter's expertise includes hydraulic models, digital twins, asset management, GIS, smart meters, energy optimization, and AI and machine learning.

Peter Ozzolek

ozzolekpj@cdmsmith.com | CDM Smith | Boston, Massachusetts

Peter Ozzolek is a management specialist with experience in civil engineering and construction management for large scale municipal design and building projects. He served six years as a submariner in the United States Navy, and has 28 years of experience in program management, construction management, civil engineering project management, business operations, and client relationship management. Mr. Ozzolek has an extensive background in owner's representation and construction inspection across a diverse range of projects. His expertise spans municipal facilities, water plant construction and overhaul, landfill cap and expansion, hazardous waste removal, pumping stations, sewer drain systems, and water distribution projects. He is currently a Regional Team Leader with CDM Smith, supervising approximately thirty staff members

Philip Lander

lander@inctrl.com | inCTRL Solutions Corp | Cottonwood Heights, UT

Phil Lander is a Product Owner at inCTRL Solutions, overseeing the development of advanced data capabilities. Phil has over 15 years of experience in the membrane business with GE Water and Suez as a process engineer using intelligent data solutions to support customers manage their fouling, cleaning, and membrane life. Phil is a licensed Professional Engineer in Ontario and holds a Bachelor of Applied Science in Chemical Engineering from the University of Waterloo.

Pranoti Deshmukh

Pranoti.Deshmukh@wsp.com | WSP | Portland, Oregon

Pranoti Deshmukh has nearly 9 years of experience in the industry. Her focus area is design and modeling for stormwater and wastewater infrastructure projects, specializing in conveyance systems, and sewer rehabilitation and replacement. She has worked on various projects for state and municipal clients.

Prithviraj Chavan

PNCWA2025 Speaker Bios

rchavan@ardurra.com | Ardurra | Coeur d'Alene, ID

Raj Chavan, Ph.D, PE, PMP is National One Water Lead at Ardurra. He has over twenty years of experience in water/wastewater industry and his main areas of expertise include advanced nutrient removal and recovery and beneficial reuse. Raj has also been involved in several research projects including climate change impact, nutrient removal, DBP formation, etc. He chairs several committees in WEF/AWWA/WateReuse Association and has authored numerous publications.

Quitterie Cotton

quitterie.cotten@jacobs.com | Jacobs | Portland, OR

Will add later

Rachel Golda

goldar@cleanwaterservices.org | Clean Water Services | Hillsboro, OR

Dr. Rachel Golda is a researcher at Clean Water Services in Washington County, Oregon. She has over 14 years of research experience, specializing in methods development, molecular biology, algal ecology, and microplastics, with a focus on water quality and wastewater-based technology. Rachel holds a B.S. in Biology and a Ph.D. degree in Environmental Science and Engineering from Oregon Health & Science University. She is a member of Water Environment Federation (WEF), the Pacific Northwest Clean Water Association (PNCWA), and Oregon Association of Clean Water Agencies (ORACWA), the latter of which she serves on the Legislative and Water Quality Committees.

Rachel Shaw

rachel.shaw@stantec.com | Stantec | Portland, OR

Rachel is a process engineer with 5 years of experience working in water and wastewater planning and design. She is involved in projects across the Western U.S. and relocated to Hawaii to operate a pilot at the Sand Island Wastewater Treatment Plant.

Rasha Maal-Bared

maalbaredr@cdmsmith.com | CDM Smith | Burnaby, British Columbia Canada

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Rasha is a principal scientist at the CDM Smith Bellevue Research and Testing Laboratories, where she oversees environmental microbiology and innovative water and wastewater treatment research and development projects. Before she joined CDM Smith two years ago, she was the senior microbiologist and wastewater treatment specialist at EPCOR Water Canada for ten years. Rasha is also an adjunct professor at the University of Alberta's Department of Civil and Environmental Engineering. She completed her PhD in Environmental Microbiology at UBC and her two MSc degrees at the Harvard School of Public Health and Dalhousie University. She proudly serves as the Water Environment Federation's (WEF) Community Leadership Council chair, and on the Board of Directors of Vancouver Island Women in Science and Technology (iWIST). She lends her expertise to the editorial boards of Science of the Total Environment, Water Practice and Technology, and Data in Brief. Rasha was the recipient of several prestigious water industry awards, including the WEF 2020 Water Heroes Award, the 2023 Western Canada Water Analyst Excellence Award, and the 2020 US Empowering Women in Industry STEM Award. She has authored more than 50 peer-reviewed publications. When she's not working, she enjoys travelling and playing Dungeons and Dragons with her family.

Refreeno Harvey

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Mr. Harvey is a water resources engineer with AECOM and has two year of work experience in planning work and hydraulic modeling. In this presentation, I will share my water story, from growing up on the Navajo Nation to my current role at AECOM.

Riley Murnane

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Riley Murnane is a Principal Engineer with Hazen and Sawyer focusing primarily on wastewater treatment facility planning and design projects. Riley works on projects throughout the West Coast and has performed planning projects on dry- and wet-weather systems.

Rita Cooper

CooperR@CleanWaterServices.org | Clean Water Services | Hillsboro, OR

Rita Cooper has a passion for water in all its forms. She is a professional civil engineer with over 13 years of experience in stormwater treatment, groundwater and soil remediation, and complex water resource compliance. Rita holds a M.Eng. in Water Resource Engineering from Portland State University and a B.S. in Civil and Environmental Engineering from the University of Maine.

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Rob Hamilton

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Rob Hamilton is a retired U.S. Army Recruiter and Special Operation Medic with 25 years of service. Rob has deployed throughout the Central Command area of operations in support of OIF and OEF. While with Special Operations, Rob worked with a Civil Affairs unit where engineering was a large aspect of the work from bidding road projects, a TV Station and many wells and wastewater plants. Rob is now a Lead Recruiter with CDM Smith for the past 3 years as well as the Veterans Hiring Program Manager.

Rob has an undergraduate degree from Roger Williams University in Public Administration and an MBA from Syracuse University with a dual concentration in Marketing and Entrepreneurship.

Robert Sharp

| Hazen and Sawyer Engineers | New York, New York

Rob Sharp specializes in advances wastewater treatment process and design. He has been with Hazen and Sawyer for 18 years working on nutrient removal and resource recovery projects across the United States and abroad.

Ron Gearhart

rgearhart@eaglesewer.org | Eagle Sewer District | Eagle, Idaho

Mr. Ron Gearhart brings more than 38 years of experience, knowledge and expertise to the water and wastewater fields. Currently the Treatment Manager for Eagle Sewer District. I hold multiple wastewater certifications in Idaho; a Wastewater Treatment Operator Class IV, Collections Operator Class IV, Laboratory Analyst Class IV and is a graduate of BSU.

Ross Mollenhauer

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Ross Mollenhauer is Engineering Manager for the City of Missoula.

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Ryan Hartlieb

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Project Superintendent

Ryan Hougham

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Ryan Hougham is a mechanical engineer with nearly 20 years of experience in consulting engineering and technology provision in the water/wastewater industry. He is VP of Business Development at Specific Energy focusing on digital twin optimization of pumping systems. Ryan's main passion is resource recovery, helping organizations maximize the assets and resources that they already have, while making sure new investments are put in the best position to succeed.

Ryan Locicero

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Ryan Locicero, PhD, P.E., is a Business Practice Leader at Clean Water Services in charge of Business Strategy, Performance and Innovation. In his previous role, Ryan was awarded the American Association for the Advancement of Science (AAAS) Science and Technology (S&T) Policy Fellowship at The National Science Foundation (NSF) in the Directorate for Computer and Information Science and Engineering's (CISE) Office of the Assistant Director (OAD). Ryan contributed to CISE research and education activities, including cross-cutting initiatives such as Smart and Connected Communities (NSF 16-610 and NSF 18-520), Cyber-Physical Systems (NSF 17-529 and NSF 18-538), Innovations at the Nexus of Food Energy Water (NSF 17-530 and NSF 18-545), and Signals in the Soil (NSF 18-047). Dr. Locicero received a Ph.D. in Environmental Engineering, M.E. in Environmental Engineering Sciences, and B.S. in Civil Engineering from the University of South Florida (USF), University of Florida, and USF respectively. Ryan is also a registered Professional Engineer in the State of Florida and the State of Oregon and has worked for several years as a private consultant on public infrastructure projects.

Ryan Priest

rpriest@hazenandsawyer.com | Hazen and Sawyer | Denver, Colorado

Ryan Priest has been with Hazen and Sawyer for 9 years primarily focusing on wastewater secondary processes and design, including clarifier testing and modeling. Now a Denverite, he began his career with Hazen in Dallas following completion of his Masters in Environmental Engineering at Cal. His passion for high performing wastewater treatment is paralleled by his passion for following Dallas sports (unfortunately now excluding the Mavericks, due to betrayal).

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Ryan Sanford

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Ryan Sanford is a professional engineer licensed in the State of Colorado. With an education in Chemical Engineering and initial experience in process engineering for oil refineries, Ryan has demonstrated over 10 years of expertise and leadership in the wastewater treatment process engineering space. At DHI, Ryan leads a small team of wastewater specialists and manages, executes, and delivers projects in collaboration with municipal utilities to make the most out of existing assets through process optimization and value engineering studies, custom controller development and deployment, and digital twin configuration.

Senior Wastewater Engineer, Project Manager

University of Colorado, B.E. Chemical Engineering and Chemistry

12 years of process engineering work experience; 8 years with DHI

Professional Chemical Engineer licensed in Colorado

Based out of home office in Leadville, CO

Sam Gould

Samuel.Gould@portlandoregon.gov | City of Portland Bureau of Environmental Services | Portland, Oregon

Sam Gould is a Civil Engineer in the City of Portland's Bureau of Environmental Services Risk Assessment Division. In his 8 years at the City, he has been involved in developing software to streamline the division's processes for mortality and capacity risk assessment and planning level cost estimating of horizontal assets, to help identify priority planning areas in the combined, sanitary, and stormwater collection system. Prior to joining the City, he spent 10 years in the private sector working on projects involving hydraulic, hydrologic, and water quality modeling of stormwater and surface water systems in Washington and Oregon.

Before transitioning to the water resources field, he was a software engineer working on a team building web applications for running hydroelastic, sea-keeping, and CFD simulations of ships and yachts on the UK e-Science Grid.

He has a Bachelor's in Mechanical Engineering from Rose Hulman Institute of Technology, a Master's in Marine Engineering from the University of Southampton, and a Master's in Civil and Environmental Engineering from Portland State University.

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Sam Reifsnyder

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Sam Reifsnyder is a Wastewater Technologist and the R&D Lead at Carollo, specializing in the research and development of wastewater technologies. Sam has nine years of experience working on projects addressing aeration performance, energy optimization, and greenhouse gas emissions mitigation. Sam currently leads Carollo's off-gas testing consulting services, supports local projects for transitioning to biological nutrient removal (BNR), and coordinates national programs that integrate innovative renewable energy systems into the wastewater sector.

Samantha Harper

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Samantha is the wastewater project manager with the Jefferson County Department of Public Works.

Samir Mathur

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Samir is the Global Water Reclamation Practice Leader for CDM Smith with expertise in wastewater treatment, BNR, biosolids management, and PFAS. He is a Senior Vice President in CDM Smith's Dallas Office. He has a Bachelors degree in Mechanical Engineering from India and a Masters Degree in Civil/Environmental Engineering from Carnegie Mellon University in Pittsburgh, PA. He has worked at CDM Smith for over 31 years, He is involved in several of the firm's initiatives related to growing the industry's understanding of PFAS compounds and their impacts on WWRFs.

Sarah Galst, PE, PMP

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Sarah Galst is a Vice President at Hazen and Sawyer, where she has been working for the past 20 plus years. She is a Project Management Professional with a Professional Engineering license in New York. Her career has focused on process improvements at wastewater treatment plants required to improve effluent quality and increase capacity. Major projects include the New York City BNR program, which reduced nitrogen discharges by tens of thousands of pounds each day to the East River and New York City's Jamaica Bay, and sidestream deammonification analysis and design at several facilities in the northeast.

Sarah Lingley

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Sarah Lingley is a professional engineer with 15 years of experience in the water industry, including project management for large, complex linear infrastructure projects. For the past three years, she has been the project manager for the design team Carolina Sewer Truck project, which is being delivered using the CMGC method.

Sarah Merrill

sarah.merrill@wsp.com | WSP | Portland, Oregon

Sarah Merrill has 7 years of experience in design of water and wastewater utility projects, including pump stations and tanks. She has designed nearly 30 miles of wet utilities in addition to performing modeling and master planning. Sarah is at the forefront of the earthquake resistant market, having designed several hazard resilient watermains including the Pacific Northwest's first earthquake resilient watermain with resilient connecting laterals.

Scott Bash

scott.bash@stantec.com | Stantec | Bellevue, Washington

Scott Bash is the Director of Systems and Operational Technologies at Stantec, based in Bellevue, Washington. With over 35 years of experience in the public infrastructure sector, Scott has led asset management and information technology and initiatives across water, transit, transportation, and solid waste systems. He has delivered strategic and technology solutions for public agencies and local governments throughout North America, Europe, Australia, and Southeast Asia.

Scott’s current focus is on helping utilities harness data for decision-making—designing integrated business intelligence solutions that align with ISO 55000 asset management standards. He is passionate about advancing the effectiveness, sustainability, and resilience of public infrastructure through technology and innovation.

Seth Sokol

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Seth Sokol is a water resources engineer and project manager at Parametrix's Portland office. His primary areas of focus are stormwater design and H&H modeling, but he also has a decade of experience in wastewater collection, conveyance, pumping and pretreatment.

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Shane Colglazier

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Shane is an operator for the West Sound Utility District at the South Kitsap Water Reclamation Facility.

Shannon Cavanaugh

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Shannon is a process engineer at Brown and Caldwell in Seattle and works on wastewater and biosolids planning projects with a focus on nutrient removal and greenhouse gas accounting and monitoring. She serves as vice chair of the WEF Greenhouse Gas Focus Group and her graduate research with King County focused on nitrous oxide emissions from wastewater treatment. She received her MS in Civil and Environmental Engineering from the University of Washington and BS in Environmental Science from UCLA.

Shawn Spargo

shawnspargo@kennedyjenks.com | Kennedy Jenks | Portland, Oregon

Shawn Spargo is an engineer with more than 23 years of experience in water and wastewater treatment, construction management, and facility operations. His focus has been on projects involving wastewater treatment facility process selection, design and construction.

Shruti Jagini

shruti.jagini@jacobs.com | King County | Seattle, WA

Shruti Jagini is a wastewater process engineer with Jacobs based out of Bellevue, Washington. Shruti focuses on planning and design of wastewater and combined sewer overflow projects and has 4 years of work experience in the industry. She holds a Master of Science in Environmental and Water Resources Engineering from State University of New York (SUNY), Buffalo.

Soraya Azahari

sazahari@parametrix.com | Urban Flood Safety and Water Quality District | Portland, Oregon

Soraya is a senior water/wastewater engineer at Parametrix with 11 years of experience in process mechanical and civil design, construction, and commissioning projects including gravity and pressure pipes, industrial skid systems, pump

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station upgrades, and treatment facilities. She has been involved in varied construction delivery methods including traditional design bid build, design build, and CMAR/CMGC.

Soraya Azahari, PE

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Soraya Azahari is a Senior Water/Wastewater Engineer at Parametrix with 11 years of experience in process mechanical and civil design, construction, and commissioning projects that range from gravity and pressure pipes, industrial skid systems, smaller pump station upgrades to treatment facilities with a capacity of 800 MGD. She has been involved in varied construction delivery methods including traditional design bid build, design build and CMAR/CMGC.

Srivalli Veerapaneni

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Ms. Veerapaneni is a Civil Engineer in the operations group at Black & Veatch with a variety of experience in construction services, condition assessments, preparing conceptual and detailed designs and supporting construction in water/wastewater treatment facilities.

Stefan Chabane

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Stefan Chabane is a Wastewater Operations Analyst at the City of Portland Columbia Boulevard Wastewater Treatment Plant (CBWTP).??He is currently a grade 3 wastewater operator in Oregon, with previous certifications in California as a grade 2 in wastewater, distribution and water treatment.

Stephanie Schramm

stephanie.schramm@hdrinc.com | HDR | Chicago, IL

Stephanie is a wastewater engineer at HDR with experience in wastewater design and process modeling. Her work on odor control projects focuses on using sewer process modeling and piloting studies to analyze odor control solutions in collection systems.

Stephanie Seymanski

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sseymanski@m-m.net | Morrison-Maierle, Inc. | Billings, Montana

Stephanie Seymanski is a senior civil engineer with experience in the planning, coordination, design, and construction administration of wastewater and water facilities. Stephanie's experience includes project management; preparation of reports, design drawings, and specifications; preparation of wastewater and water preliminary engineer reports (PERs); coordination with governmental agencies for funding and permitting; and construction administration.

Stephanie is the Project Manager for the Lockwood Water and Sewer District Phase 3 Sewer Subdistrict project and has worked with the Lockwood Water and Sewer District on a variety of projects in various capacities.

Stephen Groner

sgroner@sgamarketing.com | SGA Marketing | Long Beach, California

Stephen Groner is the founder of SGA Marketing. SGA specializes in developing environmental outreach and community engagement programs for cities and counties. Currently in its 26th year, with staff across the West Coast. SGA has received many honors for its work, including the top award from the Public Relations Society of America for the best public service campaign in the country, for work done on behalf of the US Environmental Protection Agency focused on environmental health and supporting disadvantaged communities.

Prior to starting SGA, Groner worked for almost 10 years at the LA County Public Works as a registered Civil Engineer. Initially working on technical water and environmental issues and then moving into managing policy and community engagement. In more recent years, he has worked on crisis communication issues both nationally and internationally, conducting training with Federal, State and local agencies (in North America and Europe).

Steve Seibert

steve.seibert@ae2s.com | AE2S | Maple Grove, Minnesota

Steve Seibert is the Lead BIM/Revit Specialist at AE2S. During his 20 years with AE2S, Steve has been the lead process designer for many water and wastewater projects throughout the Upper Midwest. In his current role as Lead BIM/Revit Specialist, Steve and his talented team of Revit professionals develop highly efficient, and productive workflows for their Clients.

Steve Tedesco

steve.tedesco@Tetratech.com | Tetra Tech | Irvine, NotFound

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Steve Tedesco is a Senior Vice President with Tetra Tech. He is a licensed Professional Engineer in California and Arizona. He has extensive design experience with groundwater treatment systems. Steve has spent the last 5 years heavily involved in PFAS design for drinking water systems across the United States. His experience includes planning, design, and construction of both IX and GAC PFAS treatment systems.

Stillman Norton

stillman@Kellerassociates.com | Keller Associates, Inc. | Clarkston, Washington

Stillman Norton, P.E., Office and Senior Project Manager for Keller Associates, Inc.

Stillman has provided civil engineering services to clients in the Pacific Northwest for 20 years and is a licensed professional engineer in Idaho, Oregon, and Washington. He graduated from Boise State University with a bachelor's degree in civil engineering with an emphasis on water resources design. Stillman manages Keller's Clarkston, Washington office located on the border of Idaho and Washington and played a key role in the Lewiston WWTP Improvements. He has been providing planning and design services at Lewiston's WWTP over the last 12 years.

Summer Sherman-Bertinetti

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Summer is an Operations Analyst in the Research and Innovation Department at Clean Water Services. She co-leads the emerging contaminants research projects and leads the method development for trace organics in-house at Clean Water Services, completing the validation of EPA 1633 method for PFAS analysis in 2024. Her work at Clean Water Services focuses on research of emerging contaminants throughout WRRFs and the surrounding waters, soils, and most recently, vegetation. Summer received her BS in Chemistry and BS in Mathematics Applied Science from the University of California, San Diego (UCSD) in 2017 and PhD in Chemistry from the University of Wisconsin, Madison (UW-Madison) in 2022. Following her PhD, she continued as a Postdoctoral Research Associate at UW Madison, in which she spent her time researching PFAS in surface water, natural freshwater foam, and in ice around Wisconsin. Shortly following her move to Oregon in 2023, she joined Clean Water Services.

Susan Schlangen

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Susan brings more than 13 years of engineering and planning experience with municipal water and wastewater systems. As a reuse advocate and active member of WateReuse, Susan has a deep understanding and commitment to supporting

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forward-looking recycled water programs in the Pacific Northwest. Her recent experience includes leading reuse planning projects for Clean Water Services, Portland Bureau of Environmental Services, and Clackamas Water Environment Services. Susan also brings significant regulatory compliance and permitting experience, having performed analysis and implementation of regulatory programs in over 25 states, including Oregon.

Tahne Corcutt

Tahne.Corcutt@jacobs.com | Jacobs Engineering | Seattle, WA

Tahne Corcutt is a nationally recognized expert in the State Revolving Fund (SRF) and Water Infrastructure Finance and Innovation Act (WIFIA) programs, with over 17 years of experience advancing strategic water infrastructure financing across the United States. She began her SRF career in 2008 as an Environmental Program Specialist at the Arizona Water Infrastructure Finance Authority and has since become a trusted advisor to federal, state, and local agencies.

Before joining Jacobs in 2023, Tahne served as a prime contractor to the U.S. Environmental Protection Agency, supporting a diverse portfolio of water infrastructure funding programs in all 50 states. Her work has helped secure over $1 billion in funding for critical drinking water and wastewater projects nationwide.

Tahne is known for developing innovative financing mechanisms that address water quality and public health challenges through watershed-based strategies. In 2024, she led the conceptualization of a comprehensive, multi-year funding strategy for Seattle Public Utilities' Duwamish River Valley Resilience Program. This initiative brought together federal, state, and local funding sources to implement $16 million in nature-based and community-integrated water resiliency solutions over a 10-year period.

She has also led more than a dozen state-specific pilot projects exploring advanced financing tools such as conduit lending, sponsorships, programmatic financing, linked deposits, and credit guarantees. Her insights are featured in several EPA publications, including Financing Options for Non-Traditional Eligibilities in the CWSRF, Supporting Healthy Watersheds in the West, and the CWSRF Best Practices Guide for Financing Nonpoint Source Solutions.

Ted Merrell

ted@merrellbros.com | Kimley-Horn | Everett, WA

Ted Merrell co-founded Merrell Bros., Inc. with his brother Terry in 1982, growing it into one of the largest and most respected biosolids management companies today. Known for his hands-on approach and steady leadership, Ted remains at the forefront of advancing the industry—developing practical solutions, building long-term partnerships, and pioneering innovative systems that address complex biosolids challenges while opening new possibilities for communities and partners alike.

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Teigan Gulliver

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Teigan has 16 years working on water and sanitation with a BS and MS in civil and environmental engineering. Teigan received the MWH/Association of Environmental Engineering & Science Professors National Best Master's Thesis Award, studying the fate and transport of microplastics in wastewater treatment processes. As the Chair of the cross-sector PFAS Practice Group for HDR, a vice-chair of WEF's PFAS Task Force, and active member in founding WEF's microstituent community, she facilitates a space for professionals in remediation, landfill, surface water, groundwater, drinking water, and wastewater to come together to discuss solving larger emerging contaminent problems together.

Thomas Suesser

tsuesser@brwncald.com | Brown and Caldwell | Portland, Oregon

Thomas is a water resources engineer at Brown and Caldwell based in Portland, Oregon, with 6 years of experience in stormwater planning and modeling. His work focuses on modeling complex stormwater systems, designs standards development, climate resilience, and making sound planning decisions under uncertainty. Thomas is a licensed Professional Engineer in Oregon and has a bachelor's degree in civil engineering and a master's degree in engineering management from Cornell University.

Tim Wigington

Tim@thefreshwatertrust.org | The Freshwater Trust | Portland, Oregon

Tim Wigington, Vice President of Finance & Policy at The Freshwater Trust, has more than 12 years of experience working on complex environmental business, law, and policy matters. As an expert in water-related finances and policy, Tim works closely with conservation and analytical experts to design and structure large-scale water quality improvement solutions that balance financial, policy, and technical variables. He has extensive experience building new transaction models and supporting policy approaches aimed at enabling watershed-scale investment.

Ting Lu

Ting.Lu@portlandoregon.gov | City of Portland's Bureau of Environmental Services | Portland, OR

Dr. Ting Lu is an innovative utility leader with over 15 years of experience in public works, spanning public utilities, consulting, and strategic leadership roles. She currently serves as the Interim Director of Portland's Bureau of Environmental Services, where she leads a team of 700 employees, oversees a $700 million annual operating budget,

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and manages a five-year, $1 billion capital program. Her work supports essential stormwater and wastewater services, environmental remediation, and the preservation and restoration of Portland's watershed.

Previously, Ting has served in various leadership roles at Clean Water Services, Metropolitan Sewer District of Greater Cincinnati and Black & Veatch. In these roles, she has led large-scale infrastructure upgrades and climate initiatives, championed innovation, and built high-performing teams. Beyond her professional responsibilities, Ting is actively engaged in community service and industry leadership. She serves on the Board of Tualatin Riverkeepers and co-chairs NACWA's Climate and Resilience Committee. She received her Ph.D. at the University of Cincinnati.

Todd Williams

todd.williams3@jacobs.com | Jacobs | Charlotte, North Carolina

Mr. Williams has a 40+year career in environmental engineering. Todd has supported dozens of biosolids and residuals management master plans in his career which include adaptive planning to manage emerging contaminants such as PFAS. Todd is an engineering graduate of Virginia Tech and previously served as the Chair of the Water Environment Federation's Residuals and Biosolids Committee. Todd works out of Jacobs Charlotte, North Carolina office where he serves as Jacob's Global Principal for Residuals Resource Recovery and Biosolids Management.

Tony Benavidez

anthony.benavidez@jacobs.com | Jacobs | Spokane, WA

Tony Benavidez is the Project Manager for Jacobs at the Spokane County Regional Water Reclamation Facility (SCRWRF) where he oversees the facility operations and maintenance. His devotion to maintaining the water resources of our communities has earned him the Hatfield Award for excellence in wastewater treatment operations. His 20+ years of wastewater treatment experience includes O&M experience at 8 different treatment facilities in 3 states. He currently holds a Washington State Group IV Wastewater Treatment Operator License, an Oregon Level 4 license, and a Class 1 Georgia license. Tony has worked at SCRWRF for 14 years as an operator, supervisor, IPP specialist and project manager. Tony was born in Spokane and continues to live, work, and play there. When he is not working, he enjoys downhill skiing, ice hockey, riding dirt bikes, and boating on the many lakes in the area with his wife and two daughters.

Trent Stober

john.stober@hdrinc.com | | ,

Trent Stober is HDR's National Director of Water and Wastewater Utility Management Services with 30 years of experience in water, wastewater, and stormwater planning and design. His national team provides utility planning, risk

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and resiliency assessments, asset management, financial, operations, and regulatory support for municipal water and wastewater utilities. Trent is a strong technical resource for utility planning and decision-making having guided multi-billion-dollar capital investment programs. Trent has led multiple Integrated Plans (IP) for Wastewater and Stormwater Management using EPA's IP Framework to balance and prioritize infrastructure investments, providing utilities with a strong framework for similar planning efforts. He is also actively involved, through various national and local trade organizations, as a stakeholder shaping water quality policies and regulations, at both the State and Federal levels.

Trevor Stull

tstull@plummer.com | Plummer Associates | Bothell, WA

Trevor Stull graduated with a BS in Civil Engineering from the University of Texas at Arlington in 2018 and a MS in Water Resource Engineering in 2023. His MS thesis focused on estimating suspended sediment concentrations using satellite imagery within the Brazos River and its estuary. Trevor has over 7 years of experience in the engineering field in potable and wastewater system modeling and planning.

Trung le

Tle@brwncald.com | Brown and Caldwell | Richmond, Virginia

Trung le has more than 11 years of experience in planning, design, and research on solids and energy projects. His primary roles have involved technical design and biosolids process applications with expertise in digestion, energy, GHG accounting and decarbonization strategies. He leads BC's Fugitive Methane Taskforce.

Tsigereda Woldegiorgis

twoldegiorgis@co.marion.or.us | Keller Associates, Inc. | Beaverton, Oregon

Tsigereda has over a decade of experience in the construction industry managing various infrastructure projects. She holders a master’s degree in civil engineering and worked in Africa and Asia before joining Marion County in Oregon as Project Engineer for the North Santiam Canyon Sewer Project.

Tyle Zuchowski

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Tyle Zuchowski – Capital Planning Manager | LOTT Clean Water Alliance

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Mr. Zuchowski is responsible for managing LOTT's Capital Improvements Plan, which averages $35 million a year in infrastructure investments to include repair and replacement, system upgrades, and capacity development projects. His area of expertise is on asset management, risk assessment, investment prioritization, and facilitating stakeholder collaboration through the project life cycle. He led LOTT's recent master planning effort, resulting in LOTT's new capacity management strategy and long-range investment plan, which focused on maximizing value and minimizing risk.

Tyler Whitehouse

twhitehouse@carollo.com | Carollo Engineers | Seattle, Washington

Tyler Whitehouse has 18 years of experience as a civil engineer performing civil and mechanical planning and design, constructability and design review, and construction services for water and wastewater projects across the U.S., with a primary emphasis on pump station design. Tyler has experience in modeling complex pumping hydraulics, evaluating different pumping alternatives and operating conditions, and designing cost effective pumping solutions to meet end user needs. Tyler enjoys travelling with family, playing golf, and cheering on the Cougs.

Vanessa Johnson

vjohnson@crwwd.com | Clark Regional Wastewater District | Vancouver, Washington

Vanessa Johnson

Capital Program Manager, Clark Regional Wastewater District

Vanessa Johnson is a Senior Project Manager at Clark Regional Wastewater District, where she has spent the past nine years leading complex infrastructure and wastewater projects. With nearly two decades of experience in civil and environmental engineering, Vanessa brings a practical, solutions-driven approach to water management. She holds a Bachelor's degree in Civil Engineering from the University of Portland and a Master of Engineering from Portland State University.

Vasily Chernishov

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Senior Engineer - Clean Water Services

Victor Xu

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Victor is an environmental attorney and skilled litigator based in Portland, OR who represents public water systems in the Pacific Northwest and across the country on addressing emerging contaminants like PFAS in drinking water and wastewater, and recovering related costs from polluters.

Victoria Lopez Boschmans

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Victoria a process mechanical engineer with experience in the evaluation, design, and construction of municipal wastewater facilities. Her expertise lies in detailed mechanical designs, process sampling and optimization, real-time process controls, and construction and project management. She's had the honor of working as a trusted consultant on both U.S. coasts.

Wade Phillips

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Wade Phillips is a Civil/Environmental Engineer working in wastewater with King County Wastewater Treatment Division (WTD) since 2016, and has worked full-time at the West Point Treatment Plant (WPTP) in Seattle, WA since 2022. Wade previously worked with large wastewater treatment operations at Los Angeles County Sanitation District (LACSD) in Carson, CA, and at multiple International Paper mills in Alabama and in Texas prior to joining King County WTD.

Wayne Flournoy

wayne.flournoy@entexinc.com | Entex Technologies | Chapel Hill, NC

President Wayne Flournoy began his water and wastewater career over 25 years ago. Wayne has extensive technical and management experience with advanced wastewater treatment technologies, including both fixed and moving media systems, as well as IFAS and submerged fixed film systems. Prior to Entex, Wayne provided leadership as President of Kaldnes North America, promoting moving media systems, with full responsibility for all activities for this North American subsidiary of a Scandinavian company. Before that, Wayne was Director of Water and Wastewater for Brentwood Industries where he gained extensive experience with attached growth biological systems. He is well versed in biological nutrient removal and activated sludge systems, having been involved with some of the industry's groundbreaking work on biological phosphorus removal.

Wayne has also contributed to industry leadership by serving two terms on the Water Environment Federation's Manufacturing and Representative Committee (MARC). In addition to the wastewater industry, Wayne's experience in

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the environmental industry includes tenure with landfill gas to energy project development and cogeneration among others.

Wayne has a BS in Mechanical Engineering and an MBA, both from the University of Virginia.

Wayne White

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Wayne is a senior water resources engineer with more than 32 years of experience specializing in wastewater treatment, water and wastewater pipeline design, pump stations, and construction observation. Wayne's experience includes the planning, design, permitting, and construction of reclaimed water, water, and wastewater collection, transmission, treatment, and disposal systems. Wayne has also prepared water and reclaimed water master plans that have included hydraulic modeling and forecasting of future flows utilized to secure state and federal funding for projects.

Wendell Khunjar

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Wendell Khunjar, Ph.D. P.E, is a Vice President, Process Specialist and Director of Wastewater Innovation at Hazen and Sawyer. Dr. Khunjar obtained his B.S. in civil engineering from Howard University, M.S. and PhD. in Civil and Environmental Engineering from Virginia Tech. He completed post-doctoral research at both the University of Michigan and Columbia University. He is a licensed professional engineer in the Commonwealth of Virginia. He brings 20+ years of experience related to wastewater, biosolids and advanced treatment processes.

Wendy Waudby

wendy.waudby@cascadeenergy.com | Cascade Energy | Portland, Oregon

Wendy Waudby is a Senior Water/Wastewater Engineer at Cascade Energy. She helps operators and engineers be more energy efficient without sacrificing water quality. She has experience in energy efficiency, wastewater treatment plant design, reuse, and wastewater service charges. She has worked as a consultant and a regulator and worked for a large wastewater agency. She graduated from Cal Poly, San Luis Obispo with a B.S. and M.S. in Civil/Environmental Engineering. She is a registered professional engineer in Idaho and California.

PNCWA2025 Speaker Bios

Will Einstein

einsteinwt@bv.com | Black & Veatch | Seattle, Washington

Placeholder

William Leaf

William.Leaf@jacobs.com | Jacobs | Boise, ID

William Leaf is a registered professional engineer, specializing in wastewater treatment, startup and commissioning, and process optimization. Mr. Leaf has 30 years of experience in the industry, focusing on municipal wastewater treatment. Mr. Leaf is a vice president and senior water resource recovery technologist with Jacobs Engineering, based in Boise, Idaho.

Yang Zhang

Yang.Zhang@portlandoregon.gov | City of Portland Bureau of Environmental Services | Portland, OR

Yang Zhang is a senior engineer in the City of Portland Bureau of Environmental Services (BES). He received his Ph.D in Civil and Environmental Engineering from Arizona State University. He has over 20 years of experience in design and construction of water and wastewater treatment facilities, pump stations, water reservoirs, and sewer collection system. Before he joined BES, he has worked on municipal infrastructure design and construction in the consulting firms. Now, he serves as a project manager and a design manager for wastewater treatment projects in the BES.

Zach Frieling

zach.frieling@ae2s.com | AE2S | Bozeman, Montana

Zach Frieling began his career in wastewater as an operator at the Bozeman Water Reclamation Facility in Montana, where he contributed to the plant's longstanding record of excellent effluent quality. A certified wastewater operator and engineer, Zach brings a unique blend of hands-on operational experience and technical expertise to his consulting work. He has been closely involved in process optimization at several treatment plants, with a particular focus on biological nutrient removal (BNR) systems. Zach holds both Bachelor's and Master's degrees in Chemical Engineering from Montana State University. He lives on his family's homestead in Montana with his wife and three children, where they enjoy an outdoor lifestyle—including some of the best trout fishing right in their backyard.

Zia Klocke

PNCWA2025 Speaker Bios

zia.klocke@ovivowater.com | Ovivo | Salt Lake City, Utah

Zia Klocke is a Senior Product Manager in Ovivo's PFAS Solutions group, specializing in integrating treatment technologies for PFAS treatment. She holds a bachelor's degree in chemical engineering from Oregon State University and a Professional Engineering license in several states. Ms. Klocke started her career as a consultant, designing industrial wastewater treatment plants across the United States. She joined Ovivo in 2023 as a research engineer to identify, develop, and optimize PFAS concentration technologies like foam fractionation and ion exchange. During her time at Ovivo, Zia has been both in the lab and field developing, optimizing and piloting new PFAS treatment technologies.

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PNCWA2025
Flowing Together: Stories of Dedication and Innovation

Annual Conference & Exhibition
September 14th - 17th, 2025
Oregon Convention Center
Portland, Oregon

PNCWA2025 Conference Tours

Times listed include travel. All tours are 2 hours of non-travel, educational hours.

Oregon Convention Center Stormwater Management Tour

Date: September 15, 10:30 a.m. -12:30 p.m.

Address: 777 NE Martin Luther King Jr Blvd, Portland, OR 97232

Lead: Nancy Reimer | nancyreimer@oregoncc.org | 503-731-7822

Description:

The Oregon Convention Center has long held a leadership role in green building and other environmentally responsible business practices. In 2004, we were the first convention center to earn the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) for Existing Buildings certification. In 2014, we reached our biggest milestone by earning LEED® Platinum, the highest level of certification, and did it again for our recertification in 2023. We are also proud to be recognized as a Salmon-Safe certified venue and have an award-winning rain garden on the south end of our building which filters and cleans water before it enters our waterways. This behind the scenes tour with OCC's staff will take a look at some of our primary sustainability features including our rain garden, 2 MW rooftop solar array, and innovative back of house recycling and waste diversion program.

Carlie Creek Water Quality Facility Tour

Date: September 15, 2:00-5:00 p.m.

Address: 11436 SE Capps Road, Clackamas, OR 97015

Leads: Gail Shaloum, PLA | gshaloum@clackamas.us | (503) 793-4364

Leah Johanson, PE | LJohanson@co.clackamas.or.us | (503) 502-4514

Description:

Since December 18, 2018 the innovative Carli Creek Water Quality facility has been filtering harmful pollutants from stormwater runoff from surrounding industrial properties before it reaches Carli Creek and the Clackamas River, the drinking water source for nearly 400,000 people in Clackamas County. The facility is made up of a meandering channel with pools along nearly 1,700 linear feet of Carli Creek. There are 61 large wood habitat structures for fish and other aquatic wildlife, a backwater channel, floodplain enhancements, and diverse native species planted. The facility is a constructed wetland and contains stream restoration elements.

Swan Island CSO Pump Station Tour

Date: September 16, 8:00 - 11:30 a.m.

Address: 4299 N Port Center Way, Portland, OR 97217

Leads: Ricky Davis | ricky.davis@portlandoregon.gov | (503) 823-6618

Aaron Lawler | aaron.lawler@portlandoregon.gov | (503) 823-2476

Description:

BES operates the 220-mgd Swan Island CSO Pump Station (SICSO) as part of the combined sewer overflow (CSO) program to manage CSO flows to the Columbia Boulevard Wastewater Treatment Plant (CBWTP). The SICSO serves as the terminus of two large CSO conveyance and storage tunnels deep beneath the City of Portland (in excess of 120 feet underground), designed to collect and store over 100 million gallons of combined sewage. The pump station consists of a 135-foot diameter circular cast-in-place, 150-foot deep below grade concrete structure, located adjacent to the Willamette River.

Stormwater Stewardship & Portland Water System Education Event

Date: September 16, 8:00-11:45 a.m.

Address: 16160 SE Powell Blvd, Portland, OR 97236

Lead: Susan Hawes | Susan.Hawes@portlandoregon.gov | 503-823-6588

Description:

The PNCWA Stormwater Committee is partnering with the City of Portland Bureau of Environmental Services (BES) to host a stormwater stewardship and Portland water system education event. The stewardship will begin with an introduction to Green Streets, stormwater swales, and stormwater retention ponds near Powell Butte Nature Park. The attendees will have the opportunity to learn about the stormwater systems and conduct stewardship activities. Stewardship activities include pruning blackberry bushes and shrubs, removing sediment, light weeding, and trash pick-up. Tools will be provided. Participants are encouraged to bring their own gloves, especially if they want leather gloves for working with blackberry bushes. After one hour of stewardship activities, participants will be led on a 1 mile hike up Powell Butte. Afterwards, Portland BES will present on the City of Portland's water infrastructure and water system. Light refreshments will be provided during the presentation. Transportation to and from the event will be provided.

Secondary Treatment Expansion Project (STEP) Facility Tour

Date: September 16, 1:15-4:45 p.m.

Address: 5001 N Columbia Blvd, Portland, OR 97203

Lead: Muriel Gueissaz-Tuefel | Muriel.Gueissaz-Teufel@portlandoregon.gov | (971) 201-2567

Dave Green | dave.green1@jacobs.com | (503) 860-8201

Brian Gomolski | Brian.Gomolski@Stantec.com | (503) 964-2056

Description:

Since 2022, PNCWA Attendees have heard about CBWTP's Secondary Treatment Expansion Program (STEP), the City's largest investment in it's resource recovery plant since the Clean Water Act when secondary treatment was first added. The project stemmed as the final action required from a 2011 Mutual Agreement and Order coming on the heels of the last "Big Pipe" being installed to control and minimize Combined Sewer Overflows in the Willamette River. The core regulatory requirement of the project aimed to add secondary treatment capacity during wet weather events, which would otherwise be treated via chemically enhanced primary treatment. However, the CBWTP being such a constrained site with many adjoining needs, BES adopted a programmatic approach starting in 2017 to maximize delivery efficiency, minimize risks to plant operation, minimize risks to safety, while maintaining the regulatory schedule. The site tour will showcase the newly built facilities (clarifiers and RAS pump station, aeration basins rehabilitation, utility tunnels and major electrical work, non process facilities) and those remaining in construction, notably the solids handling facilities. A number of lessons learned will be shared from representatives of the partnering teams (City, Engineer, Construction) during the tour.

Ecology, Hydrology, and Engineering: An Innovative and Collaborative Pilot Project for Habitat Restoration Through Water Reuse

Date: September 17, 8:00-12:30

Address: Durham Water Resource Recovery Facility and Thomas Dairy Wetland
16580 SW 85th Ave, Tigard, OR, 97224

Facility guide name(s) / Titles / Affiliations

- Justine Abrook / Senior Operations Analyst / Clean Water Services (Water Resource Recovery)
- Jared Kinnear / Reuse Manager / Clean Water Services (Research & Innovation)
- John Goetz III / Water Resources Analyst / Clean Water Services (Research & Innovation)

Facility guide email address(es)

- AbrookJ@CleanWaterServices.org
- KinnearJ@CleanWaterServices.org
- GoetzJ@CleanWaterServices.org

Description:

Tour will include a comprehensive tour of the Durham WRRF, including the reuse process. After the WRRF tour, participants will be able to get a tour of the reuse pilot project know as Thomas Dairy where CWS is using Class A Recycled Water to enhance ecological function at a degraded urban wetland as a new beneficial use in Oregon. More about Durham (from CWS' website):

Durham Water Resource Recovery Facility

Durham Water Resource Recovery Facility, located in Tigard near Cook Park and Tigard High School, is a nationally acclaimed, state-of-the-art facility, serving Washington County residents in the cities of Beaverton, Durham, King City, Sherwood, Tigard, Tualatin, and small portions of southwest Portland and Lake Oswego.

Today, the facility cleans an average of 26 million gallons of used water each day to among the highest safety and quality standards in the nation. Through advanced technology and processes, the Durham facility treats and removes valuable resources from water collected from homes and businesses. This water flows through a strategic process of liquids and solids recovery. The water is then returned to Washington County's only river — the Tualatin. The returned water is so clean, it improves the river's water quality.

Cleaned water is also used for local irrigation, and natural byproducts of the treatment process are converted to electricity and heat and used as soil amendments. Captured methane gas, a byproduct of anaerobic digestion, supplies electrical power for the facility. In 2009, Durham installed the first commercial nutrient recovery facility in the nation in partnership with Ostara Nutrient Recovery Technologies in Canada. The facility captures 80% of the phosphorus from the wastewater recycle stream and converts it into a premium, slow-release fertilizer used in agriculture and nurseries.

The Durham facility began operations in 1976 to reverse decades of severe water pollution in the Tualatin River and its tributaries, and to meet the demands of a growing population. This facility centralized a scattered system of inefficient wastewater treatment plants, creating one of the most efficient and advanced facilities in the world.

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Operator's Breakfast Presentation

7 AM – 9 AM, Tuesday, September 16

Title: From Prep to Performance: A Holistic Approach to Operator Certification

Instructors: Paul Bishop, Thomas Healy

Training Goals

By the end of this session, participants will be able to:

- Understand the rationale, structure, and development process behind the 2025 exams.
- Navigate and effectively utilize study materials including study guides, flashcards, and practice exams.
- Recognize how these tools fit into a broader, holistic approach to operator education.
- Gain confidence in responding to emergency scenarios through scenario-based learning and exam alignment.

Course Outline

1. Welcome & Overview

- Introduction to the session and its purpose
- Overview of training goals and agenda

2. Exam Development Process

- Goals and philosophy behind the new exams
- Participants involved (e.g., SMEs, committees)
- Steps from conducting the job analysis to pilot testing
- Ensuring validity, reliability, and relevance

3. Supporting Materials: Study Tools Breakdown

- **Study Guide:** Structure, contents, and tips for use
- **Practice Exams:** Format, how to interpret results, self-assessment strategies
- **Flashcards & Quick Reference Sheets:** Reinforcement tools and use cases

4. Holistic Approach to Training

- Integrating cognitive, practical, and situational learning
- How the exams reinforce real-world operator competencies
- Aligning training with emergency preparedness protocol
- *Discussion:* Review of a sample or past emergency scenario and how holistic training could help

5. Q&A, Wrap-Up, and Next Steps

- Recap of key points
- Open forum for questions

Instructor Background And Information Form

Thank you for filling out this form.

Presentation Title: From Prep to Performance: A Holistic Approach to Operator Certification

Presenter: Paul D. Bishop, CAE Title: President and CEO

Employer: Water Professionals International Address: 9400 Plum Drive, Suite 160

City: Urbandale State: IA Zip: 50322 Phone: 515-2323623

Summary of Lesson content: This 90-minute session introduces the new operator exams nd the comprehensive training tools behind them, including study guides, flashcards, and practice tests. Participants will learn about the exam development process and our holistic approach to preparing operators for both certification and real·

Professional Background: (Note a brief - 2 page maximum - resume may be submitted in lieu of the following data. Please be sure the resume includes all requested information. Qualifications should be related to your presentation.) Use the reverse side of this form if more room is needed to fully answer the following questions.

Primary Knowledge/Skills/Abilities related to presentation: President and CEO of Water Professionals International an internationally recognized non-profit specializing in certification and credentialing water/wastewater professionals - 17 yea

Education (High School, Upgrades, Colleges and Degrees): B.S. - Nebraska Wesleyan University; Washington DC Semester at American University focused on political science studies

Professional Registration/Certification: Certified Association Executive (CAE)

Related papers/instruction you have presented:

Title: _____ Date: _____ Event: _____

Title Examination Updates and Strategies Date: 3/10/2025 Event: Municipal Utilities Leadership Conference

Professional Organizations/Activities:
Member of WEF and AWWA; Past President of Iowa Society of Association Execs Date: current

Commissioner; Certification Commission for Association Executives Date: current

Course sponsor: Water Professionals

Signature of Instructor: _____ Date: 5/30/2025

DO NOT WRITE BELOW THIS LINE

Date Evaluated: _____ By: _____ Approved: Yes_____ No _____

Return Completed Form To:

OESAC CEU COMMITTEE
P.O. Box 577
Canby, OR 97013-0577

Email: info@oesac.org
Phone: 503-698-6486

Operations Challenge Competition

The Operations Challenge is the industry's premier professional skills competition. PNCWA's Ops Challenge competition at the Annual Conference is a qualifying event for the Water Environment Federation's Operations Challenge at the National WEFTEC Competition. The event recognizes excellence in wastewater operations. Teams are evaluated in five events that demonstrate the span of skills necessary for contemporary water quality professionals. The event exposes participants to emerging practices and products in a competitive, educational, and social atmosphere.

Ops Challenge competition events will take place simultaneously and run concurrently to technical sessions. If approved for CEUs, competitors will track time only during hands-on applications or educational activities- practice sessions, training meeting, and active competition.

Expected maximum educational hours: **10 Hours**

Sunday, September 14th

10:00 AM – 12:00 PM	Practice Sessions – teams rotate through events for hands-on practice
1:00 PM – 2:00 PM	Pre-competition training meeting, Competition protocols are reviewed.
2:00 PM - 4:00 PM	Competition – teams rotate through events

Monday, September 15th

9:00 AM – 4:00 PM	Competition Ongoing – teams rotate through events

Event Descriptions:

Process Control event

The Process Control event will be held Monday morning and will consist of a written test and a scored computer simulation, using the OpTool created by Hydromantis. Teams will try to earn as many points as possible in the time allowed. Points will be awarded for correct answers in the written test, and for achieving goals in the computer simulation.

The test content and layout will be essentially unchanged from previous years. Test questions containing math or process data will have both English and metric units listed allowing teams to work a problem in whatever units they desire. The event consists of answering a number of multiple choice questions, some short math questions with multiple choice answers, and up to five operational

type scenarios that have four to six questions each that may require considerable calculations. The event is timed, with a total of 25 minutes. The team can split up the test any way it chooses during the test. The team that scores the most points for correct answers will win. The event should be viewed as an opportunity for a team to demonstrate their accumulated knowledge of wastewater treatment and skills in plant process control.

Time is an important factor in taking the test. The total time available for each team for all portions of the test event is 25 minutes. The first portion of the test is a five minute test preview period. The second is 20 minutes for answering the questions.

Laboratory event

Laboratory results are valuable as a record of plant operations. This data lets the operator know how efficiently the plant is running and help predict and prevent troubles that may be developing within the various processes. Laboratory results are required as a record of performance for regulatory agencies and are of value to the operators, staff and design engineers for performance optimization, troubleshooting, determination of loadings, and for determining when plant expansions are necessary. For these reasons, laboratory tests should be conducted as carefully and consistently as possible and according to appropriate analytical methods.

Reactive Phosphorus is a highly monitored nutrient for wastewater plants. Many wastewater plants have or will have total phosphorus limits in their permits. The results from the TNT tests can be used to optimize biological phosphorus removal processes and/or estimate chemicals needed to help remove the phosphorus from the final effluent before it is discharged into the receiving waters. The test can be performed at different areas of the plant to maximize the removal efficiency and optimize chemical costs at the plant. These samples are preserved with sulfuric acid and held at <6 C. The hold time is 28 days.

Total Residual chlorine is measured to optimize effluent chlorination disinfection processes, which is the most common of the disinfection processes found at facilities in the US. For facilities that use chlorination for disinfection, some states require seasonal chlorination while others require year round chlorination. Chlorine is added to render the pathogen ineffective at reproduction, mitigate illness, and reduce E.coli that is being discharged to the receiving waters from in the final effluent. All permits require the residual chlorine to be down to a certain level before it is discharged into the receiving waters from the final effluent. This test has a 15 minute hold time and is typically done in the field.

The 2025 laboratory event will include two different chemical analyses, orthophosphate (PO_4) and total residual chlorine. The challenge will utilize Hach's TNTplus vial chemistries and the powder pillow PermaChem style of testing. Utilizing two-stage and tensette pipets to demonstrate the operator's understanding of determining dilution calculations and performing volumetric dilutions.

The participants will need to determine the PO_4 concentration of an unknown sample to create a 2 mg/L PO_4 standard to analyze. The TNTplus TNT843 reagent set will be used for the PO_4 testing. For the total residual chlorine procedure, the operator will need to prepare a 1 mg/L chlorine standard from a known concentration provided by Hach and perform standard additions.

Collections event

Teams will remove a section of in-service 8" gravity polyvinyl chloride pipe, fabricate a replacement section with a 4 1/2" compression fitting, and install the replacement section with flexible repair couplings. They will simultaneously construct a Victaulic valve tower, using a combination of hand tools and impact guns. Following completion of the physical repair activities, the integrity of the repair will be evaluated.

Maintenance event

The purpose of this event is to test the skills of a maintenance team in response to issues at a sanitary pumping station.

This pumping station is in a district that has many restaurants and businesses. While the city has an ordinance dis-allowing industrial waste discharges, its restaurant grease trap program has been sub-par at best. This district service area has been very problematic over the years with many SSO's that were not rain related but countless ragging/debris issues creating pump clogs and line blockages. The high cost of station cleaning and line maintenance has prompted city management to act. Recently, the city had initiated a new CMOM Capital Improvement Project. A portion of the CIP is to develop a program to reduce or eliminate "rags" that are problematic to the pumping and collection system. As a result of the CMOM study, it was determined by the asset class engineer to install Vaughan Chopper conditioning pumps to help eliminate SSO's and future blockages. However, as with any wastewater application, there are many variables to operating an efficient collection system that must be addressed including but not limited to FOG (Fats, Oils and Grease), wet wipes and other various debris. The new management has just recently created a grease trap program to address these issues, however, these programs take time due to budget schedules, implementation, and training.

A pump station team has received high level alarms via telemetry in the problematic service district. The high-level alarms have been cleared and acknowledged several times. The SCADA trends show that the pumps are cycling as programmed but continue to hit the high-level set-point alarm (level sensor activated). It is also confirmed that the station has yet to receive the high, high level back-up float so visual and audible alarms were not activated. The early morning plan was to not only mitigate the

alarming issue but perform a full service of the station and it control panel. All the results from the service would then be documented in CMMS.

Upon arrival to the pumping station, it was determined that there was an abnormal amount of build-up just below the level sensor in the neutral corner of the wet well. The wet well pumps and conditioning pump appeared to be operating well but adjustment/direction of the conditioning pump was going to be required. Since a full service was going to be performed any way as a preventive measure, the impeller, corroded hardware, and pump nozzle were to be replaced along with the pump re-positioning.

Teams will have a 5 minute setup time for this event. They may move things on the table as desired and set up the tool box as desired. However all the tools in the tool box must start in the tool box and all tools/equipment on the table must start on the table, the only exception are the new impeller bolt and washer and the four new volute bolts. The only items that may be moved or touched during the 5 minute setup are the tool box, tools, and equipment on the starting table. The hoist, trolley, and gantry may be situated during the 5 minute setup however all pins must remain in. Hoist, trolley, and gantry must start and finish in the designated marked areas. All tools and equipment must start and end on the equipment/tool table. Installation of the rubber gasket for the new guide claw during the 5 minute setup time is not permitted. The pump service table and the equipment/tool table may not be moved.

Safety event

While a facility crew is working, one of the workers collapses inside a manhole. The coworker is found at the bottom of a (confined space) lift station unconscious. It is suspected that he/she has been overcome with an unknown gas or lack of oxygen due to a worn 4” check valve gasket in the station. The in-plant rescue/repair team is immediately called to the scene. The Tripod (3M DBI/ Sala 3-way combo unit) unit will be assembled and placed over the manhole. The chains must be adjusted and pulled tight. The tripod must be fully assembled, over the manhole, before the entrant can be connected to the SRL, and before the cover is pulled. The entrant that is connected to the SRL must be connected via a lifeline. Lifeline must be tied off to the railing before the entrant breaks the plane. The entrant that is connected to the retrieval rope must disconnect immediately from the SRL once they have made entry (both feet on the floor). The entrant on the SRL/winch combo must remain connected to their SRL while in the manhole.

Two members of the team will enter the confined space, rescue the downed worker, and repair the check valve. Two gate valves will be closed, locked out, and tagged out, by the entrants, the check valve flapper and gasket will be replaced, and the line put back into service. A bag stored in the equipment area will be used to lower tools and equipment. After rescue the victim will be revived and moved to a decontamination shower.